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December 1, 2012

Greetings. I write as Chair of the Self Study Committee which put together the report that hopefully will give you information, metric data and insight into the Department of Chemistry here at TAMU. The principal sections listed in the Table of Contents include details regarding our department as a whole, the graduate and undergraduate academic programs, a profile of the faculty, and descriptions of our staff and infrastructure. We also provide details about our departmental budget, our resources and our policies for their allocation. The last section of this report provides a list of issues that we see as critical for the future of our department.

I hope that, in advance of your travel, you will be able to explore and search this document for any information that you may find useful. Should crucial information be missing, please let us know and we will do our best to provide it. Of course we will be available to assist you in any way we can during your days here in College Station. We greatly appreciate the time and intellectual focus you will give to us during this review.

Sincerely yours

Francois P. Gabbai
Professor of Chemistry and
Chair, Self-Study Committee

Self-Study Committee:
  James Batteas
  Tadhg Begley
  Marcetta Darensbourg
  Holly Gaede
  Timothy Hughbanks
  Wenshe Liu
  Simon North
  Daniel Romo
  Karen L. Wooley
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I. The Department of Chemistry, Texas A&M University

A. Description and Brief History (written by Michael P. Rosynek)

History of the Chemistry Department, 1966-2005

1966-1980

Prior to 1966, the principal role of the Department of Chemistry at Texas A&M University was to teach service courses to students in the Colleges of Agriculture and Engineering. Only a few faculty members at that time conducted research programs, and these were fairly modest, with only minimal external funding and relatively few graduate students. In 1966, the Department of Chemistry (along with four other departments at Texas A&M) was formally earmarked by the University for development into a major research department. To this end, Arthur E. Martell was appointed Department Head in that year by the Dean of the College of Science, Clarence Zener, and given a mandate by the University administration to develop the research and graduate programs of the department into nationally recognized programs of excellence.

Aided by funds provided by the University and by a National Science Foundation Development Grant in 1969, Martell was successful in hiring more than 50 new faculty members, including nine senior faculty, during the late 1960's and throughout the 1970's, in an effort to begin developing excellence in the department’s research programs. In addition, twelve research-active faculty members left the department during this period. Because of the substantial increase in research faculty, the number of departmental graduate students, in turn, more than tripled (to a total of more than 200) during this period, and the number of postdoctoral researchers increased ten-fold to approximately 80. This growth in the department’s research and graduate programs was also made possible by the completion in 1972 of a major additional wing to the Chemistry Building, which provided more than 35,000 net sq.ft. of laboratories and offices devoted to research activities.

When Martell’s term as Department Head ended in Fall 1980, the total number of tenure-track faculty had increased to 54, of whom 45 were research-active. More than $5 million in major research instrumentation had been acquired, and total funding of the department’s research programs from all sources was approximately $5.3 million per year.

1980-1986

After having had only one Department Head for almost 14 years, the department had three Department Heads during the next six years. When Martell stepped down as Head at the end of the 1979-80 academic year, Choo-Seng Giam was appointed Head by Dean Thomas T. Sugihara, beginning with the Fall 1980 semester. However, Giam left the University less than one year later to assume the position of Dean of the College of Science at the University of
Texas-El Paso. (He returned to the department in Fall 1981, after serving only one year at UT-El Paso.) Three new faculty, including one senior faculty member, were hired during Giam’s one-year term in office, but three other research-active faculty members left the department during that year, including the death of one senior faculty member. Giam was instrumental in establishing the department’s Industry-University Cooperative Chemistry Program (IUCCP), an industrial affiliates initiative that existed until 2009.

After Giam’s departure, Joseph B. Natowitz was appointed Head by Dean John B. Beckham, effective with the Fall 1981 semester. Natowitz served as Head for four years, during which period 11 new faculty were hired, including three senior appointments. However, 11 other faculty left the department during this period, including two senior faculty. By the end of Natowitz’ term as Head, the total number of graduate students had increased to more than 250, and funding for the department’s research programs was more than $8.3 million per year. Planning and construction of a major addition to the Chemistry Building, providing more than 65,000 net sq.ft. of both teaching and research laboratories and support facilities, was initiated during Natowitz’ term as Department Head. The new wing was completed and first occupied in Spring of 1987.

When Natowitz announced his intention to step down as Head after a single four-year term, the department undertook an external nationwide search for a replacement (the first time that such a search had been made since Martell was appointed almost 20 years earlier). As a result of this search, Donald T. Sawyer was appointed Head in Fall 1985 and was given a substantial commitment of resources by the Dean of the College of Science, John P. Fackler, and by the University to further develop the department’s research stature by hiring several more junior and senior faculty members during the next four years. However, because of an unexpected and substantial budget shortfall by the State of Texas during the 1985-86 fiscal year, the University’s budget was decreased substantially by the State, and it was not possible for the University to honor the financial commitment that had been made to Sawyer for faculty hiring and development. As a result, Sawyer resigned as Head prior to the beginning of the 1986-87 academic year, and no new faculty hires were made during his term. The department’s Center for Chemical Characterization and Analysis (CCCA), which combined NMR, MS, XRD, and elemental analysis services under a single administrative oversight, was formally established by Sawyer during his term as Head. Emile A. Schweikert was appointed Director of the new Center.

1986-1994

Following Sawyer’s resignation as Head, Dean John P. Fackler elected to forego an external search for a replacement and appointed Michael B. Hall as Head in Fall 1986. Hall Served two four-year terms, during which period 13 new faculty were hired, including three senior faculty. This period also saw the departure of five research-active faculty, four of whom were Full Professors. Development of the department’s graduate program continued while Hall was Head, with the total number of graduate students exceeding 300 for two years during this period. However, a substantial number of these students were admitted under the auspices of various special programs, and many of them did not successfully complete a graduate degree. As a result, the graduate enrollment subsequently decreased to approximately 250-260 by the end of Hall’s term as Head. Largely because of the above-mentioned departure of several senior faculty members during this period, total funding for the department’s research programs
remained approximately constant at $10.0 to $10.5 million during this eight-year period, despite
the net addition of several junior faculty.

In addition, the department’s non-salary operating budget was decreased substantially in
the early 1990's because the new Dean of the College of Science, Richard E. Ewing, who was
appointed in 1991, wished to re-distribute financial resources among the several departments in
the College. The concomitant freeze on hiring of support staff and loss of staff salary savings
further exacerbated the department’s financial situation.

The three oldest wings of the Chemistry Building underwent a substantial renovation as
part of two major projects during the late 1980's and early 1990's. These renovations provided
approximately 70,000 net sq.ft. of substantially upgraded and modernized laboratory, office, and
support spaces in these areas of the building.

1994-2005

During the last year (1993-94) of Hall’s second four-year term, Dean Ewing organized a
comprehensive review of the department’s programs by an external committee. One of the
conclusions of this committee was that the department had developed sufficient maturity and
experienced leadership that an external search for a new Department Head was probably
unnecessary. Accordingly, upon the subsequent unanimous recommendation of a faculty search
committee appointed by the Dean, Emile A. Schweikert was appointed as the new Department
Head, effective in Fall 1994.

Schweikert’s term as Department Head saw a resurgence in several areas of departmental
operations. A total of 15 new faculty have been hired between 1995 and 2005. However, this
same period saw the departure, retirement, or death of 10 research-active faculty, including seven
senior faculty. The department’s Division of Biological Chemistry was established from among
several existing faculty in 2002. Research funding increased substantially during this period, to a
total of more than $14.4 million per year in 2003, of which $9.7 million was from federal
sources. During his re-appointment negotiations in 1998 and 2002, Schweikert was successful in
restoring a substantial portion of the non-salary operating funds that had been removed from the
departmental budget in previous years. He was also able to establish budgeted funding through
the Vice-President for Research for certain departmental analytical instrumentation services.
Increased emphasis has also been placed on extending and strengthening departmental
interactions with industry. Unfortunately, the department again lost a substantial portion of its
non-salary operating budget (as did many other departments on campus) in 2003, as a means of
partially funding the President’s Faculty Re-Investment Program, a four-year University-wide
faculty hiring initiative. This has again required careful re-allocation and prioritization of
departmental financial resources.

2005-2012

In Spring of 2005, in the penultimate year of Schweikert’s third and final term as
Department Head, Dean Newton arranged another review of departmental programs and
operations by an external committee, with particular emphasis on assessment of the graduate
program, in preparation for appointing Schweikert’s successor. The visiting committee
concluded that the Chemistry Department continued to be the flagship science department at
TAMU and had made substantial progress in faculty development and in improvement of
research and instructional programs during Schweikert’s 12-year tenure as Department Head, but
that several issues still required further, and in some cases urgent, attention. Particularly cited by the committee were the need to: (a) ensure that momentum gained from the Faculty Reinvestment Program not be lost by immediately initiating a rigorous search for a new Department Head to replace Schweikert when his final term ended prior to the 2006-07 academic year; (b) take maximum advantage of the Faculty Reinvestment Program by identifying thrust areas for “cluster” hires of new faculty, anchored by a senior hire in each area; and (c) develop a long-range space plan that is coupled to faculty hiring and retention and graduate student recruiting.

A faculty search committee, appointed by Dean Newton, interviewed both external and internal candidates for the position of Department Head, and unanimously recommended to the Dean that David H. Russell, an internal candidate, be designated as the new Department Head. The Dean enthusiastically accepted the search committee’s recommendation, and Russell was appointed as Head, effective in Fall 2006.

The department has made substantial progress during Russell’s tenure as Head toward addressing several of the most critical issues that were cited by the external review committee. Chief among these has been faculty hiring, at both the junior and senior levels. Since the 2006-07 academic year, the department has hired a total of 11 faculty, including six senior faculty. Three of these new faculty, including one senior hire, were in the area of Biological Chemistry, which substantially increased the department’s strength in this field. Unfortunately, this success in hiring new faculty has again been tempered by the loss, due to retirement or departure, of nine faculty, including five senior faculty, during the period 2006-2012. In addition, three research-active senior faculty have died since 2006, further depleting our faculty ranks. The net result of these additions and departures has been to decrease the number of tenure-track faculty from 44 in Fall 2006 to 42 in Fall 2012. Despite the net decrease in faculty during the last six years, however, funding for faculty research programs, has increased substantially since 2006, largely due to the new faculty hires during this period. Research funding for calendar year 2011, for example, was $19.2M, of which $15.4M was from federal sources. This represents an increase of more than 30% from calendar year 2007, for which the corresponding figures were $14.4M and $11.4M, respectively.

It should be noted that all of the new faculty hires described above occurred during the period 2006-2010. Decreases in funding allocations to TAMU from the State have resulted in severe budgetary constraints that have prevented new faculty hires during the last two years. Our total budget for the 2011-12 academic year has essentially returned to the same level as it was for the 2009-10 academic year. This has again required careful re-allocation and prioritization of departmental financial resources, a challenge that remains if we are to maintain the excellence of our faculty research programs.
### Numerical History of Chemistry Department, 1966-2011

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<td>15.83</td>
</tr>
<tr>
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<td>David H. Russell</td>
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<td>David H. Russell</td>
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</tbody>
</table>

1. Associated Centers, Laboratories, and Institutes

Along with the Cyclotron Institute, various special interest, collaborative, and service groups exist within or are associated with the Department as Centers and Laboratories. These are listed below and descriptions of their roles are provided in Appendix A2.

- Center for Atmospheric Chemistry and the Environment, Director: Renyi Zhang
- Cyclotron Institute, Director: Robert E. Tribble
- Center for Chemical Characterization and Analysis, Director: Emile Schweikert
- Elemental Analysis Laboratory, Manager: Williams James
- X-ray Diffraction Laboratory, Manager: Joseph Reibenspies
- NMR, Manager: Steven Silber
- Laboratory for Biological Mass Spectrometry, Director: David H. Russell
- The Natural Products LINCHPIN Laboratory, Director: Daniel Romo
- Laboratory for Molecular Simulation, Director: M. B. Hall
- Laboratory for Synthetic-Biologic Interactions (LSBI), Director: Karen L. Wooley

B. Vision and Plans (written by David Russell, Head)

1. Vision

In the mid-1960s, Texas A&M University started to invest in its chemistry department. A sustained effort over the past 40 years moved the chemistry department from a “no rank” into the top ten national programs at public universities. However, this ranking is not cast in stone. We compete in a dynamic national environment where societal needs and research priorities continue to evolve. The number of U.S. students specializing in chemistry has been declining, yet the need for chemical expertise that contributes to scientific and technological progress keeps growing.

Texas has the second largest population in the Union, and as such, it must contribute a proportionate share of scientific manpower and research expertise to the nation’s chemical expertise. Texas must, at a minimum, have two nationally prominent chemistry programs. This minimum can be met by the departments at Texas A&M and UT-Austin. The challenge for Texas A&M is to maintain and strengthen its key asset. Our overarching goal must be to enhance the effectiveness of our programs. As the 2005 NRC ranking (see section F, Analysis of the Department – National Research Council Ranking on page 14) showed, we have maintained
a good reputation (26th) but there are signs of concerns in our ranking based on criteria that scholars say are most important (41st).

The issues to be tackled are clear and in line with the first three imperatives of the University’s Vision 2020 project: (a) retain and recruit the best chemists; (b) increase graduate enrollment; (c) improve the undergraduate learning experience.

The first imperative requires that our faculty view A&M as the place where they can do their best work. That state of mind started to gel during the last few years, but it is still fragile. The departure of some of our lead faculty has adversely affected faculty morale, and the looming retirements of others cast additional shadows. Our goal must be to reach the level of faculty loyalty one finds at the top ten programs. A continuing concern must be to sustain faculty effectiveness in teaching and competitiveness in research as individuals evolve in their careers. An effective response should be to encourage team efforts, and so, we must develop a departmental culture conducive to team projects.

Our claim to be one of the country’s prominent chemistry programs should evolve into aspiring to be Texas’ premier chemistry department. As a State University, we must strive for expertise in all facets of chemistry, justified by and in support of the large teaching enterprise. We must leverage our efforts with interdisciplinary initiatives in structural and computational biology and in oceanic, atmospheric, materials, energy-related and nuclear sciences to further our programs’ renewal and growth. The faculty’s record of leadership in establishing cutting edge research resources and campus-wide collaborations (shared experiment and training grants) augurs for successful future interdisciplinary initiatives.

The second imperative, strengthen our graduate programs, recognizes graduate education as a key mission of the University. Indeed, some have argued that the most innovative research is done by professionals working with “amateurs”, a.k.a., graduate students. The challenges for the department are to increase graduate enrollment (which will be necessary to remain commensurate with faculty expansion) and to provide the resources, environment, and programs that support our graduate students’ needs and aspirations. A major concern is the University’s unclear stance as to the priority it assigns to its graduate programs. There is an urgent need to reaffirm the University’s commitment to a top tier graduate program, including elimination of the 99-hour cap for Ph.D. students, remission of tuition and fees, and adequate teaching assistant budgets. A corollary to graduate student issues is the status of postdocs. They have no official standing within the University.

The third imperative, enhance the undergraduate academic experience, must be addressed from the viewpoint of the majors program and from that of the service courses. The challenge is to offer a better experience to the students without greatly increasing the cost. A key unknown is the evolution of enrollments. Indications from the administration suggest that overall undergraduate enrollments will continue to increase. Given this assumption, we expect that even with a successful faculty reinvestment effort, the size of the lecture sections in the large-enrollment courses cannot continue at the current level. Recruiting more faculty members would allow us to offer additional honors and specialized courses, enrollments which would be kept below 50 students per section.

A deficiency in our undergraduate program is the lack of upper-level honors courses. A shortage of faculty, chemistry majors, and other qualified students interested in such offerings has held us back. As noted already, the faculty reinvestment program, coupled with an expansion of the number of majors, should remedy the situation.
The majors program in chemistry is small in relation to the size of Texas A&M. A large majority of our B.S. and B.A. graduates go on to successful completions of graduate and professional degrees or to successful careers as chemists or chemistry teachers. The key concern, stated already, is that the field of chemistry needs its fair share of talented young people. The number of majors must grow for enhanced offerings of courses including upper level honors courses.

2. Plans for FY12-FY17

Faculty. The highest priority is the retention of successful faculty. This effort requires a salary budget with yearly increases (~7%) for merit raises and equity adjustments. Of equal importance is the support of the faculty’s research competitiveness, i.e., maintaining and developing major research facilities and the availability of matching funds for new shared instrumentation ($0.3-0.5M/year).

An aggressive hiring effort must be pursued to maintain the department’s reputation given our numbers of aging faculty, reduced numbers at the junior ranks, and our recent losses of mid- to senior level faculty. The current university climate also provides enormous opportunities. Chemistry is central to major university-level efforts and ventures that include the emerging “bio-corridor,” the Chancellor’s Research Initiative, the “Grand Challenge” effort, especially “One Health” and “Renewable Energy,” and related programs, i.e., National Center for Therapeutics Manufacturing (NCTM), Texas Institute for Pre-Clinical Studies (TIPS), and the National Center for Innovation. Chemistry is positioned to take leadership roles in many of these ventures. There are two faculty-level challenges to achieving such goals: (i) faculty must abandon their silos and embrace the community responsibilities of the “central discipline,” and (ii) we must add three talented and creative new faculty members per year over the next five years. To achieve this, we will require start-up funds in the range of $2.5 to $3.5M/year.

We have a competitive edge as well as certain liabilities in recruiting. The comparatively low cost of living in College Station and the amenities of a small university town are definite advantages for young families. However, we as a department struggle with space, diversity and partner placement.

Regarding space, we are hampered in offers to synthetic chemists by our outdated and poor-quality laboratory space. Significant improvements have been achieved by laboratory renovation in the Reed-McDonald building, the 4th floor of the 1972 wing, and the laboratories assigned to chemistry faculty in the Interdisciplinary Life Sciences Building; however, less than 20% of our faculty have benefitted from these efforts.

Diversity is a necessary, but arduous, objective. A realistic indication of what we can expect in faculty diversity in the next few years is to have around one-third of new appointments be women and/or underrepresented minority groups. Another disadvantage is that, given our location, we have limited options for partner placement. The administration is commended for setting aside funds for this purpose, but the amounts of these funds are insufficient considering the size of the university faculty and the total campus growth.
Table I. Faculty Hiring FY012-FY0116

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Number</th>
<th>Notes</th>
</tr>
</thead>
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<tr>
<td>Analytical Chemistry</td>
<td>3</td>
<td>[will only provide replacement for expected retirements]</td>
</tr>
<tr>
<td>Biological Chemistry</td>
<td>2</td>
<td></td>
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<tr>
<td>Inorganic Chemistry</td>
<td>2</td>
<td>[materials, bioinorganic]</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>3</td>
<td>[synthesis, materials]</td>
</tr>
<tr>
<td>Physical Chemistry</td>
<td>3</td>
<td>[does not include replacing Cremer and Goodman]</td>
</tr>
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</table>

Hiring plans are outlined in Table I. Of the projected 13 hires, only half of these represent increases in the total faculty numbers. As to rank, we want to be flexible; an important consideration is to re-center the faculty demographics. In practice, at least three-fourths of the hires should be at the rank of Assistant Professor. The difference between the proposal of three hires/year for five years and the 13 hires listed is the anticipated need to replace (yet unspecified) retirements or departures. It should also be noted that some of the hires (regardless of field) should be senior appointments. While local political climate favors NAS membership, we have more pressing needs to fill the Martell chair (formerly held by Paul Cremer) and the Robert A. Welch Chair (formerly held by D. Wayne Goodman). To meet the hiring targets, the administration must be prepared to underwrite six offers per year with an expectation of three acceptances. At least for FY13 we are seeking applications in all areas of chemistry, with emphasis on organic and physical/analytical; however, the highest priority should be given to the very best possible hire, independent of the subdiscipline. The Biological group is the least well-staffed and should at this time continue their recruiting efforts. Some issues remain regarding the future role of Nuclear Chemistry in the department’s program, but the continued development of the Nuclear Science Institute and other programs, especially TIPS, provide excellent opportunities for the department.

The department has endeavored to recognize the contributions and professional aspirations of the Senior Lecturers. Currently, their salaries are pegged to a floor of 80% of the starting salary of Assistant Professors. The appointments are on a three-year rolling basis, and the department subsidizes active participation (oral/poster presentation) at one scientific meeting per year. Following the Lichter committee’s recommendation, the faculty mandated that the Department Head present to the faculty a specific proposal related to issues of concern to Lecturers including “a mechanism for lecturers to achieve long-term appointment” and “pathways for lecturer professional advancement”. In response to this challenge, the department has instituted a designation of “Instructional X-Professor (X denotes Assistant, Associate, and Professor), and currently three of our former Senior Lecturers carry this designation.

Planning and funding for faculty replacements would be further facilitated if the University had a proactive retirement program that incentivizes multi-year teaching/consulting contracts to faculty (70+ years) retiring on an A&M Foundation charitable gift annuity.
C. Industry partnerships (written by Simon North)

Since our last departmental review (2005), the Industry-University Cooperative Chemistry Program (IUCCP) which was established in 1980 was formally ended. The purpose of the IUCCP was to foster a long term relationship between industrial companies and the Department of Chemistry to provide 1) support to the Department of Chemistry, specifically the graduate/undergraduate programs and faculty and 2) tangible benefits to the member companies. In the 10 years prior to the end of the IUCCP program industrial membership has varied from 4 to 12 companies. Membership dues were used in support of undergraduate scholarships and graduate fellowships, the annual graduate research symposium, and funding of provisional patents by chemistry faculty. In addition, the annual Industry-University IUCCP symposium facilitated onsite industrial recruiting and provided an opportunity for our graduate students and postdoctoral associates present their research.

The graduate office continues to coordinate onsite industrial recruiting efforts and every year many companies (e.g. Dow, Conoco-Phillips, Eastman, BASF, and others) participate. We are actively engaged in expanding the number of companies. Over the past several years the University Career Fair has grown and many chemical/pharmaceutical companies participate in this event which is open to our students. There are several other recent initiatives which partially fill the role of the IUCCP program. Student Research Week (SRW), an event held by the Graduate Student Council (GSC) in conjunction with the Office of Graduate Studies, the Vice President for Research, and other TAMU organizations, provides a forum for our graduate and undergraduate students to present their results. The Dow Chemical Company has recently established an endowment to recognize an outstanding chemistry graduate student with the Dow Chemical Company/Charlene Black Miller '79 Endowed Memorial Fellowship which will be presented annually at SRW. Partnerships with BASF, Eastman Chemical, and Dow Chemical Company are currently being pursued. We anticipate that these partnerships will provide long-term support for graduate and undergraduate programs and research opportunities for our faculty. Finally, two years ago the department established an annual graduate awards ceremony to recognize outstanding performance in research and teaching. We are optimistic that this event, attended by industrial representatives who have endowed Fellowships and awards, is an ideal time to schedule departmental-industrial interactions.

D. Previous Reviews and Assessments - Departmental Review of 2005

The previous review was conducted on April 24-27, 2005. The external review panel consisted of:

Dr. George L. McLendon  
Dr. R. Graham Cooks  
Dr. Michael P. Doyle  
Dr. Daniel G. Nocera  
Dr. Geraldine L. Richmond  
Dr. John C. Tully

The report from the 2005 external review committee is found as Appendix A3. Departmental responses to the principal issues raised by the external review committee were reviewed by professors in the Chemistry Department in 2005 and revisited in 2009. The relevant
The main concerns raised by this external review can be summarized by the following bullets:

- Lack of transparency and inadequate governance structure
- Lack of space both in terms of quality and quantity
- Lack of a department long term space plan
- Need for aggressive faculty recruiting with resources from the VPR and the Dean
- Poor diversity among the faculty and the graduate cohort
- Graduate student stipend
- Health care and tuition disparity among domestic and international students
- Master in chemical eduction not working as planned
- Aging instrumentation in the shops and user facilities

The 2012 Self-Study Committee has concluded that several of these problems have been addressed. However, the economic crisis that has affected our nation in the past several years, as well as the death of Al Cotton, Wayne Goodman and Ian Scott, or the departure of Paul Cremer, Richard Crooks, and Ray Schaak have made new problems surface. These unanticipated conjunctures have affected our ability to work toward the recommendations made by the 2005 external panel. As a result, some of the previously noted issues remain and several new problems have now emerged. Top priority issues for 2012 and onward are listed in the Grand Challenges Section XII.

E. Analysis of the Department by Academic Analytics

Who is Academic Analytics?

As stated on the company’s website, Academic Analytics is a provider of high-quality, custom business intelligence data and solutions for research universities in the United States and the United Kingdom. Their mission is to provide universities and university systems with objective data that administrators can use to support the strategic decision-making process as well as a method for benchmarking in comparison to other institutions. Rooted in academia, they intend to help universities identify strengths and areas where improvements can be made. For more details, please visit: http://www.academicanalytics.com/.

In the following sections, we will present a comprehensive graph (Department Radar) as well as a table of strengths and weaknesses that capture the current standing of our department with respect to 230 other comparable chemistry programs in the nation. In any given area, the best program will be given a percentile score of 100%. The time-intervals used for data collection and analysis can be found below the graph or table.
Academic Analytics 2010 Data Coverage

**Faculty:** Academic Year 2010-2011

**Journal Articles:** 2007 - 2010

**Citations:** 2006 - 2010

**Conference Proceedings:** 2007 - 2009

**Books:** 2003 - 2010

**Grants:** 2007 - 2010

**Awards:** Varies by award and ranges from the previous 5 to 50 years
### Academic Analytics Department Strengths and Weaknesses

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<th>Description</th>
<th>Rank</th>
<th>Percentile</th>
<th>Z-Scores</th>
<th>Totals</th>
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<td>95%</td>
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<td>Percentage of Faculty With a Grant</td>
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<td>73.6%</td>
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<td>68%</td>
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<td>1.95</td>
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<td>83.1%</td>
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<td>84.9%</td>
<td>1.1</td>
<td>41%</td>
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<td>Total Grant Dollars</td>
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<td>Total Number of Grants</td>
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<td>Number of Faculty With an Article</td>
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<td>Articles per Faculty Member</td>
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<td>97.0%</td>
<td>2.3</td>
<td>987</td>
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### Academic Analytics 2010 Data Coverage

- **Faculty:** Academic Year 2010-2011
- **Journal Articles:** 2007 - 2010
- **Citations:** 2006 - 2010
- **Conference Proceedings:** 2007 - 2009
- **Books:** 2003 - 2010
- **Grants:** 2007 - 2010
- **Awards:** Varies by award and ranges from the previous 5 to 50 years
F. Analysis of the Department – National Research Council Ranking

In 2005, the National Research Council assessed programs according to 21 different criteria. Here are the NRC's five major ratings summarizing those criteria.

- **S-Rank**: Programs are ranked highly if they are strong in the criteria that scholars say are most important.
- **Research**: Derived from faculty publications, citation rates, grants, and awards.
- **Students**: Derived from students' completion rates, financial aid, and other criteria.
- **Diversity**: Reflects gender balance, ethnic diversity, and the proportion of international students.
- **R-Rank**: Programs are ranked highly if they have similar features to programs viewed by faculty as top-notch.

For a more detailed explanation, please visit the NRC website at http://chronicle.com/article/NRC-Rankings-Overview-/124713/

<table>
<thead>
<tr>
<th>INSTITUTION, PROGRAM</th>
<th>S-Rank High</th>
<th>Research High</th>
<th>Students High</th>
<th>Diversity High</th>
<th>R-Rank High</th>
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<td>49</td>
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<td>Students High</td>
<td>Diversity High</td>
<td>R-Rank High</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------</td>
<td>----------------</td>
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<td>33</td>
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<td>4</td>
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II. **Administration and Governance** (provided by Marcetta Darensbourg)

**A. Administrative Structure**

The administrative structure for the TAMU Department of Chemistry is illustrated in the Flow Charts 1-8 (see following pages). Departmental bylaws were developed initially as response to a Departmental Review in 2000, and accepted by Faculty in 2002. They were reviewed and revised in 2008, and again in March, 2012. Appendix A11 contains the bylaws with description of the responsibilities and organization of various components of the department, a brief narrative of which is below.

The Texas A&M University Chemistry Department is administered by a department head, appointed by the dean of the College of Science, who receives input in filling this position, or reappointment, from the department faculty. The standard term of office is four years and the current Head is Professor David H. Russell, initially appointed in 2006 and now in his second term. Prof. Russell is assisted by the associate department head, Professor Michael Rosynke, for academic operations, and the assistant department head, Mr. Ronald Carter, for all business and facilities operations of the department. Prof. Rosynke chairs the committee which is responsible for assignment of research, office, and teaching space. He also assists the Head by overseeing the teaching assignments of the faculty and graduate students. He may also manage concerns for the facilities and shop services with the Department Head. Additional administrative positions, typically part time, are filled by faculty – these exist in the offices of graduate studies: graduate recruitment (Ozerov), graduate advising (North); and undergraduate studies: undergraduate advising (Gaede) and First Year Program director (Hughbanks).

The department is divided into five separate divisions for the purpose of teaching assignments, seminar scheduling, faculty recruiting, and the writing of cumulative exams. The current division chairs are: James D. Batteas (analytical), Tadhg P. Begley (biological), Janet Bluemel (inorganic), Daniel Romo (organic), and Robert R. Lucchese (physical/nuclear). The assistant department head, Mr. Ron Carter, manages the department business office. His purview ranges from overseeing the personnel and accounting staff to the management and maintenance of the buildings in the chemistry complex. The business office currently has 13 staff members. Approximately 17 administrative assistants in various ranks support faculty research groups. Four additional support staff are assistants to associate editors or an editor of journals.

The department holds faculty meetings at least twice each semester, which are conducted by the department head. Decisions ranging from tenure and promotion to the modification of the department bylaws are discussed and voted upon in this format as advice to the department head. An **Advisory Executive Committee**, the AEC, makes recommendations to the Department Head regarding major departmental actions, long-range planning, and policy issues related to research activities. An **Academic Operations Council**, the AOC, advises the Head with regard to policy
issues relevant to academic operations. The compositions of these advisory groups are described in Appendix A7.

ADMINISTRATION (Flow Chart 1)
ACADEMIC OFFICES (Flow Chart 2)

David H. Russell
Department Head

Michael P. Rosynek
Associate Head

Pat Forman
Assistant to Dept. Head
Faculty Support

Holly C. Gaede
Undergraduate Advisor

Joe Mawk
Associate Undergraduate Advisor

Simon W. North
Graduate Advisor

Oleg Ozerov
Graduate Recruiting Coordinator

Rebecca Breeding
Lead Office Assistant

Marylin Warren
Senior Office Associate

Joanna G. Pellois
Associate Graduate Advisor

Valerie McLaughlin
Program Coordinator

Sandra Manning
Program Coordinator
CHEMISTRY DEPARTMENT SHOPS (Flow Chart 6)

David H. Russell
Department Head

Shop Advisory Committee
Simon North (Committee Chair) – Machine
Emile Schweikert – Electronics
François Gabbaï – Glass

Timothy Pehl
Research Instrumentation Specialist
Electronics Shop

Student Workers

William C. Merka III
Research Instrumentation Specialist
Glass Shop

Student Workers

William Seward
Research Instrumentation Specialist
Machine Shop

Ronald Page
Master Instrument Maker

Student Workers
INSTRUMENTATION SERVICE CENTERS (Flow Chart 7)
*Editorial Assistants for associate editors Gabbai, Dunbar and editor-in-chief Gladysz
B. Departmental Committees

The following are standing committees within the Department. Ad hoc committees, such as Faculty Search committees, are formed at the wish of the Head. A complete listing of current standing committee members is found in Appendix A7.

- **Executive Committee (elected)** - The purpose of the Executive Committee is to review major departmental actions and make recommendations to the Department Head, and to serve as a resource for long-range planning and policy issues related to research activities within the department.

- **Academic Operations Council** - The purpose of the Academic Operations Council is to advise the head and serve as his or her resource for long range planning and policy issues relevant to the academic operations of the Department.

- **Advisor to the American Chemical Society Student Affiliate Chapter** - Advises and encourages development of professional interests of undergraduate chemistry majors.

- **Colloquium and Seminar Committee** - Organizes and coordinates departmental colloquium and seminar program; coordinates and supervises Department's participation in Southwest Speakers Exchange program.

- **External Faculty Awards Committee** - Solicits and reviews nominations of department faculty members for external professional society awards.

- **Internal Faculty Awards Committee** - Solicits and reviews nominations of department faculty members for internal and University-administered awards.

- **Promotion and Tenure Committee** - (elected) Reviews instructional/research performances and professional activities of departmental lecturers and tenure track faculty members; advises Department Head on promotion, tenure, and appointment recommendations.

- **Faculty/Graduate Student Working Group** – Provide a forum for all Graduate Students, via their elected GSAC representatives, to voice their concerns and opinion regarding issues of interest to Graduate Students. Provide information flow from Chemistry Department Administration to Graduate Students.

- **Graduate Recruiting, Admissions and Review Committee** - This committee is chaired by the Coordinator of Recruiting, Admission, and Review. It establishes and periodically reviews departmental standards for admission of prospective graduate students; reviews academic records and qualifications of marginal applicants; reviews progress of probationary graduate students and makes recommendations to the Graduate College.

- **Graduate Awards Committee** – Reviews and identifies nominees, from among graduate students, for various awards, fellowships, and honors.

- **Graduate Curriculum Committee** - Establishes and reviews departmental standards related to graduate instructional programs; periodically reviews departmental policies regarding preliminary examinations, degree programs, student research proposals, and course requirements; reviews faculty proposals for new graduate courses.

- **Library Committee** – Solicits, reviews, and expedites chemistry-related acquisitions by the University and Libraries.

- **Information and Communications Technology (ICT)** - Serves as an advisory panel to formulate the departmental policies of information and communications technology.

- **Research Infrastructure Committee** - Provide guidance to the existing research infrastructure as well as develop plans for future needs. Planning for shared instrumentation grants, identifying people to write grant proposals.
- **Staff Advisory Committee** – Serves the Head in an advisory capacity on a regular basis; represents the staff in the governance of the department. This committee serves as a communication link between the staff, faculty, and department administration. Member elections and appointments are self-governed.
- **Space Committee** - Reviews requests and allocates laboratory space within the Department.
- **Undergraduate Curriculm Committee** - Reviews curricula and requirements of undergraduate B.A. and B.S. chemistry majors; plans program modifications and improvements.
- **Undergraduate Student Awards Committee** - Reviews and identifies nominees, from among undergraduate chemistry majors, for various awards, scholarships, and honors.

### C. Bylaws

Following the advice of the 2005 External Review team, Bylaws for the Departmental governance were revised and approved by the faculty on July 8, 2008 and again on March 1, 2012. A copy of the bylaws can be found in Appendix A11.
III. **Budgets (provided by Julie Allen (College of Science) and Ron Carter (Chemistry))**

**A. Goldplate Budget Allocation from College of Science (FY06-12)**

The following table is of Goldplate (amount of money that is appropriated by the University and College to the Department) budget allocation to the five Departments within the College of Science for fiscal years 2006-2012.

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**B. Department of Chemistry Goldplate* Budget (FY06-12)**

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*Goldplate  = Amount of money that is appropriated by the University and College to the Department.

**Includes a $43,868 subsidy provided to account for increased enrollment after 9/1/09.

### C. Staff Funding by Source

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<tr>
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<td>72</td>
<td>3,460,193</td>
<td>2,002,131</td>
</tr>
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</table>
### D. Salary Range Listings

#### Faculty (per month)
- **Distinguished Professors**: $26,250 - $13,281
- **Professors**: $20,841 - $8,557
- **Associate Professors**: $9,673 - $9,257
- **Assistant Professors**: $7,956 - $6,802
- **Instructional Assistant Professors**: $8,436 - $6,801
- **Senior Lecturers**: $8,489 - $4,742
- **Lecturers**: $6,406 - $3,692

#### Staff (yearly)
- **Senior Research Instrumentation Specialist**: non-classified exempt
- **Research Instrumentation Specialist**: non-classified exempt
- **Senior Systems Analyst I**: non-classified exempt
- **Systems Analyst I**: non-classified exempt
- **Software Applications Developer**: non-classified exempt
- **Facilities Coordinator**: non-classified exempt
- **Master Instrument Maker**: $43,765.00
- **Electronics Technician II**: non-classified exempt
- **Senior Information Technology Manager**: non-classified exempt
- **Laboratory, Stores & Procurement Officer II**: $33,180.00
- **Technical Laboratory Coordinator**: non-classified exempt
- **Technician II**: $35,780
- **Laboratory Operations Technician**: $30,749
- **Assistant to Department Head**: non-classified exempt
- **Business Coordinator I**: non-classified exempt
- **Administrative Assistant**: non-classified exempt
- **Administrative Coordinator I**: non-classified exempt
- **Program Coordinator**: non-classified exempt
- **Lead Office Associate**: $34,668
- **Senior Office Associate**: $28,008.00
- **Office Associate**: $29,226.00
- **Lead Office Assistant**: $27,940.00
- **Senior Office Assistant**: $26,592.00
- **Assistant Department Head**: non-classified exempt
- **Business Administrator I**: non-classified exempt
- **Payroll Services Supervisor**: non-classified exempt
- **Business Associate II**: $29,617.00
- **Business Associate I**: $28,875.00
- **Research Chemist**: non-classified exempt
- **Research Scientist**: non-classified exempt
- **Associate Research Scientist**: non-classified exempt
- **Assistant Research Specialist**: non-classified exempt
IV. Graduate Program (provided by Simon North and Joanna Pellois)

A. Mission Statement

The Department of Chemistry offers programs of study leading to the MS and PhD degrees in chemistry, with primary emphasis on admitting students who intend to pursue the PhD degree. Although the department had an MS degree in Chemical Education, this option has been discontinued. The program leading to the PhD degree is designed to ensure that the student receives extensive research experience. There are significant professional development opportunities and on-site industrial recruiting for students.

B. Demographics

Enrollment

During the Spring 2012 semester 270 students were enrolled in the graduate program. This represents a 35% increase in total enrollment from 2000 and a 15% increase from 2005. Over the past 10 years the percentage of international students enrolled has varied from 42% to 50%. International enrollment is currently 50% and has been increasing steadily since 2007. The percentage of female students enrolled has fluctuated between 29% and 39%. Although female enrollment declined between 2006 and 2009, women currently represent 37% of the graduate population (compared to 27.4% nationally in 2008). The total enrollment data from 2001-2012 is plotted in Figure 1.

With rare exceptions, the Chemistry Department does not accept entering graduate students seeking to obtain only an M.S. degree. As a result, most students obtaining M.S. degrees have switched from the Ph.D. program, either by their own choice or at the recommendation of their research advisor.

As the percentage of international students enrolled has increased, the percentage of domestic female students enrolled has decreased and the percentage of international females enrolled has increased. The percentages of domestic and international male students enrolled have not changed significantly. These trends are illustrated in the snapshots of the Spring 2012 and 2005 graduate program enrollments represented in Figure 2 and Figure 3. Permanent
residents, representing 1.3% and 3.3% of the respective 2005 and 2012 student populations, are included in the domestic population counts.

<table>
<thead>
<tr>
<th>Figure 2. Graduate students enrolled in Spring 2012 (270 Students)</th>
<th>Figure 3. Graduate students enrolled in Spring 2005 (235 Students)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dom. M 31%</td>
<td>Dom. M 30%</td>
</tr>
<tr>
<td>Int. M 32%</td>
<td>Int. M 31%</td>
</tr>
<tr>
<td>Int. F 18%</td>
<td>Int. F 15%</td>
</tr>
<tr>
<td>Dom. F 19%</td>
<td></td>
</tr>
</tbody>
</table>

Ethnicities
A majority (86%) of the 136 domestic students enrolled in our graduate program identify themselves as being Caucasian. Hispanic (6%) and Asian/Pacific Islanders (5%) make up the next largest ethnic groups represented amongst domestic graduate students. The ethnic make-up of the current domestic graduate population is shown in Figure 4. The only ethnic minority that has seen a decline in representation since 2005 is the Hispanic population, which decreased from 12% to 7%. Concurrently the Caucasian population increased from 77% in 2005 to 82% in 2012. By comparison the 2008 national average for underrepresented minorities is 5.2%.

<table>
<thead>
<tr>
<th>Figure 4. Domestic student ethnicities, 2012</th>
<th>Figure 5. International student nationalities, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>White 86%</td>
<td>China 31%</td>
</tr>
<tr>
<td>Hispanic 6%</td>
<td>Taiwan 15%</td>
</tr>
<tr>
<td>Amer Indian 1%</td>
<td>Caribbean 2%</td>
</tr>
<tr>
<td>Asian or Pacific Islander 5%</td>
<td>South America 1%</td>
</tr>
<tr>
<td></td>
<td>Mexico 5%</td>
</tr>
<tr>
<td></td>
<td>Japan, Korea 11%</td>
</tr>
<tr>
<td></td>
<td>Indonesia, Philippines 4%</td>
</tr>
<tr>
<td></td>
<td>India, Nepal, Sri Lanka 17%</td>
</tr>
</tbody>
</table>
| | | }

Int. M 32%
Int. F 15%
Dom. M 30%
Dom. F 19%
Dom. M 31%
Int. M 31%
Int. F 18%
Dom. F 19%
Nationalities

There are currently 134 international graduate students enrolled in our graduate program. The nationalities of the international students enrolled during the Spring 2012 semester are shown in Figure 5. The countries that are most frequently represented by these students are China (31%), Taiwan (15%), India (14%) and Korea (10%). The percentage of Chinese students in enrolled in our program has remained constant at about 30% over the past 5 years. Over the same time period the percentage of Korean students enrolled in our program has decreased by approximately 50%. Conversely the percentage of both Indian students and Taiwanese has approximately doubled.

Divisional Breakdown

There are 5 divisions, Analytical, Biological, Inorganic, Organic and Physical/Nuclear, within the Department of Chemistry. Although many faculty members associate themselves with more than one division, each has a primary divisional assignment. Students within a research group may choose to associate themselves with any division within the department. However, a majority of students identify themselves as being members of the same division as their research advisor. In Figure 6 and Figure 7, students were assigned to divisions according to the primary association of the research advisor. The differences in the 2005 and 2012 snapshots highlight recent trends in divisional membership. Over the past 5 years the memberships of the Analytical and Organic divisions have decreased and the memberships of the Biological and Inorganic divisions have increased.

<table>
<thead>
<tr>
<th>Figure 6. 2012 Student divisional breakdown (270 Students)</th>
<th>Figure 7. 2005 Student divisional breakdown (235 Students)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Bar Chart" /></td>
<td><img src="image2.png" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Primary Division by Research Group</td>
<td>Primary Division by Research Group</td>
</tr>
</tbody>
</table>

34
Research Group Size

Of the 270 students currently enrolled in our graduate program 154 are associated with research groups that are housed within the Department of Chemistry. The remaining students have research advisors whose administrative appointments are in outside departments such as Atmospheric Sciences, Biochemistry and Biophysics, and Physics. The histogram in Figure 8 shows the current number of students per research group for the 40 research groups in the Department of Chemistry. Of these groups 10% are considered large groups (>10 graduate students) and 32% are considered small (<5 graduate students). A majority of graduate students are therefore in groups consisting of 5-10 graduate students. By comparison in 2005 41% of the research groups were considered small, 10% were considered large and a majority (smaller than that of 2012) of the research groups consisted of 5-10 graduate students. It should be noted that the group size distributions represented here includes only graduate students. The undergraduates, postdocs or graduate students from other departments who also populate many of the research groups in the Department of Chemistry have not been included.

Figure 8. Research group size 2012

C. Degree Programs

All incoming graduate students are enrolled in the 5-year Ph.D. program. Master’s degrees are typically granted to students in three different categories: (1) those who choose to leave the program early for personal reasons, (2) those who fail to pass one of the Ph.D. milestones, and (3) those who fail to show adequate progress in research. All M.S. degrees that are conferred include theses and a defense of the completed research. The academic milestones towards the Ph.D. degree, numbers of degrees conferred annually and attrition rates are discussed in the sections below.

Academic Milestones

The academic milestones towards a Ph.D. in chemistry are diagrammed and described in Figure 9.
Figure 9.

<table>
<thead>
<tr>
<th>MILESTONES</th>
<th>TIMELINE FOR COMPLETION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Research Advisor</td>
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</tr>
<tr>
<td>Degree Plan</td>
<td></td>
</tr>
<tr>
<td>681 Seminars</td>
<td></td>
</tr>
<tr>
<td>Cumulative Exams</td>
<td></td>
</tr>
<tr>
<td>Frontiers Seminars</td>
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</tr>
<tr>
<td>Preliminary Exams</td>
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</tr>
<tr>
<td>Research Proposal</td>
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<tr>
<td>Teaching</td>
<td></td>
</tr>
<tr>
<td>Coursework</td>
<td></td>
</tr>
<tr>
<td>Final Defense</td>
<td></td>
</tr>
</tbody>
</table>

Research Advisor Selection: Research advisors are assigned half way through the first semester that a student is enrolled. Incoming students interview 5 potential advisors and rank their top three choices. The Graduate Advisor facilitates the advisor selection process by matching faculty members and students according to their stated preferences. Students who begin research the summer before their first semester have the option to select a research advisor early. All students who wish to remain in the program are required to find a research advisor by the end of the first semester.

Degree Plan: The degree plan outlines the coursework to be completed for the Ph.D. and is completed at the end of the first year of study. Degree plans include a total of 96 hours of coursework. All Ph.D. committee members are required to approve the degree plan. Committee members are therefore typically chosen at the end of the first year of study just before the degree plan is submitted. Ph.D. committees consist of 4 members: the advisor, two faculty members from the department and one outside faculty member.

681 Seminar: All second year students present a literature seminar. The seminars are attended by committee members and first year students. Committees may require that students retake the seminar course if a seminar presentation does not meet the required standards.

Cumulative Exams: Cumulative exams test basic undergraduate chemical knowledge, graduate chemical knowledge and knowledge of the chemical literature. Students have 20 opportunities to take cumulative exams. They are allowed to attempt 15 exams and must pass 5 before the end of the second year of study. The cumulative exams may serve as a substitute for the written part of the preliminary exam.

Frontiers Seminars: Second year students are enrolled in CHEM 695: Frontiers in Chemical Research. This course is centered on the “Frontiers in Chemical Research” lecture series. Frontiers speakers are recognized leaders in their particular fields of chemistry. Each speaker
gives a series of three lectures and engages in discussions with groups of students while visiting the department. Second year students are required to attend all Frontiers lectures and write a term paper focused on the research of a particular speaker during both the spring and fall semesters.

**Preliminary Exams:** The preliminary exam, prepared by and presided over by the 4 committee members, tests a student’s readiness to advance to PhD candidacy. Preliminary exams consist of written and oral parts. Committees may choose to substitute the cumulative exams for the written part of the preliminary exam. The preliminary exam is one of two requirements for advancement to Ph.D. candidacy.

**Research Proposals:** The doctoral research proposal is approved by committee members and is the second requirement for advancement to Ph.D. candidacy. Research proposals describe preliminary results and outline the direction of dissertation research.

**Teaching:** All graduate students are required to teach a minimum of four laboratory sections spread over two semesters. A majority of first year graduate students teach three sections of laboratory in either the General Chemistry or Organic Chemistry programs. Approximately 24 undergraduate students are enrolled in each laboratory section. Graduate teaching assistants attend weekly training sessions and are evaluated by both staff and undergraduate students. All incoming students are required to attend teaching workshops during graduate orientation. All first time teaching assistants enroll in CHEM 697: Methods in Teaching.

**Course Work:** Graduate students enroll for 9 credit hours during the spring and fall semesters and 6 credit hours during the summer semester. The Ph.D. degree requires a total of 96 credit hours. The M.S. degree requires 32 hours. Students are required to maintain 3.0 GPR. Students who fail to maintain a GPR of 3.0 are put on probation for a maximum of one year. In addition to enrolling in CHEM 695: Chemical Research all students are required to take the following courses: i) Elective Courses (see appended list of graduate courses in Appendix A6), ii) CHEM 681: Seminar, iii) CHEM 697: Methods in Teaching, iv) CHEM 686: Ethics in Chemical Research and, v) CHEM 695: Frontiers in Chemical Research.

**Final Defense and Dissertation:** The doctoral dissertation is written and defended during the 5th year.

**D. Degrees Conferred**

Since 2007 the Department of Chemistry has graduated an average of 33 Ph.D. students annually (see Figure 10 for trends in degree awarded in the past 10 years). This represents an increase from the average of 27 Ph.D.s granted during the preceding 5-year period. The average number of M.S. degrees conferred annually between 2007 and 2011 was 6. This is a decrease as compared to the average of 10 Master’s students who graduated per year between 2002 and 2006. Of the 286 students who entered the graduate program between 2001 and 2005 66% received a Ph.D., 14% received an M.S., 18% left the program with no degree and 2% are still actively pursuing a degree. This data is presented in Figure 11. Students who received both an
M.S. and Ph.D. in chemistry from Texas A&M, about 1.4% of the total population, are included in the Ph.D. count only. Attrition rates are discussed in detail in the next section of this report.

The average time to graduation with a Ph.D. for students entering the program between 2001 and 2005 was 5.5 years with a standard deviation of 1.1 years. This number is slightly higher than the 5.2 years that was calculated as the average time to graduation for students graduating between 2002 and 2005. The time to graduation data represented in the histogram (Figure 12) reveals that approximately 41% of the students graduated in less than 5 years and 72% graduated in less than 6 years. Calculating the actual time spent by students in our Ph.D. program is difficult due to several factors. Approximately 20% of our incoming students begin their projects the summer before they officially enroll as students, increasing their time in the program by 2-3 months. On the other hand many students choose to leave immediately following their defense, 2-6 months prior to their graduation date. The average time to the final defense for the same group of students is 5.2 years. A more realistic estimate of time to Ph.D. could be given as 5.3 years. By comparison the 2008 national average is 5.1 years.
**Attrition Rates**

Approximately one third (32%) of the students who entered the Ph.D. program between 2001 and 2005 did not receive a doctorate degree. Of the students who didn’t receive a Ph.D. less than half (44%) received M.S. degrees. The attrition rate data for this time period is presented in Figure 13 and Figure 14. The Ph.D. attrition rate for domestic students (38%) is significantly higher than the attrition rate for international students (23%). The attrition rate for female students (40%) is higher than that of male students (27%). The most significant difference can be seen between the attrition rates for male and female international students. The attrition rate for international female students (38%) is more than double that of international male students (17%). When considering attrition rates for students who exit the program with no degree the international female students (25%) and the domestic male students (22%) have the highest attrition rates.

**Figure 13.** Attrition rate (no PhD) for students entering the graduate program in 2001-2005  **Figure 14.** Attrition rate (no degree) for students entering the graduate program in 2001-2005

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**E. Admissions and Recruiting**

Over the past 5 years the size of the incoming graduate class has fluctuated from a low of 38 in 2011 to a high of 75 in 2009 (Figure 15). During the 2012 recruiting season a total of 316 students applied (147 domestic, 169 international) and 141 offers were extended (76 domestic and 65 international). The offer acceptance rates were 36% for domestic students and 43% for international students.

The average GRE quantitative score for this time period was 720 (757 international, 690 domestic). The average verbal score was 491 (497 international, 487 domestic). While the average international quantitative scores have risen slightly, the domestic quantitative, domestic verbal and international verbal scores have not changed significantly over the past 5 years.

**Figure 15.** Incoming graduate classes 2007-2011
The pie chart in Figure 16 shows the geographic regions from which our domestic students were recruited between 2007 and 2011. The geographic regions are defined below the chart. Approximately half (49%) of our domestic students are recruited from undergraduate institutions in the south (AR, LA, MS, NM, OK, TX). Close to one third (29%) of our domestic graduate students come from undergraduate institutions within the state of Texas. The western, northeastern and northwestern regions are not very well represented amongst the graduate population.

F. Graduate Student Support

The department supports graduate students primarily with a combination of GAT (teaching) and GAR (research positions). At any time approximately 60% of the students are supported by either GAR positions or Fellowships. The department currently has a policy requiring faculty to provide GAR positions to at least 50% of the graduate students in their research group.

The department has been proactive in increasing graduate stipends to stay competitive with peer institutions. However, these efforts have not been supported at the university level. The internal university-level support of TA stipends has been fixed at $1500 for more than 20 years. Since the departmental stipend for both GAT and GAR positions are equivalent, any increase in the stipend (22% since 2002, see Figure 17) imposes a large financial burden on the department to cover the GAT budget. Over the past 10 years the cost of graduate tuition has risen 89% while student fees have increased over 216%.

All departmental graduate students, both domestic and international, now have identical health insurance coverage available to them. In addition, tuition and mandatory fees are paid for all doctoral graduate students through their 5th year of study. Students who switch to a MS option are not guaranteed tuition and fee support.
The department has issued a family/leave policy. Female graduate students will receive 6-weeks of leave time following childbirth. Salary and benefit payment will continue throughout this time period. The parent of a newborn or adopted child will also receive short term leave as typically associated with vacation leave days.

**G. Professional Development**

Each year, the Chemistry Department hosts a representative (Dr. Jim Burke) from the ACS Career Services Division to present the "Managing an Effective Job Search" seminar. The Department provides pizza and drinks prior to the 3 hour evening seminar. The following morning, the representative meets with students to individually critique their resumes. The department also manages on-site recruiting efforts which take place in interview rooms which are used exclusively for company recruiters. All arrangements are coordinated by the graduate office and tailored to meet the recruiters' exact specifications, including hotel reservations, tours, lunch arrangements, meeting with selected faculty, arrangements for informational meetings, and a schedule of interviews based on the needs and time constraints of both the recruiters and interviewees. The position descriptions are posted and updated resumes are collected and sent to the recruiter well in advance of the visit. Application forms and other documents are collected for the recruiter if desired before the interview.

Multiple programs exist to support graduate student travel to national and international conferences. The department awards A.E. Martell Travel Awards and Martin Corera Travel Awards twice each year, and recent support from Eastman Chemicals has increased the number of travel awards. GSAC currently administers the student invited seminar speakers program which involves 1 speaker for each division. There are several local societies in which chemistry graduate students are active. The Society for Plastics Engineers (SPE) is an interdisciplinary student organization that exists to promote scientific and engineering knowledge relating to polymers. This is accomplished through seminars, conferences, and visits to plastic companies.
Job Placement

The graduate office has started comprehensive tracking of our graduate students following completion of their doctorate. Of particular interest is the nature of both the initial positions of our student and their permanent positions. Our preliminary analysis indicates that the majority of students find permanent positions in the chemical/pharmaceutical industry.

Student Groups

A Faculty/Graduate Student Working Group was established in 2005 with two principal Missions: 1) To provide a forum for all graduate students to voice their concerns and opinions and 2) To provide a direct conduit for information flow from the chemistry department administration to the graduate students. The group meets each semester and is chaired by the graduate advisor. There are several student organizations which provide professional development opportunities and social events, and coordinate outreach programs. These include the Graduate Student Association in Chemistry (GSAC), Phi Lambda Upsilon (PLU), National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCHe), Society for Advancement of Chicanos and Native Americans in Science (SACNAS), and the Society of Plastics Engineers (SPE).

H. Survey Results

A recent survey of current graduate students yielded 177 responses (66%) on various aspects of the graduate program and the department in general. Several of the questions on the survey echoed questions on the faculty survey. The respondents were a representative sample of the population in terms of male/female, domestic/international, and divisional breakdown. There were many thoughtful and constructive written comments, sometimes in excess of 100 comments for several of the questions. Overall, the responses were positive for every aspect of the program and the department. There are a few points of note:

1) There is some dissatisfaction with the current stipend amount and the health insurance plan.

2) There is some dissatisfaction with the amount of teaching which constitutes full support. “Other departments (ex. Biochemistry) have their GAT3’s teach 2 classes”

3) In terms of space and facilities students ranked the current ‘gathering spaces’ as lowest. A similar level of dissatisfaction was found in the faculty survey.

4) 54 students (73 were unable to assess) felt that the department was deficient in emerging research areas. Nanotechnology and material science were identified by a large number of these students as deficient areas.

5) Although students feel prepared for careers at research Universities they want better professional development for jobs at smaller, teaching, colleges and in industry. A number of students feel that the degree of preparation is “very dependent of the specific research group” and felt that a more generalized approach is warranted.

A similar survey will be administered every 3 years by the graduate office in order to track changing student attitudes.
I. Academic Papers Published by Graduate Students

One measure of the productivity of a PhD student is the number of first author peer reviewed articles published by the student whilst in graduate school. The average number of first author publications written by the 69 PhD students graduating in 2010 and 2011 is 2.28. The average number of publications on which a student’s name appears as an author is 4.37. Over 40% of the graduates in these two classes published three or more first author papers. Approximately 15% did not publish a single first author paper. There is little discrepancy between the average number of first author publications written by domestic (2.24) and international (2.33) students. However, there is a more significant difference between the average number of first author papers written by male (2.64) and female (1.69) PhD students. This difference cannot be attributed to the length of PhD study as the average time to degree for male and female students in these two classes was comparable. The indicated lower publication rate of female students warrants further investigation.

J. Supplemental Data

Graduate Course List: Appendix A6.
Student Survey Questions: Appendix A15.
V. Undergraduate Program –Chemistry Majors
(provided by Holly Gaede)

A. Student Demographics

Incoming Students

First time in college

From Fall 2005 to Fall 2011, 623 entering freshman matriculated as chemistry majors. The majority of these students were white (387, 62%), with Hispanic students making up the second largest cohort (122, 20%). Asian Americans (69, 11%) and African Americans (26, 4%) contributed significantly to our incoming population. The remainder of the students were multiracial (14, 2%), Native American (2, 0.3%), unknown (2, 0.3%), or international (1, 0.2%). Slightly more women (329, 53%) than men (294, 47%) enrolled. These students had an average SAT Verbal score of 590, an average SAT Math score of 628, an average SAT Total score of 1216 (median 1210), with a range of 800 to 1600. The incoming students average high school class percentile is 87.5.

Transfer Students

Between Fall 2005 and Fall 2009, 30 students transferred to TAMU as chemistry majors. Students transferred from a variety of two-year and four-year institutions, with Blinn College accounting for 7 of the 30 transfer students. Most students did not have an Associates Degree. Of all these students, 18 (60%) graduated with TAMU degrees by Spring 2012, 6 with BA CHEM degrees, 9 with BS CHEM degrees and 3 with TAMU degrees in other disciplines. There are 3 students (10%) still enrolled at TAMU and on track to graduate. Overall, 21 of the 30 transfer students (70%) should earn degree from TAMU. Of the 18 students who have earned TAMU degrees, 10 graduated within 2 years of enrollment, 6 graduated within 3 years of enrollment and 2 took 3+ years to graduate.

Graduating Students

Since Fall 2005, 353 students have graduated with undergraduate degrees in chemistry, 141 with BS and 212 with BA degrees. Of these students, 164 began as first-year chemistry students at Texas A&M. The remaining students were internal transfers from other departments within Texas A&M University (148) or transfer students from other colleges and universities (41).

The historical trend in the number of graduates produced, as well as the division between BS and BA graduates, is shown in Figure 1.
Table 1 gives shows the number of entering students from Fall 2000 – Fall 2011, the number of total chemistry undergraduates on the 12th class day of each Fall semester, and the number of graduates from August to May. The same information is displayed in Figure 2.

Table 1. Number of entering students from Fall 2000 – Fall 2011, the number of total chemistry undergraduates on the 12th class day of each Fall semester, and the number of graduates from August to May

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Incoming First-Year Students</th>
<th>Total Chemistry Majors on 12th Class Day</th>
<th>Total Chemistry BA/BS Graduates from August – May</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>56</td>
<td>203</td>
<td>42</td>
</tr>
<tr>
<td>2001</td>
<td>53</td>
<td>185</td>
<td>34</td>
</tr>
<tr>
<td>2002</td>
<td>58</td>
<td>197</td>
<td>37</td>
</tr>
<tr>
<td>2003</td>
<td>60</td>
<td>222</td>
<td>39</td>
</tr>
<tr>
<td>2004</td>
<td>84</td>
<td>244</td>
<td>46</td>
</tr>
<tr>
<td>2005</td>
<td>81</td>
<td>269</td>
<td>45</td>
</tr>
<tr>
<td>2006</td>
<td>77</td>
<td>272</td>
<td>49</td>
</tr>
<tr>
<td>2007</td>
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<td>274</td>
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<td>2008</td>
<td>82</td>
<td>270</td>
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<tr>
<td>2009</td>
<td>90</td>
<td>254</td>
<td>51</td>
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<tr>
<td>2010</td>
<td>77</td>
<td>252</td>
<td>51</td>
</tr>
</tbody>
</table>
The breakdown by sex and race/ethnicity of chemistry major graduates from Fall 2005-Spring 2012 is given in the Table 2.

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Male</th>
<th>Female</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>White</td>
<td>131</td>
<td>37.11</td>
<td>132</td>
</tr>
<tr>
<td>Hispanic</td>
<td>14</td>
<td>3.97</td>
<td>29</td>
</tr>
<tr>
<td>African American</td>
<td>5</td>
<td>1.42</td>
<td>11</td>
</tr>
<tr>
<td>Asian American</td>
<td>13</td>
<td>3.68</td>
<td>9</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>0.28</td>
<td>1</td>
</tr>
<tr>
<td>International</td>
<td>2</td>
<td>0.57</td>
<td>2</td>
</tr>
<tr>
<td>Multiracial</td>
<td>1</td>
<td>0.28</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>0</td>
<td>0.00</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>167</strong></td>
<td><strong>46.23</strong></td>
<td><strong>186</strong></td>
</tr>
</tbody>
</table>

Figure 2. The number of entering students from Fall 2000 – Fall 2011, the number of total chemistry undergraduates on the 12th class day of each Fall semester, and the number of graduates from August to May.
Graduating chemistry majors from Fall 2005 through Spring 2012 had an average SAT Verbal score of 606, and average SAT Math score of 650, an average SAT Total score of 1254 (median 1250). The graduating chemistry majors average high school class percentile was 90.7.

**B. Retention**

Table 3 shows students who enter the university as chemistry majors as their first time in college and are still chemistry majors a year later.

**Table 3. Retention of first-year chemistry majors**

<table>
<thead>
<tr>
<th>Entering Fall</th>
<th>Entering First Year Students</th>
<th>Number Retained a Year Later</th>
<th>% Retained a year later</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>81</td>
<td>49</td>
<td>60.5</td>
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<tr>
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<td>77</td>
<td>34</td>
<td>55.8</td>
</tr>
<tr>
<td>2007</td>
<td>92</td>
<td>48</td>
<td>47.8</td>
</tr>
<tr>
<td>2008</td>
<td>82</td>
<td>40</td>
<td>48.8</td>
</tr>
<tr>
<td>2009</td>
<td>90</td>
<td>39</td>
<td>43.3</td>
</tr>
<tr>
<td>2010</td>
<td>77</td>
<td>39</td>
<td>50.6</td>
</tr>
<tr>
<td>2011</td>
<td>124</td>
<td>84</td>
<td>67.7</td>
</tr>
</tbody>
</table>

Part of our attrition is compensated for by internal transfers from other departments at the University. The 148 graduates who changed their majors into chemistry came from 34 different majors, with the largest number coming from general studies, chemical engineering, and biology.

**C. Graduation**

A low percentage of students enter as chemistry majors graduate with chemistry degrees in four years (Only 27% of students who entered from Fall 2005 – Fall 2008 had graduated with a chemistry degree by Spring 2012.) This trend is not very different from the College of Science as a whole, in which 34% of incoming science majors are retained in science majors after four years. For entering classes of Fall 2005- 2008 the graduation rate with a chemistry degree is actually highest for African American students (38%), though the total numbers are small (5/13). The graduation percentage for white students is 31% (71/228), and for Asian American students is 24% (8/33). The graduation rate for entering Hispanic chemistry majors is low, only 14% (7/51).

Most of the students who do not graduate with chemistry degrees do graduate from Texas A&M, but with other degrees. Students who have changed their majors out of chemistry during this time period have transferred into almost 50 different majors, in every undergraduate college. 42% of the incoming chemistry students from Fall 2005-Fall 2008 had graduated with another degree by Spring 2012. 30% of students who entered from Fall 2005-Fall 2008 had not yet graduated from TAMU with an undergraduate degree, but this relatively large percentage is skewed by the large number from the entering class of 2008 (41) whose graduation may be somewhat delayed by their change of major. The graduation rate for matriculating chemistry majors is shown in Table 4 with a comparison to all TAMU matriculates. Again, the number of
entering chemistry majors who ultimately graduate with a chemistry degree is small, but the overall four year graduation rate compares favorably to the university as a whole.

**Table 4.** Graduation Rates for Incoming Chemistry Majors versus all TAMU Matriculates

<table>
<thead>
<tr>
<th>Matriculation Year</th>
<th>% Graduated within 4 years</th>
<th>% Graduated within 5 years</th>
<th>% Graduated within 6 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>All TAMU chemists, from TAMU</td>
<td>49.8</td>
<td>61.6</td>
<td>24.4</td>
</tr>
<tr>
<td>All TAMU chemists, with chem degree</td>
<td>77.1</td>
<td>72.1</td>
<td>24.4</td>
</tr>
<tr>
<td>All TAMU chemists, from TAMU</td>
<td>80.4</td>
<td>73.3</td>
<td>24.4</td>
</tr>
<tr>
<td>All TAMU chemists, with chem degree</td>
<td>69.8</td>
<td>29.1</td>
<td>24.4</td>
</tr>
</tbody>
</table>

The average years to degree for chemistry majors who graduated between Fall 2005 and Spring 2012 are shown in blue in Figure 3, where 3.66 years corresponds to an “on time” graduation. The data is also separated to show the time to degree for students who entered as chemistry majors versus those who transferred into chemistry from another department on campus. Most retained chemistry majors graduate on time, but a significant percentage of internal transfers have a delayed graduation. The overall average graduation time is 3.90 years, with retained chemistry majors having an average of 3.72 and internal transfers having an average of 4.10 years.

**Figure 3.** Time to degree for chemistry majors graduating between Fall 2005 and Spring 2012, where 3.66 corresponds to “on time” May graduation for students who matriculate in August.
D. Program Graduates

Since 2008, a graduating senior survey has been distributed. The total number of surveys distributed has been 217, with a response received from 197 students (91%). The data below is compiled from the responses of the 157 students who responded to a question about post-graduation plans on the graduating senior survey distributed by the Undergraduate Advising Office in the years 2008 to 2012.

Medical School: 21
Pharmacy School: 15
Dental School: 7
Law School: 3
Allied health programs (physician assistant, optometry, chiropractic, nursing school): 6
Graduate School in chemistry: 29
Graduate School in some other scientific discipline: 9
Graduate School non-scientific, such as MBA: 6
Industrial or government chemistry-related employment: 33
Other employment: 3
Military: 6
Teaching (for example, high school chemistry): 17

This distribution probably underrepresents the number of students who find chemical employment, because many do not begin an active job search until after graduation, when the survey is administered. Additionally, every year several students apply (or reapply) for medical or pharmacy school in the year following graduation, so more students ultimately end up in these pursuits. This distribution certainly underrepresents students who do not pursue careers directly related to their chemistry degrees, since they are less likely to respond to surveys and requests for information. With this caveat, Figure 4 is a reasonable representation of the post-graduate pursuits of our students.

![Academic/Professional Pursuits Post-Graduation](image)

Figure 4. Post-graduate pursuits (percentages of respondents) of recent chemistry graduates
Graduate programs in chemistry and other STEM fields that our students have attended in this time period include; California Institute of Technology; KTH Royal Institute of Technology; Northwestern University; Princeton University; Purdue University; Rice University; Texas A&M University; Texas Women’s University; University of California-Berkeley; University of California-Irvine; University of California-Santa Barbara; University of Florida; Universite Laval; University of Michigan; University of North Texas; University of Southern Mississippi; University of Texas; University of Texas-Dallas; University of Texas-San Antonio; University of Wisconsin; and Washington University- Saint Louis.

Recent employers of our students include Alcoa; Alcon Laboratories; Baker Hughes Petrolite; Cerilliant; Chevron Phillips; ExxonMobil; GT Products; Halliburton; INEOS; Kaneka Nutrients; Lockheed Martin; Lubrizol; Lynntech, Merichem; Memorial Hermann Hospital; Neos Theraupeutics; OI Analytical; Shell Westhollow Technology Center; TechSpray; Texas A&M University Qatar; Texas Children’s Hospital; Thomas Analytical; Union Pacific Railroad; Univation Technologies; and US Oncology.

**E. The Chemistry Undergraduate Curriculum**

The degree plans for B. S. or B. A. degrees in chemistry are included below. The curricula are fairly standard, with General Chemistry in the first year, Organic in the second, Physical in the third. The BS degree includes more chemistry (including laboratories), research, and more mathematics than the B.A. degree. This degree is ACS certified, provided the students choose biochemistry as an advanced chemistry elective.

The B.A. degree has fewer hours of required courses, allowing greater flexibility for pursuing other interest or fulfilling professional school prerequisites. These students must choose a minor or a “track,” which is a concentration in a particular area of chemistry. Tracks available for B.A. students are biological chemistry, chemical education, or environmental chemistry. The track in biological chemistry is especially popular among pre-medical or pre-pharmacy students, as it includes introductory, biology, microbiology, genetics and anatomy and physiology. The chemical education track allows students to become certified to teach high school chemistry in Texas with no addition credit hours or time to degree.

Major changes in recent years include major revision of physical chemistry. The lecture sequence now starts with the microscopic view in the first semester, focusing on quantum chemistry and spectroscopy. The subsequent course includes thermodynamics and kinetics. The physical chemistry laboratory sequence has also been revised substantially. Formerly, B.A. and B.S. students enrolled in the same first-semester one credit physical chemistry laboratory and B.S. students took a two-credit second semester physical semester laboratory, while B.A. students took a different, one-credit second-semester laboratory. Now, both B.A. and B.S. students take two one-credit laboratories in physical chemistry. The multi-week experiments utilize more modern equipment and focus mostly on areas of modern physical chemistry research.

Previously, BS students were required to take a 400-level inorganic chemistry, CHEM462, which they mostly took as seniors. To introduce students to the discipline earlier, a 300-level inorganic chemistry course has been developed. CHEM462 is now considered an advanced elective. CHEM362, Descriptive Inorganic Chemistry, has blossomed and become a popular course for chemistry minors as well as majors. However, the enrollment in CHEM462 has declined.
The writing intensive courses required by the University graduation requirements have also been revised. CHEM481, the senior seminar, has been raised from one credit to two, to allow more time for writing instruction, in-class writing activities, and student presentations. The second-semester organic laboratory for majors has been approved as our second writing-intensive course.

In addition to these changes, some new advanced electives have been developed. CHEM483, Green Chemistry, has become popular, not only with our majors, but also with chemical engineers. In addition, CHEM456, Chemical Biology, is a new course with a growing enrollment.

Curricular changes are planned for analytical chemistry in response both to external factors (changes in requirements of other majors), and the sentiment of our analytical faculty.

1. Bachelor of Arts in Chemistry, 2012-13 Catalog #135

The Bachelor of Arts program (see details on following page), through the availability of a generous number of electives, gives the student a firm and broadly based foundation in chemistry, with the option of pursuing other educational objectives involving specialization in at least one other field in depth. This objective is accomplished by means of the B.A. program flexibility and by the inclusion of a minor area of study in another discipline or completion of a track as outlined above. Additional elective hours allow further diversification.

The B.A. degree offers somewhat more flexibility than the B.S. program, in terms of tailoring a program of study which combines chemistry with an interest in subject areas such as biochemistry, biology, business, computer science, education, forensics, medicine or physics. Although the B.A. program may in any specific case turn out to be a somewhat less technical curriculum, it meets the needs of many students who plan to use chemistry as a springboard to a career in chemical sales, marketing, law, technical writing, teaching at a pre-college level, science journalism, etc., to name only a few possibilities.

A B.A. degree in Chemistry coupled with a minor in Biology, or completion of a biological chemistry track, is excellent preparation for a variety of careers in the health-related disciplines. In particular, a B.A. degree in Chemistry is excellent and proven preparation for medical and dental schools, and affords the superior student the opportunity to maintain flexibility for a broad spectrum of medical or dental careers.

Although not required for the B.A. program, abundant research opportunities are available to students. The B.A. program also permits and encourages non-technical elective courses.
### FRESHMAN YEAR (Bachelor of Arts in Chemistry)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
<th>Second Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
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<tr>
<td>CHEM 100 Horizons in Chemistry</td>
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<td><strong>Total</strong></td>
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### SOPHOMORE YEAR (Bachelor of Arts in Chemistry)

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<td>CHEM 227a Organic Chemistry I³</td>
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<td>PHYS 218 Mechanics</td>
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<td>PHYS 208 Electricity and Magnetism</td>
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<td>POLS 207 State and Local Govt</td>
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<td>KINE 198 Health and Fitness Activity</td>
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<td><strong>Total</strong></td>
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### JUNIOR YEAR (Bachelor of Arts in Chemistry)

<table>
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<th>(Th-Pr)</th>
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</thead>
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<tr>
<td>CHEM 315 Quantitative Analysis</td>
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<td>3</td>
<td>CHEM 325 Physical Chemistry Lab I</td>
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<td><strong>Total</strong></td>
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### SENIOR YEAR (Bachelor of Arts in Chemistry)

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<td>CHEM 326 Physical Chemistry Lab II</td>
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<tr>
<td>Elective²</td>
<td>(3-0)</td>
<td>3</td>
<td><strong>Total</strong></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

**Notes:**
1. Students may substitute any 6 hours of American history courses approved by the Department of History to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106. 2. These electives must include 12 hours which meet the humanities (3 hours), visual and performing arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Additional elective hours must be used to complete a required minor approved by the granting department or students must satisfy the requirements of one of the approved chemistry track programs. B.A. chemistry majors may take CHEM 485 or 491 as elective courses. The total hours of CHEM 485 and 491 taken on a graded (A-F) basis may not exceed 9. Additional hours of these courses may be taken on an S/U basis. A maximum of 6 hours of these courses may be included on the degree plan. Electives should be chosen in consultation with the chemistry advisor, and should be selected to meet the residency requirement (36 hours at 300-400-level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered. 3. This is a special section of the course for chemistry majors. 4. The advanced chemistry electives must be selected from CHEM 317 or 410, 411, 440, 441 or PHYS 309. Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e. BICH 410 or 440). 5. This is a designated W-course.
2. Bachelor of Science in Chemistry, 2012-13 Catalog # 135

The B.S. program in Chemistry is arranged so that a student obtains a comprehensive, solid foundation in all of the major branches of chemistry, combined with a suitable measure of individual flexibility (see details on following page). The latter objective is met in part by a strong emphasis on involving the undergraduate B.S. chemistry major in exciting, innovative, state-of-the-art research programs. Most students in the B.S. program become involved in research during their junior year, and continue this until graduation. Students frequently receive research scholarships and fellowships which include opportunities for summer research programs. It is not uncommon for an undergraduate chemistry major to be a coauthor of scientific publications in major research journals before graduation.

Undergraduate chemistry research activities involve substantial use of modern scientific equipment, including major instrumentation. The student involved in this activity also gains considerable insight into the profession by means of substantial individual contact with chemistry department faculty.

The B.S. degree in Chemistry is the appropriate program for students planning advanced degree programs in chemistry, biochemistry, forensics, chemical physics, and other fields. Students planning careers in chemical industry should also choose the B.S. degree in Chemistry. Students may wish to choose electives suggested in the biological or environmental chemistry tracks. This degree program satisfies fully the accreditation requirements of the American Chemical Society.
FRESHMAN YEAR (Bachelor of Science in Chemistry)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
<th>Second Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
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<td>or</td>
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<tr>
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SOPHOMORE YEAR (Bachelor of Science in Chemistry)

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<th>Second Semester</th>
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JUNIOR YEAR (Bachelor of Science in Chemistry)

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SENIOR YEAR (Bachelor of Science in Chemistry)

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<td>Elective</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
<td>16</td>
</tr>
</tbody>
</table>

Notes:
1. Students may substitute any 6 hours of American history courses approved by the Department of History to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106. 2. These electives must include 12 hours which meet the humanities (3 hours), visual and performing arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Electives should be chosen in consultation with the chemistry advisor, and should be selected to meet the residency requirement (36 hours at 300-400-level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered. 3. This is a special section of the course for chemistry majors. 4. Students should choose MATH 304, 308, STAT 211 or another MATH or STAT course approved by the chemistry advisor. 5. The advanced chemistry electives must be selected from CHEM 446, 456, 462, 464, 466, 470, 483, 489 and BICH 410, 411, 440, 441 or PHYS 309. Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e. BICH 410 or 440). Graduate-level courses are encouraged for qualified students. 6. The total hours of CHEM 485 and 491 taken by B.S. chemistry majors on a graded (A-F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis. 7. This is a designated W-course.
F. Undergraduate Research

Undergraduate research is an essential component of the undergraduate curriculum. The B.S. chemistry majors are required to take at least 6 credits of undergraduate research to complete their degree. In a regular semester, the student is expected to work in the faculty mentor’s laboratory an average of 3 hours per week to receive 1 credit. (The per week expectation is raised for a 10-week summer term to keep the total hours constant.) The students are expected to give a presentation of the results to the research group and submit a research report to the Undergraduate Office. Strong students are encouraged to participate in a University thesis program. Although undergraduate research is not required for B.A. chemistry majors it is strongly encouraged and many participate in undergraduate research, though not always in chemistry, and not always for credit.

Our undergraduates have appeared as co-authors on 115 peer-reviewed publications over the time period 2005-2012, and have made 62 presentations at regional, national, or international scientific meetings. During this time 372 students have enrolled in CHEM491 for a total of 1471 credit hours. The average enrollment in undergraduate research per semester consisted of 19 B.S. students, 4 B.A. students, and 4 students from outside the department. These numbers underestimate research participation because it does not include students working as volunteers, for a stipend, in other departments, or off campus. In an average semester, 18 faculty are supervising undergraduates in CHEM491, and since 2005 48 different chemistry faculty have participated. Since the last self-study, standard expectations for research have been established and are communicated with the students through the undergraduate advising office and website. The freshman chemistry seminar now includes a discussion about the importance of research and how to find in both local and external research opportunities.

G. Issues for Consideration

1. We have not substantially revised our curriculum since the ACS changed their certification requirements. Several local issues suggest that this would be a good time to revise our curriculum.
   a. Statewide core curriculum changes will be implemented Fall 2013. Our entry level courses will have to be recertified as meeting the learning objectives for the Science Core Curricula.
   b. Biochemistry recently dropped analytical chemistry and physical chemistry from their degree requirements. However, other programs such as Nutrition and Forensic and Investigative Sciences have added more analytical chemistry.
   c. Although we advertise the BA as a degree for students not interested in pursuing a career in chemistry, many of these students do so with limited laboratory skills and research experience. Should we consider developing additional tracks or changing requirements?

2. The growing enrollment has created a back log for enrollment in some of the laboratories, particularly CHEM234, our second-semester organic laboratory for chemistry majors. Many students are unable to take the advanced laboratories in the semester planned, including both semesters of physical chemistry laboratory, advanced analytical laboratory, and inorganic laboratory.

3. We are beginning to see pressures in our lecture courses as well. With priority for scheduling in only five classrooms in the chemistry building, we do not have the flexibility to easily accommodate class sizes between 36 and 80, which is the current demand for most of our advanced undergraduate courses.
VI. Chemistry Service Courses (provided by Tim Hughbanks)

A. First Year Program

1. Recent changes

Partly in response to the 2004 Lichter Report (see Appendix A5) and partly in response to personnel changes in the department that would have occurred anyway, the chemistry First Year Program (FYP) underwent a number of changes when Prof. Eric Simanek assumed the position of FYP Director in the Fall of 2005. Some of these changes have been extended and consolidated under the directorship of Prof. Timothy Hughbanks, who assumed the FYP Director position in July of 2009. A summary of the changes and comments that will also illuminate the current status and organizational structure of the chemistry FYP are as follows:

a. Lecture and laboratory courses

The lecture and laboratory courses and personnel are now distinct and operate largely independently. On matters of laboratory management, operation, and student concerns, the Technical Laboratory Coordinators (TLCs - positions currently held by Drs. Amber Schaefer and Tak Wai (Tom) Leung and their supporting staff oversee day-to-day events. A laboratory Technician (currently Terry Junek) runs the FYP chemical stockroom and oversees student workers in that capacity. In contrast with the de-facto situation that obtained prior to 2005, the Lecturers who perform classroom instruction have only nominal laboratory supervisory roles and do not supervise FYP staff. Lecturers and selected tenure-track faculty do conduct safety tours of respectively designated labs throughout the academic year. The independent operation of the lab and lecture courses has been for the most part a positive development, but the tendency for the lecture and lab course calendars to diverge in response to lab scheduling pressures is a continuing concern and we are working to resist further lecture/lab calendar divergences when practically feasible.

b. Laboratory Manuals

The laboratory manuals for the two major lab courses, Chem 111/112, and Chem 117 (the one-semester Engineering lab course) are produced entirely ‘in-house’ and printed by Hayden-McNeil publishing. The third edition of the 111/112 manual and the first edition of the 117 manual debuted in the Fall 2012 semester (the latter manual is a thoroughly revised version of the manual developed by Dr. Larry Brown in 1996 that had undergone only minor year-to-year revisions.) Royalties from 111/112 manual sales have been used to build an endowed Directors fund for the use of the chemistry FYP. They total about $50,000 annually, a sum that will increase to roughly $65,000 annually beginning in the 2013-14 academic year as the Chem 117 manual contributions are added in. Hayden McNeil provided two $10,000 contributions for salaries to individuals involved in lab manual upgrades. In the summer of 2010, Hayden-McNeil funds provided half of the summer stipends for Drs. Joanna Pellois and Joe Mawk – who did most of the work in producing the second edition of the Chem 111/112 manual. The second
$10,000 contribution was used to provide summer teaching assistantship support to graduate students who are developing and testing new experiments for the 111/112 and 117 lab manuals.

c. Textbooks
We have negotiated favorable cost options for student textbooks. For Chem 101/102, the most attractive option offers the student a full text (full color loose-leaf) copy, OWL homework/eBook system (24 mos.) for net $99.00 for both semesters. This is only $9.00 more than the previous (Simanek era) price and now includes the loose-leaf paper version of the text as part of the package. This compares to a hardcover retail price of $257.00 for the same. This translates to a course-wide cost saving for Chem 101/102 students of roughly $500,000 per year for 3500 students. For the ~2000 or so Chem 107 students, the $70 price per student for a full text (full color loose-leaf) copy, OWL homework/eBook system (6 months) is offered, translating into a savings approaching $200,000.

d. Quizzes
An on-line quiz system was brought into use in the Fall 2011 semester. The pedagogical motivation for the system was to induce students to better prepare for the lab experiments by having them take a quiz covering questions in both safety and chemistry before they can enter the laboratory; i.e., successful completion of the quiz will constitute their ‘ticket’ into the lab. This new approach seems to have been moderately successful; more students seem to be giving their labs at least a cursory reading before they actually arrive. The time devoted to doing the experiments has been moderately shortened. The elimination of paper quizzes has the incidental benefits of reducing our copying page count by more than 50,000 per semester and TA grading loads have been reduced as well.

e. Lecture series
The FYP has sponsored an evening program of seminars intended for general audiences for which the combined annual attendance is roughly 5200. The program receives some support from the College of Science and has been sponsored in recent years by Cengage publishing at a rate of $7500 per year. The seminar topics comprise a blend of chemistry and more general interest science and science-related areas; the seminars are available on-line at http://www.chem.tamu.edu/academics/fyp/lecture_series/

2. Teaching personnel involved and class sizes
Most of the classroom instruction in the chemistry FYP is assumed by non-tenure-track Lecturers and Senior Lecturers; participation by tenure-track faculty at any given time amounts to instruction of between 10 to 20% of the students enrolled. In the first years of his directorship, Eric Simanek made an effort to decrease the average class sizes, and section enrollments decreased from ~290 students in the 2005-7 period to ~255 students in the 2007-8 to 2010-11 academic year period. Rising enrollment and concomitant budget reductions have forced these numbers back up to 275 per section in the 2011-12 academic year and they seem destined to rise further in upcoming years. (It should be noted that our lecture rooms have a capacity of 316 students. That capacity is now routinely reached in Spring Chem 107 lectures. For the present, 316 is the upper limit on FYP lecture course enrollments since budgets and competition for lecture room space with other service courses precludes the addition of more sections.
Total enrollment for the past 7 years

![Plot](image1.png)

Figure 1: Lab and lecture enrollments, 2005-12

Laboratory and lecture hall occupancy

![Plot](image2.png)

Figure 2: Room occupancies, 2005-12
3. Teaching assistants

Graduate students being fully supported as teaching assistants (TAs) are responsible for three lab sections (GAT-3) – a workload that seems to be on the high side in comparison with that in peer institutions. The number of GAT-1 equivalents expended by the FYP on duties other than lab supervision has been reduced in the past two years from greater than 50 to just over 30. The functions carried out by individuals in these positions fall into four categories: Instructional Assistants dedicated to laboratory work (lab-IAs), Instructional Assistants dedicated to lecture-related tasks (lec-IAs), graders, and make-up lab TAs. Post-1st-year graduate students who are simultaneously working as GAT-1’s or GAT-2’s hold virtually all the IA positions. IAs provide ‘logistical support’ in running a large teaching system. The lab-IAs help to pass on their knowledge and experience to 1st-year TAs and also help the TLCs manage the labs and serve as a conduit of information useful in identifying lab problems and debugging new experiments. The lec-IAs assist Lecturers in managing their large classes and are used by lecturers in various ways. They are useful in handling technical problems in on-line homework, ‘clickers’, and scheduling of make-up exams. They can supplement or temporarily fill in at office hours. They may put in some time at the chemistry Helpdesk. Lec-IAs are quite useful to tenure-track faculty who are rotating through the FYP for a few years and need help in keeping up with changes in classroom technology. Many instructors have labored to keep at least part of their exams on something other than a multiple-choice basis. Obviously, this requires a commitment to institutional support of graders. The FYP has employed as many as 15 GAT-1’s as graders, but as budgets have tightened this has been reduced to roughly 10 GAT-1 positions. These positions are filled almost entirely by international graduate students whose rudimentary English-language skills preclude their employment as TAs in any case.

![Graph showing numbers of lab sections taught by the FYP program for the past 7 years](image-url)

Figure 3: FYP lab distributions for 2005-12
4. **Special laboratory sections**

Several FYP lab sections are currently designated for the first-year lab for chemistry majors (Chem 111, 112 and 231). These are in addition to labs conducted in the main chemistry building for honors students (Chem 111H/112H) and other chemistry majors (Chem 113/114). Each lab section of up to 24 students has a teaching assistant with a full-time TA (designated as GAT-3) assigned 3 sections.

5. **Teaching assistant training and safety**

All Teaching Assistants coming into the FYP program for the first time are required to undergo site-specific safety training and to take a 1-credit hour course (Chemistry 697) in which they receive experiment-specific training (including conducting at least a major portion of the experiment). This course is taught each semester covering the large-enrollment class for that semester. Thursday night training sessions are held every week in preparation for the labs in the subsequent week; TAs teaching any of the lab course for the first time are required to perform the appropriate experiments before they teach them. The TLCs supervise these activities.
B. Organic Chemistry Service Courses

The large courses involved here are Organic Chemistry I (Chem 227) and Organic Chemistry II (Chem 228) and their corresponding lab courses (Chem 237 and Chem 238). Organic and Biological Chemistry (Chem 222) and its lab course (Chem 242), currently a teaching responsibility of the Biological Chemistry Division, impact the organic lab courses because Chem 242 is currently taught in the organic chemistry lab rooms.

1. Lecture Courses:

The lecture courses are separate courses from the lab courses although the labs attempt to parallel the coverage of the lecture courses. Total Enrollments in the two lecture courses (See Figure 5) during Fall Semesters increased from just over 1500 in Fall 2005 to just above 1700 in Fall 2007 followed by a drop to level off at just above 1600 for the last 4 years. (Fall 2011 was slightly below 1600 perhaps because of reductions in number of sections as a result of budget reductions.) Spring semester totals are lower than Fall semester primarily by students not continuing into the 2nd semester course. Over the past seven years, the Fall 227 enrollment as a percentage of the Spring 102 enrollment (prerequisite course) has trended down from 82% to about 76% (See Figure 6). This may indicate that the recent growth in Chem 102 enrollments (1623 in Spring 2008 to 1806 in Spring 2011) has involved students in majors that do not require chemistry beyond General Chemistry.

<table>
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Organic lecture class sizes (See Figure 7) have been maintained at averages generally below 100 students/section as a result of two factors – the lack of suitable classrooms in or near the chemistry building with seating above 105 students (one less desirable classroom seats a maximum of 129 and is used for a limited number of sections) and a desire to maintain some faculty-student interactions outside of classroom. The average size was reduced to the low 80’s during 2009 and 2010 by increasing the number of sections (and # of faculty teaching organic) in conjunction with a slight decrease in enrollments until the budget reduction in Fall 2011 resulted in an immediate reduction in the number of organic lecturers. We have recovered a bit this Fall even with the slight increase in enrollment. Section sizes in the off-sequence course are often less than the larger-enrollment on-sequence course. Therefore, class sizes in individual courses have averaged above 100/section five times over the past seven years and individual sections have hit or exceeded 105 numerous times.
Of the 15 – 19 sections of organic chemistry being taught per semester, the vast majority are taught by Lecturers and Senior Lecturers. Tenure-track faculty teach a chemistry major’s section and an honors section – neither of which is considered in the numbers compiled here. Of the service course sections, there is usually between zero (most frequent) and two sections covered by tenure-track faculty. In general, the number of different faculty teaching these service sections ranges between 7 and 9. The multiple lectures are coordinated to the extent that all faculty cover the exact same chapters during Org. Chem. I (with some flexibility between sections at the end of Org. Chem. II) and all sections use OWL on-line homework coordinated with the textbook. Individual instructors assign grades for their sections, but meet to consider proposed grade distributions prior to final grade assignments.

A full-time lecturer teaches 3 lecture sections, although some lecturers may have an assignment that includes instructional responsibilities for one section of our chemistry major’s intensive lab course (Chem 234) instead of a lecture section. Lecturers are responsible for handling all aspects of their sections with minimal clerical assistance since there is no central organic staff as in the First Year Program. Each lecture section is provided about one GAT-1 equivalent (1/3 of a full-time TA assignment) of grading assistance. All exam preparation, handling of student questions, selecting on-line homework questions and setting assignment dates, exam reviews, administration of make-up exams, and compilation of grades are the responsibility of individual instructors. Tenure-track faculty members have some departmentally funded clerical assistance that help with these responsibilities. Each full-time non-tenure-track lecturer is normally assigned about 3 Chem 237 periods as lab supervisor. Duties as 237 lab supervisor are minimal as described below.

Students in the Chemistry 227/228 sequence are required to purchase access to an on-line bundle that includes on-line versions of the McMurry 8th Edition Organic textbook and the corresponding Study Guide and Solutions Manual and Cengage On-line Web-based Learning (OWL) on-line homework for the McMurry text. Students can purchase 24-month access to these resources for a cost of $130. The cost for on-line access plus a loose-leaf full-color version of the textbook costs $149 direct from Cengage Learning. The bundle with the textbook is sold by local bookstores for about $185. The ‘discounted’ on-line price from the publisher is $242.99 for a bound textbook alone and $415.48 for the textbook and a paperback Study Guide.
Amazon.com lists the combination for $325.19 new and $289.79 used. Savings to students are substantial, and students who start the course when a new edition is released will pay no more than students who start the course when used textbooks are available. Large numbers of students credit the on-line homework system as instrumental in their success in these courses. This will be particularly important in the future since the university has decided to provide Supplemental Instructors to chemistry courses without prohibitive contributions from the department. Only a fraction of students availed themselves of supplemental instruction while all students can take advantage of the learning opportunities provided by the high-quality on-line system.

The one-semester 3-credit hour survey of organic chemistry course (Chem 222) has been offered as one section each semester with total enrollments ranging between 291 and 430 over the past seven years with an average enrollment of 342/year. The enrollment trend appears to be increasing slightly over the last 4 years. (Figure 8) This course is taken as a terminal organic course by a variety of majors primarily in the College of Agriculture. Only a fraction (<25%) of these students take the corresponding lab course (Chem 242). Because of space requirements, this lab course can now be offered only during the Spring semester (and Summer semester if funds are available). This appears to have led to Spring semester enrollments in 222 being significantly larger than Fall semester (not true from 2005 – 2007 when labs were offered both semesters).

2. Lab Courses:

Chemistry 237 and Chemistry 238 are 1-credit hour lab courses. These courses are conducted over 18 different 3-hour time periods during the week with four sections meeting at a time. There is a short computerized Powerpoint presentation followed by a pre-lab quiz (generated for each section from a databank of questions) at the beginning of the time period in a lecture room. Students then move to the lab rooms to conduct the experimental assignments. Sections of the lab course have no formal connection to specific lecture courses.

Although the First Year Program does not make use of their laboratory rooms after 6PM, the Organic Laboratory Program for many years has had to conduct night labs from 6:30 – 9:30 PM three nights a week (with one additional night reserved for make-up labs)! For Fall 2011, sixteen of our 68 Chem 227/228 lab sections (25%) are night labs. We are able to conduct night labs by staffing our stockroom with experienced chemically proficient student workers during
these lab periods. These student workers also have to clean up after the night labs and get the labs prepped for 8AM labs the next morning (sometimes for a different course). Although we have space available for 72 lab sections during the 18 time periods we conduct labs (four sections running concurrently in our 4 available lab rooms), four of those lab sections are currently designated for the first-semester organic chemistry lab for chemistry majors (Chem 231). For Fall 2012, the remaining 68 lab sections are projected to be over 95% of full capacity (1560 students out of 1632 possible) prior to final preregistration. The trend for organic lab enrollments is shown above in Figure 5.

Each lab section of up to 24 students has a teaching assistant with a full-time TA (designated as GAT-3) assigned 3 sections. In addition to assignments to official lab sections, a Teaching Assistant assignment may include 1-section as TA for Thursday night make-up sections (up to 3 GAT-1 assignments), one TA as a GAT-1 assignment for the TA training course (Chem 697), or a GAT-1 equivalent as grader for instructors in the lecture courses (approx. 14 GAT-1 assignments in Spring semester; Fall semester grading assignments come primarily from International Students ineligible to act as teaching assistants because of language deficiencies).

All Teaching Assistants coming into the organic program for the first time are required to undergo site-specific safety training and to take a 1-credit hour course (Chemistry 697) in which they receive experiment-specific training (including conducting at least a major portion of the experiment). This course is taught each semester covering the large-enrollment class for that semester.

An organic faculty member (normally a lecturer) is assigned to each 4-section lab period. They are responsible for starting the computerized Powerpoint presentation over the experiment to be conducted and collecting the scantrons from the pre-lab quizzes. They are also expected to make at least one pass through the lab rooms checking for safety compliance and detecting issues that students may be having. They are also expected to be in the building throughout the lab period in case of an emergency – particularly important for the night labs.

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**Numbers of organic TA position**

![Figure 9](image_url)

The number of TA positions (as GAT-1 equivalents) used in the Organic Lab Program (Chem 237 and Chem 238) is shown in Figure 9. (A full-time Teaching Assistant is considered a
GAT-3 and covers three sections; a GAT-1 would normally cover one service laboratory section.) This graph excluded the 3-5 GAT-1 positions used for Chem 242 lab since that course was taught in General Chemistry labs for some of the time over the last seven years. In addition to assignments to lab sections, there are 4 GAT-1 positions for make-up labs and to serve as teaching assistants for the TA training course. Since Fall 2009, very few GAT-1 positions are used in the Fall semester because the International students that have not passed English Language Proficiency Exams and cannot be Teaching Assistants fill most of the grading positions for organic chemistry lecturers.

C. Challenges and Goals of the Service Courses

In the short- and medium-term, budgetary and/or space constraints limit the scope of changes that might be made to improve the operation of the service courses or to do much that is ‘adventurous’ in adopting different models for achieving the goals of the program. TAMU’s financial allotment for TAs is now badly out-of-line with their stipends, and the stipends have been stagnant for several years. Before a modest cost of living increase in the 2012-13 year period, salaries for most FYP and Organic faculty have also not increased for several years. At the same time, enrollments have risen by about 15% in FYP lecture courses over the past four years. Laboratory enrollment increases have been more modest, but the number of GAT-1 positions has declined by ~10%. Simply put, fewer people are bearing a greater workload.

These difficulties notwithstanding, both the First-Year and Organic service programs have done well in continuously modifying curricula and facilities/equipment to continually provide a high-quality experience for the students we serve. In lecture rooms, audio-visual equipment has been continually upgraded. Technology upgrades in the labs have also been brought on-line on a continuous basis.

This section concludes with some areas where we believe there is some room for innovation in the teaching of our service courses:

(1) Effective ways to improve/modernize laboratories.
If we can get support for new lab experiment testing by graduate students, support needed for faculty in course development can be quite modest. In the FYP, for example, the introduction of new labs in polypyrrole and nanoparticle synthesis were evaluated, tested, and debugged quite smoothly by use of this model.

(2) Improve student performance.
There is increasing pressure at TAMU (and elsewhere) to improve graduation rates and accelerate graduation times. While we continue to try to make improvements, overall we feel we are doing a good job with the students as we get them. We can exert little direct control on the quality of our incoming students. Therefore, we are looking at ways we can better prepare our weakest students and remediate their deficiencies. To this end, we are now evaluating the use of diagnostic proficiency exams and considering options whereby remedial instruction might be provided to students entering the chemistry FYP.
Abbreviated *curricula vitae* of all faculty members are found in section XIII of this document. Over the past seven years (2005-2012), the 42 tenure-track and 14 non-tenure-track faculty whose primary appointment is in the Department of Chemistry have educated >96,100 students through teaching *ca.* 1550 sections of courses, and have published *ca.* 1800 published articles and delivered *ca.* 2200 lecture presentations. They have mentored *ca.* 320 postdoctoral research associates, 580 Ph.D. students and 390 undergraduate research students. In order to carry out these multiple missions, the department has an annual instructional budget of *ca.* $10M and the faculty has attracted significant external research support, totaling over $18M. Additionally, there are 5 faculty members who have primary appointments in other departments with joint appointments in chemistry. The following sections provide details on the profile and productivity of the faculty, currently and with trends over the past 20 years.

**A. Listings of the Faculty**

1. Tenure-track faculty members, listed according to divisions*

<table>
<thead>
<tr>
<th>Analytical Chemistry Faculty</th>
<th>Inorganic Chemistry Faculty</th>
<th>Physical/Nuclear Chemistry Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteas, James D.</td>
<td>Barondeau, David P.</td>
<td>Batteas, James D.</td>
</tr>
<tr>
<td>Hilty, Christian</td>
<td>Bluemel, Janet</td>
<td>Bevan, John W.</td>
</tr>
<tr>
<td>Macfarlane, Ronald D.</td>
<td>Clearfield, Abraham</td>
<td>Herschbach, Dudley R. (Physics)</td>
</tr>
<tr>
<td>North, Simon W.</td>
<td>Daresbourg, Donald J.</td>
<td>Hilty, Christian</td>
</tr>
<tr>
<td>Russell, David H.</td>
<td>Daresbourg, Marcetta Y.</td>
<td>Laane, Jaan</td>
</tr>
<tr>
<td>Schweikert, Emile A.</td>
<td>Dunbar, Kim R.</td>
<td>Lucchese, Robert R.</td>
</tr>
<tr>
<td>Son, Dong He</td>
<td>Gabbai, Francois P.</td>
<td>Natowitz, Joseph B.</td>
</tr>
<tr>
<td>Soriaga, Manuel P.</td>
<td>Gladysz, John A.</td>
<td>North, Simon W.</td>
</tr>
<tr>
<td>Vigh, Gyula</td>
<td>Hall, Michael B.</td>
<td>Rosynek, Michael P.</td>
</tr>
<tr>
<td>Zhang, Renyi (Atmospheric Sciences)</td>
<td>Hughbanks, Timothy R.</td>
<td>Scull, Marlan (Physics)</td>
</tr>
<tr>
<td></td>
<td>Ozerov, Oleg V.</td>
<td>Son, Dong He</td>
</tr>
<tr>
<td></td>
<td>Zhou, Hongcai (Joe)</td>
<td>Wheeler, Steven E.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Biological Chemistry Faculty</th>
<th>Organic Chemistry Faculty</th>
<th>Zhang, Renyi (Atmospheric Sciences)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barondeau, David P.</td>
<td>Barondeau, David P.</td>
<td></td>
</tr>
<tr>
<td>Begley, Tadhg P.</td>
<td>Begley, Tadhg P.</td>
<td></td>
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<tr>
<td>Daresbourg, Marcetta Y.</td>
<td>Burgess, Kevin</td>
<td></td>
</tr>
<tr>
<td>Hilty, Christian</td>
<td>Gabbai, Francois P.</td>
<td></td>
</tr>
<tr>
<td>Johnson, Arthur (Biochemistry &amp; Biophysics)</td>
<td>Gladysz, John A.</td>
<td></td>
</tr>
<tr>
<td>Lindahl, Paul A.</td>
<td>Harding, Kenneth E.</td>
<td></td>
</tr>
<tr>
<td>Liu, Wenshe</td>
<td>Liu, Wenshe</td>
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<tr>
<td>Macfarlane, Ronald D.</td>
<td>Ozerov, Oleg V.</td>
<td></td>
</tr>
<tr>
<td>Rauschel, Frank M.</td>
<td>Rauschel, Frank M.</td>
<td></td>
</tr>
<tr>
<td>Romo, Daniel</td>
<td>Romo, Daniel</td>
<td></td>
</tr>
<tr>
<td>Sacchettini, James C.</td>
<td>Singleton, Daniel A.</td>
<td></td>
</tr>
<tr>
<td>(Biochemistry &amp; Biophysics)</td>
<td>Watanabe, Coran M. H.</td>
<td></td>
</tr>
<tr>
<td>Scully, Marlan (Physics)</td>
<td>Wheeler, Steven E.</td>
<td></td>
</tr>
<tr>
<td>Watanabe, Coran M. H.</td>
<td>Wooley, Karen L.</td>
<td></td>
</tr>
<tr>
<td>Yang, Jiong</td>
<td>Yang, Jiong</td>
<td></td>
</tr>
</tbody>
</table>

* Several faculty are cross-listed in more than one division, with their names in bold font in their primary division; joint faculty (joint department) are shaded
2. Non-tenure-track faculty members

Brown, Lawrence S.
Gaede, Holly C., Chief Undergraduate Advisor
Goodey-Pellois, Joanna, Associate Graduate Advisor
Gopalakrishnan, Ganesa
Hildreth, Robert A.
Keeney-Kennicut, Wendy, Associate Director of the First Year Chemistry Program
Mawk, Elmo J., Associate Undergraduate Advisor
Mullen, Christine A.
Pennington, James D.
Ponnamperuma, Krishan
Santander, Patricio
Soriaga, Elizabeth
Tiner, Tammy H.
Williamson, Vickie M.

B. Profile of the Faculty: Numbers

1. Current numbers and trends over the past ca. 20 years

The Department of Chemistry at Texas A&M University currently consists of 56 faculty members, comprising 42 tenure-track and 14 non-tenure-track faculty members. Of the tenure-track faculty members, there are 3 Assistant Professors, 4 Associate Professors and 35 Full Professors, 11 of whom are University Distinguished Professors. There are also 2 University Distinguished Professors Emeritus, and we have 5 joint appointees, 3 of whom are University Distinguished Professors. The 14 non-tenure-track faculty members include 4 Instructional Assistant Professors, 8 Senior Lecturers, 1 Lecturer and Technical Coordinator, and 1 Lecturer.

Figure 1. Numbers of tenure-track, non-tenure track and combined total faculty members holding positions in the Department of Chemistry over the past 20 academic years.
The number of faculty members in the Department of Chemistry has fluctuated over the past twenty years, reaching a maximum of 73 in 2009-2010, and declining significantly over the past 3 years to the current status of having 56 total members. This decline in faculty numbers has occurred while the numbers of Ph.D. and undergraduate students have risen steadily (see Graduate and Undergraduate Program Overview sections). The tenure-track and non-tenure-track faculty serve distinctive purposes in providing education, training, scholarship, service, mentoring and outreach at the post-graduate, graduate and undergraduate levels, therefore, it is important to maintain strong numbers of quality personnel on each track. The economic downturn over the past few years has caused budget cuts and hiring freezes. There have been no additions of faculty since 2010, and with normal attrition and losses due to budget cuts, the 40 tenure-track faculty are reduced by 7 members, relative to the average of 47 over the past 20 years. The 14 non-tenure-track faculty are reduced by 1 member, relative to the 20-year average; however, they have lost the enhanced growth that had been occurring over the past \textit{ca.} 10-15 years, having been cut nearly in half from their maximum of 25 members, just three years ago.

2. Growth and attrition of tenure-track faculty

Over the past 18 years, the department has undergone dynamic changes in the tenure-track faculty, with 27 hires, yet 37 departures. Of the Assistant Professor hires, 10 have been promoted, 7 of whom remain on the faculty, 4 were denied tenure and 3 are currently at the Assistant Professor level, with 2 of those undergoing tenure reviews currently. There have been 7 senior faculty hires since 1999, with all 7 remaining at TAMU. In addition to the 4 negative tenure cases, attrition has included 12 faculty moves to other institutions, 14 retirements and 6 deaths. Clearly, our faculty is “top heavy” and there is a serious need to hire aggressively at the Assistant Professor level. There is also a need to replace the leadership and expertise of senior faculty members who have passed (Goodman) or have left the institution (Cremer and Simanek) recently. With the increasing student populations and diversity of chemistry research, the Department tenure-track faculty numbers cannot continue to remain at a level (40) that is 15% below our average number of faculty (47) and \textit{ca.} 25% below our high of nearly twenty years ago (54).
Table 1. Tenure-track faculty members who have joined the department since 1994.

<table>
<thead>
<tr>
<th>Faculty member</th>
<th>Year joined department</th>
<th>Current position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Standeart</td>
<td>1995</td>
<td>--</td>
</tr>
<tr>
<td>Victoria DeRose</td>
<td>1995</td>
<td>--</td>
</tr>
<tr>
<td>Simon North</td>
<td>1997</td>
<td>Professor</td>
</tr>
<tr>
<td>Paul Cremer</td>
<td>1998</td>
<td>--</td>
</tr>
<tr>
<td>Francois Gabbai</td>
<td>1999</td>
<td>Professor, Davidson Chair</td>
</tr>
<tr>
<td>Aaron Harper</td>
<td>1998</td>
<td>--</td>
</tr>
<tr>
<td>Eric Simanek</td>
<td>1998</td>
<td>--</td>
</tr>
<tr>
<td>Kim Dunbar</td>
<td>1999</td>
<td>University Distinguished Professor, Davidson Chair</td>
</tr>
<tr>
<td>Steve Miller</td>
<td>2000</td>
<td>--</td>
</tr>
<tr>
<td>Coran Wantanabe</td>
<td>2001</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Raymond Schaak</td>
<td>2003</td>
<td>--</td>
</tr>
<tr>
<td>Yi Qin Gao</td>
<td>2004</td>
<td>--</td>
</tr>
<tr>
<td>Eva Sevick</td>
<td>2004</td>
<td>--</td>
</tr>
<tr>
<td>James Batteas</td>
<td>2005</td>
<td>Professor</td>
</tr>
<tr>
<td>Brian Connell</td>
<td>2005</td>
<td>--</td>
</tr>
<tr>
<td>Dong Hee Son</td>
<td>2005</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>David Barondeau</td>
<td>2006</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Christian Hilty</td>
<td>2006</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Janet Blümel</td>
<td>2007</td>
<td>Professor</td>
</tr>
<tr>
<td>John Gladysz</td>
<td>2007</td>
<td>University Distinguished Professor, Dow Chair in Chemical Invention</td>
</tr>
<tr>
<td>Wenshe Liu</td>
<td>2007</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Jiong Yang</td>
<td>2007</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Hongcai Zhou</td>
<td>2008</td>
<td>Professor</td>
</tr>
<tr>
<td>Tadhg Begley</td>
<td>2009</td>
<td>University Distinguished Professor, D. H. R. Barton and Robert A. Welch Chair</td>
</tr>
<tr>
<td>Oleg Ozerov</td>
<td>2009</td>
<td>Professor</td>
</tr>
<tr>
<td>Karen Wooley</td>
<td>2009</td>
<td>University Distinguished Professor, W. T. Doherty-Welch Chair</td>
</tr>
<tr>
<td>Steven Wheeler</td>
<td>2010</td>
<td>Assistant Professor</td>
</tr>
</tbody>
</table>
Table 2. Tenure-track faculty members who have left the department since 1994.

<table>
<thead>
<tr>
<th>Faculty member</th>
<th>Year departing department</th>
<th>Reason for departure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emory Adams</td>
<td>1995</td>
<td>Retired</td>
</tr>
<tr>
<td>Edward Meyers</td>
<td>1995</td>
<td>Retired</td>
</tr>
<tr>
<td>Ralph Zingaro</td>
<td>1995</td>
<td>Retired</td>
</tr>
<tr>
<td>William McMullin</td>
<td>1996</td>
<td>Denied tenure</td>
</tr>
<tr>
<td>Alan Rodgers</td>
<td>1996</td>
<td>Retired</td>
</tr>
<tr>
<td>Donald Sawyer</td>
<td>1996</td>
<td>Retired</td>
</tr>
<tr>
<td>John Bockris</td>
<td>1997</td>
<td>Retired</td>
</tr>
<tr>
<td>Jeffery Kelly</td>
<td>1997</td>
<td>Left TAMU (Scripps)</td>
</tr>
<tr>
<td>Daniel O’Brien</td>
<td>1997</td>
<td>Retired</td>
</tr>
<tr>
<td>Yi-Noo Tang</td>
<td>1997</td>
<td>Retired</td>
</tr>
<tr>
<td>Kevin Wolf</td>
<td>1997</td>
<td>Deceased</td>
</tr>
<tr>
<td>Derek Barton</td>
<td>1998</td>
<td>Deceased</td>
</tr>
<tr>
<td>James Haw</td>
<td>1998</td>
<td>Left TAMU (USC)</td>
</tr>
<tr>
<td>Karl Gingrich</td>
<td>1999</td>
<td>Retired</td>
</tr>
<tr>
<td>Aaron Harper</td>
<td>2000</td>
<td>Left TAMU (USC)</td>
</tr>
<tr>
<td>Jack Lunsford</td>
<td>2000</td>
<td>Retired</td>
</tr>
<tr>
<td>Robert Standaert</td>
<td>2001</td>
<td>Denied tenure</td>
</tr>
<tr>
<td>Arthur Martell</td>
<td>2002</td>
<td>Retired</td>
</tr>
<tr>
<td>Gary Sulikowski</td>
<td>2004</td>
<td>Left TAMU (Vanderbilt)</td>
</tr>
<tr>
<td>Richard Crooks</td>
<td>2005</td>
<td>Left TAMU (UT-Austin)</td>
</tr>
<tr>
<td>Richard Schmitt</td>
<td>2005</td>
<td>Retired</td>
</tr>
<tr>
<td>Eva Sevick</td>
<td>2005</td>
<td>Left TAMU (UT-HSC-Houston)</td>
</tr>
<tr>
<td>Dwight Conway</td>
<td>2006</td>
<td>Retired</td>
</tr>
<tr>
<td>Victoria DeRose</td>
<td>2006</td>
<td>Left TAMU (UOregon)</td>
</tr>
<tr>
<td>Marvin Rowe</td>
<td>2006</td>
<td>Went to TAMU-Qatar</td>
</tr>
<tr>
<td>F. Albert Cotton</td>
<td>2007</td>
<td>Deceased</td>
</tr>
<tr>
<td>Steve Miller</td>
<td>2007</td>
<td>Denied tenure (UFlorida)</td>
</tr>
<tr>
<td>Raymond Schaak</td>
<td>2007</td>
<td>Left TAMU (Penn State)</td>
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<tr>
<td>A. Ian Scott</td>
<td>2007</td>
<td>Deceased</td>
</tr>
<tr>
<td>John Fackler</td>
<td>2008</td>
<td>Retired</td>
</tr>
<tr>
<td>John Hogg</td>
<td>2008</td>
<td>Deceased</td>
</tr>
<tr>
<td>Eric Simanek</td>
<td>2010</td>
<td>Left TAMU (TCU)</td>
</tr>
<tr>
<td>Yi Qin Gao</td>
<td>2010</td>
<td>Left TAMU (Changjiang, China)</td>
</tr>
<tr>
<td>Rand Watson</td>
<td>2010</td>
<td>Retired</td>
</tr>
<tr>
<td>Brian Connell</td>
<td>2012</td>
<td>Denied tenure</td>
</tr>
<tr>
<td>Paul Cremer</td>
<td>2012</td>
<td>Left TAMU (Penn State)</td>
</tr>
<tr>
<td>Wayne Goodman</td>
<td>2012</td>
<td>Deceased</td>
</tr>
</tbody>
</table>
C. Profile of the Faculty: Ranks

The faculty members of the Department of Chemistry have achieved high quality scholarship in research and teaching, and they hold leadership positions throughout the university and the broader scientific community. The tenure-track faculty are weighted heavily toward Full Professors (35, 83%), with minority numbers at the Associate (4, 10%) and Assistant (3, 7%) Professor levels. The 35 Full Professors hold 15 of the 40 Chairs in the College of Science, and 11 are University Distinguished Professors. There are also 2 University Distinguished Professors Emeritus. Of our 5 joint appointees, 3 are University Distinguished Professors and all but one hold Chaired positions; the one having a half-time appointment but also a Nobel Prize (1986, Chemistry). The 14 non-tenure-track faculty members are also highly experienced, with 4 having been promoted to Instructional Assistant Professors and 8 to Senior Lecturer positions. However, this situation of strength is tenuous for the future, without continued promotion and immediate aggressive hiring at all levels, especially at the junior level.

Table 3. Chairs and professorships held by Department of Chemistry faculty in 2012.

<table>
<thead>
<tr>
<th>Chair/Professorship</th>
<th>Holder</th>
<th>Year Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclotron Institute Bright Chair in Nuclear Science</td>
<td>Natowitz, Joseph</td>
<td>2002</td>
</tr>
<tr>
<td>Dow Chair in Chemical Invention</td>
<td>Gladysz, John</td>
<td>2007</td>
</tr>
<tr>
<td>Gradipore Chair in Separation Science in Chemistry</td>
<td>Vigh, Gyula</td>
<td>2001</td>
</tr>
<tr>
<td>Hershel E. Burgess Chair in Physics (Non-High Energy Physics), and Distinguished Research Chair (TEES)</td>
<td>Scully, Marlan*</td>
<td>1997 and 2000</td>
</tr>
<tr>
<td>Presidential Professor for Teaching Excellence</td>
<td>Bergbreiter, David</td>
<td>2006</td>
</tr>
<tr>
<td>Rachal Chair in Chemistry</td>
<td>Burgess, Kevin</td>
<td>2004</td>
</tr>
<tr>
<td>Robert A. Welch Foundation Chair and Derek Barton Professor in Chemistry</td>
<td>Begley, Tadhg</td>
<td>2009</td>
</tr>
<tr>
<td>W. T. Doherty-Welch Foundation Chair in Chemistry</td>
<td>Wooley, Karen</td>
<td>2009</td>
</tr>
<tr>
<td>E. L. Wehner-Welch Chair in Chemistry</td>
<td>Johnson, Arthur*</td>
<td>1994</td>
</tr>
<tr>
<td>Wolfe-Welch Chair in Science</td>
<td>Sacchettini, James*</td>
<td>1996</td>
</tr>
<tr>
<td>University Distinguished Professor</td>
<td>Begley, Tadhg</td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td>Clearfield, Abraham</td>
<td>2007</td>
</tr>
<tr>
<td>Chair/Professorship</td>
<td>Holder</td>
<td>Year Awarded</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Cremer, Paul</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>Darenbourg, Donald</td>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>Darenbourg, Marcetta</td>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>Dunbar, Kim</td>
<td>2007</td>
<td></td>
</tr>
<tr>
<td>Fackler, John**</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>Gladysz, John</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Herschbach, Dudley*</td>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>Johnson, Arthur*</td>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>Lunsford, Jack**</td>
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<tr>
<td>Macfarlane, Ronald</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Natowitz, Joseph</td>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>Raushel, Frank</td>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>Scully, Marlan*</td>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>Wooley, Karen</td>
<td>2011</td>
<td></td>
</tr>
</tbody>
</table>

* Joint appointees
** Emeritus faculty

**D. Profile of the Faculty: Diversity**

1. Academic age diversity

The Department’s average “academic age”, which is measured as the average number of years since the Department’s faculty members have completed their Ph.D. degrees, has been rising. The average number of years past the Ph.D. in 1994 was 24 years. Following the external review in 1994, the department hired new faculty and the average years since Ph.D. dropped to 23 years in 1999. The current average number of years since the Ph.D. has grown to its highest level, 28 years. The average years from Ph.D. for non-tenure-track faculty members is 22 in 2012. Including our joint appointees, 82% of the tenure-track faculty and 79% of the non-tenure-track faculty are more than 15 years beyond having completed their Ph.D. degree. Nonetheless, there are faculty members across all “academic ages”, and there have been additions of faculty at the senior level, so that new research areas and fresh perspectives have been added. The average of faculty careers at TAMU is 21 years for tenure-track and 16 for non-tenure track faculty members. Many of those external hires were promoted to University Distinguished Professorships, and internal promotions have also been pursued aggressively, to increase the proportion of Distinguished Professors vs. Professors, while maintaining a relatively low proportion of Associate and Assistant Professors.

| Table 4. Average and median numbers of years since completion of Ph.D. degrees (“academic age”) of tenure-track faculty in the Department, calculated for the years of 1994, 1999, 2004 and 2012. |
|-----------------------------------------------|----------------|----------------|----------------|----------------|
| average                                       | 24   | 23   | 27   | 28   |
| median                                        | 24   | 24   | 29   | 29   |

Faculty age distribution: years since Ph.D.

72
Figure 2. Numbers of years that have passed since the current (2012) tenure-track faculty members (including joint appointees) have completed their Ph.D. degrees.

Figure 3. Numbers of years that the current (2012) tenure-track faculty members have spent on the faculty in the Department of Chemistry at TAMU vs. the numbers of years that have passed since they completed their Ph.D. degrees.
Table 5. Distributions of tenure-track faculty members in the Department of Chemistry by rank in 1994, 1999, 2004 and 2012.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Professor</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>10</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Professor</td>
<td>29</td>
<td>29</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>Distinguished Professor</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>11</td>
</tr>
</tbody>
</table>

2. Gender diversity

The Department of Chemistry promotes gender equality and creates an atmosphere in which our faculty has thrived, regardless of gender. Currently, there are 6 female tenure-track faculty (15% of the primary faculty, 13% including joint appointees) and 7 non-tenure-track female faculty members (50%). All of the tenure-track female faculty members have been awarded tenure: 3 are University Distinguished Professors, 2 are Full Professors, and 1 is an Associate Professor. The productivity and impact of the research being conducted by our female faculty are outstanding, in fact, the average h-index for the female faculty is slightly higher than that for the males (38 vs. 37). All of the non-tenure-track female faculty members have also been promoted: 3 to the title of Instructional Assistant Professor and 4 to Senior Lecturer positions. Since the number of student credit hours that are taught by the non-tenure-track faculty is large, the representation of women in this group enhances the interactions of the general student body that take our service courses. However, the large fraction of the female faculty in the non-tenure track ranks is somewhat problematic in the message it sends to our graduate students. This is, of course, an issue that is broader than TAMU. There is conscientious effort to consider all faculty hires fairly, with attention to increasing equality in the numbers of faculty of each gender, and to adding faculty members from underrepresented groups.

3. Cultural diversity

The Department is home to a number of faculty members who originated and studied in countries outside the U.S., including China, England, Estonia, France, Germany, Hungary, Ireland, Korea, the Philippines, Russia, and Switzerland. The non-tenure track faculty enrich this further by contributing the cultures of India and Costa Rica. While this international diversity is beneficial to our department, increased representation of U.S.-born ethnic minorities is a priority as less than 10% of our faculty belong to underrepresented groups. This is especially important for Texas being a minority majority state.

E. Profile of the Faculty: Salaries

Although state and local economic issues have led to budget cuts and limited salary raises over the past couple of years, there is a general trend of increasing salaries for faculty across all ranks. Calculations performed for only the start- vs. end-point years of 2004 vs. 2012 indicate increased annual average salaries of 9, 30, 2, 12, 20 and 10% for the ranks of Distinguished Professor, Professor, Associate Professor, Assistant Professor, Senior Lecturer, and Lecturer, respectively. The newly awarded positions of Instructional Assistant Professors received salaries that are 28% higher in 2012 than was the average Senior Lecturer salary of 2004. There are some complications, however, with comparisons between and, even, within ranks, due to salaries.
for different faculty members varying from 9-12 months without uniformity, depending on additional factors, including committee service and other duties.

Figure 4. Fiscal year average salaries for faculty members from 2004 to 2012, according to rank.

### F. Productivity of the Faculty: Teaching

The tenure-track and non-tenure-track faculty members have uniformly demonstrated strong commitments to education, including the development of educational innovations and outreach activities (please see abbreviated details in the bio-sketches provided in section XIII). The minimum workload required for a faculty member is 9 teaching credits. For most faculty members, this educational effort is met with a combination of classroom/laboratory teaching credits and equivalent teaching credits. The equivalent teaching credits (e.g., undergraduate research, graduate research and seminar course credits administered by an advisor) allow for the reality that most tenure-track faculty members spend a significant portion of their time on the research-based education and training of future scientists. Taking into account only the classroom/laboratory teaching activities over the last 7 years (2005-2012), the tenure-track faculty taught 14,900 students (an average of 54 students/yr/tenure-track faculty member), primarily in graduate courses, upper-level undergraduate coursework or honors and majors sections of undergraduate courses. Much of the classroom teaching load of the department is placed on non-tenure track faculty, who taught 81,200 students (an average of 830 students/yr/non-tenure-track faculty member) over the same period of time. Many of the tenure-track and non-tenure track faculty are outstanding educators and have been recognized with both College-level and University – level teaching awards.

### G. Productivity of the Faculty: Mentoring

Most of the Department’s tenure-track faculty members operate active research programs, with training and mentorship of undergraduate students, graduate students and postdoctoral associates (please see abbreviated details in the bio-sketches provided in section XIII). The research group sizes range from the faculty member alone to the largest group of 27,
and there is currently an average of 11 members per group. From 2005-2012, the tenure-track faculty has provided research training to 390 undergraduate students, 580 Ph.D. students and 320 postdoctoral associates. Those students/postdocs have received many awards and have generated a significant body of scholarly research advances. Our students progress to further academic pursuits and are actively recruited by companies.

H. Productivity of the Faculty: Scholarly publications and presentations

Research productivity and dissemination in the form of written publications and presentations has remained high, as tracked over the past nearly 20 years, without an obvious correlation to the numbers of tenure-track faculty members. Over the past 12 years (2005-2012), Department research has generated \( \text{ca.} \) 1790 publications (5.8 papers/tenure track faculty / year) and a similar number of faculty member-delivered talks. As determined on October 31, 2012, the average h-index of the Department’s faculty (including jt. appointees) was 37, with a high of 72 and a low of 10. Comparison of the h-index vs. years since completion of the Ph.D. degree indicates that there is a range of impact levels (as measured by h-index, an admittedly imperfect parameter, but a measure nonetheless) of the publications by the Department’s faculty members across their breadth of “academic ages”. The data suggest a decrease in impact for the “35+ years since PhD” group.

![Figure 5. Total publications per year generated from research conducted in the Department of Chemistry.*](image-url)

*ISI results for ad=(texas a&m and station and chemistry) and au=(cotton f* or barondeau d* or batteas j* or begley t* or bergbreiter d* or bevan j* or bluemel j* or brown l* or burgess k* or clearfield a* or connell h* or conway d* or cremer p* or crooks t* or darenbourg m* or darenbourg d* or dense v* or dunbar k* or fackler j* or gabbai p* or gaede h* or gladysz j* or goodey-pellois j* or goodman w* or gopalakrishnan g* or hall m* or harding k* or harper a* or son d* or herschbach d* or hildreth r* or hilty c* or hogg j* or hughbanks t* or scott a* or johnson a* or keeney-kenmikut w* or laane j* or lindahl p* or liu w* or lucchese t* or macfarlane t* or martell a* or maw k* or miller s* or mullen c* or natowitz j* or north s* or ozerov o* or pennington j* or ponnanperuma k* or gao y* or raushel f* or romo d* or rosinke m* or rowe m* or russell d* or sacchettini j* or santander p* or schaak t* or schmitt r* or schweikert e* or scully m* or sevick e* or simanek e* or singleton d* or soriaga m* or soriaga e* or standeart r* or sulikowski g* or tiner t* or vigh g* or wantanabe e* or watson t* or wheeler s* or wheeler s* or williamson v* or wooley k* or yang j* or yeager d* or yennello s* or zhang r* or zhou h* or wells r or fitzpatrick p* or lunsford j*) refined by: document types= (article or proceedings paper or letter or review)
Figure 6. Average numbers of publications per faculty member generated each year from research conducted in the Department of Chemistry.

Figure 7. H-index vs. “academic age” of the tenure-track faculty members (including joint appointees). This graph shows the distribution in impact with the data points within the rectangle representing the natural average.
I. Productivity of the Faculty: Awards

Our tenure-track and non-tenure track faculty members have been awarded many prestigious honors for their scholarly research and educational activities. Many of the recent awards can be found in the bio-sketches provided in section XIII or in the tabulated listings below for years 2006-2010 (captured from Department annual reports).

Honors & Awards Received by Faculty, 2012

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Batteas</td>
<td>Fellow of the Royal Society of Chemistry</td>
</tr>
<tr>
<td>David Bergbreiter</td>
<td>Eppright University Professorship for Undergraduate Teaching Excellence</td>
</tr>
<tr>
<td>Marcetta Darensbourg</td>
<td>TAMU Association of Former Students Graduate Mentoring Award</td>
</tr>
<tr>
<td>Kim Dunbar</td>
<td>TAMU Women Former Students’ Network Eminent Scholar Award (inaugural)</td>
</tr>
<tr>
<td>Wenshe Liu</td>
<td>NSF CAREER Award</td>
</tr>
<tr>
<td>Oleg Ozerov</td>
<td>ACS Award in Pure Chemistry</td>
</tr>
<tr>
<td></td>
<td>Welch Foundation Norman Hackerman Award in Chemical Research</td>
</tr>
<tr>
<td>Daniel Romo</td>
<td>TAMU Academy of Distinguished Former Students Inductee</td>
</tr>
<tr>
<td>Jiong Yang</td>
<td>NSF CAREER Award</td>
</tr>
<tr>
<td>Sherry Yennello</td>
<td>TAMU Association of Former Students Distinguished Teaching Award</td>
</tr>
</tbody>
</table>

Honors & Awards Received by Faculty, 2011

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
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</thead>
<tbody>
<tr>
<td>David Bergbreiter</td>
<td>Fellow of the American Chemical Society</td>
</tr>
<tr>
<td></td>
<td>Wells Fargo Award for Teaching Excellence, Texas A&amp;M University</td>
</tr>
<tr>
<td>Lawrence Brown</td>
<td>TAMUS Teaching Excellence Award</td>
</tr>
<tr>
<td>P. Cremer</td>
<td>Excellence in Innovation Award, Texas A&amp;M University</td>
</tr>
<tr>
<td></td>
<td>Fellow, American Association for the Advancement of Science</td>
</tr>
<tr>
<td>Marcetta Darensbourg</td>
<td>Fellow of the American Academy of Arts &amp; Sciences</td>
</tr>
<tr>
<td></td>
<td>Distinguished Scientist Award, Sigma Xi</td>
</tr>
<tr>
<td>Kim Dunbar</td>
<td>Fellow of the American Chemical Society</td>
</tr>
<tr>
<td>François Gabbaï</td>
<td>Fellow of the American Chemical Society</td>
</tr>
<tr>
<td>Holly Gaede</td>
<td>TAMU Association of Former Students College Level Teaching Award</td>
</tr>
<tr>
<td>O. Ozerov</td>
<td>ACS Award in Pure Chemistry, American Chemical Society</td>
</tr>
<tr>
<td>D. Romo</td>
<td>Distinguished Achievement Award - Research, The Association of Former Students</td>
</tr>
<tr>
<td>G. Vigh</td>
<td>Halász Medal Award, Hungarian Society for Separation Sciences</td>
</tr>
<tr>
<td>S. Yennello</td>
<td>Fellow, American Physical Society</td>
</tr>
</tbody>
</table>
### Honors & Awards Received by Faculty, 2010

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>K. Burgess</td>
<td>Distinguished Achievement Award - Research, The Association of Former Students</td>
</tr>
<tr>
<td>P. Cremer</td>
<td>Edith and Peter O’Donnell Award, The Academy of Medicine, Engineering and Science of Texas Fellow, American Association for the Advancement of Science</td>
</tr>
<tr>
<td>D. Darenbourg</td>
<td>Award in Inorganic Chemistry, American Chemical Society</td>
</tr>
<tr>
<td>D. Goodman</td>
<td>Southwest Regional Science Award, American Chemical Society</td>
</tr>
<tr>
<td>K. Harding</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
<tr>
<td>R. Hildreth</td>
<td>Outstanding Staff Achievement Award, College of Science</td>
</tr>
<tr>
<td>W. Keeney-Kennicutt</td>
<td>Piper Professor Award, Minnie Stevens Piper Foundation</td>
</tr>
<tr>
<td></td>
<td>Student Led Award - Teaching Excellence, Texas A&amp;M University</td>
</tr>
<tr>
<td>S. North</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
<tr>
<td>K. Wooley</td>
<td>Polymer Chemistry Division, Founding POLY Fellow, American Chemical Society</td>
</tr>
<tr>
<td>S. Yennello</td>
<td>Outstanding Mentoring Award, Women’s Faculty Network</td>
</tr>
</tbody>
</table>

### Honors & Awards Received by Faculty, 2009

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
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</thead>
<tbody>
<tr>
<td>D. Bergbreiter</td>
<td>Student Led Award - Teaching Excellence, Texas A&amp;M University</td>
</tr>
<tr>
<td>J. Fackler</td>
<td>Fellow, American Chemical Society</td>
</tr>
<tr>
<td>F. Gabbaï</td>
<td>Dalton Lecturer in Inorganic Chemistry</td>
</tr>
<tr>
<td>J. Gladysz</td>
<td>Fellow, American Chemical Society</td>
</tr>
<tr>
<td>D. Goodman</td>
<td>Fellow, Royal Society of Chemistry</td>
</tr>
<tr>
<td>W. Keeney-Kennicutt</td>
<td>Outstanding Professor, Pi Beta Phi</td>
</tr>
<tr>
<td>W. Keeney-Kennicutt</td>
<td>Presidential Professor - Teaching Excellence Award, Texas A&amp;M University</td>
</tr>
<tr>
<td>W. Keeney-Kennicutt</td>
<td>Presidential Professor of Teaching Excellence, Texas A&amp;M University</td>
</tr>
<tr>
<td>J. Laane</td>
<td>Humboldt Research Award, Alexander von Humboldt-Stiftung/Foundation</td>
</tr>
<tr>
<td>S. North</td>
<td>Distinguished Achievement Award - Teaching, Association of Former Students</td>
</tr>
<tr>
<td>F. Rauschel</td>
<td>Repligen Award in Chemistry of Biological Processes, ACS Division of Biological Chemistry</td>
</tr>
<tr>
<td>D. Romo</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
<tr>
<td></td>
<td>Method to Extend Research in Time (MERIT) Award, National Institutes of Health</td>
</tr>
<tr>
<td>Name</td>
<td>Award</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>K. Wooley</td>
<td>American Competitiveness and Innovation Fellow, National Science Foundation</td>
</tr>
<tr>
<td></td>
<td>Herman F. Mark Scholar Award, American Chemical Society</td>
</tr>
<tr>
<td></td>
<td>Special Creativity Extension, National Science Foundation</td>
</tr>
<tr>
<td>R. Zhang</td>
<td>Bush Excellence Award for Faculty in International Research, George Bush Presidential Library Foundation</td>
</tr>
</tbody>
</table>

**Honors & Awards Received by Faculty, 2008**

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Bergbreiter</td>
<td>Distinguished Achievement Award - Research, The Association of Former Students</td>
</tr>
<tr>
<td></td>
<td>Southwest Regional Award, American Chemical Society</td>
</tr>
<tr>
<td>A. Clearfield</td>
<td>Gallery of Success Award, Temple University</td>
</tr>
<tr>
<td></td>
<td>National Northeast ACS Division Award - Excellence in Academic Research, American Chemical Society</td>
</tr>
<tr>
<td>D. Goodman</td>
<td>JoAnn Treat Research Excellence Award, Texas A&amp;M Research Foundation</td>
</tr>
<tr>
<td>D. Russell</td>
<td>ALA Innovation Award, LabAutomation</td>
</tr>
<tr>
<td>J. Sacchettini</td>
<td>Distinguished Achievement Award, Association of Former Students</td>
</tr>
<tr>
<td></td>
<td>Patent and Innovation Award, Texas A&amp;M University</td>
</tr>
<tr>
<td>D. Singleton</td>
<td>Arthur C. Cope Scholar Award, American Chemical Society</td>
</tr>
<tr>
<td></td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
<tr>
<td>C. Watanabe</td>
<td>Dreyfus Lectureship Award, American Chemical Society</td>
</tr>
<tr>
<td>S. Yennello</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
</tbody>
</table>

**Honors & Awards Received by Faculty, 2007**

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. Fackler</td>
<td>Distinguished Achievement Award – Research, The Association of Former Students</td>
</tr>
<tr>
<td>J. Gladysz</td>
<td>International society of Fluorous Technology, University of Pittsburgh</td>
</tr>
<tr>
<td>J. Hogg</td>
<td>Presidential Professor for Teaching Excellence, Texas A&amp;M University</td>
</tr>
<tr>
<td>W. Keeney-Kennicutt</td>
<td>Excellence in Quality Enhancement Award, 7th Annual Texas A&amp;M Assessment Conference</td>
</tr>
<tr>
<td>J. Pennington</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
<tr>
<td>M. Rosynek</td>
<td>Distinguished Achievement Award – Teaching, The Association of Former Students</td>
</tr>
<tr>
<td>M. Tichy</td>
<td>Teaching Award, Corps of Cadets</td>
</tr>
<tr>
<td>G. Vigh</td>
<td>Distinguished Achievement Award – Teaching, The Association of Former Students</td>
</tr>
<tr>
<td>S. Yennello</td>
<td>Regents Professor Award, Texas A&amp;M University System</td>
</tr>
<tr>
<td>R. Zheng</td>
<td>Outstanding Overseas Young Research Award, China National Science Foundation</td>
</tr>
<tr>
<td>Name</td>
<td>Award</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>D. Bergbreiter</td>
<td>Presidential Professor for Teaching Excellence, Texas A&amp;M University</td>
</tr>
<tr>
<td></td>
<td>Wells Fargo Honors Faculty Mentor Award, Texas A&amp;M University</td>
</tr>
<tr>
<td>F. Cotton</td>
<td>Distinguished Achievement Award - Research, The Association of Former students</td>
</tr>
<tr>
<td></td>
<td>George C. Pimentel Award in Chemical Education, Dow Chemical</td>
</tr>
<tr>
<td></td>
<td>Honorary Doctorate, Lanzhou University</td>
</tr>
<tr>
<td></td>
<td>Honorary Professorship, Sun-Yat Sen University (Quangzhou)</td>
</tr>
<tr>
<td></td>
<td>Honorary Professorship, Renmin University (Beijing)</td>
</tr>
<tr>
<td></td>
<td>Kuivila Lecturer, SUNY- Albany</td>
</tr>
<tr>
<td>P. Cremer</td>
<td>Faculty Early Career Development (CAREER), National Science Foundation</td>
</tr>
<tr>
<td></td>
<td>Norman Hackerman Award in Chemical Research, The Welch Foundation</td>
</tr>
<tr>
<td></td>
<td>Pittsburgh Conference Achievement Award, The Pittsburgh Conference &amp; Exposition on Analytical Chemistry &amp; Applied Spectroscopy</td>
</tr>
<tr>
<td></td>
<td>Southwest Regional Young Investigator Award, Sigma Xi</td>
</tr>
<tr>
<td>M. Darensbourg</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
<tr>
<td></td>
<td>Outstanding Alumnus of Kentucky, University of Kentucky</td>
</tr>
<tr>
<td>K. Dunbar</td>
<td>Distinguished Achievement Award - Graduate Mentoring, The Association of Former Students</td>
</tr>
<tr>
<td>J. Fackler</td>
<td>Visiting Lecturer, Chemistry Research Promotion Center, R.O.C., Taiwan</td>
</tr>
<tr>
<td>Y. Gao</td>
<td>Searle Scholar Award, The Chicago Community Trust</td>
</tr>
<tr>
<td>C. Hilty</td>
<td>Camille Dreyfus New Faculty Award, Camille and Henry Dreyfus Foundation</td>
</tr>
<tr>
<td>A. Johnson</td>
<td>JoAnn Treat Research Excellence Award, Texas A&amp;M University</td>
</tr>
<tr>
<td>R. Lucchese</td>
<td>Fellowship, Japan Society for the Promotion of Science</td>
</tr>
<tr>
<td>S. Miller</td>
<td>Faculty Early Career Development (CAREER), National Science Foundation</td>
</tr>
<tr>
<td>C. Murillo</td>
<td>Fellow, American Association for the Advancement of Science</td>
</tr>
<tr>
<td>J. Pennington</td>
<td>Fish Camp Namesake, Texas A&amp;M University</td>
</tr>
<tr>
<td>R. Schaak</td>
<td>Beckman Young Investigator Award, Arnold and Mabel Beckman Foundation</td>
</tr>
<tr>
<td></td>
<td>DuPont Young Professor Grant, DuPont Fellows Forum</td>
</tr>
<tr>
<td></td>
<td>Faculty Early Career Development (CAREER), National Science Foundation</td>
</tr>
<tr>
<td>V. Williamson</td>
<td>Best Practices Course, College Board Advanced Placement</td>
</tr>
</tbody>
</table>
**J. Productivity of the Faculty: External research support**

The total external funding for research has been consistently higher during the past six years, relative to the prior decade. The majority of the support is from federal sources, with private/non-profit organizations being the second largest contribution and additional amounts provided by state, industrial, university and other organizations.

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**Figure 8.** Annual total external research funding for the Department.

**Figure 9.** Annual total external research funding for the Department, including individual categories of sources for funds.
**K. Productivity of the Faculty: Service**

The Department faculty is active in service throughout the Department, TAMU and the national and international scientific communities, holding important advisory board positions and serving leadership roles on committees. For instance, Tadhg Begley serves on the Dean’s Committee on Promotions and Tenure, Dave Bergbreiter is a member of the ACS Joint Board/Council Committee on Publications, Holly Gaede directs our NSF-REU program, John Gladysz serves as Chair of the Executive Committee of the University Distinguished Professors, Joanna Goodey-Pellois and Wendy Keeney-Kennicutt served as Coordinators for the recent Chemistry Open House with activities provided by large numbers of our students and faculty and attendance by ca. 1000 local residents, Jaan Laane is a member of the Board of Directors and Co-Chair of the Alumni Council, American Friends of the Alexander von Humboldt Foundation and serves on the Scientific Advisory Board for the European Congress o Molecular Spectroscopy, Jim Pennington is the Coordinator for the TAMU Chemistry Road Show, and Karen Wooley is Chair of the NIH NANO study section and an International Scientific Advisory Board member for the Dutch BioMedical Materials program. We also have on our faculty ca. 10 editors of chemistry-related journals and our faculty members serve on the Editorial Advisory Boards of a large number of journals (http://www.chem.tamu.edu/faculty/journals/). To reserve the length of section XIII, committee service information was not requested, although some of the more prestigious roles are given.

**L. Faculty Review**


**M. State of the Faculty**

A key characteristic of any university is change: expansion in knowledge, generated through scholarship; matriculation and graduation of students, through the educational process; and the hiring, promotion and loss of faculty. The Department has been a leader in the advancement of chemistry through research, with high productivity as measured by publications, presentations and financial support. It has also exhibited a strong commitment to the education, training and mentorship of our students. However, with the decline in faculty member numbers and the increase in faculty “academic age”, one of the grandest challenges facing the Department of Chemistry is the recruitment and retention of our faculty. TAMU began a significant effort in 2002, with the goal to hire 447 new tenure-track faculty members over a six year period of time, for which 14 of those positions were allocated to Chemistry. Seventeen faculty members have been added (Table 1) since 2002, with 9 of those being senior hires. The senior hires have added research area diversity and were recruited as a combination of rising stars and established scholars. With those hires came significant resources, which has improved the Department as a whole, but has also led in many cases to inequalities of research space and resources. Therefore, attention must be paid toward improving the facilities for faculty members who have dedicated their careers to TAMU. As an important aid in this directive, Janet Bluemel and John Gladysz have generously dedicated provisions in their estate plan to establish two future chairs for the Department—one to provide resources for internal faculty retention and the other for external faculty recruitment (http://www.science.tamu.edu/articles/959). The Department has also been active in promoting its faculty from Associate to Full Professor and further to the level of University Distinguished Professor. Of the 17 junior appointments that have been made since
1994, 10 have been promoted with tenure, and 4 have not. As this report was being finalized, the Department vote on the 2 faculty members undergoing tenure review was made, as 1 approved and 1 declined. The eminent loss of that faculty member is disconcerting at a personal level and also for the Department, as the most recent 2 tenure denials were for faculty members in the Organic Division, and another senior-level Organic faculty member left for another institution in 2010. The Physical/Analytical Divisions have also experienced significant losses, with the departure and death of two members in the past year. Therefore, the greatest needs of the Department faculty are the addition of members to the Organic and Physical/Analytical Divisions, the addition of junior faculty members and the improvement of conditions to retain our current faculty strengths.
VIII. The Departmental Staff (provided by James Batteas)

The department maintains a significant support staff including a business administration office, a number of administrative assistants to the faculty, and technical support staff for our research and teaching functions. This last category includes support staff for the first year chemistry program, organic chemistry teaching labs and our graduate program. Without these individuals, the department would not be able to function. The staff interfaces with the department through an elected Staff Advisory Committee. The present Staff Advisory Committee includes: Mr. Julian Coleman, Mr. Cutis Lee, Ms. Sandy Manning, Dr. Bill Russell, Ms. Julie Zercher, and is presently chaired by Mr. Derek Pitts. This staff committee was formed to provide a mechanism for the department head to communicate information with the staff and to represent the staff in the governance of the department. The Staff Advisory Committee also functions to help build a sense of ownership among Staff and improve efficiency, morale, and equity within the Department.

In preparation for this external review a staff survey was developed in conjunction with the Staff Advisory Committee to aid in identifying areas for improvement in the staffing of the department as well as to collect the staffs’ input on the structure and operations of the department. The detailed results of the staff survey can be found in Appendix A14.

A. Survey of the Staff and Key Findings from the Survey

Here we summarize these results and address key points raised by the survey. In the survey 48 total responses were collected, split among three main categories (academic, administration and technical support staff). The majority of the respondents have been employed by the department for 6 years or more.

1. Working an Overload

An immediate finding is that the staff workload has increased over the last three years. This increase can be likely tied to increasing demands on the department while being faced with diminishing support from the university. The budget cuts of the recent years have hampered our ability to hire and promote staff in an appropriate fashion, resulting in significant increases in workload for our existing staff. This has in many cases created a mismatch between job titles and the tasks staff are currently undertaking. This is a challenge as it limits the flexibility of the department to organize staff into more suitable positions and to hire additional staff to address emerging needs. For example, as faculty are granted tenure and their groups continue to increase in size and complexity there is an increased need for administrative support. A challenge here has been effective communication between the faculty, staff and business administration office as to how these needs of the faculty can be met. Often decisions are made and communicated after the fact, especially in cases of assignments of administrate support staff.

The overload has led to the general feeling that the staff is not valued by the department and recognition for their efforts in light of the increased workload has not been forthcoming. Again here, the department has focused on recognition in terms of monetary compensation,
which in light of the budget shortfalls and cuts has made this virtually impossible to do. This is clearly noted by more than half of the staff indicating that they are not fairly compensated for their work. The department should develop a more consistent set of measures to reward and recognize the efforts of the staff in other ways. Also, the general lack of transparency and communication to the staff of the financial challenges that face the department has been a general complaint. A potential solution would be to add the chair of the Staff Advisory Committee to the Academic Operation Council in order to provide an additional route of communication between the head’s office and the faculty with the staff.

It is worth noting that, despite these challenges 80% of the staff surveyed report feeling loyalty toward the department.

2. **Training and Resources**

An integral part of job satisfaction is the matching of skill sets, resources and training to the tasks being undertaken. The majority of the staff (67%) feels that their professional and technical skills are being properly utilized and more than 80% have the needed resources. In general the staff feels that their immediate supervisors are encouraging them to pursue professional growth through enhanced training. However, 61% of staff do not feel encouraged to pursue professional growth by the department. A possible solution is for the department to develop professional training guidelines that encourage skills advancement by recognizing and rewarding staff.

A common issue among newly hired staff is that it takes too long to learn assigned responsibilities and what is required to accomplish tasks. As an enhancement to existing training and resources, a well-defined and maintained handbook of resources, FAQs and Standard Operating Procedures would increase efficiency in staff, especially newly hired administrative support staff.

3. **Communication**

Effective communication between the department head’s office, the business administration office, the faculty and the staff is of course key and essential. The overall response to the survey with regards to communication is generally neutral to positive. However, approximately 25% of the responses indicate poor communication, showing there is room for improvement. A potential solution would be to have staff representation on the Academic Operation Council.

4. **Conflict Resolution**

When considering the response to the survey with regard to raising concerns, nearly half of those surveyed indicated that they felt the need to raise a concern. These concerns were raised within the department’s administrative structure 79% of the time, outside the department 14% of the time and not raised 7% of the time. Overall, the majority of respondents who raised a concern were dissatisfied with how it was handled. A possible solution would be to implement a process in which complaints/conflicts are documented and required to be resolved within a reasonable time period. Communicating the status and actions resulting from the process would be an important part of this protocol.

5. **Outcomes of the survey**

It was clearly noted in the survey that the majority of the staff do not feel that this survey will lead to any significant changes within the department. As such, the department should seek to address these concerns in conjunction with the Staff Advisory Committee. Including the Staff Advisory Committee early in the governance process will help to change this perception.
**B. Summary of challenges and recommendations**

While the Staff Committee has been officially recognized in the Departmental By-laws and on the list of official committees, a more effective means of communication between the department head, business office and faculty with the staff needs to be implemented. As suggested in the July 24, 2008 meeting between the Department Head and the Staff Advisory Committee, the department should integrate the participation of staff into other functional committees such as the Academic Operations Council. Through these interactions, the Staff Advisory Committee should be included in discussions related to budgetary impacts on the department. This is especially of concern to the staff as budgetary fluctuations impact the mechanisms by which they can be rewarded for their hard work and exemplary performance and on how workload and tasks can be assigned. Further, methods should be developed to recognize staff in non-monetary ways. Conflict resolution should be addressed by the implementation of a formal process in which complaints/conflicts are documented and resolved. The department should develop training guidelines and a handbook of resources, FAQs and Standard Operating Procedures.
IX. Infrastructure, Support Staff and Facilities
(provided by James Batteas)

A. Scientific and Administrative Support Staff

Key to the functioning of the department is the support and expertise offered by a talented group of support and research staff. Their contributions to the department play an invaluable role in the research and educational missions of the department. A listing of Scientific and Administrative staff is given in Table 1. The Scientific and Administrative staff interfaces with the department administration through an elected Staff Committee. The details of the overall governance of the department as related to scientific and administrative staff support is covered in detail in section II of this self-study report. Here, we highlight the internal and external research facilities that support the department. The facilities associated with the teaching of the First Year Program (FYP) in chemistry are also discussed in a separate section.

Table 1. Research and Support Staff

<table>
<thead>
<tr>
<th>INSTRUMENTATION SPECIALISTS</th>
<th>SERVICE STAFF</th>
<th>DEPARTMENT BUSINESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silber, Steven (Facility Manager, NMR Lab)</td>
<td>Pitts, Derek (Senior IT Manager, Computer Network Support)</td>
<td>Carter, Ronald (Assistant Department Head)</td>
</tr>
<tr>
<td>Bakhmoutov, Vladimir (Staff Spectroscopist, NMR Lab)</td>
<td>Wen, Weihong (Software Applications Developer)</td>
<td>Kosh, Mary (Finance/Accounting)</td>
</tr>
<tr>
<td>Sarathy, K. Partha (Staff Spectroscopist, NMR Lab)</td>
<td>Miller, Mark (Senior Systems Analyst)</td>
<td>Zercher, Julie (Graduate Student Accounting)</td>
</tr>
<tr>
<td>Russell, William (Associate Director, Biological Mass Spectrometry Lab)</td>
<td>Green, Michael (Systems Analyst)</td>
<td>Harnden, Sandra (Purchasing Specialist)</td>
</tr>
<tr>
<td>Rezenom, Yohannes (Service Lab Manager, Mass Spectrometry Lab)</td>
<td>Coleman, Julian (Systems Analyst)</td>
<td>Lee, Curtis (Facilities Coordinator)</td>
</tr>
<tr>
<td>Pai, Pei-Jing, (Postdoctoral Research Assistant, Mass Spectrometry Lab)</td>
<td>Pehl, Timothy (Electronics Shop)</td>
<td>Ludwig, Judy (Personnel Services Supervisor, Budgets)</td>
</tr>
<tr>
<td>Santiago, Vanessa, (Assistant Research Scientist, Mass Spectrometry Lab)</td>
<td>Merka, William (Glass Shop)</td>
<td>Morgan, Mary (Monthly Payroll)</td>
</tr>
<tr>
<td>Reibenspies, Joseph (Associate Director, X-Ray Diffraction Lab)</td>
<td>Seward, William (Machine Shop)</td>
<td>Victorick, Janice (Biweekly Payroll)</td>
</tr>
<tr>
<td>Bhuvanesh, Nattamai (Lab Manager, X-Ray Diffraction Lab)</td>
<td>Page, Ronald (Master Instrument Maker)</td>
<td>Medina, Angie (Personnel)</td>
</tr>
<tr>
<td>Hall, Michael, Director, Molecular Simulation Lab</td>
<td>Wymola, Phillip (Stockroom)</td>
<td>Stickley, Angie (Research &amp; Gift Appropriations)</td>
</tr>
<tr>
<td>Perez, Lisa (Manager Molecular Simulation Lab)</td>
<td>Williams, Melvin (Stockroom)</td>
<td>Richards, Susan (Welch &amp; Research Grants)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>King, Crystal (Record Reconciliation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Williams, Lindsey (Fixed Assets Inventory Control)</td>
</tr>
</tbody>
</table>
B. Summary of Overall Infrastructure – Availability and Quality of Research Space

The department is housed in five primary buildings in the main complex, teaching facilities for our First Year Chemistry Program (FYP) in Heldenfelds and assigned research space in Reed McDonald Hall and the Interdisciplinary Life Sciences Building.

While the research of the faculty continues to be top rate, the facilities overall have diminished in quality since the last external review due to the general lack of upkeep by the university administration through its policies of deferred maintenance. We feel that this presents a significant barrier to hiring new faculty and attracting top notch graduate students into our department, as programs of comparable standing have in recent years made additions of new buildings or substantial renovations to create modern research facilities. As noted in the faculty survey with regards to space and facilities, while most faculty are in general satisfied with the amount and quality of their spaces, notable exceptions can be found. For example in one case a single group was flooded 7 times in the span of six months due to failing infrastructure. This particular problem has been known but has gone un-rectified for more than a decade. To improve the research facilities the department has taken the course of piecemeal renovations, with renovated space predominately being provided only in conjunction with new hires or as components of retention packages. A more proactive renovation plan should be put into place to ensure the continued functioning of the department as a top research and educational program. This should also include plans for improvements in teaching space to accommodate larger class sizes and more advanced laboratory instruction.

The department maintains a broad range of in house research facilities which have seen good growth and support since the last external review. These include Shop Facilities (glass, electronics and machining), Research Facilities (NMR, chemical analysis and mass spectrometry, EPR, X-ray, computational) and Information Technologies Services. These
facilities are augmented by administrative support for the day to day operations within the department and faculty member laboratories.

C. Shops, Stockroom, and Information Technology Facilities

The departmental shops, which include the machine shop, the electronics shop, and the glass shop play a crucial role in maintaining a broad range of research programs. In 2008, a Shops Committee was formed to oversee the operation of the shops and to evaluate the expenditures and needs of these facilities. These services are essential for assisting new faculty members in the early years of their careers. The machine shop and electronics shop, in particular, are critical to the success of groups in Analytical and Physical Chemistry which depend on novel instrument development and fabrication and to the training of graduate students in instrumental design. While there was a small decrease in the number of full-time staff in these facilities since 1994, the department has maintained the number of staff since the last external review.

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass Shop</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Electronics Shop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Machine Shop</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

1. Machine Shop

The department maintains a fully functioning machine shop. A major improvement has been seen since the last external review through a complete revamping of the chemistry machine shop. In 2008, with support from the College of Science totaling $250,000, the machine shop updated all of its equipment to modern CNC equipment and hired two new machinists. One of the machinists is an instrument design specialist. This has significantly improved the capabilities of the shops in terms of supporting the research activities of the department and has led to a marked decrease in the needs of faculty to find specialized machining outside of the department.

2. Glass Shop

The glass shop is also a vital resource to the department and provides services to numerous outside users within the University. It is currently the only glass blowing facility on campus. While the glass shop continues to provide exceptional service to the department, a key challenge for the future will be to identify and hire additional staff to take over the glass shop when our current glass blower decides to retire.

3. Electronics Shop

The department also maintains an electronics shop that performs routine instrumentation maintenance and repair, supporting both research and teaching laboratories. At present the shop is staffed by a single lead technician with student worker support. The shop also assists in supporting the audio-visual needs in all of the classrooms.

4. Stockroom

The department maintains a fully staffed stockroom (two fulltime staff members along with student workers) which provides students with immediate access to chemicals, glassware, specialty gases and basic laboratory instrumentation and safety equipment. The stockroom is open M-F 8 AM – 5 PM. In addition to providing these above listed services, the stockroom
staff also handles shipping and receiving for the department providing routine express mail services and the handling of incoming packages and instrumentation.

5. Information & Communications Technology

The Department of Chemistry has formed the Information and Communications Technology (ICT) Group and the Information and Communications Technology Committee which is comprised of IT Staff, Faculty, and Research Staff. The ICT Committee serves as an advisory panel to formulate the departmental policies on information and communications technology and to provide long term planning and vision for the ICT Group. The ICT Group is comprised of five full time employees (Senior IT Manager, Senior Systems Analyst, two Systems Analysts, Software Applications Developer) and seven student workers.

The ICT Group handles all aspects of IT within the Department of Chemistry. The ICT Group is responsible for infrastructure, security, business operations, research computing, communications, teaching support, and other services. Infrastructure managed by the ICT Group includes networking in the Main Chemistry Complex, server rooms, server virtualization technologies, and server backups. Security practices include enforcement of computing ethics policies, server hardening and patch management, password audits, Social Security Number scanning. Centrally managed antivirus software is provided by the ICT Group. Communications managed by the ICT Group include email, calendar, collaboration, web applications, and web servers. Research computing supported by the ICT Group includes departmental supercomputers, grid computing, and individual research group servers. Business operations supported by the ICT Group consist of database management, business applications, and application development. Services provided by the ICT Group include web application development, Helpdesk, and IT consulting. Teaching operations supported by the ICT Group include classroom technology, laboratory computing support, and online learning applications.

The ICT Group is currently implementing a file syncing service, a department wide backup solution, and a departmental firewall and intrusion prevention system. The departmental web server is currently being transitioned to a content management system to allow users to manage their own content more effectively. Long term planned services include the implementation of private cloud technology and the implementation of departmental single sign on. Additional resources for research computing are needed to update and expand our current offerings and to stay competitive with other universities.

D. Research Facilities

The department continues to maintain exceptional research facilities. The annual reports of these facilities from 2011 are given in Appendix A2. We briefly describe each here below.

1. Center for Chemical Characterization and Analysis

The Center for Chemical Characterization and Analysis at Texas A&M University is a component of the Department of Chemistry. The Center is a research support facility partially funded by the Office of the Vice President for Research and Associate Provost for Graduate Studies which provides state-of-the-art capabilities for organic and inorganic analysis and structural characterization. Four specialized laboratories each address a specific area of interest. Those areas and laboratories are: Elemental Analysis, X-ray Crystallography and Molecular Structure, Nuclear Magnetic Resonance, and Mass Spectrometry.
The Elemental Analysis Laboratory (EAL) is a component of the Center for Chemical Characterization and Analysis (CCCA) housed in the Teague Building on the University’s main campus. The Laboratory represents a continuance of Texas A&M University’s efforts in the area of nuclear analytical method development which now spans over 50 years. The Activation Analysis Research Laboratory, from which our laboratory is descended, was established in 1958 and played a significant role in the early developments of the field. In fact, just this last spring (March 13-18, 2011), we celebrated the 50th anniversary of the major conference series in activation analysis and radiochemistry by hosting the 13th International Conference on Modern Trends in Activation Analysis (MTAA-13). The significance of Texas A&M University’s selection as the hosting institution is related to the fact that the first two conferences in the series (MTAA-1 and MTAA-2) were also held here in College Station in 1961 and 1965. So this most recent conference represented a homecoming, in which we enjoyed participation of some 174 scientists from 29 countries.

The stature of Texas A&M University in this community is related not only to this long history, but continues based on our current activities in nuclear techniques and is enhanced through our expansion into related and alternative methods for trace and ultra-trace elemental analysis methods. Currently, the Laboratory boasts unique capabilities in reactor-based thermal instrumental neutron activation analysis (INAA), accelerator-based high-energy (fast) neutron activation analysis (FNAA), energy dispersive x-ray fluorescence spectroscopy (EDXRF) and inductively coupled plasma emission-mass spectrometry (ICP-MS).

The NAA efforts are aided by a wide variety of gamma spectroscopy equipment including high-resolution germanium spectrometers (HPGe) for INAA work, new (November, 2010) bismuth germinate (BGO) scintillators for high efficiency FNAA applications and a 12 inch sodium iodide (NaI(Tl)) annular Compton suppression system for enhancement of peak extraction from complicated spectra. In addition, the Laboratory operates a heavily-shielded large-volume germanium crystal incased in a special low-level cryostat for detection and quantification of minute quantities of natural radioisotopes. The combination of thermal and fast neutron facilities at Texas A&M are not duplicated anywhere else in Texas or the United States.

Our ICP-MS spectrometer is enhanced with sample introduction “front end” devices such as a laser ablation system for studying solid samples and surfaces and a high pressure liquid chromatography system for speciation studies. These result in functional instrumentation for the “hyphenated” techniques of LA-ICP-MS and HPLC-ICP-MS. The ICP-MS facility is a user operated instrument which directly supports research groups throughout the University community. A new Perkin Elmer NexION 300D ICP-MS was placed on order to update our facilities during July, 2011.

The purpose of the laboratory is three-fold: 1) Primary research in the development and application of analytical methodologies; 2) Support of TAMU research across all academic fields; and 3) Service analyses for entities outside the University. A great deal of the University-based work is performed in collaborative efforts, which span these program components. Most of these efforts include the hands-on utilization of the instrumentation by TAMU students which supports our emphasis on training. The focus of our efforts is to provide analytical facilities to TAMU researchers which are of such a scope or which requires such expertise that they are not otherwise available on our campus. While the primary purpose of the laboratory is to support TAMU research, the unique capabilities we have in radioanalytical methods makes the laboratory an important resource for service analysis for other universities, government agencies
and industrial users. Therefore the Laboratory offers NAA services to outside entities on either a collaborative basis or fee for service.

**g. NMR facilities (http://nmr.tamu.edu/)**

The NMR Facility consists of ten superconducting magnet systems. Six of the systems are broadband, permitting observation of a wide variety of magnetically active nuclei at several different field strengths. All of these spectrometers are UNIX based systems, with eight system running Varian's VnmrJ 3.1 software and two operating with the Bruker TopSpin software. Systems range from 300 to 500 MHz. There are 3 systems using proton/carbon switchable probes, 3 systems using proton/fluorine/carbon/phosphorus quad probes, 2 systems using broadband multinuclear probes, 1 system with a proton/carbon/nitrogen cryoprobe, and 1 solid state multinuclear system.

There are three full time staff positions and one half time position in the facility, providing service spectra, help planning and interpreting experiments, repair and maintenance of the equipment, hardware and software modification for special experiments, and instruction for users.

Researchers making extensive use of NMR in their research are encouraged to become checked out on the equipment so that they can obtain their own data. Instruments are available to authorized users 24 hours a day, 7 days a week.

**h. X-Ray Diffraction Laboratory (http://xray.tamu.edu)**

The X-ray Diffraction Laboratory is a full service facility dedicated to serving the needs of the Texas A&M University system for determining the three dimensional structure of molecules and solids from single crystal samples and performing high resolution X-ray powder diffraction. Services to outside users on a collaborative basis are also offered. The facility has two full-time crystallographers, one of whom is the manager, for the powder and single crystal needs.


Services: single crystal diffractometry, wide angle diffractometry high resolution diffractometry, 2D powder diffractometry, structure solution of single crystal and powder materials, qualitative and quantitative phase analysis, micro powder diffraction, crystallinity measurement, residual stress analysis, line broadening analysis, thin film analysis, and pole figure analysis.

The users may opt to submit their samples to the facility for structural analysis or to have students and postdocs trained to use the equipment if frequent use is expected. The hands-on aspect of the laboratory is one of the hallmarks of our PhD education, as many research groups depend on X-ray crystallography for the main method of characterization.
2. **Laboratory for Biological Mass Spectrometry (http://mass-spec.tamu.edu/**)

The Laboratory for Biological Mass Spectrometry (LBMS) was established in 1994, with operational goals focused on the developmental mass spectrometry (MS) and MS-based biological collaborations, primarily in the area broadly defined as “proteomics”. Since its establishment, the application of mass spectrometry in general, and at TAMU specifically, has expanded in ways not imagined in 1994. This has to do primarily with concurrent changes in the research environment of TAMU and the needs for high performance mass spectrometers and hyphenated MS techniques to address the high level research of interdisciplinary collaborations. The LBMS provides key expertise and instrumentation that promote new research directions for a diverse group led by faculty in chemistry, biology, biochemistry, biophysics, engineering, medicine, agriculture, and materials research. In addition, the research capabilities are accessible to non-TAMU users, both academic and industrial, either through collaborations or service-for-fee. The LBMS is now housed in two different buildings; the Chemistry building houses the service-for-fee facility and the facility in the Interdisciplinary life sciences building is focused on facilitating faculty with state-of-the-art MS instrumentation and methods. The current locations will foster interdisciplinary research and partnership with various PI’s from different departments and colleges.

Currently, the LBMS serves the TAMU research communities with expertise in mass spectrometry methodology, instrumentation, and increasingly, informatics. Compounds analyzed range from small organic molecules to macromolecules including proteins, oligonucleotides, polymers and dendrimers. Services provided include molecular-level research in various ‘omics’ related researches, i.e., petroleomics, proteomics, metabolomics, lipidomics, glycomics, etc., which represent growing research areas in the fields of the physical and life sciences, health sciences, agriculture, veterinary medicine and engineering. Thus, the LBMS serves diversified disciplines of TAMU and other institutions with cutting-edge experimental design, method development, new applications which are designed to meet the rapidly expanding needs of researchers. In order to meet with the fast evolving applications of mass spectrometry and the explosive increase in usage of mass spectrometry by the TAMU research groups, the LBMS regularly attempts to upgrade the instrumentation inventory through federal grants to maintain a complete state-of-the-art inventory of mass spectrometers and related analytical instrumentation. The LBMS is currently equipped with high mass accuracy and high resolution mass spectrometers with newly incorporated mass spectrometry techniques such as ion-mobility coupled to a tandem mass spectrometer and ultra-high resolution Fourier-transform ion cyclotron resonance (FTICR) for applications such as top-down proteomics, petroleomics, metabolomics, and drug discovery. In addition to major equipment inventory, the LBMS research scientists are actively involved in the development of new analysis methods and development of next-generation instrumentation for analysis and sample handling. Hence, the activities within the LBMS are divided into four categories: (a) service-for-fee, routine analysis (applications), (b) core research, (c) collaboration and (d) training and dissemination.

**Concerns:** Some of our mass spectrometers are a decade old, and are no longer supported by the manufacturer for parts and services. In order to meet the challenges of current research and the growing demand of TAMU research groups for MS analysis, upgrades of these instruments are absolutely necessary. In addition, currently the LBMS is understaffed despite the newly added equipments and increased demand in mass spectrometry analysis from TAMU.
research groups and outside researchers. Similar programs at other universities have two to three
times more personnel in comparison to LBMS. This will adversely affect the progress of LBMS.

3. **Laboratory for Molecular Simulation (http://lms.chem.tamu.edu/)**

The Laboratory for Molecular Simulation brings molecular modeling and computational
chemistry closer to the experimental scientist by offering advanced training and assistance to
those who already use these tools in their research, and beginning training to those who have not
yet used them. Advanced modeling software is available to use mathematical methods to
calculate the properties of individual molecules, solids, and liquids. The LMS computer lab is
available for use by professors who wish to include molecular modelling in their course material.
The LMS will provide the hardware, software, and training necessary for the students and
professor. The LMS offers, free of charge, three types of workshops throughout the year: 1) UNIX, 2) Molecular Modeling, and 3) Quantum Mechanics Short Course. Most of the programs
available through the LMS are only available on unix based SGI machines, therefore, the Unix
workshop is a pre-requisite for all other workshops. The facility is overseen by Professor
Michael Hall and managed by a PhD scientist (Dr. Lisa Perez) who is responsible for training as
well as helping users from various research groups perform specific calculations.

4. **The Center of Atmospheric Chemistry and the Environment (http://cace.tamu.edu/cace-home)**

CACE, TAMU was established by The Texas A&M Board of Regents at their meeting in
March 2003. Startup support for CACE was provided by participating Departments, Colleges,
and the Office of the Vice President for Research over a three-year period following an initial
proposal. Currently, Dr. Renyi Zhang is the director, and Dr. Simon North is the associate
director. The Internal Advisory Board consists of Dr. Jeffrey R. Seemann, V.P. for Research,
Chair; Dr. Kate C. Miller, Dean, College of Geosciences; Dr. Joe Newton, Dean, College of
Science; Dr. Arnold Vedlitz, Director of the Institute for Science, Technology and Public Policy,
Bush School; Dr. G. Kemble Bennett, Associate Dean of College of Engineering. The External
Advisory Board consists of Dr. Peter H. McMurry, Department of Mechanical Engineering,
University of Minnesota; A.R. Ravishankara, Director, NOAA; and Robert Harriss, President
and CEO, Houston Advanced Research Center.

One of the most important objectives of the Center is to provide the highest quality
information based on laboratory, field and calculation relevant to sustaining our environment and
maintaining air quality. The latter is particularly concerned with the ability to provide the basis
with which to accurately predict the formation, transportation and mitigation of air pollution
from the molecular to regional scale using state-of-the-art modeling capabilities and to predict
their effect on climate.

The Center, by the nature of its participant membership, has been multidisciplinary from
the start, and it is intended that with the initial infrastructure investment and the synergistic
activities of the participating faculty, it will provide a positive contribution to solving societal
problems associated with atmospheric pollution and the environment. The Center is always
interested in improving its infrastructure and enhancing its capabilities, including through
collaborations with universities, industrial interactions and participation with other institutions.
E. Faculty Maintained Shared Instruments in the Department

1. SQUID Magnetometer

The MPMS Quantum Design SQUID magnetometer uses Superconducting Quantum Interference Device (SQUID) technology to provide exquisite sensitivity over the temperature range of 1.8 - 400 K and up to a maximum field of 7 Tesla. Both DC and AC capabilities are available. Applications to sensitive magnetic measurements in key areas such as high-temperature superconductivity, biochemistry, and magnetic recording media as well as molecular magnets are common. The modular MPMS design integrates a SQUID detection system, a precision temperature control unit residing in the bore of a high-field superconducting magnet, and a sophisticated computer operating system. Proprietary software runs in a MS Windows environment with full automation of all system parameters while controlling measurements and collecting data.

The SQUID instrument in the chemistry department has no formal oversight from the Department and no Staff Members so it is not really a Facility per se. It was purchased in 1999 with funds from the NSF after a proposal was written when Kim Dunbar requested a SQUID as part of her hiring package. The proposal was funded although there was no money for items like the sensitive balance in the SQUID room which was purchased by Dunbar and no plan for the operation of the SQUID was put into place. The faculty who were on the NSF proposal are Tim Hughbanks, F.A. Cotton, Abe Clearfield and Kim Dunbar from Chemistry and Don Naugle and Joe Ross from the Physics Department. Since Dunbar’s arrival, she has been managing the SQUID by paying a postdoc and/or student from her group to oversee the daily maintenance of filling the liquid Helium and Nitrogen tanks, training users and to run samples for users if needed. In earlier years, the Department provided GAR2 support and there was some partial funding of a post-doc salary a few times over the course of his 10 years in the Dunbar group. The Department no longer provides support or subsidizes liquid helium use. A fee structure was implemented in October of 2009 and the rates have been increased several times including in July 2012. When the instrument experiences problems with the computer, vacuum equipment, temperature control or if someone breaks a sample rod or drops a sample into the chamber, the Dunbar group fixes it.

2. EPR Facility

The departmental EPR facility is located in room 1135. It consists of a Bruker EMX X-band spectrometer with an Oxford Instruments ER910A liquid helium cryostat. The instrument is capable of operation between \textit{ca.} 3 K and 100 K, and also at room temperature. The instrument is operated and maintained by Dr. Paul Lindahl and his research group. A number of groups use the instrument including Drs. Barondeau, Begley, Clearfield, Cremer, M. Darensbourg, Dunbar, Gabbai, Hilty, Ozerov, Raushel, and probably others. There is currently no Departmental or University support of the facility and no formal schedule for users fees sign-up times etc. Until a few years ago, the Department provided a GANT which was used to support one of Dr. Lindahl’s graduate students. This approach for maintaining the instrument was specified in the original NSF proposal, for which Dr. Lindahl was the PI and was indicated at that time as the director. Since the loss of Departmental funding, there has been no formal record-keeping of who uses the instrument. Dr. Lindahl’s group sets up the facility upon request from other groups. Minor repairs and maintenance are performed by Dr. Lindahl and his students, using Dr. Lindahl’s research funds. For major repairs, Dr. Lindahl requests funds from the Department head (and perhaps the Dean of Science) and other users in proportion to how
often they use the instrument. Dr. Lindahl is offering “EPR training” as part of his Chem 628 class this semester, which will include detailed instructions on setting up, operating and disassembling the instrument. The EPR users group meets irregularly. Meeting are announced by email, and all are invited to attend. The last meeting was in May/June, 2012; it was attended by Drs. Lindahl, Darenbourg and Dunbar. It is fair to say that there has been substantial dissatisfaction with the facility in terms of the degree of “service” offered. Faculty expect Dr. Lindahl and his group to maintain, operate and repair the instrument for them, and to train their students to use the instrument without compensation. Dr. Lindahl feels that this arrangement is unfair. He also feels that allowing any student to simply use the instrument on demand would quickly lead to damage to the facility because the instrument is delicate, susceptible to breaking, and costly to repair. He is unwilling to relinquish control of the instrument since it is a critical tool for his research program. Other users would like control to be relinquished to an “EPR manager” who would maintain the facility for all to use. This would require a new salary-line which the Department head is hesitant to fund, given the limited funds available.

F. External Facilities

1. The TAMU Materials Characterization Facility (http://mcf.tamu.edu/)

Previously the department lead the Center for Integrated Microchemical Systems (CIMS) The Center for Integrated Microchemical Systems (CIMS) that was formed in 2000 under Dr. Richard Crooks. Upon moving to The University of Texas at Austin, the facility management was transferred to Chemical Engineering under the direction of Dr. Dan Shantz, under the sole auspicious of the Materials Characterization Facility. The facility presently lacks a permanent director, but maintains a full staff of 4 PhD scientists as well as a business manager. This facility provides a broad range of research infrastructure in support of research activities in the areas of materials science and engineering across campus.

The MCF houses a Kratos imaging XPS, a Dimension Icon AFM system, Hysitron Nanoindenter, two Leica confocal fluorescence microscopes (one with spinning disk), a Nanoink dip-pen nanolithography system, a Raman microspectroscopy system, a Cameca ion probe, an imaging ellipsometer, an FE-SEM and a 350 sq. ft. class 1000 clean room. The clean room contains: a Quintel mask aligner, SCS spin-coater, Dektek profilometer, BOC Edwards metal evaporation chamber and other components essential for preparing >2 µm features for fluidics systems. There is a manager of the facility and four full-time staff research assistants. The facility also houses basic spectroscopy facilities for UV-Vis and near IR absorbance spectroscopy as well as fluorescence spectroscopy with lifetime measurement capabilities.

This facility has seen significant investments from the College of Engineering and VPR’s office over the past several years with an influx of new equipment and staffing. With the impending formation of the new Materials Science and Engineering Department, it is anticipated that this facility will be maintained by the new department.

2. The TAMU Microscopy Center (http://microscopy.tamu.edu/)

The Microscopy Center, directed by Dr. Andreas Holzenburg, and staffed by 6 staff research scientists, provides state-of-the art high resolution electron microscopy for the TAMU research community. This includes training courses in electron microscopy that range for basic imaging techniques, instrument operation training and a full course in electron microscopy. The facility, housed in the Interdisciplinary Life Sciences Building, maintains numerous electron microscopes and ancillary facilities for sample preparation. These include SEMs: a JEOL JSM-
6400 and an FEI Quanta 600-FE-SEM, and TEMs: an two FEI Tecnai G2 F20 FE-TEMs (with one dedicated to materials), a JEOL 122 EX TEM and a JEOL JEM 2010 TEM.

3. Cyclotron Institute (http://cycnt.tamu.edu/)

The Texas A&M University Cyclotron Institute is a major technical and educational resource for the State of Texas and the nation. The major functions of the Institute, which as a Department of Energy Supported University Center of Excellence is primarily funded by DOE and the state, are to conduct basic research, to educate students in nuclear science and technology, and to provide accelerator capabilities for a wide variety of applications in materials science, nuclear medicine, space science, and analytical procedures. The Institute is one of only two superconducting cyclotron facilities in the country and one of only four in the world. Internationally recognized for its research contributions, this interdisciplinary Institute is the primary experimental facility for the University’s graduate research programs in nuclear chemistry and nuclear physics. Research group leaders in the Institute are faculty members in Chemistry and Physics holding joint appointments in the Institute. Approximately 10% of the tenure track faculty members in the Chemistry and Physics Departments are group leaders in the Institute. (Though not formally required, directorship of the Institute has regularly alternated between Nuclear Chemists and Nuclear Physicists.) Many of the Institute research programs involve participation of scientists from other laboratories in Italy, France, Belgium, Japan, Russia, Ukraine, The Czech Republic, Poland and Mexico. The Institute also serves as a support and staging area for collaborative experiments carried out at other major national and international facilities. In addition a wide variety of other organizations (e.g., NASA, Boeing, Motorola, Jet Propulsion Laboratory, St. Jude’s Hospital, Harris Computer etc.) use the accelerator for a broad range of applied studies. Institute research programs are regularly reviewed by external scientific committees appointed by the DOE. In the most recent of these reviews, September 2010, the Institute programs received uniformly strong reviews and received a new three-year grant with an increase in funding. The Institute is in the final stages of a $5 million dollar upgrade of its accelerator facilities, jointly funded by DOE, The Robert A. Welch Foundation and The State of Texas. Current Institute Personnel include 12 faculty members, 23 PhD level research scientists and post docs, 24 graduate students, 6 undergraduate students and 36 technical staff members.

Since its creation in 1964 the Institute has been very successful in obtaining significant external grant funds. The Nuclear Chemistry research program has been continuously funded for 45 years. Currently the Institute’s operations and research program is funded by approximately 6.8M in external funds (DOE, the NSF, the Robert A. Welch Foundation, and beam time sales for applied uses) and 0.9M in State appropriated and local funds. The present Nuclear Chemistry faculty members are University Distinguished Professor J.B. Natowitz, Regents’ Professor S. Yennello and Assistant Professor of Nuclear Chemistry C.M. Folden. Together their external research funding is over 2 million dollars/yr. In fiscal reports the funding of Drs. Natowitz and Yennello is credited to the Chemistry department which last year accounted for over 9% of the Department’s external funding. At the time of the last review the Chemistry Department had committed to two new Nuclear Chemistry faculty positions in connection with the facility upgrade. The new Chemistry faculty members would have returned the Nuclear Chemistry faculty to its previous strength of 5. Although these hires were not made the College of Science, has hired Dr. Charles M Folden as an Assistant Professor of Nuclear Chemistry. There are two ongoing faculty searches for Radiochemists as part of the Nuclear Solutions Institute. It is possible that these individuals will have some affiliation with the Department of Chemistry.
G. New and Upcoming Facilities and Laboratories Led by Chemistry Faculty

1. The Natural Products LINCHPIN Laboratory (http://linchpin.tamu.edu/)

   Led by Daniel Romo, The Natural Products LINCHPIN Laboratory at Texas A&M University serves as a Central Collaboration and Idea Incubation Center for interdisciplinary researchers in Texas and worldwide that require the chemical synthesis, selective microscale derivatization (microscale), purification, and structural characterization of bioactive small organic molecules including natural products and derivatives with potential for human disease intervention. Initial data generated from these collaborations will become important and often essential Preliminary Results for submission of major grants to support significant, cutting edge interdisciplinary, human health related-research. The LINCHPIN brings together diverse researchers with common interests in bioactive small molecules and derivatives, proteomics, and genomics serving as a collaboration center and providing the necessary synergy, established track record (co-publications), and preliminary studies to ultimately develop funded collaborative research projects focused on small molecules-based approaches to human disease. Thus the LINCHPIN, building on the very definition of its acronym, will ‘serve to hold together parts or elements that exist or function as a unit’ (e.g. Basic Science in Chemical Biology→LINCHPIN→Translational Research/Drug Discovery).’ The LINCHPIN consists of a Co-Director (Dr. Jing Li, formerly at Eisai) with 5 years of pharmaceutical industry experience and several post-doctoral research scientists to support collaborative projects.

   Professor Romo serves as the LINCHPIN Director along with the current consultants, Profs. Tadhg Begley, Dave Bergbreiter and Jim Sacchettini. Thus, the Director, co-Director, and pertinent faculty members will be available for consultation and project development in discussions with interested LINCHPIN collaborators. The facility specializes in chemo- and site selective derivatization of complex small molecules (including natural products) and derivatives on microscale for SAR studies; the design, chemical synthesis and scale up of simplified, equipotent derivatives of initial lead compounds; the isolation, purification and structure elucidation of bioactive small molecules and derivatives; the synthesis of cellular probes to address cellular localization and cellular target/off-target identification; the isolation of putative cellular receptors for bioactive small molecules; and early preclinical studies.

2. Laboratory for Synthetic-Biologic Interactions

   Led by Karen Wooley, with the emphasis on establishing a Laboratory having capabilities to perform rigorous, multi-disciplinary studies of synthetic-biologic interactions, significant resources were dedicated to acquire instrumentation and to hire two personnel having expertise in physical chemistry and biological systems, to serve as co-Assistant Directors of the LSBI. Two offices and two laboratories on the ground floor of the ’72 wing of the chemistry complex have been assigned for occupation by the LSBI. Using start-up funds provided with Wooley’s relocation to TAMU and including items brought from Washington University, the following instrumentation and equipment capabilities were purchased or requisitioned, constituting more than $1.5M in additional research infrastructure for the College: atomic force microscopy; laser scanning confocal microscopy; fluorescence lifetime confocal microscopy; fluorescence lifetime spectrometry; microscopic and solution phase anisotropy lifetime spectroscopy; 2D steady state spectrophotometry; steady state 2D anisotropy spectrophotometry; 10 portable digital microscopes with polarization and fluorescence capabilities; portable Raman spectroscopy; micro-Raman spectroscopy; temperature controlled kinetic viscometry; dry and
submersion dynamic mechanical analysis; dry and submersion linear mechanical analysis; microplate based fluorescence, absorbance, luminescence and anisotropy spectroscopy; vertical and horizontal gel electrophoresis systems and ChemiDoc XRS lab imager, ultrasonic homogenizer, and Bio-plex 200 system with HTF and Pro II Wash station for multi-plex-based assay of proteins, cytokines and antibodies.

In addition, two biosafety-level-2 laboratories have been established with full capabilities of materials and equipment, such as refrigerators, freezers, incubating shakers, centrifuges, microscopes, liquid nitrogen cell-storage tank, biological safety cabinets, CO₂-incubators with ultraviolet- and hydrogen peroxide-decontamination capabilities, and all other necessary infrastructure and materials required to run a biological laboratory. One of the two bio-laboratories has been already approved by the Institutional Biosafety Committee (IBC) of Texas A&M University for the storage, manipulation and research of several pathogenic cell lines. The approval of the second laboratory is in progress. Furthermore, several assays have been developed by the personnel of the LSBI for materials characterization, spectroscopic, microscopic and biological analyses.

3. **Protein expression facility**

Lead by Tadhg Begley a protein expression facility is being set-up in the ILSB with an anticipated start date early in 2013. This facility will provide TAMU researchers with bacterial overexpression plasmids for genes of interest. The facility will also provide technical advice on protein purification and characterization as well as basic molecular biology techniques.
X. Resource allocation (prepared by François Gabbaï)

A. Space

The breakdown of departmental space, as currently allocated for various purposes, is summarized below in units of square feet.

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<th>Space Type</th>
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<td>Miscellaneous</td>
<td>7,004</td>
</tr>
<tr>
<td>Total</td>
<td>247,533 ft²</td>
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</tbody>
</table>

The above compilation includes all space assigned to the Department of Chemistry in the Chemistry Building, as well as in Heldenfels, the Old State Chemistry Building, Reed McDonald, ILSB and Teague Buildings, but does not include space occupied by departmental faculty in the Cyclotron Institute. A list of space allocations to individual faculty can be found on page 105.

Since the last external review panel convened seven years ago, the Department has experienced a number of noteworthy changes. Positive changes include the creation of new space in the Life Science Building, the construction of which was completed in 2009. The new space allocated to chemistry includes: 16,179 ft² of lab space and 7,334 ft² of office space. This new space is currently occupied by the groups of Barondeau, Begley, Burgess, Cremer, Russell and Burgess. We have also acquired new space in the Reed Mac Donald building where two floors were renovated up to modern standard in 2008. This space, which includes 10,144 ft² of lab space and 4,676 ft² of office space, is currently occupied by Bluemel, Gladysz and Singleton. Parts of our building have also been renovated to modern standards. These renovations concern: the fourth floor of the 1972 wing which was completed in 2010 for the group of Wooley (6120 ft² of lab space and 2642 ft² of office space); the basement & first floor of 1986 wing which was completed 2006 for the group of James Batteas (2910 ft² of lab space and 1358 ft² of office space); basement floor, first floor and third floor of the 1986 wing which was completed in 2005 for the group of Dong-Hee Son (2475 ft² of lab space and 1358 ft² of office space); and the third floor of the 1972 wing where 3,000 ft² of lab space and 1,500 ft² are being renovated for the
Gabbaï group. Other changes include the installation of a fire protection system (sprinkler system) in all existing wings as well as a renovation of the restroom that now meet the ADA standard. Despite these improvements, space quality remains an issue in most of the chemistry complex. These deficiencies are captured in the 2006 report completed by the architectural firm of Pierce Goodwin Alexander & Linville (PGAL) who was commissioned to prepare an analysis of existing conditions in the Chemistry Building complex and to provide recommendations for future development of departmental physical facilities. Their report may be summarized as follows:

Major deficiencies were found by the A/E throughout the building and were identified in virtually all areas of inspection and in all five wings of the complex. The most significant inadequacies with the existing physical facilities include the following:

1. Emergency and UPS power availabilities are insufficient throughout the complex.
2. Several areas of the building complex do not meet current city and/or ADA code requirements.
3. Most building systems (e.g., HVAC, water pumps, etc.) and architectural finishes have already exceeded or will soon reach their expected lifetimes.
4. Environmental hazards (e.g., asbestos, mold) were identified throughout the complex.
5. Air quality in many instructional and research laboratories is poor to average, at best.
6. Fume hood locations in many laboratories are not in compliance with current design standards, resulting in compromised exhaust performance and decreased laboratory air quality.
7. Construction during the last several years of high-rise buildings around the Chemistry Building complex may have adversely affected the performance of fume hood exhaust stacks on the roofs of the five wings, preventing the proper removal of exhaust fumes from the area.

**B. Space satisfaction survey**

Since the last external review panel convened seven years ago, the Department has experienced increased pressure on space for research laboratories, particularly with respect to the quality of available space. The expansion of groups, addition of new faculty members with synthetic needs, and the need to house more instrumentation have contributed to this situation. In order to get a fair perspective of the faculty, the internal review committee asked the faculty what space changes or improvements would enhance their research program. The answers are provided below:

- The most pressing need is more office space. I will have 8 graduate students, 2 incoming graduate students, 2 REU students, and 2 undergraduates in my lab this summer. I need another room (office) with 4-5 desks to accommodate these students. I may also require additional bench or instrumentation space if my group maintains this size or increases.

- Half of one of my student/postdocs offices is unusable because of repeated water leaks, and a very dangerous, precariously hung, plastic shield. I need to keep my own office
draped in plastic for the same reason. This does not present a good image of the Department when I meet visitors or interview prospective faculty. The LMS needs to have a larger and more appropriately arranged computer classroom. The current arrangement is too small for many activities that faculty want to do in the space. The current arrangement maximizes the number of computer that can be in the space, but does not allow appropriate projection or classroom teaching activities to happen simultaneously with student at their computers.

- My labs were substandard for synthetic space since I assumed them when I moved here in 1998 and they have only gotten worse. The fume hoods sweat in the summer and blow cold air in the winter. We have no natural lighting and the noise from the air handling with no ceiling tiles to absorb sound is bad for morale and work ethic suffers when students don't like their working conditions. We had a serious dust problem that has not been ameliorated by the dust cleaning in December 2011. In spite of being here for 13 years, I have not moved up in the queue to have my labs renovated. New priorities are set when someone negotiates an outside offer and there are no plans- just stop gap measures. I need better hoods, benches, air handling, temperature control and dust protection.

- My space is satisfactory. Reed McDonald suffers by not having conference room space that can accommodate 20-24 people. In general the department is short here.

- Our fume hoods in lab have not been functioning properly for years. We have very limited access to fume hoods for wet chemistry etc. We have not had adequate office space for students or postdocs. Our space in labs needs to be remodeled to serve our purposes better. Walls need to be removed and rooms reconstructed. The quality of the space we have could be better. We are also in need of additional electrical power. We have recently discovered a new spectroscopic technique that will require additional instrumentation development and further 3 phase power we do not currently have. Some additional storage space is under construction but we will need more. We could always do with more or better space as our equipment is jam packed into our current available space. I would obviously like my office to be adjacent to research space but this is a pipe dream.

- I would like to see better chemical storage facilities. I would like to have someone doing similar research near my laboratories. That would provide some synergy for students. Maybe I should have requested a move to the ILSB.

- I have received the additional space and feel very fortunate to have at my disposal excellent research space that is fully adequate for my needs.

- New fume hoods student office space chemical storage space.

- Uninterruptible power, reliable chilled water, better fume hoods.

- The biggest issues with the current office space for my students and postdocs is the repeated floods that occur, the noise coming from the adjoining lecture hall, and the temperature control. Improvements would include windows for the student offices, and a better break space including a sink.

- The 201A/201B labs adjoin hallway that is considered public space but that is space that is not used by anyone other than students in my group. It has an exit on the west and east side and could easily be changed to offices with windows into the laboratories - a modest modification that would remove student desks from the lab. The same features exist on the 1st and 3rd floors of the '28 wing. Organic laboratories like mine that involve significant synthesis with organic solvents should not have vinyl floors. Like a paint
shop, the floors should be changed to an inert material. The hoods in the laboratory are old. The sashes work if pulled evenly downward but can jam if the sash is pulled down without some modest care. This is not much of an issue in day-to-day work but represents a poor design if one were faced with an emergency where struggling with a jammed hood would be a really problem.

- I would like a little more space near my current space, which I have previously requested. My laboratory space is adequate. The office space/conference space for my group is fine. I would like a window in my office before I die.

- We very much need a conference room and more office space. We currently do not have our own or a nearby public conference room. Our offices are packed as much as possible, and to the brim. We need more and/or larger fume hoods. Currently 11 small (4.5 ft length) hoods in our space.

- The floors are in horrible shape (in desperate need of replacement), better fume hoods, lab benches very old and in bad shape (so bad that I spent $750 of my own personal funds trying to repaint and resin coat some of the bench tops). My attempt to fix the bench tops was moderately successful and I ended up only resurfacing those in the worst shape. Having subpar lab space makes it so much more difficult to recruit students. In recent years, I have tried to avoid showing new students the labs. Often times that doesn't work. 72 Wing is primarily occupied by very young faculty. The condition of the building puts the department at risk of losing these people to outside offers.

- Repairing leaking ceiling to prevent water damage to instruments repair or replace rusted types in wetlab

- We need a conference room. We’ve been having phone conference weekly with our collaborators in LBNL, SWRI, RTI, APS, and GM. My office can accommodate not even a half of my research group. It's been a struggle.
### C. Space allocation to individuals

<table>
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<th>Professor</th>
<th>Grad Students</th>
<th>Post-Docs &amp; Res Scientists</th>
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<th>Total Survey</th>
<th>Laboratory Space (ft²)</th>
<th>Office Space (ft²)</th>
<th>Total Space (ft²)</th>
<th>Hoods</th>
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<td>Grad Students</td>
<td>Post-Docs &amp; Res Scientists</td>
<td>Total</td>
<td>Total Survey</td>
<td>Laboratory Space (ft²)</td>
<td>Office Space (ft²)</td>
<td>Total Space (ft²)</td>
<td>Hoods</td>
<td>Direct from 2010</td>
<td>ft²/person</td>
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<tr>
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<td>2,524</td>
<td>6</td>
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</table>
D. Devised Guidelines for Space Allocation

Because of widely different space needs among the various instructional and research programs in the department, it is not practical to adopt a policy for space allocation that is inflexible or overly detailed. Nevertheless, it is important to establish departmental guidelines for research space assignments that are reasonable and equitable. The following guidelines will govern assignment and re-assignment of space in the Department of Chemistry:

1.) Primary responsibility for ensuring optimum space utilization for the Department’s programs rests with the Department Head. The standing departmental Space Committee should advise the Department Head, as appropriate, regarding departmental space needs and the mechanisms needed to optimize utilization of available space.

2.) First priority should be given to ensuring that the laboratories, offices, and support facilities of research-active faculty are located in the main Chemistry Building, whenever possible, and are best suited to the needs of the individual programs. To achieve this goal, it may be necessary to re-locate instructional laboratories, faculty who are research inactive, and certain departmental support services, such as administrative offices, service shops, stockrooms, etc., to spaces in other buildings, if available.

3.) Newly hired faculty members, particularly at the junior level, should be given the highest priority for allocation of research space in the main Chemistry Building.

4.) When allocating research space to faculty, every effort should be made to ensure that all of the space assigned to an individual faculty member be contiguous and, when possible, be located in close proximity to that of other research groups in related areas.

5.) Review of all departmental space needs and allocations should be carried out on a continuing basis by the departmental Space Committee. Based upon the information thus obtained, the Committee should advise the Department Head on space allocation by addressing considerations such as the following:

   a.) Current and projected space requirements for the Department’s instructional and research programs

   b.) Effects of non-contiguous space assignments that may have developed because of research group expansions

   c.) Sustained increases or decreases in research group size for certain faculty members that may justify re-allocation of space

   d.) Re-location of certain research groups to achieve improved efficiency of space utilization, desired proximity to research groups in related areas, etc. The possible
benefits that may be achieved by re-locating one or more research groups should be weighed against the possible detrimental effects on other groups.

**E. Administrative Assistants to Faculty**

The department does not have a written policy for allocation of administrative support for faculty. The clerical and office support needs of each faculty member are addressed on an individual basis. Currently, 7 faculty members have a full-time Administrative Assistant. All of these faculty are Full Professors, and all but three have large and continuously funded research programs with a substantial number of graduate students and post-docs. The three exceptions are non-research-active faculty who administer major teaching service programs and/or academic administrative activities.

An additional 14 faculty members share 50% of a full-time Administrative Assistant with a second faculty member. All but one of these are also Full Professors, and all are research-active.

The administrative needs of the remaining 21 tenure-track faculty members are fulfilled by a combination of student-worker assignments and available hours from the shared full-time Administrative Assistants. Non-recurring special needs, such as symposia preparation, large proposal preparation, etc., are fulfilled by temporary assignments from among existing staff members.

Office support needs of the 14 non-tenure-track Lecturers and Senior Lecturers are met on a continuous basis by assignment of submitted tasks to clerical staff members.

**F. Departmental support of individual research groups**

The department continues to support selected research groups by providing financial subsidies. A breakdown of these subsidies is provided hereafter:

1. **Summer salary provided by the department**

   In FY12, 17 faculty received summer support paid by the department:

   - $247,615  Administration (8)
   - $62,882  Course Development (2)
   - $8,245  Outreach (1)
   - $90,786  Summer Support (6)
   - **$409,528  Total**

2. **Postdoctoral fellow support provided by the department to individual groups**

   In FY12, 4 faculty received departmental funding for postdoctoral fellow:

   - $65,618  Research (3)
   - $18,000  Administration (1)
   - **$83,618  Total**
3. **Graduate student support provided by the department to individual groups**

In FY12, 15 graduate student positions were funded by the department:

<table>
<thead>
<tr>
<th>Amount</th>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>$68,400</td>
<td>Core Facilities</td>
<td>(2)</td>
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<tr>
<td>$234,694</td>
<td>New Faculty Commitment</td>
<td>(4)</td>
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<tr>
<td>$30,058</td>
<td>Journal and Administration</td>
<td>(2)</td>
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<tr>
<td><strong>$333,152</strong></td>
<td><strong>Total</strong></td>
<td></td>
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</table>

4. **Chair dollar matching program**

Three chair holders have their chair dollars matched 1:1 by the department when these chair dollars are used to support graduate student. This represents almost 15 graduate student positions:

<table>
<thead>
<tr>
<th>Amount</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$300,000</strong></td>
<td></td>
</tr>
</tbody>
</table>
Our chemistry department takes an active role in community outreach in an effort to positively shape the future of chemistry education and research. Every year, we host our feature event - the Chemistry Open House that reaches to local K-12 students, teachers and parents. Throughout the year, the Chemistry Road Show, a transportable set of demonstration experiments, is presented to schools throughout Texas and at other public events with the aim to both entertain and educate students. Our National Science Foundation-supported Research Experiences for Undergraduates (NSF-REU) program provides an opportunity for college students of diverse backgrounds to experience a summer of laboratory research. The Department of Chemistry also actively participates in a number of College of Science and Texas A&M University's outreach programs.

**A. Chemistry Open House & Science Exploration Gallery**

Every year, the Department of Chemistry, the TAMU local ACS section and the College of Science hosts our award-winning Chemistry Open House & Science Exploration Gallery to celebrate National Chemistry Week. Inst. Prof. Wendy Keeney-Kennicutt has been coordinating this annual event. It is free and open to the public and is advertised on radio, local and cable TV and in the local paper. Last year, this event attracted over 3000 youngsters, teachers and parents as visitors to the Department. 2012 was our 25th year for this event and had as its highlight three presentations of the popular Chemistry Road Show. We handed out 1000 science "goodie bags" and over 180 door prizes. The Science Exploration Gallery is full of hands-on and computer activities, guided lab tours, demonstrations and science talks. Our Chemistry 116 (Molecular Science for Citizens Lab) syllabus includes the opportunity for the students to do demonstrations at the Science Exploration Gallery. Several research groups hosted "booths" with hands-on experiments for the visitors. Graduate and undergraduate students organized these “booths” and gained organizational and presentation skills through this opportunity. In addition to the Department of Chemistry, the Departments of Physics and Biology and engineering disciplines are represented. Several of our departmental graduates work in the neighboring high schools and community college. They return with their students to run additional hands-on activities.

**B. Texas A&M Chemistry Road Show**

The Texas A&M Chemistry Road Show is one of the premier outreach programs of the Texas A&M Chemistry Department and the Texas A&M College of Science. Inst. Prof. James Pennington is the current coordinator and presenter. The road show is intended to be an entertaining, motivating and educational experience of chemistry for the students involved. Over the course of each 70-minute presentation, 25-30 demonstrations are performed and the science and applicability to each demonstration is briefly explained. The Chemistry Road Show is presented 50 to 60 per year, both locally and around the State of Texas. These presentations reach between 9000 and 10000 K-12 students per year. Many of the Road Shows are presented at rural and small town schools as well as Summer Reading Programs at various public libraries. Financial support for this program is provided by the Texas A&M Chemistry Department, the
Texas A&M College of Science, and grants from Dow Chemical Company and Shell Oil Company. Because we are able to provide the Road Show at no cost to the host institution, we are frequently scheduled to present Road Shows for schools and public libraries that serve underprivileged and underrepresented groups of students.

In addition to encouraging many K-12 students to pursue careers in science, the Chemistry Road Show also offers opportunities for current Aggie undergraduates and graduate students. In the past three years, 45 students (43 undergraduate and 2 graduates) acted as assistant demonstrators for the Chemistry Road Show. Of those, 26 were women, and 10 were minority students. These volunteers gain valuable organizational and presentation skills through this service learning opportunity.

Over the past several years, we have consciously worked to expand the influence of the program by actively contacting school districts and education service centers for Texas educational regions. We began with Region 6, and then expanded to include Regions 3, 4, 5, 7, 12 and 13 as well. We travel to areas of Texas outside these regions, but this allows us to actively solicit requests from schools within about a 4-hour drive from Bryan-College Station.

**C. Transportable Lab Kits for High School Students**

An extension of the Chemistry Road Show we are in the process of implementing is to prepare boxed “Lab Kits” that can be loaned to high schools, and perhaps middle schools. Prof. Christian Hilty originally proposed this idea. He, Prof. Wenshe Liu, Prof. Dong Hee Son and Inst. Prof. James Pennington have begun preparations to implement this program. The financial support of the program is from the chemistry department and National Science Foundation CAREER awards to Dr. Hilty and Dr. Liu. The basic concept is that interested faculty would develop experiment kits related to their research and/or Chemistry Road Show demonstrations. These kits could be delivered to schools in conjunction with the Chemistry Road Show. The kits would include the equipment needed for a class of 25 students to perform a lab related to, or inspired by the presentation they have seen. The labs would be coordinated with NSTA and TEKS learning standards to make implementation easier and more attractive to teachers. The Road Show Van would allow us to deliver these kits to schools. The schools would then mail them back to us after they have been used. The kits would be maintained by the research group of the faculty member that developed it. This type of a program will allow students to move from the demonstrations that were presented to hands-on experience that will help them to further understand and retain what they have learned. These “Lab Kits” will be especially valuable for schools in low-income and rural areas that may not have access to excellent laboratory resources. This program has been discussed with several high school teachers, and they are considering incorporating them in their classes in the coming academic year.

**D. NSF REU Program**

The Department of Chemistry has had an NSF-REU program for more than two decades now. The objective of our REU program is to provide meaningful research experiences for about 15 undergraduate students per summer in the areas of biological, environmental, and materials chemistry. We target undergraduates from primarily the Southwest and Southeast regions (including Puerto Rico), though our recruiting is national in scope. Many participants of our REU program are students from small colleges with little or no active chemical research. The ten-week program spans the summer session at Texas A&M University and culminates with student oral, written, and poster presentations in the final week. Immersion in research is the
heart of our REU program. In addition to their exposure to research through hands-on experiments in their projects, students are also introduced to research culture intentionally through a weekly Career Development seminar series hosted by department faculty. The highlight of this series is a Career Day in which outside speakers talk about their own research and/or career evolution. Most students find the program to be a useful way to explore the graduate school experience at a top Chemistry program. This helps them in deciding whether they want to pursue a career in chemistry research. Our faculty has an outstanding record of providing students rewarding summer research experiences, usually resulting in co-authorship on publications and/or presentations. Each spring, a large percentage of our REU students present a poster at the Spring ACS meeting. We have been very successful in attracting students of this program to pursue Ph.D. in chemistry in our department. This year, out of 55 incoming first year graduate students 9 were students of our NSF-REU program. The university has been long committed to the success of the program. Six out of the fifteen students are supported with university funds to further diversify the program by the inclusion of international students.

**E. Outreach to Minorities**

We have been aiming to promote diversity both at the university level and at the department level. In order to encourage minority students to apply our graduate programs, faculty members in the department have served recruiting tours to universities such as Albany State University in Georgia - a historically black university, University of Texas - Pan American - a Hispanic serving institution, Xavier University of Louisiana - a historically black Roman Catholic institution, etc. Our previous graduate recruiting coordinator, Prof. James Batteas presented our program several times in annual conferences of NOBCCHE - National Organization for the Professional Advancement of Black Chemists and Chemical Engineers. Now we have our own chapter in NOCCHE. The department also encourages minority students to present their research in national and international meetings with providing travel awards. One of our REU goals is for our REU participants to reflect the “face of Texas,” with a 50% minority population, primarily composed of Hispanic/Latino students (The Texas population in 2005 was 49% non-Hispanic White, 35% Hispanic, 12% Black; and 3% Asian). In addition, our students from under-represented minorities are encouraged to participate in “The Summer Scholars Program”, sponsored by the Associate Dean for Diversity in the College of Science as a supplement to the REU programs across campus.

**F. Miscellaneous**

The Department of Chemistry also actively participates in a number of College of Science and University’s outreach programs. As a part of Summer Institutes for High School Advanced Placement (AP) Teachers, the Department of Chemistry hosts summer workshops for high school teachers that provide continuing education for teachers from locations throughout the state. The AP Chemistry Teachers workshop has been held each summer for the past 25 years and has averaged 16 - 32 teachers each summer. Our faculty and graduate students also serve as judges and volunteers for junior and senior regional Science Bowls and are Event coordinators for Texas Science Olympiad organized by College of Science. In addition, our department is involved and sets up a week of experiments for K-12 students in the Young Adventure Program organized by the university.
XII. Critical Issues (prepared by Daniel Romo with input from the self-study committee)

A. Space

Current Situation

Research Laboratories: The research laboratories of many faculty members are in very poor condition and far below standards for a major research university. In particular, the synthesis laboratories in the 1928, 1959, 1972, and 1986 wings, are generally antiquated making it difficult to maintain current safety standards. These inconvenient and unattractive laboratories put the Department at a major disadvantage, relative to our peers, for the recruitment of new faculty and the retention of our outstanding colleagues. The state of the research laboratories also impacts negatively on our ability to recruit the best graduate students. When these students visit, many are turned off by the impression conveyed by run down research laboratories and decide to pursue graduate studies elsewhere. Renovations in the '72 wing (5th floor only) and additional acquired space in the Reed McDonald Building and the Interdisciplinary Life Sciences Building (ILSB) have adequately addressed these issues for a small number of our faculty. However, this has also scattered the chemistry faculty across campus, fragmented the Departmental sense of community, and created a sentiment of inequality among faculty of equal talent - without substantially solving our space problem.

Teaching/Laboratories: Most of our teaching laboratories are also outdated. For example, the organic laboratories, for the chemistry majors, are in extremely poor condition for a major university with a strong commitment to undergraduate education. Since the number of chemistry majors is expected to double in the coming years our needs for modern teaching laboratory space are urgent.

Gathering space: The current layout of the chemistry complex provides no common space that can be used for events such as poster sessions or more generally to promote interactions among faculty, students and research staff. With the chemistry faculty now spread across campus, the need for common space in the chemistry complex has greatly increased.

Going Forward

The Chemistry Department needs a new building with modern space for research and teaching. This need is the highest priority of the faculty. Modern research and teaching space is a prerequisite to maintaining an excellent Chemistry Department and is crucial for faculty retention and for attracting the new faculty and graduate students that we must have to remain competitive with our peer institutions. The chemistry department must be more aggressive in securing funds from the administration for a new building.
B. Faculty Hiring: Aggressive Junior Hiring Needed

Current Situation

The faculty is heavily weighted towards senior professors with only one assistant professor as of next year. The current rate of hiring, including that projected for the coming years, will result in an ineluctable reduction of our faculty size and research program, raising legitimate concerns about the continued strength and vibrancy of our program.

Going Forward

We must initiate an aggressive hiring strategy directed toward junior faculty. To keep pace with retirements, we should be hiring 2-3 junior faculty/year for the next 3-4 years. A long-range commitment from the administration to this rate of hiring is essential. This commitment should also include the flexibility to make more offers than available positions in a given year to ensure hiring with a historical ~50% success rate. Senior hiring should also remain a priority but it should be implemented independently as to not interfere or delay junior recruiting.

C. Budget

Current Situation

The Chemistry annual budget showed an increase between 2006 ($10.2 M) and 2010 (12.1 M). In the last two years, however, notable cuts brought us back to the 2007 level (See Table below). Because salary and operational costs have remained constant or even increased, the reduction of our annual budget has had a major impact on the funds available for graduate student teaching assistantships (TAs). Our annual TA budget shortfall is about $1.2 M, a sum that we must go request from the upper administration at the end of each fiscal year. The uncertainties that this situation brings are unacceptable because they impact our ability to offer a competitive graduate student stipend (no increase in five years, see Graduate Student Support section on page 40). This situation is aggravated by growing numbers in our undergraduate enrollment (service courses, majors) making the creation of more TA positions an imperative.

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<td>Funds available for graduate students’ teaching assistantships</td>
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<td>1,702,522</td>
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<td>1,657,510</td>
<td>1,657,511</td>
<td>1,402,715</td>
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Going Forward

The new department head will have to firmly negotiate these budgets upward, without compromise. An annual budget allocation of $13.5 M should be considered, with $2.5 M going toward the graduate student TA budget.
D. Teaching: Importance of Teaching, Teaching Assignments, and Undergraduate Curriculum

Current Situation

A general perception, as witnessed by one of the few highly negative responses to the faculty survey, is that the Department is not heading in directions that enhance teaching capabilities/excellence. The responsibilities in the first and 2nd year “service” courses are admirably fulfilled by a dedicated instructor staff. However, for majors and graduate courses the department is locked into traditional courses, inflexibility in teaching assignments, gross restrictions in the use of graduate teaching assistants for instructor assistance in higher level courses that might enhance their career goals, and discouragement of innovative approaches to advanced courses. Faculty are requiring fewer and fewer courses of their graduate students. A department-wide, transparent system for assigning teaching is absent. Many special ‘teaching arrangements’ exist and a system for increasing teaching loads for research inactive faculty is lacking. Our current undergraduate curriculum does not do enough to provide courses to undergraduates who are increasingly interdisciplinary-oriented. At the graduate level, the current limitation of five graduate courses per division is severely limiting breadth of courses available to our students.

Going Forward

Steps should to be taken within the Department to establish a culture of excellence in teaching. We need to modernize our curriculum to address student needs at the chemistry/biology and chemistry/material science interface. Clear guidelines for the granting of teaching relief are needed because inequalities in teaching responsibilities reduce the perceived value of teaching and impact faculty morale. A possible transition to larger lecture halls (i.e. ~300 students in organic chemistry) should also be considered to accommodate the rapidly increasing numbers of undergraduates in our major and service courses. At the graduate level, the current limitation of five graduate courses per division should also be re-evaluated and a departmental rather than a divisional perspective on our graduate curriculum needs to be developed.

E. Sense of optimism among the faculty and factors affecting productivity

Current Situation

The stress from reduced federal support for chemistry coupled with several local factors are leading to a lowering of faculty morale. In addition to the space and teaching issues mentioned above, chaired positions and professorships are not re-evaluated as mandated in departmental by-laws. This can destabilize the faculty because outstanding young colleagues may feel underappreciated in the absence of timely formal internal recognition. Post-tenure review is not performed in a meaningful way to address faculty’s research and teaching strengths and deficiencies. Laboratories and Centers are not evaluated on a regular basis impacting equitable distribution of departmental/College resources and faculty morale. Administrative support has recently been decreased significantly due to budget constraints. A systematic method for assigning and contracting space for individual faculty when warranted is lacking. The number
of non-science tasks (training, paperwork) has increased significantly in recent years impacting faculty productivity.

**Going Forward**

We need to identify creative methods to encourage both teaching and research excellence. A well-defined, transparent system that accounts for research and service efforts should be considered for assigning teaching. We request that administration find ways to minimize and even eliminate arduous tasks for faculty (*e.g.* repetitive online ‘training’ courses, approving time sheets, etc.). Greater transparency is needed about ‘special arrangements’ involving teaching relief or financial subsidies. Arrangements that have been in place for many years should also be re-evaluated. Transparency could be achieved by disclosing and justifying both new and existing arrangements. Departmental guidelines for re-evaluation of space are needed with a means to effect ‘lab contraction’ when warranted.

**F. Leadership/Governance**

**Current Situation**

The use of the Executive Committee for advice to the head appears to be relatively regular and useful whereas the Academic Operations Council is less active or interactive. Communication between the Department and the Dean of the College of Science is limited to two annual appearances by the Dean at faculty meetings. The frequency and format of these meetings are not conducive to discussions. A lack of informal discussion among the faculty is also noteworthy as it affects our ability to develop a departmental vision. For example, the department head needs to be replaced in 18 months and as of now, a plan is lacking for how a search will be conducted.

**Going Forward**

The development of cohesiveness and collegiality should be a priority, facilitated by informal mechanisms such as lunches and coffee breaks in common gathering spaces that we are currently lacking. A plan for selecting our next department head must be put in place. The new head should be selected for his/her ability to address the major issues noted in this report. At the departmental level, existing structures such as the Executive Committee and the Academic Operational Committee need to be more fully used as a means toward shared governance and transparency.

**G. Infrastructure**

**Current Situation**

Our research infrastructure is currently in good standing. However, some of our instrumentation is aging and some of the senior technical staff running our critical research facilities, in particular NMR, will retire in the next few years. There is also some discontent with access and/or support of several departmental instruments including the SQUID magnetometer and the EPR spectrometer.
**Going Forward**

To maintain our crucial research infrastructure, the department and faculty will have to seek funds for the purchase and operation of new instrumentation. The timely re-staffing of any vacant position will also be indispensable and is a very urgent need for the NMR facility. Finally, the creation of new facilities that integrate orphan instruments should also be considered.
XIII. Faculty Biographical Sketches
NAME
David P. Barondeau, Ph.D.

POSITION TITLE
Assistant Professor of Chemistry

eRA COMMONS USER NAME
dbaron

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>YEAR(s)</th>
<th>FIELD OF STUDY</th>
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<td>Southern Utah State College, Cedar City, Utah</td>
<td>B.A.</td>
<td>1989</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Texas A&amp;M University, College Station, Texas</td>
<td>Ph.D.</td>
<td>1996</td>
<td>Chemistry</td>
</tr>
</tbody>
</table>

A. Personal Statement: David P. Barondeau is trained in bioinorganic chemistry and structural biology and is a leader in the investigation of the mechanism of iron-sulfur cluster biosynthesis. He is active in reviewing manuscripts, synchrotron proposals, plus private and federal grants. His group is currently focused on understanding clinical defects for proteins involved in human iron-sulfur cluster formation and in designing and testing therapeutics to treat the associated neurodegenerative and cardiovascular disease.

B. Positions and Honors

Positions and Employment
2001-2002 Postdoctoral Research Associate, The Scripps Research Institute
2002-2005 Senior Research Associate, The Scripps Research Institute
2006-2012 Assistant Professor, Chemistry Department Texas A&M University
2012- Associate Professor, Chemistry Department Texas A&M University

Honors
1998-2001 National Institutes of Health Postdoctoral Fellowship
1997-1998 La Jolla Interfaces in Science Postdoctoral Fellowship

C. Selected publications (5 selected from past 2 years)
Tsai, C. L., Barondeau, D. P. “Human frataxin is an allosteric switch that activates the Fe-S cluster biosynthetic complex” Biochemistry 2010 49:9132-9139
Tsai, C., Bridwell-Rabb, J., and Barondeau, D.P. “Friedreich’s ataxia variants I154F and W155R diminish frataxin-based activation of the iron-sulfur cluster assembly complex” Biochemistry 2011 50: 6478-6487

D. Research Support

Ongoing Research Support
Robert A. Welch Foundation ($160,000 total)
A-1647, period: 2010-2013
“Structure and chemistry of DNA repair enzyme spore photoprodut lyase”
Role: Principal Investigator
In this project, we aim to characterize the spectroscopic and catalytic properties of putative spore photoprotod spectrin enzyme lyase and initiate structure-function studies.

American Heart Association ($140,000 total)
11BGIA5710009, period: Jan 2011 to Dec 2012
“Deciphering normal and aberrant function for clinical variants associated with Fe-S assembly and heart disease”
Role: Principal Investigator
In this project, we aim to determine how specific mutations identified in Friedreich’s ataxia are functionally compromised.

National Institute of Health R01 ($993,828 total)
Scored a 1.0% with an impact/priority score of 11
Role: Principal Investigator
In this project, we aim to define protein-protein interactions and conformational changes associated with Fe-S assembly by the 4 component human Fe-S assembly complex. In addition, we aim to define intermediates and contribute to the understanding of the mechanism of Fe-S cluster biosynthesis by this complex.

E. Contributions in Research Training and Mentoring (Aug 2006 – present)

<table>
<thead>
<tr>
<th></th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td>8</td>
<td>4</td>
<td>0</td>
<td>2 (1 anticipated in Oct 2012)</td>
<td>0 (1 anticipated in Oct 2012)</td>
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<tr>
<td>Total</td>
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<td>0</td>
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F. Contributions in Classroom Education
Courses taught (Aug 2006 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry</td>
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<td>3</td>
<td>511</td>
</tr>
<tr>
<td>Principles of Biological Chemistry</td>
<td>Chem 627</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>Coordination and Bioinorganic Chemistry</td>
<td>Chem 628</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>Physical Methods in Biological Chemistry</td>
<td>Chem 670</td>
<td>4</td>
<td>41</td>
</tr>
</tbody>
</table>

G. Evidence of Scholarship

• 23 publications in refereed journals

ISI Citation Report

| Sum of the Times Cited : 621 |
| Sum of Times Cited without self-citation : 592 |
| Citing Articles : 489 |
| Citing Articles without self-citation : 478 |
| Average Citations per Item : 27 |
| h-index : 13 |

• 16 invited lectures (Aug 2006 – present)
NAME: James Batteas, Ph.D.  
POSITION TITLE: Professor of Chemistry  
eRA COMMONS USER NAME: N/A

EDUCATION/TRAINING  
INSTITUTION AND LOCATION  
DEGREE -MM/YY  FIELD OF STUDY
University of Texas at Austin, TX  
B.S. 1990 Chemistry
University of California at Berkeley, CA  
Ph.D. 1995 Chemistry  
Harvard University  
1995-96 Post-doctoral Fellow

A. Personal Statement
James Batteas is a Professor of Chemistry and Materials Science and Engineering at Texas A&M University. Following a postdoctoral appointment at Harvard University, he joined the faculty at The City University of New York where he developed several projects in the area of nanoscale materials and devices. He later moved to the Surface and Microanalysis Science Division at NIST in Gaithersburg, MD as a Staff Scientist and joined the faculty at Texas A&M University in 2005. Dr. Batteas is an expert in surface science, with a focus on scanning probe microscopes, and his research activities cover a broad range of fundamental surface and interfacial phenomena of nanomaterials. Research projects in his group include investigations of charge transport in organic molecules on surfaces, optical and electronic properties of semiconducting nanomaterials, tribological properties of surfaces, self-organizing nanoscale materials for device applications, protein-surface interactions, plant biopolymers, and nanofabrication approaches for the development of optoelectronic and sensing architectures. Since 2011, Batteas has been an Associate Editor for RSC Advances, handling papers in materials chemistry. He is also presently an Editorial Board Member of ISRN Nanotechnology. At TAMU, he is Co-PI for our NSF-REU Program in Biological, Environmental and Materials Chemistry. Within the chemistry department, he became chair of the Analytical Chemistry Division in 2011.

B. Positions and Honors

Professional Positions:
2012 -  Professor, Department of Chemistry, Texas A&M University, TX
2005-2012 - Associate Professor, Department of Chemistry, Texas A&M University, TX
2002-2005 - Research Chemist, National Institute of Standards and Technology, MD
2002-2002 - Associate Professor of Chemistry, The City University of New York, College of Staten Island and The Graduate Center, NY
1996-2002 - Assistant Professor of Chemistry, The City University of New York, College of Staten Island and The Graduate Center, NY

Honors (select, since 1994):
2012 - Fellow of the Royal Society of Chemistry
2001 - Netzsch Instruments Frank Giblin Memorial Award in Polymer Analysis
2001 - (Society for Plastics Engineers—Polymer Analysis Division)
1998 - Research Corporation Research Innovation Award
1997 - CSI Junior Faculty Summer Research Fellowship

C. Selected Peer-reviewed Publications (5 most recent)


D. Research Support

ACTIVE

Charge Transport in Confined Molecular Assemblies 8/1/2012-7/31/2015; $330,000 (TC for project period)
National Science Foundation (NSF)

Studies of Friction and Adhesion in Nanoscale Asperity-Asperity Contacts

9/1/2011-8/31/2014; $309,517 (TC for project period)
National Science Foundation (NSF)

E. Contributions in Research Training and Mentoring

Graduate Students  
Undergraduate Students  
Research Associates  
Ph.D.'s awarded  
M.S.'s awarded  

Current group
7
3
1
5
2

Total
19
24
10
8
3

F. Contributions in Classroom Education

Courses taught (TAMU only 2007 - present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical Chemistry II</td>
<td>CHEM 602</td>
<td>6</td>
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<tr>
<td>Analytical Chemistry</td>
<td>CHEM 415</td>
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<td>Quantitative Analysis I</td>
<td>CHEM 315</td>
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<td>130</td>
</tr>
<tr>
<td>Physical Chemistry Lab</td>
<td>CHEM 325</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Physical Chemistry Lab II</td>
<td>CHEM 326</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>General Chemistry for Engineers</td>
<td>CHEM 107</td>
<td>272</td>
<td></td>
</tr>
</tbody>
</table>

Classroom innovations

As part of a multi-faculty team, we have completely redesigned our undergraduate physical chemistry lab curriculum. Physical chemistry is renowned for being one of the more challenging courses for chemistry majors. One of the obstacles in engaging students in the physical chemistry laboratory courses difficulty is lack of direct visualization of key fundamental principles and the incorporation of modern instrumentation. Our redevelopment of the laboratory courses includes adopting experiments which better reflect the current state

Biosketches 2
of physical chemistry research. This involves the utilization of modern techniques and instrumentation and the application to problems in material science, biological chemistry, environmental chemistry and other areas of current interest. To enhance the research based feel of the experiments, we have also moved to multi-week experiments, or modules, which permit ample time for the students to experience authentic inquiry and become familiar with equipment and techniques. As a component of this lab development, I introduced a 3-week module on imaging of surfaces: Visualization of Atoms and Molecules Using Scanning Tunneling Microscopy. This lab provides an introduction to the basic methodology of a scanning probe microscope and the utilization the technique to explore the structure and electronic properties of materials. Topics include imaging of graphite, metal, and semi-conductor surfaces, and charge transport through molecules on surfaces. Students examine tunneling distance dependence in air and through molecules with varying chain length. Also, modeled on our recent work on tunneling in porphyrins on surfaces (J. Phys. Chem. C 2008, 1110-1118), students measure the tunneling decay constant of single molecules.

G. Evidence of Scholarship
- 65 publications in refereed journals
- 54 presentations (1 Jan 2007–present)

ISI Citation Report:

<table>
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<tr>
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<tr>
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<td>Citing Articles</td>
<td>1620</td>
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<td>Citing Articles without self-citation</td>
<td>1588</td>
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<tr>
<td>Average Citations per Item</td>
<td>29.5</td>
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<tr>
<td>h-index</td>
<td>25</td>
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</table>

A. PERSONAL STATEMENT
My group is interested in the mechanistic enzymology of vitamin biosynthesis. Over the past 20 years, we have focused primarily on the biosynthesis and metabolism of thiamin, pyridoxal, B12 (axial ligand), NAD, coenzyme A, deazaflavin, and menaquinone.

B. POSITIONS AND HONORS
1986 – 1999 Assistant/Associate Professor of Chemistry, Cornell University.
1993 - Jan-July Visiting Scientist, Scripps Research Institute (Professor Peter Wright)
1994 July Visiting Professor, National University of Ireland.
2001 Jan-Feb Visiting scientist Hoffmann-La Roche
2001 May-August Visiting Professor, University of Paris.
2008 April-May Visiting Scientist Pasteur Institute
2009 Frontiers Lecture Series, Texas A&M University
2008 Calvin lecturer, UC Berkeley
2009 Merck Lecturer, Stanford
2009 Green Lecture in Enzyme Chemistry, University of Wisconsin Madison
2009 Barton Professor of Chemistry, Texas A&M University
2009-2019 NIH MERIT Award, Mechanistic Studies on Thiamin Biosynthesis
2010 – present Chair, Division of Biological Chemistry Texas A&M University
2010 Elected AAAS Fellow
2010 Honorary D.Sc. National University of Ireland.
2011 Distinguished Professor, Texas A&M University

C. SELECTED RECENT RESEARCH PUBLICATIONS (87 since 2005, h-index = 13)
Chatterjee, Abhishek; Abeydeera, N. Dinuka; Bale, Shridhar; Pai, Pei-Jing; Dorrestein, Pieter C.; Russell, David H.; Ealick, Steven E.; Begley, Tadhg P.: S. cerevisiae TH4p is a suicide thiamine thiazole synthase Nature (2011), 478(7370), 542-546.
Hanes, Jeremiah W.; Chatterjee, Debashree; Soriano, Erika V.; Ealick, Steven E.; Begley, Tadhg P.: Construction of a thiamin sensor from the periplasmic thiamin binding protein Chemical Communications (2011), 47(8), 2273-2275.
Krishnamoorthy, Kalyanaraman; Begley, Tadhg P.: Reagent for the Detection of Protein Thiocarboxylates in the Bacterial Proteome: Lissamine Rhodamine B Sulfonyl Azide. Journal of the American


**D. RESEARCH SUPPORT**

**ACTIVE**

DK44083 (Begley, MERIT Award)

12/01/09 - 4/30/13 25%, 2.0 Calendar

Mechanistic enzymology of thiamin biosynthesis.

Direct costs current year: $235,000

Mechanistic studies on the biosynthesis of thiamin thiazole in *B. subtilis* and in *S. cerevisiae*.

2U13GM070824 (Begley and Leese) Mentoring workshop

5/1/2010 - 4/1/2015, 0.5 Calendar

Direct costs current year: $40,000

**PENDING**

13-1438 (Begley for Purdue) Synthetic biology in *E. coli* or *S. typhimurium in esophagopleuronecrosis in mice.

12/01/06 - 4/30/13 25%, 2.0 Calendar

Mechanistic enzymology of thiamin biosynthesis (postdoc). 5 postdocs, one Ph.D., one M.S.

Direct costs current year: $175,000

Mechanistic studies on the biosynthesis of thiamin thiazole in *B. subtilis* and in *S. cerevisiae*.

**E. CONTRIBUTIONS IN RESEARCH TRAINING AND MENTORING (1 Jan 2005 – present)**

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>0</td>
<td>6</td>
<td>4 (2011)</td>
<td>1 (2011)</td>
</tr>
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</tr>
<tr>
<td>21</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>1</td>
</tr>
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</table>

**F. CONTRIBUTIONS IN CLASSROOM EDUCATION (since starting at TAMU, Fall 2009 – present)**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Products Biosynthesis (Fall 2009)</td>
<td>Chem 689</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Natural Products Biosynthesis (Fall 2010)</td>
<td>Chem 689</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Natural Products Biosynthesis (Fall 2011)</td>
<td>Chem 689</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>The organic chemistry of biological pathways (Fall 2012)</td>
<td>Chem 456</td>
<td>1</td>
<td>30</td>
</tr>
</tbody>
</table>

**G. EVIDENCE OF SCHOLARSHIP (SINCE 2005)**

- 87 publications (overall h-index = 40)
- 92 invited lectures
- *Escherichia Coli and Salmonella typhimurium: Editor of the cofactor metabolism section*
D. Research Support

**ACTIVE**

DMR-0907233 (Bergbreiter) 09/01/09-08/31/12, 16.67% calendar
National Science Foundation $514,649 (this is joint with Professor Batteas, my share of this grant is ca. 60% of the total costs)
Solvation Studies of Responsive Polymers in Solution and at Surfaces
The main goal of this research is the examination of the effect of polymer microstructure, solvent additives and solution components on lower critical solution temperature (LCST) phenomena in solution and at surfaces.

CHE-0952134 (Bergbreiter) 06/15/10-05/31/13, 33.33% calendar
National Science Foundation $420,000 (TC for project period)
Biphasic Catalysis Using Soluble Polymer Supports
The main goal is to show that polymeric ligands could both be designed to recover catalysts and to stabilize catalysts toward adventitious degradation after a catalytic reaction was complete.

A-0639 (Bergbreiter) 06/01/12-05/31/14, 5.56% calendar
Robert A. Welch Foundation $120,000 with an additional $10,000 supplement for the year Beginning 6/1/2010.
Thermally Responsive Multiphase Catalyst Systems
The main goal of this research is to study the behavior of thermally responsive functional soluble polymers in various types of solvents or solvent mixtures.

NPRP4-081-1-016 (Bergbreiter) 01/15/12-12/31/14, 16.67% calendar
QNRF $329,045 (TC for project period)
Phase Separable Polymerization Catalysts
The goal is to show that polymer supports can be used to prepare practical separable, recyclable catalysts for important types of polymerizations using ring opening metathesis polymerization, ring opening polyester synthesis, and polycarbonate synthesis as select examples.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<tbody>
<tr>
<td>6</td>
<td>1</td>
<td>2</td>
<td>2 (2011-2012)</td>
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<tr>
<td>Total</td>
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<td>10</td>
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</table>

F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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</thead>
<tbody>
<tr>
<td>Polymer Chemistry</td>
<td>CHEM 466</td>
<td>2</td>
<td>137</td>
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<tr>
<td>Organic Chemistry I Honors</td>
<td>CHEM 227H</td>
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<td>99</td>
</tr>
<tr>
<td>Organic Chemistry II Honors</td>
<td>CHEM 229H</td>
<td>4</td>
<td>82</td>
</tr>
<tr>
<td>Organic Chem. Lab. I (majors)</td>
<td>CHEM 231</td>
<td>3</td>
<td>130</td>
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<tr>
<td>Organic Chemistry III</td>
<td>CHEM 446</td>
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<td>Freshman Seminar</td>
<td>SCEN 289</td>
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<tr>
<td>Organic Reactions</td>
<td>CHEM 610</td>
<td>2</td>
<td>28</td>
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<tr>
<td>Frontiers in Chemical Research</td>
<td>CHEM 695</td>
<td>2</td>
<td>117</td>
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</tbody>
</table>

Classroom innovations
- An experiment demonstrating the importance of $\Delta S$ in the Gibbs equation using poly(N-isopropylacrylamide) temperature responsive solubility and a melting point apparatus was developed for the sophomore majors laboratory and subsequently published in *J. Chem. Educ.*

G. Evidence of Scholarship

- 46 publications in refereed journals (1 Jan 2005 – present)
- 5 patents or invention disclosures (1 Jan 2005 – present)
- 153 presentations (1 Jan 2005 – present)

**ISI Citation Report**

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<thead>
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<tbody>
<tr>
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<td>Citing Articles</td>
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<td>Citing Articles without self-citation</td>
<td>4499</td>
</tr>
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<td>Average Citations per Item</td>
<td>33.34</td>
</tr>
<tr>
<td>h-index</td>
<td>44</td>
</tr>
</tbody>
</table>
Lucchese, concerted semi-empirical morphing methodologies have been developed for accurate prediction of comprehensive characterization of non-covalent interactions. In collaboration with Professor Robert Lucchese, Bevan has recently developed compound-model morphing (CMM-RS) methodologies for the generation of vibrationally-complete semi-empirical potential such as in the case of OC-HF which is capable of predicting the properties of hydrogen-bonded interactions to nearly the accuracy of rotational spectroscopy. This methodology is now being generalized for the treatment of larger interactions with greater vibrational dimensionality. Bevan is one of the joint-holders of the Davidson Chair in Science at Texas A&M University and the co-holder of one patent for the development of travelling-wave surface wave discharge methods in abatement of global warming agents particularly associated with semi-conductor manufacture. He received the Semiconductor Research Council/Semiconductor Safety Association/ SEMATECH International Research Excellence Award for this work in 1996. A company, RF Systems Inc was established based on this technology. His research team and collaborators are also actively engaged in designing and constructing submillimeter/THz devices for molecular detection and monitoring and other commercial applications. He has, furthermore, recently designed quantum cascade laser spectrometers for applications of Faraday rotation spectroscopy and saturated absorption spectroscopies.

B. Positions and Honors
Professional Positions:
1978-1984 Assistant Professor, Department of Chemistry, Texas A&M University
1984-1988 Associate Professor, Department of Chemistry, Texas A&M University
1988-present Professor, Department of Chemistry, Texas A&M University
2003-2007 Director, Center for Atmospheric Chemistry and the Environment, Texas A&M University
2005-present Joint-holder Davidson Chair in Science, Texas A&M University
2006-present Director, Laboratory for Submillimeter/Terahertz Science and Technology, TAMU
Honors (select, since 1974):
1974 Ramsay Memorial Medal
1987-1987 Senior National Research Council Fellow, Jet Propulsion Laboratories, Pasadena, CA
1992-1992 Royal Society Research Fellow, Chemistry Department, University of Exeter, England
1999 Semiconductor Research Council/Semiconductor Safety Association/ SEMATECH International, Research Excellence Award
2000-2001 Guest Researcher: National Institute of Standards and Technology, Gaithersburg, Md.

C. Selected Peer-reviewed Publications (5, selected from 2010-2012)

D. Research Support
ACTIVE
CHE-0511695 (Bevan/Lucchese) 09/01/09 – 08/31/12, 0.48 calendar
NSF: $233,325 (TC for project period)
Spectroscopic and Computational Characterization of Non-Covalent Interactions.
This research project involves application of submillimeter/THz spectroscopy to the characterization of prototypical hydrogen bonded complexes and the development of compound model morphing methodologies capable of predicting the properties of these systems to accuracies orders of magnitude better than ab-initio and other less accurate methods.
A-747 (Bevan) 06/01/12 – 05/31/13, 0.00 calendar
R.A. Welch Foundation: $100,000 (TC for project period)
Structure and Dynamics of Prototypical Foundation Hydrogen Bonded, Halogen bonded and Related Interactions
This project involves application of a quantum cascade laser spectrometer and the spectroscopic methods to the characterization of hydrogen bonded and halogen bonded complexes to permit detailed comparison of their molecular dynamics and clarification of their cooperative and competitive characteristics.

PENDING
Real Energy
08/01/2012 – 08/31/2013, 1.00 calendar, $162,000 requested.
Preliminary feasibility study using microwaves to decompose gas hydrate in deep-water pipelines:

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

G. Evidence of Scholarship
- 15 publications in refereed journals (1 Jan 2005 – present)

ISI Citation Reported

Sum of the Times Cited : 1701
Sum of Times Cited without self-citation : 1283
Citing Articles with self-citation : 859
Average Citations per Item : 15.05
h-index : 23
Janet Bluemel, Ph.D.

**EDUCATION/TRAINING**

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
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<tbody>
<tr>
<td>Technical University of Munich, Germany</td>
<td>Diploma</td>
<td>1986</td>
<td>Inorganic/Organometallic Chemistry/ Spectroscopy</td>
</tr>
<tr>
<td>Technical University of Munich, Germany</td>
<td>Ph.D.</td>
<td>1989</td>
<td>Inorganic/Organometallic Chemistry/ Spectroscopy</td>
</tr>
<tr>
<td>University of California, Berkeley</td>
<td>Postdoc</td>
<td>1989-90</td>
<td>Organic/Organometallic Chemistry</td>
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</tbody>
</table>

**Courses taught (1 Jan 2005 – present)**

- Graduate Students: 7
- Undergraduate Students: 1
- Research Associates: 0
- Ph.D.'s Awarded: 1 (2012)
- M.S.'s Awarded: 6

**F. Contributions in Classroom Education**

Courses taught (1 Jan 2005 – present)

- **Course Name**: Organic Spectroscopy  
  **Course Number**: Chem 647  
  **Number of Sections**: 1  
  **Number of Students**: 16
  **Course Number**: Chem 634  
  **Number of Sections**: 1  
  **Number of Students**: 6 (+2 audits)
- **Course Name**: NMR Spectroscopy  
  **Course Number**: Chem 618  
  **Number of Sections**: 3  
  **Number of Students**: 24 (+6 audits)
- **Course Name**: Solid-State NMR Spectroscopy  
  **Course Number**: Chem 689  
  **Number of Sections**: 1  
  **Number of Students**: 5 (+1 audit)
- **Course Name**: Inorganic Chemistry  
  **Course Number**: Chem 462  
  **Number of Sections**: 5  
  **Number of Students**: 78 (+3 audits)

**Biosketches**

Janet Bluemel is an international leader in the field of immobilized catalysts. This includes expertise in the areas of (a) synthetic and organometallic chemistry, (b) homogeneous and heterogeneous catalysis, and (c) multinuclear, paramagnetic, and solid-state NMR spectroscopy. Regarding (a) a library of new monodentate and chelate phosphines containing alkoxysilane groups has been synthesized via new routes in one or only a few steps. The community uses these phosphines and synthetic approaches extensively. Point (b) includes key findings, such as the analysis of catalyst and linker deactivation pathways on oxide supports. For example, applying rigid linker scaffolds, designed in the Bluemel group, immobilized catalysts retain their homogeneous nature, while linkers incorporating long alkyl chains lead to well-defined, stable nanoparticles. Different successful methods for immobilization, e.g. by electrostatic interactions of phosphonium groups with the support, or by covalent bonding via Si-Si bonds, have been investigated and implemented. In field (c) the Bluemel group has over the years optimized NMR methods specifically for surface-bound diamagnetic and paramagnetic species and also developed new techniques. Most importantly HRMAS NMR, which allows in situ measurements of surface-bound linkers and catalysts in the presence of solvents. Furthermore, HRMAS complements T1 relaxation time data with respect to mobilities of surface species. More recently, both techniques, together with classical CP/MAS, also allow the investigation of decomposition pathways in PAEK (polyaryletherketone) polymers that are crucial for the oil and gas industry. Combining the expertise in the fields (a) to (c), the Bluemel group is able to produce effective immobilized catalysts with unprecedented activities and lifetimes, some of which are already successfully applied in industry.

**A. Personal Statement**

Janet Bluemel is an international leader in the field of immobilized catalysts. This includes expertise in the areas of (a) synthetic and organometallic chemistry, (b) homogeneous and heterogeneous catalysis, and (c) multinuclear, paramagnetic, and solid-state NMR spectroscopy. Regarding (a) a library of new monodentate and chelate phosphines containing alkoxysilane groups has been synthesized via new routes in one or only a few steps. The community uses these phosphines and synthetic approaches extensively. Point (b) includes key findings, such as the analysis of catalyst and linker deactivation pathways on oxide supports. For example, applying rigid linker scaffolds, designed in the Bluemel group, immobilized catalysts retain their homogeneous nature, while linkers incorporating long alkyl chains lead to well-defined, stable nanoparticles. Different successful methods for immobilization, e.g. by electrostatic interactions of phosphonium groups with the support, or by covalent bonding via Si-Si bonds, have been investigated and implemented. In field (c) the Bluemel group has over the years optimized NMR methods specifically for surface-bound diamagnetic and paramagnetic species and also developed new techniques. Most importantly HRMAS NMR, which allows in situ measurements of surface-bound linkers and catalysts in the presence of solvents. Furthermore, HRMAS complements T1 relaxation time data with respect to mobilities of surface species. More recently, both techniques, together with classical CP/MAS, also allow the investigation of decomposition pathways in PAEK (polyaryletherketone) polymers that are crucial for the oil and gas industry. Combining the expertise in the fields (a) to (c), the Bluemel group is able to produce effective immobilized catalysts with unprecedented activities and lifetimes, some of which are already successfully applied in industry.

**B. Positions and Honors**

**Professional Positions:**

- 1991-1996 Assistant Professor, Department of Chemistry, Technical University of Munich, Germany
- 1996-1998 Privatdozentin (no US equivalent), Department of Chemistry, Technical University of Munich, Germany
- 1998-2000 Associate Professor, Department of Chemistry, University of Heidelberg, Germany
- 2000-2002 Studiendekan (no US equivalent), University of Heidelberg, Germany
- 2007-present Professor, Texas A&M University

**Honors (select, since 1982):**

- 1982-1986 BayBFG Fellowship for excellent Bavarian students
- 1987-1989 Fellowship of the Fonds of the Chemical Industry
- 1989-1990 NATO Postdoctoral Fellowship
- 1990-1992 Liebig Habilitation Fellowship
- 2005 Guest Professor, University of Insubria, Como, Italy

**C. Selected Peer-reviewed Publications (5, selected from 2010-2012):**


**D. Research Support**

**ACTIVE**

- **(a) The Robert A. Welch Foundation**
  Source of Support: The Robert A. Welch Foundation
  Grant No. (Agency) A-1706
  Title: "The Sonogashira Catalyst System for C-C Coupling Reactions: New Mechanistic Insights and Improved Recyclability"
  PI and co-Pi's: Janet Bluemel (PI), no co-Pi's
  Total Award Period Covered: 06/01/12 - 05/31/14
  Total Award Amount: $120,000

- **(b) Industrial Cooperation (APPEAL Consortium)**
  T. Brenner (Hoerbiger), H.-J. Sue, C. Schwartz (both Department of Mechanical Engineering) and J. Blümel established an industrial consortium for Advancing Performance Polymers in Energy Applications (APPEAL).
  Within the consortium each PI is awarded an individual grant.
  Grant No. (Agency): TEES account No. 0832519-15186B.
  Title: "Characterization of PAEK (polyaryletherketone) Polymers by Solid-State NMR Spectroscopy". PIs and co-Pi's: T. Brenner, H.-J. Sue and J. Blümel, C. Schwartz
  Starting - Ending Date: 12/01/2010 - 11/30/2013
  Total Award Amount (J. Blümel): $180,000

- **(c) National Science Foundation (NSF)**
  Grant No. (Agency) CHE-0911207
  Title: "Rigid Biphenyl and Tetraphenylenemethane Linker Scaffolds for Superior Immobilized Catalyzates"
  PI and co-Pi's: J. Bluemel (PI), no co-Pi's
  Starting - Ending Date: 07/01/09 - 06/30/13
  Total Award Amount: $390,000

- **(d) National Science Foundation (NSF): Multi-PI Block Grant for Major Research Instrumentation**
  Grant No. (Agency) CHE-0840464
  Title: "Acquisition of a Cryoprobe for a NMR Spectrometer"
  PI and co-Pi's: D. Russell and J. Bluemel, C. Hilty, D. A. Singleton
  Starting - Ending Date: 02/01/10 - 01/31/13
  Total Award Amount: $601,178
An Inorganic Chemistry course where the students participate actively and present lectures on selected topics has been developed to train a diverse group of students with vastly different backgrounds.

A popular instrument demonstration has been designed to show the principles of solid-state NMR spectroscopy to the public at departmental Chemistry Open House days.

G. Evidence of Scholarship
- 20 publications in refereed journals (1 Jan 2005 – present)
- 1 patent (1 Jan 2005 – present)
- 60 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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NAME
Lawrence S. Brown, Ph.D.

POSITION TITLE
Instructional Assistant Professor

eRA COMMONS USER NAME
N/A

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
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<th>FIELD OF STUDY</th>
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<td>Rensselaer Polytechnic Institute, Troy, NY</td>
<td>B.S.</td>
<td>1981</td>
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<td>Princeton University, Princeton NJ</td>
<td>M.A.</td>
<td>1983</td>
<td>Physical Chemistry</td>
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<tr>
<td>Princeton University, Princeton NJ</td>
<td>Ph.D.</td>
<td>1986</td>
<td>Physical Chemistry</td>
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A. Personal Statement
Lawrence S. Brown is widely recognized as an outstanding teacher of chemistry. He has won an array of teaching awards at TAMU, and has been a frequent contributor to and organizer of national symposia in chemical education. He is also the lead author for a successful general chemistry textbook designed specifically for courses aimed at engineering students.

B. Positions and Honors

Professional Positions:
- 1988-1994 Assistant Professor, Department of Chemistry, Texas A&M University
- 1994-2011 Senior Lecturer, Department of Chemistry, Texas A&M University
- 2001-2004 Program Officer for Education and Interdisciplinary Research, Physics Division, National Science Foundation
- 2011- Instructional Assistant Professor, Texas A&M University

Honors:
- 1998 TAMU Association of Former Students College Level Teaching Award
- 2000 TAMU Association of Former Students University Level Teaching Award
- 2011 Teaching Excellence Award, Texas A&M University System

C. Selected Peer-reviewed Publications

D. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

<table>
<thead>
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<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<td>General Chemistry for Engineering Students</td>
<td>Chem 107</td>
<td>16</td>
<td>4542</td>
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<td>Physical Chemistry Laboratory I</td>
<td>Chem 325</td>
<td>17</td>
<td>251</td>
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<td>Chem 334</td>
<td>2</td>
<td>46</td>
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<td>Methods in Teaching Chemistry Laboratory</td>
<td>Chem 697</td>
<td>6</td>
<td>41</td>
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Classroom innovations: Developed CHEM 107 course and original accompanying labs. Developed and taught a “telecourse” version of CHEM 107 in which lectures were broadcast on local PBS station. Early adopter of various instructional technologies including electronic homework (since the early 90s) and classroom “clickers.”

E. Evidence of Scholarship
- Lead author for market-leading textbook for the one semester general chemistry course for engineering students. Third edition of textbook is currently in early stages of production.
Biosketches 9

Kevin Burgess, Ph.D.

Enantioselective hydrogenations of a more diverse set of largely unfunctionalized alkenes.

The major goals of this project are to develop methods to obtain valuable deoxypolypropionate chirons via asymmetric hydrogenations.


The major goals of this project are to explore the hypothesis that a particular small molecule type can be used as a probe, or even a pharmaceutical candidate, for the serpinopathy that is most closely related to stroke. This hypothesis is based on scanning of protein structures via a novel computational searching procedure.

Development of an Optimized System for Non-covalent Delivery of Proteins into Cells

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

<table>
<thead>
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<th>Course Name</th>
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</thead>
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<tr>
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<td>Special Topics</td>
<td>Chem 689</td>
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Classroom innovations

G. Evidence of Scholarship

82 publications in refereed journals (1 Jan 2005 – present)

4 patents (1 Jan 2005 – present)

90 invited lectures (1 Jan 2005 – present)

H-index: 50
NAME
Abraham Clearfield, Ph.D.
eRA COMMONS USER NAME: N/A

POSITION TITLE
Distinguished Professor

EDUCATION/TRAINING

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<td>6/51</td>
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<tr>
<td>Rutgers University</td>
<td>PhD</td>
<td>6/54</td>
<td>Inorganic Chemistry Crystallography</td>
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A. Personal Statement
Abraham (Abe) Clearfield is an internationally known inorganic chemist. He gained experience in government and industrial research laboratories before settling on an academic career. Professor Clearfield has published 575 scientific papers in peer reviewed journals, has edited five books and holds 16 patents. He served as Associate Dean for Research of the College of Science at Texas A&M University and was responsible for initiating the Materials Research Program. He discovered the four major layered group four and fourteen phosphates and extensively examined their structures and ion exchange, proton conduction and catalytic properties. There are now more than six thousand papers worldwide on these materials. Prof. Clearfield extensively developed the field of metal phosphorus chemistry. He is among the 5% most highly cited American Chemists.

B. Position and Honors
Professional Positions
1954-63 National Lead Co., TAM Division, Niagara Falls, New York Associate Chemist to Senior Scientist
1963-76 Ohio University Department of Chemistry, Assistant Professor to Professor
1974-75 Associate Program Director for Thermodynamics - NSF, Wash., D.C.
1976-present Professor - Texas A&M University, College Station, Texas
1980-84 Chairman, Inorganic Division, Department of Chemistry, Texas A&M University
1994-98 Chairman, Inorganic Division, Department of Chemistry, Texas A&M University
1982-88 Director, Industry-University Cooperative Chemistry Program
1985-91 Associate Dean for Research, College of Science, Texas A&M University
1986-2000 Director, Texas A&M University Materials Science and Engineering Program
2008 Promoted to Distinguished Professor

Honors
1. Elected University Professor for Excellence in Teaching, 1971-1972 Academic Year by students. This award carried a $1,000 honorarium.
2. Elected Research Institute Fellow by Dean’s Council, Ohio University for Excellence in Research 1972. Award carried a $1,500 stipend.
4. Associate Editor of Ion Exchange and Solvent Extraction.
8. Texas A&M University Association of Former Students Distinguished Achievement Award in Research, May 1985.
9. Best Fundamental Paper, 1986, from the South Texas Section of the American Institute of Chemical Engineers.
12. Elected TES Fellowship of Texas A&M in recognition of outstanding achievement in research. Award carried a $5,000 stipend.
17. Southwest Section American Chemical Society Award in Research, 1995 ($1500 Honorarium).
19. Festschrift in honor of Professor Clearfield’s 65th birthday in Materials Chemistry and Physics, October 1993.
21. Award of honorary Ph.D. (Honoris Causa) by the University of Oviedo, Oviedo, Spain March 18, 1998.
22. Elected Vice President of the American Crystallographic Association 1998 with automatic promotion to President in 1999.
23. Elected Chairman of the Faculty of Materials Science and Engineering.
28. Appointed to the International Board to Establish the University of Oviedo, Spain as a University of Excellence, 2010.
30. Named Distinguished Alumnus, Temple University, 2009

Professional Affiliations
- Secretary-Treasurer U.S. National Committee for Crystallography Chairman, Southwest Catalysis Society
- American Chemical Society
- American Crystallography Association
- Phi Lambda Upsilon
- Sigma Xi
- Southwest Catalysis Society
- Phi Beta Delta, Alpha Eta Chapter
- IUPAC
- Materials Research Society
- Served on many NSF, DOE and DOD propose reviews and workshops

C. Selected Recent Publications

D. Research Support
ACTIVE

Research Grants 2009-2012
National Science Foundation: Pillared Layered Compounds: Their Synthesis, Structures and Properties, 5/1/07 – 4/30/11, $450,000
Department of Energy, Office of Basic Research: The Synthesis, Structures and Chemical Properties of Macrocyclic Legonds Covalently Bonded into Layered Arrays, 11/14/09 – 11/15/12, $360,000
R.A. Welch Foundation: Metal Phosphonates as Crystal Engineered Solids 6-1-09 – 5/31/12, $205,000
Savannah River National Laboratory: Separation of Actinides from Lanthanides and Americium from Curium 8/1/09 – 7/31/12, $165,000

National Science Foundation – Summer Supplement for Undergraduate Research 2010, 2011, $12,000 for each summer.

Biosketches 10
E. Contributions in Research Training and Mentoring (2005-2012)

<table>
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<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Rest-Docs</th>
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F. Contributions in Classroom Education (2005-2012)

<table>
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<th>Course Name</th>
<th>Course Number</th>
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<th>Number of Students</th>
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</thead>
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<td>Molecular Science for Citizens</td>
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<td>~80 per class</td>
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<tr>
<td>Introduction to X-ray Diffraction Methods</td>
<td>Chem 635</td>
<td>7</td>
<td>~15</td>
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</table>

Classroom Innovations

In Chem 106 I tried to show how chemistry explains the workings of nature. I introduced the Big Bang Theory, the age of the earth and debunked myths about aliens from outer space. In this latter effort I had the students calculate how long it would take to reach a planet in the nearest next solar system if we had a space ship that could fly at 100,000 miles per hour. They struggled with that one.

In my x-ray course we included an optional laboratory to gain skill in running and interpreting powder patterns and solving single crystal structures.

I introduced a course in materials science then taught it with Ray Schaak.

G. Evidence of Scholarship

- 124 publications in refereed journals (1 Jan 2005 – present)
- Citations are averaging ~1000 per year
- Five Texas A&M Professors are collaborating with me on a number of projects which I initiated. In one other major project I am assisting an Assistant Professor.

ISI Citation Report

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A. Personal Statement

Paul S. Cremer, TAMU University Distinguished Professor and holder of the Arthur E. Martell Chair of Chemistry, joined the Texas A&M faculty in 1998. He was an American Chemical Society Sigal Postdoctoral Fellow at Stanford University. Cremer has a national and international reputation in the field of biological surface science, which is considered to be one of the broadest, most interdisciplinary, and fundamentally important fields of chemistry and biology. His work is key to unraveling the mysteries of why water is essential to making biology and life possible. He has been honored with numerous awards, including the O’Donnell Award from The Academy of Medicine, Engineering, and Science of Texas and The Robert A. Welch Foundation Norman Hackerman Award in Chemical Research. He is a Fellow of the American Chemical Society and the American Association for the Advancement of Science. Research in the Cremer laboratory is at the crossroads of biological interfaces, nanomaterials, spectroscopy, and microfluidics. Biophysical studies are tied together through the employment of novel lab-on-a-chip platforms. To date, he has authored 108 scholarly publications in peer-reviewed journals and holds 4 patents. In addition to his novel contributions in research, Cremer is one of the youngest chemists to serve as an editor for the Journal of the American Chemical Society. He is also an associate editor of the Annual Review of Physical Chemistry journal. He is serving as a member of the NIH Instrumentation and Systems Development study section (2012-2016).

B. Positions and Honors

Professional Positions:

- 2012-present Professor of Chemistry (major appointment), Penn State University, State College, PA
  - Professor of Biochemistry and Molecular Biology (minor appointment), Penn State University, State College, PA
  - 2012 Distinguished Professor of Chemistry, Texas A&M University, College Station, TX

Honors and Awards:

- 2012 Named J. Llyod Huck Chair in Natural Sciences, Penn State University
- 2012 27th Lu Xijia Lectureship Award, Xiamen University
- 2011 Texas A&M University System, Excellent in Innovation Award
- 2010 Fellow of the American Association for the Advancement of Science
- 2010 Peter and Edith O’Donnell Award, The Academy of Medicine, Engineering, and Science of Texas
- 2009 Fellow of the American Chemical Society
- 2007 17th Frederic LeRoy Conover Lecturer, Vanderbilt University
- 2007 Named A.E. Martell Chair in Chemistry
- 2006 Sigma Xi, Southwest Regional Young Investigator Award
- 2006 Robert A. Welch Foundation, Norman Hackerman Award in Chemical Research
- 2006 Pittsburgh Conference Achievement Award
- 2003 Camille Dreyfus Teacher-Scholar Award
- 2002 Alfred P. Sloan Research Fellow
- 2001 Beckman Young Investigator Award
- 2001 NSF CAREER Award
- 2000, 2001, & 3M Nontenured Faculty Award
- 2002 Office of Naval Research Young Investigator Award
- 1999 Research Corporation, Research Innovation Award

Service:

- Associate Editor, J. Am. Chem. Soc., 2008-present
B. Selected recent peer-reviewed publications from a total of 109:

Single Plasmonic Nanoparticle Tracking Studies of Solid Supported Bilayers with Ganglioside Lipids
Laura B. Sagle, Laura Ruvuna, Julia Bingham, Chunming Liu, Paul S. Cremer, and Richard P. VanDuyne

The Molecular Mechanisms of Ion-Specific Effects on Proteins
Kelvin B. Rembert, Jana Peterova, Jan Heyda, Christian Hilty, Pavel Jungwirth, and Paul S. Cremer

Monitoring Protein, Small Molecule, and Ion Binding by Local pH Modulation
Da Huang, Aaron D. Robison, Yiqian Liu, and Paul S. Cremer

Phospholipidic/Reversibility Binds Cu²⁺ with Extremely High Affinity
Christopher F. Monson, Xiao Cong, Aaron Robison, Hudson P. Pace, Chunming Liu, Matthew F. Poyton, and Paul S. Cremer

The Methyl Groups of Trimethylamine N-Oxide (TMAO) Orient Away from Hydrophobic Interfaces
Laura B. Sagle, Katherine Cimatu, Vladislav A. Litosh, Yi Liu, Sarah C. Flores, Xin Chen, Bin Yu, and Paul S. Cremer

Supported Bilayer Electrophoresis under Controlled Buffer Conditions
Christopher F. Monson, Hudson P. Pace, Chunming Liu, and Paul S. Cremer
Anal. Chem., 83 (2011) 7876-7880

Chemistry of Hofmeister Anions and Osmolytes
Yanjie Zhang and Paul S. Cremer

Hydrogen Bonding of [γ-Turn Structure is Stabilized in D₂O
Younhee Cho, Laura B. Sagle, Satoshi Imura, Yanjie Zhang, Jaibir Kherb, Ashutosh Chilkoti, J. Martin Scholtz, and Paul S. Cremer

The Inverse and Direct Hofmeister Series for Lysozyme
Yanjie Zhang and Paul S. Cremer
PNAS 106 (2009) 15249-15253

Multivalent Ligand-Receptor Binding on Supported Lipid Bilayers
Hyunsook Jung, Aaron D. Robison, and Paul S. Cremer

Investigating the Hydrogen Bonding Model of Urea Denaturation
Laura B. Sagle, Yanjie Zhang, Vladislav A. Litosh, Xin Chen, Younhee Cho, and Paul S. Cremer

Detecting Protein-Ligand Binding on Supported Bilayers by Local pH Modulation
Hyunsook Jung, Aaron D. Robison, and Paul S. Cremer
J. Am. Chem. Soc. 131 (2009) 1006-1014

Silver Nanoparticles as Selective Ionization Probes for Analysis of Olefins by Mass Spectrometry
Stacy D. Sherrod, Armando J. Díaz, William K. Russell, Paul S. Cremer and David H. Russell
Anal. Chem. 80 (2008) 6796-6799

Impact of Hapten Presentation on Antibody Binding at Lipid Membrane Interfaces
Hyunsook Jung, Tinglu Yang, Mauricio D. Lasagna, Jinjun Shi, Gregory D. Reinhart, and Paul S. Cremer

C. Ongoing Research Support

Office of Naval Research, (N00014-08-1-0467) “Developing Label-Free Assays for Ligand-Receptor Binding at Biointerfaces”,
01-Apr-2011 to 31-Mar-2014, $450,000

Norman Hackerman Advanced Research Project: “Patterning Nanoscale Arrays for Evaporative Templating”
01-Jul-2010 to 31-May-2013, $196,460

D. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

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<td></td>
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<tr>
<td>Analytical Chemistry II</td>
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E. Evidence of Scholarship

- publications in refereed journals (1 Jan 2005 – present)
- 2 patents (1 Jan 2005 – present)
- ~150 invited lectures (1 Jan 2005 – present)

F. Evidence of Scholarship

- publications in refereed journals (1 Jan 2005 – present)
- 2 patents (1 Jan 2005 – present)
- ~150 invited lectures (1 Jan 2005 – present)

ISI Citation Report

Sum of the Times Cited : 2318
Sum of Times Cited without self-citation : 2201
Citing Articles : 1822
Citing Articles without self-citation : 1762
Average Citations per Item : 20.88
h-index : 25

Biosketches 12
A. Personal Statement

Donald J. Darensbourg is known for his contributions to mechanorganometallic/inorganic chemistry, with an emphasis on catalytic processes. His research group has investigated the organometallic chemistry of carbon dioxide, and for the last decade has focused on the synthesis of polymeric materials from carbon dioxide and cyclic ethers, as well as from various renewable resources such as lactides. He has published over 350 peer-reviewed articles, including numerous well-received comprehensive reviews and book chapters. In addition to Texas A&M University teaching and research awards, he received the ACS Award in Inorganic Chemistry in 2010. He has served on numerous NSF Committees and Advisory Boards. Currently, he is a Distinguished Professor at Texas A&M University where he has been tenured for over 30 years.

B. Positions and Honors

Professional Positions:

1964 - 1968
Teaching/Research Assistant in the Department of Chemistry at the University of Illinois

1967
NIH Fellowship recipient

1968 - 1969
Research Chemist (Infrared Spectra of Adsorbed Molecules with Dr. R. P. Eischens) Texaco Research Center, Beacon, New York

1969 - 1973
Assistant Professor of Chemistry, State University of New York at Buffalo

1973 - 1982
Assistant-Full Professor of Chemistry, Tulane University

1982 - 2010
Professor of Chemistry, Texas A&M University

2010 -
Distinguished Professor of Chemistry, Texas A&M University

Honors (select, since 1994):

1988-1997;
Member, Editorial Advisory Board of Inorganic Chemistry

2001-2003

2003-Member, Editorial Advisory Board of Advanced Inorganic Chemistry

2006-2009

2009 Panelist, NSF Center for Chemical Innovation

2009-Panelist, NSF Graduate Research Fellowship Program

2010 American Chemical Society Award in Inorganic Chemistry

2011-Member, Editorial Board of Journal of Coordination Chemistry

C. Selected Peer-reviewed Publications (5, selected from 2012)


Kyran, S. J.; Muhammad, S.; Knestrick, M.; Bengali, A. A.; Darensbourg, D. J., “Photochemically Generated Transients from \( \kappa^2 \) and \( \kappa^3 \) Triphos Derivatives of Group 6 Metal Carbonyls and Their Reactivity with Olefins”, Organometallics 2012, 31, 3163-3170.


D. Research Support

ACTIVE

- A-0923 (D. J. Darensbourg) 06/01/2012 – 05/31/2014, 0.10 calendar
  Robert A. Welch Foundation, $150,000 (TC for project period)
  Design and Reactivity Studies of Metal Catalysts for the Production of Polycarbonates from Novel OXiranes and Carbon Dioxide
  The overall goal of this research work is to examine metal catalysts specifically designed to better copolymerize carbon dioxide and novel oxiranes, e.g., indene oxide.

- CHE-1057743 (Darensbourg), 09/15/2011 – 08/31/2014, 0.5 summer

- NPRP 09-157-1-024 (Bengali) 12/1/2010-11/30/2013, 0.06 calendar
  Qatar National Research Fund, $1,050,000 ($122,500/yr DC to Darensbourg)
  Detection and Reaction Dynamics of Intermediates in Ruthenium Catalyzed Processes
  This collaborative research is centered on identifying and studying the reactivity of key resting states and intermediates in several reactions using ruthenium centered catalysts, employing a variety of time-resolved infrared techniques to obtain important information about the mechanisms of the proposed reactions.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

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<th>Position</th>
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<td>11</td>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

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<td>Green Chemistry</td>
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<tr>
<td>Chem 642</td>
<td>2</td>
<td>43</td>
<td>Organomet. &amp; Homogeneous Catalysis</td>
</tr>
</tbody>
</table>

Classroom innovations

- Three years ago, I developed and began teaching a course in Green Chemistry to advance undergraduate Chemistry and Chemical Engineering students. The course covers the principles of green chemistry with an emphasis on catalytic processes. A particular focus of the course is the synthesis of polymers from renewable resources, at the same time always addressing the differences between renewable and sustainable. The course has been taught to class sizes of 50-100 students, and makes extensive use of the internet for the most up-to-date resources and developments in this area of chemistry. Included in the course are PowerPoint presentations and written research reports by all students on topical areas in green chemistry and green processing.

G. Evidence of Scholarship

- 76 publications in refereed journals (1 Jan 2005 – present)
- 48 invited lectures (1 Jan 2005 – present)

National Science Foundation, $537,061 (TC for project period)
Catalytic Studies of the Production of Biodegradable Polymeric Materials from Carbon Dioxide and Renewable Resources

The major component of this research addresses many of the kinetic and mechanistic details of known single-site catalysts and the development of new catalysts for the preparation of various biodegradable polymers and biomaterials, in part from renewable resources, for use in various important applications.

ISI Citation Report

Sum of the Times Cited : 11750
Sum of Times Cited without self-citation : 10000
Citing Articles : 6117
Citing Articles without self-citation : 5829
Average Citations per Item : 26.90
h-index : 57

Biosketches 13
Marcetta Y. Darensbourg, Ph.D.

**Position Title:** Distinguished Professor of Chemistry

**Education/Training:**

<table>
<thead>
<tr>
<th>Institution and Location</th>
<th>Degree</th>
<th>MM/YY</th>
<th>Field of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union College, Barbourville, KY</td>
<td>B.S.</td>
<td>1963</td>
<td>Chemistry</td>
</tr>
<tr>
<td>University of Illinois, Urbana, KY</td>
<td>Ph.D.</td>
<td>1967</td>
<td>Inorganic Chemistry</td>
</tr>
</tbody>
</table>

**A. Personal Statement**

Marcetta Y. Darensbourg is a native of Kentucky, USA, with a Ph.D. from the University of Illinois. Following academic posts at Vassar College and Tulane University, she joined the faculty at Texas A&M University, College Station, TX, in 1982. She holds the title of Distinguished Professor of Chemistry. Trained as an organometallic chemist and with earlier research programs in low valent transition metal hydrides, the possibility of metal hydrides in nature, specifically as intermediates in hydrogenation metalloenzymes lured her into the new field of bioorganometallic chemistry. She has been a leader in the development of synthetic analogues of the diiron hydrogenase active site and the insight they bring to the catalytic mechanism of these natural fuel cell catalysts.

**B. Positions and Honors**

**Professional Positions:**

- 2010- Distinguished Professor, Texas A&M University
- 2008-2009 Professor, Texas A&M University
- 1971-1982 Assistant and Professor, Tulane University
- 1969-1971 Visiting Assistant Professor, State University of New York, Buffalo
- 1967-1969 Assistant Professor, Vassar College
- 1999 Visiting Professor, Harvard University

**Honors (select, since 1994):**

- 2007 Organizer, 8th International Conference on Hydrogenase International
- 2007-2008 The Robert A. Welch Lectureship Program
- 2006 Texas A&M Chapter of Sigma Xi – Distinguished Scientist Award
- 2004 Texas A&M Association of Former Students Achievement Awards in Teaching (College level)
- 2003 National Science Foundation: $150,000 (TC for project period)
- 2002-2003 National Academy of Sciences Fellowships
- 2002-2004 National Science Foundation: Beckman Scholars Program
- 2002-2003 National Academy of Sciences Review of Department of Energy Basic Sciences Catalysis Program
- 2001-2002 Organizer, 8th International Conference on Hydrogenase International Conference, Breckenridge, CO
- 1995-1999 American Chemical Society Southwest Region Award
- 1996-1998 Arnold and Mabel Beckman Foundation: Beckman Scholars Program
- 1994-1995 American Chemical Society - Distinguished Service Award in the Advancement of Inorganic Chemistry sponsored by the Mallinckrodt Specialty Chemicals Company

**C. Selected Peer-reviewed Publications**


**D. Research Support**

**ACT/Pro:**

- CHE 0910679 (Darensbourg) 08/15/2009 – 07/31/2013, 0.06 calendar
- National Science Foundation: $810,000 (TC for project period)

**Total: $810,000**

**E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)**

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td>8</td>
<td>2</td>
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<tr>
<td>Total</td>
<td>23</td>
<td>19</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>(Awarded</td>
<td>(12/2011)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.S.’s Awarded</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**F. Contributions in Classroom Education**

**Courses taught (1 Jan 2005 – present)**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry of the Elements</td>
<td>Chem 104</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>Descriptive Inorganic Chemistry</td>
<td>Chem 362</td>
<td>6</td>
<td>214</td>
</tr>
<tr>
<td>Advanced Inorganic Laboratory</td>
<td>Chem 432</td>
<td>4</td>
<td>46</td>
</tr>
<tr>
<td>Inorganic Chemistry</td>
<td>Chem 462 &amp; 633</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Metals in Biology and Medicine</td>
<td>Chem 489</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Mechanistic Inorganic Chemistry</td>
<td>Chem 636</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Organometallic Chemistry and Homogeneous Catalysis</td>
<td>Chem 642</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

**Classroom innovations:**

- For Chem 362 - configured this course with emphasis on Descriptive Inorganic Chemistry appropriate to Bioinorganic Chemistry.
- For Chem 636 - developed new methods for presenting the classic mechanisms of Inorganic Chemistry, and its applications to Organometallic chemistry and catalysis as well as Metalloenzyme catalysis.
I continue to develop projects for classroom and outside classroom activity. These include current literature problems sets and guided literature study. I strive to discern the correct balance of traditional lecturing vs student projects for optimal learning experience.

G. Evidence of Scholarship
- 63 publications in refereed journals (1 Jan 2005 – present)
- 67 invited lectures (1 Jan 2005 – present)
- I continue to develop projects for classroom and outside classroom activity. These include current literature problems sets and guided literature study. I strive to discern the correct balance of traditional lecturing vs student projects for optimal learning experience.

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westminster College, New Wilmington, PA</td>
<td>B.S.</td>
<td>1980</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Purdue University, West Lafayette, IN</td>
<td>Ph.D.</td>
<td>1984</td>
<td>Inorganic Chemistry</td>
</tr>
<tr>
<td>Texas A&amp;M University, College Station, TX</td>
<td>Postdoctoral</td>
<td>1984-86</td>
<td>Inorganic Chemistry</td>
</tr>
</tbody>
</table>

### A. Personal Statement

Kim Dunbar is an international leader in synthetic and structural inorganic chemistry with projects that span diverse areas of coordination chemistry. Her experimental and theoretical work directed at understanding physical and chemical phenomena in several important areas have redirected and focused the work of researchers in her areas of expertise; examples include work in the areas of inorganic/organic hybrid materials, molecular magnets, anion-π interactions and dirhodium compounds as anticancer drugs, particularly those that are activated by light. A unifying theme of her research is to use coordination chemistry to establish structure/bonding/properties relationships in homologous series of compounds. Her research has been funded by the National Science Foundation, the Department of Energy, the American Chemical Society-Petroleum Research Fund and the Robert A. Welch Foundation. Professional honors include an Alfred P. Sloan Foundation Fellowship, a Camille and Henry Dreyfus Teacher-Scholar Award, and Fellowships in the American Association for the Advancement of Science, the American Institute of Chemists and the American Chemical Society. She has been honored with Distinguished Alumna Awards from Purdue University Department of Chemistry (2004) and from Westminster College (2000). She received an honorary degree from Westminster College, ranked first in nation as "Best College for Women in Science, Technology, Engineering and Math" STEM fields, 2012 - Forbes.com. She serves her profession as Associate Editor of Inorganic Chemistry and is past Secretary and Chair of the American Chemical Society’s Division of Inorganic Chemistry. Recognized as an excellent teacher as well as a researcher, Kim received the inaugural Graduate Mentoring Award from The Association of Former Students at Texas A&M University in 2006 and the Research Award in 2012. She holds the Davidson Chair of Science and is a Distinguished University Professor. She was named a Wilsmore Fellow at University of Melbourne in Australia (2011) and served as a Visiting Professor at the Institut Le Bel, Université de Strasbourg, France (2011). Kim is the author of over 320 publications including nineteen reviews or book chapters.

### B. Positions and Honors

#### Professional Positions:
- 1987-1990 Assistant Professor, Michigan State University
- 1991-1992 Associate Professor, Michigan State University
- 1993-1998 Professor, Michigan State University
- 1998-1999 University Distinguished Professor, Michigan State University
- 1999-2006 Professor, Texas A&M University
- 2004-present Davidson Professor of Science Chair, Texas A&M University
- 2007-present Distinguished Professor of Chemistry, Texas A&M University
- 2011 Wilsmore Fellow, University of Melbourne, Australia
- 2011 Visiting Professor, Institut Le Bel, Université de Strasbourg, France

#### Honors (Select since 1990):
- 2012 Texas A&M University Women Former Students’ Network Eminent Scholar Award (Inaugural)
- 2012 Association of Former Students, Texas A&M, Distinguished Achievement Award Research
- 2011 Wilsmore Fellow, University of Melbourne
- 2011 Visiting Professor, Institut Le Bel, Université de Strasbourg
- 2011 Fellow, American Chemical Society
- 2011 Featured Editorial in Angewandte Chemie, Women in Chemistry
- 2010 Featured Author in Angewandte Chemie, Author Profile Series
- 2006 Association of Former Students Inaugural Distinguished Achievement Award Graduate Mentoring
- 2004 Purdue University Department of Chemistry Distinguished Alumna Award
- 2004 Fellow, American Association for the Advancement of Science
- 1995 NSF Creativity Extension Awards
- 2002 NSF Creativity Extension Awards
- 2000 Distinguished Alumni Award, Westminster College
- 1998 Distinguished Faculty Award, Michigan State University
- 1998 Plenary Lecturer XXXIII ICC Conference, Florence, Italy
- 1998 Sigma Xi Research Award, Michigan State University

### Publication Summary

- Sum of Times Cited: 7938
- Sum of Times Cited without self-citation: 6892
- Citing Articles: 2851
- Citing Articles without self-citation: 3644
- Average Citations: 23.98
- h-index: 48

**Kim R. Dunbar, Ph.D.**

**eRA COMMONS USER NAME:** N/A

**NAME:** Kim R. Dunbar, Ph.D.

**POSITION TITLE:** University Distinguished Professor; Davidson Chair of Science

**EDUCATION/TRAINING**

- **NAME:** Kim R. Dunbar, Ph.D.
- **DEGREE:** B.S.
- **MM/YY:** 1980
- **FIELD OF STUDY:** Chemistry
- **INSTITUTION AND LOCATION:** Westminster College, New Wilmington, PA
- **DEGREE:** Ph.D.
- **MM/YY:** 1984
- **FIELD OF STUDY:** Inorganic Chemistry
- **INSTITUTION AND LOCATION:** Purdue University, West Lafayette, IN
- **DEGREE:** Postdoctoral Fellowship
- **MM/YY:** 1984-86
- **FIELD OF STUDY:** Inorganic Chemistry
- **INSTITUTION AND LOCATION:** Texas A&M University, College Station, TX

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Biosketches 15
1992 Fellow of the Alfred P. Sloan Foundation
1991 Camille and Henry Dreyfus Teacher-Scholar Award
1990 University Teaching Award, Michigan State University

C. Selected Peer-reviewed Publications (5, selected from 2011-2012)


D. Research Support

<table>
<thead>
<tr>
<th>ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Robert A. Welch Foundation (Dunbar,PI) &quot;Magnetic and Electronic Properties of Molecular Materials: Investigation of Factors that Effect Bistability&quot; $200,000,06/01/12-05/31/14</td>
</tr>
<tr>
<td>National Science Foundation (Dunbar, PI) &quot;Magnetism, Conductivity and the Interplay between these Properties in d, p and f Block Materials with Organocyanide Ligands&quot; $450,000, 4/01/10-3/31/13</td>
</tr>
<tr>
<td>Department of Energy (Dunbar, PI) &quot;Molecular Magnets Based on a Modular Approach: Investigation of Coupling, Anisotropy and Electronic Factors on Bistability&quot; $720,000, 9/1/11-8/31/14</td>
</tr>
<tr>
<td>National Science Foundation (subcontract from Ohio State University (co-PIs C. Turro and R. Thummel) “Tuning the Excited States of New Ru(II) Complexes for Potential Photodynamic Therapy Applications” $184,599 (TAMU portion), 9/1/12-8/31/15</td>
</tr>
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E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>25</td>
<td>5</td>
<td>5 and 9 Visiting Scholars</td>
<td>13</td>
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</tbody>
</table>

F. Contributions in Classroom Education

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Methods in Inorganic Chemistry</td>
<td>Chem 634</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Physical Methods in Inorganic Chemistry</td>
<td>Chem 634</td>
<td>1</td>
<td>12 (3 audits)</td>
</tr>
<tr>
<td>Physical Methods in Inorganic Chemistry</td>
<td>Chem 634</td>
<td>1</td>
<td>16 (3 audits)</td>
</tr>
<tr>
<td>Descriptive Inorganic Chemistry (UG)</td>
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<td>50</td>
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<td>Advanced Inorganic Chemistry Laboratory (UG)</td>
<td>Chem 433</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Advanced Inorganic Chemistry Laboratory (UG)</td>
<td>Chem 433</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Advanced Inorganic Chemistry Laboratory (UG)</td>
<td>Chem 433</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>
A. Personal Statement
Our group is involved in the synthetic chemistry of main group and late transition metal elements, with application in the fields of anion sensing, solar energy conversion and positron emission tomography imaging. With a group size of about 10 students, we publish an average of 10 papers per year.

B. Positions and Honors

Professional Positions:
1990-1994 Research and Teaching Assistant, University of Texas at Austin
1994-1996 Postdoctoral Research Fellow, Technische Universität München
1996-1998 Habilitand, Technische Universität München
1998-2003 Assistant Professor of Chemistry, Texas A&M University
2003-2006 Associate Professor of Chemistry, Texas A&M University
2006 Professor (effective Sept. 2006)
2008- Davidson Professorship of Science

Other Experience and Professional Memberships
1996- Member of the American Chemical Society
1998- Member of the Marie Curie Fellowship Association
2007- Award Coordinator for the ACS Division of Inorganic Chemistry
2011 Chair of the ACS Division of Inorganic Chemistry
2011 Associate Editor for Organometallics (published by the ACS)

Honors
2011 Fellow of the American Chemical Society
2009 Visiting Professor – University Paul Sabatier – Toulouse, France (May 2009)
2007- Member of Chemistry Central Journal
2007- Member of Organometallics
2006- Member of Main Group Chemistry
2004- Member of the Editorial Board of Heteroatom Chemistry
2001 NSF Career Award
1996-1998 Marie Curie European Commission Research Fellowship, Technische Universität München
1994-1996 Alexander von Humboldt Fellowship, Technische Universität München

C. Selected Peer-reviewed Publications (5 selected from 2012)

D. Research Support
ACTIVE
CHE0952912 Gabbaï (PI) 03/01/2010-02/28/2013
National Science Foundation $140,000
Cationic Lewis acids as anion receptors

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>16</td>
<td>14</td>
<td>11</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adv Inorg Chem Lab</td>
<td>Chem 433</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Research</td>
<td>Chem 491</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>Research</td>
<td>Chem 691</td>
<td>21</td>
<td>117</td>
</tr>
<tr>
<td>Main Group Chem</td>
<td>Chem 629</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Frontiers in Chem Res</td>
<td>Chem 695</td>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>Chem of the Elements</td>
<td>Chem 104</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Quantitative Analysis</td>
<td>Chem 114</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Seminar</td>
<td>Chem 681</td>
<td>5</td>
<td>85</td>
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<tr>
<td>Directed Studies</td>
<td>Chem 685</td>
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<td>1</td>
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<tr>
<td>Frontiers in Chem Res</td>
<td>Chem 695</td>
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<td>187</td>
</tr>
<tr>
<td>Research</td>
<td>Chem 291</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Princ. of Inorg Chem</td>
<td>Chem 633</td>
<td>1</td>
<td>17</td>
</tr>
</tbody>
</table>

G. Evidence of Scholarship
- 149 publications in refereed journals
- 102 invited lectures (1 Jan 2005 – present)

ISI Citation Report
Sum of the Times Cited: 5472
Sum of Times Cited without self-citation: 4780
Citing Articles: 3567
Citing Articles without self-citation: 3444
Average Citations per Item: 36.72
h-index: 33

This project is concerned with the synthesis of Lewis acidic main group compounds as receptors for azide, cyanide and fluoride anions

A-1423 Gabbaï (PI) 06/01/2008-05/31/2012
Robert A. Welch Foundation $65,000
Cationic gold-antimony complexes Lewis acidic and catalytic properties.
This project is concerned with the synthesis and catalytic properties of novel coordination complexes containing gold and antimony.
Holly C. Gaede focuses on undergraduate education and mentoring. Teaching communication skills is one of her specialties; she has presented nationally and internationally on the topic. She has developed two courses at Texas A&M University that have been approved as writing-intensive courses, and served on the University Writing Committee for four years. She promotes undergraduate research, and has directed the REU program in the Department of Chemistry at TAMU since 2007, writing two successful NSF proposals to obtain funding for the program. In summer 2012, the summer research program expanded to include 10 locally-funded TAMU students. Since 2008, she has served on the Chemistry REU leadership group (a select group of REU PIs who advocate for the REU program and interface between the PIs and the NSF), this year serving as chair. Having mentored over two dozen undergraduate researchers herself, she served in the TAMU Office of Undergraduate Research (since merged with the Honors Office), where she developed the Undergraduate Research Scholars Program, a University-wide thesis program. She has also been active in curricular development at TAMU, working with a team of other chemists to revitalize the physical chemistry laboratory program. She serves as chair of the Undergraduate Curriculum Committee in chemistry and is chemistry's representative on the Undergraduate Program Committee in the College of Science. She serves as an Undergraduate Advisor in the department, overseeing the undergraduate degree programs in chemistry and their students. With the assistance of an Associate Undergraduate Advisor, she serves as an academic and career counselor for 350 chemistry majors. In this role, she is also responsible for enrollment management, degree evaluations and substitutions, prospective student meetings and events, and program assessment. She serves on the ACS Exams Institute Diagnostic Undergraduate Chemistry Knowledge Exam. She chairs the Undergraduate Awards Committee, responsible for administering departmental awards and scholarships. She has served on the Faculty Senate and several of its committees since 2008, most recently chairing the Workplace Climate and Diversity Committee. She has served on the Faculty Advisory Boards for both the Center for Teaching Excellence (2006-11) and for the Vice President of Student Affairs (2011-12).

B. Positions and Honors

<table>
<thead>
<tr>
<th>Professional Positions</th>
<th>University/Location</th>
<th>Degree</th>
<th>MM/YY</th>
<th>Field of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Chemistry; Ursinus College; Collegeville, PA</td>
<td>1991</td>
<td>Chemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995 - 2001</td>
<td>Assistant Professor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001 - 2004</td>
<td>Associate Professor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMR Section, Laboratory of Membrane Biochemistry and Biophysics, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health; Rockville, MD</td>
<td>2002 - 2004</td>
<td>Chemist, on leave from Ursinus College through Intergovernmental Personnel Act</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004 - 2005</td>
<td>Chemist, on contract from MedData Research, Inc. Waikersey, MD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas A&amp;M University; College Station, TX</td>
<td>2005 - 2010</td>
<td>Senior Lecturer in Chemistry</td>
<td></td>
<td></td>
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<tr>
<td>2011 – present</td>
<td>Instructional Assistant Professor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 – present</td>
<td>Undergraduate Advisor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005 - 2008</td>
<td>Assistant Associate Dean for Undergraduate Research</td>
<td></td>
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</tbody>
</table>

Honors:
- Association of Former Students College Level Teaching Award, 2011
- National Science Foundation Graduate Research Fellowship in Chemistry, 1991-94
- Student Travel Stipend, Experimental NMR Conference, 1995
- Elizabeth Dyer Scholarship, University of Delaware, 1991
- Hullthen Award for Service, University of Delaware, 1991
- Phi Beta Kappa, 1990
- American Chemical Society Award, University of Delaware, 1990
- American Microchemical Society Award, University of Delaware, 1990
- Wallace H. Carothers Scholarship, University of Delaware, 1989

C. Selected Peer-reviewed Publications (5)

D. Research Support

- Purchase of iPad tablet computers for use in CHEM481, a writing-intensive course in Chemistry. 
  Agency: Competitive Grant Proposal for Computer Access/Instructional Technology Fee (Internal Grant) (PIs: H. C. Gaede; J. Pellois) 
  Awarded: 12/9/12 
  Total Award Amount: $18,000 

- REU: Biological, Environmental, and Materials Chemistry Research Experiences for Undergraduates at Texas A&M University 
  Agency: National Science Foundation (PI: H. C. Gaede; co-PI: J.D. Batteas) 
  Award Period: 4/1/11 – 3/31/14 
  Total Award Amount: $300,941 
  Location: Texas A&M University 
  Award Period: 4/1/11 – 2/28/14 
  Awardee Institution: Texas A&M University 

- REU: Biological, Environmental, and Materials Chemistry Research Experiences for Undergraduates at Texas A&M University 
  Agency: National Science Foundation (PI: H. C. Gaede; co-PI: J.D. Batteas) 
  Award Period: 3/1/08 – 2/28/11 
  Location: Texas A&M University 
  Awardee Institution: Texas A&M University 

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current group</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education

Courses taught (TAMU: Fall 2005-Fall 2012)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>CHEM481</td>
<td>16</td>
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<td>Horizons in Chemistry</td>
<td>CHEM100</td>
<td>15</td>
<td>157</td>
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<td>Molecular Science for Citizens</td>
<td>CHEM106</td>
<td>39</td>
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<td>Physical Chemistry Laboratory I</td>
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<td>39</td>
<td>64</td>
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<td>Physical Chemistry Laboratory II</td>
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<td>11</td>
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<td>Special Topics</td>
<td>CHEM485</td>
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Classroom innovations (TAMU)
- Developing the first writing-intensive course in the department, CHEM481W. Presently integrating iPads into course for the teaching and learning of communication skills, along with Joanna Pellois.
- Part of the team that revamped physical chemistry laboratories. Developed a solid-state NMR experiment for the physical chemistry laboratory. Developed policies for evaluating students, including a team rating system, that have been adopted course-wide.

G. Evidence of Scholarship

17 publications
A. Personal Statement

John A. Gladysz has authored over 400 papers and patents, and his research spans a wide range of problems in the general areas of synthetic and mechanistic organometallic chemistry, and catalysis. He has made seminal contributions to syntheses of reactive C1 ligands playing key roles in metal-catalyzed CO reduction (formyl, hydroxymethyl, methylidene, etc.). He pioneered the development of chiral-at-metal complexes, and demonstrated geometric isomerism about metal-carbon double bonds. Like their organic counterparts, these are applicable to enantioselective syntheses (e.g., chiral methyl groups -CHDT) and mechanistic investigations, one of which showed that metals can migrate from one face of an alkene to the other without dissociation. Gladysz developed chiral metal Lewis acids exhibiting high enantioface binding selectivities for aldehydes and amines, and formulated a general theory for such chiral recognition. The three and two-dimensional carbon allotropes diamond (sp3) and graphite (sp2) have been known since antiquity, but the one-dimensional sp carbon nanotubes remains a missing link. To model its properties, Gladysz synthesized an extensive series of carbon-chain complexes MCx, with even- and odd-carbon bridges as long as C9. These can exist in a variety of delocalized valence, redox, and spin states, and constitute one of the most fundamental types of molecular wires. Gladysz went on to develop a self-assembly processes that "insulates" the sp chain with two double-helical sp carbon chains, akin to household wire. Gladysz has used alkyne metathesis in syntheses of molecules that model the symmetry, connectivity, and rotational properties of toy gyroscopes, and developed new strategies for recycling catalysts using perfluoroalkyl substituents to create high affinities for perfluoroalkanes phases. Such materials have strong temperature-dependent solubilities, allowing homogeneous reactions at elevated temperatures and facile catalyst recovery at lower temperatures. In addition to the honors itemized below, Gladysz served as the Associate Editor of Chemical Reviews from June 1984 until July 2010. He then succeeded Dietmar Seyferth as the Editor in Chief of Organometallics. He has been a consultant for G.D. Searle, Proctor & Gamble, Monsanto, Union Camp, Exxon, Kimberly Clark, 3M, Rhodia, Total, and Terrabon. He has served as a member of the NIH medicinal chemistry study section (1995-1999), chaired the Organometallic Gordon Conference (1996), and organized many NSF workshops.

B. Positions and Honors

Professional Positions:

1974-1982 Assistant Professor, University of California, Los Angeles
1982-1998 Associate Professor/Professor, University of Utah
1998-2007 Professor Ordinarius, Friedrich-Alexander-Universität Erlangen-Nürnberg (chair, organic chemistry) (Germany)
2008- Distinguished Professor, Texas A&M University
Dow Chair in Chemical Invention Honors
1980-1984 Alfred Sloan Foundation Fellow
1980-1985 Camille and Henry Dreyfus Teacher-Scholar Grant
1988 Arthur C. Cope Scholar Award
1992 University of Utah Distinguished Research Award
1994 American Chemical Society Award in Organometallic Chemistry
1995-1996 von Humboldt Foundation Research Award for Senior Scientists
2004 Fellow, American Association for the Advancement of Science
2007 International Flourosocie Technologies Award
2009- Fellow of the American Chemical Society (inaugural 2009 class)

Named Visiting Professorships or Lectureships:

2003-2004 Lady Davis Professorship, Technion – Israel Institute of Technology
2009 Tarrant Visiting Professorship, University of Florida
2011 Kuvela Lecture, State University of New York, Albany
2011 J. Clarence Karcher Lecturer, University of Oklahoma

C. Selected Peer-reviewed Publications (5 from 2011-2012)


D. Research Support

ACTIVE

NPRP08-607-1-108, 09/09 – 08/12, 08 calendar
Qatar National Research Fund (QNRF) $268,000
*Phase Transfer Activation Of Catalysts For Olefin Metathesis And Polymorization

A-1656
Welch Foundation,06/10 – 05/12
*Selective Methane Oxidations in Fluorocarbons media* $100,000

463761, 07/12 – 06/15, 08 calendar
National Science Foundation,$648,849
*Wire-Like and Gyroscope-Like Organometallic Complexes*

5-845-1-142, 10/12 – 09/15, 04 calendar
Qatar National Research Fund (QNRF) $348,569
*New Approaches to the Selective Oxidation of Methane*

5-945-1-158, 10/12 – 09/15, 04 calendar
Qatar National Research Fund (QNRF) $333,835
*Phase Transfer Activation Of Catalysts For Olefin Metathesis And Polymerization* (renewal, first grant)

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

F. Contributions in Classroom Education

Courses taught (01 January 2005 – present)

G. Evidence of Scholarship

•1 book or meeting reviews, encyclopedia contributions, checked procedures, etc. (01 Jan 2005 – present)
•4 patents or patent applications (01 Jan 2005 – present)
Joanna Goodey Pellois, Ph.D.

**NAME**

**EDUCATION/TRAINING**

**INSTITUTION AND LOCATION** | **DEGREE** | **MM/YY** | **FIELD OF STUDY**
--- | --- | --- | ---
College of William and Mary, Williamsburg, VA | B.S. | 1996 | Chemistry
University of Houston, Houston, TX | Ph.D. | 2001 | Inorganic/Solid State Chemistry

**ISI citation report**

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**A. Personal Statement**

Joanna Goodey Pellois is currently a Senior Lecturer and the Associate Graduate Advisor in the Department of Chemistry at Texas A&M. As a member of the First Year Chemistry Program faculty she teaches general chemistry to science and engineering students. In addition to teaching in the classroom she has developed the second semester general chemistry laboratory curriculum that focuses on the chemistry of the Texas environment. Joanna also teaches a senior undergraduate writing seminar that focuses on effectively communicating scientific results and a graduate course that focuses on ethics in scientific research. As the Associate Graduate Advisor Joanna helps to coordinate activities associated with recruiting new graduate students, advises the current graduate students and manages the department’s Graduate Office. Her research interests are related to solid state chemistry. In the past she has studied materials with interesting magnetic, electronic and optical properties.

**B. Positions and Honors**

2001-2002 Post Doctoral Research Assistant, Department of Chemistry University of Houston

2002-2006 Visiting Assistant Professor, Department of Chemistry, Barnard College, Columbia University

2006- Senior Lecturer, Department of Chemistry, Texas A&M University

2010- Associate Graduate Advisor, Department of Chemistry, Texas A&M University

**C. Selected Peer-Reviewed Publications**


**D. Contributions in Classroom Education**

Courses taught (1 Sep 2006 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
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<th>Number of Sections</th>
<th>Number of Students</th>
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<td>Fund. of Chem. II Lab</td>
<td>CHEM 112</td>
<td>150</td>
<td>3600</td>
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<tr>
<td>Chemistry and Society</td>
<td>CHEM 481 W</td>
<td>12</td>
<td>150</td>
</tr>
<tr>
<td>Ethics in Chem. Res.</td>
<td>CHEM 686</td>
<td>2</td>
<td>90</td>
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</table>
Classroom innovations

- Developed curriculum including lab manuals and teaching materials for Fundamentals of Chemistry II (CHEM 112) laboratory course. This curriculum impacts approximately 2000 students each year and focuses on the role that chemistry and environmental issues in the state of Texas.
- Received a competitive institutional grant to buy a class set of iPads for the senior writing seminar, CHEM 481 W.
- Restructured CHEM 688, Ethics in Chemical Research, course to include a series of speakers from across campus.

E. Evidence of Scholarship


A. Personal Statement

I am currently involved in teaching organic chemistry (CHM 227 & CHM 238) to about 300 students and supervising 3 or 4 Organic Chemistry Laboratory courses (CHM 237 & CHM 238) each semester. These courses serve the students from a variety of academic majors that include agriculture, biochemistry, biology, biomedical sciences, chemical engineering, nutrition, pre-medical and pre-veterinary medicine. I also taught organic chemistry in each summer to students in the "Bridge to Medicine" program at College of Medicine for 15 years and students in the "Bridge to Veterinary Medicine" program at College of Veterinary Medicine for 5 years. I was involved in organizing the Brazos Valley Regional Engineering and Science Fair for more than 15 years and the "Joy of Chemistry in Summer" for Junior High School students for 5 years. I love teaching and enjoy every minute of it.

My service to the Department of Chemistry and Texas A&M University includes:

2002-2005: Member, Chemistry Department Advisory committee
1998- present: Faculty Advisor to Sigma Alpha Lambda, Texas A & M Chapter
2000-present: Faculty Advisor to Chi Psi Beta, Texas A & M Chapter

B. Positions and Honors

Professional Positions:
1966-1973 Assistant Professor, Department of Chemistry, Presidency College, Madras
1974-1980 Professor, Department of Chemistry, Presidency College, Madras
1980-1981 Research Associate, Department of Chemistry, Texas A&M University
1981-1984 Lecturer, Department of Chemistry, Texas A&M University
1984-1997 Visiting Assistant Professor, Department of Chemistry, Texas A&M University
1995- Senior Lecturer, Department of Chemistry, Texas A&M University.

Honors:
2009: Student Led Award for Teaching Excellence, Texas A & M University
2008: Student Led Award for Teaching Excellence, Texas A & M University
2004: Partners in Learning Award of Excellence, Texas A & M University
2004: Outstanding Panhellenic Professor, Collegiate Panhellenic Council, Texas A & M University
2002: Appreciation Award, The Corps of Cadets, Texas A & M University
1999: Piper Professor Award, Minnie Stevens Piper Foundation
1998: Faculty Distinguished Achievement Award in Teaching, Texas A & M University
1994: Distinguished Teaching Award, College of Science
1994: Award of Merit for Teaching, Gamma Sigma Delta Honor Society of Agriculture
1984: Award of Merit for Teaching, Gamma Sigma Delta Honor Society of Agriculture

C. Selected Peer-reviewed Publications


D. Contributions in Classroom Education

Courses taught (in each year 1981-present)

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<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<td>Organic Chemistry I</td>
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<td>Organic Chemistry II</td>
<td>CHEM 228</td>
<td>4</td>
<td>400</td>
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<td>Organic &amp; Biological Chemistry (2000-2009)</td>
<td>CHEM 222</td>
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E. Evidence of Scholarship

Author of the following undergraduate Chemistry books in Tamil (a classical and ancient language of India), published by Tamil Nadu Text Book Society.

1. Thermodynamics (1975)
2. Physical Chemistry (1972)
3. Inorganic Chemistry (1977)
4. Acids and Bases (1973)
5. Atomic Structure and Chemical Bonding (1973)

In addition served as a member of:

1. Three person committee which drafted the Science Text Books for 6th-10th grades in India.
2. Four person committee which drafted the Chemistry text Books for 11th-12th grades in India.

Michael B. Hall is an international leader in the computational chemistry. He has published over 300 peer-reviewed articles in the field. In recognition of his outstanding contributions to our understanding of the electronic structure and bonding in transition metal complexes he was named Davidson Professor of Science in 2004. Professor Hall has served on the External Advisory Board of 'catalysis', an Energy Frontier Research Center at the Pacific Northwest National Laboratory since 2009. In 2012 he was named Distinguished Visiting Scientist at Juniata College. His research is mainly focused on determining the reaction mechanisms for transition metal reactions especially those related to catalysis. He is especially well known for his mechanistic studies of carbon-hydrogen activation and hydrogen production and utilization by the hydrogenase enzymes and related model complexes.

Michael B. Hall, Ph.D.
Professor of Chemistry

EDUCATION/TRAINING

INSTITUTION AND LOCATION | DEGREE | MM/YY | FIELD OF STUDY
---|---|---|---
Juniata College | B.S. | 1966 | Chemistry
University of Wisconsin | Ph.D. | 1971 | Physical Chemistry

A. Personal Statement

Michael B. Hall is an international leader in the computational chemistry. He has published over 300 peer-reviewed articles in the field. In recognition of his outstanding contributions to our understanding of the electronic structure and bonding in transition metal complexes he was named Davidson Professor of Science in 2004. Professor Hall has served on the External Advisory Board of 'catalysis', an Energy Frontier Research Center at the Pacific Northwest National Laboratory since 2009. In 2012 he was named Distinguished Visiting Scientist at Juniata College. His research is mainly focused on determining the reaction mechanisms for transition metal reactions especially those related to catalysis. He is especially well known for his mechanistic studies of carbon-hydrogen activation and hydrogen production and utilization by the hydrogenase enzymes and related model complexes.

B. Positions and Honors

Professional Positions:

- Davidson Professor of Science, College of Science, 2004-present
- Executive Associate Dean, College of Science, 2002-present
- Associate Director, Institute for Scientific Computation, 1997-2006
- Director, Laboratory for Molecular Simulation, 1997-present
- Head, Chemistry Department, Texas A&M University, 1986-1994
- Professor, Chemistry Department, Texas A&M University, 1983-present
- Graduate Advisor, Chemistry Department, Texas A&M University, 1982-1984
- Associate Professor, Chemistry Department, Texas A&M University, 1980-1983
- Assistant Professor, Chemistry Department, Texas A&M University, 1975-1980
- Assistant Professor, Chemistry Department, Adelphi University, 1974-1975
- Research Associate, Chemistry Department, University of Wisconsin, 1973-1974
- AEI Fellow in Chemistry, University of Manchester, England, 1971-1972
- Research Assistant, Chemistry Department, University of Wisconsin, 1968-1971

Honors and Boards:

- AEI Fellowship, University of Manchester, 1971-1972
- Visiting Associate, Clare Hall, Cambridge, 1982
- Texas A&M University Faculty Development Leave, 1982
- Life Member, Clare Hall, Cambridge, 1983-present
- Editorial Advisory Board, Organometallics(ACS), 1996-1999
- Editorial Advisory Board, Theoretical Chemistry Accounts, 1996-2004
- Endowed Professorship, Davidson Professor of Science, 2004-present
- Association of Former Students Distinguished Achievement Award in Research, 2005
- External Advisory Board, Center for Molecular Electroca
tanalysis, PNPL, 2009-present
- Distinguished Visiting Scientist, Juniata College, 2012

C. Selected Peer-reviewed Publications (5, selected from 2012)


"Computational Insights into Uranium Complexes Supported by Redox-Active α-Dimine Ligands", Giovanni Lima, Justin R. Walensky, Steven J. Kraft, William P. Forrest, Lisa M. Pérez, Michael B. Hall, Laura Gagliardi, and Suzanne C. Bart, Inorganic Chemistry, 2012, 51, 2058-2064, DOI: 10.1021/ic202522w.


D. Research Support
National Science Foundation - $426,000, September 1, 2009, to August 31, 2013, Theoretical Studies of Inorganic, Organometallic and Bioinorganic Systems, (CHE-0910552)
Qatar National Research Fund - $258,122, July 1, 2009 to June 30, 2013, Computational Investigation of the Reactions of Olefins with Nickel Dithiolenes
The Welch Foundation – $150,000, June 1, 2012 to May 31, 2014, Computational Chemistry of Transition Metal System, (A-0648)
Qatar National Research Fund - $326,682, September 1, 2012 to August 31, 2015, A Theoretical Investigation of Olefin Purification Via Bidentate Metal Complexes

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

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<th>M.S.’s Awarded</th>
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<td>Total</td>
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<td>1 Undergraduate Student</td>
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F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

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<td>Structure and Bonding</td>
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Classroom innovations
- Course development; innovations in teaching methods and materials (include goals for next year): Chem 641 continues to evolve as new problems are added and computer simulations are improved.

G. Evidence of Scholarship
- 47 invited lectures (1 Jan 2005 – present)

ISI Citation Report:

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NAME
Kenn E. Harding, Ph.D.

POSITION TITLE
Professor

eRA COMMONS USER NAME : N/A

EDUCATION/TRAINING

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<th>INSTITUTION AND LOCATION</th>
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<td>Oklahoma State University</td>
<td>B.S.</td>
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<td>Chemistry</td>
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<tr>
<td>Stanford University</td>
<td>Ph.D.</td>
<td>1968</td>
<td>Organic Chemistry</td>
</tr>
<tr>
<td>Harvard University</td>
<td>Postdoctoral</td>
<td>1968-1969</td>
<td>Organic Chemistry</td>
</tr>
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</table>

A. Personal Statement
Areas of interest include organic laboratory instruction, application of technology to organic instruction, and use of molecular modeling in organic chemistry instruction.

B. Positions and Honors
1996-present Coordinator of Organic Laboratory Programs, Department of Chemistry, Texas A&M University
1991 - 1996 Graduate Advisor, Department of Chemistry, Texas A&M University
1986 - present Professor, Department of Chemistry, Texas A&M University
1985-1986 Program Director, NSF, Division of Chemistry
1976 - 1986 Associate Professor, Department of Chemistry, Texas A&M University
1969 - 1976- Assistant Professor, Department of Chemistry, Texas A&M University

Honors:
1968 - 1969 National Institutes of Health Postdoctoral Research Fellowship

D. Contributions in Classroom Education
Coordinator Organic Chemistry Laboratories, Department of Chemistry, TAMU. Developed new guided inquiry experiments for undergraduate students in Chemistry 237, Chemistry 238, and Chemistry 242.

Courses taught (1 Jan 2005 – present)

<table>
<thead>
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<td>Organic Chemistry II</td>
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<td>Organic Chemistry Lab</td>
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<td>Techniques of Organic Chemistry Lab</td>
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<td>Spectra of Organic Compounds</td>
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<td>Directed Studies</td>
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E. Evidence of Scholarship
ISI Citation Report

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NAME
Robert A. Hildreth, Ph.D.

POSITION TITLE
Lecturer and Technical Coordinator of Organic Chemistry Laboratory Program

eRA COMMONS USER NAME: N/A

EDUCATION/TRAINING INSTITUTION AND LOCATION DEGREE MM/YY FIELD OF STUDY
Eastern Illinois University, Charleston, IL B.S. 1971 Chemistry, Physics, & Mathematics
Texas A&M University, College Station, TX Ph.D. 1976 Organic Chemistry Management, policy, leadership, & international relations
Air Command & Staff College, Maxwell AFB, AL M.S equiv 1988-1989

A. Personal Statement:
Robert Hildreth is an experienced educator, laboratory manager, technical problem solver, and technical manager. He has 21+ years of experience as an Air Force officer in basic research, applied research, and as a faculty member in chemistry at the USAF Academy. His research has included development of new energetic materials for use as explosives and rocket propellant ingredients. He also has experience as a technical manager of high-power laser weapons research and with development of specialty materials for use with/as lasers.

Dr Hildreth also has 12 years of experience in technical management of the large undergraduate organic chemistry laboratory program at Texas A&M University. In addition, he has been a popular lecturer of organic chemistry for 11+ years at TAMU.

B. Professional Positions & Recognition:

Lecturer of organic chemistry and Technical Coordinator, Organic Chemistry Lab Program, Department of Chemistry, Texas A&M University, fall 2000 – present.

Visiting Associate Professor of Chemistry at Colorado College, Colorado Springs, CO, spring 1998


Associate Professor of Chemistry, Chemistry Department, US Air Force Academy, Colorado, 1995 – 1997


Instructor, Assistant Professor, Associate Professor of Chemistry, Chemistry Department, US Air Force Academy, Colorado, 1984 – 1988

Instructor (part-time), Chemistry Department, US Air Force Academy, Colorado, 1978 – 1979


AWARDS and RECOGNITIONS

US Air Force Systems Command "Award for Technical Achievement" in 1978 for technical innovations in polyimidoaliphatic energetic plasticizer research for increased energy density in explosives and rocket propellants.

Selected as a key Senior Manager for Science and Technology for the Air Force, 1991

His Materials Research Team set the research productivity record for the Frank J. Seiler Research laboratory, US Air Force Academy, Colorado. Team members received a national level Technology Transfer Award.

Received various military awards including the Air Force Meritorious Service Medal with 5 Oak Leaf Clusters.

Received Outstanding Staff Achievement Award at Texas A&M University in the College of Science in 2010.

C. Peer-reviewed Publications & Technical Reports:


Technical Reports:


D. Contributions in Research Training and Mentoring:

Not currently working in a research environment. Numerous military examples from my 21 year Air Force career both in teaching cadets (USAF Academy, CO) and in basic and applied research in energetic materials, laser weapons, and specialty materials for use with/as lasers.

E. Contributions in Classroom Education:

Courses taught

<table>
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<td>General Chemistry</td>
<td>Chem 102 equiv</td>
<td>10+</td>
<td>&gt;300</td>
</tr>
<tr>
<td>Organic Chemistry I</td>
<td>Chem 227</td>
<td>14</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Organic Chemistry II</td>
<td>Chem 228</td>
<td>6</td>
<td>&gt;400</td>
</tr>
<tr>
<td>Org. Chem. Lab I</td>
<td>Chem 237/equiv</td>
<td>&gt;60</td>
<td>&gt;1000</td>
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<td>Org. Chem. Lab II</td>
<td>Chem 236/equiv</td>
<td>&gt;60</td>
<td>&gt;1000</td>
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<tr>
<td>Organic/Biological Chem</td>
<td>Chem 222</td>
<td>4</td>
<td>&gt;450</td>
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</table>

Classroom innovations

- Extensive use and demonstration of large organic molecular models to illustrate chirality, electrophiles vs. nucleophiles, and stereochemical relationships.
- Promotes student learning using two student learning teams with switchable roles as faculty and student. Stresses the use of: standing, speaking, writing, & explaining to maximize learning by students.

F. Evidence of Scholarship: see various items above.
The goal of this project is to identify structural features of molecular interactions that arise in the assembly of helical membrane proteins.

0846402 Hilty (PI): 02/01/09-01/31/14
National Science Foundation, $550,003
CAREER: Reaction mechanisms by real-time, hyperpolarization enhanced nuclear magnetic resonance
This award was given for the development of methods to exploit hyperpolarization for the study of enzyme catalysis and protein folding.

0840464 Russell (PI): 8/1/2009-7/31/2012
National Science Foundation, $247,238
CRIF:MU: Acquisition of a cryoprobe for a NMR spectrometer
Role: Co-Investigator and Lead Writer (PI: Department Head per program requirement). This award was given to upgrade a departmental 500 MHz NMR spectrometer with a cryoprobe for enhanced sensitivity.

COMPLETED
Camille and Henry Dreyfus Foundation, $50,000
Structure and function of membrane proteins by NMR using DNP hyperpolarization
This award was given in support of a research program aiming to study membrane proteins by NMR, and to develop novel methods of pre-polarization for determining interactions and dynamic processes.

The Welch Foundation, $150,000
Structural perspectives on transmembrane Helix Assembly by NMR
The goal of this project was to identify structural features of molecular interactions that arise in the assembly of helical membrane proteins.

Fellowship for Prospective Researchers: 7/1/04-6/30/05
Swiss National Science Foundation, $52,402
Xenon Biosensors applied to Microcoil NMR and NMR at Ultralow Magnetic Fields
This fellowship was awarded for postdoctoral training at UC Berkeley.

E. Contributions in Research Training and Mentoring (9/2006 – present)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>1</td>
<td>307</td>
</tr>
<tr>
<td>CHEM 325</td>
<td>Physical Chemistry Laboratory I</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>CHEM 326</td>
<td>Physical Chemistry Laboratory II</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>CHEM 327</td>
<td>Physical Chemistry I</td>
<td>4</td>
<td>198</td>
</tr>
<tr>
<td>CHEM 601</td>
<td>Analytical Chemistry I</td>
<td>5x1/4 (team taught)</td>
<td>91</td>
</tr>
<tr>
<td>CHEM 689</td>
<td>Physical Methods in Biological Chemistry</td>
<td>3x1/3,1/3,0.45 (team taught)</td>
<td>26</td>
</tr>
</tbody>
</table>

Classroom Innovations
- Constructed low-field NMR spectrometer and developed laboratory experiment for CHEM-325
- Developed quantum-first approach and lecture hall demonstration experiments for CHEM-327.
- Developed an enzyme kinetics laboratory experiment for middle/high school, which has been used twice in TAMU Youth Adventure Program, and will be distributed next semester with Chemistry
NAME Timothy R. Hughbanks, Ph.D.
POSITION TITLE Professor
eRA COMMONS USER NAME: N/A

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Washington, B. S.</td>
<td>B.A.</td>
<td>1977</td>
<td>Chemistry</td>
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<tr>
<td>Cornell University</td>
<td>Ph.D.</td>
<td>1983</td>
<td>Theoretical Chemistry</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>Postdoctoral</td>
<td>1983-1985</td>
<td></td>
</tr>
<tr>
<td>Iowa State University</td>
<td>Postdoctoral</td>
<td>1985-1987</td>
<td></td>
</tr>
</tbody>
</table>

A. Positions and Honors
Professional Positions:
1997 - present Professor, Department of Chemistry, Texas A&M University
1993 - 1997 Associate Professor, Department of Chemistry, Texas A&M University
1987 - 1993 Assistant Professor, Department of Chemistry, Texas A&M University

Honors:
1997 - 2000 Chair, Inorganic Division, Texas A&M University
1998 Reilly Lecturer, University of Notre Dame
1997 - present Member, Materials Research Society
1997 – 1999 Member, Editorial Board of Inorganic Chemistry
1997 President, Texas A&M University Local Chapter of the American Chemical Society
1995 – present Member, Editorial Board of High Temperature and Materials Science
1993 –present Monthly Contributor to Chemistry in Industry (Highlights in Inorganic Chemistry)
1988-93 NSF Presidential Young Investigator Award
1987 Sigma Xi, Iowa State Chapter, 1987

B. Selected Peer-reviewed Publications (5)

C. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
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<td></td>
<td></td>
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D. Contributions in Classroom Education
Courses taught (1 Aug 2010 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of Chemistry II</td>
<td>Chem 102</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>General Chemistry for Engineering Students</td>
<td>Chem 107</td>
<td>316</td>
<td></td>
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<tr>
<td>Direct Study</td>
<td>Chem 485</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Physical Method in Inorganic Chemistry</td>
<td>Chem 634</td>
<td>40</td>
<td>40</td>
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<tr>
<td>Symmetry and Group Theory in Chemistry</td>
<td>Chem 673</td>
<td>118</td>
<td>118</td>
</tr>
<tr>
<td>Seminar</td>
<td>Chem 681</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Research</td>
<td>Chem 691</td>
<td>81</td>
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E. Evidence of Scholarship
Citation Report

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Sum of Times Cited without self-citation</td>
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</tr>
<tr>
<td>Citing Articles</td>
<td>2229</td>
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<tr>
<td>Citing Articles without self-citation</td>
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<tr>
<td>Average Citations per Item</td>
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<tr>
<td>h-index</td>
<td>24</td>
</tr>
</tbody>
</table>

41 journal articles
Patent applications: 2
Book chapters: 1
Oral Presentations: 29 (since 2005)

ISI Citation reported (8/15/2012)
Sum of the Times Cited : 907
Sum of Times Cited without self-citation : 835
Citing Articles : 695
Citing Articles without self-citation : 668
Average Citations per Item : 22.12
h-index : 18
Biosketches 27

A. Personal Statement
Arthur E. Johnson is a physical biochemist/cell biologist who has examined several biochemical processes, including the movement of proteins through or into a membrane (protein trafficking), nascent protein folding, or of proteins and nucleic acids, most of which are membrane-bound. His research and published work therefore includes studies of protein-membrane, protein-nucleic acid, protein-protein, and protein-metal ion interactions. To examine how these processes are accomplished and regulated at the molecular level, he employs a wide variety of techniques. Multiple fluorescence techniques are used to detect and characterize, both kinetically and thermodynamically, the molecular interactions and conformational changes involved in the assembly, function, and regulation of free and membrane-bound macromolecular complexes, as well as to determine their structure and topography. He also uses fluorescence resonance energy transfer (FRET), photocrosslinking, and chemical crosslinking to determine the spatial arrangement of individual components within the complexes, to identify which components or residues are adjacent to each other, and to quantify the magnitude of conformational changes in the complexes. Importantly, all of his biophysical experiments examine functional molecules in fully assembled multi-component complexes in intact membranes in aqueous solution so that he can directly correlate structure and function.

B. Positions and Honors
1964-65 to 1968-69
Milton Academy, Milton, MA; Teacher of Physics, Chemistry, etc.; academic years; head football coach.
6/67-8/67
Phillips Andover Academy, Andover, MA; Teacher of Chemistry and Physics.
12/73-6/77
Univ. of Oklahoma, Norman, OK; Assistant, Associate, and Full Professor, Dept. of Chemistry and Biochem
4/92-8/94
Univ. of Oklahoma, Norman, OK; Gracey B. Kerr Chair, Department of Chemistry and Biochem.
9/83-8/94
University of Oklahoma Health Sciences Center, Oklahoma City, OK; Department of Biochemistry and Molecular Biology; Adjunct Professor.
9/94-present
Texas A&M Health Science Center, College Station, TX; Department of Molecular and Cellular Medicine (formerly Medical Biochemistry and Genetics); Wehner-Welch Chair; Professor, 9/94-9/97; Distinguished Professor, 9/97-3/04; Distinguished Professor, 3/04-present, Regents Professor, 12/08 to present.
9/02-present
Texas A&M University, Department of Chemistry; Professor, 9/02-present; Distinguished Professor, 9/02-present.
9/95-present
Texas A&M University, Department of Biochemistry and Biophysics; Professor.
2/00-2/05
Texas A&M University, Molecular Biophysics Program; Director.
5/87-5/88
11/84 & 11/91 Member, Special Study Sections, National Institutes of Health.
10/85 & 4/87 Member, Grant Proposal Advisory Panel, NSF Biophysics Program.
10/95
Ad Hoc Member, Cell Biology Study Section, National Institutes of Health.
1998-2002

Honors:
9/60-6/62
Caltech Scholarship Award.
9/62-6/64
General Motors Scholar.
6/63-8/63
NSF Undergraduate Summer Research Fellowship.
9/69-11/73
Public Health Service Traineeship.
2/74-2/77
Helen Hay Whitney Fellowship.
1974-76
Jane Coffin Childs Fellowship, (declined to accept Whitney award)

C. Selected Peer-reviewed Publications, 1/1/2005 to present (13 chosen from a total of 166 full-length papers published between 1976 and the present)

D. Current Research Support
R01 GM26494 (29-32) Johnson (PI)
NIH/NIHMS
Cholesterol-dependent cytolysins (CDCs) are bacterial protein toxins that form very large holes in mammalian cholesterol-containing membranes. We are examining the molecular mechanisms by which spontaneous pore formation is achieved and regulated. In this project, our contribution is primarily to use various fluorescence, FRET, and crosslinking techniques to investigate structural issues.

**Contributions in Research Training and Mentoring (1 Jan 2005 – present)**

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Contributions in Classroom Education**

I taught a Biological Membranes course (BICH 372/MBCH 372) in the spring and fall semesters of 2005, 2006, 2007, and 2008. The average number of students plus auditors was 20.

**Evidence of Scholarship**

- 49 full-length publications in refereed journals (1 Jan 2005 – present)
- 166 full-length publications from 1976 to date
- 1 patent pending (1 Jan 2005 – present)
- 23 invited talks at international meetings (1 Jan 2005 – present)
- 42 invited seminars at institutions worldwide (1 Jan 2005 – present)

**ISI Citation Report**

<table>
<thead>
<tr>
<th>Sum of the Times Cited</th>
<th>8644</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Times Cited without self-citation</td>
<td>7681</td>
</tr>
<tr>
<td>Citing Articles</td>
<td>5074</td>
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<tr>
<td>Citing Articles without self-citation</td>
<td>4936</td>
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<tr>
<td>Average Citations per Item</td>
<td>57</td>
</tr>
<tr>
<td>h-index</td>
<td>54</td>
</tr>
</tbody>
</table>

**Personal Statement**

Wendy Keeney-Kennicutt is presently the Associate Director of First Year Chemistry and master administrator of Calibrated Peer Review (CPR) for Texas A&M University (TAMU) with 35 publications. She joined the TAMU chemistry faculty in 1984 and teaches general chemistry. During this time, she spent several years managing a research lab that performed many analyses for the Exxon-Valdez oil spill. She has received numerous teaching awards, including the Presidential Professor for Teaching Excellence Award in 2009 and the Piper Professor in 2010. She has recognized for an extensive study of the effect of international TAs on student learning and attitude. This involved repeated assessment of 2500 first year chemistry students in Fall 2005 as part of TAMU Quality Enhancement Plan. In 2002, she established Calibrated Peer Review on the TAMU campus as a valuable tool for teaching peer review and “writing to learn” in chemistry. It has now been used by over 32,000 undergraduate and graduate students, in courses taught by 520 instructors in 580 courses spread over 30+ majors in 9 colleges at TAMU. As CPR administrator, she has presented over 20 talks and workshops on CPR and its effects on student learning and attitude. She is currently studying how the virtual world of Second Life affects chemistry learning and has given 18 presentations and workshops on the topic. She is a co-PI on a NSF grant proposal to study virtual chemistry labs in Second Life. As the coordinator of TAMU’s “Chemistry for Citizens” lab course, she writes new curriculum for future K-8 teachers. Wendy has organized the award winning American Chemical Society Chemistry Open House and Science Exploration Gallery at TAMU since 2000 and has been the Chemistry coordinator for the Texas Science Olympiad since 2002.

**Honors (select, since 1991):**

- 1991 Texas A&M Association of Former Students Outstanding Teaching Award for the College of Science
- 1996-2010 Wkonse Fellow
- 1998 Outstanding Teacher Award from Gamma Sigma Delta, The Honor Society of Agriculture
- 2001 Math Review web site honored by the sciLINKS program, a service of the National Science Teachers Association
- 2001 Texas A&M Association of Former Students Distinguished Achievement Award in Teaching
- 2004-2005 Outstanding Panhellenic Professor, TAMU
- 2006 ChemLuminary Award: Outstanding On-Going National Chemistry Week (NCW) Event
- 2007 Excellence in Quality Enhancement Award, “Enhancing the Teaching Assistant/Undergraduate Student Experience in the First Year Chemistry Program,” 2007 from the 7th Annual Texas A&M Assessment Conference
- 2008-2009 Member, TAMU Academic Master Plan Engagement Roadmap Committee
- 2008-2009 Member, TAMU Academic Master Plan Steering Committee
- 2009 Faculty representative, Comprehensive Program Review, Department of Disability Services
- 2009 Presidential Professor for Teaching Excellence Award, TAMU
- 2010 Student Led Award for Teaching Excellence, TAMU
- 2010 Piper Professor, Minnie Stevens Piper Foundation
2010-2011 Member, TAMU Faculty Senate Task Force for Academic Excellence
2010-2011 Chair, TAMU Association of Former Students Distinguished Achievement Awards for Teaching
2011 Member, TAMU Vision 2020 Faculty Imperative Study Group

C. Selected Publications (5)
W.L. Keeney-Kennicutt, A. Baris Gunersel and N. Simpson (2008) "Overcoming Student Resistance to a Teaching Innovation " International Journal for the Scholarship of Teaching and Learning, 2, 1, 1-26 (peer reviewed)

D. Research Support
ACTIVE
NSF TUES Type 1 Project (coPI) Funded: 08/01/2012 – 08/30/2014 Evaluating Students’ Learning and Attitudes in a Virtual Chemistry Laboratory

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)
Chaired undergraduate student’s research project, 2009-2010
Member of 2 Ph.D. committees in Dept. of Educational Technology: 1 graduated May, 2012 and the other will graduate in December 2012.

F. Contributions in Classroom Education
Courses taught (9 Sept 1984 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry</td>
<td>Chem 101</td>
<td>~2 per spring semester</td>
<td>~ 14,000</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>Chem 102</td>
<td>~2 per fall semester</td>
<td>~ 14,000</td>
</tr>
<tr>
<td>Student Research (Hon.)</td>
<td>LBAR 485/CHEM 485</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>Student Research Project</td>
<td>CHEM 485</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Classroom innovations
- Creating lab modules especially for elementary and middle school teachers taking Chem 116: “Molecular Science for Citizens” that they can use in the classroom.
- Using writing and peer reviewing in the chemistry classroom via Calibrated Peer Review.
- Creating and updating my public class website, which holds interesting links, class notes and videos. Learning videos are created from her personal Sympodium for her students. She created a math review website for chemistry students for which she received an award and is accessed nationally.
- Involving students in outreach programs, like Chemistry Open House and Texas Science Olympiad
- Using clickers (personal response systems) in the classroom 2-4 times every class period. She has given many talks and workshops to other faculty on the pedagogy of clickers.
- Letting classroom students participate in graduate student projects. Last year, they participated in a project analyzing her innovative method of giving partial credit on a multiple choice exam.
- Having students take on-line personality and learning mode tests as quiz scores to help them figure out their best learning styles.

G. Evidence of Scholarship
- 35 publications (1 Jan 1972 – present)
  - 13 peer-reviewed in chemistry, oceanography and education journals
  - Solution manual for Whitten et. al. General Chemistry textbook for 7 editions.
  - Chapter for ACS Book on Simulations and Virtual Worlds (in preparation)
- Documentation, talks, workshops, classroom visits for faculty and students on Calibrated Peer Review at TAMU
- 153 invited presentations and workshops (1 Jan 1984 – present)
  - Primary Topics: Calibrated Peer Review, Clickers, Second Life, Outreach
A. Personal Statement

Jaan Laane is internationally recognized as a leading scientist in the field of molecular spectroscopy. He has published more than 300 journal articles and is the editor of three books, including *Frontiers in Molecular Spectroscopy* (Elsevier, 2009). He is the recipient of numerous awards including the prestigious E.R. Lippincott Award in Molecular Spectroscopy administered jointly by the Society for Applied Spectroscopy, the Optical Society, and the Coblentz Society. He is best known for his pioneering work on vibronic potential energy functions for which he has developed much of the theory, written the widely used computer programs, and produced extensive experimental results for challenging problems. His computer programs have been distributed to dozens of laboratories and their descriptions have been cited many hundreds of times. He is also known for his work on organosilicon syntheses, and half a dozen new cyclic organosilanes have been prepared for the first time in his laboratory. He has served as Editor for the Journal of Molecular Structure since 1994 and has served on numerous international advisory boards for spectroscopic conferences. He also served as President of the Alexander von Humboldt Foundation of America. At Texas A&M he was elected the third Speaker of the Faculty Senate (1985-6) and he was the founding President of the Faculty Club (now the University Club). While Director of the Institute for Pacific Asia, he played the leading role in establishing the Texas A&M campus in Koriyama, Japan. He also served as Associate Dean for Graduate Studies for the College of Science. He has also received an Association of Former Students Distinguished Teaching Award.

B. Positions and Honors

**Professional Positions**

1985-86 Speaker, Faculty Senate, Texas A&M University

1985-86 Associate Dean of Science (graduate studies)

1987-90 Exec. Deputy Director/Sr. Policy Advisor, Texas A&M, Japan

1993-94 Visiting Professor, University of Ulm, Germany

1996 Elected to Estonian Academy of Science

1998-99 Elected to Estonian Academy of Science

1997-99 Elected to Estonian Academy of Science

1999-2000 Elected to Estonian Academy of Science

2000-2001 Elected to Estonian Academy of Science

2002-2003 Elected to Estonian Academy of Science

2003-2004 Elected to Estonian Academy of Science

2004-2005 Visiting Professor, Stanford University

2005-2006 Visiting Professor, University of Colorado (JILA)

2006-2007 Visiting Professor, University of Ulm (Germany)

2007-2008 Visiting Professor, University of Ulm (Germany)

2008-2009 Visiting Professor, University of Ulm (Germany)

2009-2010 Visiting Professor, University of Ulm (Germany)

2010-2011 Visiting Professor, University of Ulm (Germany)

2011-2012 Visiting Professor, University of Ulm (Germany)

2012-2013 Visiting Professor, University of Ulm (Germany)

2013-2014 Visiting Professor, University of Ulm (Germany)

2014-2015 Visiting Professor, University of Ulm (Germany)

2015-2016 Visiting Professor, University of Ulm (Germany)

2016-2017 Visiting Professor, University of Ulm (Germany)

2017-2018 Visiting Professor, University of Ulm (Germany)

2018-2019 Visiting Professor, University of Ulm (Germany)

2019-2020 Visiting Professor, University of Ulm (Germany)

2020-2021 Visiting Professor, University of Ulm (Germany)

2021-2022 Visiting Professor, University of Ulm (Germany)

2022-2023 Visiting Professor, University of Ulm (Germany)

2023-2024 Visiting Professor, University of Ulm (Germany)

2024-2025 Visiting Professor, University of Ulm (Germany)

2025-2026 Visiting Professor, University of Ulm (Germany)

2026-2027 Visiting Professor, University of Ulm (Germany)

2027-2028 Visiting Professor, University of Ulm (Germany)

2028-2029 Visiting Professor, University of Ulm (Germany)

2029-2030 Visiting Professor, University of Ulm (Germany)

30. Biosketches

C. Selected Peer-reviewed Publications (7 recent selected)


D. Research Support

**ACTIVE**

A-0396 (Renewal), Laane (PI)

Robert A. Welch Foundation

6/1/12-5/31/14, $150,000 (TC for project period)

Molecular Structures and Vibrational Potential Energy Surfaces in Ground and Excited Electronic States

Goals: Several spectroscopic methods including fluorescence, infrared and ultraviolet absorption, and Raman spectroscopy in conjunction with theoretical calculations are utilized to characterize the structures and conformations of molecules in their ground and excited electronic states.

**PAST (2 most recent NSF Grants)**

RF# 454911, CHE 0731935, Laane (PI)

National Science Foundation

3/1/02- 2/28/07, $491,774

Spectroscopic Investigations of Vibrational Potential Energy Surfaces and Molecular Structures in Singlet and Triplet Electronic Excited States

RF# 439911, Laane (PI)

National Science Foundation

2/15/98- 10/31/02, $522,300

Vibrational Potential Energy Surfaces in Excited Electronic Singlet and Triplet States

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)
F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Chemistry I</td>
<td>CHEM 327</td>
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<tr>
<td>Physical Chemistry</td>
<td>CHEM 322</td>
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<tr>
<td>Physical Chemistry</td>
<td>CHEM 324</td>
<td>3</td>
<td>101</td>
</tr>
<tr>
<td>Fund. of Chem. Lab I</td>
<td>CHEM 111</td>
<td>7</td>
<td>168</td>
</tr>
<tr>
<td>Fund. of Chem. Lab II</td>
<td>CHEM 112</td>
<td>6</td>
<td>192</td>
</tr>
<tr>
<td>Molecular Science CIT Lab</td>
<td>CHEM 116</td>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>Gen. Chem. For Engr. Lab</td>
<td>CHEM 117</td>
<td>6</td>
<td>144</td>
</tr>
</tbody>
</table>

G. Evidence of Scholarship
- 39 publications in refereed journals (1 Jan 2005 – present); 305 in total
- 1 book chapter, 1 book edited (1 Jan 2005 – present)
- 75 invited lectures (1 Jan 2005 – present)

A. Personal Statement
I have the background and expertise required to direct the proposed project on iron trafficking and homeostasis in the mouse brain. This project is truly multidisciplinary, as it involves animal studies, cell biology and biochemistry, bioinorganic spectroscopy, bioanalytical chemistry and biomathematics. Although I am not an expert in all of these areas, I have sufficient background in all of them to organize and direct the “pieces” of the project such that it will be productive and provide new insights into the emerging field of metal trafficking and homeostasis in vertebrate animals. I have 31 years of experience as a researcher in the fields of bioinorganic and biophysical chemistry, including 24 years on the faculty at Texas A&M University, 3 years as a post-doc at the University of Minnesota, 6 years as a graduate student at MIT and Berkeley, and 1 year as an undergraduate at IIT. I have published over 100 articles and have spoken at about the same number of conferences and seminars at various universities internationally. For the first 20 of those years, my research focused on the catalytic mechanisms of metalloenzymes as probed by various biochemical and bioanalytical methods. The enzymes studied included nitrogenase, NiFe hydrogenase, acetyl-coenzyme A synthase, the associated corrinoid Fe/S protein, and carbon monoxide dehydrogenase. Ten years ago I began to collaborate with Professor Jeffry J. Morgan (Department of Mathematics, University of Houston) on a biomathematics project modeling the process of cellular self-replication; we have now received support by the NSF on this and have published a number of papers in this area. Starting about 6 years ago, I decided to shift my experimental research program away from metalloenzymology and towards the cell biology of iron in yeast and human cells. The success that we have enjoyed in this new research direction prompted me (2 years ago) to consider the feasibility of applying similar methods to studying iron in an even more complex system – the brain. The project being evaluated now is the culmination of those considerations. It has taken 2 years to build the lab facilities required for this project, develop the animal colony, and generate sufficient preliminary results to demonstrate feasibility and justify funding. I have invested more creative energy into this project than perhaps any previous one, mainly because I see the real possibility of impacting health and making progress in understanding Fe-associated diseases. I would find nothing more satisfying than to contribute to the treatment or cure of a disease. I hope that you will grant me this opportunity. I will do everything in my power to make it happen.

B. POSITIONS AND HONORS

POSITIONS AND EMPLOYMENT:
- 1988-1994 Assistant Professor of Chemistry, Texas A&M University, College Station, TX
- 1994-1999 Associate Professor of Chemistry
- 1998-1999 Associate Professor of Biochemistry and Biophysics, Texas A&M University
- 1999-present Professor of Chemistry and of Biochemistry and Biophysics

AWARDS AND HONORS:
- 1978 NSF Undergraduate Research Fellowship
- 1979-1997 American Chemical Society
- 1979 Summa cum laude (GPA 3.97), North Park College
- 1979 Paul Bennett Award in Chemistry, North Park College
- 1986-1988 NIH post-doctoral fellowship

ACTIVITIES:
- 1995 Speaker, Metals in Biology Gordon Conference
- 1995 Speaker, Seventh International Conference on Bioinorganic Chemistry, Lubeck, Germany
- 1996 Speaker, American Chemical Society National Meeting, New Orleans
- 1996 Speaker, Nitrogenase Gordon Conference
- 1996 Speaker, NSF Bioinorganic Summer Workshop, Athens, Georgia
- 1997 Speaker, Fifth Chemical Congress of North America, Cancun Mexico
- 1998 Ad-hoc member, Physical Biochemistry Study Section, NIH
- 1998 Member, multidisciplinary Special Emphasis Panel (P41), NIH
- 1999 Ad-hoc member, Metalllobiochemistry Study Section, NIH
Biosketches 32

C. SELECTED PEER-REVIEWED PUBLICATIONS

1999  Speaker, 9th International Conf. on Biological Inorganic Chemistry, Minneapolis MN

2000  Speaker, 34th International Conf. on Coordination Chemistry, Edinburgh, Scotland

2003  Ad-hoc member, Physical Biochemistry Study Section, NIH

2003  Speaker, American Chemical Society Meeting, New Orleans

2004-2011 Chairman of the Biological Chemistry Division

2004  Member, Special Emphasis Panel/Instrumentation, NIH,

2004  Ad-hoc member, Biochemistry Study section, NIH

2004  Speaker, Symposium on Bioinorganic Chemistry, University of Pennsylvania (April)

2004  Speaker, Gordon Conference on one-carbon metabolism, New Hampshire (July)

2005  Member, Basic Hydrogen Energy Review Panel, DOE

2006  Speaker, International Conference on Bioinorganic Chemistry, Ann Arbor, Michigan

2006  External Advisor Council, Computational Neuroscience program, University of Minnesota

2006-present Editorial Board, Journal of Biological Inorganic Chemistry

2006  Speaker, Max Planck Institute for Terrestrial Microbiology, Marburg Germany

2006  Speaker, Penn State Summer Symposium in Molecular Biology, University Park, PA

2006  Speaker, Third Asian Biological Inorganic Chemistry Conference, Nanjing China

2006  Speaker, International Bioinorganic Symposium in Seoul Korea

2006-2012 Director of the Chemistry/Biology Interface Training Program at Texas A&M University.

2007  Speaker, American Chemical Society National Meeting, Chicago IL

2008  Speaker, Metals in Biology Gordon Conference, Ventura CA

2008  Speaker, Iron-Sulfur Enzymes Gordon Conference, New London NH

2008  Keynote Speaker, 4th Asian Biological Inorganic Chemistry Conference, Jeju Island, Korea

2009  Speaker, University of Illinois, Chemistry dept

2010  Speaker, Nagoya Symposium on Bioinorganic Chemistry, Nagoya Japan

2010  Lyceum Speaker, Lone Star College, Houston TX

2010  Speaker, Wayne State University, Dept of Biochemistry

2010  Speaker, Frontier’s in Bioinformatics Conference, U of Maryland

2010  Speaker, American Chemical Society Conference, Boston MA

2010  Speaker, Dept of Mathematics, Trinity University, San Antonio TX

2010  Speaker, Dept of Chemistry, University of Texas, Arlington, TX

2011  Speaker Department of Bioinformatics and Comp. Biology Iowa State University, Ames IA

2012  Speaker, Department of Chemistry and Biochemistry, University of South Carolina

2012  Speaker, Department of Chemistry, College of Charleston, Charleston South Carolina

2012  PhD Opponent Centre for Organelle Research, University of Stavanger, Norway

2012  Speaker, Centre for Organelle Research, University of Stavanger, Norway

C. SELECTED PEER-REVIEWED PUBLICATIONS (selected from 100 publications overall)

Most relevant to the current application


PMID:1817590

“Kinetic Modeling of the Assembly, Dynamic Steady State, and Contraction of the FtsZ Ring in Prokaryotic Cytokinesis” Ivan V. Surovtsev, Jeffrey J. Morgan, and Paul A. Lindahl, 2008 Plos Computational Biology, 4, 1-19. PMC2432035


PMID:17665226

D. RESEARCH SUPPORT

CURRENT

1. Integrated Modeling and Analysis of Animal-Cell Cytokinesis

NSF. 0714896 (PI) 09/01/08-07/31/13 (no cost extension)

Specific aims of project: This computational project involves modeling mechanisms of cell growth and division, with an emphasis on modeling contractile rings into a whole-cell model.

There is no overlap with the proposed project.

2. Biophysical Probes of Iron Metabolism in Yeast Vacuoles

R01 GM084266-01 6/1-12-5/31/13

Specific aims of project: This computational project involves modeling mechanisms of cell growth and division, with an emphasis on modeling contractile rings into a whole-cell model.

There is no overlap with the proposed project.

3. Iron in Mitochondrial Physiology and Disease

R01 GM084266-01 6/1-12-5/31/13

Specific aims of project: To use an integrative biophysical and genetic approach to evaluate the distribution of iron in mitochondria isolated from cells with different genotypes.

There is overlap with the proposed project only in terms of biophysical tools used (Mossbauer, EPR, UV-vis, ICP-MS) and a similar focus on iron in biology. There is no overlap in terms of the systems to be examined, this project is focused on the iron in yeast and human mitochondria and involves neither animal studies nor the brain.

COMPLETED

1. Bioinorganic Chemistry of Carbon Monoxide Dehydrogenase

R01 GM046441-16 National Institutes of Health

Biosketches 32
Evidence of Scholarship

**2. Probing Iron Metabolism in Mitochondria using EPR and Mössbauer Spectroscopy**

- Robert A. Welch Foundation A-1170 (PI)
- Specific aims of project: To develop an integrative biophysical approach to evaluate the distribution of iron in mitochondria.

**Biosketches**

- Goals: To develop an integrative biophysical approach to evaluate the distribution of iron in mitochondria.

**C. Publications**


**ISI Citation Report**

- Sum of the Times Cited: 3218
- Sum of Times Cited without self-citation: 2572
- Citing Articles: 1470
- Citing Articles without self-citation: 1384
- Average Citations per Item: 28.48
- h-index: 35

**A. Personal Statements**

The major research in the PI’s group at Texas A&M Chemistry Department focuses primarily on devising new methods for the genetic incorporation of noncanonical amino acids into proteins in living cells and exploring new organic reactions for protein and nucleic acid conjugations.

**B. Positions and Honors**

- **Positions**
  - 2005-2007: Postdoctoral Fellow, The Scripps Research Institute
  - Research Advisor: Dr. Peter G. Schultz
- 2007:
  - Assistant Professor of Chemistry, Texas A&M University
- **Honors**
  - 1997-1998: Huikai Fellowship
  - 1998-1999: Canon Fellowship
  - 1999-2000: Outstanding Student Leader Award
  - 2000-2004: UC Systemwide Biotechnology Research Training Fellow
  - 2003: UC-Davis Travel Award
  - 2004: UC-Davis Summer Research Award
  - 2012-2017: NSF Career Award

**C. Publications (with names as W. Liu and W.R. Liu)**

- *As an independent principal investigator*

Before becoming an independent investigator


(+equally contributing authors)


Liu W. & Toney M.D.* "Kinetic and thermodynamic analysis of the interaction of cations with dialkylglycine decarboxylase", Biochemistry 2004, 43: 4998-5010


D. Research Support

Current Support

Welch Research Grant A-1715
06/01/2009-05/30/2012, $150,000
*Synthesis and evaluation of methyltransferase-mediated alkylating agents*

Principal investigator: Wenshe Liu, Ph.D.

NIH-1R01CA161158-01
07/01/2011-04/30/2016, $1,483,085
*Phage display with two genetically incorporated noncanonical amino acids*

Principal investigator: Wenshe Liu, Ph.D.

NSF CAREER Award CHE-1148684
04/01/2012-03/31/2017, $575,000
*CAREER: Site-specific dual-labeling of a protein through two genetically incorporated noncanonical amino acids*

Principal investigator: Wenshe Liu, Ph.D.

E. Contributions in Research Training and Mentoring (Sept 2007 – present)

<table>
<thead>
<tr>
<th>Postdocs</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<tr>
<td>3</td>
<td>9</td>
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<td>2 (2012)</td>
<td>1 (2012)</td>
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</table>

Total (Sept 2007 – present) 5 11 10 2 1

F. Contributions in Classroom Education

Course taught (Sept 2007 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
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<tr>
<td>Biorganic Chemistry</td>
<td>Chem 630</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Principle of Biological Chemistry</td>
<td>Chem 627</td>
<td>2</td>
<td>41</td>
</tr>
<tr>
<td>Organic Chemistry II</td>
<td>Chem 228</td>
<td>2</td>
<td>107</td>
</tr>
</tbody>
</table>

Classroom Innovations:
Chem 630: Biorganic Chemistry was initiated by the PI and encompassed of most of advanced chemical tools with biological applications.

G. Evidence of Scholarship

- 17 publications in refereed journals (Sept 2005 – present)
- 3 patents (Sept 2005 – present)
- 35 invited lectures (Jan 2008 – present)
Robert R. Lucchese is an international leader in the theoretical study of molecular photoionization. He has published over 250 peer-reviewed articles in top-ranked scientific journals, has received a number of competitive awards, including the National Science Foundation’s Presidential Young Investigator Award, an Alfred P. Sloan Research Fellowship, and the Camille and Henry Dreyfus Teacher-Scholar Award. In addition to his work on processes involving electron-molecule scattering collisions, his group has an active collaboration with Prof. John Bevan that combines high-resolution spectroscopy with theoretical modeling to obtain accurate intermolecular interaction potentials.

The objective of the project is to combine high-resolution spectroscopy and theory to obtain accurate intermolecular potentials for dimer systems.

A-1020 (Lucchese)
Welch Foundation, Houston, TX; 06/01/12 – 05/31/14; 1.0 Calendar
$150,000 (TC for project period)
Reaction Dynamics Probed by Molecular-Frame Photoionization
The objective of this project is to investigate molecular probes based on photoionization that could be used for time-resolved studies of reaction dynamics.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded (2012)</th>
<th>M.S.’s Awarded</th>
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<tr>
<td>Graduate</td>
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F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

<table>
<thead>
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<th>Course Name</th>
<th>Course Number</th>
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<th>Number of Students</th>
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<tbody>
<tr>
<td>Physical Chemistry I</td>
<td>Chem 323</td>
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<tr>
<td>Physical Chemistry II</td>
<td>Chem 324</td>
<td>3</td>
<td>77</td>
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<tr>
<td>Physical Chemistry for Engineers</td>
<td>Chem 322</td>
<td>1</td>
<td>23</td>
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<tr>
<td>Physical Chemistry II</td>
<td>Chem 328</td>
<td>2</td>
<td>78</td>
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<tr>
<td>Principles of Quantum Mechanics</td>
<td>Chem 648</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>Chemical Kinetics</td>
<td>Chem 621</td>
<td>2</td>
<td>21</td>
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<tr>
<td>Statistical Thermodynamics</td>
<td>Chem 631</td>
<td>2</td>
<td>16</td>
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<tr>
<td>Seminar</td>
<td>Chem 681</td>
<td>1</td>
<td>14</td>
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<tr>
<td>First Year Chemistry Laboratories</td>
<td>Chem 111/112/117</td>
<td>12</td>
<td>288</td>
</tr>
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</table>

G. Evidence of Scholarship
- 76 publications in refereed journals (1 Jan 2005 – present)
- 31 invited lectures (1 Jan 2005 – present)
NAME
Ronald D. Macfarlane

POSITION TITLE
Distinguished Professor, Professor of Chemistry

eRA COMMONS USER NAME : N/A

EDUCATION/TRAINING

INSTITUTION AND LOCATION
University of Buffalo
Carnegie-Mellon University
Carnegie-Mellon University

DEGREE
B.A.
M.S.
Ph.D.

MM/YY
1954
1957
1959

FIELD OF STUDY
Chemistry
Chemistry
Chemistry

A. Positions and Honors

Professional Positions:
1962-1967 Assistant and Associate Professor, Chemistry, McMaster University, Hamilton, Canada
1967-present Full Professor of Chemistry, Texas A&M University

Awards & Honors
1969 J.S. Guggenheim Fellow (Niels Bohr Institute, Copenhagen)
1983 Texas A&M University Distinguished Achievement Award in Research
1990 American Society for Mass Spectrometry Distinguished Contribution Award, First Recipient

B. Selected Peer-reviewed Publications (5 selected from 2012)


C. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

Course Name
General Chemistry I
General Chemistry II
Directed Studies

Number of Sections
19
5
1

Number of Students
4015
1310
1

D. Evidence of Scholarship

Citation Report

Sum of the Times Cited : 4130

Sum of Times Cited without self-citation : 3745

Citing Articles : 2708

Citing Articles without self-citation : 2592

Average Citations per Item : 24.58

h-index : 29

A. Personal Statement

Elmo J. Mawk is a Senior Lecturer with extensive teaching experience first year chemistry courses as well as non-majors instrumental analysis. He has coordinated undergraduate laboratories, spending 3 semesters coordinating General Chemistry laboratory and currently coordinating the non-majors instrumental analysis laboratory. Elmo has served on the Laboratory Assessment Examination Committee, for the ACS DivCHED Examination Institute and has volunteered for various College of Science outreach activities. He has an interest in the implementation of web and computer based technologies to enhance student learning. To that end he has written an extensive library of quiz questions in the BlackBoard Vista learning management system to quiz for credit freshman chemistry students over new concepts discussed in lecture. Additionally Elmo has worked to prepare laboratory curriculum materials, principally laboratory experiments for the freshman chemistry program as well as the non-majors instrumental analysis laboratory. Since 2008 Elmo has been advising incoming chemistry majors during the summer New Student Conferences at Texas A&M University. Beginning in Fall 2012 Elmo will be the Associate Undergraduate Advisor in the Department.

B. Positions and Honors

1999-2004 Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
2005-2012 Associate Undergraduate Advisor, Department of Chemistry, Texas A&M University, College Station, TX

C. Selected Peer-reviewed Publications (since 1996)


D. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

Course Name
Quantitative Analysis
Quantitative Analysis Laboratory
Research
Analytical Chemistry I
Analytical Chemistry II
Seminar
Research

Number of Sections
14
14
21
1
1
6
10

Number of Students
417
268
36
16
23
49
41

Classroom innovations

• Implemented the use of screencasts for student exam reviews for Chemistry 101, 102 and 107.

• Screencasts are computer video and audio captures of the solutions to practice exam problems.

• Developed a quiz question database in BlackBoard Vista to replace in-class quizzing of new material for Chemistry 101, 102 and 107.
E. Evidence of Scholarship
“Using Screencasts for Examination Reviews: Student and Instructor Impressions”, Elmo J. Mawk and Vickie Williamson, 21st Biennial Conference on Chemical Education, August 1-5, 2010, University of North Texas, Denton, TX.
“Three Different Homework Systems, Three Different Approaches”, Elmo J. Mawk, 21st Biennial Conference on Chemical Education, August 1-5, 2010, University of North Texas, Denton, TX.

A. Positions and Honors
Positions and Employment
2000-2003  Postdoctoral Teaching Fellow, University of San Diego
2003-2006  Visiting Assistant Professor, University of San Diego
2006-   Senior Lecturer, Texas A&M University, College Station, TX

Professional Memberships
1994-   Member, American Chemical Society

B. Peer-reviewed Publications


G. Evidence of Scholarship
- 142 publications in refereed journals (1 Jan 2005 – present)
- 9 patents (1 Jan 2005 – present)
- 175 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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<td>Citing Articles</td>
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<td>Average Citations per Item</td>
<td>29.67</td>
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<td>h-index</td>
<td>58</td>
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</table>

NAME
Simon W. North, Ph.D.

POSITION TITLE
Professor of Chemistry

eRA COMMONS USER NAME : N/A

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
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<tbody>
<tr>
<td>University of New Hampshire, Durham, NH</td>
<td>B.S.</td>
<td>1990</td>
<td>Chemistry</td>
</tr>
<tr>
<td>University of California, Berkeley, CA</td>
<td>Ph.D.</td>
<td>1995</td>
<td>Chemistry</td>
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<tr>
<td>Brookhaven National Laboratory, Upton NY</td>
<td>Postdoctoral</td>
<td>1995-1997</td>
<td>Chemistry</td>
</tr>
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</table>

A. Personal Statement
Simon W. North is a recognized leader in the areas of chemical kinetics measurements and modeling, photodissociation dynamics, development of novel laser-based diagnostics, spectroscopy of transient species, trace gas detection, and flow visualization. He has published ca. 130 peer-reviewed articles in top-ranked scientific journals, and is currently the Associate Director of the Center for Atmospheric Chemistry and the Environment (CACE) and the co-Director of the National Aerothermochemistry Laboratory (NAL). He currently serves as the Graduate Advisor in the Department of Chemistry.

B. Positions and Honors

Professional Positions:
1997-2003 Assistant Professor, Department of Chemistry, Texas A&M University, College Station TX
2003-2008 Associate Professor, Department of Chemistry, Texas A&M University, College Station TX
2008- Professor, Department of Chemistry, Texas A&M University, College Station TX

Honors:
2010 Distinguished Achievement College-Level Award in Teaching
2009 Distinguished Achievement University-Level Award in Teaching
2004 Distinguished Achievement College-Level Award in Teaching
1994 Mahan Award, Outstanding Graduate Student Instructor, U.C.B.
1990 Bailey Prize, U.N.H.
1990 American Chemist’s Society Medal, U.N.H
1989 Merck Award, U.N.H.
1989 Marie-Langulair Scholarship, U.N.H.

C. Selected Peer-reviewed Publications (5, selected from 2011-2012)

D. Research Support

<table>
<thead>
<tr>
<th>Current</th>
<th>Photofragment Imaging of Atmospheric Free Radicals</th>
<th>The Robert Welch Foundation</th>
<th>$60,000</th>
<th>06/01/12-05/31/13</th>
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<tr>
<td>Current</td>
<td>Integrated Theoretical, Computational, and Experimental Studies for Transition Estimation and Control (co-PI)</td>
<td>Air Force Office of Sponsored Research/NASA</td>
<td>$10,000,000</td>
<td>09/01/2009-08/31/2014</td>
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<tr>
<td>Current</td>
<td>Reaction Mechanisms of Tropospheric Hydrocarbon Oxidation Studied by Cavity Ringdown Spectroscopy and Mass Spectrometry (sub contract)</td>
<td>National Science Foundation</td>
<td>$102,000 (sub-contract)</td>
<td>09/01/2010-08/31/2013</td>
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E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
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<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Current group</td>
<td>5</td>
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<td>2 (2012)</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>23</td>
<td>2</td>
<td>9 (terminal)</td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

Course Name                      Course Number | Number of Sections | Number of Students
---                              --------- | ------------------ | ------------------
Chemical Kinetics                Chem 621       | 6                 | 74
Freshman Chemistry              Chem 101       | 2                 | 590
Physical Chemistry Lab I        Chem 325       | 7                 | 140
Physical Chemistry Lab II       Chem 326       | 1                 | 13
Chemistry of Environmental Pollution Chem 383 | 1 | 30

Classroom innovations
- Involved in revitalizing the undergraduate physical chemistry laboratory
- Participation in two NSF funded K-12 outreach programs which impact underrepresented groups in the state of Texas: The Information Technology in Science (ITS) program (2002-2007) and the PCL-MAP grant.
- Authored 4 papers in the Chemical Education literature

G. Evidence of Scholarship

- 54 publications in refereed journals (1 Jan 2005 – present)
- 58 invited lectures (1 Jan 2005 – present)

Citation Report

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<td>h-index</td>
<td>27</td>
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</table>

A. Personal Statement

Oleg Ozerov is a professor of chemistry at Texas A&M University whose interests are in organometallic chemistry of transition metals and main group elements. He has authored over 50 independent publications and is a recipient of several awards, including the 2012 ACS Award in Pure Chemistry and the 2012 Hackerman Award in Chemical Research. He serves on the board of Chemical Science and Organometallics. Since 2011, Oleg has been the Graduate Recruitment Coordinator in the Department of Chemistry at Texas A&M. His research group is pursuing a number of different projects, ranging from energy conversion to carbon-fluorine bond activation and to organometallic catalyst development.

B. Positions and Honors

Professional Positions:
- 2002-2006 Assistant Professor, Dept. of Chemistry, Brandeis University, Waltham, Massachusetts
- 2006-2008 Associate Professor, Dept. of Chemistry, Brandeis University, Waltham, Massachusetts
- 2009 only Adjunct Professor, Dept. of Chemistry, Brandeis University, Waltham, Massachusetts
- 2009- Professor, Department of Chemistry, Texas A&M University, College Station, Texas

Honors:
- 2003 Research Corporation Research Innovation Award
- 2006 Alfred P. Sloan Research Fellowship
- 2007 Camille Dreyfus Teacher- Scholar Award
- 2012 Norman Hackerman Award in Chemical Research, Welch Foundation
- 2012 American Chemical Society Award in Pure Chemistry

C. Selected Peer-reviewed Publications (selected: 10 most significant)

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Journal Name</th>
</tr>
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</table>

D. Research Support

Active

Sponsorship:
- Air Force Office of Sponsored Research

Funding:
- $300,000 11/31/2011-10/31/2014
- $682,000 12/31/2011-
1. National Science Foundation
01/2009- 07/2013; $494,000 (OVO allocation for project period; total of 20 PI’s will share $20M for 5 years)
POWERING THE PLANET: A Chemical Bonding Center for the Direct Conversion of Sunlight into Chemical Fuel
2. Department of Energy
09/2010-09/2013, $463,000
Catalysis of C-F Activation by Highly Electrophilic Si Compounds
3. Dreyfus Foundation
04/2007-06/2012, $75,000
Camille Dreyfus Teacher Scholar Award
4. Robert A. Welch Foundation
06/2012-05/2014, $150,000
Highly Unsaturated Cationic Group 10 Transition Metal Pincer Complexes
5. Weizmann Foundation
09/2012-08/2014, $100,000 (OVO allocation for collaboration with D. Milstein, Weizmann Institute)
Novel Approaches to Fuels and Chemicals from Biomass Triglycerides

Advisors and Collaborators:
Ph.D. advisor: Folami T. Ladipo, University of Kentucky.
Postdoctoral advisor: Kenneth G. Cautlon, Indiana University.
"Co-PI’s in the NSF CCI ‘Powering the Planet’": B. Brunschwig (Caltech), K.-S. Choi (Purdue U), C. Cummins (MIT), G. Gall (UC Davis), F. Gomez (Cal State – LA), H. Gray (Caltech), S. Hammes-Schiffer (Penn State U), T. Jaramillo (Stanford U), P. Hammond (MIT), X. Hu (EPFL, Switzerland), N. Lewis (Caltech), D. Nocera (MIT), B. Parkinson (Colorado State U), J. Peters (MIT), R. Schaal (Penn State U), S. Stahl (U Wisc), J. Shuttlefield (U Wisc – Oshkosh), E. Walker (Southern U), J. Winkler (Caltech).
Other collaborators: D. Bourissou (Toulouse, France), A. Fernandez (Merrimack C), B. Foxman (Brandeis U), D. Gusev (Wilfrid Laurier U, Canada), J. Kiplinger (LANL), A. Larsen (Ithaca C), D. Milstein (Weizmann Institute of Science) D. Mindiola, (Indiana U), B. S. Williams (Claremont McKenna C).

E. Contributions in Research Training and Mentoring (1 June 2009 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<tr>
<td></td>
<td>10</td>
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<tr>
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<td>12</td>
<td>5 (includes 1 high school student)</td>
<td>5</td>
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F. Contributions in Classroom Education Courses taught (1 Jan 2009 – present)

<table>
<thead>
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<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tbody>
<tr>
<td>Chemistry of the Elements</td>
<td>CHEM 104</td>
<td>2</td>
<td>25</td>
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<tr>
<td>Mechanistic Inorganic Chemistry</td>
<td>CHEM 636</td>
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</tr>
<tr>
<td>Organometallic Chemistry and Homogeneous Catalysis</td>
<td>CHEM 642</td>
<td>1</td>
<td>18</td>
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G. Evidence of Scholarship
- 49 publications in refereed journals (1 Jan 2005 – present)
- 56 invited lectures (1 Jan 2005 – present)

ISI Citation Report

| Sum of the Times Cited : | 1722 |
| Sum of Times Cited without self-citation : | 1463 |
| Citing Articles : | 934 |
| Citing Articles without self-citation : | 931 |
| Average Citations per Item : | 12.66 |
| h-index : | 24 |

A. Personal Statement
Jim Pennington’s primary professional role is as an instructor of sophomore organic chemistry. He has been recognized for excellence in this area with a Distinguished Achievement College-Level Award in Teaching from The Association of Former Students in 2007, and has twice been nominated for the Distinguished Achievement University-Level Award in 2010 and 2011.

Since 2008, he has served as the coordinator for the Texas A&M Chemistry Road Show. The Texas A&M Chemistry Road Show is one of the premier outreach programs of the Texas A&M Chemistry Department and the Texas A&M College of Science. It is intended to be an entertaining, motivating and educational experience of chemistry for the students involved. The Chemistry Road Show is presented 50 to 60 times per year, both locally and around the State of Texas. These presentations reach between 9000 and 10000 K-12 students per year. In addition to engaging these K-12 students, the Texas A&M Chemistry Road Show offers opportunities for Texas A&M undergraduates and graduate student volunteers to gain valuable organizational and presentation skills through this service learning opportunity. In recognition of his service through the Texas A&M Chemistry Road Show, he was nominated for the AF$ University Level Extension/Outreach Award in 2012.

B. Positions and Honors
Professional Positions:
1998-2003 Lecturer, Texas A&M University
2003-2011 Senior Lecturer, Texas A&M University
2011- Instructional Assistant Professor, Texas A&M University
Honors:
2012 Nominee, Distinguished Achievement University-Level Award in Extension/Outreach from The Association of Former Students
2011 Nominated for the John J. Koldus Faculty and Staff Achievement Award
2010, 2011 Nominee, Distinguished Achievement University-Level Award in Teaching from The Association of Former Students
2007 Distinguished Achievement College-Level Award in Teaching from The Association of Former Students
2007 IIIrd Sorority Teaching Award
2006 Fish Camp Namesake
2003-2007 Aggie Access Namesake

C. Peer-reviewed Publications:


D. Support (Texas A&M Chemistry Road Show)
Shell Oil Company has granted the program $5,000/year for the past several years.
Dow Chemical Company provided a $30,000 grant in 2011 that provided a new, specially equipped van for the Chemistry Road Show.

E. Contributions in Research Training and Mentoring (N/A)

F. Contributions in Classroom Education

Courses taught (1 Sept. 1998 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
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<th>Number of Students</th>
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<td>3 per year</td>
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<tr>
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<td>Chem 485</td>
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</table>

Classroom innovations

- Coordinating the "ChemBoxes" program. Prof. Christian Hilty and Prof. Wenshe Liu have received grants for which the "broader impact" portions are related to developing demonstrations and high-school science kits for the Chemistry Road Show. We are also collaborating on this effort with Prof. Dong Hee Sun. These kits have hands-on activities for students in high school science classes to further investigate phenomena demonstrated during the Road Show. In particular kits related to atomic emission spectroscopy, superconductivity, kinetics and enzyme catalyzed reactions have been constructed and are available for high-school instructors to borrow. One of the long-term goals of this program is for it to become an opportunity for other research groups to plug into in order to meet broader impact objectives in their own grants.

- Arranged for special "Expert" and former student class presentation by:
  - Dr. Howard Williams (NMR specialist in Dr. Scott’s group) on applications of spectroscopy that tie together spectroscopy, synthesis, biology, medicine, etc.;
  - Prof. Walter Bradley (Mechanical Engineering) on polymers and their application;
  - Patricio Santandar on Vitamins and Biochemistry
  - Kristyn Kimball, former student presentation of application of O-Chem in later classes such as Quant. Anal. And Biochemistry.
  - Amye E. Gibbs, Texas A&M Graduate, Physician’s Assistant, M D Anderson Cancer Center, Lympoma & Melanoma Clinic
  - Dr. Robert Hildreth, Texas A&M Faculty, Lt. Col. USAF (Retired), Energetic Materials

- Course notes (with substantial amount to be filled in in-class) available as a course pack to minimize transcription error, increase time spent listening, thinking and solving problems in class, and optimize the use of lecture time.

- Incorporation of in-class demonstration of reactions and concepts.

- "Pet Molecule" project that has students select organic compounds that are contained in products that they use and then collect data from the literature on their compound. This exercise is intended to help students see the organic chemistry in the world around them, and begin to develop some basic literacy in finding chemical information.

- Explicit effort to create homework, quizzes and exams with heavy focus on short answer, mechanism and synthesis questions to encourage higher order thinking (analysis, application and synthesis)

- Implementation of in-class group work to facilitate learning through teaching and to allow students with different learning styles an opportunity to assimilate information and construct understanding in a variety of ways.

- Implementation of Classroom Assessment Techniques such as daily reading quizzes to encourage pre-class preparation and "Muddies Point" surveys to help students identify where they are experiencing difficulty.

G. Evidence of Scholarship

- 3 publications in refereed journals (1 Jan 2003 – present)

  ISI Citation Reported August 20, 2012

  Sum of the Times Cited: 69

A. Personal Statement

Krishan Ponnamperuma came to Texas A&M in the 1999 where he was involved in research on the enzymology of Vitamin B12 biosynthesis in Professor A. Ian Scott’s laboratory. He subsequently joined Professor Daniel Romo’s research group where he pursued research on the isolation of receptors for biologically active marine natural products. He feels fortunate to have worked on projects that gave him the opportunity to use several different techniques (synthesis of stable-isotopically labeled starting materials, enzyme purification, cloning, microbiology and high field NMR analysis) and learn from expert senior colleagues in these areas.

Currently, as a senior lecturer, he teaches three sections of sophomore Organic Chemistry (CHEM 227 or CHEM 228), and supervises four laboratory sessions of Organic Chemistry Laboratory (CHEM 237 and CHEM 238). He enjoys all aspects of teaching.

B. Positions and Honors

Professional Positions:

2009–present
Senior Lecturer in Organic Chemistry
Department of Chemistry, Texas A&M University, College Station, Texas
Lecturer in Organic Chemistry
Department of Chemistry, Texas A&M University, College Station, Texas

Summers 2004–2006
Research work in Professor Daniel Romo’s Laboratory,
Department of Chemistry, Texas A&M University,
1999–2003
Post-doctoral research in Professor Ian A. Scott’s laboratory
Department of Chemistry, Texas A&M University,
1998–1999
Research in Dr. Hideo Ishii’s laboratory
Laboratory of Fungicide Chemistry, National Institute of Agro-Environmental Sciences, Tsukuba, Japan
1992–1995
Post-doctoral research in Professor Rodney Croteau’s laboratory
Institute of Biological Chemistry, Washington State University, Pullman, Washington
1987-1992
Graduate research in Professor Chris Abell’s laboratory
Department of Chemistry, University of Cambridge, United Kingdom

Honors:

1998
Japan Science and Technology Agency Research Fellowship, National Institute of Agro- Environmental Sciences, Japan
1987
Cambridge Commonwealth Trust Fellowship, University of Cambridge, U.K.
1983
Exhibition Award in Chemistry, University of Oxford, U.K.

C. Selected Peer-reviewed Publications


Spickett, C. M., Ponnamperuma, K. and Abell, C. The resolution of diterpene cyclases from Ricinus communis. Phytochemistry, 37, No.4, 971-973 (1994).

### D. Contributions in Classroom Education

Courses taught (January 2004 – present)

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*CHEM227 : ORGANIC CHEMISTRY I  
CHEM228 : ORGANIC CHEMISTRY II

### E. Evidence of Scholarship

- Five publications in refereed journals

### NAME

**Frank M. Raushel, Ph.D.**

**eRA COMMONS USER NAME**

Raushe1

**POSITION TITLE**

Distinguished Professor of Chemistry

**Davidson Professor of Science**

**INSTITUTION AND LOCATION**

- St. Thomas College
- University of Wisconsin
- Pennsylvania State University

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<th>DEGREE</th>
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<tr>
<td>B.A.</td>
<td>1972</td>
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<td>Ph.D.</td>
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<td>Postdoctoral</td>
<td>1976-1980</td>
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### A. Personal Statement

**Professional Experience**

- 1980-1986 Assistant Professor of Chemistry, Texas A&M University
- 1986-1989 Associate Professor of Chemistry, Texas A&M University
- 1989-2010 Professor of Chemistry and of Biochemistry & Biophysics, Texas A&M University
- 2010-present Distinguished Professor of Chemistry
- 1992-1993 Visiting Professor, Enzyme Institute, University of Wisconsin
- 2004-present Davidson Professor of Science
- 2006-present Director, Center for Biological NMR Spectroscopy
- 2008 Visiting Professor, Regensburg University

**Honors**

- 1975-1979 NIH National Research Service Award
- 1982-1985 NIH New Investigator Research Award
- 1985-1990 NIH Research Career Development Award
- 1991 Co-Chair, Gordon Research Conference on Enzymes and Metabolic Pathways
- 1995-1999 NIH Biomedical Science Study Section – Charter Member
- 1999-2003 Chair, 18th Enzyme Mechanisms Conference
- 2006 Fellow, American Association for Advancement of Science
- 2009 Repligen Award (American Chemical Society)

### B. Positions and Honors

**Selected Peer-reviewed Publications** (selected from ~265 peer-reviewed publications).

Most relevant to the current application:


Additional recent publications of importance to the field:


D. Relevant Research Support.

**Current Research Support**

**Title:** Deciphering Enzyme Specificity; PI: John A. Gerlt (University of Illinois)

**Agency:** NIH (P01 GM 71790)

**Period:** July 1, 2009 to June 30, 2014 ($250,000 per year in direct costs)

**Role:** Co-Investigator

The primary aim of this project is the discovery of function for members of the amidohydrolase family of enzymes.

**Title:** Enzyme Reaction Mechanisms; PI: Frank M. Raushel

**Agency:** Robert A. Welch Foundation (A-840)

**Period:** June 1, 2011 to May 31, 2015 ($75,000 per year in direct costs).

**Role:** Principal Investigator

The specific aim of this project is to establish the reaction mechanism for the reaction catalyzed by CbiA.

**Title:** Mechanism and Control of Urea Biosynthesis; PI: Frank M. Raushel

**Agency:** NIH (R01 DK 30343)

**Period:** September 1, 2008 to August 31, 2012 ($210,000 per year in direct costs)

**Role:** Principal Investigator

The major goal of this project is to elucidate the structure and mechanism of action for carbamoyl phosphate synthetase and cobyric acid synthetase.

**Title:** Enzymatic Detoxification of Organophosphate Nerve Agents; PI: Frank M. Raushel

**Agency:** NIH (R01 GM 68550)

**Period:** July 1, 2008 to June 30, 2012 ($225,000 per year in direct costs).

**Role:** Principal Investigator

The major goal of this project is to design and construct mutants of a bacterial phosphotriesterase for the detoxification of organophosphate nerve agents.

**Title:** Collaborative Center for an Enzyme Function Initiative (EFI); PI: John A. Gerlt

**Agency:** NIH (US4 GM 93342)

**Period:** May 1, 2010 to December 31, 2012 ($150,000 per year in direct costs).

**Role:** Director of Amidohydrolase Bridging Project

The major goal of this collaborative project is the development of an integrated strategy for functional annotation of enzymes.

**E. Contributions in Research Training and Mentoring**

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<th>Role</th>
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<th>Research Associates</th>
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**F. Contributions in Classroom Education**

Courses taught (1 Jan 2005 – present)

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<th>Course Name</th>
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NAME: Daniel Romo, Ph. D.  
POSITION TITLE: Professor  
INSTITUTION AND LOCATION:  
EDUCATION/TRAINING:  
Texas A&M University, College Station, TX  
Ph.D. 1991 Chemistry  
B.A. 1986 Chemistry/Biology  
Harvard University, Cambridge, MA  
Post-doc 1991-3 Chemistry  
Colorado State University, Fort Collins, CO  
B.A. 1991 Chemistry  
DEGREE:  
FIELD OF STUDY:  
INSTITUTION AND LOCATION:  
EDUCATION/TRAINING:  
Texas A&M University, College Station, TX  
Ph.D. 1991 Chemistry/Biology  
B.A. 1986 Chemistry  
Harvard University, Cambridge, MA  
Post-doc 1991-3 Chemistry  
Colorado State University, Fort Collins, CO  
B.A. 1991 Chemistry  
DEGREE:  
FIELD OF STUDY:  
INSTITUTION AND LOCATION:  
EDUCATION/TRAINING:  
Texas A&M University, College Station, TX  
Ph.D. 1991 Chemistry/Biology  
B.A. 1986 Chemistry  
Harvard University, Cambridge, MA  
Post-doc 1991-3 Chemistry  
Colorado State University, Fort Collins, CO  
B.A. 1991 Chemistry  
DEGREE:  
FIELD OF STUDY:  
A. Personal Statement  
For the past 18 years, interests in my independent research laboratory have spanned the development of novel strategies for the synthesis of complex, bioactive natural products with a focus on anticancer agents, mechanism of action studies of these natural products including developing methods of for simultaneous arming/SAR studies, biosynthetic studies of natural products, and development of synthetic methodologies with particular emphasis on β-lactones. These studies are enabled and bolstered by highly productive collaborations with laboratories specializing in cell and molecular biology, biochemistry, protein crystallography, natural product isolation and biosynthesis, and preclinical studies of anticancer agents. Our expanding collaborative studies led to establishment of the Natural Products LINCHPIN Laboratory as an idea incubation center for scientists interested in the synthesis of natural product conjugates useful for identifying their putative cellular receptors and studying their full potential as drug candidates. In one project spanning ~12 years with my long-time collaborator Prof. Jun Liu and the subject of this proposal, we have dissected the mechanism of action of patamine A and DMDAPatA at the molecular and cellular level. In numerous collaborations, we have continued to study the potential of DMDAPatA as a protein synthesis inhibitor and as a drug candidate. I have mentored and supervised 20 Ph.D. students, 7 M.S. students, 24 post-doctoral fellows, and >70 undergraduates in my research lab. My group’s research has been described in >98 peer-reviewed publications, 3 issued patents, and 3 pending patents based on research involving natural products as drug leads for cancer and other human ailments. I have served on numerous grant review boards and am a member of the American Chemical Society, American Association for Cancer Research, American Association for the Advancement of Science, and the Society for the Advancement of Chicanos and Native Americans in Science. Of particular importance to the current grant has been my involvement in the NIGMS Chemistry-Biology Interface Training Program as a joint venture between the Chemistry and Biochemistry/Biophysics Depts. at TAMU. I mentored one Ph.D. student who was a trainee of this Training Program, Dr. Anja S. Dilley.  
B. Positions and Honors  
Positions and Employment  
1985-1986 University Undergraduate Fellow  
Department of Chemistry and Department of Biology, Texas A&M University  
1986-1991 National Science Foundation Minority Pre-doctoral Fellow  
Department of Chemistry, Colorado State University  
1991-1993 American Cancer Society Post-doctoral Fellow  
Department of Chemistry, Harvard University  
1993-1999 Assistant Professor, Department of Chemistry, Texas A&M University  
1999-2003 Associate Professor, Department of Chemistry, Texas A&M University  
2003-present Professor, Department of Chemistry, Texas A&M University  
2010-present Director, Natural Products LINCHPIN Laboratory, Texas A&M University  
Other Experience and Professional Memberships  
1985-present Life member, Society for the Advancement of Chicanos and Native Americans in Science  
1985-present Member, American Chemical Society Organic Division  
1994-present American Association for the Advancement of Science  
1995 National Institutes of Health: Small Business Innovation Research Proposals: Special Study Section  
1995-present NSF CAREER and Regular Grant Reviewer  
1998-2000 ACS Committee on Minority Affairs  
2000 National Institutes of Health: General Medical Science Council, Ad Hoc Participant  
2000 National Institutes of Health: Medicinal Chemistry A Study Section, Ad Hoc Reviewer  
2001 National Academy of Sciences: Ford Foundation Pre-doctoral Fellowship  
2002-2006 NIH Med Chem A/SBC A Study Section Regular Member  
2009 Member, American Association for Cancer Research  
Honors and Awards (Since 2005)  
2008 Excellence in Innovation Award, TAMU Office of Technology Commercialization  
2009 Assoc. of Former Students, Coll. Level Distinguished Achievement Teaching Award  
2009 NIH “Method to Extend Research in Time” (MERIT) Award  
2011 TAMU Assoc. of Former Students, Univ. Level Distinguished Ach. Award for Research  
2012 Induction into the Texas A&M Academy of Distinguished Former Students  
C. Selected Peer-reviewed Publications (out of 100 total)  
D. Research Support  
Ongoing Research Support  
NIH/NIGMS R37 GM052964-16 (MERIT Award), Romo (PI)  
4/1/09-3/31/14  
Title of Project: Synthetic/ Mechanistic Studies of Bioactive Marine Agents  
Goal: The chemical synthesis, mechanism of action, and biosynthetic studies of selected bioactive natural products including several anticancer agents.  
NIH/NIGMS ARRA R01 GM096784-04, Romo (PI)  
9/1/09-8/31/12 (no cost ext.)  
Title of Project: β-Lactones: Bioactive Targets and Vehicles for Synthesis  
Goal: Development and optimization of a concise strategy to the anticancer agent, salinosporamide A employing a nucleophile-catalyzed aldol-lactonization process and extension to the anticancer agent, oxazolomycolin. Studies of transamnual CH insertions to the scabrolide/inlelanolide/rameswaralide diterpenes.  
NSF CHE-1112397, Romo (PI)  
10/1/11-9/30/13  
Title of Project: Novel Asymmetric Routes to 2-Octoxanones and Their Application  
Goal: Development of methods for the enantioselective synthesis of β-lactones and application of the nucleophile catalyzed aldol-lactonization to the antiproliferative natural product, spongialactone.  
Robert A. Welch Foundation, Romo (PI)  
06/01/08-5/31/13  
Title of Project (or Subproject): Bioactive Natural Product Total Synthesis and Derivitization Studies including the use of β-Lactones (3-Octoxanones).  
Project Goal : The primary goal of this project continues to be the development of methods for the enantioselective synthesis of β-lactones including kinetic and dynamic kinetic resolution methods. Novel reaction manifolds of the nucleophile-catalyzed aldol-lactonization process will be investigated. Developed methods will be applied to bioactive natural product synthesis.  
Completed Last 5 years  
NIH/NIGMS R01 GM086307-01, Romo (PI), G. Vigh (Co-PI)  
7/1/08-6/30/12 (no cost ext.)  
Title: New Methods for Simultaneous Arming and SAR Studies of Natural Products  
Goal: Invent new methods for the functional group and site selective derivatization of natural products (including anticancer natural products) for SAR studies and eventual synthesis of bioactive probes for cellular target isolation.  
NSF CHE-0809747, Romo (PI)  
07/15/08-6/30/11  
Title of Project: Novel Asymmetric Routes to 2-Octoxanones and Their Application  
Goal: The primary goal of this project is the development, including mechanistic studies, of methods for the enantioselective synthesis of β-lactones. Also included is the application of the nucleophile catalyzed aldol-lactonization to the β-lactone containing natural product, spongialactone.  
Robert A. Welch Foundation, Romo (PI)  
06/01/09-5/31/12  
Title of Project: Novel Asymmetric Routes to 2-Octoxanones and Their Application  
Goal: Development of methods for the enantioselective synthesis of β-lactones and application of the nucleophile catalyzed aldol-lactonization to the antiproliferative natural product, spongialactone.
Title of Project (or Subproject): Bioactive Natural Product Total Synthesis and Derivitization Studies including the use of \( \beta \)-Lactones (3-Oxetanones).

Project Goal: The primary goal of this project continues to be the development of methods for the enantioselective synthesis of \( \beta \)-lactones including kinetic and dynamic kinetic resolution methods. Novel reaction manifolds of the nucleophile-catalyzed aldol-lactonization process will be investigated. Developed methods will be applied to bioactive natural product synthesis.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

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<td>Org Synth and Analysis IV</td>
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<td>Org Chem II</td>
<td>Chem 228</td>
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<td>35</td>
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<tr>
<td>Spec. Top. Heterocycles</td>
<td>Chem 689</td>
<td>1</td>
<td>10</td>
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<tr>
<td>Undergraduate Research</td>
<td>Chem 491</td>
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<td>35</td>
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<tr>
<td>Theory of Chemical Research</td>
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<td>Graduate Research</td>
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G. Evidence of Scholarship

- 7 patents (1 Jan 2005 – present)
- 64 invited lectures (1 Jan 2005 – present)
- 59 publications in refereed journals (1 Jan 2005 – present)

ISI Citation Report

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NAME: Michael P. Rosynek, Ph.D.
POSITION TITLE: Professor of Chemistry and Associate Head of Department

EDUCATION/TRAINING: (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)

<table>
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<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
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<td>University of Wisconsin-Milwaukee</td>
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<td>University of Wisconsin-Milwaukee</td>
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<td>1969</td>
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<td>Rich University, Houston, TX</td>
<td>Ph.D.</td>
<td>1972</td>
<td>Physical Chemistry</td>
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</table>

A. Personal Statement

When previously research-active (until approximately 10 years ago), Dr. Rosynek’s fields of specialization were heterogeneous catalysis, surface chemistry, and applied spectroscopy. He made contributions in catalyst synthesis and characterization, catalytic kinetics, and electron spectroscopy of catalyst surfaces. He currently teaches General Chemistry lecture courses for honors students, as well as a senior-level course in industrial and applied chemistry. He is currently the coordinator of the department’s General Chemistry laboratory program for honors students and chemistry majors. He also serves as the Associate Head of the department, being responsible for various administrative functions, including class scheduling, teaching assignments, space allocation, safety practices, oversight of construction and renovation activities, etc.

B. Positions and Honors

Professional Positions:
- 1972-1973 Research Chemist, Mobil Research and Development Corp., Princeton, NJ
- 1973-1979 Assistant Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
- 1979-1986 Associate Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
- 1986- Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
- 1981- Associate Head of Chemistry Department, Texas A&M University, College Station, TX

Honors:
- 2007 Distinguished Achievement Award in Teaching, Association of Former Students, Texas A&M University

C. Most Recent Peer-Reviewed Publications (5)


D. Contributions in Classroom Education

Courses taught (Fall 2007 – present)

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<th>Number of Students</th>
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<td>Chem 111H</td>
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<td>Industrial Chemistry</td>
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<td>3</td>
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Classroom Innovations
- Developed application of group-learning techniques to honors-level General Chemistry lecture courses.
Biosketches 47

David H. Russell is an internationally recognized first-rate expert in mass spectrometry and analytical chemistry. A Fellow of the American Association for the Advancement of Science, Russell is a past recipient of a National Science Foundation Foreign Travel Award as well as a Two-Year Extension for Special Creativity. In 2004, he received an Association of Former Students Distinguished Achievement Award in Research, Texas A&M’s highest recognition for excellence in that category. He has served as a co-editor for *Journal of Cluster Science* for more than a decade. A past member of the editorial boards for several mass spectrometry journals, he currently serves on the editorial advisory board for the *Journal of Mass Spectrometry*. In addition, he has authored ca. 240 scholarly publications in peer-reviewed journals and has eight patents. Russell holds the Applied Biosystems MDS Sciex Chair in Mass Spectrometry, is Director of the Laboratory for Biological Mass Spectrometry, and Head of the TAMU Department of Chemistry. As Russell has pioneered in his own fundamental and applied research, he has formed significant collaborations with colleagues in Texas A&M’s Colleges of Science, Veterinary Medicine and Biomedical Science, and Agriculture and Life Sciences as well as other institutions across the United States. His research area is best described as developmental mass spectrometry and gas-phase ion chemistry. Research in his group encompasses a broad range of fundamental and applications-oriented projects that focus on development of tandem TOF-MS (TOF-TOF) and ion-mobility-mass spectrometry (IM-MS) for proteomics and biophysical/structural biology. The research has provided many contributions to mass spectrometry, but much of this has focused on development and application of novel methods and instrumentation for identification and characterization of complex biological molecules. The research has had significant impact on early development in MS-MS, hybrid magnetic sector-TOF, large molecule FT-ICR MS, advanced TOF and TOF-TOF instruments, and ion-mobility-mass spectrometry.

**A. Personal Statement**

David H. Russell is a 2004 Texas A&M University, Association of Former Students Distinguished Achievement Award for Research Fellow of the American Association for the Advancement of Science. He is a Minnesota Chromatography Forum, Special Recognition journals, he currently serves on the editorial advisory board for the *Journal of Cluster Science* for more than a decade. A past member of the editorial boards for several mass spectrometry journals, he currently serves on the editorial advisory board for the *Journal of Mass Spectrometry*. In addition, he has authored ca. 240 scholarly publications in peer-reviewed journals and has eight patents. Russell holds the Applied Biosystems MDS Sciex Chair in Mass Spectrometry, is Director of the Laboratory for Biological Mass Spectrometry, and Head of the TAMU Department of Chemistry. As Russell has pioneered in his own fundamental and applied research, he has formed significant collaborations with colleagues in Texas A&M’s Colleges of Science, Veterinary Medicine and Biomedical Science, and Agriculture and Life Sciences as well as other institutions across the United States. His research area is best described as developmental mass spectrometry and gas-phase ion chemistry. Research in his group encompasses a broad range of fundamental and applications-oriented projects that focus on development of tandem TOF-MS (TOF-TOF) and ion-mobility-mass spectrometry (IM-MS) for proteomics and biophysical/structural biology. The research has provided many contributions to mass spectrometry, but much of this has focused on development and application of novel methods and instrumentation for identification and characterization of complex biological molecules. The research has had significant impact on early development in MS-MS, hybrid magnetic sector-TOF, large molecule FT-ICR MS, advanced TOF and TOF-TOF instruments, and ion-mobility-mass spectrometry.

**B. Positions and Honors**

**Positions and Employment**

1978-1980 Research Scientist, Oak Ridge Nat’l Laboratory, Division of Analytical Chemistry
1980-1989 Assistant and Associate Professor, Texas A&M University
1987-1990 Chairman, Analytical Chemistry Division, Texas A&M University
1980-1989 Assistant and Associate Professor, Texas A&M University
1978-1980 Research Scientist, Oak Ridge Nat’l Laboratory, Division of Analytical Chemistry

**Honors**

National Science Foundation/Am. Society of Mass Spectrometry Foreign Travel Award
National Science Foundation, Two Year Extension for Special Creativity
TL Minnesota Chromatography Forum, Special Recognition Fellow of the American Association for the Advancement of Science

2004 Texas A&M University, Association of Former Students Distinguished Achievement Award for Research

**C. Selected Peer-reviewed Publications (Selected from 242 peer-reviewed publications)**

- **Saccharomyces cerevisiae THP1 is a suicide thiamine thiazole synthase.**, Chatterjee, Abhishek; Abeydeera, N. Dinuka; Bale, Shrinath; Pai, Per-Jing; Donrstein, Pieter C.; Russell, David H.; Ealick, Steven E.; Begley, Tadhg P. (2011). *Nature*, 478(7370), 542-546. *PMID: PMC22031445*

**D. Research Support**

Ongoing Research Support
Robert A. Welch Foundation, (A-1176)

“Studies of the Structure-Gas-Phase Ions”
06/01/10 – 05/31/12   $100,000

Department of Energy, (BES-DE-FG-04ER-15520)

“Nanoparticle Laser Desorption Ionization and IM-MS Applied Structural Mass Spectrometry”
04/01/10 – 03/31/13   $512,000

National Science Foundation (DBI-0821700)

MRI – “Development of Ion Mobility Mass Spectrometer for Protein Chemistry”
09/01/08-08/31/2012   $1,396,567

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

**Graduate Students**
13

**Undergraduate Students**
13

**Research Associates**
5

**Ph.D.’s Awarded**
3

**M.S.’s Awarded**
8

**Current group**
28

**Total**
3

**6**
F. Contributions in Classroom Education. Courses taught (1 Jan 2005 – present)

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<tr>
<th>Course Name</th>
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<th>Number of Sections</th>
<th>Number of Students</th>
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G. Evidence of Scholarship
- 95 publications in refereed journals (1 Jan 2005 – present)
- 2 patents (1 Jan 2005 – present)
- ~25 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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NAME: Patricio J. Santander, Ph.D.
POSITION TITLE: Lecturer
eRA COMMONS USER NAME: N/A

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
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<th>FIELD OF STUDY</th>
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<tr>
<td>Universidad de Chile, Santiago, CHILE</td>
<td>B.S.</td>
<td>1978</td>
<td>Chemistry</td>
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<tr>
<td>Texas A&amp;M University, College Station, TX</td>
<td>Ph.D.</td>
<td>1987</td>
<td>Organic Chemistry</td>
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A. Personal Statement
Patricio Santander came to Texas A&M in the early 1980's. For his graduate studies, he got involved in different aspects of the Vitamin B12 biosynthetic studies project. He feels fortunate to have worked in a rather unique project that gave him the opportunity to use several different techniques (synthesis of stable-isotopically labeled starting materials, enzyme purification, cloning, microbiology, and high field NMR analysis) and learn from expert senior colleagues in these areas. The race for unraveling the nature of the two biosynthetic pathways of this complex molecule was exciting and plenty of surprises.

Currently, as a lecturer, he teaches two sections of sophomore Organic Chemistry (CHEM 227 or CHEM 228), and one section of Organic Synthesis and Analysis IV (CHEM 234) for Chemistry majors each Fall or Spring semesters.

He enjoys all different parts of the teaching experience, in particular the "Office Hours" interactions with the students which gives him a better opportunity to relate the subjects discussed on the whiteboard with their career interests, and possibly get them in contact with research labs.

B. Positions and Honors

Professional Positions:
- Sept. 2006- Present: Department of Chemistry, Texas A&M University, College Station, Texas.
  Lecturer of Organic Chemistry I and Organic Chemistry II for non-Chemistry majors (two or three sections of 90 students each) and Synthesis and Analysis IV for Chemistry majors (30 students).
- Summers 2007-2009: Center for Biological NMR, Department of Chemistry, Texas A&M University, Research work in Professor A. Ian Scott Laboratories.
- April 1988-Aug. 2006: Center for Biological NMR, Department of Chemistry, Texas A&M University, College Station, Texas. Research Scientist (Professor A. Ian Scott Laboratories)
  Department of Chemistry, University of Chile, Santiago, Chile. Assistant Professor, Taught "Organic Chemistry II" to undergraduate Chemistry majors.
- 1981-1983: Department of Chemistry, Texas A&M University, College Station, Texas. Teaching Assistant, Undergraduate Freshman Chemistry.

Honors:

C. Selected Peer-reviewed Publications
D. Contributions in Classroom Education

Courses taught (31 August 2006 – present)

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*CHEM227 : ORGANIC CHEMISTRY I; CHEM228 : ORGANIC CHEMISTRY II; CHEM234 : SYNTHESIS AND ANALYSIS IV FOR CHEMISTRY MAJORS

E. Evidence of Scholarship

- More than 30 publications in refereed journals

A. Personal Statement

My research interests are in microscopic surface analysis. The current frontiers are to detect and localize attomole quantities of molecules in nanoscale surface volumes. New instrumentation and methodology must be created to explore the extreme limits of molecular detection-localization. My approach involves a novel version of secondary ion mass spectrometry, SIMS. The conventional bombarding beam of atomic, polyatomic, cluster ions is replaced with bombardment with individual nanoprojectiles, specifically Au\textsuperscript{193} ions of ~2 nm in diameter. When they are accelerated to hypervelocity, their impact causes abundant ion, electron and photon emission. The ejecta from an individual nanoprojectile arise from a surface area of 10 – 20 nm in diameter, yielding spatially refined molecular information. Localization is achieved by examining the co-emitted electrons with an electron emission microscope. The original instrumentation and methodology has been developed with a team from the Institut de Physique Nucléaire in Orsay (led by S. Della-Negra/and my associates and students at Texas A&M). Current work aims to advance molecular microscopy to an unparalleled level.

B. Positions and Honors

Positions and Employment

- 1960-1961 Summers, Laboratory Assistant, Chemistry Laboratory, Plutonium Department, Commissariat a l’Energie Atomique, France
- 1963-1965 Research Assistant, Center for Metallurgical Chemistry, Vitry, France, University of Paris
- 1964 Summer – 1965 Visiting Scientist, Comision Nacional de Energia Nuclear, Mexico
- 1965-1966 Scientific Consultant to the Division of Radioisotopes, European Nuclear Energy, OECD, Paris, France
- 1966-1967 Assistant Research Chemist, AARL, TEES, Texas A&M University
- 1967-1970 Assistant Professor, Chemistry & Chemical Engineering, Texas A&M University
- 1970-1974 Associate Professor, Chemistry & Chemical Engineering, Texas A&M University
- 1972-Present Professor of Chemistry, Texas A&M University
- 1972-1974 Chairman, Analytical-Inorganic Division, Department of Chemistry, Texas A&M University
- 1974-1987 Director, Center for Chemical Characterization & Analysis, Department of Chemistry, Texas A&M University
- 1974-Present Chairman, Analytical Chemistry Division, Department of Chemistry, Texas A&M University
- 1974-1994 Coordinator, Texas A&M Industry-University Cooperative Chemistry Program
- 1994-2006 Head, Department of Chemistry, Texas A&M University
- 2009-2011 Member, Board of Managers, TamChem LLC

Other Experience and Professional Memberships

American Chemical Society

Honors

- 2000-Present Chairman, Nuclear Reactor Safety Board, Texas A&M University
- 2011 Co-Chair, 13th Int. Conf. on Modern Trends in Activation Analysis
- 1986 George Hevesy Medal
- 1986-1995 President, International Committee on Modern Trends in Activation Analysis
- 1982-1993 Founding Editor, Journal of Trace & Microprobe Techniques, Marcel Dekker Inc.
- 1992 Chairman, Texas A&M Section, American Chemical Society
- 1976-Present Member, Editorial Board, Journal of Analytical Instrumentation
- 1989-2000 Member, Program Advisory Committee, Cold Neutron Research Facility, NIST
1987-1992  Member, IUPAC Working Group on Surface and Microanalysis, Commission V.2
1979-1983  Titular Member, Commission V.7, "Analytical Radiochemistry and Nuclear Materials,"
1961-1994  Member, Reactor Safety Board, Texas A&M University
1980-1990  Member, Technical Committee on Nuclear and Atomic Analysis, Isotopes and Radiation Division, ANS
1980-1983  Member, Panel for Analytical Chemistry, NBS
1979-1988  Member, Professional Development Council, Texas A&M University
1982-1987  Member, Comite de Direction, CNRS Cyclotron Laboratory, Orleans, France
1981-1993  Member, Board of Directors, St. Michael's Academy, Bryan, TX

C. Selected Peer-reviewed Publications

D. Research Support
Active
None.

Pending
ONR Co-invest, PI: Wooley, Nanoscale Molecular Analysis ($20,685/yr. to Schweikert).
NIEHS SRP-Center Grant, Co-PI, Phillips ($200,000/yr. to Schweikert).

G. Evidence of Scholarship
- 42 publications in refereed journals (1 Jan 2005 – present)
- 9 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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<td>21</td>
</tr>
</tbody>
</table>

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th></th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
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<tbody>
<tr>
<td>Current group</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>2 (2012)</td>
<td>0</td>
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<td>Total</td>
<td>13</td>
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<td>3</td>
<td>8</td>
<td>1 (terminal)</td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)
(During tenure as Dept. Head, team taught CHEM 601 Anal. Chem.)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental Analysis</td>
<td>CHEM 317</td>
<td>2</td>
<td>65</td>
</tr>
<tr>
<td>Instrumental Lab</td>
<td>CHEM 434</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>Analytical Chemistry</td>
<td>CHEM 601</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Special Topics in Analytical Chemistry</td>
<td>CHEM 689</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Seminar</td>
<td>CHEM 681</td>
<td>3</td>
<td>59</td>
</tr>
</tbody>
</table>
A. Personal Statement

The Singleton research group has developed original methods for the experimental measurement of kinetic isotope effects as well as original theoretical methods for the interpretation of kinetic isotope effects. This combination of experiment and theory has been used to study diverse organic, bioorganic, and organometallic reaction mechanisms. The Singleton group is a world leader in the measurement and mechanistic interpretation of kinetic isotope effects. Our success in this work was the reason for our winning the Cope Scholar Award from the ACS in 2008. In recent years, our mechanistic studies have led to a series of advances in the understanding of the role of dynamic effects in chemistry, and the Singleton group has become the leader in demonstrating the experimental effects of dynamics in ordinary organic reactions.

B. Positions and Honors

Professional Positions:

1981-1982  Associate Staff Chemist, General Electric, Corporate R&D, Schenectady, NY
1987-1993  Assistant Professor, Department of Chemistry, Texas A&M University
1993-1997  Associate Professor, Department of Chemistry, Texas A&M University
1997-  Professor, Department of Chemistry, Texas A&M University
2005-  Davidson Professor of Science, Texas A&M University
2006-  Owner, Process Origins, College Station, Texas

Other Experience and Professional Memberships:

1983-  Member, American Chemical Society
1999  Chair, Texas A&M Section of the American Chemical Society
1997, 2001  Temporary Member Medicinal Chemistry Study Section, NIH
2007-  Editorial Advisory Board, The Open Organic Chemistry Journal

Honors:

1977  Valedictorian, Meadowbrook High School
1977-1980  Horsburgh Scholar, Case Western Reserve University
1981  Carl F. Prutton Prize in Chemistry, Case Western Reserve University
1982-1983  University of Minnesota Graduate School Fellowship
1983-1986  National Science Foundation Fellowship
1985  Lee Irvin Smith Award in Organic Chemistry, University of Minnesota
1986-1987  National Institutes of Health Postdoctoral Fellowship
1995  Distinguished Teaching Award, College of Science, Texas A&M
2001-2006  University Faculty Fellow, Texas A&M University
2008  Distinguished Achievement Award, University Level, Texas A&M
2006  Arthur C. Cope Scholar Award, American Chemical Society
2008  Davidson Professor of Science, Texas A&M University

C. Selected peer-reviewed Publications


D. Research Support

ACTIVE

GM-45617  Singleton (PI)
4/1/11-3/31/14, $784,000 total direct cost
National Institutes of Health

"New Concepts in Organic Selectivity and Mechanisms"

The grant funds our experimental and theoretical investigations of the dynamic effects that we believe commonly affect reactivity and selectivity in organic reactions. In addition, it funds the application of our unique capabilities in the experimental study of reaction mechanisms to the solution of specific interesting mechanistic questions in organic, organometallic, and bioorganic chemistry.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>10</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education

Dr. Singleton is recognized as an outstanding and innovative teacher, and he has won awards for his teaching at both the college and university level. In 25 years at Texas A&M, Dr. Singleton has 45 regular semester (non-summer) teaching assignments. Dr. Singleton’s teaching assignments have consistently addressed the central needs in the undergraduate and graduate organic programs, including the undergraduate organic and organic lab courses for chemistry majors and the graduate physical organic course for entering graduate students.


As evidence to the quality, significance, and broad interest of the research in the Singleton group, it may be noted that the Singleton group has published 40 papers in the Journal of the American Chemical Society since Dr. Singleton joined the faculty, including 32 since 1999 and 9 since 2009. In recognition of this research, Dr. Singleton won a Cope Scholar Award from the ACS in 2008.

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California at Berkeley</td>
<td>-</td>
<td>2002-2005</td>
<td>Chemistry</td>
</tr>
<tr>
<td>University of Texas, Austin, TX</td>
<td>M.S.</td>
<td>2002</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Seoul National University, Korea</td>
<td>M.S.</td>
<td>2002</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Seoul National University, Korea</td>
<td>B.S.</td>
<td>1992</td>
<td>Chemistry</td>
</tr>
</tbody>
</table>

A. Personal Statement

Dong Hee Son is an expert in the synthesis and fabrication of complex metallic and semiconducting nanostructures and characterization of their photophysical properties. His research aims to gain fundamental understanding on the structural correlation and control of static and dynamic photophysical properties of nanoscale inorganic materials. He published more than 30 peer-reviewed research articles (20 published or in review since A&M appointment) in major scientific journals. He received National Science Foundation CAREER award. He is serving as a reviewer for many journals and national laboratories (LBNL, LANL). He is also serving as an office of the local ACS section.

B. Positions and Honors

Professional Positions:

2005-2011 Assistant Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
1999-2009 Associate Professor, Dept. of Chemistry, Texas A&M University, College Station, TX

Honors (select, since 1994):

2009 NSF CAREER award

C. Selected Peer-reviewed Publications (5, selected from 2012)


D. Research Support

ACTIVE

NSF 
01/01/09-12/31/13, $400,000
Ultrafast Electronic, Magnetic and Coherent Lattice Dynamics and the Dynamic Structure-property Relationship in Nanocrystalline Transition Metal Oxides

Welch Foundation
06/01/12-05/31/14, $100,000
Energy transfer in doped anisotropic semiconductor nanostructures

PENDING

DOE
$393,854
Structurally-correlated dynamic of energy transfer and charge carrier trapping in transition-metal doped semiconductor nanocrystal
E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

- Modernizing the physical chemistry laboratory course that reflects the current state of chemistry research and experimental methods to effectively teach fundamental concepts and experimental skills has been an issue of discussion in the department since I joined TAMU. As a part of a collective effort to address this issue, I participated in the complete redesign of our undergraduate physical chemistry laboratory curriculum involving several physical chemistry faculty. In this team effort, I designed and implemented a three-week-long experimental module introducing modern optical spectroscopic and imaging techniques for characterizing photophysical properties of semiconductors and metal nanocrystals. The experiment involves the measurements of (i) absorption and fluorescence spectra and emission quantum yield of colloidal quantum dots, (ii) plasmon scattering spectrum of gold nanocrystals and (iii) surface-enhanced Raman scattering of organic molecules adsorbed on silver nanocrystals. For this purpose, I designed and built a modular optical experimental setup capable of doing both spectroscopy and imaging on a single platform with a relatively simple modification of the setup by the students operating the instrument. The setup was composed of modular parts such as a selectable light source bank (laser and white light source), a sample stage on 2-axis translation stage, a home-built optical microscope and a switchable detector bank (two CCD spectrometers and a imaging camera). Students could modify the selection of the light source, type of detector and optical beam path to make a particular type of measurement. The experiments were designed to increase students direct intellectual involvement in performing the experiment with minimal step-by-step instructions.

G. Evidence of Scholarship

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical Chemistry I</td>
<td>CHEM 601</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Special Topic (Optics and Spectroscopy)</td>
<td>CHEM 689</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>General Chemistry</td>
<td>CHEM 101</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Physical Chemistry</td>
<td>CHEM 323/328</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Physical Chemistry Lab</td>
<td>CHEM 325/326</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Citing Articles without self-citation:

- Absorption and fluorescence spectra and emission quantum yield of colloidal quantum dots:

A. Personal Statement

Elizabeth Binamira-Soriaga is a Senior Lecturer at the Department of Chemistry, Texas A&M University, from 1993 to the present. She earned her Masters Degree in X-ray Crystallography from the University of Hawaii and her Ph.D. in Inorganic Chemistry from the University of California at Santa Barbara. She was in hiatus for seven years to raise her three children who are now professionals in the fields of chemistry and electrical engineering. She has taught freshman chemistry, quantitative and instrumental methods of analysis, both lecture and laboratory courses primarily for chemistry and chemical engineering majors, as well as Physical Chemistry Laboratory. Her focus has been in the field of chemical education, specifically, in the development of instructional tools for lecture and laboratory courses. Together with Dr. M.P. Soriaga, she developed multimedia lectures for general chemistry on CD-ROM. She assisted in the restructuring of the physical chemistry laboratories. She co-authored the laboratory manual for quantitative analysis laboratories. She currently serves as Coordinator of Quantitative Analysis Laboratories.

B. Positions and Honors

- **Professional Positions:**
  - 1998-present: Senior Lecturer, Texas A&M University
  - 1993-1998: Lecturer, First Year Chemistry Program, Texas A&M University
  - 1995: Expert Instructor, Bridge to Medicine Program, Texas A&M University

- **Honors:**
  - 1981-1982: Regents Fellowship, University of California, Santa Barbara
  - 1975: Magna cum laude, University of San Carlos, Philippines

C. Publications

- *Mixed-Valence Complexes of Ruthenium and Osmium with 2,7-Bis-(2-Pyridyl)-1,8-naphthyridine. Tri-Chelated Complexes of Ruthenium with 2-(2-Pyridyl)-1,8-naphthyridine and 5,6-Dihydrido-


A. Personal Statement

Manuel P. Soriaga is Professor of Chemistry and the Director of both the Center for Electrochemical Systems and the Electrochemical Surface Science Laboratory at Texas A&M University. He earned his Ph.D. from the University of Hawaii and was a postdoctoral research fellow at the University of California at Santa Barbara before his appointment on the faculty at Texas A&M University. Dr. Soriaga has been a National Science Foundation Presidential Young Investigator and has served as National President of Phi Lambda Upsilon, the national Chemistry honors society. He has 225 publications, including a monograph and four co-edited books, in the fields of surface science, electrocatalysis and renewable energy. He is presently a Visiting Faculty at the Joint Center for Artificial Photosynthesis at the California Institute of Technology where he functions as the Project Lead of the heterogeneous catalysis group.

B. Positions and Honors

Professional Positions:

1985-1991 Assistant Professor, Department of Chemistry, Texas A&M University
1991-1997 Associate Professor, Department of Chemistry, Texas A&M University
1997- Professor, Department of Chemistry, Texas A&M University

Honors:

1989-1994 National Science Foundation Presidential Young Investigator Award

C. Selected Peer-reviewed Publications (5, selected from 2012)


D. Research Support

ACTIVE


E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
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<td>1 (1 high school student)</td>
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<td>Total</td>
<td>7</td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry</td>
<td>Chem 102</td>
<td>7</td>
<td>600</td>
</tr>
<tr>
<td>Quantitative Analysis</td>
<td>Chem 315</td>
<td>4</td>
<td>140</td>
</tr>
<tr>
<td>Instrumental Analysis</td>
<td>Chem 415</td>
<td>3</td>
<td>105</td>
</tr>
</tbody>
</table>

G. Evidence of Scholarship
- 45 publications in refereed journals (1 Jan 2005 – present)
- 10 invited lectures (1 Jan 2005 – present)

A. Personal Statement
Since 1981, Tammy H. Tiner has lectured Organic Chemistry in the Department of Chemistry at Texas A&M University. Chemical Education and Academic Advising have been the focus of her career. She has authored supplemental materials for three organic chemistry textbooks and served the Department of Chemistry at TAMU as Associate Undergraduate Advisor for 17 years as academic advisor to 250-300 undergraduate chemistry majors, in addition to her organic chemistry lecture duties. Her service to the Department of Chemistry and Texas A&M University includes:

- 2006-present College of Science Representative to the University Scholarship Committee 2000-2005 & 2008-2009
- College of Science Representative to the Executive Committee of University Advisors and Counselors
- September 2002 Co-Chair, Advisor Briefing Days, University Advisors and Counselors
- 2004 Chair, Bylaws Revision, University Advisors and Counselors
- 1995-1998 Chair, Organic Division Undergraduate Curriculum Committee
- 1995 Chair, Department of Chemistry Course Evaluation Committee
- 1995-present Chemistry Department Undergraduate Awards Committee –
- 2000-present Member Constituent Advisory Council, Center on Disability and Development, TAMU

B. Positions and Honors
Professional Positions:
- 1981-1984 Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
- 1984-1985 Visiting Assistant Professor, Department of Chemistry, Texas A&M University, College Station, TX
- 1989-1991 Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
- 1993-1995 Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
- 1995-2012 Assoc. Undergraduate Advisor, Department of Chemistry, Texas A&M University, College Station, TX
- 1995 Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX

Honors:
- 1999 Association of Former Students’ College-Level Distinguished Achievement Award in Teaching

C. Selected Peer-reviewed Publications
**D. Contributions in Classroom Education**

Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Chemistry I</td>
<td>CHEM 227</td>
<td>12</td>
<td>1146</td>
</tr>
<tr>
<td>Organic Chemistry II</td>
<td>CHEM 228</td>
<td>16</td>
<td>1450</td>
</tr>
<tr>
<td>Horizons in Chemistry</td>
<td>CHEM 100</td>
<td>7</td>
<td>677</td>
</tr>
</tbody>
</table>

**E. Evidence of Scholarship**


**A. Personal Statement**

Gyula Vigh is an internationally recognized expert in the field of high performance analytical and preparative-scale separation methods. He has published ca. 180 peer-reviewed articles in top-ranked scientific journals, holds several patents and has received numerous awards, including the Halasz Medal for Lifelong Achievements in Separation Science, Teaching Award of the Association Former Students of TAMU and the Spirit of Innovation Award of TAMU. He has served two terms as editor of Journal of Chromatography - Symposium Series, as member of the editorial boards of Chirality, Enantiomer, Journal of Chromatography, Journal of Separation Science, Chromatographia, Journal of Microcolumn Separations, Journal of High Resolution Separations and Electrophoresis. He serves as a member of the Permanent Scientific Committee of the International Symposia on Isotachophoresis and served on the Scientific Committee of High Performance Liquid Chromatography Symposia. Gyula Vigh holds the Gradipore Chair in Separation Science at Texas A&M University, where his research team has been engaged in the synthesis and analytical use of single-isomer charged cyclodextrin chiral resolving agents, the development of isoelectric focusing and isoelectric trapping analytical and preparative-scale separation methods and the development of families of new fluorophores for the capillary electrophoretic separation of amines, amino acids, peptides, proteins and lately, carbohydrates as well as the development of theories to describe and optimize these separations.

**B. Positions**

Professional Positions:


1971-1975  Instructor, Department of Analytical Chemistry, University of Veszprem, Hungary

1975-1980  Assistant Professor, Department of Analytical Chemistry, University of Veszprem, Hungary

1980-1985  Associate Professor, Department of Analytical Chemistry, University of Veszprem, Hungary

1985-2000  Associate Professor, Department of Chemistry, Texas A&M University, College Station, TX

2000-2001  Professor, Department of Chemistry, Texas A&M University, College Station, TX

2001-  Gradipore Professor of Separation Science, Department of Chemistry, Texas A&M University, College Station, TX

**C. Selected Peer-reviewed Publications (5, selected from 2011-2012)**


**D. Research Support**

Active

Gradipore Chair in Separation Science (PI: Vigh) 01/01/12 – 12/31/12 $50,000

The objective of this work is the development of high performance electrophoretic separation methods.
The objective of this work is the development of high performance liquid chromatographic separation methods and fluorescent derivatizing agents.

### E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td></td>
<td></td>
<td>1 (2012)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>

- 26 publications in refereed journals (1 Jan 2005 – present)
- 10 invention disclosures filed (1 Jan 2005 – present)
- Ca. 30 invited lectures (1 Jan 2005 – present)

Classroom innovations:
- A Special Topics in Modern Chromatographic Methods course was further developed for conversion into a permanent graduate course, Modern Chromatographic Methods CHEM 603.
- A Special Topics in Modern Electrophoretic Methods course was further developed for conversion into a permanent graduate course, Modern Electrophoretic Methods CHEM 604.

G. Evidence of Scholarship

- Ca. 30 invited lectures (1 Jan 2005 – present)
- 10 invention disclosures filed (1 Jan 2005 – present)
- Ca. 30 invited lectures (1 Jan 2005 – present)
- ISI Citation Report

<table>
<thead>
<tr>
<th>Sum of the Times Cited</th>
<th>170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Times Cited without self-citation</td>
<td>114</td>
</tr>
<tr>
<td>Citing Articles without self-citation</td>
<td>88</td>
</tr>
<tr>
<td>Average Citations per Item</td>
<td>6.54</td>
</tr>
<tr>
<td>h-index</td>
<td>9</td>
</tr>
</tbody>
</table>

A. Personal Statement

Coran Watanabe is a bio-organic chemist with a programmatic emphasis in natural product biosynthesis and chemical biology. As a graduate student at Johns Hopkins University the biosynthesis of the potent mycotoxin aflatoxin B1 by the fungus Aspergillus parasiticus was investigated. A new and highly effective method to prepare fungal cell-free extracts was developed, which not only greatly extended the lifetime of the enzymatic activities, but demonstrated complete in vitro biosynthesis of aflatoxin (approximately 17 enzymatic steps), including a pair of fatty acid synthase subunits and a polyketide synthase. The cell-free extract was exploited to probe particularly enigmatic steps of the pathway in time course and cofactor dependence experiments. HPLC was utilized for quantitative analyses. Affinity chromatography columns, employing bound substrate analogs, were created as a means to achieve selective binding and purification of the specialized yeast-like fatty acid synthase pair and polyketide synthase. Isotopic labeling studies (18O, 2H), were employed both in vivo and in vitro, to elucidate the mechanism of particularly complex structural rearrangements initiated by the organism en route to aflatoxin B1. Incorporation patterns were determined and quantified by 1H, 13C-NMR spectroscopy and mass spectrometric analyses. As a postdoctoral fellow at UC Berkeley/The Scripps Research Institute, the diverse applications of transcriptional array profiling with high-density DNA microarrays was evaluated. The technology was new at the time and was exploited to investigate the biological actions of complex herbs and natural products as well as evaluate the molecular mechanism of complex biological processes, e.g. cardiac remodeling. These experiments utilized a variety of methods and techniques including animal studies, cell culture, biochemical assays, and transcriptional profiling.

Coran Watanabe’s laboratory is experienced with genetic knockout strategies, enzyme characterization, DNA library construction and screening, chemical synthesis, natural product structure elucidation, cell culture, transcriptional profiling, and animal studies, which have resulted in a variety of publications.

B. Positions and Honors

Professional Positions:
- 1999-2002  The Scripps Research Institute, La Jolla, CA  (Research Advisor: Peter G. Schultz)
- 2002-2008  Assistant Professor, Department of Chemistry, Texas A&M University, College Station, TX
- 2008  Associate Professor, Department of Chemistry, Texas A&M University, College Station, TX

Honors:
- 2008  America Cancer Society Research Scholar
- 2003  Research Innovation Award, Research Corporation
- 1998  Howard Hughes Research Fellow (HHMI) of the Life Sciences Research Foundation
- 1996  NIH Postdoctoral Fellowship Declined for HHMI
- 1998  Sarah and Adolph Roseman Achievement Award for Outstanding Achievement in Chemistry
- 1992  Merck Award (ACS) for Outstanding Achievement in Chemistry
- 1991  ACS Analytical Division Award

Representative Professional Activities:
- Organizer for C. A. Townsend 65th Birthday Symposium, Johns Hopkins University, Baltimore, MD; August 10th-12th, 2012
- NIH BCMB-U Study Section, March 12-13th, 2012
- American Cancer Society Study Section June 23rd-24th, 2011; have been appointed to the study section full time, a commitment of 4 years (2012-2016)
Invited Participant in Arnold and Mabel Beckman Initiative for Macular Research, 2011
NIH SBCB Study Section Feb. 1st-2nd, 2011
American Cancer Society Study Section June 17th-18th, 2010
NIH SBCB Study Section February 11th-12th, 2009
Participated in evaluation of NIH Innovator Award program
Participated in evaluation of Research Corporation Young Investigators Award program
Served on scientific advisory board for the 50th Anniversary Meeting of the American Society of Pharmacognosy, Honolulu, HI; June 27-July 1, 2009
Presented invited lecture on pursuing an academic career and academic life to the ASP younger members society at the 50th Anniversary Meeting of the American Society of Pharmacognosy, Honolulu, HI; June 27-July 1, 2009
Representative Oral Presentations (Out of a total of 60):
Zing Conference: Enzymes, Coenzymes and Metabolic Pathways; Nov. 17-21, 2011
PacificChem Honolulu, Hawaii; Dec. 17th, 2010
Mona Symposium, Plenary Lecturer; Jamaica, Jan. 4th, 2010-Jan. 8th, 2010
11th International Conference on the Chemistry of Antibiotics and Other Bioactive Compounds (ICCA-11); September 29th, 2009-October 2nd, 2009
The 50th Anniversary Meeting of the American Society of Pharmacognosy; June 27th, 2009-July 1st, 2009
California Institute of Technology, Department of Chemistry; December 17th, 2008 (ACS Progress Dreyfus Lectureship Award)
1st Euro-Mediterranean Conference on Marine Natural Products, Sharm El Sheikh, Egypt; October 31st, 2008-November 4th, 2008
The 7th US Japan Seminar on the Biosynthesis of Natural Products; San Diego, CA; June 21-26th, 2008
Gordon Research Conference: Marine Natural Products, Ventura, CA; February 24-28th, 2008 (session title: Hot Stuff from Future Luminaries)
Iterative Polyketide Synthase Meeting (IPKS), Banff, Canada; July 22-26th, 2007
Gordon Research Conference: Enzymes Coenzymes and Metabolic Pathways, Ditteford, ME, July 16th-21th, 2006
C. Selected Peer-Reviewed Publications (Out of a total of 26)

2006


D. Research Support

ACTIVE
American Cancer Society (Brazos County Cattle Barons Ball)
04/01/12-10/31/12, $15,350 (DC)
Probing the Biosynthesis of the Anti-Tumor Agent Azinomycin B This study aims to identify the principal building blocks of the pathway and elucidate the azinomycin biosynthetic gene cluster
RSG-07-239-01-CDD (Watanabe)
American Cancer Society
07/1/07-10/31/12, $720,000 (TC for project period)
Probing the Biosynthesis of the Anti-Tumor Agent Azinomycin B This study aims to identify the principal building blocks of the pathway and elucidate the azinomycin biosynthetic gene cluster
NSF also funded this American Cancer Society grant. However, we accepted the ACS grant and declined the NSF grant because ACS provided an extra year of funding and the amount of funds provided per year were higher.
NSF/NIDDK
Riboswitches as Sensors for Inhibition of Thiamin Biosynthesis
The major goal of this project is to identify inhibitors of the thiamin biosynthetic pathway
1R01GM086307-01 (Romo) 9/01/08-8/31/11, NIH/NIGMS $35,000 (DC to Watanabe for project period)
New Methods for Simultaneous Amiing and SAR Studies of Natural Products This investigation involves the mild arming and derivatization of natural products including conjunction with reporters such as biotin
A-1587 (Watanabe) 6/1/07-5/31/10, $150,000 (DC)
Welch Foundation
Probing the Molecular Origin and Biological Actions of Substituted Cyclohexadienes
The study investigates the chemical and enzymatic reactions of the formation of substituted cyclohexadienes as well as their biological effects
A-1587 (Watanabe) 6/01/04-5/31/07, $150,000 (DC)
Welch Foundation
Investigation of the Biological Roles of 1,2,4-Trisubstituted and 1,4-Disubstituted Cyclohexadienes This study investigated the use of proline to catalyze the formation of substituted cyclohexadienes and examined their biological activity against a variety of cell-based assays
ConocoPhillips 08/01/05-7/31/07, $74,000 (DC)
Accessing Enzymes for the Processing of Petroleum Naphthenic Acids
This study investigated the use of plant enzymes in the neutralization of petroleum naphthenic acids
Elsa Pardee Foundation 01/01/06-12/31/06, $53,306 (DC)
Elucidation of the Azinomycin Biosynthetic Cluster: Paving the Way for Pharmacogenomic Therapy
This study investigated methods to identify the azinomycin biosynthetic cluster
Research Corporation Research Innovation Award 06/01/03-5/31/04, $35,000 (DC)
Harnessing Marine Derived Pharmaceuticals
The study investigated the use of mixed culture screening and metagenomic approaches in the activation of silent natural product pathways
NIH/NEHS CERH Pilot Study (Texas A&M) 07/01/04-06/30/04, $25,000 (DC)
Probing Marine Natural Product Biosynthetic Pathways
The study investigated the use of mixed culture screening and metagenomic approaches in the activation of silent natural product pathways

E. Contributions in Research Training and Mentoring (1 Sept 2002 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1 (2012)</td>
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<tr>
<td>Total 2002 – present</td>
<td>11</td>
<td>16 (includes NSF-REU students)</td>
<td>4</td>
<td>6</td>
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</table>

Biosketches 58
F. Contributions in Classroom Education
Courses taught (1 Sept 2002 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab. Meth. in Biol. Chem.</td>
<td>Chem 640</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>Bio-Organic Chem.</td>
<td>Chem 669</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Chemical Biology</td>
<td>Chem 456</td>
<td>1</td>
<td>39</td>
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<tr>
<td>Org. Chem. III</td>
<td>Chem 446</td>
<td>1</td>
<td>94</td>
</tr>
<tr>
<td>Org. Chem. I</td>
<td>Chem 227</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Org. Chem. II, for majors</td>
<td>Chem 228</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>Org. Chem. I lab, for majors</td>
<td>Chem 231</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>Org. Chem. II lab, for majors</td>
<td>Chem 234</td>
<td>2</td>
<td>108</td>
</tr>
</tbody>
</table>

Classroom innovations
- Developed game/problem sessions to supplement formal lecturing
- Developed organic lab experiments for Org. Chem II, for majors
- Developed biological lab methods course for first year graduate students
- Developed upper level undergraduate course in chemical biology

G. Evidence of Scholarship
- 26 publications in refereed journals (1 Sept 2002 – present)
- 1 patent (1 Sept 2002 – present)
- 60 invited lectures (1 Sept 2002 – present)

ISI Citation Report

<table>
<thead>
<tr>
<th>Sum of the Times Cited :</th>
<th>496</th>
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<td>Sum of Times Cited</td>
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<td>Sum of Citations</td>
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<td>Citing Articles</td>
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<td>Citing Articles without self-citation:</td>
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<td>Average Citations per Item :</td>
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</tr>
<tr>
<td>h-index :</td>
<td>16</td>
</tr>
</tbody>
</table>

A. Personal Statement
Steven E. Wheeler is a leader in the application of computational quantum chemistry to problems in organic chemistry, particularly those involving non-covalent interactions and supramolecular chemistry. He has published 46 papers in top ranked scientific journals. He is an assistant professor in the Department of Chemistry at Texas A&M University, where his research group seeks to understand the effects that govern non-covalent interactions with aromatic systems through the application of computational quantum chemistry and to quantify the role of these non-covalent interactions in organic chemistry, materials science, and molecular biology. A hallmark of his work is the emphasis on building simple, physically-motivated conceptual models that are of great utility for chemists.

B. Positions and Honors
Professional Positions:
2010- Assistant Professor, Department of Chemistry, Texas A&M University, College Station, TX
Honors:
2002-2006 Presidential Fellowship (University of Georgia)
2002-2006 Robert S. Mulliken Fellowship (Center for Computational Quantum Chemistry, UGA)
2007-2010 NIH NRSA Postdoctoral Fellowship (NIGMS, National Institutes of Health)
2010 MBI Postdoctoral Award (Molecular Biology Institute, UCLA)

C. Selected Peer-reviewed Publications (5)

D. Research Support
ACTIVE
- ACS PRF 50645-DN16
  1/1/11 – 8/31/13, 0.04 calendar, $100,000 (TC for project period)
  Intermolecular Non-Covalent Interactions in π-Conjugated Heterocyclic Oligomers
  The objective of this project is to quantify the impact of non-covalent π-stacking interactions on the properties of conjugated heterocyclic oligomers and polymers used in organic electronic materials.
  A-1775.
- Welch Foundation
  6/1/11 – 5/31/14, 0.04 calendar $170,000 (TC for project period)
  Non-Covalent π-Stacking Interactions in Organocatalysis
  The objective of this project is study the mechanisms of mode of stereoinduction for organocatalyzed reactions that purportedly rely on π-stacking interactions in stereocontrolling transition states.

PENDING
- NSF (CHE- MSN), 2/01/2013 – 1/31/2018
  CAREER: Controlling Supramolecular Self-Assembly of Planar and Curved Polycyclic Aromatic Systems
E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Total (1 Aug 2010 – present)</td>
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F. Contributions in Classroom Education
Courses taught (1 Aug 2010 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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</thead>
<tbody>
<tr>
<td>Physical Chemistry I</td>
<td>Chem 327</td>
<td>2</td>
<td>72</td>
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<tr>
<td>Physical Chemistry II</td>
<td>Chem 328</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Principles of Quantum Mechanics</td>
<td>Chem 648</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Introduction to Quantum Chemistry</td>
<td>Chem 8930 (UGA)</td>
<td>1</td>
<td>7</td>
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</tbody>
</table>

Classroom innovations
• Incorporated computational chemistry into the Physical Chemistry curriculum, both in the lecture courses and in the development of a computational module for the Physical Chemistry Laboratory course (in progress)

G. Evidence of Scholarship
• 46 publications in refereed journals (1 Jan 2004 – present)
• 13 invited lectures (1 Aug 2010 – present)

ISI Citation Report

<table>
<thead>
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<th>Sum of the Times Cited</th>
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<tr>
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<td>17.35</td>
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<tr>
<td>h-index</td>
<td>16</td>
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</table>

NAME
Vickie M. Williamson, Ph.D.

POsITION TITLE
Instructional Assistant Professor

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
</tr>
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<tbody>
<tr>
<td>University of Central Oklahoma (formerly Central State University), Edmond, OK</td>
<td>B.S.</td>
<td>7/1974</td>
<td>Natural Science (Chemistry Emphasis)</td>
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<tr>
<td>University of Oklahoma, Norman, OK</td>
<td>M.S.</td>
<td>5/1997</td>
<td>Chemistry</td>
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<tr>
<td>University of Oklahoma, Norman, OK</td>
<td>Ph.D.</td>
<td>5/1992</td>
<td>Science Education (Chemical Education)</td>
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</table>

A. Personal Statement
Vickie M. Williamson interested in the development and testing of techniques to improve students’ understanding of chemistry. She has published chemical education research articles dealing with student understandings and misunderstandings of chemical concepts, the use of visualizations to increase conceptual understanding of chemistry, and the results of implementing inquiry-based, learning-cycle curriculum. Her curriculum development work has included lab manuals, interactive CD’s, textbooks and supplements for middle school to college level. Currently her inquiry-based laboratory manuals for general and non-majors chemistry are adopted nationally. Her grant activity has included infusing molecular visualization into the high school and college classroom and working with teachers to combat science phobia and to teach learning-cycles strategies. Her current grant is investigating the ways in which students use visualizations that are commonly found in chemistry textbooks. All of these activities are applied to her teaching to help her students; her teaching has been recognized by awards. She serves as the administrator for the electronic homework system for Chemistry 101, 102, 106, and 107. Her other service includes activities at the national, state, and university levels (e.g., serving as a director to the state chemistry teachers association, hosting visiting families and students in her classroom, editing the demonstration manual used by chemistry 101 and 102, advising a student service organization, chairing a Division of Chemical Education Task Force).

B. Positions and Honors
Professional Positions:
1992-1993 Visiting Assistant Professor. Department of Chemistry and Biochemistry, University of Oklahoma, Norman, Oklahoma
1993 Visiting Assistant Professor. Department of Chemistry, University of Central Oklahoma (formerly Central State University), Edmond, Oklahoma
1999-2011 Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
2011-present Instructional Assistant Professor, Department of Chemistry, Texas A&M University

Honors (select, since 2000):
2000 Inducted into the Texas A & M Reagents’ Initiative, Academy for Educator Development. A&M University, College Station, TX
2001 Fish Camp Namesake Winner, Freshman Orientation Camp, Texas A&M University.
2003 Distinguished Achievement College-Level Award in Teaching, College of Science. The Association of Former Students, Texas A&M University, College Station, TX
2006 College Board Advanced Placement® Best Practices Course, from a national study of general chemistry courses by the Center of Educational Policy Research on behalf of the College Board.
2009 Student-Led Award for Teaching Excellence, Texas A&M University, College Station, TX

C. Selected Peer-reviewed Publications (5, since 2008)
D. Research Support

ACTIVE


E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
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<td>(1 Jan 2005–present)</td>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry I</td>
<td>Chem 101</td>
<td>12</td>
<td>5205</td>
</tr>
<tr>
<td>General Chemistry II</td>
<td>Chem 102</td>
<td>12</td>
<td>3283</td>
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<tr>
<td>Directed Studies</td>
<td>Chem 485</td>
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<td>13</td>
</tr>
<tr>
<td>Internship</td>
<td>Chem 684</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Directed Studies</td>
<td>Chem 685</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Modern Applications in Chemistry</td>
<td>Chem 696</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Inquiry &amp; Chemistry Concepts</td>
<td>Chem 698</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Classroom innovations

- Implementation of screencasts for student exam reviews for Chemistry 101 and 102. Screencasts are computer video and audio captures of the solutions to practice exam problems.
- Development and testing of methods to promote both conceptual learning and problem solving.
- Infusion of different presentation media in Chemistry 101 and 102 (computer technology, animations, visual aids, demonstrations, group problem solving, and conceptual problems).
- Development of questions to enhance the use of clickers with lecture.
- Promoting the use of online homework since 2001

G. Evidence of Scholarship (1 Jan 2005 – present)

- 9 Publications in refereed journals (5 have been previously listed)

- Chaired examination committee to produce a standardized exam: (2008). 2008 ACS Conceptual General Chemistry Examination. Milwaukee, WI, ACS Division of Chemical Education Examinations Institute
- Member of examination committee to produce a standardized exam: 2001 ACS Conceptual General Chemistry Examination. Clemson, S.C., ACS Division of Chemical Education Examinations Institute

- 5 Publications in non-refereed journals/newsletters
- 7 invited lectures
- Seminar speaker. Department of Chemistry, University of Michigan, Ann Arbor, MI, February 17, 2005.
- Seminar speaker. Department of Chemistry, Purdue University, West Lafayette, IN, November 15, 2006.
- Keynote Address at the 178th Conf. of the Two-Year College Chem. Consortium, Paramus, NJ Sept. 2007
- Co-Presenter. Learning OWL Workshop (online homework), University of Massachusetts, Amherst, MA, Nov. 14-15, 2008.
- Speaker. Gordon Res. Conf.: Visualization in Science Education. Smithfield, RI., July 12, 2011

- 41 presentations at national and regional meetings. (2011 and 2012 presentations listed)

- Served as an editor or editorial board member
- Feature Editor for the Chem. Education Research section of the Journal of Chemical Education, 2002 to 2010
- Associate Editor, School Science and Mathematics Journal, 2006 to 2011
- Editorial Board Member, Journal for Science Education and Technology, 2004 to present
- Reviewer, Journal of Chemical Education, 1998 to present
- Reviewer for the Chemical Educator, 2007 to present
Karen L. Wooley, Ph.D.
W.T. Doherty-Welch Chair; Professor of Chemistry; Professor of Chemical Engineering

**A. Personal Statement**
Karen L. Wooley is an international leader in the design, synthesis, characterization and implementation of polymers and nanostructured organic materials. She has published ca. 250 peer-reviewed articles in top-ranked scientific journals, holds several patents and has received numerous competitive awards, including the National Science Foundation’s National Young Investigator Award and American Competitiveness and Innovation Award, the American Chemical Society’s Arthur C. Cope Scholar and Herman F. Mark Scholar Awards, and several awards from other agencies. For seven years, she has served as Director of one of the four National Heart Lung and Blood Institute’s Programs of Excellence in Nanotechnology. She serves as an advisor to the National Institutes of Health Nanomedicine Development Centers and the Dutch Biomedical Materials Program. Among other advisory roles, she is a member of the NIH NANO study section, and is serving as Chair, 2012-2014. Karen holds the W. T. Doherty-Welch Chair in Chemistry and is a University Distinguished Professor at Texas A&M University, where her research team is actively engaged in creative approaches to materials for nanomedicine applications, degradable polymers from natural resources, coatings for marine antifouling, advanced photoresist materials for the microelectronics industry, and other projects of fundamental and applied nature.

**B. Positions and Honors**

**Professional Positions:**
- 1993-1999 Assistant Professor, Department of Chemistry, Washington University, St. Louis, Missouri
- 1999-2009 Professor, Department of Chemistry, Washington University
- 2007-2009 Professor, Department of Radiology, School of Medicine, Washington University
- 2009- Professor, Department of Chemistry, Texas A&M University, College Station, TX
- 2009- Professor, Dept. of Chemical Engineering, Texas A&M University
- 2009- W. T. Doherty-Welch Chair in Chemistry, Texas A&M University
- 2011- University Distinguished Professor, Texas A&M University

**Honors (select, since 1994):**
- 1994-1999 National Science Foundation National Young Investigator Award
- 1996-1999 DuPont Young Professor Grant
- 1996-1999 Army Research Office Young Investigator Award
- 1998-2001 Office of Naval Research Young Investigator Award
- 1999-2003 Award Programs Advisory Committee Member, Research Corporation
- 2002 Arthur C. Cope Scholar Award in Organic Chemistry
- 2002-2004 National Science Foundation, Division of Materials Research, Special Creativity Extension
- 2002 Academy of Science of Saint Louis Innovation Award
- 2004 Advisory Board for the National Nanotechnology Infrastructure Network (NNIN)
- 2004-2006 Advisory Board for the NIH Nanomedicine Development Centers
- 2005 Co-organizer, 2005 US-Japan Polymer Chemistry Forum
- 2005 U.S. Area Coordinator for Materials Science and Nanotechnology for Pacifichem 2005
- 2005 Distinguished Faculty Award, Washington University
- 2006-2009 James S. McDonnell Distinguished University Prof. of Arts & Sciences, Washington Univ.
- 2007 Chair, 2007, Polymers (East) Gordon Research Conference
- 2007 Outstanding Faculty Mentor Award, Washington University
- 2007-2008 International Scientific Advisory Board, Dutch Biomedical Materials Program
- 2008-2010 National Science Foundation American Competitiveness and Innovation (ACI) Fellow
- 2008-2010 National Science Foundation, Division of Materials Research, Special Creativity Extension

**EDUCATION/TRAINING**

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
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<th>FIELD OF STUDY</th>
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<tr>
<td>Oregon State University, Corvallis, OR</td>
<td>B.S.</td>
<td>1988</td>
<td>Chemistry</td>
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<tr>
<td>Cornell University, Ithaca, NY</td>
<td>M.S.</td>
<td>1990</td>
<td>Organic/Polymer Chemistry</td>
</tr>
<tr>
<td>Cornell University, Ithaca, NY</td>
<td>Ph.D.</td>
<td>1993</td>
<td>Organic/Polymer Chemistry</td>
</tr>
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</table>

Biosketches 62
C. Selected Peer-reviewed Publications (5, selected from 2012)


Imbesi, P. M.; Finlay, J. A.; Aldred, N.; Eller, M. J.; Felder, S. E.; Pollack, K. A.; Lonnecker, A. T.; Raymond, J. A.; Development of Negative-Tone EUV Photoresists with Controlled Molecular Architecture


D. Research Support

ACTIVE

N00014-10-1-0527 (Wooley)
ONR
02/01/10 – 01/31/13, 0.48 calendar, $482,530 (TC for project period)
The Development of Non-toxic Anti-fouling Coatings Based Upon Nanoscopic Surface Complexes

The objective of this work is the development of non-toxic polymer coatings that exhibit anti-fouling characteristics.

HHSN268201000046C (Co-PIs: Brody, Gropler, Wooley)
NIH/NHLBI Programs of Excellence in Nanotechnology
08/20/10 – 08/19/15, 3.0 calendar, $17,869,644 ($635,725/yr. DC to Wooley and Sacchettini at TAMU)
Integrated Nanosystems for Diagnosis and Therapy

Four projects and two Developmental Projects are supported by three Cores to develop degradable, organic polymer-based nanomaterials with controlled size, shape, composition and surface chemistry to achieve appropriate biodistribution and targeting, controlled surface ligand distribution to optimize molecular recognition of specific biomarkers, and controlled release of payload to provide therapeutic benefits in the imaging and treatment of lung and cardiovascular diseases.

R01-DK082546-01 (Hunstad)
NIH
08/01/10 – 07/31/14, 0.30 calendar $1,903,773 ($55,656/yr. DC to Wooley)
Adhesive-based Nanotherapeutics in Urinary Tract Infection

This project evaluates the performance of polymer nanoparticles suitable for functionalization as nanotherapeutics for urinary tract infections.

DMR 0906815 (Pochan)
National Science Foundation
07/01/09 – 06/30/13, 0.12 calendar, $138,906 ($54,781/yr. DC to Wooley)
Charged Block Copolymer Assembly of Unique Nanoscale Objects

The goal of this project is to provide graduate students at the University of Delaware and Texas A&M University with multidisciplinary knowledge and expertise, acquired through the investigation of the fundamental phenomena that define charged, amphiphilic block copolymer co-assembly with multivalent, organic counterions in solution.

10-0855 (Wooley)
The Dow Chemical Company

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tr>
<td>Polymer Chem.</td>
<td>Chem 466</td>
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<tr>
<td>Special Topic: Nanomedicine</td>
<td>Chem 689</td>
<td>1</td>
<td>6 (+6 audits)</td>
</tr>
<tr>
<td>Org. Chem. Lab. I</td>
<td>Chem 257 (WU)</td>
<td>1</td>
<td>224</td>
</tr>
<tr>
<td>Org. Chem. Lab. II</td>
<td>Chem 356 (WU)</td>
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<td>10</td>
</tr>
<tr>
<td>Synthetic Poly. Chem.</td>
<td>Chem 452 (WU)</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Matter &amp; Energy: K-8 hands-on outreach</td>
<td>Educ 6009 (WU)</td>
<td>1</td>
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</tr>
</tbody>
</table>

Classroom innovations

- A K-8 hands-on science course was developed on the topics of matter and energy, and taught to K-8 teachers of the St. Louis area.
- A nanomedicine course was developed and taught via distance learning to students at Texas A&M University, Washington University in St. Louis, Emory University and the University of California at Santa Barbara.
A. Personal Statement
Jiong Yang began his independent career at Texas A&M University in 2007. He has published ca. 35 peer-reviewed articles in top-ranked scientific journals, gave ca. 25 invited seminars, and hold numerous awards, including the National Science Foundation’s Career Award, Thieme Chemistry Journal Award, Ruth L. Kirschstein National Research Service Award, etc. He is interested in developing new synthetic methods and strategies for synthesis of bioactive compounds, with a long-term goal of bringing the power of modern synthetic organic chemistry to bear on problems in biology and medicine.

B. Positions and Honors
Professional Positions:
2005-2007 NIH Postdoctoral Research Fellow, Harvard University/Broad Institute of MIT and Harvard, Cambridge, MA
2003-2004 Postdoctoral Research Fellow, The Scripps Research Institute, La Jolla, CA
Honors:
2012-2017 National Science Foundation Career Award
2011 Thieme Chemistry Journal Awardee
2005-2000 Ruth L. Kirschstein National Research Service Award
2003-2004 NIH Eli Lilly graduate fellowship, The Ohio State University

C. Selected Peer-reviewed Publications (from 2008)
Xue, H.; Gopal, P.; Yang, J. "Transannular Michael reaction cascade: Stereoregulation studies and application in synthesis of the ABC ring system of zoanthamines" submitted.
Yang, J. "Recent development in nitroso chemistry: Some new transformations", invited Synpacts review, Synlett, accepted.
Huang, J.; Yang, J. "Studies toward elucidating the stereochemical structure of iriomoteolide 1a" Synlett 2012, 23, 737-740.
D. Research Support

ACTIVE

PI, Robert A. Welch Foundation, A-1700, Development of new reagents for selective enolization of carbonyl compounds, 6/1/2011–5/31/2013, direct cost: $50,000 for year one, $60,000 for year two
PI, National Science Foundation (CAREER), CHE-1150606, Synthesis of zoanthamine alkaloids by cascade reactions, 8/15/12-7/31/17, total cost: $95,000/year for 5 years

F. Contributions in Classroom Education

Experiments for undergraduate laboratory courses were designed to expose students to modern synthetic organic chemistry.

G. Evidence of Scholarship

- 35 publications in refereed journals
- 25 invited lectures

E. Contributions in Research Training and Mentoring

- 8 graduate students, 10 undergraduate students, 7 research associates, 4 Ph.D. students, and 0 M.S. students
- 8 graduate students, 10 undergraduate students, 7 research associates, 4 Ph.D. students, and 0 M.S. students
- 2012, 1023, 96-100.
- 2012, 85, 054502.
- 2012, 110(9-10), 663-667.
- 2012, 1023, 96-100.

C. Selected Peer-reviewed Publications (5, selected from 2012)

Zhang, S.; Yeager, D. L,”A complex scaled multi-reference configuration interaction method to study Li and Li-like cations (Be, B, C, N, O) Auger resonances 1s2s2 (1S), and 1s(2s2p 3P') 1P' Journal of Molecular Structure, 2012, 1023, 96-100.

D. Research Support

ACTIVE

$120,000 ($80,000/yr.)

Robert A Welch Foundation
Developments and Studies Using Complex Scaled Multiconfigurational Methods for Electron Atom/Molecule Resonances

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)
F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tbody>
<tr>
<td>Fundamentals of Chemistry Laboratory I</td>
<td>CHEM 111</td>
<td>25</td>
<td>600</td>
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<tr>
<td>Fundamentals of Chemistry Laboratory II</td>
<td>CHEM 112</td>
<td>18</td>
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<td>General Chemistry for Engineers Laboratory</td>
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<td>356</td>
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<td>Physical Chemistry for Engineers</td>
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<td>Physical Chemistry Ii</td>
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<td>Physical Chemistry ii</td>
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<td>Statistical Thermodynamics</td>
<td>CHEM 631</td>
<td>2</td>
<td>17</td>
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<td>Principles of Quantum Mechanics</td>
<td>CHEM 648</td>
<td>3</td>
<td>22</td>
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<td>Directed Studies</td>
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G. Evidence of Scholarship
- 11 invited lectures (1 Jan 2005 – present)
- 14 publications in refereed journals (1 Jan 2005 – present). 111 total.

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<td>Average Citations per Item : 25.85</td>
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NAME
Sherry J. Yennello, Ph. D.

POSITION TITLE
Regents' Professor of Chemistry; Associate Dean for Faculty Affairs

EDUCATION/TRAINING
<table>
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<tr>
<th>INSTITUTION AND LOCATION</th>
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<tr>
<td>Indiana University</td>
<td>Ph.D.</td>
<td>10/1990</td>
<td>Nuclear Chemistry</td>
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<td>5/86</td>
<td>Physics</td>
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<td>B.S.</td>
<td>12/85</td>
<td>Chemistry</td>
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A. Personal Statement
Sherry J Yennello is an international leader in the study of dynamics and thermodynamics of excited nuclear systems. Her research, supported by $5.5M in grants, has been presented in over 65 invited talks and published in 160 peer-reviewed articles in top-ranked scientific journals. She has received numerous competitive awards, including the National Science Foundation’s National Young Investigator Award, the American Chemical Society’s Francis P. Garvan-John M. Olin Medal and the Sigma Xi National Young Investigator Award. She is a fellow of the American Chemical Society and the American Physical Society. She has been named both a University Faculty Fellow and a Regents' Professor. Additionally she has been recognized with the Texas A&M Association of Former Students Distinguished Achievement Award in Teaching at both the College-Level and University-Level, the Center for Teaching Excellence’s Montague Scholar Award and the Women’s Faculty Network Outstanding Mentor Award. In addition to her teaching, nuclear research, and administrative duties, Yennello currently serves as principal investigator for four major National Science Foundation grants totaling more than $5.5 million in funding to benefit STEM (science, technology, engineering, mathematics) education and outreach.

B. Positions and Honors
Professional Positions:
- 2002 – present Professor - Texas A&M University
- 2008 – present University
- 2004 – 2008 Associate Dean for Diversity – College of Science Texas A&M University
- 2000 – 2002 Program Director for nuclear physics– National Science Foundation
- 1998 – 2002 Associate Professor - Texas A&M University
- 1993 – 1998 Assistant Professor - Texas A&M University
- 1987 – 1990 Graduate Research Assistant - Indiana University
- 1986 – 1987 Associate Instructor - Indiana University
- 1986 Environmental Scientist - New York Power Authority, JAF Environmental Lab
- 1985 –1986 Undergraduate Research Assistant - Rensselaer Polytechnic Institute

Honors:
- 1994 NSF Young Investigator Award
- 1995 TAMU Center for Teaching Excellence Scholar
- 2000 Sigma Xi National Young Investigator Award
- 2002 University Fellow
- 2000 Women's Spirit Month Award
- 2005 Fellow, American Physical Society, elected
- 2007 Regents Professor
- 2008 Association of Former Students Distinguished Award for Teaching – College Level
- 2010 ACS Francis P Garvan - John M Olin Medal
- 2010 Outstanding Mentoring Award, Women’s Faculty Network
- 2011 Fellow, American Chemical Society, elected
- 2012 Association of Former Students Distinguished Award for Teaching – University Level

C. Selected Peer-reviewed Publications (5 from past year) (undergraduates in BOLD)
Sensitivity of intermediate mass fragment flows to the symmetry energy, Z. Kohley, M. Colonno, A. Bonasera, L. W. May, S. Wuenischel, M. Di Toro, S. Galanopoulos, K. Hagel, M. Mehmlan, W. B. Smith, G.


D. Research Support

CURRENT:

Title: Investigating the equation-of-state for a two-component nuclear system  
Sponsor: Robert A. Welch Foundation  
Amount: $130,000; Period: 6/1/11- 5/31/13  
PI: Yennello

Title: Cyclotron based nuclear science  
Sponsor: Department of Energy  
Amount: $7,232,000; Period: 2008-2011  
PI: Tribble; co-PI: Yennello

Title: Determination of the Equation of State of Asymmetric Nuclear Matter  
Sponsor: DOE  
Total Award Amount: $ 236,476; Period: 2010-2013  
PI: Yennello

Title: REU Site: Nuclear and Particle Science at Texas A&M University  
Sponsor: NSF  
Total Award Amount: $662,137; Period: 2010-2015  
PI: Yennello

Title: ADVANCE: Promoting Success of Women Faculty through a Psychologically Healthy Workplace  
Sponsor: NSF  
Total Award Amount: $ 3,499,980; Period: 05/01/10 – 04/30/15  
PI: Yennello

Title: Expanding Opportunities through the Science Scholars Program (S-STEM)  
Sponsor: NSF  
Amount: $600,000; Period: 2008-2012  
PI: Yennello

Title: Professional Skills Development Workshops for Women in Physics  
Sponsor: NSF  
Amount: $297,000; Period: 2011-2013  
PI: Yennello

Title: Collaborative Research: Conference for Undergraduate Women in Physics  
Sponsor: NSF  
Amount: $9,000; Period: 11/1/2012-12/31/2012  
PI: Yennello

PENDING:

Title: Texas A&M University Science Scholars Program  
Source of Support: National Science Foundation  
Total Award Amount: $613,367; Period Covered: 1/1/2013-12/31/2017  
PI: Yennello

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

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<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<td>17</td>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

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<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tr>
<td>Molecular Science for Citizens</td>
<td>CHEM106</td>
<td>3</td>
<td>approx 160</td>
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<tr>
<td>Kitchen Chemistry</td>
<td>UGST181</td>
<td>1</td>
<td>20</td>
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<tr>
<td>General Chemistry II</td>
<td>CHEM104</td>
<td>1</td>
<td>approx 20</td>
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<tr>
<td>Nuclear Chemistry</td>
<td>CHEM464</td>
<td>3</td>
<td>approx 60</td>
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Classroom innovations

G. Evidence of Scholarship

- invited lectures (1 Jan 2005 – present): 54
A. Personal Statement
Renyi Zhang's research focuses on atmospheric chemistry. Dr. Zhang has made major contributions in aerosol chemistry, aerosol-cloud-climate interaction, and photooxidation of hydrocarbons, and his work has provided critical insights into the impacts of human activities on the environment, weather, and climate. He has published 149 papers (three in Science, one in Nature Geoscience, five in PNAS, five in Journal of the American Chemical Society, and one in Chemical reviews) with more than 4300 citations and an h-index of 41. His research made numerous national and international headlines. He serves as director of Center for Atmospheric Chemistry and Environment at TAMU, chair American Meteorological Society's Atmospheric Chemistry Committee, and is editor of Journal of Geophysical Research – Atmospheres and a member of International Commission on Atmospheric Chemistry and Global Pollution. He has supervised 16 Ph.D. dissertations and 9 M.S. theses and received external funding over $8 millions. His awards include honorary professorships at Fudan University and Peking University, Outstanding International Collaboration Researcher Award by China National Science Foundation, Bush Excellence Award for Faculty in International Research at TAMU, Cheung-Kong Distinguished Scholar Award by Ministry of Education – China, distinguished achievement award for faculty research – College of Geosciences, Holder of Harold J. Haynes Endowed Chair in Geosciences, Fellow of American Geophysical Union, and University-Level Distinguished Achievement Award – Research at TAMU.

B. Positions and Honors

<table>
<thead>
<tr>
<th>POSITION TITLE</th>
<th>NAME</th>
<th>INSTITUTION AND LOCATION</th>
<th>FIELD OF STUDY</th>
<th>DEGREE</th>
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<tbody>
<tr>
<td>Harold J. Haynes Endowed Chair; Professor of Chemistry; Professor of Atmospheric Sciences</td>
<td>Renyi Zhang, Ph.D.</td>
<td>MIT</td>
<td>Atmospheric Chemistry</td>
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C. Selected Peer-reviewed Publications


D. Research Support

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<td>2013</td>
<td>AMS Robert A. Duce Symposium, $10,000, 10/1/2012 – 5/31/2013, National Science Foundation (NSF), PI, Implementation of particle size magnification for analysis of sub-4 nm nanoparticles, $22,271, 7/1/2012 – 7/15/2013, Texas Air Research Center (TARC), co-PI with Alexei Khalizov</td>
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<td>2013</td>
<td>Analysis of Particulate Matter Chemistry, $150,000, 10/2012 – 12/2013, Texas Environmental Research Consortium/Houston Advanced Research Center, PI</td>
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<td>2013</td>
<td>Aerosol Growth and Chemical Compositions from Heterogeneous Processing of Organic Compounds, $597,358, National Science Foundation (NSF), 1/10 – 12/13, PI</td>
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<td>2013</td>
<td>Generation, Characterization, and Atmospheric Aging of Soot Particles from Diesel Combustion, $330,000, National Science Foundation (NSF), 9/2009 – 8/2013, PI</td>
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<td>2013</td>
<td>Investigation of Cloud and Precipitation Processes Using WRF with A Two-Moment Microphysics: Contribution to the DOE Climate Change Prediction Program (CCPP) project, $100,000, Brookhaven National Laboratory (BNL) Department of Energy (DOE), 9/09 – 8/2013, PI</td>
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<td>2013</td>
<td>Investigation of the Effects of the Asian Pollution Outflow on Winter Storms over the North Pacific, $90,000, NASA, 8/2009 – 12/2012, PI</td>
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</tr>
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</table>
G. Evidence of Scholarship

- 149 publications in refereed journals (Researcherid: A-2942-2011). Dr. Zhang has published 149 refereed journal papers, including 96 papers as the senior author (i.e., first or corresponding author) and 93 papers with his past/current graduate students as co-authors. His publications have received over 4300 literature citations with an h-index of 41 (from Web of Science).
- 1 patent (1 Jan 2005 – present)
- 49 invited lectures and chaired 3 conferences (1 Jan 2005 – present)

F. Contributions in Classroom Education

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<td>Atmospheric Chemistry and Pollution</td>
<td>ATMO - 363</td>
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<td>Advanced Atmospheric Chemistry</td>
<td>ATMO - 613</td>
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<td>10</td>
</tr>
<tr>
<td>Thermodynamics and Atmospheric Physics</td>
<td>ATMO – 602</td>
<td>1</td>
<td>75</td>
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<tr>
<td>Atmospheric Sciences Seminars</td>
<td>ATMO – 681</td>
<td>1</td>
<td>30</td>
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<tr>
<td>Introduction to Atmospheric Chemistry</td>
<td>ATMO – 606</td>
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<td>30</td>
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Biosketches 69

D. Research Support

**ACTIVE**

**PENDING**
- NSF SBIR (50,000, 2012-2014)

E. Contributions in Research Training and Mentoring (1 August 2008 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
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<td>28</td>
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F. Contributions in Classroom Education

Courses taught (1 August 2008 – present)

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<th>Number of Students</th>
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</thead>
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<tr>
<td>Frontiers in Chem Research</td>
<td>CHEM 695</td>
<td>4</td>
<td>239 – total</td>
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<tr>
<td>Descript. Inorg. Chemistry</td>
<td>CHEM 362</td>
<td>3</td>
<td>101 – total</td>
</tr>
<tr>
<td>Literature Seminar</td>
<td>CHEM 681</td>
<td>4</td>
<td>131 – total</td>
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Classroom innovations
- Revamped the Advanced Inorganic Chemistry Lab by the addition of the latest advancement in technology. For example, the robotic synthetic reaction platform was added to the course.
- Lab techniques such as vacuum pump repair and NaK solvent still preparation and maintenance were also added to the lab.
- Two versions of Descriptive Inorganic Chemistry, one with emphasis on elemental chemistry and the other focusing on principles of inorganic chemistry, have been developed and taught.

G. Evidence of Scholarship
- 108 publications in refereed journals
- 3 patents (1 Aug 2008 – present)
- 70 invited lectures (1 Aug 2008 – present)

ISI Citation Report

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Appendices to the
Self-Study Report

External Review
January 27-30, 2013

This document was completed on Dec. 1, 2012
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A1. Vision 2020 and FY11-15 Strategic Plan of Texas A&M University
Executive Summary of Vision 2020 – Texas A&M

The Idea

On October 10, 1997 President Ray Bowen placed a stake in the ground. He proposed that Texas A&M University strive to be recognized as one of the ten best public universities in the nation by the year 2020, while at the same time maintaining and enhancing our distinctiveness. This goal set in motion the efforts of more than 250 people on and off campus to determine where we are now and how to narrow the distance between the place we are now and the goal President Bowen has envisioned. This is the foundation of Vision 2020.

The Best

In order that a course might be charted to our goal, significant research was undertaken to ascertain which public universities are regarded as “the best” and why. To identify qualitative and quantitative attributes of superior public institutions, two approaches were taken. The first was to consider the most prominent ranking systems and their results, as published by US News & World Report and the National Research Council. Six institutions are currently ranked among the nation’s ten best public universities by both of these sources: University of California – Berkeley, University of Michigan, University of California – Los Angeles, University of North Carolina – Chapel Hill, University of California – San Diego, and University of Wisconsin – Madison. Comparisons are drawn between Texas A&M University and these six institutions at many points throughout this document. In addition, a number of other universities were deemed worthy of study, in order that all colleges and programs at Texas A&M University be accurately measured against leading academic counterparts. These institutions are Georgia Institute of Technology, University of California – Davis, University of Illinois – Champaign-Urbana, Pennsylvania State University, University of Minnesota, Ohio State University, Purdue University, University of Florida, and University of Texas – Austin.

Our Strength

Many characteristics distinguish us nationally. We fare very well in our ability to attract National Merit Scholars. Some programs, such as our nautical archaeology unit and its affiliated Institute of Nautical Archeology, are the best in the entire world. Our chemistry program is consistently identified as outstanding, the more remarkable for the dramatic growth it has experienced in the last three decades. The colleges of Agriculture and Life Sciences, Business, Engineering, and Veterinary Medicine are frequently cited as among the very best in the nation. Education for leadership is a fundamental and distinctive part of our campus life. Our ability to engender an attitude of good stewardship marks us; we have the lowest ratio of administrative to general costs of any university in the State of Texas. An expansive physical
plant reminds us of the intensity of our growth. We have many existing strengths in which we can and do take pride. Our greatest strength, however, is our desire to be even better.

**The Need**

The need to improve is real. We are good but not good enough. We do not provide the resources that the best public universities in America do to fuel quality teaching, research, and outreach. Our faculty, while excellent, as a whole is not the equal of those at the best institutions in the land, when measured by objective assessment. Many of our programs are very strong, as evidenced by their national recognition; few of our humanities and social science programs, however, have reached real strength. As an institution, we have accomplished much, but we must not become complacent. We need to be better if we are to effectively serve our students, the State of Texas, and the nation.

**Our Core Values**

Our core values have been re-articulated and re-affirmed during the extensive process of reviewing our progress. We are dedicated to the search for truth. We hold the public trust sacred. We seek excellence in all we do. We welcome all people. We desire the enlightenment brought by true diversity and global interaction. We will manage ourselves to the highest standards of efficiency and productivity. These powerful values undergird every aspect of our plan.

**Our Mission**

Our mission also has been clarified and affirmed. We seek academic, research, and service excellence; teaching excellence; and leadership and citizenship development for our students and all associated with the university. We expect managerial and service excellence from ourselves. Our values and mission set high targets for the future of Texas A&M University.

**Our Vision**

A culture of excellence will be the hallmark of Texas A&M University in 2020. Our energy and boldness will distinguish us, guide our decision-making, and empower us to continue to improve. Our vision for 2020 addresses, through careful and honest analysis, our strengths and weaknesses. It reflects a steadfast determination to build on strengths, eliminate weaknesses, seek opportunities, and face threats creatively and energetically. We will create a culture of excellence that fulfills the need for an institution with quality of the first order. In 2020 Texas A&M University will be more distinctive than it is today. That distinctiveness will be created on a foundation of quality that is widely recognized and measured by world standards.

**The Twelve Imperatives** The process of Vision 2020 produced hundreds of ideas supporting our goal. Almost all of these suggestions have merit, and most earn acknowledgment in the body of this report. The precepts, focused goals, and measures can be summarized in twelve overarching ideas. We call these the twelve imperatives.

*Elevate Our Faculty and Their Teaching, Research, and Scholarship* The world today is knowledge-based and constantly changing. In such a world, the quality research university is “a creator, organizer,
preserver, transmitter, and applier of knowledge.” The foundation of these functions is an excellent faculty in adequate numbers. We need to increase substantially the size of our faculty (perhaps by half), and we must attract and retain many more top scholars, teachers, and researchers. We will have to review and strengthen hiring and tenure policies, enhance compensation, focus our scholarship, and transform our administrative culture. We cannot achieve our goal without a nationally recognized faculty with a passion for teaching and an academic environment that values and rewards innovation, great ideas, and the search for the truth.

**Strengthen Our Graduate Programs** We must have a shift in our thinking about the role of graduate education to attain the level of excellence we desire. A substantially expanded graduate studies effort is critical to our academic aspirations and to our effectiveness as a great research university. Outstanding professors attract superior graduate students and, in many instances, the money to help support their research. But these professors by themselves will not be enough. We must create a dynamic, exciting, discovery-driven intellectual environment that will draw superior graduate students, comparable to those in the nation’s best graduate programs.

**Enhance the Undergraduate Academic Experience** The core of Texas A&M University must be a residential, learner-centered community that attracts excellent students and provides quality learning and mentoring experiences. We must better prepare learners for lives of discovery, innovation, leadership, and citizenship by better inculcation of writing, thinking, and self-expression skills. Texas A&M University is proud of its history of developing student leaders. Our co-curricular programs are already an area of true distinctiveness, but we must continue to strengthen their substance and reputation and extend their benefits to a greater percentage of the student body. While our retention rate is the highest in Texas, it is low relative to the best national institutions; we must make an institutional commitment to graduate those we enroll. We must emphasize education more than training and significantly improve our student-faculty ratio. We must provide more opportunity for intellectual exchange between distinguished faculty and undergraduates. Our recruiting should be more proactive and produce a more broadly representative student body. We need to expand our honors, study/live-abroad, interdisciplinary studies, and course-assistance programs.

**Build the Letters, Arts, and Sciences Core** Texas A&M University has historically placed less emphasis on the letters and arts. While many of our basic science disciplines are nationally acclaimed, the best public universities have stronger and deeper liberal arts programs and a fuller range of such programs with a significantly higher institutional commitment. Such strengthening is necessary for the true, enduring education of our graduates and the enrichment of their lives. It is abundantly clear that we will never be seen as a premier institution nationally without a far stronger letters, arts, and sciences program.

**Build on the Tradition of Professional Education** Undergraduate education in all areas, including professional education, has been our traditional strength at Texas A&M University. At the heart of Vision 2020 is a belief that we will not only sustain but also continually strengthen our professional programs at both the undergraduate and the graduate levels. We expect that these programs will be the first (as some already are) to represent Texas A&M University solidly and firmly in the top ten nationally. Our professional programs must also recognize the necessity to prepare their graduates more broadly for entry into a complex, changing, and unpredictable world.
Diversify and Globalize the A&M Community The time has passed when the isolation of the Texas A&M University campus served a compelling utilitarian function. Information, communication, and travel technology have produced a highly connected global society. The ability to survive, much less succeed, is increasingly linked to the development of a more pluralistic, diverse, and globally aware populace. It is essential that the faculty, students, and larger campus community embrace this more cosmopolitan environment. The university’s traditional core values will give us guidance and distinctiveness, while preparing us to interact with all people of the globe. Texas A&M University must attract and nurture a more ethnically, culturally, and geographically diverse faculty, staff, and student body.

Increase Access to Knowledge Resources Despite recent progress, the intellectual assets represented by Texas A&M University library holdings are underdeveloped and must be increased. Coincidentally, we must recognize that the technology related to the storage, access, and distribution of knowledge resources has changed as much in the last decade as in the 550 years since the invention of movable type. Texas A&M University must invest rapidly, but wisely, to gain parity with its academic peers. It must lead, not just grow, in forcefully developing new methods and measures of success in this rapidly changing arena. The wedding of communications and computer technology will, no doubt, yield the most formidable change in academe by 2020. Texas A&M University must lead the adaptation.

Enrich Our Campus The physical environment of our campus should be conducive to scholarly work and study. Texas A&M University has an efficient and well-maintained campus. However, during our rapid growth over the past four decades, the physical unity of the campus has been diminished by the presence of Wellborn Road and the railroad tracks. Innovative planning and bold leadership are needed to redress this division for reasons of safety and convenience as well as aesthetics. West Campus has not maintained the human scale that exists on the Main Campus. Through judicious planning we need to attain the same pedestrian-friendly scale and green space that gives the Main Campus its character. The use of large areas for surface parking needs to be reconsidered so that the unity of the campus is maintained as new building occurs to accommodate growth. As more of the university’s current land holdings are consumed by non-agricultural uses, acquisition of land on or near the Riverside Campus for agricultural development should be a high priority.

Build Community and Metropolitan Connections The way that we relate to the local community, Houston, and other metropolitan areas of the state will have a powerful impact on Texas A&M University and the communities supporting and supported by the university. In addition, it is critical that the community in which we live provide opportunities for families to work and grow. Spouses need high-quality employment opportunities. Faculty and researchers need private-sector sponsorships and commercialization support. As we attract a wider range of people to Texas A&M University, the enrichment provided through our connection to a large metropolitan area becomes increasingly important. Correctly choreographed, such a connection gives us the best of both worlds.

Demand Enlightened Governance and Leadership Great universities have a clearly articulated vision, a stimulating intellectual environment populated by great faculty and students, and resources adequate to support quality offerings. One other characteristic often contributes to greatness: enlightened leadership. Clear, cooperative relationships between the university and the System must be the norm. To achieve our aspirations, strong, enlightened, stable, and forward-thinking leadership focused on academic quality is
essential. We have made progress, but we must guard it zealously. Regents must continue to take the policy high ground. The System administration must acknowledge and nurture Texas A&M University’s role as a comprehensive research university with national peers. The university administration must be steadfast in its demand for quality in every decision. And finally, the university administration must make decisions through a process characterized by openness and appropriate faculty and staff participation. Our responsibility to the System as its flagship must be evidenced in all decision-making. Academic progress is fragile. Enlightened, shared governance and leadership are elemental to its achievement.

**Attain Resource Parity with the Best Public Universities** The combination of rapid population growth, demand for government services and difficult economic times have placed a strain on the Texas treasury in recent years. A good and widely dispersed university system has provided access to a growing college-aged population. Access alone is no longer enough. Texas must have a few universities that offer opportunities equal to the best public universities, while taking complementary steps to maintain access. Competitive peer states have long recognized the economic necessity of comprehensive research universities in meeting the knowledge demands of an information society. States with the best universities are currently investing twice as much funding per student as at Texas A&M University. Texas A&M University and the University of Texas are ideally positioned to achieve recognition as top national institutions because of the state’s historical, constitutional financial commitment to them. Texas may also need additional institutions of this caliber. The institutions designated to fill this role must be acknowledged and supported in a way that is consistent with national competition. They must be provided the flexibility and exercise the wisdom and courage to price their offerings more in line with their value, while taking complementary steps to maintain access. Finally, they must use their historical strength to generate more private capital. Texas A&M University must attain resource parity with the best public institutions to better serve Texas.

**Meet Our Commitment to Texas** Texas A&M University is a creation of the state and in its origin was designed to prepare educated problem-solvers to lead the state’s development. This fundamental mission, born out of the land grant heritage of service, remains today. Texas A&M University’s aspiration to be among the best public universities in the country resonates with this historical mandate. The diverse population of Texas should have access to the best public education in America without having to leave the state. Texas A&M University must also reach out even more to help solve the most difficult societal problems, including those related to public education, crime, and the environment, and must honor its heritage of enhancing the economic development of all regions of the state. Texas A&M University, if it aspires to national prominence, must first stay committed to Texas.
CONTEXT FOR 2011-2015 STRATEGIC PLANNING

- Texas A&M University was revolutionized by General Earl Rudder, who developed our first strategic plan in 1962, the “aspirations study,” which, among other changes, set Texas A&M on the path to becoming a comprehensive research university. Even as it has grown in size, scope, and stature, A&M has retained its commitment to tradition, honor and excellence.

- Today, many are asking serious questions and making critical assessments about the role, purpose and productivity of research universities—including the performance of Texas A&M on several dimensions. Where those criticisms are on target, we need to change what we do and how we do it. Where we have done an inadequate job of describing what we do and why, then we must redouble our efforts to explain our purpose and to provide evidence of our success. With humility, we need to demonstrate that we are accountable to ourselves and to others who are committed to our success.

- Texas A&M requires significant resources to achieve and sustain its status as a flagship university of the first rank. The State of Texas and the families of A&M students have provided significant resources enabling much of our growth. Limited state revenues and current economic conditions suggest that these resources will decline in relative terms. Texas A&M must diversify the resources necessary to serve our constituents and commitment to excellence.

The continued pursuit of excellence must be accompanied by an even greater accountability and stewardship of the resources provided to us by the State of Texas, along with an increased commitment to the identification and acquisition of new resources that advance Texas A&M University and Texas.

Thus, Texas A&M is prepared to:

- make targeted investments in excellence even in the face of requiring relocations to do so.

- continue to grow our federal and corporate support for research and scholarship.

- grow our philanthropic resources to provide a long-term stable base for excellence.

- increase our entrepreneurial efforts across a range of activities—including, technology commercialization, business initiatives, and professional certification/degree programs.
Texas A&M will be a leader in integrating the three primary missions of higher education—teaching, research and service—by taking actions, making investments and designing outcomes that produce a holistic vision of academic excellence in the 21st century. Our plan insists on “Education First,” an inseparable mix of missions that interrelate, stimulate and support one another in a way that develops a new model for an American university, but builds on the firm foundation of the old. Texas A&M must demonstrate that the superior quality of the education it provides to enrolled students, professional peers and an engaged citizenry so substantially promotes the advancement of the public good that its value and contributions to the state are unquestioned. As the first public institution of higher education in Texas, Texas A&M University is rich in tradition and dedicated to the vitality of Texas, its culture, its economy and the well-being of its citizens. We understand that Texas A&M’s stature as a great flagship university must be continuously earned. The Education First initiative reflects a strong commitment to continuous improvement, which is fundamental to a culture of excellence.

**Action 2015: Education First** is a plan that insists on bold choices about the grand challenges on which we as an institution will focus, and thus, on those we will not. The plan insists that we make difficult decisions about the investment of scarce new resources, and that we make even more difficult choices about whether we are using our current resources in a manner that is consistent with our stated plan and goals. **Education First** means that we cannot make decisions about only teaching or only research. Rather, the plan demands that we make new, original decisions and investments that will knit together the traditional elements of Education First and enable the innovations required to take Texas A&M to new levels of performance, productivity and impact.

An education from Texas A&M is provided by the collective expertise of our world-renowned faculty with the support of the dedicated staff. The extraordinary value of a student’s experience at Texas A&M is deeply energized and enriched by faculty who are leading scholars in their fields. Graduates of Texas A&M are noted for their readiness to work because of their leadership, work ethic, loyalty and dedication to public service. We will continue to strengthen their appreciation of a global world enriched by diverse cultures, backgrounds and ideas. These hallmark educational outcomes are a result of the comprehensive mission of Texas A&M and are realized through innovative teaching practices, the creation and dissemination of new knowledge, high-impact learning experiences, experiential offerings, and relevant outreach and engagement. Few institutions share Texas A&M University’s balance of research prowess, graduate education, and commitment to holistic undergraduate excellence.
Texas A&M’s Action 2015: Education First will continue to demonstrate that Texas A&M University is:

**Efficient** in its stewardship of the resources and responsibilities granted by the people of Texas;

**Effective** in the balance of its multifaceted educational mission; and

**Focused** to meet its commitment to Texas, the nation and the world through comprehensive disciplinary and multi- or interdisciplinary excellence, but particularly in interdisciplinary or multidisciplinary areas where it can have the greatest impact on solutions for modern challenges, such as energy, health, information, economic development and innovation, and public service.

**Action 2015: Education First** has been guided by Vision 2020: Creating a Culture of Excellence and its 12 imperatives. This Vision, which was developed through a process that involved numerous stakeholders in the late 1990s, is very broad and must be reviewed in its entirety to appreciate its bold ideas and approaches to being a top university (http://vision2020.tamu.edu/visioning-process-reports).

Our current plan for actions from FY2011–2015 was further informed by documented efforts that also engaged a significant number of stakeholders, including:

- The Academic Master Plan (2009),
- Individual college, branch campus and division strategic plans (2010),
- Closing the Gaps (2006), the Texas Higher Education Coordinating Board’s strategic plan for higher education in Texas,
- Strategic task force reports on: the built environment, the undergraduate experience, the graduate experience, faculty evaluations, shared governance, campus diversity, campus arts, enrollment management, campus athletics and the university financial environment,
- The Texas A&M University System Strategic Plan 2009-2013, and
- The Budget Reallocation Working Group Report (November 2010).

Documents mentioned above are available at http://provost.tamu.edu/strategic-planning-2010.
TEXAS A&M UNIVERSITY MISSION STATEMENT

approved by the Texas A&M System Board of Regents and
the Texas Higher Education Coordinating Board

Texas A&M University is dedicated to the discovery, development, communication, and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility, and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic, and geographic groups, women and men alike, as it addresses the needs of an increasingly diverse population and a global economy. In the twenty-first century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.
IMPERATIVES, PRECEPTS AND GOALS

Texas A&M University will continue to evolve through collective integration and implementation of the 12 imperatives of Vision 2020. During the first ten years after establishing the Vision, with strategies that appeared to some to be too inwardly focused, we worked to strengthen and expand our faculty. We did this knowing that an excellent faculty is needed to provide the greatest educational experience for students and to elevate our impact on the public good. Now, the current economic situation and current public perceptions of higher education call for us to ensure that it is clear, internally and externally, that our pursuit of excellence begun with Vision 2020 is worthwhile only insofar as we are serving the public good. Therefore, it is time that we turn our focus on Vision 2020 inside-out. It must be clear that our efforts in every precept have a purpose rooted in advancement toward meeting significant challenges to society. Therefore, we will focus the work in all imperatives in a manner that ensures we are meeting our commitment to Texas, the nation and the world.

2015 Precept 1  Fulfill our flagship mission

GOAL 1 Maintain the current on-campus enrollment and increase the number of students who graduate annually, ensuring that Texas A&M’s learning environment prepares students for a highly competitive and rapidly changing world and professional workforce, and for responsible civic engagement in a diverse society.

GOAL 2 Elevate the impact of our scholarship to effectively advance the state, the nation and the world in meeting societal challenges and opportunities.

GOAL 3 Diversify the resource base of Texas A&M University by expanding external funding from public and private sources through competitive, philanthropic and commercialization activities.

2015 Precept 2  Practice intelligent stewardship of resources entrusted to Texas A&M

GOAL 4 Recognize and strengthen the contributions and value of a diverse community of faculty, staff and administrators who serve Texas A&M and the State of Texas.

GOAL 5 Create clear processes and effective resource utilization to maintain health, safety and sound infrastructure throughout Texas A&M University.

GOAL 6 Ensure public trust in Texas A&M through open accountability mechanisms that demonstrate efficient resource utilization and effective programmatic outcomes.
STRATEGIES AND METRICS

GOAL 1 Maintain the current on-campus enrollment and increase the number of students who graduate annually, ensuring that Texas A&M’s learning environment prepares students for a highly competitive and rapidly changing world and professional workforce, and for responsible civic engagement in a diverse society.

Strategy 1A Award more degrees per year.

**Metrics:** Graduate 12,500 students/year averaging 4.5 years for bachelor’s degrees, 1.75 years for master’s degrees, and 5 years for doctoral degrees.

Strategy 1B Ensure all students have at least one high-impact learning experience that is not already required: first year seminars, common intellectual experiences, learning communities, writing-intensive courses, collaborative assignments and projects, undergraduate research, diversity/global learning, service- or community-based learning, internships, and capstone courses or projects.

**Metrics:** All graduating students have an effective high-impact learning experience that most students believe has enhanced their ability to serve the public good at the time of the experience as well as after graduation.

GOAL 2 Elevate the impact of our scholarship to effectively advance the state, the nation and the world in meeting societal challenges and opportunities.

Strategy 2A Mentor, value and invest in scholars whose work demonstrates the greatest impact on their field, on the citizens of the state, the nation and the world, and, where appropriate, demonstrate scholarship in action through learning experiences for our students including implementation on and off campus.

**Metrics:** Increase the number of national and international awards and recognitions received by Texas A&M faculty and students, especially but not only in the following areas representing strengths at Texas A&M University: Energy Development, Sustainability, and Conservation; Health and Life Sciences; Information Management and Knowledge Utilization; Public Policy and Public Service; and Economic Development and Innovation.

Strategy 2B Increase investments and improve structures for large institutes and centers that will aid Texas A&M University in making significant contributions to societal challenges and opportunities.

**Metrics:** Develop at least three externally funded centers, each significantly engaging at least ten faculty members and incorporating innovations widely into curricula, especially in the five areas of focused strength (see Strategy 2A).
**Strategy 2C** Enhance the comprehensive nature of Texas A&M University to ensure that our students and scholarship are enriched by and considerate of the breadth of global culture, intellectual thought and the history of human contributions.

**Metrics:** Increase external recognition achieved through national fellowships, awards and recognitions received by faculty and students in all fields; ensure ongoing evaluation of general education/core curriculum for continuous improvement in our students’ broad education; build competitiveness of faculty and students across all disciplines through venues such as the Texas A&M Institute for Advanced Studies.

**GOAL 3** Diversify the resource base of Texas A&M University by expanding external funding from public and private sources through competitive, philanthropic and commercialization activities.

**Strategy 3A** Improve competitiveness of Texas A&M’s faculty and student scholars in winning external financial support for their studies and activities.

**Metrics:** Increase funding for research and scholarly activities through faculty-driven initiatives with institutional support. Increase the total number of students receiving externally funded scholarships and fellowships.

**Strategy 3B** Strengthen Texas A&M’s success in garnering philanthropic and investment support for the activities detailed in this strategic plan.

**Metrics:** Increase the number and size of endowments and annual contributions from non-governmental sources to support more activities of the faculty, staff and students of Texas A&M University.

**GOAL 4** Recognize and strengthen the contributions and the value of a diverse community of faculty, staff and administrators who serve Texas A&M University and the State of Texas.

**Strategy 4A** Expand and support faculty, staff and administrator development opportunities to enhance the overall work environment and increase personal skills and education.

**Metrics:** Develop and promote a wide variety of opportunities for training and education of the faculty, staff and administrators to enhance the effectiveness of their work, the quality of the work environment and diversity.

**Strategy 4B** Fully support and fund the University Diversity Plan.

**Metrics:** Provide a sustained financial commitment to the University Diversity Plan and implement full accountability at every level.

**Strategy 4C** Implement recommendations from the task force on faculty evaluations and the staff evaluation studies.

**Metrics:** Align all faculty and staff evaluations with the core missions of the units and the University as a whole.
**Strategy 4D**  Implement the recommendations of the task force on shared governance.

**Metrics:** Consistent communication between System and Board officers with stakeholders on campus concerning policy or regulation changes and leadership selection; clarity in the rules about processes for selecting significant administrators on campus and the engagement of the constituents in these selection processes; and leadership in shared governance across campus should be valued in annual performance and promotion reviews.

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**GOAL 5** Create clear processes and effective resource utilization to maintain health, safety and sound infrastructure throughout Texas A&M University.

**Strategy 5A** Create a clear process for prioritizing and resourcing investment and the deferred and preventive maintenance on campus infrastructure.

**Metrics:** Implement a deferred and preventive maintenance plan and allocate adequate resources to demonstrate commitment to a campus infrastructure befitting Texas A&M.

**Strategy 5B** Enhance the campus culture concerning compliance and safety as a recognized necessity for accomplishing all aspects of the University mission.

**Metrics:** Reduce the total number of compliance violations and safety incidents and develop and implement a robust risk-management system for the campus.

**Strategy 5C** Maintain and enhance the competitive status and operational integrity of the information technology systems on campus.

**Metrics:** Meet and exceed industry standards for network server and infrastructure availability and provide high-level support services for the teaching, research and administrative needs of the campus community.

**Strategy 5D** Enhance efforts to make Texas A&M University a recognized “green” campus.

**Metrics:** Reduce energy consumption and increase the resources for sustainability including recycling bins, energy management plans and design processes.

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**GOAL 6** Ensure public trust in Texas A&M University through open accountability mechanisms demonstrating efficient resource utilization and effective programmatic outcomes.

**Strategy 6** Develop accountability and reporting systems that can be easily accessible to the Texas A&M community and our external constituents.

**Metrics:** Collect key data in a central web-accessible portal that can be accessed by both the internal and external stakeholders of Texas A&M University.
A2. Associated Centers, Laboratories & Institutes
CACE, TAMU was established by The Texas A&M Board of Regents at their meeting 3/27/2003-3/28/2003. Startup support for CACE was provided by participating Departments, Colleges, and the Office of the Vice President for Research over a three-year period following an initial proposal.

Currently, Dr. Renyi Zhang is the director, and Dr. Simon North is the associate director. The Internal Advisory Board consists of Dr. Jeffrey R. Seemann, V.P. for Research, Chair; Dr. Kate C. Miller, Dean, College of Geosciences; Dr. Joe Newton, Dean, College of Science; Dr. Arnold Vedlitz, Director of the Institute for Science, Technology and Public Policy, Bush School; Dr. G. Kemble Bennett, Associate Dean of College of Engineering. The External Advisory Board consists of Dr. Peter H. McMurry, Department of Mechanical Engineering, University of Minnesota; A.R. Ravishankara, Director, NOAA; and Robert Harriss, President and CEO, Houston Advanced Research Center.

One of the most important objectives of the Center is to provide the highest quality information based on laboratory, field and calculation relevant to sustaining our environment and maintaining air quality. The latter is particularly concerned with the ability to provide the basis with which to accurately predict the formation, transportation and mitigation of air pollution from the molecular to regional scale using state-of-the-art modeling capabilities and to predict their effect on climate.

The Center, by the nature of its participant membership, has been multidisciplinary from the start, and it is intended that with the initial infrastructure investment and the synergistic activities of the participating faculty, it will provide a positive contribution to solving societal problems associated with atmospheric pollution and the environment. The Center is always interested in improving its infrastructure and enhancing its capabilities, including through collaborations with universities, industrial interactions and participation with other institutions.

**Accomplishments**

- Facilitated the recruitment of faculty to TAMU as well as graduate students and post-docs
- Enhanced interdepartmental faculty interactions including joint faculty appointments
- Established multi-use observing facility including field campaigns in Houston and Mexico City
- Enhanced inter-departmental and inter-collegial faculty research that would have not been possible otherwise
- Forged national and international collaborations and activities
- Led to interdisciplinary funding
Other Recent Activities

- Successful organization of a symposium “Atmospheric Chemistry and Air Quality in Texas: Challenges and Opportunities” in 2010 to discuss the current status and future directions in atmospheric chemistry and air quality research in Texas, and to explore broad collaboration among the research communities both inside and outside the state.
- Organization of “2011 IYC SYMPOSIUM ON STRATOSPHERIC OZONE AND CLIMATE CHANGE” in observance of the 2011 International Year of Chemistry (IYC) on November 7-10, 2011 in Washington DC to recognize the contributions of scientists, policy decision makers, industry, and intergovernmental agencies to characterize and counteract the threat that industrially produced halocarbons posed to the Earth’s protective stratospheric ozone layer. This symposium was sponsored by the American Geophysical Union, the American Meteorological Society, the American Chemical Society, the United Nations Environment Program, and the UN World Meteorological Organization. Keynote presentations in this symposium included a number of the world’s most distinguished scientists in this area, including Robert T. Watson, former chair of the Intergovernmental Panel on Climate Change; Ralph Cicerone, President of the National Academy of Sciences; Mario Molina, Nobel Laureate in Chemistry; Nancy Jackson, President of the American Chemical Society; Michael McPhaden, President of the American Geophysical Union; Jonathan Malay, President, of the American Meteorological Society; Michel Jarraud, Secretary General of the World Meteorological Organization, and many others. President George H.W. Bush also made a video presentation to the symposium. (http://2011-iyc-o3.org/)

Faculty and Department Involvement

Fuller Bazer, Department of Animal Science, Ph.D., Regents Fellow, Distinguished Professor & O. D. Butler Chair, Physiology of Reproduction

Bill Batchelor, Civil Engineering Department, Professor and holder of the R.P. Gregory ’32 Chair, treatment of water, wastewater, hazardous wastes and contaminated sites using physical, chemical and biological techniques.


S. A. Brooks, Atmospheric Sciences, Associate Professor. Ph.D., University of Colorado, 2002. Atmospheric aerosols, ice cloud nucleation, chemical and physical processes of aerosols.

T. Cahill, Associate Professor, Civil Engineering, Ph.D., Johns Hopkins, 1998. Land-atmosphere interactions, atmospheric boundary, remote sensing and hydrology.

D. R. Collins, Atmospheric Sciences, Professor, Ph.D., Caltech, 1999. Atmospheric aerosols; radiative forcing/climate change; urban/regional air pollution; indoor/outdoor exchange of air pollutants.
G. A. Gill, Oceanography, Galveston, Associate Professor, Ph.D., Connecticut, 1986. Atmospheric trace metal transport, chemistry and deposition.

George C. Kattawar, Professor of Physics, Ph.D., Texas A&M University, 1973, Remote sensing, applications of Mueller Matrices to atmospheric problems.


W. H. Marlow, Nuclear Engineering, Professor, Ph.D., Univ. of Texas Austin, 1973. Atmospheric aerosol microphysics - theory and modeling.


J. W. Nielsen-Gammon, Atmospheric Sciences, Professor, Texas State Climatologist, Ph.D., MIT, 1990. Analysis and modeling of atmospheric circulations from local to global scales.

G. R. North, Atmospheric Sciences, Distinguished Professor and Head, Ph.D., Wisconsin, 1966. Climate analysis and climate dynamics.

S. W. North, Chemistry, Professor, Ph.D., Univ. of California, Berkeley, 1995. Photo-induced reactions, kinetics of tropospheric oxidation reactions, laser-based probes of transient species.

Gunnar W. Schade, Associate Professor, Ph.D., Johannes Gutenberg University, Mainz, Germany. Atmospheric Trace Gases and Biogeochemical Cycles, Biosphere-Atmosphere Interactions, Analytical Chemistry for the Atmospheric Sciences.

C. H. Spiegelman, Professor of Statistics, Ph. D. Northwestern, 1976 Environmental statistics


Qi Ying, Assistant Professor, Environmental Engineering. Atmospheric physics and chemistry; urban and regional scale air quality modeling; aerosol source apportionment; emission control strategies; atmospheric radiative transfer.


Guoyao Wu, Department of Animal Science, Distinguished Professor, University & AgriLife Research Faculty Fellow, Animal Nutrition

R. Zhang, Atmospheric Sciences, Professor, Ph.D., MIT, 1993. Laboratory, field measurements and numerical studies of atmospheric chemical processes.
The Texas A&M University Cyclotron Institute is a major technical and educational resource for the State of Texas and the nation. The major functions of the Institute, which as a Department of Energy Supported University Center of Excellence is primarily funded by DOE and the state, are to conduct basic research, to educate students in nuclear science and technology, and to provide accelerator capabilities for a wide variety of applications in materials science, nuclear medicine, space science, and analytical procedures. The Institute is one of only two super-conducting cyclotron facilities in the country and one of only four in the world. Internationally recognized for its research contributions, this interdisciplinary Institute is the primary experimental facility for the University’s graduate research programs in nuclear chemistry and nuclear physics. Research group leaders in the Institute are faculty members in Chemistry and Physics holding joint appointments in the Institute. Approximately 10% of the tenure track faculty members in the Chemistry and Physics Departments are group leaders in the Institute. (Though not formally required, directorship of the Institute has regularly alternated between Nuclear Chemists and Nuclear Physicists.) Many of the Institute research programs involve participation of scientists from other laboratories in Italy, France, Belgium, Japan, Russia, Ukraine, The Czech Republic, Poland and Mexico. The Institute also serves as a support and staging area for collaborative experiments carried out at other major national and international facilities. In addition a wide variety of other organizations (e.g., NASA, Boeing, Motorola, Jet Propulsion Laboratory, St. Jude’s Hospital, Harris Computer etc.) use the accelerator for a broad range of applied studies. Institute research programs are regularly reviewed by external scientific committees appointed by the DOE. In the most recent of these reviews, September 2010, the Institute programs received uniformly strong reviews and received a new three-year grant with an increase in funding. The Institute is in the final stages of a $5 million dollar upgrade of its accelerator facilities, jointly funded by DOE, The Robert A. Welch Foundation and The State of Texas. Current Institute Personnel include 12 faculty members, 23 PhD level research scientists and post docs, 24 graduate students, 6 undergraduate students and 36 technical staff members.

Since its creation in 1964 the Institute has been very successful in obtaining significant external grant funds. The Nuclear Chemistry research program has been continuously funded for 45 years. Currently the Institute’s operations and research program is funded by approximately 6.8M in external funds (DOE, the NSF, the Robert A. Welch Foundation, and beam time sales for applied uses) and 0.9M in State appropriated and local funds. The present Nuclear Chemistry faculty members are University Distinguished Professor J.B. Natowitz, Regents’ Professor S. Yennello and Assistant Professor of Nuclear Chemistry C.M. Folden. Together their external research funding is over 2 million dollars/yr. In fiscal reports the funding of Drs. Natowitz and Yennello is credited to the Chemistry department which last year accounted for over 9% of the Department’s external funding. At the time of the last review the Chemistry Department had committed to two new Nuclear Chemistry faculty positions in connection with the facility upgrade. The new Chemistry faculty members would have returned the Nuclear Chemistry faculty to its previous strength of 5. Although these hires were not made the College of Science,
has hired Dr. Charles M Folden as an Assistant Professor of Nuclear Chemistry. There are two ongoing faculty searches for Radiochemists as part of the Nuclear Solutions Institute. It is possible that these individuals will have some affiliation with the Department of Chemistry.

Center for Chemical Characterization and Analysis

Director: Emile A. Schweikert

This center is comprised of the Elemental Analysis Laboratory (William James, Ph. D.), NMR facility (overseen by Senior Research Instrumentation Specialist, Steven Silver, Ph. D.), and the X-ray Diffraction Facility (Joseph Reibenspies, Ph. D.).

I. Elemental Analysis Laboratory

http://www.chem.tamu.edu/eal/

Manager: William D. James

Description: The Elemental Analysis Laboratory (EAL) is a component of the Center for Chemical Characterization and Analysis (CCCA) housed in the Teague Building on the University’s main campus. The Laboratory represents a continuance of Texas A&M University’s efforts in the area of nuclear analytical method development which now spans over 50 years. The Activation Analysis Research Laboratory, from which our laboratory is descended, was established in 1958 and played a significant role in the early developments of the field. In fact, just this last spring (March 13-18, 2011), we celebrated the 50th anniversary of the major conference series in activation analysis and radiochemistry by hosting the 13th International Conference on Modern Trends in Activation Analysis (MTAA-13). The significance of Texas A&M University’s selection as the hosting institution is related to the fact that the first two conferences in the series (MTAA-1 and MTAA-2) were also held here in College Station in 1961 and 1965. So this most recent conference represented a homecoming, in which we enjoyed participation of some 174 scientists from 29 countries.

The stature of Texas A&M University in this community is related not only to this long history, but continues based on our current activities in nuclear techniques and is enhanced through our expansion into related and alternative methods for trace and ultra-trace elemental analysis methods. Currently, the Laboratory boasts unique capabilities in reactor-based thermal instrumental neutron activation analysis (INAA), accelerator-based high-energy (fast) neutron activation analysis (FNAA), energy dispersive x-ray fluorescence spectroscopy (EDXRF) and inductively coupled plasma emission-mass spectrometry (ICP-MS).

The NAA efforts are aided by a wide variety of gamma spectroscopy equipment including high-resolution germanium spectrometers (HPGe) for INAA work, new (November, 2010) bismuth germinate (BGO) scintillators for high efficiency FNAA applications and a 12 inch sodium iodide (NaI(Tl)) annular Compton suppression system for enhancement of peak extraction from complicated spectra. In addition, the Laboratory operates a heavily-shielded large-volume
germanium crystal incased in a special low-level cryostat for detection and quantification of minute quantities of natural radioisotopes. The combination of thermal and fast neutron facilities at Texas A&M are not duplicated anywhere else in Texas or the United States.

Our ICP-MS spectrometer is enhanced with sample introduction “front end” devices such as a laser ablation system for studying solid samples and surfaces and a high pressure liquid chromatography system for speciation studies. These result in functional instrumentation for the “hyphenated” techniques of LA-ICP-MS and HPLC-ICP-MS. The ICP-MS facility is a user operated instrument which directly supports research groups throughout the University community. A new Perkin Elmer NexION 300D ICP-MS was added to update our facilities during 2012.

Activity: The purpose of the laboratory is three-fold: 1) Primary research in the development and application of analytical methodologies; 2) Support of TAMU research across all academic fields; and 3) Service analyses for entities outside the University. A great deal of the University-based work is performed in collaborative efforts, which span these program components. Most of these efforts include the hands-on utilization of the instrumentation by TAMU students which supports our emphasis on training. The focus of our efforts is to provide analytical facilities to TAMU researchers which are of such a scope or which requires such expertise that they are not otherwise available on our campus. While the primary purpose of the laboratory is to support TAMU research, the unique capabilities we have in radioanalytical methods makes the laboratory an important resource for service analysis for other universities, government agencies and industrial users. Therefore the Laboratory offers NAA services to outside entities on either a collaborative basis or fee for service.

Table 1 shows the utilization of the Laboratory’s services for Texas A&M University users. The fast neutron facilities are very lightly used by campus users but the thermal INAA capability as well as the ICP-MS instrument are heavily used by research groups from various departments. Table II shows the level of utilization by our outside customers. Commercial companies make maximum use of our fast neutron activation analysis services. In addition significant utilization is made of conventional INAA work and to a lesser degree, ICP-MS. This utilization by University and outside users constitutes a continuing interest in the technologies we provide and demonstrates the need for their availability on campus.

Table I. Facility utilization by Texas A&M research groups.

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<tr>
<th>TAMU Department-PI</th>
<th>No. Samples</th>
<th>Hours</th>
<th>Hours</th>
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<tr>
<td></td>
<td>FNAA</td>
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<td>ICP-MS</td>
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<tr>
<td>Anthropology-Eckert</td>
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<td>Chemistry-Clearfield</td>
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<td>Chemistry-Dunbar</td>
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Table II. Facility utilization by customers outside the University.

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<tr>
<th>Commercial Company</th>
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<th>INAA</th>
<th>ICP-MS</th>
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<td>Albion Environmental</td>
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<td>BWXT Y12</td>
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<td>Ceradyne Inc.</td>
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<tr>
<td>Chevron Energy Techn. Co.</td>
<td>50</td>
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<td></td>
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<tr>
<td>CSIRO</td>
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<td>10</td>
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<tr>
<td>EaglePicher Technologies</td>
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<td>Elemental Analysis Corp</td>
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<td>Enser Corporation</td>
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<tr>
<td>ICL Performance Products</td>
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<tr>
<td>KIOR, Inc.</td>
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<tr>
<td>Lockheed Martin Missiles</td>
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<td>Nanospectra</td>
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<td>Sandia National Lab</td>
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<td>US Magnesium</td>
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<td>UTHSCSA-Feldman</td>
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<td>204</td>
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<tr>
<td>Income</td>
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<td>$22,943.11</td>
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<tr>
<td>Total Income</td>
<td>$169,361.31</td>
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<td>$8,160.00</td>
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</table>
**Funding:** The salary and benefits for the EAL manager are provided by the University. All other funds required for salaries, operational costs, supplies, equipment and maintenance are derived from user fees. Current Department of Chemistry (state funds) support is $133,873. User fees for sample received varies greatly from year to year. Typically annual income expected from outside sources is $100,000 to $220,000. Other estimated expenses are:

<table>
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<tr>
<th>Other salaries and benefits</th>
<th>$86,684</th>
<th>(FY2012 figures)</th>
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<tr>
<td>Student worker wages:</td>
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<td>Instrument Maintenance</td>
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<td>(4% of ~$1,000,000)</td>
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<td>Equipment Replacement including</td>
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<td>generator tube replacement:</td>
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<td>(4% of ~$1,000,000)</td>
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<td>costs:</td>
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<td>Specialty supplies like</td>
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<td>compressed and liquid gases,</td>
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<td>high purity acids and standards:</td>
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<td>Publication and travel costs:</td>
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<td></td>
<td>$5000</td>
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<tr>
<td><strong>Total estimated expenses:</strong></td>
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<td></td>
<td><strong>$340,557</strong></td>
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</table>

**EAL User Committee:**
Dr. Emile Schweikert, Chemistry, Science  
Dr. David Carlson – Anthropology, Liberal Arts  
Dr. Suzanne Eckert – Anthropology, Liberal Arts  
Dr. Richard Leoppert – Soil and Crop Sciences, Agriculture  
Dr. Gordon Carstens, Animal Science, Agriculture  
Dr. Abraham Cleearfield, Chemistry, Science  
Dr. Niall Slowey, Oceanography, Geosciences  
Dr. Bob Taylor, Veterinary Integrative Biosciences, Veterinary Medicine

**Future Development**
The laboratory expects to continue to improve and upgrade our facilities with the purpose of anticipating campus needs in elemental analysis. Our current method development activities and collaborations are exploring the new technologies of nanotechnology, nuclear forensic measurements and application of nuclear methods to social sciences such as anthropology. These rapidly expanding fields are deemed likely to benefit greatly from the techniques we employ. To that end, we are involved in renovation of our facilities. In the fall of 2010, the electronics that supports
the fast neutron facility were upgraded to include new bismuth germinate (BGO) scintillation detectors. Our preliminary measurements reveal that the new detectors have increased the sensitivity of the analysis system for oxygen determination by about 37%, thereby reducing the threshold determination limit for the method. The decade-old Perkin Elmer DRCII ICP-MS was replaced with a Perkin Elmer NexION 300D system this last year which will enhance our capabilities by the addition of interference avoidance using kinetic energy discrimination (KED). The instrument actually has been installed and is awaiting full implementation as of this writing.

II. NMR Facility

http://nmr.tamu.edu/

Manager: Steven Silber

Brief Description of Facility:
The NMR Facility consists of ten superconducting magnet systems. Six of the systems are broadband, permitting observation of a wide variety of magnetically active nuclei at several different field strengths. All of these spectrometers are UNIX based systems, with eight system running Varian's VnmrJ 3.1 software and two operating with the Bruker TopSpin software Systems range from 300 to 500 MHz. There are 3 systems using proton/carbon switchable probes, 3 systems using proton/fluorine/carbon/phosphorus quad probes, 2 systems using broadband multinuclear probes, 1 system with a proton/carbon/nitrogen cryoprobe, and 1 solid state multinuclear system.

There are three full time staff positions and one half time position in the facility, providing service spectra, help planning and interpreting experiments, repair and maintenance of the equipment, hardware and software modification for special experiments, and instruction for users.

Researchers making extensive use of NMR in their research are encouraged to become checked out on the equipment so that they can obtain their own data. Instruments are available to authorized users 24 hours a day, 7 days a week.

List of Faculty and Staff who work in the Facility:
There are three full time staff positions supporting the NMR facility. Mr. Steven Silber is the facility manager, Dr. Patha Sarathy is a staff spectroscopist supporting users primarily on the higher field systems, and Dr. Vladimir Bakhmoutov is a staff spectroscopist supporting solid state users, and users on the lower field systems. Dr. Howard Williams has a half time position in the facility supporting the Avance 500 cryoprobe system.

There are currently in excess of 300 graduate students and post doctoral fellows checked out to use the various spectrometers 24 hours/day, 7 days per week. These users represent approximately 40 different research groups. In addition, as many as 60 undergraduates may have 1 semester access to the teaching instrument in conjunction with one of the 3 undergraduate courses (234, 326, 433) using NMR as part of the laboratory instruction.
The major users within the chemistry department include: Drs. Begley, Bergbreiter, Bluemel, Burgess, Clearfield, D. Daresnbourg, M. Daresnbourg, Dunbar, Gabbai, Gladysz, Hilty, Liu, Ozerov, Raushel, Romo, Singleton, Vigh, Watanabe, Wooley, Yang, and Zhou.

**Funding sources:**
Support for the facility comes from user fees and departmental funds. Instrument purchases are usually funded by shared instrumentation grants and local matching funds.

**III. X-ray diffraction laboratory**

http://xray.tamu.edu
Manager: Dr. Joseph Reibenspies

This is a full service X-ray Diffraction laboratory offering state of the art instrumentation for the analysis of solid materials. Our services include single-crystal, powder diffraction and small angle X-ray scattering analysis for Chemistry, Material Sciences and Pharmaceuticals. We are staffed by fully trained Ph.D. scientists who employ the most up to date diffraction and X-ray techniques. Please feel free to contact us about your diffraction needs.

**Mission:** The purpose of our laboratory is to provide X-ray diffraction analysis to the Texas A & M University system and to educate our students in the science of Crystallography. Our main focus is to determine molecular structure from single-crystal samples, to determine shape and size by small angle X-ray scattering and to perform high resolution X-ray powder diffraction. We provide services to outside users. We are a full service facility, able to determine the three dimensional structure of molecules and solids, from single crystal samples. We can determine various structural types from small inorganic solids to small macromolecules.

Laboratory Services Include:
- Single-Crystal and X-ray Powder Diffractometry
- High Resolution and Two-Dimensional X-ray Powder Diffractometry
- Wide Angle Diffractometry
- Small Angle X-ray Scattering
- Structure Solution from single-crystal or powdered materials
- Qualitative and quantitative phase analysis
- Micro-Powder Diffraction
- Ultra-low temperature single-crystal diffraction (~30K)
Polymorph and crystalline state Identification Powder Pattern comparisons
Identification of unknown materials by X-ray powder pattern search and match routines

The Existing Instruments include:
SMART1 Bruker-AXS SMART1000 CCD 3-thircle X-ray Diffractometer
SMART2 Bruker-AXS SMART1000 CCD 3-thircle X-ray Diffractometer
APEX21 Bruker-AXS APEX-II CCD 3-thircle X-ray Diffractometer
GADDS Bruker-AXS MWPC 3-thircle X-ray Diffractometer
APEX23 Bruker-AXS APEXII CCD 3-thircle X-ray Diffractometer
APEX22 Bruker-AXS APEX-II CCD 3-thircle X-ray Diffractometer Workstation
Powder_SA BrukerD8-Focus Bragg-Brentano X-ray Powder Diffractometer
POWDER_LA BrukerD8-Vario X-ray Powder Diffractometer
SAXS BrukerNANO-STAR Small Angle X-ray Scattering Instrument
Funding:
1. Department: Chemistry 100%
2. Other Income from Service provided: $95,366

List of Laboratory Users:

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<thead>
<tr>
<th>Name</th>
<th>Department/Company</th>
<th>Name</th>
<th>Department/Company</th>
<th>Name</th>
<th>Department/Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akbulut, Mustafa</td>
<td>Chemical Engineering</td>
<td>Kameoka, Jun</td>
<td>Electrical Engineering</td>
<td>Kameoka, Jun</td>
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<tr>
<td>Alvarado, Jorge</td>
<td>Engineering Technology</td>
<td>Karaman, Ibrahim</td>
<td>Mechanical Engineering</td>
<td>Karaman, Ibrahim</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Anthony, Rayford</td>
<td>Chemical Engineering</td>
<td>Kelly, Mark</td>
<td>Luminant Power</td>
<td>Kelly, Mark</td>
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<td>Bai, Hebi-Battteas,</td>
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<td>Kuo, Yue</td>
<td>Chemical Eng.</td>
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<td>James Bergbeiter,</td>
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<td>David</td>
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<td>UTEP</td>
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<td>Lunsford, Jack</td>
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<td>Cong, Derek</td>
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Connell, Brian
Copeland, Kevin
Darensbourg, Don
Darensbourg, M.
Dunbar, Kim
Elsenbaumer, Ron
Fackler, J.
Fernando, Sandun
Fook, Tham
Gabbai, F.
Garner, DeOnna
Gladysz, John
Goodman, D. W.
Griffin, Richard
Grunlan, Jaime
Guarrera, Donna
Guo, Bing
Hartwig, K.
Hill, Craig
Hollingsworth, Mark
Ozerov, Oleg
Phelps, Michael
Raushel, F.
Romo, Dan
Ronda, Howell
Ross, Joseph
Rowe, Marvin
Russell, David
Sammakia, Tarek
Schweikert, E.
Shantz, Dan
Slaughter, LeGrande
Son, Dong Hee
Sue, HJ
Sulikowski, G.
Telzer, Winfried
Thong, Irene
Tomaselli, Ryan
Vaddiraju, Sreeram
Varvel, Tracey
Holtzapple, Mark
Hughbanks, Tim
Jeffery, Stephen
Jeong, Hae-Kwon
Johns, Adam
Jordan, Jim
Yarbourgh, Jason
Yavuz, Mustafa
Yu, Choongho
Zhang, Mingbao
Zhang, Xinghang
Zhou, Hongcai

Chemical Engineering
Department of Chemistry
Heraeus Metal Processing
Chemical Engineering
Dow Chemical
Department of Geology
Sealed Air Corporation
Mech. Engineering
Mechanical Engineering
Institutes for Pharmaceutical Discovery
Mechanical Engineer
Department of Chemistry

Vigh, G.
Wang, Haiyan
Wang, Xiang
Wu, Weidong
Wu, Wenhao
Yang, Jiong

Department of Chemistry
MEEN
University of Colorado
LaserGen Inc
Physics
Department of Chemistry

Laboratory for Biological Mass Spectrometry (LBMS)

Director: Dr. David H. Russell

Description: The Laboratory for Biological Mass Spectrometry (LBMS) was established in 1994, with operational goals focused on the developmental mass spectrometry (MS) and MS-based biological collaborations, primarily in the area broadly defined as “proteomics”. Since its establishment, the application of mass spectrometry in general, and at TAMU specifically, has expanded in ways not imagined in 1994. This has to do primarily with concurrent changes in the research environment of TAMU and the needs for high performance mass spectrometers and hyphenated MS techniques to address the high level research of interdisciplinary collaborations. The LBMS provides key expertise and instrumentation that promote new research directions for a diverse group led by faculty in chemistry, biology, biochemistry, biophysics, engineering, medicine, agriculture, and materials research. In addition, the research capabilities are accessible to non-TAMU users, both academic and industrial, either through collaborations or service-for-fee. The LBMS is now housed in two different buildings; the Chemistry building houses the service-for-fee facility and the facility in the Interdisciplinary life sciences building is focused on facilitating faculty with state-of-the-art MS instrumentation and methods. The current locations
will foster interdisciplinary research and partnership with various PI’s from different departments and colleges.

Activities

Services: Currently, the LBMS serves the TAMU research communities with expertise in mass spectrometry methodology, instrumentation, and increasingly, informatics. Compounds analyzed range from small organic molecules to macromolecules including proteins, oligonucleotides, polymers and dendrimers. Services provided include molecular-level research in various ‘omics’ related researches, i.e., petroleomics, proteomics, metabolomics, lipidomics, glycomics, etc., which represent growing research areas in the fields of the physical and life sciences, health sciences, agriculture, veterinary medicine and engineering. Thus, the LBMS serves diversified disciplines of TAMU and other institutions with cutting-edge experimental design, method development, new applications which are designed to meet the rapidly expanding needs of researchers. In order to meet with the fast evolving applications of mass spectrometry and the explosive increase in usage of mass spectrometry by the TAMU research groups, the LBMS regularly attempts to upgrade the instrumentation inventory through federal grants to maintain a complete state-of-the-art inventory of mass spectrometers and related analytical instrumentation. The LBMS is currently equipped with high mass accuracy and high resolution mass spectrometers with newly incorporated mass spectrometry techniques such as ion-mobility coupled to a tandem mass spectrometer and ultra-high resolution Fourier-transform ion cyclotron resonance (FTICR) for applications such as top-down proteomics, petroleomics, metabolomics, and drug discovery. In addition to major equipment inventory, the LBMS research scientists are actively involved in the development of new analysis methods and development of next-generation instrumentation for analysis and sample handling. Hence, the activities within the LBMS are divided into four categories: (a) service-for-fee, routine analysis (applications), (b) core research, (c) collaboration and (d) training and dissemination.

Service-for-fee: Routine analysis/applications are performed using existing methods/techniques and the PI is charged for these services. Three categories of users are recognized, Texas A&M University and affiliations, academic and government investigators outside of the TAMU system, and private sector users. Separate fee schedules apply to each.

Core Research: The core research is aimed at advancing cutting-edge experimental capabilities of LBMS, which involves in the development of new techniques and instrumentations. Industrial Partnerships form an integral part of the research objectives of the LBMS. Historically the major source of innovations for mass spectrometry hard ware has been the academic scientist, and the LBMS is actively involved with instrument vendors to develop the next-generation mass spectrometers. The PI’s research activities in the area of fundamental gas-phase ion chemistry, advanced MS instruments, applications of MS to proteomics, and developmental research in laser-mass spectrometry techniques as ionization methods as well as structural probes represents the cutting-edge of the field. Over the past years this research has led to several patents, major research grants and brought major new instruments to TAMU well in advance of the instruments being commercially available products.

Collaboration: Collaborative research efforts usually involve development of new methods/techniques for specific chemical and/or chemical-biology problems as defined by PI’s
outside the LBMS. Often times projects are designated as collaborations simply because methods development research is required, and the time (cost) to develop the experiment would be prohibitive to the P I. In other cases the research cannot be performed using available methods/technology and new methods/technology must be developed. Typically, pilot projects are performed as proof-of-principle in support of grants in hopes of securing federal funding for these research projects. Grant support for collaboration: Collaborations often involve preparing grant applications to support the research activities. Over the last year we have helped prepare proposals for many P I’s.

d. **Training /dissemination:** Training and dissemination are routine parts of the LBMS activities. An integral part of the MS training activities is the education of the next generation of mass spectrometrists. In the academic year 2010-2011, 12 Ph.D. graduate students along with one undergraduate participated in the LBMS. There are two post-docs working in the LBMS. In addition to the PI’s graduate students, graduate students from Professors’ Paul Cremer and David Barondeau research groups were allowed to use the mass spectrometers as part of LBMS’ collaboration projects. LBMS has also been accepting undergraduate students from Professor Emile Schweikert Instrumental Analysis (Chem 434) class to perform their senior projects on mass spectrometry. In the spring 2010, we trained four undergraduate students from this class. LBMS personnel also actively participated in group meetings of collaborators in order to facilitate communication and research projects.

Our major mechanism of dissemination is publication in referred journals, invited contributions to research texts, special feature articles and tutorials, and research presentations at national/international meetings/conferences/seminars.

**User’s Committee:** Below is a list of user’s committee. The LBMS director is a member of this committee. The committee is responsible for developing LBMS and insuring that the instrument inventory is adequate. In the coming year (2012), we are planning to expand the user’s committee to include additional members from the Chemistry Department and other departments and colleges of TAMU.

1) Kevin Burgess  
2) Francois Gabbai  
3) Frank Raushel  
4) Daniel Romo  
5) David Russell  
6) Emile Schweikert  
7) Eric Simanek  
8) Marcetta Daresbourg  
9) Kim Dunbar  
10) Charles Kenerly  
11) Heather Wilkinson  
12) Friedhelm Schroeder  
13) Gyula Vigh
Research Infrastructure Facilities
Laboratory for Biological Mass Spectrometry - LBMS
September 1, 2010 - August 31, 2011

Figure 1. The percents (pie charts) and total numbers (text on the left) are of TAMU's samples analyzed by mass spectrometry, and are sorted by college and department.

Industry: 148
Lynntech: 73
TX Biochemicals: 18
Xbiotech: 4
Los Alamos: 46
McKenzie/Wright: 7

Other Universities: 334
UWM: 249
Louisville: 39
Haverford: 20
Tulane: 3
UTMB: 14
TCU: 2
Alabama: 2
TAMUK: 6

Total: 482

Figure 2. The percents (pie charts) and total numbers (text on the left) are of industrial and other university samples that were analyzed by mass spectrometry.
Funding & Other Source

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<th>Source</th>
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<tr>
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<table>
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<tr>
<th>Revenue Desc.</th>
<th>Category/Title</th>
<th>Actuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>Miscellaneous Income</td>
<td>$0.00</td>
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<tr>
<td></td>
<td>Service</td>
<td>$94,562.50</td>
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<tr>
<td></td>
<td>Sub-Total Revenue</td>
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<td>Department Credits</td>
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<td><strong>Total Revenue</strong></td>
<td><strong>$104,412.50</strong></td>
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<table>
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<tr>
<th>Expense Desc.</th>
<th>Category/Title</th>
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<tbody>
<tr>
<td>Expense</td>
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<td>Equipment</td>
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<td>Maintenance &amp; Repairs</td>
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<td>Operations</td>
<td>$1,811.94</td>
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<td>Services</td>
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<td>Supplies &amp; Materials</td>
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<td>Wages</td>
<td>$2,805.03</td>
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<td>Fringes</td>
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<td></td>
<td>Travel</td>
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<td><strong>Total Expenses</strong></td>
<td><strong>$158,688.85</strong></td>
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<table>
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<tr>
<th>Personnel</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Research Scientists</td>
<td>$196,041.00</td>
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<tr>
<td>GAR’S</td>
<td>$45,600.00</td>
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<td><strong>Total Salaries</strong></td>
<td><strong>$241,641.00</strong></td>
</tr>
<tr>
<td><strong>Total Expenditures</strong></td>
<td><strong>$401,396.85</strong></td>
</tr>
</tbody>
</table>

**Future**

**Objectives:** The LBMS will continue to provide cutting edge experimental capabilities to support a broad range of molecular-level research, develop technologies, and train scientists to advance the field of mass spectrometry. The future goals of the LBMS are to increase the quality of services that are currently provided to the TAMU research communities, in particular, and other local and national private and government sectors in general by expanding its capabilities and partnership in scope and impact. We also plan to increase its outreach programs. We will put
steps towards achieving its long-term objective; i.e for the LBMS to be renowned as a center in which no other centers in the south/southwest region could provide in the services that LBMS provides in mass spectrometry methodology, instrumentation, and nature and scope of collaborations. This will provide TAMU with the ability to attract and retain scientists of the highest caliber, ultimately for the LBMS to achieve its long-term objective to be designated as a NIH-NCRR mass spectrometry center. The relocation of the LBMS Collaborations Laboratory to the ILS B has started to significantly impact our mission. In the short time since the initial move we have seen a substantial increase in the numbers of collaborative projects. The growth in collaborations will significantly impact our competitiveness for attracting federal and industrial support for the LBMS research activities.

**Concerns:** Some of our mass spectrometers are a decade old, and are no longer supported by the manufacturer for parts and services. In order to meet the challenges of current research and the growing demand of TAMU research groups for MS analysis, upgrades of these instruments are absolutely necessary. In addition, currently the LBMS is understaffed despite the newly added equipments and increased demand in mass spectrometry analysis from TAMU research groups and outside researchers. Similar programs at other universities have two to three times more personnel in comparison to LBMS. This will adversely affect the progress of LBMS.

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**The Natural Products LINCHPIN Laboratory**

Director: Daniel Romo

**An Idea Incubation and Research Center for Collaborative, Small Molecule-Based Drug Discovery at Texas A&M University**

The Natural Products LINCHPIN Laboratory at Texas A&M University serves as a Central Collaboration and Idea Incubation Center for interdisciplinary researchers in Texas and worldwide that require the chemical synthesis, selective derivatization (microscale), purification, and structural characterization of bioactive small organic molecules including natural products and derivatives with potential for human disease intervention. Initial data generated from these collaborations will become important and often essential Preliminary Results for submission of major grants to support significant, cutting edge interdisciplinary, human health related-research. The LINCHPIN brings together diverse researchers with common interests in bioactive small molecules and derivatives, proteomics, and genomics serving as a collaboration center and providing the necessary synergy, established track record (co-publications), and preliminary studies to ultimately develop funded collaborative research projects focused on small molecules-based approaches to human disease. Thus the LINCHPIN, building on the very definition of its acronym, will ‘serve to hold together parts or elements that exist or function as a unit’ (*e.g.* Basic Science in Chemical Biology→LINCHPIN→Translational Research/Drug Discovery).’ The LINCHPIN consists of a Co-Director (Dr. Jing Li, formerly at Eisai) with 5 years of pharmaceutical industry experience and several post-doctoral research scientists to support
collaborative projects. Prof. Daniel Romo serves as the LINCHPIN Director along with the current consultants, Profs. Tadhg Begley, Dave Bergbreiter and Jim Sacchettini. Thus, the Director, co-Director, and pertinent faculty members will be available for consultation and project development in discussions with interested Natural Product LINCHPIN collaborators.

We have expertise in: **Chemo- and Site selective derivatization** of complex small molecules (including natural products) and derivatives on microscale for SAR studies; **Design, chemical synthesis and scale up** of simplified, equipotent derivatives of initial lead compounds; **Isolation, purification and structure elucidation** of bioactive small molecules and derivatives; **Synthesis of Cellular Probes** to address cellular localization and cellular target/off-target identification; **Isolation of putative cellular receptors** for bioactive small molecules; and **Early preclinical studies**.

**Activities:** Several highly productive, interdisciplinary research projects involving natural product and other small molecule drug leads for human disease are currently underway in the LINCHPIN Laboratory. These projects vary in the stage of development from preclinical animal studies, lead optimization/medicinal chemistry, development of novel therapy delivery devices, to early discovery projects seeking to exploit novel cellular targets for cancer, aging, traumatic brain injury, and parasitic infection. Approximately 80% of the research effort in the Natural Products LINCHPIN Lab is focused on cancer.

**LINCHPIN Laboratory Collaborators**

<table>
<thead>
<tr>
<th>Collaborators</th>
<th>Project Support</th>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peter Davies</strong>, Ph.D., M.D., Director, Screening Alliance for Cancer Therapeutics, Professor, The University of Texas Health Science Center, Houston</td>
<td>“CPRIT High Throughput Screening Program” CPRIT RP110532-AC (Davies, PI),</td>
<td>SAR follow-up on hits from a screening collection that includes 1,100 natural products and extracts. Cellular probe synthesis and de novo synthesis as warranted.</td>
</tr>
<tr>
<td><strong>David J. Tewardy</strong>, M.D., Professor and M.D. Anderson Chair in Medicine, Chief, Section of Infectious Diseases, Baylor College of Medicine, Houston</td>
<td></td>
<td>SAR follow-up on piperlongumine, a potent Stat-3 inhibitor</td>
</tr>
<tr>
<td>Collaborators</td>
<td>Project Support</td>
<td>Project Description</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>William Plunkett</strong>, Professor, Department of</td>
<td>“Chronic Lymphocytic Leukemia Research Consortium” PO1 CA81534, (Thomas Kipps, PI, Plunkett, Project 5 Leader); &quot;Development of New Drugs for CLL&quot; US-European Alliance for Chronic Lymphocytic Leukemia, (Plunkett, PI)</td>
<td>Studies of DMDAPatA as a single agent and as a combination therapy for various leukemias including CLL.</td>
</tr>
<tr>
<td>Experimental Therapeutics, MD Anderson Cancer</td>
<td></td>
<td></td>
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<tr>
<td>Center, Houston</td>
<td></td>
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</tr>
<tr>
<td><strong>Elizabeth Grimm</strong>, Professor, Dept. of Melanoma</td>
<td>Study of DMDAPatA for use against B-Raf resistant melanomas.</td>
<td></td>
</tr>
<tr>
<td>Medical Oncology-Research and Experimental</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutics, MD Anderson Cancer Center, Houston</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Susan Mooberry</strong>, Professor of Pharmacology, Co</td>
<td>“Taccalonolides: Mechanisms of Action and Cellular Resistance” NIH/NCI 5R01CA121138-06 (Mooberry, PI)</td>
<td>SAR and study of the mechanism of action of novel antimitotic agents from plants.</td>
</tr>
<tr>
<td>leader of Experimental and Developmental</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutics, Cancer Therapy Research Center,</td>
<td></td>
<td></td>
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<tr>
<td>UTHSC San Antonio</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>John MacMillan</strong>, Assistant Professor, UT</td>
<td>“Discovery and optimization of natural and artificial ligands regulating Hypoxia</td>
<td>SAR studies and derivatization of endogenous oxysterols that regulate HIF-2a</td>
</tr>
<tr>
<td>Southwestern Medical Center, Dallas Texas.</td>
<td>Inducible Factor”; CPRIT RP100846 (Gardner, PI), “A Concerted Chemical, Biophysical and Molecular Attack on Intracellular Targets” NIH/NCI 5PO1CA095471 (McKnight, PI)</td>
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<tr>
<td>Chilton/Bell Scholar in Biochemistry Research</td>
<td></td>
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<tr>
<td>2007-11.</td>
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<tr>
<td><strong>Phillip Jones</strong>, Ph.D. Head of Drug Discovery,</td>
<td>CPRIT Texas Life Sciences Incubator Infrastructure Award CP120015 (Joint award</td>
<td>Assistance and follow-up by direct derivatization of hits in screening efforts</td>
</tr>
<tr>
<td>Institute of Applied Cancer Science, MD</td>
<td>with Rice University, Lynda Chin, George McLendon, PIs)</td>
<td></td>
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<tr>
<td>Anderson Cancer Center, Houston</td>
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<tr>
<td>Collaborators</td>
<td>Project Support</td>
<td>Project Description</td>
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<tr>
<td><strong>Coran Watanabe, Ph.D.,</strong></td>
<td>“Probing the Biosynthesis of the Anti-Tumor Agent Azinomycin B” American Cancer</td>
<td>SAR and follow-up on bioactive natural products from Hawaiian cyanobacteria extracts.</td>
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<tr>
<td>Associate Professor, Department of Chemistry,</td>
<td>Cancer Society RSG-07-239-01-CDD (Watanabe, PI)</td>
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</tr>
<tr>
<td>Texas A&amp;M University, College Station</td>
<td></td>
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<tr>
<td><strong>Carl Lovely, Ph.D.,</strong></td>
<td></td>
<td>Derivatization of pyrrole-amino imidazole natural products for SAR studies</td>
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<tr>
<td>Associate Professor, Dept. of Chemistry, UT Dallas</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>James C Sacchettini,</strong></td>
<td>“Structure, Function and Inhibition of Human Methionine Aminopeptidases” NIH/NCI</td>
<td>MiniPharma Undergraduate Program (funding from TAMU Honors Program) development of dual inhibitors of</td>
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<tr>
<td>Professor of Biochemistry/Biophysics and Chemistry,</td>
<td>5R01CA078743-15 (Jun O. Liu, PI)</td>
<td></td>
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<tr>
<td>Texas A&amp;M University</td>
<td></td>
<td></td>
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<tr>
<td><strong>Jun O. Liu, Ph.D.,</strong></td>
<td></td>
<td>• SAR and mode-of-action study of triptolide, lactimodycin and glutarimide-containing 12-membered</td>
</tr>
<tr>
<td>Professor of Pharmacology and Molecular Sciences</td>
<td></td>
<td>macroide inhibitors of cell migration. • Target identification of the anticancer agents agelastatin</td>
</tr>
<tr>
<td>and of Neuroscience, Johns Hopkins School of</td>
<td></td>
<td>A and phakellstatin</td>
</tr>
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<td>Medicine, Baltimore, Maryland</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Robert Schneider, Albert B.</strong></td>
<td>“Translational control and therapy of the breast cancer epithelial and cancer stem cell” Breast Cancer Research Foundation, $175,000/yr (Drs. Schneider and Formenti, co-PIs); “Research consortium for inflammatory breast cancer research Time commitments” Avon Breast Cancer Research Foundation $445,000/yr (Schneider, PI)</td>
<td>Studies of DMDAPatA and derivatives as protein synthesis inhibitor for treatment of inflammatory breast cancer (IBC)</td>
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<tr>
<td>Collaborators</td>
<td>Project Support</td>
<td>Project Description</td>
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<tr>
<td><strong>Benjamin Cravatt</strong></td>
<td></td>
<td>Derivatization of eupalmerin acetate and eupalmerolide for SAR studies of these potent anticancer agent</td>
</tr>
<tr>
<td>Professor, Department of Chemical Physiology, The Scripps Research Institute, La Jolla, California, and <strong>Abimael Rodriguez</strong>, Professor, Department of Chemistry, University of Puerto Rico, Rio Piedras, Puerto Rico</td>
<td></td>
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<tr>
<td><strong>Ratna B. Ray</strong>, Professor, Department of Pathology, St. Louis University School of Medicine, St. Louis, Missouri</td>
<td>“Bitter melon and chemoprevention of prostate cancer” NIH/NCI 1R21CA137424 (Ratna Ray, PI)</td>
<td>Isolation and identification of active compounds from bitter melon extract for prostate cancer.</td>
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<td><strong>Vitaly A. Polunovsky</strong>, Ph.D. Professor, Department of Medicine, University of Minnesota Medical School, Minneapolis, Minnesota</td>
<td>“Translational control of Idiopathic pulmonary fibrosis” NIH/NHLBI R01 HL089249 (Bitterman PI)</td>
<td>Studies of DMDAPatA for prevention and treatment of breast cancer.</td>
</tr>
<tr>
<td><strong>Jing Huang</strong>, Associate Professor, Department of Molecular &amp; Medical Pharmacology, UCLA David Geffen School of Medicine, Los Angeles, California</td>
<td>“Exploiting TOR Signaling for Cancer Drug Discovery” NCI/NIH R01 CA124974 (Jing Huang, PI)</td>
<td>Use of DARTS to identify cellular targets of DMDAPatA in various cell lines • Studies of DMDAPatA as anti-aging agent and</td>
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<td><strong>Phil Baran</strong>, Professor, Department of Chemistry, The Scripps Research Institute, La Jolla, California</td>
<td>“Synthesis of Pyrrole-imidazole Alkaloids” NIH/NIGMS 5R01GM073949-07 (Baran, PI)</td>
<td>Derivatization of haouamine for SAR studies of this anticancer agent</td>
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<td><strong>Sergio Serna-Saldivar</strong>, Professor and Head, Department of Biotechnology and Food Engineering, Instituto Tecnológico y de Estudios Superiores de Monterrey, Monterrey, México</td>
<td></td>
<td>Derivatization and study of the anti-inflammatory mechanism of primisterin, a naturally occurring triterpenoid</td>
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**Collaborators** | **Project Support** | **Project Description**
---|---|---
Armen Zakarian, Professor of Chemistry and Biochemistry, the University of California Santa Barbara | “Total Synthesis of Bioactive Marine Natural Products” NIH 5R01GM077379-04 (Zakarian, PI) | Derivatization and study of the mechanism of action of the novel and potent anti-cancer natural product trichodermamide B.
Jules Puschett, Adjunct Professor of Veterinary Pathobiology, College of Veterinary medicine, TAMU | | Diagnosis and Prevention of Preeclampsia, Traumatic Brain Injury and Traumatic Spinal Cord Injury, studies on MBG, RBG and other bufadienolides
Jeffrey Cirillo, Professor of Microbial and Molecular pathogenesis, TAMU | Isolation and structural elucidation of tuberculosis mycobacteria quorum sensing molecules | Development of methods for the extraction of biogasoline from *solanum pennellii*
Thomas McKnight, Professor of Biology, TAMU | | Synergism of anti-cancer chemotherapeutics
Martin Matzuk, Professor of Developmental Biology, Baylor College of Medicine | | Derivation and study of the mechanism of action of the novel and potent anti-fungal natural product Occidiofungin
James Smith, Assistant Professor of Biology, TAMU | “Examination of the Pharmacological Properties of a Novel Antifungal Named Occidiofungin” CPRIT (Smith, PI) |

**Budget:** TAMU (VPR, College of Science, and the Dept. of Chemistry) has supported the LINCHPIN Laboratory with an investment of $700,000 for the initial three years of operation (Sep. 2010 – Aug. 2013) and providing chemical laboratory space (~1000 sq. ft.). Access to departmental analytical instruments (routine NMR, MS/MS) at the rate charged to departmental faculty is also being provided.

**Future:** We foresee the LINCHPIN Lab developing increasing ties with a number of Cores and Centers in the State of Texas that offer complimentary capabilities. This is a natural progression given that the discovery and exploitation of new cellular targets for disease intervention and bioactive small molecules that perturb these targets requires a multidisciplinary approach that no single laboratory can offer alone. We have already established contacts with faculty and directors at several Centers/Cores, which has already led to several collaborations. The current roster of Cores and Centers that we are partnering with include (see list above for specific projects):

**Texas Screening Alliance for Cancer Therapeutics,** UT Health Science Center, Houston, Texas (Peter Davies, Ph.D., M.D, Director) The LINCHPIN Lab will collaborate with the TSA by performing SAR and mode of action studies on anti-cancer compounds discovered through
high throughput screening of a natural product collection, a subset of its larger compound screening collection.

**Institute of Applied Cancer Science**, MD Anderson Cancer Center, Houston, Texas (Giulio Draetta, Director; Phillip Jones, Ph.D. Head of Drug Discovery) The institute seeks to generate exciting basic science discoveries focused on cancer targets, to forge close collaborations between physicians and experts in pharmaceutical development, and to accelerate the translation of scientific discoveries into new, safe and effective drugs for cancer patients.

**John S. Dunn Gulf Coast Consortium for Chemical Genomics Chemistry Core** UT Health Science Center, Houston (Scott Gilbertson, Ph.D., U. Houston, Director) The Chemistry Core provides SAR and synthesis of simplified biologically active analogs of small molecule synthetic drug leads.

**Texas A&M Institute for Preclinical Studies**, College Station, Texas (Theresa Fossom, Ph.D., Director) The Texas A&M Institute for Preclinical Studies (TIPS) provides core services in the areas of device development, preclinical animal studies, and biomedical imaging. TIPS provides in-life testing using a variety of disease models and is a nearby partner for safety and PK studies for promising natural product drugs.

**Michale E. Keeling Center for Comparative Medicine and Research**, Bastrop, Texas. The Keeling Center, a core research facility of the M.D. Anderson Cancer Center, provides veterinary services, preclinical testing in animals, clinical pathology services, and biologics and antisera production for research.

**Laboratory of Biological Mass Spectroscopy** (LBMS), College Station, Texas (Dr. David H. Russell, Director) In collaboration with the LBMS and Prof. James Sacchettini Group (Texas A&M), we are investigating new strategies for the identification of biochemical targets of natural products using protein digestion and mass spectrometry.

**Laboratory for Molecular Simulation**

[http://lms.chem.tamu.edu/](http://lms.chem.tamu.edu/)
Director: Michael Hall

**Description:** Molecular modeling is a multidisciplinary area of research that transcends the boundaries traditionally separating chemistry, biochemistry, biology, engineering, and physics. It is a branch of science that uses mathematical methods to calculate the properties of atoms, molecules, solids, and liquids. With the advent of modern computer technology and advanced algorithms, molecular modeling has moved from the realm of a few experts working on supercomputers to every scientist using workstations and PCs. To facilitate this process and prepare the future generations of molecular scientists, material scientists, and life scientists, Texas A&M University operates the Laboratory for Molecular Simulation to better integrate molecular modeling and visualization into research and teaching curriculum of the faculty. The role of the laboratory is to bring molecular modeling closer to the experimental scientist by offering advanced training and assistance to those who already use these tools in their research and
elementary training to those who have not yet used them. To facilitate the training and research activities of the LMS, advanced modeling software is installed on the following, LMS machines: SUN FIRE X4500 server, 20 Sun Ultra20 workstations, 3 SGI O2 workstations, 1 SGI Octane, and 4 Power Mac dual-G5’s, chemistry departmental machines: 3 64-core Altix 450’s, SGI Origin 300 server, and a 128-core Altix 3700, TAMU Supercomputing Facility machines: 832-core IBM p5-575 Cluster, and 3168-core IBM iDataplex Cluster, Academy for Advanced Telecommunications and Learning Technologies machine: 1376-core Xeon/AMD cluster, Chemical Engineering departmental machine: 224-core Mac Cluster, along with a wide variety of Windows workstations in research groups across campus. The molecular modeling software supported and maintained by the LMS is also exported to 131 Linux/UNIX machines in 11 different departments across campus. The LMS also provides system administration support for Linux/UNIX users.

We continuously try to satisfy the growing and complex needs of the many research groups by maintaining the current hardware and software as well as adding new resources. Our research activities cover a broad range of topics. Collaborative research with faculty results in conference presentations, portions of Ph.D. dissertations, lecture invitations, press releases, and publications in peer reviewed journals. This year we have made important direct contributions to major research proposals submitted both to the university and national granting agencies. Along with direct contributions, faculty regularly incorporates the facilities offered through the LMS in their research proposals. Our research activities also cover a wide range in the level of theories used in our calculations. We apply force-fields in conformer searches of large molecules, simple molecular mechanics and dynamics calculations, and in large scale solution and solid phase property calculations. Certain educational and organic chemistry related research projects require semi-empirical methods when orbital analysis or reaction mechanisms are desired. To accurately describe small molecules (less than 200 atoms) and derive potential energy surfaces, we routinely use the highest-level density functional theory methods with state- of-the-art basis sets and \textit{ab initio} wave-function methods.

The LMS provides the resources and support necessary for faculty members to incorporate molecular modeling in their courses. Five undergraduate courses: Fundamentals of Chemistry Laboratory I (CHEM111H), Fundamentals of Chemical Principles (CHEM113), Physical Chemistry Laboratory (CHEM 334), Organic Synthesis and Analysis Laboratory (CHEM 234), and Chemical Engineering and Materials (CHEN 313), included quantum chemical calculations in their course work this year. Students perform one or two “experiments” on the computer,
learning basic building, visualization, and computational skills. The students also get an introduction to the Linux operating system. This year, at least three graduate level courses: Structural Inorganic Chemistry (CHEM 641), Molecular Modeling (CHEM 658), and Computational Materials Science and Engineering (CHEN 670) utilized the software, and/or computers and support provided by the LMS to visualize and perform calculations on a variety of chemical systems.

The LMS offers a series of workshops and short courses oriented toward the Linux operating system, molecular mechanics/dynamics, and quantum chemistry. The Linux workshop was offered three times during the calendar year (CY) 2011 with 168 participating students, faculty, and staff from 26 different departments shown in the chart below. The 2 1/2 hour lecture is followed by a 3-hour hands-on exercise session using the LMS computer lab.

The molecular modeling workshop consists of a 3-hour introductory lecture and continues with a 3-hour hands-on exercise session. During the exercise session, students learn how to perform simple visualization, building, density functional, and minimization/dynamics operations within the AMBER, CHARMM, Discovery Studio, Gaussian, NAMD/VMD, LAMMPS, Materials Studio, or SPOCK programs. This course was offered twice last year with 44 students and faculty participating from 14 different departments.
The highest-level workshop that the LMS currently offers is the Quantum Mechanics (QM) Short Course. The QM course is designed to teach the student how to use the quantum chemistry code Gaussian 09 to model small to medium sized molecules (up to approx. 200 atoms) and the theory behind the calculations. As stated last year, the QM short course was changed to 3 days with 6 1-hour lectures and 6 2-hour lab exercises to better fit the schedule of post-graduate researchers. Response to the change in format was favorable. The LMS also offered a university credit course (CHEM 658 Introduction to Molecular Modeling/2 credit hour) during the Fall session. CHEM 658 consists of 15 1-hr lectures and 15 3-hour lab sessions. CHEM 658 and the QM Short Course had a total of 39 participants from 9 different departments.

To attract prospective faculty and graduate students in the departments of Chemistry, Chemical Engineering, Mechanical Engineering, etc. the LMS regularly participates in lab tours and other recruiting efforts. The LMS collaborates with faculty in the departments of Chemistry, Biochemistry & Biophysics, Soil & Crop Sciences, Mechanical Engineering, Medical Biochemistry and Genetics, Physics and Chemical Engineering, and operates as a consultant to faculty who wish to incorporate molecular modeling in research proposals.
The LMS also participates in community services to give school children the opportunity to learn about and “play with” the molecular modeling tools that scientists use in cutting edge research. This year the LMS participated in the National Chemistry Week – Chemistry Open House, and Expanding Your Horizons – A sixth grade girls’ conference. The LMS also heads the Protein Modeling Event for the Texas Science Olympiad State Competition.

**Funding:**
$61,377 VPR  
$41,000 Department of Chemistry  
$43,692 College of Science  
$5,123 Faculty (Contributions toward software purchases) Total: $151,192

**Expense:**
$103,096 Personnel Salary (Manager & Support Staff)  
  $17,600 Accelrys Software Maintenance  
  $29,844 Software and Hardware Purchase  
Total: $150,540

While there is no charge for researchers at TAMU to utilize the resources at the LMS, we regularly ask for and receive contributions from faculty to purchase new or update current software. In past years, the LMS has received between $15,000 and $30,000 in support from faculty for software purchases. In CY 2009, there was a significant drop in contributions from previous years due to university wide budget cuts and uncertainty in future funding. Since CY 2009, contributions have ranged between $5,000 and $10,000. The LMS continues to incorporate support and training for free-to-academics molecular modeling software to compensate for the decrease in faculty funding. Although there are a wide variety of free programs available, there is still a strong need for user-friendly commercial software that the LMS should continue to provide. This year, the LMS was able to negotiate a lower price for the Accelrys software maintenance.

**User Committee:**
**Chemistry:** Barondeau, Batteas, Bergbreiter, Bevan, Burgess, Clearfield, Cremer, M. Darenbourg, D. Darenbourg, Dunbar, Fackler, Gabbaï, Gladysz, M.B. Hall, Hughbanks, Laane, Lindahl, Liu, Lucchese, MacFarlane, North, Ozerov, Raushel, Romo, Russell, Schweikert, Singleton, Son, Soriaga, Vigh, Wheeler, Watanabe, Yennello, Yeager, and Zhou.
**Aerospace Engineering:** Lagoudas.
**Animal Sciences:** Gill and Riggs.
**Biology:** Aramayo, Gomer, Hu, Pepper and McKnight.
**Biochemistry & Biophysics:** Fitzpatrick, P. Li, Pace, Pettigrew, Reinhart, Sachettini, Scholtz, Wild, and Young.
**Chemical Engineering:** Balbuena, Cagin, K. Hall, Mannan, Rodgers, Seminario, and Shantz.
**Computer Science:** Amato and Ioerger.
**Oceanography:** Campbell.
**Physics:** Allen, McIntyre, Ross, and Scully.
**Atmospheric Sciences:** Zhang.
Civil Engineering: Autenrieth and Grasley.
Nuclear Engineering: Shao.
Soil and Crop Sciences: Deng and Hons.

Future Goals: Better support for life science researchers through newly designed workshops, continued expansion for the support of free to academics software, and obtaining outside funding sources (NSF-CRIF, etc).

Concern: While the LMS works very hard to fulfill the molecular modeling needs of researchers at Texas A&M University, a lack of staff and inadequate computer lab space continues to make it difficult to keep pace with the increase in demand and the growing number of programs available.

Laboratory for Synthetic-Biologic Interactions (LSBI)

Director: Karen L. Wooley

Description: The LSBI was established in 2009, and aggressive activities in 2011 have been directed toward expansion of the LSBI as a multi-user facility for the purpose of enhancing the research capabilities and instrumentation infrastructure of the Department of Chemistry, the College of Science, and the entire university. The facility focuses on providing multi-disciplinary tools and expertise for investigation of the interaction of synthetic materials with biological systems, bio-inspired materials, bio-active materials and events at the bio-nano interface. A particularly strong area of both knowledge and interest for the LSBI is the interaction of synthetic polymeric systems and biological agents, which provides a focal point for research at the forefront of nanomedicine and nanofunctional surfaces. Infrastructure is being established to allow the LSBI to serve research groups that may otherwise lack the in-house expertise/instrumentation to readily perform experimentation in these fields.

Activities: With the emphasis on establishing a Laboratory having capabilities to perform rigorous, multi-disciplinary studies of synthetic-biologic interactions, significant resources were dedicated to acquire instrumentation and to hire two personnel having expertise in physical chemistry and biological systems, to serve as co-Assistant Directors of the LSBI. Two offices and two laboratories on the ground floor of the ’72 wing of the chemistry complex have been assigned for occupation by the LSBI. Using start-up funds provided with Wooley’s relocation to TAMU and including items brought from Washington University, the following instrumentation and equipment capabilities were purchased or requisitioned, constituting more than $1.5M in additional research infrastructure for the College:

Atomic force microscopy; Laser scanning confocal microscopy; fluorescence lifetime confocal microscopy; fluorescence lifetime spectrometry; microscopic and solution phase anisotropy lifetime spectroscopy; 2D steady state spectrophotometry; steady state 2D anisotropy spectrophotometry; 10 portable digital microscopes with polarization and fluorescence capabilities; portable Raman spectroscopy; micro-Raman spectroscopy; temperature controlled
kinetic viscometry; dry and submersion dynamic mechanical analysis; dry and submersion linear mechanical analysis; microplate based fluorescence, absorbance, luminescence and anisotropy spectroscopy; vertical and horizontal gel electrophoresis systems and ChemiDoc XRS lab imager, ultrasonic homogenizer, and Bio-plex 200 system with HTF and Pro II Wash station for multi-plex-based assay of proteins, cytokines and antibodies.

In addition, two biosafety-level-2 laboratories have been established with full capabilities of materials and equipment, such as refrigerators, freezers, incubating shakers, centrifuges, microscopes, liquid nitrogen cell-storage tank, biological safety cabinets, CO₂-incubators with ultraviolet- and hydrogen peroxide-decontamination capabilities, and all other necessary infrastructure and materials required to run a biological laboratory. One of the two bio-laboratories has been already approved by the Institutional Biosafety Committee {IBC} of Texas A&M University for the storage, manipulation and research of several pathogenic cell lines. The approval of the second bio-laboratory is in progress (delayed by a relocation of the laboratory in April 2012). Furthermore, several assays have been developed by the personnel of the LSBI for materials characterization, spectroscopic, microscopic and biological analyses.

**Future**

**Short Term Goals:**
Opening the facility to a subset of faculty as a beta-test of facility infrastructure (03); formally opening the facility to all faculty researchers on campus (04); finishing installation of laboratory space and instrumentation; training extensively on instrumentation to provide the best possible customer service to users and collaborators by supplying training and expertise; pursuing grant funding for additional instrumentation and staff; promotion of the LSBI through lectures, website development and outreach; development of new research capabilities and collaborations with a focus on increased bioassay development for drug delivery platforms, physical testing of nanocomplex polymeric systems and the kinetics of nanoparticle assembly; continuation of current research by personnel.

We are working with the Department of Chemistry IT personnel to establish the IT infrastructure to facilitate instrument/equipment reservation, access, usage, and re-charge.

**Long Term Goal**
Continuation of all 2012 activities, with a focus on collaboration, service and grant writing; development of a LSBI internship or scholarship for high school, undergraduate or graduate students; development of an annual symposium hosted by the LSBI, preferably with sponsorship from a corporate collaborator; generation of a LSBI award for research excellence. In addition, establishment of a small animal facility would be of interest to study the interactions between the synthetic nanomaterials and the biological systems in vivo and will provide an essential service that is not available nearby the Department of Chemistry.
External Review of the Department of Chemistry

Texas A&M University
April 24–27, 2005

In 1994 (the last review), Chemistry was recognized as the most distinguished science department at TAMU, but concerns loomed. By many measures, Chemistry remains A&M’s most distinguished science department. When asked, a group of science and other chairs stated that maintaining the prestige of Chemistry was essential to the reputation of TAMU and their own departments. However, some issues that were problematic ten years ago remain, and others have approached crisis proportion.

The department has many strengths. The faculty rank has members of great international reputation and prominence but many are 70+ years of age. Over the last ten years, a cohort of mid-career faculty has emerged internally, and they are ready to assume greater leadership roles. The excellent self-study provides an example of how such faculty can engage in departmental leadership. The faculty maintains strong research support and attracts enthusiastic and committed graduate students, who forge good careers post TAMU both within and beyond Texas. The head of the department has managed a large and demanding job with dedication and success for almost a decade. The faculty reinvestment plan offers a remarkable opportunity to build at the cutting edge of chemistry, creating new learning opportunities for undergraduate and graduate students. In doing so, the key metrics must stress faculty quality over quantity.

Despite these strengths and opportunities, there is a concern that the hard won gains for TAMU Chemistry might be fragile. Given the central role of a department head at TAMU, it is of highest priority to replace Professor Schweikert as he steps down as chair.

A clear vision is necessary to target specific areas for strategic investment. We recommend that the department work diligently in the next few months to develop this vision. We further recommend that a committee be charged to present a strategy to implement a long range reinvestment plan by October 2005.

To work towards this vision, we recommend that TAMU begin an immediate search for a new department head. An internal appointment may be necessary to ensure the necessary time for a subsequent full search for a highly qualified external candidate to take over from the internal appointee. Some excellent internal candidates exist. It is crucial that momentum associated with the reinvestment opportunity not be lost, as other TAMU departments are already farther along in this process.

The most prestigious faculty, given their demographics, cannot be expected to provide continued leadership throughout the next decade. We recommend that the University begin a department-wide process to identify the next generation of leaders, both internally and externally. At least 3 senior hires should be pursued to add leadership from outside, with ca. $7M committed for this purpose.

The young faculty who have risen internally are attractive to other universities. TAMU should provide proactive attention, including the opportunity for their greater role in defining departmental vision and implementation.

Many faculty perceive the current departmental structure as opaque and reactive rather than proactive. A governance structure that is more participatory and transparent will be needed.
We recommend that a departmental committee be empowered with the authority to assist the head in an executive role in department governance. This will greatly facilitate both the transparency of departmental decisions and help the head to focus on broad issues of strategic vision and resource acquisition and allocation.

Since many frontier areas are intrinsically interdisciplinary, a strategy to define shared opportunities with multi-disciplinary centers and with other departments is crucial. There is concern that the relatively rigid divisional structure may impede this process. The last review recommended blurring divisional distinctions. We reiterate this recommendation. A model can be seen in the emergence of biological chemistry, whose members generally participate in other divisions. Ties between Chemistry and other departments remain underdeveloped, with lost opportunities for leverage of intellectual and financial resources. Many of the frontier areas of chemistry transcend traditional sub-disciplines. For TAMU to maintain a leadership position it will need to develop strength in some of these areas.

We recommend that the VPR and Dean work with the department to provide resources that encourage through space, start-up, and differential hiring priorities that some fraction of the ten new positions be co-invested in interdisciplinary centers, where appropriate, and/or in joint appointments with other departments. Given the current status of the cyclotron the chemistry faculty should address the opportunities and opportunity costs for chemistry within the TAMU cyclotron institute. The committee was divided on this point.

I. Diversity remains an issue within the faculty and the graduate cohort

We recommend that the department institute a self-study to identify why female graduate students differentially leave the program relative to peer programs elsewhere.

This study should recommend approaches to ameliorate this trend. It is important that the department take advantage of its location and environment to create climates that attract underrepresented groups. The possibility that the Master’s program in Chemical Education is providing an “acceptable” alternative to completing the Ph.D. should be examined.

With the large number of new hires anticipated in the coming years the department should make a concerted effort to hire women and minority faculty. Increasing the number of applicants from these groups will require aggressive recruiting in the early stages of the search process. TAMU is in an advantageous position with the large number of positions to attract couples that are seeking two faculty positions at the same institution. It is important that the administration work with the department to facilitate such dual hires.

Many other academic institutions have a policy that allows for a year delay of the tenure or promotion clock for the birth of a child or other family health related obligations. This policy is generally extended for both male and female faculty members. TAMU has such a policy but it appeared not to be well-known among Chemistry faculty. It should be emphasized to all junior faculty that there will be no penalty whatever in exercising this policy. Such a policy can be an asset in recruiting new faculty.

II. Recruiting

The university-wide Reinvestment Program is an opportunity for the department to enhance its faculty, initiate new strategic areas of research and position itself for the retirement of senior faculty. Over the next four or five years the department has license to hire at least 10 new faculty, in addition to replacements, with the potential to dramatically change the makeup, quality and standing of the department. To take full advantage of this opportunity will require planning
and concerted action. Our committee urges that the department undertake an in-depth analysis of areas, both in the core and at the boundaries of chemical research, where growth would have the most positive impact. This will require development of a 10-20 year vision of the future of the Department and identification of emerging areas of chemistry. A mechanism for creating this vision should be developed that involves all members of the department and that crosses the boundaries of the departmental divisions.

No department can be uniformly outstanding in all sub-fields. It is generally more effective to create a few world-class programs than to attempt to cover all areas of chemistry. This is particularly true for attracting the best graduate students and obtaining block funding. We recommend that the department consider identifying one or two thrust areas for a “cluster” hire; the recruiting of 3 to 5 faculty with similar or overlapping research interests, perhaps nucleated by a distinguished senior hire. It might prove particularly advantageous to establish a new thrust in an area that falls at the boundaries of the traditional departmental divisions and/or at the interface of chemistry with materials science, molecular biology or environmental science.

Our committee finds it disappointing that a comprehensive, department-wide vision and hiring plan has not been completed as yet. Rather, it appears that hiring slots have been simply apportioned to each division. Moreover, recruiting, appraising and interviewing have been carried out by subsets of the chemistry faculty, with little or no input from and knowledge of the rest of the department. The hiring of new faculty is so crucial for the future of the department that the entire chemistry faculty should be involved in all decisions, particularly so for the recruitment of senior faculty.

The Texas A&M Biology and Physics Departments have moved forward quickly and decisively in response to the Reinvestment Program. The Chemistry Department has been slower to respond, in part in order to maintain its high standards of quality and in part due to limitations in space. As a result, however, it may find it increasingly difficult to obtain the needed startup and renovation costs from the administration. It is critical that the Chemistry Department carry out its vision and planning study promptly so that it can move forward with a responsible, department-wide recruiting program that results in the hiring of new faculty of the highest quality in emerging areas chemistry.

III. Graduate Program

Review of the statistics provided and interviews with graduate students and faculty portray increasing difficulty in attracting domestic students – a situation encountered nationally – and an increased reliance on international students. The Committee thought that the GRE averages of admitted students could be higher, and several faculty reported that recently their students were too weak to complete the Ph.D. program. Efforts to attract domestic students are substantial, especially in Texas, but those to attract English-speaking international students could be improved (travel to selected countries and video-recording interviews, for example). Extensive efforts to attract Hispanic students are fruitful, and there is opportunity for the department to be a center for their recruitment, but the department has not planned special programs or external fellowships for them.

Women are underrepresented in the program, and they do not complete the program with the same rate of success as their male counterparts.
Time required to obtain a degree is at the national average for similar institutions, and students seemed to be generally satisfied in their programs. However, the only apparent mechanism for student-faculty interaction was that with the research director. **We recommend broadening interaction with graduate students to include one or more thesis committee members.** There are various mentoring models available from other institutions; the department should review several and select one that meets their situation.

The intensity of faculty concerns about tuition costs were not shared by the members of the Review Committee. The department needs to obtain comparative data from peer institutions if they are to make a case to the administration concerning this issue. The charges to the department for teaching assistant tuition remission, however, represent a significant drain on departmental resources. In addition, the Committee felt that the stipend offers made to students were too low, despite the relatively low cost-of-living in the College Station area. **We recommend that the College and Department commit continuing resources for attracting the best students.**

The issue of health insurance costs is one the Committee believed to be serious as an impediment to attracting students. The high costs for married students are in need of immediate resolution. **We recommend that the disparity in health care insurance costs be resolved.**

There is a differential in the compensation for first-year graduate students who have not yet passed the language exam. These students must pay their own tuition whereas other incoming graduate students do not pay their tuition out of their own pockets. **We recommend that the department address the disparity in tuition charges for international students.**

The expectations of the faculty to increase the number of graduate students towards 300 appeared to the committee to be unrealistic in the short term. The department needs, first of all, to increase the quality of admitted students and to maintain minimum standards without increasing further the percentage of international students.

**IV. Undergraduate Programs**

The Lichter Report provided a detailed analysis of the first-year program, and a response to the report is being prepared. The Committee read the report and spoke to affected units of the department on the specific and related issues, but the focus of our visit was directed to graduate programs and extensive commentary on the education issues raised in the Lichter Report was inappropriate. However, there was general agreement that the current Master’s degree program in Chemical Education was not working as planned, and other alternatives should be considered.

The department’s undergraduate curriculum is traditional, and there does not appear to be a great deal of faculty involvement in curricular change. Faculty teach majors courses, and do so with expertise and thoroughness, but non-tenure-track faculty teach non-majors courses that serve the vast majority of students in the program. The undergraduate laboratories that we visited were not impressive in comparison with those at peer institutions. However, the students with whom we met have a very good impression of and appreciation for their education.

There is a disparity among faculty in teaching assignments, and these inequities present problems in perception of the importance of undergraduate education and in the reality of faculty assignments to teach in the undergraduate program.
V. Space

Reassessment, reallocation and renovation of laboratory and teaching space are needed to maintain and advance the stature of the department in the future. Current space, which was described as depressing, unsafe and outdated, does not meet current standards of flagship programs in the country. The inferior quality of space was identified to the committee by members from all levels of the department, ranging from Distinguished Professors to undergraduate students. Three areas where space issues are having an especially debilitating impact to the department are:

Faculty hiring. Professors, at all levels, identified the space issue as one of the major obstacles to successfully hiring prospective junior, senior and chaired faculty. Space is not contiguous and modern. In most instances, space is not identified prior to faculty recruiting efforts; in some recent recruiting trips, candidates were shown space peripheral to the Chemistry complex and the prospective candidate was left with a confused viewpoint of their space situation.

Graduate recruiting. The sense of faculty is that outdated and drab space is having a negative impact on their ability to recruit the best students to the graduate program. This impression was confirmed to the committee during its meeting with the undergraduate students. Many of the undergraduate students that were selected to meet with the committee planned on continuing their education in graduate school. Accordingly, they had visited many graduate programs at other institutions. The quality of laboratory space was unanimously cited as the major distinguishing trait between the graduate programs that they visited and TAMU. And in all cases, the space in the Department of Chemistry at TAMU came out on the short end.

Retention. With a flourishing faculty developing from junior hires, low-quality space in the department exposes an Achilles heel that could be exploited by competitive academic departments in their attempts to attract this cohort of faculty from TAMU.

It is obvious to the committee that recruiting, at graduate and faculty levels, will be successful in the future only if space needs are addressed. Several measures should be undertaken, both at the department and university level, to rectify space problems:

A departmental long-range space plan needs to be developed. In its absence, current space has become in some cases fragmented and underutilized. Data detailing current utilization of space has been assembled for the self-study report, which provides a starting point for developing a long-range space. Reallocation of space may be warranted on the basis of research program size and volume. Equity in space allocation across the department has the potential to open space for future faculty hires. The exercise may also identify schemes in which fragmented space might be consolidated, thus allowing the department to show contiguous space to prospective faculty candidates.

Existing and/or planned space within the university could be assigned to Chemistry in response to immediate space needs in the department. For instance, space in the Reed-McDonald building assigned to Chemistry provides an opportunity for the department to move non-research space out of the main departmental complex. The vacated space resulting from this move could be renovated to high quality research space, which could be used to lure junior and senior hires.

Even with consolidation and reallocation of space among current members of the Chemistry Department, there is simply not enough space for the department to capitalize on the tremendous opportunity afforded by the university’s faculty reinvestment program. This could be
detrimental to TAMU’s desire to maintain their competitive edge in state and national academic arenas since the department of chemistry is recognized as one of TAMU’s flagship programs. **We recommend that the University consider additional space needs in the near future so that a University flagship program can capitalize on the faculty reinvestment program.** Possible scenarios include assignment of space in the planned Life Sciences building, a wing to the existing chemistry building and other space scenarios developed in a meaningful dialogue between Chemistry and the administration. The advantage of new space, such as an adjoining wing, is that it may be less costly for a ground-up design of new space, especially if the space is for synthesis-intensive research programs. This space would not only be a step in the right direction of modernization but provide an avenue for swing space so that the main Chemistry complex could be renovated in the most cost-effective manner.

The issues of the foregoing paragraph are sufficiently technical that we recommend that the University retain an architectural/engineering firm experienced in laboratory building and renovation. The architect could guide the most cost-effective and least disruptive plan to make the space at TAMU to be competitive, functional and safe.

A genuine response to the space needs will require a significant commitment of the part of the upper administration. The committee’s experience and voluminous data establishes that for state-of-the-art renovated space costs are in the neighborhood of $500 per square foot. Renovation at this level is essential to attracting the best faculty to TAMU.

**VI. Resources and Infrastructure**

Infrastructure needed for experimental analytical and physical chemistry has fallen behind in the Chemistry Department at Texas A&M. This has a negative impact on existing programs in analytical and physical chemistry and must make the department uncompetitive to potential new hires doing cutting edge work in these fields. Given the historical “go getter” attitude of the department, the inability to gather the rather modest resources needed to maintain first-rate infrastructure (not referring to buildings and space) is unacceptable.

The department operates one precision machine shop staffed by one person with the part-time assistance of a retired machinist. The shop has a collection of lathes and drill presses none of which are CNC types. The most recent was acquired approximately 20 years ago. Students do not have a student machine shop (as is available at most research universities) and have only very limited access to the precision shop. There is a four-person shop in Physics and a highly utilized machine shop in the Cyclotron Facility. Some faculty members have work done in the shops at Rice, paying outside-user fees.

The electronics instrumentation facility is staffed by one person with part-time student assistance. It is modestly provided with test equipment, can provide interfacing assistance for new experiments but is in effect an undergraduate support facility. Particular faculty members have (partially) resolved the limitations this situation imposes by hiring skilled electronics personnel into their groups, however, the scale on which this can be done and the inefficiencies involved make this an unsatisfactory solution. Some of the groups involved are working around these limitations using graduate students and post-doctorals with less or more success.

Specialized instrumentation available to the members of the department is satisfactory for solid state chemistry where the x-ray instrumentation is of high quality and assists in connecting Chemistry to other academic units on campus. The Molecular Simulations laboratory is also strong, although in need of more staff. For a department with the size and reputation of A&M’s,
some of the other instrumentation and infrastructure is less satisfactory. The nmr resources are somewhat limited, especially in the high field area. It does seem that the Chemistry Department is among the campus leaders in this and related areas, providing services to outside users and technical expertise in some cases to facilities in other departments. However, in too many cases the weakness of the instrumentation infrastructure appears to limit opportunities for exercising leadership on campus in interdisciplinary research. Attention needs to be paid to this to avoid having this leadership pass to facilities that are developing elsewhere on campus. Plans for an 800 MHz nmr and the emergence of proteomics mass spectrometry facilities elsewhere on campus might be examples of this development.

The Laboratory for Biological Mass Spectrometry is clearly the best specialized instrumentation facility in the department. With a staff of 3 Ph. D. scientists, it provides a highly visible service in mass spectrometry for users around campus. The instruments used for this purpose include several modern time of flight instruments. Two (older) triple quadrupole instruments are being installed currently to provide GC/MS/MS and LC/MS/MS capabilities. The instrumentation is impressive and the operation appears to be efficient and well run. It sets an appropriate standard for other multiuser instrumentation facilities in the department and on campus.

The size of the scientific technical staff associated with mass spectrometry, nmr, advanced computations and other department-wide facilities is small, relative to the size of the Department. The individuals on the technical staff work under rather poorly defined conditions with respect to issues like career paths, reporting structure, faculty liaison, grievances and promotion. The individuals with whom the Committee had discussions expressed general satisfaction with their jobs, although there was some concern about the issues just listed.

Departmental services in some areas seem remarkably well provided while in others the opposite is true. Assistant Professors without federal funding appear to have no clerical support whatsoever and several have expressed distress at spending time putting up fliers for visitors and make arrangements for trips and other minor matters.

In a department as strongly divisionalized as that at A&M, the generally mediocre standard of the instrumentation facilities and the almost complete absence of support capabilities for research in analytical instrumentation has a negative effect on the performance of the analytical division. Several characteristics of A&M (size, strong engineering program, historical large-concept thinking, a willingness to go in new directions) might lead one to expect a nationally competitive analytical program, with large numbers of graduate students, faculty leadership in their research fields, and creativity in defining the field itself. This is not the case to the extent one might expect. The Committee did not perceive a strong sense of analytical identification, in spite of the strongly divisional nature of the department. The combination of factors just delineated has made A&M less competitive in this subdiscipline than it was one and two decades ago.

VII. Summary

In summary, despite challenges, Chemistry remains the flagship science department at TAMU. We commend the department for a thoughtful self-study, and TAMU for a bold reinvestment plan. Creating a fully successful reinvestment in Chemistry will require an insightful vision for the future and a concurrent commitment to space, infrastructure, and startup. If these challenges can be met, TAMU Chemistry can honor the past by building for the future. We believe that a successful transition to an even higher level of success is possible, if the key
recommendations are attended to now.
We will follow your progress with great interest.
Yours sincerely,

R. Graham Cooks
Purdue University
Daniel G. Nocera
MIT

Michael P. Doyle
University of Maryland
Geraldine L. Richmond
University of Oregon

George McLendon, Chair
Duke University
John C. Tully
Yale University
Appendix
Faculty, staff and student concerns and comments have been incorporated into the body of the report but there were others which are listed here:

- Faculty expressed concern at being unable to teach special topics graduate courses because of divisional affiliations and/or uneven teaching loads
- Lack of systematic planning; this impacts everything …infra-structure, space management, hiring
- Poor shop facilities and effects on individual faculty research programs
- Under-estimation by administration of start-up, renovation and accompanying infrastructure costs
- Reactive mode often used in retention and this leads to inequities and hence morale problems.
- Lack of transparency in governance and decision-making was noted by several groups of faculty
- Faculty expressed lack of formal mentoring program for junior faculty
- Faculty noted that when faculty candidates not easily allocated to particular divisions, the creation of the inter-divisional committee (catch-all committee) is a good activity that is successful and should be continued.
- Faculty noted that the divisional structure works well but coordination and lines of communication between divisions should be improved
- Faculty expressed strong effort on faculty recruiting and enthusiasm for this and strong recognition of its continued importance shown by the faculty
- Lecturers, especially in the higher-level courses, have limited professional satisfaction.
- Undergraduate students noted the high drop out rate of majors, the difficulty of the program and, in spite of this, their general satisfaction with instruction and the value of their degrees
- Staff display a high degree of loyalty to TAMU and expressed satisfaction with their jobs
- Graduate students are required to begin their studies in August but receive their first pay checks in October, this is a problem that the department must solve
- Graduate and undergraduate students noted that the quality of laboratory facilities compared unfavorably to those in other universities
- Graduate student loyalty and enthusiasm for the institution was highly evident
- The heads of other departments revealed that their activities re the Reinvestment Plan have moved ahead quickly, with many hires in Physics and Biology and at least some of these being cluster hires in new areas
- There was a common expression across all the groups heard from of a lack of a shared agreed vision for the future of the department
Response to the Report of the External Review Committee
Self-Study Committee Department of Chemistry (July 2005)

Introduction

"I have been spared to live beyond the allotted span of three score years and ten, and, in that lifetime [...] have accumulated property of substantial value [...] My desire, now, is to make that disposition of it by will which will result in its being used in the way most beneficial to Mankind. I have long been impressed with the great possibilities for the betterment of Mankind that lay in the field of research in the domain of Chemistry. Day by day we see marvels wrought in that field."

Robert A. Welch

Chemistry is ubiquitous. Chemistry is reality. If we are to ultimately understand everything around us—air and water and earth and buildings and cars and desks and paper and ink and trees—that understanding will derive from chemistry. Sight and taste and smell and touch, themselves, are chemistry, as is the motion in a muscle and the emotion in a mind. Life is chemistry. But chemistry does not merely seek to uncover nature's secrets. Whether it is generating new materials and pharmaceuticals, or inventing new reactions, or simply synthesizing molecules that test scientific ideas, chemistry builds things. It is a science of both understanding and invention.

Nanoscale materials, smart polymers, molecular diagnostics, gene sequencing, lamellar waste filters, medicinal natural products, sensor arrays, biocatalysis, molecular machines, atmospheric photoreactions, nerve agent detoxification, archaeological analysis, biosynthetic engineering, spintronics, drug delivery— the frontiers of each of these areas and many more are under study in the Department of Chemistry at Texas A&M University. As the central science, chemistry is both an outlet for advances in mathematics and physics and the foundation for biology and medicine and engineering. The opportunities in chemistry are endless, as are its frontiers of fundamental knowledge. A hundred years from now, chemistry will be new, chemistry will be thriving, chemistry will be important to its sister sciences.

Fueled in the 1970's by a unique confluence of inspired leadership, institutional will, luck, and the constant aid of the Welch Foundation, Chemistry at Texas A&M rose from nowhere to national prominence. Any realistic review of our department should start with the recognition of excellence. As one measure of this, Table 1 lists a count of the J. Am. Chem. Soc. papers published so far in 2005 by U.S. universities. The concept is that such a list reflects on-the-ground impact chemistry, being published today, unaffected by bias or preconceptions or historical school strength. Texas A&M ranks 8th on this list, only a short way from the top and far surpassing some schools with haughty reputations. No one is going to argue that the Chemistry Department at A&M is superior to that of Harvard or Stanford, but, the point is that Texas A&M has one of the elite chemistry programs in the world.

We are also a program at great risk. Every year is a struggle, a struggle to keep our top faculty, a struggle to hire the best new faculty, a struggle against every other university to attract the best graduate students, a struggle to obtain and maintain our research and educational Infrastructure, a struggle to maintain excellence in our undergraduate and graduate programs.
Departments can rise or fall. A comparison of Table 1 with analogous data from 1975 would show, as examples, the unsettling drop of Ohio State, Princeton, Indiana, Brandeis, Wayne State, and Case Western Reserve.

We are taking losses. Some are inevitable—we have a cadre of outstanding but aging faculty that will be lost in coming years. They are irreplaceable, but we must do what we can to soften the blow. However, we have suffered continually from losing top young faculty to other institutions—Chi-Huey Wong, Marty Newcomb, Chuck Martin, Jeff Kelly, Jim Haw, Gary Sulikowski, and soon Dick Crooks. If we had managed to keep them, or if we had successfully hired half of the senior faculty we have sought, the Chemistry Department would be vying for top-five status by anyone's standards. On the other hand, in the coming years we may continue to lose rising stars and to fare poorly in attracting senior faculty from elsewhere. If so, the lost excellence will be almost impossible to recover, and the detrimental impact on Texas A&M will be broad.

We have had successes too. Most notable has been the hiring and development of a strong cadre of nationally recognized mid-career and younger faculty. The external review committee explicitly noted this and was very impressed.

If the Department of Chemistry at Texas A&M is to maintain and build on its current excellence, a series of steps must be taken. Some of these steps, ranging from addressing discrete problems to organizing our governance to best develop and pursue a vision, can be accomplished by direct action within the department. Our recommendations for steps of this type will be described in the last section of this response. For other critical steps, however, the Department of Chemistry needs help from higher levels of the university. Such necessary actions by the university will be described in the next section.

The external review did not discuss our undergraduate service courses, and made only minor comments on our undergraduate majors program. Both of these areas are critical missions for the Department of Chemistry, and any departmental changes must promote excellence in these areas. However, the response to the recent Lichter Report dealing with the service courses is being handled by other mechanisms, and the focus here is on the major issues raised by the external review.

Table 1. J. Am. Chem. Soc. papers for U.S. universities, January 1 to June 8, 2005

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Priorities for the University

Space. The chemistry complex is composed of wings built in 1928, 1932, 1959, 1972, and 1986. A few of these areas have seen renovation at times, but most have significant need for upgrades and repairs. On a more basic level, the complex is simply not designed well for chemical research and safety. In its longest section, the report of the External Review Committee emphasized that the "inferior quality of space" in the chemistry department "does not meet current standards of flagship programs in the country" and had "an especially debilitating impact to the department" in faculty hiring, graduate recruiting, and faculty retention. We would certainly concur. Almost all chemical research and a large component of chemistry teaching occur in laboratories, and space is the most important component of infrastructure for chemistry. The quality of space directly affects both the ability to carry out quality research and safety, so chemists pay careful attention to space. This is true even at the level of students picking a university and a research advisor, so that the quality of space has a tremendous indirect effect on the ability of faculty to carry out research.

In the past dozen years, the Department of Chemistry has continually undertaken searches for senior faculty including extensive efforts to fill vacant endowed Chair positions. Only one senior faculty member has been hired in that time, and the paramount problem has been space. For example, in our effort to hire Huw Davies for the Davidson Chair, the lack of quality space for synthetic chemistry was essentially the deal breaker. At a different level, the space problem has a severely repressing effect at the beginning of any faculty search process – recognizing that we cannot show adequate space to prospective senior faculty in many desirable research areas, or that any space we could give them is far inferior to their current laboratories, we simply give up on attracting them to Texas A&M. Because of this, it is currently impossible for the Department of Chemistry to adequately take full advantage Texas A&M's ambitious faculty reinvestment plan.

The impact of space on graduate student recruiting could be illustrated with many examples. Here is one. In the spring, we heavily recruited an outstanding African-American student from East Carolina University. He had been taught by an A&M graduate and he was clearly interested in the research here, to the point of discussing collaborations with our faculty on his current research. He visited here, but he also visited Wisconsin, which has a beautiful new modern-design chemistry building. We didn't stand a chance.

The quality of space affects the retention of faculty in multiple ways. Outside of the more direct issues of carrying out effective and safe research and graduate student recruiting, visiting faculty from other universities recognize that we have a space problem. As the external review states "with a flourishing faculty developing from junior hires, low-quality space in the department exposes an Achilles heel that could be exploited by competitive academic departments." On the other side, the jealousy that our faculty feel when visiting other departments creates an opening. Examples of departments with recent new wings or whole new buildings include: Duke, UC-Irvine, Yale, Illinois, Wisconsin, Washington, Penn State, UC-Berkeley, North Carolina, and MIT. How can A&M lose faculty to inferior schools like Vanderbilt and Wayne State? It always starts with our faculty visiting their buildings.

Finally, it should be noted that space problems have had a negative impact on the quality of our undergraduate program. We no longer offer some of the chemistry majors courses we offered ten years ago, simply because we do not have adequate laboratory space for a growing number of majors. Many attractive curriculum ideas, such as offering an honors organic laboratory to go with the very successful honors (non-majors) organic lecture course, are
non-starters because of a lack of adequate space.

Here is what we need in the short run. As recommended by the report of the External Review Committee, the university should "retain an architectural/engineering firm experienced in laboratory building and renovation" and have them recommend "the most cost effective and least disruptive plan to make the space at TAMU to be competitive, functional, and safe." This should be done as expeditiously as possible, preferably so that the currently planned stage of renovations can begin before the end of 2005. More importantly, the university will need to support the architectural recommendations with a substantial and timely commitment of resources. We would emphasize that in order to be competitive with peer institutions, great care must be taken toward the quality of the renovations. The external review report notes that "state-of-the-art renovated space costs are in the neighborhood of $500 per square foot" and that "renovation at this level is essential." It should be understood that may mean $15,000,000 in renovation money within the next six years, in addition to the approximately $5,000,000 currently anticipated. An objective look at our faculty and current trends will make it clear that renovation 10 years from now will be too late.

The Department of Chemistry's highest priority is not to obtain greater space; rather, it is to have greater high-quality space. Some space outside of our current allocation will be needed as swing space during renovations. The department has been promised access to portions of the Reed MacDonald building for this purpose, and some additional swing space will be necessary as further renovations proceed. However, chemistry thrives on interaction, and a lasting dispersal of the chemistry research groups among several buildings should be avoided.

Renovation in the short run is necessary, but it cannot provide the needed new space within the chemistry complex. Further, there is a limit on the efficacy of renovation for old and poorly designed buildings, and renovation is simply not the most cost-effective way to create the necessary high-quality space. Chemistry needs to be in line for a new wing of at least 60,000 square feet within the next ten years. There is an empty area to the south of the chemistry complex that could be used for this purpose.

Chemistry as a discipline will be thriving into the distant future. Chemistry is the core of university science, and it is always a critical component of emerging technologies. Texas A&M needs to move rapidly to take advantage of its current distinction of the Chemistry Department to provide for the future, and developing high-quality space should be its utmost priority.

**Faculty Hiring.** The External Review praised Texas A&M's faculty reinvestment plan and made several recommendations regarding hiring: "At least 3 senior hires should be pursued... with ca. $7M committed for this purpose." "We recommend that the department consider identifying one or two thrust areas for a 'cluster' hire [...] perhaps nucleated by a distinguished senior hire." The report also strongly encouraged interdisciplinary hiring.

Faculty hiring at both the junior and senior levels will certainly be necessary for the Chemistry Department to maintain and enhance its present excellence, and the department will work to develop a vision for this hiring. Some hiring will need to await a solution to the quality space issue described in the previous section——senior hires will be pursued but they will be quite difficult prior to renovations. Throughout the hiring in the coming years, substantial resources will be required from the university in the way of start-up funds and research group specific renovations.
Resources and Infrastructure. In their analysis of the Chemistry Department's general resources and infrastructure for research, not including space but including scientific support staff, instrumentation, clerical support, and shops, the External Review Committee focused on one major deficiency in shop support for experimental analytical and physical chemistry. In their words, "this has a negative impact on existing programs [...] and must make the department uncompetitive to potential new hires doing cutting edge work [...] the inability to gather the rather modest resources needed to maintain first-rate infrastructure is unacceptable." We agree. In some other areas the External Review Committee felt that we did not have satisfactory resources, but getting our shops up to an acceptable level should be the highest priority.

It should be understood that high-quality shops would both generate significant user fees and save substantial money at a higher level on start-up funds. Currently, chemistry research groups routinely pay high fees to outside shops, often despite receiving low priority on work completion, or the groups pay extra for out-of-the-box equipment that could have been built by a quality in-house shop for a fraction of the cost. Some groups have gone so far as to hire their own electronics personnel. The diverse extra costs of research due to our deficient shops must be factored into start-up offers — competitive universities can offer prospective faculty the equivalent of hundreds of thousands of dollars in shop time, and A&M simply cannot match such offers.

To fix this situation, Chemistry needs short-term help in the amount of $250,000 for new equipment. As a result of years of tight budgets and alternative priorities, the shops are antiquated. The most recent equipment in the machine shop is 20 years old, some of which was bought used, and the modern retooling of the shops is a critical first step. The $250,000 would allow us to purchase Bridgeport mills and high precision lathes, a CNC mill and a CNC lathe for manufacturing complex parts, and smaller items including saws, drill presses, a plasma cutter, and modern welding equipment.

It is imperative that we also add staff. In 1994, Texas A&M had seven total shop personnel. Today we have four. For comparison, Indiana has 16, North Carolina has 9, Purdue has 19, Illinois has 16, and Berkeley has 19. As a start toward rebuilding our shop staff toward acceptable levels, we need to add three new salary lines at a total cost of approximately $160,000 per year.

This is a significant ongoing cost but it should be balanced against the benefits. A single instrument-development grant funded this year by NSF is worth 1.2 million dollars and provides Texas A&M with $125,000 in overhead per year. Under current circumstances, a large amount of the research money will go to shops at Rice, not Texas A&M. Considering such examples and the savings on each start-up package for a new or senior faculty, our shops are a solid investment for the university. More importantly, getting our shops up to a reasonable standard is simply a requisite for a first-class research program in chemistry.

Graduate Student Health Care. Graduate students in chemistry average working 50 to 70 hours per week but are now considered half-time employees for benefits. Single graduate students have available to them a reasonable health plan called UniCare that will cost them $20.39 per month in 2005-2006. For the same plan, married graduate students with families would pay $830.70. A student who is married with no children would pay $605.27. The cheapest plan, A&M Care 1250, would provide no benefits whatsoever for most graduate students but would still cost $357.71 per month for a family because of its high deductible. The cheapest
reasonable plan, Scott & White, will cost $466.74 per month, over one-third of a student’s take-home pay. For comparison, "full-time employees," including graduate students who arrived before June 1, 2004, will be paying $222.34 for the Scott & White plan.

Because of this situation, the only way that Texas A&M can attract married graduate students with families is if the students do not know about the health-care premiums. To quote the External Review Committee, "The issue of health insurance costs is one the Committee believes to be serious as an impediment to attracting students. The high costs for married students are in need of immediate resolution."

The situation is outrageous, it is stupid and wrong, and it is having a major detrimental effect on the Department of Chemistry. A&M has traditionally been strong in attracting graduate students with families, and our health-care premiums destroy that strength. We have example after example of specific graduate students who have declined our offers because of the health-care premiums. Here is an excerpt from a letter to a Chemistry research group from Rocky Barney, a prospective student in the spring of 2005:

"It was very hard for me to turn down the chance of studying under your direction at TAMU. I am absolutely enthralled by your research. If my interests were purely academic, TAMU would be the only choice for me. It is still a source of great anxiety that I am unable to participate in what I feel is "cutting edge" research. Also, I really liked the atmosphere of College Station, and feel that you and I would have gotten along famously. The reasons for me being unable to attend are purely financial. The compensation was adequate, but the healthcare costs for a family diminished a sizable portion of the stipend. The healthcare cost would have imposed an excessive burden on my family, to whom I am ultimately responsible. Had the current plan been more like the plan that the graduate students I met were given, TAMU would have been an easy choice."

The Department of Chemistry lives by the work of its graduate students. The loss of terrific prospective graduate students, simply because they have a family, means the loss of research, the loss of papers, the loss of grants, the loss of faculty, and the loss of reputation. Most of all, the policy is not in keeping with the values of Texas A&M University.

Research groups had traditionally paid extra for benefits for married graduate research assistants, and many would like to do so now out of a simple sense of justice. **Texas A&M should immediately move to allow research groups to give graduate research assistants the same benefits as nominal full-time employees.** This would help, but it would not solve our recruiting problem since most graduate student offer letters are based upon graduate teaching assistant salaries. It would also initiate a complicated two-tiered benefit system. The only ultimate solution is for the university to return to the traditional policy of giving graduate assistants, our research and teaching lifeblood, the same benefits as regular full-time employees. Since graduate students in chemistry are mostly supported as research assistants with grants and contracts, most of this cost will be borne by research grants, NOT by the university. The University's costs will be restricted to those students supported as teaching assistants—a status students usually only have for two-to-four semesters of their typically five years in a Ph. D. program.

**University Support of Graduate Teaching Assistant Salaries.** In the External Review, "the Committee felt that the stipend offers made to students were too low, despite the relatively low cost-of-living in the College Station area." The Department of Chemistry has to
compete with other universities for the graduate students that teach our undergraduate laboratories and carry out our research. The competition for domestic and native-English speaking students is particularly tough. To adequately fill our teaching and research missions, we must offer a competitive salary. We would therefore concur with the Review's recommendation "that the College and Department commit continuing resources for attracting the best students."

However, there is a problem. The GAT/GANT budget has not seen any significant increase in over 5 years, while the cost of a GAT or GANT including tuition and fees has increased by about 49%. This is unacceptable. The anticipated tuition remission for graduate teaching assistants is an important first step. However, the university must anticipate that any flexibility at the departmental level, for example by adjusting TA workloads, has already been stretched to its limits, and that the costs of adequate teaching assistants will continue to rise. **Texas A&M must anticipate paying a competitive stipend, including tuition and fees, to the graduate assistants that effect the instructional mission of the university, and the GAT/GANT budgets need to reflect this.** If we cannot make our offers competitive, the undergraduate experience will suffer from less qualified TAs and fewer domestic TAs - not to mention the adverse effect this will have on the research of the department.

**Department Head Search.** To quote from the External Review Committee, "Given the central role of a department head at TAMU, the replacement of Professor Schweikert as he steps down as chair is of highest priority. A clear vision is necessary to target specific areas for strategic investment. We recommend that the department work diligently in the next few months to develop this vision...To work towards this vision, we recommend that TAMU begin an immediate search for a new department head...A governance structure that is more participatory and transparent will be needed. We recommend that a departmental committee be empowered with the authority to assist the head in an executive role in department governance." Later parts of the report emphasize the need for "a 10-20 year vision of the future of the Department" and "a mechanism for creating this vision [...] that involves all members of the department [...]." Vision and governance and the department head search are all intertwined. If the faculty as-a-whole are to participate in planning the future of the department, we will need to establish governance procedures that manifest participation. The next department head will shape the future both directly and by promoting mechanisms for faculty involvement.

It is neither necessary nor desirable to have the search for a new Department Head await the involved process of changes in the governance structure of the department. Rather, the search should go hand-in-hand with governance changes and the discussion of departmental vision. **In agreement with the External Review Committee, we recommend that the search for a new Department Head be initiated immediately.** The external review discusses the demographics of departmental leadership in the coming decade, and the formulation of the search committee should be in keeping with this discussion.

**Recommendations for the Department of Chemistry**
Governance

As a fundamental precept, the faculty as-a-whole needs to take responsibility for the missions of the department and its future. Everyone is responsible for our teaching, everyone is responsible for faculty searches and hiring, everyone is responsible for our research instrumentation and infrastructure, everyone is responsible for the undergraduate curriculum, everyone is responsible for the well being of the graduate students. Distinguished Professors are responsible for the quality of freshmen chemistry, and lecturers and scientific staff are responsible for the quality of graduate education.

The External Review Committee recommended that "a governance structure that is more participatory and transparent will be needed." They also recommended "that a departmental committee be empowered with the authority to assist the head in an executive role in department governance." We concur. If the Department of Chemistry is to remain "the flagship science department at TAMU," if it is to remain one of the elite chemistry departments in the country, if it is to maintain high quality and modern undergraduate and graduate programs, if the department is to, as emphasized emphatically in the External Review, develop and implement a vision for the future, then the faculty will have to be more involved and take their broad responsibilities more seriously. This will require more work from the faculty. The benefit in return, exceeding the importance of individual decisions, is that of ownership.

Within this spirit, and in keeping with the external review, we are recommending some changes in departmental governance. In designing these changes, a goal was to strike a balance between the advantages of executive power and the advantages of participatory democratic governance. In this regard, the ultimate legal powers of the Department Head have not been diminished, but we have tried to assist the Department Head with strong committees that will be involved and expert and unignorable in their areas of concern. This required some division of powers between a "Departmental Executive Committee" focused more on research and an "Academic Operations Council" focused more on academics, but it is expected that neither should ignore the multiple missions of the department.

Proposal for a Departmental Executive Committee

Structure and Membership

The committee shall be chaired by the Department Head and include seven tenured faculty members administratively located in the department. The committee members will be elected by majority vote by ballot of the tenure-track faculty administratively located in the Chemistry Department, with one representative elected from each division (analytical, biological, inorganic, organic, physical-nuclear), and two representatives elected "at-large." No more than two members from any division may serve on the committee. Three-year terms begin January 1 and are staggered to avoid complete replacement of the committee in a single year. No one can be re-elected to the committee without a break of one year between terms of service. As soon as possible following the resignation of a committee member, a special election will be held. The newly elected member will serve only the remaining portion of the term. A quorum of any five members can act on all matters.

Meetings and Agendas

The Executive Committee will meet at the pleasure of the Department Head but at least
four times per year. The Agenda for these meetings will be determined by the Department Head, with input by the members. Minutes will also be distributed to the faculty after each meeting, giving members the opportunity to correct minutes by email but aiming for faculty distribution within two weeks. The agreement of any two members shall be sufficient to bring a proposition to a vote. Votes shall be recorded in the minutes, as shall any recommendations overruled by the Department Head. If necessary, minutes distributed to the faculty may contain sections that are redacted because sensitive information was discussed. The presence of such redacted material will be noted in the minutes with a general heading indicating the nature of the redacted text (e.g., "start-up offer to Dr. X", "plans for retention of Dr. Y").

Responsibilities

The purpose of the Executive Committee is to review major departmental actions and make recommendations to the Department Head, and to serve as a resource for long range planning and policy issues related to research activities within the Department. The Executive Committee will represent the department as a whole in facilitating meeting the missions of the department, including its teaching mission. As part of these responsibilities, the Executive Committee shall:

1. Review recommendations by the department head concerning annual tenure-track faculty salary raises.
2. Review the departmental budget recommended by the department head.
3. Make recommendations regarding areas for faculty recruiting. If the Executive Committee does not approve a particular recruitment effort, a faculty group proposing the effort may petition the faculty as a whole to get approval for the hiring plan in question. Faculty recruitment proposals that fail to get the approval of either the Executive Committee or the faculty as a whole will not proceed.
4. Formulate a vision for the department that leads toward excellence in both research and teaching, and communicate this vision to the department. This vision should include the overall hiring, space, and infrastructure priorities that are guiding the committee and Department Head in making decisions.
5. Make recommendations regarding faculty start-up and retention packages. It is understood that the Department Head may act unilaterally when rapid action is required.
6. Make recommendations regarding graduate student recruitment and remuneration policies.
7. Review controversial recommendations by the space committee and suggest issues to be addressed by the space committee.
8. Review recommendations by the department head for major administrative assignments.
9. Make recommendations on new initiatives such as centers.
10. Review and assess programs and infrastructure issues.
11. Take over the current duties of the post-tenure review committee (see discussion below).
12. Make recommendations on research-related departmental committees and membership.

Proposal for an Academic Operations Council (AOC)

Structure and Membership

The AOC shall be composed of the division chairs plus the Director of First-Year Programs, the Graduate Advisor, the Undergraduate Advisor, the Associate Head, an elected representative of the non-tenure track lecturers (a three-year term), the president of GSAC, and
the Department Head. The Assistant Head shall participate as an *ex officio* non-voting member. The Department Head shall chair the meetings of the AOC.

*Meetings and Agendas*

The AOC will establish a regular time for its meetings but at least once every two months. The Agenda for these meetings will be determined by the Department Head, with input by the members, and will be distributed prior to the meeting to all departmental faculty. The agreement of any two members shall be sufficient to bring a proposition to a vote. Votes shall be recorded in the minutes, as shall any recommendations overruled by the Department Head. Minutes will also be distributed to the faculty before the next regularly scheduled AOC meeting. It is expected that special AOC meetings may be called by the Head. For voting purposes, 6 or more members shall constitute a quorum.

*Responsibilities*

The purpose of the AOC is to advise the head and serve as his or her resource for long-range planning and policy issues relevant to the academic operations of the Department. As part of these responsibilities, the AOC shall offer advice or make recommendations regarding:

1. the undergraduate and graduate curricula. The AOC would not displace the undergraduate or graduate curricula committees, but it could suggest issues for study by those committees and review recommendations by those committees.
2. funding for academic operations and teaching
3. controversial or disputed teaching assignments
4. improving instruction
5. all committee actions that have major academic implications for the faculty and department
6. staff and personnel issues
7. building security I resources
8. short-term issues regarding research support services
9. make recommendations on teaching-related departmental committees and membership

If an Executive Committee is to review the salary recommendations of the Department Head, there is some duplication of attention versus the current Post-Tenure Review committee. This raises the possibility of eliminating the Post-Tenure Review Committee and giving its current duties to the Executive Committee. The Self-Study committee was divided on this issue, but without apparent strong feelings in either direction. We would therefore recommend that the following proposal be placed before the faculty for consideration, if they adopt the Executive Committee proposal.

**Proposal for revision of Post-Tenure Review**

The Post-Tenure Review Committee currently evaluates departmental faculty who have obtained the rank of full professor or higher to determine if their current research, teaching, and service constitute a level of performance deemed appropriate and desirable for a chemistry department of our stature. This duty would be transferred to the Executive Committee. The Executive Committee would each spring, within one month of the submission of the required departmental annual report information to the Department Head, meet, in the absence of the
Department Head, to evaluate faculty performance as Satisfactory or Unsatisfactory, using the current standards described for the Post-Tenure Review Committee. Evaluations would be forwarded to the Department Head who will then communicate them to the individual faculty member. The Department Head will evaluate the members of the Executive Committee. When a tenured faculty member receives three consecutive unsatisfactory annual reviews, a professional review will be initiated as outlined in the document Texas A&M University Rule on Post-Tenure Review. This review will be initiated by the Head who will seek input from the Executive Committee as to the recommended course of action.

**Hiring**

The departmental review and recent events have made it clear that the Department of Chemistry's process for hiring tenured or tenure-track faculty needs to be better defined. The Executive Committee proposal above would define the process for deciding areas for recruiting efforts, and a later section discusses outreach for applications. We recommend here the procedure that should be used to conduct interviews and decide on offers.

**Proposal for a revised Faculty Hiring Procedure**

At the time the Executive Committee recommends areas for faculty recruiting, it should recommend the composition of search committees. Search committees may be *ad hoc* or they may consist of a division or they may consist of a division augmented by recommended additional faculty. The search committee should evaluate applications, recommend candidates to be interviewed to the Department Head, and organize interviews. In evaluating applications, search committees should call on faculty assistance such that every application is looked at fairly.

When deemed appropriate, the search committee should hold a meeting to consider the candidates that have been interviewed. All faculty who have met with any of the candidates for a search area should be invited to this meeting. The meeting should rank the acceptable candidates and record a YES/NO vote on the support for extending an offer to the top-ranked candidate. The recommendation from this meeting should be distributed to the complete faculty. For candidates at the Assistant Professor level, if there is no timely objection from faculty (within a couple of days), the Department Head may proceed with an offer. However, if two faculty members request a vote on an offer, the Department Head should obtain a faculty vote on the offer. Offers to candidates at an advanced level should always be subjected to a faculty vote. If the timeliness of an offer is deemed important by the Department Head, the vote may be held by email. If a majority of the faculty are against an offer, no offer should be made. If the majority of the faculty favor an offer but there is significant opposition, the Department Head should consult with and receive strong support from the Executive Committee before proceeding with an offer.

Exceptional targets of opportunity arise at both the senior level and in applications for Assistant Professor positions that are not readily categorized. A request to interview such a candidate should inform both the Department Head and the Executive Committee. The Department Head may then, in formal or informal consultation with the Executive Committee, approve the interview. A meeting of all interested faculty should be organized after the interview. Offers that arise in this way should be subjected to a full faculty vote.
All hires at a senior level require a formal interview unless the candidate is of clear National Academy-level status. All offers including tenure will be contingent upon an evaluation by the Promotion and Tenure Committee. The Promotion and Tenure Committee should be consulted before an offer is made anticipating the granting of tenure, with the understanding that the full P&T evaluation process requires a reasonable period of time for completion.

**Shops**

The problems with our shops, made clear by the report of the External Review Committee, are not solely the result of a lack of equipment and staff and resources – they are also the result of inadequate faculty involvement. Progress in this essential infrastructure will require that the faculty who benefit from the shops play a greater role in their organization, hiring, policies, and long-range planning.

The governance of the shops has evolved since the last external review. In the bylaws there are separate User Groups for the Glassblowing and Electronics and Machine Shops. Prior to 1997, the shops were overseen by user groups consisting of faculty and chaired by a faculty member. This has been replaced by oversight of the Associate Department Head. While there are advantages to such an arrangement, the present structure does not provide for direct input from concerned faculty and limits their influence in acquiring new equipment and personnel. To correct this, we are presenting a proposal for a reconstituted Shop User Group that would oversee all of the chemistry shops.

**Proposal for a Shop User Group**

*Structure and Membership*

The user group shall consist of any chemistry faculty members who have an interest in the operation of the Electronics, Machine, and Glassblowing Shops. The user group chair will be elected by ballot by majority vote of the user group.

*Meetings*

After an initial meeting that elects a user group chair, the Shop User Committee will have meetings organized by the chair at least twice per year. Items for the Agenda of these meetings may be suggested by either the Department Head or the user group members. At least once per year the full committee will meet with shop staff to discuss the state of the shops and provide for staff input.

*Responsibilities*

The chair of the Shop User Group will serve as the supervisor of record for the full-time professional shop personnel. If the shops are reorganized with a central shops manager, the user group chair will be the supervisor for the shops manager and the shops manager will supervise other personnel.

The Shop User Group will make recommendations to the Department Head regarding cost recovery, access policies, equipment purchase, personnel hiring, and long range planning related to glass, electronics, and machine shops.
**Space.** In addition to university-level actions that would improve the quality of chemistry space, the external review notes that reassessment and reallocation of laboratory and teaching space are needed. The review supports the idea that equity in space allocation may be a problem and notes that space has become fragmented and underutilized. It is clear that in the coming years, many difficult space decisions will be necessary, particularly if space is to be reorganized to allow renovation and senior hires. As the review states emphatically, "A departmental long-range space plan needs to be developed." For this to happen, the space committee needs to be stronger and it needs to assume a decision-making role that extends beyond the response to faculty requests.

The Department Head has recently made a proposal for a revised Space Committee that would consist of one elected member from each division with the Associate Head serving *ex officio*. This committee would be charged with developing a three- and five-year space plan for department. In considering faculty space requests, the committee would forward initial recommendations to the tenured and tenure-track faculty for comments within two weeks, and based on the faculty feedback would submit a recommendation to the Department Head. This is all a significantly positive step. The space committee should also be charged with developing and disseminating general criteria for deciding space allocations. The proposed Executive Committee would be charged with reviewing controversial decisions by the space committee.

**Faculty Diversity**

In faculty hiring, Texas A&M has been taking steps to encourage the recruitment of women and underrepresented minorities. The Dean of Faculties, Karan Watson, has been meeting with representatives of search committees to encourage outreach for applications and the interviewing of diverse applicants. It is understood that extra resources may be available to assist in the hiring of qualified applicants that would increase our faculty diversity. There is no encouragement that unqualified applicants should be hired in any circumstances. This is all appropriate. It is recommended that specific application-outreach activities be undertaken at the departmental level in association with our yearly faculty searches.

For all junior-faculty hires, we must do everything possible to assist in their success. This includes systematizing their mentoring from successful senior faculty, and facilitating their having normal lives outside of chemistry. As noted in the External Review, Texas A&M has policies regarding delay of the tenure and promotion clock for the birth of a child or other family health related obligation, but the policies are not widely known. The policy needs to be systematized at the departmental level. Toward that end, we are proposing some changes in Leave of Absence and P&T policies. We are also proposing the institution of a formalized faculty mentoring program.

**Proposal for Family-Friendly Bylaw Changes**

Section II. D. currently reads:

D. *Faculty Leaves of Absence*

1. Applications for sabbatical leaves shall ordinarily be submitted to the Department Head not later than nine months before the proposed leave.

This should be changed to read:
D. Faculty Leaves of Absence
1. Applications for sabbatical leaves shall ordinarily be submitted to the Department Head not later than nine months before the proposed leave.
2. In keeping with the Family and Medical Leave Act of 1993, faculty will be granted at least 12 workweeks leave of absence for the birth and care of the newborn child, or for placement of a son or daughter for adoption or foster care, or to care for an immediate family member with a serious health condition, or to take medical leave when the employee is unable to work because of a serious health condition.

Section 4. b. i. (a) currently reads:
(a) Before the end of the fifth year of the non-tenure appointment period, the candidate is requested to supply all information relevant to the tenure decision with the suggested format for his/her departmental file:

This should be changed to read:
(a) The timing of a candidate's tenure evaluation will be determined by the candidate's initial offer letter. In general, the tenure review will begin at the end of the candidate's fifth year for candidates whose initial appointment is at an assistant professor level. Candidates can, however, request a one-time delay of one year in their consideration based on personal considerations. This request must be made to the Department Head before the time when an evaluation is scheduled to begin. Requests may be approved by a simple majority vote of the P&T committee. If the candidate has missed eight or more workweeks due to reasons enumerated in the Family and Medical Leave Act (see section II. D. 2.), no request is necessary and a one year extension is automatically granted. To be considered for tenure, a candidate is required to supply all information relevant to the tenure decision before the tenure evaluation begins. This information should consist of the following and should follow the same suggested format as used for his/her departmental file.

Proposal for a Junior Faculty Mentoring Program

Under this program, each Assistant Professor would be assigned a specific tenured faculty member as a mentor. The Assistant Professor should be given the opportunity to state a preference in this assignment. It would be expected that the mentor and mentee would meet at least once every two months. The mentor could list the duty as service to the department. If the mentor is on the P&T committee during the year of a tenure decision for the mentee, a new mentor should be assigned. The mentee may at any time request an alternative mentor, with no justification necessary. Changes in mentor should be considered normal and recognized as having some advantages.

The main focus of the mentoring relationship is the professional development of the mentee. These relationships will differ depending on the needs and goals of each mentee, but discussions should include effective teaching, research, grant-seeking, leadership and university service. It is expected that discussions between the mentor and mentee of any sensitive nature will remain confidential.

The mentor should take responsibility for making the relationship work. The mentor is
expected to contact the mentee to set up meetings, and both parties should reach a clear understanding of what they expect from each other. It is expected that the mentor will have an essentially ‘open door’ policy for the mentee.

**Graduate Student Diversity Issues.**

In the external review, there was particular concern that “female graduate students differentially leave the program relative to peer programs elsewhere.” Despite some uncertainties, this issue should be taken very seriously. An *ad hoc* committee should be formed and tasked with 1. Determining the accuracy of the claim. 2. Identifying factors that directly or potentially contribute to the loss of female graduate students. 3. Recommending changes that may ameliorate the problem.

There is no reason to await the results of the *ad hoc* committee to take some positive steps. Texas A&M has clear policies regarding non-discrimination, equal-opportunity employment, and sexual harassment. As one simple step, the Department Head should communicate to everyone in Chemistry that violations of these policies will not be tolerated.

A second step can be taken to be benefit of all graduate students. Our department brings together men and women graduate students from diverse ethnic and international backgrounds. Despite the repeatedly expressed desire on the part of the faculty to serve as the mentor for their students, not all graduate students feel comfortable going to faculty for general advice that affects their success in graduate school. This is particularly true early in their graduate school career, and can be a factor when the gender or ethnic or cultural background of the student is different from most faculty. It is therefore desirable to give students alternative outlets for seeking advice. To this end, we recommended that the Graduate Advisor in conjunction with the Graduate Curriculum Committee be tasked with the design and implementation of system in which all beginning graduate students would be assigned a senior graduate student as a mentor. Some students will not desire mentoring, and that is ok, but for some students the access to an alternative outlet for advice can only help as they face the significant life adjustments associated with starting graduate school here.

**Graduate Student Tuition/Stipend**

As made clear in the external review, the cost of graduate student tuition for graduate students who are teaching and research assistants is an ongoing issue for the Chemistry Department. Currently ALL competitive graduate programs provide students full tuition and fees. The schemes by which this is done vary. Typically, a combination of overhead return, different indirect cost assessments, discounted tuition/fees, institutional payment of tuition/fees for teaching assistants and, in some cases, partial or full reimbursement of tuition/fees for research assistants is used. In most or all cases, the student’s mentor pays some portion of the tuition and fees in some way. The External Review committee found that the current scheme is not workable for several reasons. First, they noted that the University should meet its obligation to provide TA stipends that correspond to those of our competitors. They explicitly noted that the stipends we now offer should be raised. They also noted that foreign and domestic students should be treated the same with regard to tuition and fees.

Departmental funding for graduate student stipends and their tuition and fees is currently in a period of transition. It is anticipated that the University will pay tuition for GATs, albeit by a
complex scheme. This makes it difficult for the Self-Study Committee to propose a concrete plan to deal with these issues. However, as the Department develops a plan in conjunction with the College and University, some principles should be regarded. At the University level, the University should provide funding for tuition and fees for all students who serve as GATs. This is in keeping with the moral obligation that the University, not research grants, should pay for the University's teaching. Payment of tuition and fees must be considered part of the cost of obtaining the GATs. **At the Departmental level, the goal should be to provide all students (who serve at GAR's or GATs) with tuition and fees for up to five years so long as they are in good academic standing**, and any plan should make progress toward achieving this goal. As part of this scheme, the faculty may be required to provide GARs with tuition and fee support or, if tuition and fee support is not available with their funding source, with an increased monthly stipend that covers the average tuition/fee cost for the semester in question.

The Department should provide the College and University with outside surveys that document that 'average' stipends for 10 or more of our peer institutions. Such information can be collected by mail from Departments and from other institutions' independent surveys. Based on that information, we recommend that the Department raise its GAT/GAR stipend to the average of these other institutions' stipend for the 2006/7 academic year. (This means that the stipend be set sometime in Fall 2005, before we begin making offers in December/January.) This will impose a heavy cost on faculty research budgets. If the stipend increase were to be as large as the external committee seemed to imply, it might be necessary to make this process a two-year process. The increase in stipends and tuition/fee coverage for GATs will also require additional University funding for GAT stipends for Fall2006 and beyond.
MEMORANDUM

TO: Dr. Karan L. Watson
Interim Provost and Executive Vice President for Academics
TAMU 1248

Through: Dr. Robert C. Webb
Interim Dean of Graduate Studies
TAMU 1113

Dr. J. Martyn Gunn
Dean of Undergraduate Programs
TAMU 1125

Dr. H. Joseph Newton
Dean, College of Science
TAMU 3257

FROM: David H. Russell
Head, Department of Chemistry
TAMU 3255

SUBJECT: Academic Program Review: Four-Year Status Report

Please find attached a Four-Year Status Report for the review of the Department of Chemistry that occurred in April of 2005.

To prepare this report, a committee of departmental faculty consisting of Daniel Singleton, Francois Gabbai, James Batteas, and Coran Watanabe was charged by the Department Head with evaluating the department’s and university’s progress in addressing the recommendations of the Program Review and implementing the plans of action developed in the review process. As a part of this process, this committee sought broad input from the faculty of the Department of Chemistry. This report is the product of that input as well as the committee’s consideration of the issues raised in the review.
Four-Year Status Report

Department of Chemistry Academic Program Review

In 2005, the Department of Chemistry at Texas A&M University underwent review of its academic program. The process for this review was extensive, including a thorough self-study in the spring of 2005, external review on April 24-27, 2005, and a three-month process of brown-bag luncheons and committee meetings culminating in a detailed faculty response to the external review in July of 2005.

The central charge to the external reviewers was the examination of the doctoral program in the Department of Chemistry. The undergraduate majors’ curriculum was also considered in the review but was not a primary focus. The department had undergone a review of its first-year program and service courses in October of 2004 by an external committee chaired by Dr. Robert L. Lichter of Merrimack Consultants, LLC.

Chemistry is the central science and Texas A&M has one of the elite chemistry programs in the world. The External Review Committee affirmed the excellence of the department and that maintaining the quality of Chemistry was essential to the reputation of Texas A&M. At the same time, the committee recognized that the hard-won quality of the department is fragile. Accordingly, the report of the External Review Committee made a long series of recommendations for actions on the part of the department and university to maintain and enhance the quality of the chemistry program.

The recommendations of the External Review Committee and the actions taken in response to this counsel will be discussed on a point-by-point basis below. Here, we will briefly summarize the progress of the Department of Chemistry in the last four years, the department-level steps taken to address issues raised in the review, and the status of the response of higher levels of the university to the review.

Some of the issues raised in the External Review were addressable by direct action within the department. This included as a major theme some reorganization of departmental governance and procedures. These issues were rapidly tackled by a series of propositions that were passed by the faculty including changes to the departmental bylaws. Other issues were only addressable with the aid and support of the university administration. There is no doubt that the administration has been highly supportive, though some issues are incompletely addressed or else have been addressed on an ad hoc basis that may lead to new problems in the future. Some faculty concerns along these lines will be discussed below.

One central issue, touching on many aspects of the External Review, was the maintenance and cultivation of the quality of the faculty. In the last four years, the Department of Chemistry has suffered from the passing of its two most distinguished scientists in Al Cotton and Ian Scott as well as its most distinguished teacher in John Hogg. Three other tenured faculty (Richard Crooks, Ray Schaak, Vickie DeRose) have been lost to other universities. Two have retired (Larry Peck, Dwight Conway). One did not receive tenure. Two other faculty with joint appointments in Chemistry have moved to other universities.

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These losses are irreparable, but with the aid of a supportive university administration the department has been extremely aggressive in hiring outstanding new faculty. At a junior level, seven faculty have been added in the last four years (Brian Connell, Dong Hee Son, James Batteas, Christian Hilty, David Barondeau, Jiong Yang, Wenshe Liu). At a senior level, the department has seen unprecedented success in attracting top faculty to Texas A&M, including John Gladysz, Janet Bluemel, Joe Zhou, Oleg Ozerov, Tadhg Begley and Karen Wooley. We cannot rest on this success - departments can rise or fall, and every year is a struggle to keep our top faculty and hire the best new faculty – but the department and university administration has energetically assailed this core issue.

A second key issue raised in the External Review was that the Chemistry space did not meet the standards of the country's flagship programs. The External Review Committee made the particular point "It is obvious to the committee that recruiting, at graduate and faculty levels, will be successful in the future only if space needs are addressed." As will be described, the university administration has certainly worked on this issue. However, a Master Plan recommended by an external architectural/engineering firm was not adopted. Renovations of some space along with added space in Reed McDonald has partially met the department's needs, but the approach has been piecemeal and no commitment has been made for some badly needed renovations. In particular, the modernization of the 2nd and 3rd floors of the vintage 1972 wing of the chemistry complex would help meet the short-term space needs of the department.

The discussion below presents excerpts from the External Review, comments on how the recommendations have been addressed, and where appropriate presents concerns for future consideration.

“A clear vision is necessary to target specific areas for strategic investment. We recommend that the department work diligently in the next few months to develop this vision. … To work towards this vision, we recommend that TAMU begin an immediate search for a new department head. … We recommend that the University begin a department-wide process to identify the next generation of leaders, both internally and externally. At least 3 senior hires should be pursued to add leadership from outside, with ca. $7M committed for this purpose.”

**Vision:**

As recommended by the external review committee, the department worked diligently to identify a successor to Emile Schweikert as Department Head. These efforts led to the appointment of Dave Russell as Head of the Department of Chemistry in September of 2006. Under the guidance of Schweikert and then Russell, the department identified some specific needs which included: i) filling the Dow Chair; ii) filling the chairs formerly occupied by Cotton and Scott; iii) hire senior faculty to make up for the departure of Schaak, the retirement of Fackler, and the passing away of Cotton and Scott; iv) develop an aggressive plan for occupation of space in the newly created life-science building; v) create new space to accommodate the new hires.

**Identification of the next generation of leaders:**
In an effort to meet some of the needs evoked in the preceding section, the Department was able to recruit Tadhg Begley, Janet Bluemel, John Gladysz, Oleg Ozerov, Joe Zhou, and Karen Wooley. The quality of these new faculty members is indisputable and has already elevated the overall quality of our department. Internally, Dunbar, Gabbaï and Singleton have been promoted to Davidson Professorships while Cremer now holds the Martell Chair.

Between the new hires and the advancement of successful junior faculty, the department now has a large cohort of faculty at the full-professor level between the ages of 40 and 55. This includes Professors Begley, Bluemel, Burgess, Cremer, Dunbar, Gabbaï, Hughbanks, Lindahl, Lucchese, North, Romo, Simanek, Wooley, Yennello, and Zhou. This group notably includes four women. One full professor (Ozerov) is younger still. For the first time in recent history, it is fair to say that the demographic distribution of our leading faculty is healthy.

“A governance structure that is more participatory and transparent will be needed. We recommend that a departmental committee be empowered with the authority to assist the head in an executive role in department governance.”

Based on this recommendation made by the external committee, a proposal was developed in the summer of 2005 for the creation of an elected executive committee to assist the department head in governing the department. This proposal was approved by the faculty in August of 2005 and implemented immediately. The creation of this committee has increased the involvement of the faculty in the governance of the department, and it has also led to an increase in the transparency of the department’s decision-making. The faculty appear to uniformly view this change as a significantly positive step.

“We recommend that the VPR and Dean work with the department to provide resources that encourage through space, start-up, and differential hiring priorities that some fraction of the ten new positions be co-invested in interdisciplinary centers, where appropriate, and/or in joint appointments with other departments.”

Investment from the Dean/VPR:
The aforementioned hires would not have been possible without the help of the Dean and VPR. In addition to making new space available in the life-science building, the upper administration has made a colossal contribution to chemistry. About nineteen million dollars have been provided in the form of start-up funds. Parts of these funds have been used to enhance departmental facilities including the NMR and X-ray facility. About thirteen million dollars have been devoted to the creation of new chemistry space in Reed McDonald. Approximately 9.5 million dollars have been allocated to the renovation of the 4th floor of the 1972 wing. Over 1.5 million dollars was spent on the 1959 Wing. Additional investments have been made around the department including in the machine shop.
Of the new appointments, Begley, Wooley, and Zhou will be formally involved in indisciplinary centers.
“Diversity remains an issue within the faculty and the graduate cohort. We recommend that the department institute a self-study to identify why female graduate students differentially leave the program relative to peer programs elsewhere. ... With the large number of new hires anticipated in the coming years the department should make a concerted effort to hire women and minority faculty.”

The following data summarize the eventual outcomes for students who entered our graduate program during the 8-year period Fall 1996 through Fall 2003:

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th></th>
<th>Men</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Received Ph.D. degree</td>
<td>70 (46%)</td>
<td>163 (59%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received M.S. degree</td>
<td>43 (28%)</td>
<td>30 (11%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Program with no degree</td>
<td>32 (21%)</td>
<td>52 (19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Still in Program</td>
<td>6 (4%)</td>
<td>20 (7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died or left with Advisor</td>
<td>0 (0%)</td>
<td>10 (4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>151</td>
<td>275</td>
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These statistics are little changed from the time the visiting committee made their assessment in Spring 2005. Thus, although approximately the same percentages of female and male students left the program with no degree, a significantly larger fraction of female students than male students (28% vs. 11%) completed their graduate careers in the department with an M.S. degree, rather than a Ph.D. degree. Although it is not uncommon that more men graduate students complete their Ph.D. degree than women, the department has been taking the following actions. As women graduate students appear to be more sensitive to the climate in the department, the department has issued a family/leave policy. Female graduate students will receive 6-weeks of leave time following childbirth. Salary and benefit payment will continue throughout this time period. The parent of a newborn or adopted child will also receive shortterm leave as typically associated with vacation leave days. As it is in the best interest of the department to promote open lines of communication between Graduate Students and Faculty Members, the Faculty/Graduate Student Working Group has been established. The Working Group has two principal Missions: 1] To provide a forum for all graduate students to voice their concerns and opinions and 2] To provide a direct conduit for information flow from the chemistry department administration to the graduate students. Since 2005, the department has also added two new women faculty to the department, Karen Wooley and Janet Bluemel. They will each serve as good role models for our women graduate students. One woman, Coran Watanabe, has been promoted to Associate Professor with tenure. It has been suggested that the women graduate students with a faculty advisor could meet once a month for science discussions/presentations over a pizza lunch to help provide a supportive environment for women graduate students.

Regarding the representation of minority students in our graduate program and yet maintaining our high standards for student admission, the Chemistry department participates in a variety of recruitment activities including ca. 15 faculty visits to predominantly undergraduate institutions, 4-5 national or regional recruitment events and an annual graduate student visitation weekend which brings ca. 50 students per year to campus to visit and learn about the graduate program. We have also partnered with the Office of Graduate Studies to take advantage of the more than 30 national recruitment
events that their office attends annually to aid in recruiting students to chemistry. This extensive recruitment plan produces ca. 150 domestic and 400 international applications annually, of which we make on the order of ca. 120 offers of admission. We also take advantage of our NSF-REU on Biological, Environmental and Materials in Chemistry to aid in the recruitment of students into our doctoral program. Our REU program supports 15 students each summer to conduct research in the department. Importantly, the chemistry REU program is partnered with several additional minority serving institutions in Texas including Prairie View A&M, TAMU-Kingsville, UT-Pan American and TAMU-Corpus Christi, and has had excellent success in attracting students from underrepresented groups to our program. Notably, TAMU is a national leader in the production of Hispanic PhDs in Chemistry. Our recruitment and retention activities have also benefited from coordination with the NSF Louis Stokes-Alliance for Minority Participation (LS-AMP) and Bridge to the Doctorate programs at TAMU. Last year, six (6) chemistry doctoral students received fellowship support from the LS-AMP program. Additional support was garnered through the award of four (4) diversity fellowships sponsored by the Office of Graduate Students.

“Our committee urges that the department undertake an in-depth analysis of areas, both in the core and at the boundaries of chemical research, where growth would have the most positive impact. ... We recommend that the department consider identifying one or two thrust areas for a “cluster” hire; the recruiting of 3 to 5 faculty with similar or overlapping research interests, perhaps nucleated by a distinguished senior hire.”

The department has not directly pursued a "cluster" approach to hiring, but rather has focused on hiring the best talent available. With that said, the addition of Wooley, Zhou, Bluemel, and Son has added significant strength to a cluster of researchers in materials chemistry, and the addition of Begley, Liu, Barondeau, Hilty, Connell, and Yang has added greatly to a cluster of researchers focused on biological chemistry and natural products. Both of these areas were among those suggested as opportunities in the External Review.

“The only apparent mechanism for student-faculty interaction was that with the research director. We recommend broadening interaction with graduate students to include one or more thesis committee members.”

This issue has been informally addressed in the last few years by committee members who have been requiring student interaction as a condition for service on the committee. Typically, the required interaction would include presentations at group meetings on an annual or semi-annual basis. A move to formalize this requirement has met with some resistance from the faculty but is still under consideration. In addition, the department has recently adopted a motion to require additional committee meetings for students continuing their Ph.D. studies beyond the 5th year.

“We recommend that the College and Department commit continuing resources for attracting the best students.”
In order to maintain our high standards for student admission into our graduate program in chemistry and to increase the diversity of our students, the recruitment activities conducted out of Chemistry include, ca. 15 faculty visits to predominantly undergraduate institutions (PUIs) annually, 4-5 national or regional recruitment events and an annual graduate student visitation weekend which brings ca. 50 students per year to campus to visit and learn about the programs at TAMU. Additional individual student visits to campus occur for those students that cannot attend our visitation weekend. We have also partnered with the Office of Graduate Studies to take advantage of the more than 30 national recruitment events that their office attends annually to aid in recruiting students to chemistry. Each student that we meet at any of these events is contacted personally by our graduate office and encouraged to apply to our program. This extensive recruitment plan produces ca. 150 domestic and 400 international applications annually, of which we make on the order of ca. 120 offers of admission. We also take advantage of our NSF-REU on Biological, Environmental and Materials in Chemistry to aid in the recruitment of students into our doctoral program. Our REU support 15 students each summer to conduct research in the department. Importantly, the chemistry REU program is partnered with several additional minority serving institutions in Texas including Prairie View A&M, TAMU-Kingsville, UT-Pan American and TAMU-Corpus Christi, and has had excellent success in attracting students from underrepresented groups to our program. Notably, TAMU is a national leader in the production of Hispanic PhDs in Chemistry. Our recruitment and retention activities have also benefited from coordination with the NSF Louis Stokes-Alliance for Minority Participation (LS-AMP) and Bridge to the Doctorate programs at TAMU. Last year, six (6) chemistry doctoral students received fellowship support from the LS-AMP program. Additional support was garnered through the award of four (4) diversity fellowships sponsored by the Office of Graduate Students.

"We recommend that the disparity in health care insurance costs be resolved. ... We recommend that the department address the disparity in tuition charges for international students."

This issue has been completely addressed since the time of the external committee's recommendation. All departmental graduate students, both domestic and international, now have identical health insurance coverage available to them. In addition, tuition and mandatory fees are paid for all graduate students through their 5th year of study.

“There is a disparity among faculty in teaching assignments, and these inequities present problems in perception of the importance of undergraduate education and in the reality of faculty assignments to teach in the undergraduate program."

The perception of a disparity in teaching assignments continues to be a concern among some of the senior faculty. The opinion was expressed by some faculty that teaching "relief" because of scholarly and research activities, if it is to be available at all, should be more systematically administered. There is a perception of a departmental "culture" in which it is considered a desirable goal to be relieved of classroom teaching.
The teaching-relief policy is being reviewed by the Executive Committee, and a new policy will be proposed and voted on by the faculty in the spring of 2010.

“Reassessment, reallocation and renovation of laboratory and teaching space are needed to maintain and advance the stature of the department in the future. Current space, which was described as depressing, unsafe and outdated, does not meet current standards of flagship programs in the country. ... It is obvious to the committee that recruiting, at graduate and faculty levels, will be successful in the future only if space needs are addressed. ... A departmental long-range space plan needs to be developed. ... Existing and/or planned space within the university could be assigned to Chemistry in response to immediate space needs in the department. ... We recommend that the University consider additional space needs in the near future so that a University flagship program can capitalize on the faculty reinvestment program. ... we recommend that the University retain an architectural/engineering firm experienced in laboratory building and renovation. ... A genuine response to the space needs will require a significant commitment of the part of the upper administration. The committee’s experience and voluminous data establishes that for state-of-the-art renovated space costs are in the neighborhood of $500 per square foot. Renovation at this level is essential to attracting the best faculty to TAMU.”

The issue of space was clearly of central importance to the External Review Committee, as it has been a substantial concern of the faculty for many years. From one perspective, the university administration has contributed extensively to addressing this serious problem in the years since the External Review. From another perspective, much more remains to be done. The departmental faculty are also concerned about an ad hoc approach to space problems that is leading to a dispersion of chemistry faculty on the campus.

An external Architectural/Engineering (A/E) firm was engaged by the University during the Summer of 2006 to prepare a Current Conditions Assessment report of all five wings of the Chemistry Building. In addition, the A/E was commissioned to assess current and projected space needs and utilization and to prepare an overall recommended Master Plan for the department. The Master Plan included recommendations that either an entirely new Chemistry Building complex be developed (at a projected cost of more than $250 million) or, at minimum, that a new wing be constructed, to be followed by extensive renovations of the existing wings of the building.

The A/E firm submitted their reports in late Summer '06 and made an oral presentation of their findings and recommendations to a group that included several TAMU administrators. Unfortunately, within less than one year after completion of the Master Plan, and before its implications could be thoroughly assessed by the administration, certain key administrators, including Bob Gates, President of TAMU, David Prior, Provost, and Bill Perry, Chairman of the Council on Built Environment (CBE) left TAMU. Further turnover in the administration has occurred recently. As a result, the department has been faced with the task of ensuring that the replacement administrators become thoroughly acquainted with the contents of these reports and with the need to proceed with their recommendations regarding construction and renovation.
As a response to the concerns about the state of the machine shop in particular we have hired two new staff members, Will Seward and Carl Johnson, replacing the two staff members who retired. Both machinists have extensive experience in computer-controlled machinery and welding. The department also improved the infrastructure within the machine shop using with a $250,000 commitment from the VPR to purchase both manual equipment and CNC equipment which significantly enhances the capabilities of the shop. A shop user committee has been re-constituted to oversee anticipated upgrades to the electronics and glass shops. Both the machine shop and the glass shop are currently offering graduate student training workshops. Future goals include the establishment of a student machine shop in chemistry.

At the undergraduate level, the Chemistry Department has completed a two year development of the undergraduate physical chemistry laboratory course investing $160,000 in modern instrumentation. We have replaced the outdated single week experiments with more modern 3 week experimental modules. The topics in the new laboratory include; Molecular Spectroscopy, Photophysical Properties of Nanocrystalline Materials, Visualizing Atoms and Molecules by Scanning Tunneling Microscopy, Low Field NMR, Thermodynamic Properties of Real Gases, Solid State NMR of Model Membranes, Excitation and Emission Studies of Pyrene in Solution, Fluorescence Microscopy for Imaging Biointerfaces. The ‘in class’ time has been increased from 8 weeks to 12 weeks and the written reports are now in ACS Journal format. The redesigned laboratory is considered by those outside the University to be a model for the modern course. Feedback from students who have experience both the new and old formats during the transition has been uniformly positive.

The department has developed plans to upgrade the upper division analytical instrumentation course. We anticipate that lessons learned in upgrading the physical chemistry laboratory course will be helpful in this endeavor.

Some advances have been made. As of January of 2007, the NMR Laboratory no longer gets help from the department for non-technical NMR maintenance. The current technical staff has remained at the same size since 2002. With the addition of a new NMR in ReedMcDonald and the upcoming addition of a high-maintenance cryoprobe-equipped NMR to the facility, some additional staffing help will be required. Some concern was expressed regarding the current EPR and SQUID operations, and it was suggested that they should be combined in a single facility supervised by a staff scientist that would report to a user group, rather than having the responsibility loaded on individual faculty members.
“Departmental services in some areas seem remarkably well provided while in others the opposite is true. Assistant Professors without federal funding appear to have no clerical support whatsoever and several expressed distress at spending time putting up fliers for visitors and make arrangements for trips and other minor matters.”

This problem has been partially addressed in that several staff assistants have been re-tasked to provide support to junior faculty via a “hub” type system with several faculty sharing a staff assistant. This has some advantages from the standpoint of the numbers of staff members required, but in many instances this does not necessarily meet the needs of new faculty due to the limited training of many of the staff members in areas such as finance (in particular budgeting) and the practices of the Research Foundation and university in grant applications and grant management.

“In summary, despite challenges, Chemistry remains the flagship science department at TAMU. We commend the department for a thoughtful self-study, and TAMU for a bold reinvestment plan. Creating a fully successful reinvestment in Chemistry will require an insightful vision for the future and a concurrent commitment to space, infrastructure, and startup. If these challenges can be met, TAMU Chemistry can honor the past by building for the future. We believe that a successful transition to an even higher level of success is possible, if the key recommendations are attended to now."
A5. First Year Program Review from 2005
First year Program Review Merrimack Consultants or Lichter Report

Report of Consultant Committee
Department of Chemistry
Texas A&M University
10-12 October 2004

Introduction

As part of a curricular review, the Department of Chemistry invited a Committee of Consultants to examine 100- and 200-level courses (“service courses”) that are offered primarily to first- and second-year students who are not majoring in chemistry. A Departmental ad hoc committee that was chaired by Dr. Joseph B. Natowitz and included Dr. David E. Bergbreiter, Dr. Marcetta Y. Darensbourg, Dr. François P. Gabbaï, Dr. Kenn E. Harding, and Dr. Paul A. Lindahl organized the visit. The Consultants were charged to

- Review the course objectives, contents, organization and integration with other lower-division offerings;
- Outline how the Department may best meet its service teaching obligations in light of the Department’s goals, current and projected faculty, staff, physical resources, expectations of students and their home departments, and enrollment trends.

These goals were amplified by a comprehensive and detailed list of questions for the Consultants to consider.

Consisting of Dr. Robert L. Lichter (Merrimack Consultants, LLC, Chair), Dr. Jeanne E. Pemberton (University of Arizona), and Dr. William R. Roush (University of Michigan), the Consultants met during one and a half days with faculty members from the Chemistry Department and the College of Engineering; Department, College and University administrators; teaching assistants; support staff; and a number of highly articulate undergraduates. The Consultants also visited the classrooms and laboratories used for the first-year courses. Before the visit, the Consultants received detailed self-study materials derived largely from Fall 2003 data; additional materials were provided during the visit. Prior to its departure, the Consultants met with the Department faculty at large to present a preliminary oral report. During the visit, the Consultants met several times in executive session.

While the Committee’s charge was highly specific, the self-study and the visit convinced the Consultants that the roles and effectiveness of the service courses have to be addressed as part of the Department’s larger vision and mission. These, in turn, need to go beyond operational details and take into account the evolution of science and science education themselves. This report will reflect that larger perspective. It should also be noted that the Consultants’ views and suggestions were based on a snapshot and not on an in-depth analysis of the circumstances.
Departmental Accomplishments

The Consultants were impressed at the outset with the very fact that Department initiated the review on its own initiative. That alone clearly underscores the Department’s commitment to offering its students a high-quality education. In pursuit of that goal, the Department has invested considerable resources in the service courses, not only in supplies, equipment and laboratory space, but also in an intensive TA training program, and in appointment of Instructional Assistants (IAs) and, especially, Mentor IAs in the critical first-year program. Proven technology appears to be used effectively, especially the use of videotaped Chem 107 lectures, which are broadcast over cable TV and are available on demand. Classrooms and laboratories for first-year program courses are well equipped if not state-of-the-art, although the 24-student laboratory sections are somewhat crowded.

Most arresting is the passion and commitment of the faculty members teaching the service courses and of the staff supporting them. While teaching responsibilities for these courses are distributed among the entire faculty, the Lecturers, Senior Lecturers, and a small number of tenured/tenure-track faculty members (12 out of 46, 26 percent) teach the service-course lectures that represent 65 percent of the Department’s semester credit hours and are taken by ca. 4,000 students. Even so, a few of those who teach these courses participate in professional activities, write textbooks, and publish education-focused articles in peer-reviewed journals. Several have received teaching awards both within and outside the University. One Senior Lecturer and the Coordinator of the organic teaching laboratories have been National Science Foundation program officers.

The Department has also signaled its responsiveness to the needs of the client departments, as exemplified by the creation of Chem 107, which satisfies many of the College of Engineering’s requirements. Chemistry 222 has also been reinvigorated to appeal to the non-majors. Indeed, the client department advisors whom the Consultants met, and the diverse array of students themselves, expressed general satisfaction with these courses.

Administrators with whom the Consultants met hold the Department in high esteem. Noting that the Department “has the prestige to be more confident about its potential for leadership” in education, they would welcome proposals for new models for evaluating teaching and educational contributions by all faculty members. Administrators also indicated willingness to receive proposals for creation of tenure-track options for faculty members with strong educational interests.

The Department pays particularly close attention to its own undergraduate majors, offering research opportunities and scholarships to all majors.

Areas of Departmental Opportunity

The Consultants were asked to focus on two broad themes: the service courses and the development of chemical education as a departmental subdiscipline. While the two themes are coupled through specific faculty members, this report will treat them separately.
Service Courses

Role of the Service Courses in the Department

The service courses represent more than half the Department’s total student credit hours. For that reason alone, it is important that the Department as a whole pay serious attention to this part of the curriculum within the framework of the overall department mission. Yet, for reasons related to the Department’s modern evolution, the service courses occupy the attention of only a minority of the total faculty. Most of the administrative responsibility lies with the directors of the first-year and organic chemistry programs, and little history of department-wide discussion of the service courses is apparent. Several service-course instructors described unsuccessful attempts to generate such faculty-wide discussion of the program, and told of general departmental reluctance to consider detailed re-examination of the program’s current structure and content. Indeed, the Consultants received the impression throughout the visit that the Lecturers, who teach the bulk of the courses, have no formal role in the Department’s curriculum committee, which indeed does not consider course content of the service courses. If these impressions are correct, this is an untenable situation that must be addressed.

Therefore, the Consultants recommend that:

- The Department create a mechanism for regular Department-wide discussion, assessment, and enhancement of the service courses in the context of the Department’s larger educational mission;
- The Departmental Curriculum Committee include the service courses in its purview;
- Those faculty—including Lecturers—charged with the major responsibility for organizing and teaching the courses have a formal role on the Departmental Curriculum Committee and be empowered to contribute to decision-making. Alternatively, a separate Service Curriculum Committee comprising both selected service-course faculty members and tenured/tenure-track faculty members could be created and charged with considering the content of the service courses;
- The Department undertake a formal assessment of service-course outcomes, using experts in assessment from outside the department. While details of an assessment need to be established, it should include longitudinal follow-up of a fraction of students in these courses at least through their graduation. The University’s recently created Quality Enhancement Plan for assessing student learning outcomes may provide a vehicle for framing the assessment;
- The overall educational strategy for service courses be established in a coordinated manner, including the relationship between the first-year program and organic classroom and laboratory objectives, allocation of resources, and the roles and preparation of teaching assistants;
- These steps result in an explicit articulation and incorporation of the exact role of the service courses in the department’s overall educational mission and strategic plan.
Course Syllabi

All courses were accompanied by detailed syllabi. However, most of the content of the syllabi is devoted to organizational and operational matters, many of which were repetitive. With few exceptions, none gave students a good sense of what the course was about, why they should take it, and what they will gain from it. Students thus had to rely on often inadequately informed advisors or the lore of other students to make correspondingly uninformed decisions about what courses to take and with what instructors. They should not be advised to ask the medical schools why they have to take organic chemistry.

Among other information, the syllabi list the exam schedules. Faculty members told the Committee that exams must be held during the day unless all students in a course agree to alternative times. However, students said that other departments are easily able to give exams in the evening, which many students prefer. This question bears further examination if the teaching faculty, as the Committee was told, need more classroom time.

Accordingly, the Consultants recommend that

- The course syllabi be revised collaboratively by all faculty members teaching these courses to emphasize the fundamental content and value of each course, both with respect to the students’ career plans and for the courses’ inherent intellectual content. Repetitive organizational material could be provided to all students in separately distributed materials;
- A strategy for offering exams in the evening, where preferred, be developed.

Course Content

Faculty members in both the First-Year and organic programs emphasized that the courses were essentially standard chemistry courses. Indeed, the organic textbook is identical to that used in the course for majors. Use of the first-year program text, written by a faculty member in the program, has not been reviewed for considerable time. Laboratory experiments are well known, time tested, and of interest to chemists. Guided-inquiry labs appear to be well received, although some students and a few teaching assistants noted the disconnect with the more-structured labs and required laboratory reports in the organic courses. All sections of a given course are expected to cover the same material, and students in the organic laboratory course take a common final exam. The Consultants perceived that Lecturers do not uniformly favor these last two practices.

While no profound red flags emerged from the students or the engineering faculty with whom the Consultants met, students offered an array of both positive and negative perspectives that could inform regular assessment or examination of the courses. The one recurrent theme that emerged both from the conversations and the student evaluations was the issue of course relevance to student interests. Engineering students, for example, felt that the emphasis on algorithmic problem solving in Chemistry 101 and 102 was less useful to them than would be more emphasis on conceptual understanding. Moreover, students made it clear that they were less concerned about examples being drawn from their specific areas of interest than that
applications and examples be offered in any areas outside the narrow realm that fascinates chemists. The relationship between organic chemistry problem solving and medical diagnosis, for example, can be a powerful pedagogical tool for more than premedical students. Students in addition to biology majors and premedical students could benefit from illustrations of chemical principles in a biological or biomedical context. Not only environmental-sciences students but many others as well could gain from illustrations and laboratory applications drawn from that realm. One could even imagine exercises in which the students are challenged to identify the role of chemistry in areas that interest them. Indeed, the breadth of the students’ interest and experience affords a nearly unlimited mine from which to extract precious nuggets that can enthrall the students. Doing so can also contribute substantially to creating ambassadors who could propel a better understanding of the larger role and applicability of chemistry—that it is indeed a liberal art.

Accordingly, the Consultants recommend that:

- The Department thoroughly review the content and textbooks of the first-year program and organic courses, especially Chemistry 101, 102, 227, 228, and their associated laboratory courses, and revise them to incorporate more examples, illustrations, and applications to areas outside traditional chemistry. Laboratory experiments especially could be tailored to the interests of the non-majors who constitute the bulk of the students. Successful approaches in chemistry departments elsewhere may offer some models, as could the types and breadth of examples discussed in Chemistry 100;
- The Department consider building on the first-year-program perspective of chemistry as an experimental science, established through the guided-inquiry labs, by including at least one guided-inquiry, discovery-based, or problem-based experiment in the organic laboratories;
- The Department establish mechanisms for capturing student views about courses that do not emerge from the evaluation questionnaires.

Relationships with Client Departments

While the representatives from engineering with whom the Consultants met were generally satisfied with the Department’s offerings, they hinted at a desire for closer communication with the Department. Indeed, out of the Consultants’ conversations with the engineering faculty emerged an interest in developing a new course that, together with Chem 107, could satisfy a bioengineering requirement. Because no faculty representatives from other client departments were available, the Consultants do not know the breadth of overall satisfaction with the service courses or desire for greater communication with the Department. However, it is easy to imagine that all Departments would benefit from greater interaction with the Chemistry Department. Therefore, the Consultants recommend that:

- The Department review syllabi and course content periodically with faculty members from client departments—at least, those from which the majority of the students come—for suitability for their students. In addition to improving courses, this step will strengthen alliances with client departments, which can have larger salutary effects in garnering institutional support for curricular matters;
• The Department regularly explore with client departments new course opportunities that would enable client students to meet their requirements while strengthening the Chemistry Department’s presence.

*TA Training*

The Consultants were pleased with the commitment to preparing teaching assistants for the laboratory courses. Requiring the TAs to carry out the experiments as if they were taking the courses, while labor intensive, is a useful exercise that the TAs value. The IAs and Mentor IAs were especially satisfied with their experience. Indeed, appointment to one of those positions could be used to benefit graduate student recruiting. The Department should work to extend all successful attributes of TA training in the first-year program to TA training for all levels of the curriculum.

However, it is not clear if the TA training activities draw sufficiently upon the emerging knowledge base of successful experiences and approaches to TA training at other institutions that might make the Department’s efforts even more effective and efficient. Some TAs expressed a wish for further guidance on use of the Help desk that they are required to staff; others conceded a lack of clarity about the role and grading of laboratories. No information was available on the effectiveness of the Help desk. The Consultants thus recommend that:

• The Department explore additional models, such as the “Preparing Future Faculty” Program, and additional programs at the Universities of Michigan and California at Berkeley, and other institutions, for preparing teaching assistants;
• The Department expand the teaching-assistant training approach used in the first-year program, especially the use of Mentor IAs, at least to the second-year organic courses, especially because the “guided-inquiry” labs in the first-year program are not carried over into the organic laboratories;
• TA training be extended to include discussion of responsibilities at the Help desk;
• The effectiveness of the Help desk be reviewed and evaluated;
• A consistent set of TA expectations be developed.

*Facilities*

The Committee visited only the first-year program laboratories and classrooms in Heldenfeld, and thus cannot comment on the organic laboratories facilities. However, from information made available, the perception exists that somewhat greater support staff and other resources appear to be on hand for the organic courses than for the first-year program. At the same time, students raised more concerns about access to enough sufficiently modern equipment in the organic laboratories compared to the first-year program laboratories. While the first-year program’s stockroom displays substantial improvement, it is clear that, for safety and efficiency, more renovation is necessary.

The Consultants were also struck by the overwhelming extent to which the laboratory fees are used to support not only the service courses but others as well, and were especially concerned about the use of laboratory fees for salaries of service-course instructors. While acknowledging
that the need for such use lies in reductions in State allocations, the Consultants are troubled by the use of these fees for these purposes, a practice that essentially represents a hidden tuition increase. A more-comprehensive strategy for restoring State allocations, in collaboration with the administration and the departments whose students benefit from the courses, should be explored.

Accordingly, the Consultants recommend that:

- Support for the two sets of laboratories be analyzed regularly and maintained at a level commensurate with the overarching educational goals of each, taking into account any specific course-related constraints;
- Investments be made in appropriate instructional laboratory equipment to meet these overarching educational goals, and an effective maintenance procedure be put into place;
- Alternatives to use of the laboratory fees for support of the service courses (especially the support of service-course instructor salary lines) be explored, and a strategy be developed in collaboration with the client departments and in cooperation with the administration.
- Resource allocation to the service courses be transparent to all faculty and staff associated with these courses.

**Faculty Participation and Development**

The Consultants were took substantial note of how few service-course faculty members take part in broader Department activities. Little evidence existed of attempts either to engage these faculty members in this way, or of their own desire to do so. For example, most do not regularly attend Department-wide seminars by external speakers; however, few such seminars of interest to them are scheduled. They appear to play no role in shaping the seminar programs or other substantive Departmental activities. Service-course faculty members are not ordinarily members of standing committees, and chair none of them. They appear not to teach honors courses. Such apparent divisions can lead to misunderstandings and misapprehensions, and prevent the Department from fully exploiting the vast intellectual strength it possesses.

While some of these faculty members take part in on-campus educational seminars, given their high teaching expectations it is not surprising that most do not participate to any great extent in professional activities either within or outside the department. These include attendance at professional conferences and meetings, preparation and submission of external proposals as principal investigators, travel to other institutions for professional purposes, professional collaborations across departments and institutions; research/scholarly leave; and individual or, perhaps more effectively, collaborative research with attendant scholarly publication. Such activities are critical for maintaining intellectual vitality, ensuring awareness of latest pedagogies, and enhancing both individual and Departmental visibility in the educational arena that is so important for attracting students, faculty, and external support. Thus, not only does Department policy need to encourage professional activities for this cohort of its staff, as it does for research-active faculty, but the teaching faculty also has to take responsibility for creating circumstances that would allow them to do so.

The issue of proposals is an important one. A focus on education at all levels is increasingly part of national educational policy, and substantial Federal, state and private funds are available for
educational and pedagogical purposes, some of which carry indirect costs. Yet, examination of the Department’s grant portfolio reveals negligible amounts of those funds. This is a missed opportunity.

The Consultants thus recommend that:

- Departmental policies and practices be re-examined with the goal of institutionalizing greater service-course faculty participation in Departmental activities and committees in a manner that best capitalizes on their intellectual strengths and abilities to contribute;
- Funds be budgeted for this faculty cohort to travel to professional meetings and for related purposes, such as research or scholarly leave, based on justifiable requests;
- Policies be changed to accommodate these faculty members as principal investigators on external proposals when appropriately justified;
- The service-course faculty develop a strategy that allows participation in professional activities, especially for those without extended contracts.

**Faculty Evaluation, Reward and Advancement**

Faculty teaching is evaluated via student questionnaires and visits to lectures. Course coordinators or their designees visit the classes of all Lecturers. The Consultants were pleased to learn that the Department Head has adopted the practice of occasionally visiting the lectures of all faculty members, not just those to be promoted or tenured. Institutionalization of this practice across the entire faculty would be highly desirable.

The use of service-course faculty for teaching the bulk of the student-credit hours means that the Department effectively has a two-tier faculty structure. This is not unique to the Department, nor is it inherently problematic. However, the two tiers do not operate in a professionally parallel manner. The system especially prohibits crossing between tiers as the abilities, interests and priorities of the faculty evolve over time. Again, these circumstances represent an opportunity for the Department to take leadership in developing new models for advancement and promotion, especially of the service-course faculty but in fact for all faculty members.

In the evaluation of service-course faculty members, research and scholarly activities appear to play a lesser role than teaching does in the evaluation of tenured/tenure-track faculty members. For the reasons described above, this is understandable. However, the absence of any apparent set of incentives for innovative activities in education was notable. This question, which University administrators have identified as one opportunity for the Department to demonstrate leadership, stretches beyond the service-course domain into the ranks of the professoriate. Indeed, the Consultants heard concerns expressed by some tenured/tenure-track faculty members about how their participation in educational development would be perceived by their colleagues, especially with respect to promotion. This topic bears considerable attention. If contributions to teaching are not valued sufficiently for tenure and promotion, and the efforts of a substantial subset of faculty members are not validated and nurtured, then the seeds for educational improvement will not take root. The corresponding risk of stagnation could have a serious effect on the ability to attract new faculty members, who increasingly will emerge with a commitment to education as part of their professional portfolios. Furthermore, a growing number
of departments elsewhere have observed that incorporating a commitment to education into their programs increasingly appeals to prospective graduate students.

The status of the Lecturers also bears attention. The Lecturers play a central and critical role in the Department that enables others to carry out their responsibilities largely in the research arena. Yet, Lecturers are appointed without the prospect of continuing employment, without formal pathways for career advancement, and with no hierarchy of position titles available through which their careers can advance. Indeed, even the title of Lecturer is not uniform across the University; in at least one other department, this title is applied to graduate teaching assistants. Thus, little professional incentive exists for Lecturers to develop long-term commitments to the Department, although some existing long-term commitments are largely tied to personal circumstances.

The opportunity thus arises to craft a clear set of expectations for Lecturer accomplishments, a more-highly structured evaluation procedure comparable to that used for assistant professors, longer-term contracts at the Senior Lecturer level than the current rolling three-year commitment, and creation of titles that reflect the professional status and respect suitable for the appropriate level of professional accomplishment. The prospect of tenure or its equivalent (e.g. continuing appointment) should also be considered. Examination of practices used at other institutions would be fruitful in this regard. For example, the City University of New York provides a Certificate of Continuous Employment to comparable faculty after a defined period of employment and satisfactory evaluations.

Accordingly, the Consultants recommend that:

- Participation in teaching and other educational activities for all faculty members be explicitly recognized and nurtured, and opportunities for tenured/tenure-track professorial faculty to devote attention to educational matters be encouraged;
- Clearly articulated pathways for professional advancement be established for, and in collaboration with, the Lecturers, including expectations for Lecturer professional activities.
- A hierarchy of titles parallel to the professorial track be developed for the Lecturer track that explicitly reflects and acknowledges professional accomplishments by the Lecturers;
- A mechanism for Lecturers to achieve long-term or continuous appointment be established.

Establishment of a Chemical Education Subdiscipline

Since 1997, the Department has offered a Master of Science degree with an emphasis in Chemical Education. Twenty-one students have been or are enrolled in the program; six graduates are known to have pursued careers in education. In 2002 the Department established a Chemical Education Committee to review the Masters degree. The Committee made several thoughtful recommendations that the Consultants understand are being pursued, but which were not discussed during the visit.
Additionally, a number of faculty members have expressed interest in establishing a more-formal chemical education subdiscipline within the Department of Chemistry, and in exploring establishment of a Ph.D. degree program in Chemical Education. This interest appears to be driven by the participation of some faculty in chemical education activities: attendance at conferences, educational assistance to the State of Texas, the Chemistry Roadshow, occasional papers in the *Journal of Chemical Education*, textbook publication, and the like. However, there has been relatively little activity of a scholarly nature that produces new, peer-reviewed knowledge, is published in scholarly journals, and forms the basis for research-grant support. It is thus important to understand that creation of a subdiscipline would imply exactly these types of scholarly activities, and those activities would in turn attract and prepare graduate students interested in chemical education as an area of scholarship.

Establishing a program in chemical education is growing in interest at other institutions. Indeed, the experience of some leading chemistry departments is that a vibrant program in chemical education can appeal to highly capable graduate students, and can even attract promising research faculty with a strong interest in education. However, this is not a step to be taken lightly. The Department should undertake a thorough study of the larger need for such a program. Among other factors, the study should explore the Department’s potentially unique contributions to chemical education research, the resources required to be invested, hiring strategies for new faculty, the market for recruiting potential graduate students, policies for supervision of graduate students, the job market for graduates, and the program’s competitiveness with other such programs. Additionally and importantly, the possibility for Lecturers to serve as the primary dissertation advisors to doctoral students will have to be seriously examined. The study would be best carried out with the critical assistance of an external visiting committee of experts.

**Concluding Comments**

The Texas A&M Chemistry Department stands at the entrance to new opportunities. It has elected not merely to address the quality of its service courses. Rather, it has asked how those courses can contribute to the fulfillment of the Department’s larger mission as an institution of higher learning, committed not only to producing new knowledge but also to creating those who will produce and propel the knowledge of the future. Doing so is the “service” that the courses under examination provide. Because of the respect it has earned through its leadership in research, the Department is poised to take leadership in education as well. The Consultants are convinced that if it uses this exercise to crystallize its larger educational role, and if the entire faculty unites behind these objectives, the Department will indeed emerge into a sphere of leadership that can only advance itself, the University, and the future of science and scholarship.
First Year and Service Course Review:
Departmental Responses and Recommendations

The Merrimack Consultants Report on the recent evaluation of our service course offerings makes a large number of recommendations addressing various aspects of our program. Some of these address detailed operating procedures while others are intended to encourage the Department to reflect further on its own goals and motivations as regards these programs.

We, the Chemistry Department Committee (D. Bergbreiter, M. Darensbourg, F. Gabbai, K. Harding, P. Lindahl, J. Natowitz) charged with reviewing these recommendations find that they are generally well considered and worthy of serious consideration by the faculty and so recommend. Based upon our own review and discussion of the report we have formulated several specific policy recommendations, which if acted upon, should address many of the items discussed in the report.

Major Recommendation 1

We recommend that the Department Head appoint a new “Service Course Curriculum Committee”. This Committee should include both faculty members (tenure-track and non tenure-track) who are involved directly in the service courses and other faculty members interested in the undergraduate education.

As an initial charge, this committee should be asked to review and make appropriate recommendations on:

- The exact role of the service courses in the department’s overall educational mission and strategic plan.
- The content and overall educational strategy of the service courses
- Appropriate staffing (teaching and support personnel) of service programs
- The textbooks of the first-year program and organic service courses and their associated laboratory courses
- The relationship between the first-year program and organic classroom and laboratory objectives
- The roles and preparation of teaching assistants
- The allocation of Departmental resources to these programs
• Mechanisms for periodic review of course content and exploration of new course opportunities with faculty members from client departments.

Longer term, this committee should be charged with the continuing monitoring, advising and evaluation for the service courses, including formal assessment of service-course outcomes. As noted by the Lichter Committee, “The University’s recently completed Quality Enhancement Plan for assessing student learning outcomes may provide a vehicle for framing the assessment.”

**Major Recommendation 2**

We recommend that the Department Head present to the faculty a specific proposal for

- A systematic approach for evaluation and hiring of new lecturers
- A hierarchy of titles and salary ranges for the Lecturer track that explicitly reflects and acknowledges professional accomplishments by the Lecturers
- A mechanism for Lecturers to achieve long-term appointment
- Clearly articulated pathways for Lecturer professional advancement

In this context, we further recommend that current Departmental policies and practices be re-examined with the goal of institutionalizing greater service-course faculty participation in Departmental activities, committees and external funding initiatives in a manner that best capitalizes on their intellectual strengths and abilities to contribute.

**Major Recommendation 3**

The Committee notes the number of caveats made by the Lichter Committee about undertaking a major Chemical Education initiative. This Committee recommends that the Chemistry Department not pursue development of a Chemical Education sub-discipline at this time. We do recommend that the Department increase its commitment to Chemical Education through the development of a Preparing Future Faculty program that would be available to any graduate student in the Department. The TAMU Graduate Teaching Academy in the Center for Teaching Excellence could serve as a starting point for the PFF program. (Information on Preparing Future Faculty programs can be found at: [http://www.preparing-faculty.org/](http://www.preparing-faculty.org/) ; [http://www1.umn.edu/ohr/teachlearn/pff/index.html](http://www1.umn.edu/ohr/teachlearn/pff/index.html) ; and [http://sociweb.tamu.edu/faculty/PRECHEL/PreparingFutureFaculty.pdf](http://sociweb.tamu.edu/faculty/PRECHEL/PreparingFutureFaculty.pdf))

**Additional Recommendation**

We recommend that Faculty members associated with each major Departmental offering be tasked with developing introductory handouts for those courses which emphasize the fundamental content and value of each course, both with respect to the courses’ inherent intellectual content and the students’ career plans.
A6. Department of Chemistry
Graduate Course Description
Department of Chemistry Graduate Course Descriptions

601. Analytical Chemistry I. (3-0). Credit 3. Fundamentals of chemical instrumentation. Modular approach to instrumental methods of chemical analysis; modules to be covered include digital electronics, modern optics, basic quantification and signal-to-noise enhancements. Prerequisite: Graduate classification in chemistry or approval of instructor.

602. Analytical Chemistry II. (3-0). Credit 3. Modern analytical techniques, spectroscopies, chromatography, and “hyphenated” methods such as GC-FTIR, GC-MS, HPLC-MS, CE-LIF, and CE-MS are examined from the perspective of surface analysis, fundamentals of separation science and structural characterization of complex molecular systems. Prerequisite: CHEM 601.

603. Modern Chromatographic Separation Methods. (3-0). Credit 3. Detailed treatment of the most recent developments in the theory and methodology of high performance chromatographic techniques. Intended for graduate students in chemistry, chemical engineering, and the life sciences. Prerequisite: Graduate standing.

604. Modern Electrophoretic Separation Methods. (3-0). Credit 3. This 3 credit hours course is concerned with the most recent developments in the theory and methodology of modern electrophoretic separation methods. The course is designed for graduate students in chemistry, chemical engineering and the life sciences who have taken or are taking now CHEM 601, are familiar with the fundamentals of analytical separation methods and require the knowledge of electrophoretic separations for their research. Prerequisite: CHEM 601 or instructor’s approval.

610. Organic Reactions. (3-0). Credit 3. Introduction to mechanisms and scope of the basic organic reaction types as applied to major functional groups. Prerequisite: CHEM 646 or approval of instructor.


616. Organometallic Transformations for Organic Synthesis. (3-0). Credit 3. Introduction to transition and main group metal-mediated reactions in organic synthesis; organometallic mechanisms in the context of homogeneous catalytic systems currently employed in synthetic laboratories; emphasis on the properties of transition metal complexes and their interactions with organic substrates that promote useful chemical transformations. Prerequisite: CHEM 646 recommended.
618. NMR Spectroscopy. (3-0). Credit 3. Theory and practice of modern nuclear magnetic resonance spectroscopy; Bloch equations, relaxation and relaxation mechanisms, chemical exchange, pulse and Fourier-transform methods, selective excitation, 2-D methods and solid-state nuclear magnetic resonance. Prerequisite: Graduate classification in chemistry or approval of instructor.

619. Analytical Spectroscopy. (3-0). Credit 3. Modern analytical spectroscopic techniques; U.V., visible spectroscopy, atomic absorption, emission spectrometry, flame emission, fluorometry, x-ray methods and other new developments in analytical spectroscopy. Prerequisite: CHEM 602 or approval of instructor.

621. Chemical Kinetics. (3-0). Credit 3. Present theories about chemical reaction rates and mechanisms. Prerequisite: CHEM 324.

622. Adsorption Phenomena and Heterogeneous Catalysis. (3-0). Credit 3. Chemistry of the gas-solid interface; energetics, isotherms and rates of gas adsorption on solid surfaces; experimental methods of studying solid surfaces and adsorption phenomena; kinetics and mechanisms of selected heterogeneous catalytic reactions.

623. Surface Chemistry. (3-0). Credit 3. Nature, structure and chemistry of surfaces; characterization of surfaces from surface energy to structure; relation to chemical processes. Prerequisite: Graduate classification in chemistry or approval of instructor.

626. Thermodynamics. (3-0). Credit 3. Theory and applications of classical thermodynamic functions. Prerequisite: CHEM 324.

627. Principles of Biological Chemistry. (3-0). Credit 3. General principles of biological chemistry with an emphasis on the structures and mechanisms of action for proteins, nucleic acids and lipids. Prerequisite: Graduate classification.

628. Coordination and Bioinorganic Chemistry. (3-0). Credit 3. Structure and reactivity of coordination compounds; reactions of metal ions with small biomolecules and the reactions of toxic metal ions; role of metal ions in biological systems including the function of metal ions in enzymes. Prerequisite: CHEM 633.

629. Main Group Chemistry. (3-0). Credit 3. Chemistry of the ns and np elements of the periodic table and the noble gases including the organometallic chemistry of these elements. Prerequisite: CHEM 633.
630. Bioorganic Chemistry. (3-0). Credit 3. Introduction to current research areas of bioorganic chemistry and chemical genetic tools in exploring biological systems; DNA recombinant technology; histone chemical biology; protein glycosylation; protein engineering methods; gene transcription regulation; semi-synthesis of proteins with PTM analogs. Prerequisites: CHEM 627 or approval of instructor.

631. Statistical Thermodynamics. (3-0). Credit 3. Methods of statistical mechanics based primarily on Boltzmann statistics; approach to thermodynamics through partition function; statistical concept of entropy. Prerequisite: CHEM 626.

633. Principles of Inorganic Chemistry. (3-0). Credit 3. General principles of inorganic chemistry treated with a view to applications in other subfields of chemistry. Prerequisite: Graduate classification in chemistry or approval of instructor.

634. Physical Methods in Inorganic Chemistry. (3-0). Credit 3. Determination of the molecular structure of inorganic and organometallic species; modern aspects of diffraction, magnetic resonance and vibrational methods. Prerequisite: CHEM 641 or 673.

635. Introduction to X-ray Diffraction Methods. (3-0). Credit 3. This course presents the fundamentals of diffraction theory by crystals and the solution of crystal structures using this methodology. Prerequisite: BS in Chemistry, Physics, or Engineering.

636. Mechanistic Inorganic Chemistry. (3-0). Credit 3. Reaction pathways in both main group and transition-metal complexes; factors which influence the reaction rate including nature of the metal, the coordination sphere, reaction conditions and catalytic intermediates. Prerequisite: CHEM 633.

637. Electroanalytical Chemistry. (3-0). Credit 3. Modern electroanalytical methods including potentiostatic, galvanostatic, sweep and periodic techniques. Prerequisite: CHEM 602 or approval of instructor.

641. Structural Inorganic Chemistry. (3-0). Credit 3. Introduction to chemical bonding; ionic, covalent, coordinate and hydrogen bonding; relationship of molecular orbital and ligand field theories to experimental studies of the electronic structure of inorganic molecules. Prerequisites: CHEM 633 and 673.

642. Organometallic Chemistry and Homogeneous Catalysis. (3-0). Credit 3. Synthesis, structure and reactivity of organometallic compounds; elementary processes for general and radical reactions, mechanism of reactions at metal centers and applications to homogeneous catalysis. Prerequisite: CHEM 633.
646. Physical Organic Chemistry. (3-0). Credit 3. A detailed introduction to the theory and principles of organic chemistry; bonding and structure in organic chemistry, stereochemistry, reactive intermediates in organic chemistry and transition state theory; kinetics and thermodynamic approaches. Prerequisite: CHEM 228 or approval of instructor.

647. Spectra of Organic Compounds. (3-0). Credit 3. Correlations of molecular structure with spectroscopic and other physical properties; applications to modern problems in organic chemistry. Prerequisite: CHEM 646 or approval of instructor.

648. Principles of Quantum Mechanics. (3-0). Credit 3. Classical mechanics and development of wave mechanics; application of wave mechanics to special chemical problems. Prerequisite: Approval of instructor.

650. Molecular Spectra and Structure. (3-0). Credit 3. Introduction to molecular spectroscopy and its relations to structure, theoretical treatments, quantum and wave mechanics, vibrations and normal coordinates, molecular symmetry and group theory. Prerequisite: Qualifying graduate students in chemistry and physics or approval of instructor.

658. Molecular Modeling. (1-1). Credit 2. An introduction to molecular modeling with an emphasis on quantum level calculations. Lectures will cover the basic theory behind the calculations and lab work will focus on the practical application of modern computational chemistry codes. Prerequisite: Graduate classification or approval of instructor.

660. Nuclear Chemistry. (3-0). Credit 3. Radioactive decay, nuclear models, nuclear spectroscopy, nuclear reactions, fission and other topics of current interest in nuclear chemical research. Prerequisite: CHEM 464 or approval of instructor.

670. Physical Methods in Biological Chemistry. (3-0). Credit 3. Overview of current methods for the characterization of biological macromolecules, including protein structure, protein-ligand interactions, protein folding; techniques discussed include nuclear magnetic resonance, optical spectroscopy, calorimetry, electron paramagnetic resonance, Mössbauer spectroscopy, X-ray crystallography, electron microscopy, and mass spectrometry. Prerequisite: Graduate classification or approval of instructor.

671. Macromolecular Folding and Design. (1-0). Credit 1. Oral presentations and discussions in the general area of biomolecular structure, folding, function and design. May be taken 12 times. Prerequisite: Approval of instructor. Cross-listed with BICH 671 and MBCH 671.
672. Bioorganic Reaction Mechanisms. (3-0). Credit 3. Proposed mechanisms of action of various enzymes and coenzymes from the “model systems” approach; new developments, theory and established mechanisms. Prerequisites: CHEM 646; BICH 624.

673. Symmetry and Group Theory in Chemistry. (3-0). Credit 3. Applications of symmetry and group theory to various types of chemical systems; classification of molecules into symmetry point groups and use of character tables. Prerequisite: Bachelor’s degree in chemistry.

681. Seminar. Credit 1 each semester. Oral presentations and discussions of recent advances in chemistry.

684. Professional Internship. Credit 1 to 4. Supervised practical experience in professional functions appropriate to career goals in chemical education. Students will be required to complete a scholarly report of these activities acceptable to graduate committee. Enrollment limited to students pursuing a non-thesis MS degree, with emphasis on chemical education. Requires approval of committee chair and department head with non-thesis MS degree plan filed. Prerequisite: Graduate classification in chemistry.

685. Directed Studies. Credit 1 to 6. Special topics to suit small group requirements; more recent problems and results in various branches of chemistry; laboratory work or conference and discussion. Prerequisite: Graduate classification.

686. Ethics in Chemical Research and Scholarship. (1-0). Credit 1. Ethical issues in chemical research and scholarship and methods for resolution of such issues; includes Texas A&M University Policies and Procedures, ethics and scientific truth, ethics and other scientists and ethics and society; case studies. Prerequisite: Graduate classification in chemistry or biochemistry.

689. Special Topics in... Credit 1 to 4. Selected topics in an identified area of chemistry. May be repeated for credit. Prerequisites: Graduate classification and approval of instructor.

690. Theory of Chemical Research. (3-0). Credit 3. The design of research experiments in various subfields of chemistry and the evaluation of research results with the aid of examples taken from the current scientific literature. May be repeated for credit.

691. Research. Credit 1 or more each semester. Research for thesis or dissertation.

695. Frontiers in Chemical Research. (3-0). Credit 3. Present status of research in a variety of significant chemical fields. Content will depend on the availability of visiting lecturers who will
be selected because of distinguished international recognition in their fields of research. May be taken twice. Prerequisite: Graduate classification.

696. Modern Applications in Chemistry. (3-0). Credit 3. Investigates modern topics in chemistry and their application in pre-college classrooms in a manner compatible with good scientific inquiry; designed for in-service teachers or those who have permission from their graduate advisory committee. Prerequisite: CHEM 101/102 or approval of instructor.

697. Methods in Teaching Chemistry Laboratory. (1-2). Credit 1. An introduction to teaching methods associated with the teaching of introductory chemistry laboratories using graduate teaching assistants. Emphasis placed on effective communication, preparation, record keeping, and safe and effective management of an instructional laboratory. May be repeated for credit. Prerequisite: Graduate classification in chemistry.

698. Inquiry and Chemical Concepts. (2-0). Credit 2. Essential concepts in chemistry at the pre-college level; investigates methods and techniques of inquiry teaching as called for by state and national standards; parallels between inquiry teaching and scientific inquiry. This course will be a combination of regular and Internet-based classes. Prerequisite: CHEM 102 or approval of instructor.
A7. Chemistry Department Committees
CHEMISTRY DEPARTMENT COMMITTEES

* = Chair

Academic Operations Council: (Elected and Appointed) Advises the head and serves as his or her resource for long-range planning and policy issues relevant to the academic operations of the Department.

Department Head: Russell, D.H.* Rosynek, M.P.
Associate Head: Graduate Advisor: Undergraduate Advisor: North, S.W. Gaede, H. Hughbanks, T.R. Pellois, J.
First Year Representative Lecturers Representative

Division Chairs: Analytical/Batteas, J.D.Alternate: Cremer, P.S.
Biological/Begley, T.P.Alternate: Raushel, F.M.
Inorganic/Bluemel, J.Alternate: Hughbanks, T.R.
Organic/Romo, D.Alternate: Gladysz, J.A.
Phys./Nuc./Lucchese, R.R. Alternate: Bevan, J.W.

Ex officio non-voting members
Assistant Head Carter, R.G. President of GSAC
President undergraduate ACS student affiliates

ACS Student Affiliate Chapter Advisor: Advises and encourages development of professional interests of undergraduate chemistry majors.
Tiner, T.*

Colloquium and Seminar Committee: Organizes and coordinates departmental colloquium and seminar program; coordinates and supervises Department's participation in Southwest Speakers Exchange program.

Cremer, P.S. Lindahl, P.A. Watanabe, C.M.
Gabbaï, F.P. Rosynek, M.P. *

Executive Committee: Review major departmental actions and make recommendations to the Department Head and serve as a resource for long-range planning and policy issues.

**Faculty Awards Committee**: Solicits and reviews nominations of department faculty members for both internal, University-administered awards, and those of external professional societies.

**Teaching/Service:**
Bergbreiter, D.E. Rosynek, M.P.
Schweikert, E.A.* Gaede, H.
Carter, R.G. Yennello, S.J.

**Research:**
Burgess, K. Raushel, F.M.
Romo, D. Gladysz, J.A.
Daresbourg, M.Y. Soriaga, M.P.*

**Faculty/Graduate Student Working Group**: Provide a forum for all Graduate Students, via their elected GSAC representatives, to voice their concerns and opinion regarding issues of interest to Graduate Students. Provide information flow from Chemistry Department Administration to the Graduate Students.

Batteas, J.D. Pellois, J. Romo, D.
Begley, T.P. North, S.W. Rosynek, M.P.
Cremer, P.S. Ozerov, O. Russell, D.H.

**Graduate Admissions and Review Committee**: Establishes and periodically reviews departmental standards for admission of prospective graduate students; reviews academic records and qualifications of marginal applicants and makes appropriate recommendations to Graduate Advisor; reviews progress of probationary graduate students and makes recommendations to Graduate College.

Batteas, J.D. Ozerov, O.* Yang, J.
Begley, T.P. Pellois, J.
North, S.W Son, D.H.

**Graduate Awards Committee**: Reviews and identifies nominees, from among graduate students for various awards, fellowships, and honors.

Gabbai, F.P.* Singleton, D.
Pellois, Lindahl, P.A.
J. Hilty, C.B.
Graduate Curriculum Committee: Establishes and reviews departmental standards related to graduate instructional programs; periodically reviews departmental policies regarding cumulative examinations, degree programs, student research proposals, and course requirements; reviews faculty proposals for new graduate courses.

Batteas, J.D. Lindahl, P.A. Rosynek, M.P.
Darensbourg, D.J. North, S.W.*
Gabbaï, F.P. Romo, D.

Information and Communications Technology (ICT): Serves as an advisory panel to formulate the departmental policies of information and communications technology.

Hall, M.B.* Reibenspies,
Pitts, D. J. Pérez, L.
Hilty, C. Rosynek, M.P

Library Committee: Solicits, reviews, and expedites chemistry-related acquisitions by University and Libraries.

Burgess, K.* (Liaison) Darensbourg, M.Y.
Lucchese, R.R. Vigh, G.
Darensbourg, M.Y.

Promotion and Tenure Committee: (Elected) Reviews instructional/research performances and professional activities of departmental lecturers and tenure-track faculty members; advises Department Head on promotion, tenure, and appointment recommendations.

Analytical: Soriaga, M.P. At-Large: Bergbreiter, D.E.
At-Large: Cremer, P.S. Organic: Singleton, D.A.
Biological: Raushel, F.M. Physical: Bevan, J.W.

Research Infrastructure Committee: Provide guidance to the existing research infrastructure as well as develop plans for future needs.

Dunbar, K.R. Romo, D.
Reibenspies, J. Lindahl, P.A.
Gladysz, J.A.* Silber, S.
**Space Committee:** Reviews requests and allocates laboratory space within the Department.

Cremer, P.S.  
Raushel, F.M.  
Darensbourg, M.Y.

**Undergraduate Awards Committee:** Reviews and identifies nominees, from among undergraduate chemistry majors, for various awards, scholarships, and honors.

Brown, L.S.  
Darensbourg, D.J.  
Gaede, H.*

Brown, L.S.  
Darensbourg, D.J.  
Gaede, H.*

**Undergraduate Curriculum Committee:** Reviews curricula and requirements of undergraduate B.A. and B.S. chemistry majors; plans program modifications and improvements.

Gaede, H.*  
Hughbanks, T.R.

Gaede, H.*  
Hughbanks, T.R.

Raushel, F.M.  
Singleton, D.A.

Rushel, F.M.  
Singleton, D.A.

Gabbai, F.P.  
Soriaga, E.

Rosynek, M.P.*  
Rosynek, M.P.*

Vigh, G.  
Soriaga, E.
A8. List of Undergraduate Institutions for Recent Entering Graduate Students
# List of Undergraduate Institutions for Recent Entering Graduate Students

## 2012

<table>
<thead>
<tr>
<th>Student Name</th>
<th>University Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahn, Shin-Hye (Grace)</td>
<td>University of British Columbia</td>
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<tr>
<td>Ali, Ahmed</td>
<td>Southern Polytech State University</td>
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<tr>
<td>Baker, Joseph</td>
<td>Missouri State University/Eastern Kentucky University</td>
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<tr>
<td>Birk, Francisco</td>
<td>University of Florida</td>
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<td>Chao, Chih-Gang</td>
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<td>Chen, Chia-Hsiu</td>
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<td>Chihak, Sasha</td>
<td>University of Wisconsin-LaCrosse</td>
</tr>
<tr>
<td>Das, Deepika</td>
<td>Calcutta University/India Institute of Technology-Madras</td>
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<td>DeLaRosa, Anna Marie</td>
<td>University of Dallas</td>
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<td>Ding, Shengda</td>
<td>Fudan University</td>
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<td>Dong, Yitong</td>
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<td>Estrada, Alexander</td>
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<td>Felder, Simcha</td>
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<td>Hoyuela, Robert</td>
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<td>Marrero Ortiz, Wilmarie</td>
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<td>Sharma, Vangmayee</td>
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<td>Name</td>
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<tr>
<td>Shih, Wei-Chun</td>
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<td>Zou, Lanfang</td>
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<td>Name</td>
<td>Institution</td>
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<tr>
<td>Bhandari, Dhananjay</td>
<td>Ind. Inst. of Chemical Tech.</td>
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<td>Chanani, Prem</td>
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<td>Northern Arizona University</td>
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<td>Eveland, Wade</td>
<td>Louisiana State University</td>
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<td>Fan, Jingwei</td>
<td>Nankai University</td>
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<td>Zhang, Guannan</td>
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A9. Listing of Administrative and Technical Staff
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Start Date</th>
</tr>
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<tbody>
<tr>
<td>Bakhmoutov, Vladimir</td>
<td>Research Instrumentation Specialist</td>
<td>2/18/2002</td>
</tr>
<tr>
<td>Belcik, Jennifer E</td>
<td>Office Associate</td>
<td>9/1/2008</td>
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<tr>
<td>Bhuvanesh, Nattamai</td>
<td>Research Instrumentation Specialist</td>
<td>1/2/2003</td>
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<tr>
<td>Breeding, Rebecca D</td>
<td>Lead Office Assistant</td>
<td>4/4/2006</td>
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<tr>
<td>Burch, Lyles M</td>
<td>Laboratory Operations Technician</td>
<td>7/1/2009</td>
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<tr>
<td>Campbell, Charlene R</td>
<td>Administrative Operations Coordinator</td>
<td>1/7/2002</td>
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<tr>
<td>Canales, Mayela</td>
<td>Administrative Assistant</td>
<td>10/1/2007</td>
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<tr>
<td>Capareda, Evamarie</td>
<td>Program Coordinator</td>
<td>11/14/2005</td>
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<tr>
<td>Carter, Ronald G</td>
<td>Assistant Department Head</td>
<td>9/7/1972</td>
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<tr>
<td>Coleman, Julian D</td>
<td>Systems Analyst I</td>
<td>4/7/2006</td>
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<tr>
<td>Dillard, Cindie T</td>
<td>Administrative Coordinator</td>
<td>7/1/2008</td>
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<tr>
<td>Farmer, Tammisha L</td>
<td>Administrative Coordinator</td>
<td>11/1/2010</td>
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<td>Forman, Patricia</td>
<td>Assistant to Department Head</td>
<td>9/24/1990</td>
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<tr>
<td>Gonzales, Monica R</td>
<td>Office Associate</td>
<td>4/7/1992</td>
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<td>Goodman, Eva</td>
<td>Administrative Assistant</td>
<td>5/10/2010</td>
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<td>Green, Michael D</td>
<td>Systems Analyst I</td>
<td>6/20/2000</td>
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<td>Hildreth, Robert A</td>
<td>Technical Laboratory Coordinator</td>
<td>6/26/2000</td>
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<tr>
<td>James, William D</td>
<td>Research Chemist</td>
<td>6/1/1980</td>
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<td>Junek, Terry A</td>
<td>Technician II</td>
<td>8/5/2010</td>
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<tr>
<td>Kolar, Frank L</td>
<td>Technical Laboratory Coordinator</td>
<td>6/1/1971</td>
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<td>Kosh, Mary J</td>
<td>Business Administrator I</td>
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<tr>
<td>Ledesma, Myong P</td>
<td>Administrative Assistant</td>
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<td>Lee, Curtis</td>
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<td>1/12/1989</td>
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<td>Leung, Tak W</td>
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<td>8/16/2011</td>
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<td>Liu, Amy H</td>
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<td>Ludwig, Judy R</td>
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<td>8/24/1974</td>
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<td>Manning, Sandra H</td>
<td>Administrative Assistant</td>
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<td>Medina, Angeline T</td>
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<tr>
<td>Mejia, Ethelyn V</td>
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<td>Melton, Sherry R</td>
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<td>8/27/2007</td>
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<tr>
<td>Merka, III, William C</td>
<td>Research Instrumentation Specialist</td>
<td>1/9/1985</td>
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<td>Miller, Mark L</td>
<td>Senior System Analyst I</td>
<td>1/1/1983</td>
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<td>Morgan, Mary J</td>
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<td>10/25/1990</td>
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<td>Nichols, Carrie A</td>
<td>Administrative Assistant</td>
<td>5/15/1974</td>
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<tr>
<td>Page, Ronald R</td>
<td>Master Instrument Maker</td>
<td>9/1/2011</td>
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<td>Perez, Lisa M</td>
<td>Associate Research Scientist</td>
<td>6/16/1994</td>
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<tr>
<td>Pitts, Derek C</td>
<td>Senior Information Technology Manager</td>
<td>10/24/2005</td>
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<td>Powers, Jill F</td>
<td>Senior Office Associate</td>
<td>9/8/1992</td>
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<td>Ramirez, Veronica</td>
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<td>8/18/2004</td>
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<td>Raulerson, Michael R</td>
<td>Electronics Technician II</td>
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<td>Redd, Linda S</td>
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<td>Reibenspies, Joseph H</td>
<td>Senior Research Instrumentation Specialist</td>
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<td>Rezenom, Yohannes H</td>
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<td>Richards, Susan M</td>
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<td>Robinson, Janet L</td>
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<td>Santiago, Vanessa</td>
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<td>Seward, William T</td>
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<td>Silber, Steven K</td>
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<td>Stickley, Angela T</td>
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<td>Warren, Marylin D</td>
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<td>Wen, Weihong</td>
<td>Software Applications Developer</td>
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<td>West, Elizabeth (Lizzie) M</td>
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<td>Williams, Howard</td>
<td>Senior Scientist</td>
<td>12/6/1990</td>
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<td>Williams, Lindsey D</td>
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<td>Williams, Melvin C</td>
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<td>Senior Office Associate</td>
<td>7/30/2010</td>
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<td>Wymola, Phillip V</td>
<td>Lab Stores &amp; Procurement Officer II</td>
<td>1/4/2006</td>
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<td>Zaragoza, Traci L</td>
<td>Lead Office Associate</td>
<td>5/13/2002</td>
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<td>Zercher, Julie A</td>
<td>Business Coordinator I</td>
<td>10/1/2004</td>
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</table>
A10. Chemistry Department Seminars
Colloquium and Seminar Speakers, 2010

Frontiers Lecture Series

2/8/2010  Brian Stoltz  
California Institute of Technology  
*Complex Natural Products as a Driving Force for Discovery in Organic Chemistry*

2/9/2010  Brian Stoltz  
California Institute of Technology  
*Oxidation Catalysis: The Development of Aerobic Based Oxidation Methodology for Synthetic Chemists*

2/10/2010  Brian Stoltz  
California Institute of Technology  
*The Intertwined Nature of Chemical Synthesis and the Discovery Process*

4/19/2010  Benjamin Cravatt  
The Scripps Institute  
*Activity-Based Proteomics: Technology Development and Biological Applications*

4/20/2010  Benjamin Cravatt  
The Scripps Institute  
*Activity-Based Proteomics: Mapping Enzymatic Pathways in Human Disease*

4/26/2010  Harry Gray  
California Institute of Technology  
*The Oxo Wall*

4/27/2010  Harry Gray  
California Institute of Technology  
*Electron Flow Through Metalloproteins*

4/28/2010  Harry Gray  
California Institute of Technology  
*Metalloprotein Conformational Dynamics*
Seminar Speakers

1/7/2010  Arthur Bragg
University of California, Los Angeles
*Watching Solvation in Liquids, One Solvent Molecule at a Time*

1/8/2010  Adolfo Horn, Jr.
Universidade Estadual do Norte Fluminense
*Development of Coordination Compounds with Pro-Oxidant, Antioxidant, Antitu-moral, and Antibacterial Activites*

1/20/2010  Kay Severin
École Polytechnique Fédérale de Lausanne
*Molecular Nanostructures, Polymers, and Sensors by Self-Assembly*

1/27/2010  Amar Flood
Indiana University
*Strong CH Hydxogen Bonds: The Newest Player in the Field of Anion Receptors.*

2/3/2010  Mu-Hyun Baik
Indiana University
*Searching for Mechanistic Keys to Unlock Small Molecule Activation Catalysis: The Two Faces of Redox-Non Innocence in Water Oxidation and C-H Activation*

2/4/2010  Milton Smith, III
Michigan State University
*Metal Catalyzed C-H Borylation: How Mechanistic Insights Made the Impractical Practical*

2/23/2010  Ken Czerwinski
University of Nevada
*Actinide Nitrides and Technetium Halides: Preparation and Characterization of Radioelement Compounds*

2/24/2010  Alan Heyduk
University of California, Irvine
*Redox-Active Ligands: Enabling Multi-Electron Reactivity at Electron-Poor Metal Centers*

3/2/2010  Peng Chen
Cornell University
*Single-Molecule Nanocatalysis and Bioinorganic Chemistry*

3/4/2010  Vahe Bandarian
Unraveling Natme's Paradigm for Biosynthesis of 7-Deazapurines
<table>
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<tr>
<th>Date</th>
<th>Speaker</th>
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<tr>
<td>3/10/2010</td>
<td>Kyoung-Shin Choi</td>
<td>Purdue University</td>
<td><em>Electrochemical Synthesis of Electrode Materials with Controlled Architectures for Use in Clean Energy Production</em></td>
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<td>3/11/2010</td>
<td>Jeff DeBrabander</td>
<td>University of Texas Southwestern Medical Center</td>
<td><em>Natural Products: Opportunities for Discovery</em></td>
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<td>3/25/2010</td>
<td>Kip Guy</td>
<td>St. Jude Children's Research Hospital</td>
<td><em>Discovery and Development of Novel Antimalarials</em></td>
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<td>3/26/2010</td>
<td>Istvan Horvath</td>
<td>City University of Hong Kong</td>
<td><em>Biomas Conversion to Fuels and Fluorous Chemistry</em></td>
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<td>3/29/2010</td>
<td>Carol Robinson</td>
<td>University of Oxford</td>
<td><em>Protein Complexes-Learning to Fly</em></td>
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<td>3/30/2010</td>
<td>Carol Robinson</td>
<td>University of Oxford</td>
<td><em>What Can we Learn from the Mass Spectrometry Regarding the Shape of Protein</em></td>
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<td>3/31/2010</td>
<td>Carol Robinson</td>
<td>University of Oxford</td>
<td><em>Looking Towards the Future Mass Spectrometry as a Hybrid Structural Technique</em></td>
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<td>4/1/2010</td>
<td>Juren Rohr</td>
<td>University of Kentucky</td>
<td><em>Modifying Biosyntheses of Natural Product Anticancer Drugs by Combinatorial Biosynthesis Challenges and Solutions</em></td>
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<td>4/5/2010</td>
<td>Jack Taunton</td>
<td>University of California, San Francisco</td>
<td><em>Cellular Secrets Revealed by Covalent Kisses</em></td>
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<td>4/7/2010</td>
<td>Paula Diaconescu</td>
<td>University of California, Los Angeles</td>
<td><em>Reactions of Heterocycles with Eledrophilic Ferroocene-Diamide Complexes</em></td>
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<td>4/8/2010</td>
<td>David Gin</td>
<td>Memorial Sloan-Kettering Cancer Center</td>
<td><em>Synthesis of Vaccine Adjuvants and Bioactive Alkaloids</em></td>
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4/9/2010  Russell Chianelli  
University of Texas, El Paso  
*Transition Metal Sulfide Catalytic Materials: 100 Years of Science and Application*

4/15/2010  John Gladysz  
Texas A&M University  
*Turning Molecules Inside-Out: a Venture into Previously Uncharted Dynamic Terrain*

Kenneth Raymond  
University of California, Berkeley  
*Lanthanide Coordination Chemistry from Basic to Imaging*

Peter Stang  
University of Utah  
*A Biological Self-Assembly: Predesigned Metallacycles and Metallacages via Coor-Dination*

4/30/2010  Richard Vachet  
University of Massachusetts Amherst  
*Using Mass Spectrometry to Study Protein Amyloid Formation*

5/5/2010  Daniel Mindiola  
Indiana University  
*Metal-Ligand Multiple Bonds: From Methane Activation and Functionalization to Catalytic Prospects*

5/7/2010  Donna Chen  
University of South Carolina  
*Characterization and Chemistry of Au-Based Bimetallic Clusters on Ti02 (110)*

5/12/2010  Bradley Holliday  
University of Texas, Austin  
*Functional Conducting Metallopolymers Materials*

5/13/2010  Joan Broderick  
Montana State University  
*Insights into Maturation of the [FeFe]-Hydrogenase*

5/18/2010  Albert Blanchard  
Yeshiva University  
*Tuberculosis: Finding an Achilles Heel*
9/2/2010  John Tovar  
John Hopkins University  
*Topological and Supramolecular Considerations for Organic (bio)Electronics*

9/8/2010  Jerry Atwood  
University of Missonri  
*Metal Organic Nanocapsules*

9/14/2010  Philippe Guyot-Sionnest.  
The University of Chicago  
*Energy Relaxation and Transport in Colloidal Quantum Dots*

9/15/2010  David Muddiman  
North Carolina State University  
*Development and Application of Mass Spectrometry for the Early Detection of Epithelial Ovarian Cancer*

9/16/2010  Jiyong Hong  
Duke University  
The Chemistry and Biology of Subglutinols A and B

9/20/2010  Kaz Tatsumi  
Nagoya University  
*Organometallic Routes to Fe-S Clusters-Challenge to Model the Active Sites of Reductases*

9/21/2010  Kaz Tatsumi  
Nagoya University  
*Syntheses of Dinuclear Ni-Fe Complexes Modeling the Active Site of Hydrogenase*

9/22/2010  Kaz Tatsumi  
Nagoya University  
*Activation of Small Molecules by Coordinatively Unsaturated Transition Metal Complexes Having Bulky Thiolate or N-Heterocyclic Carbene*

9/23/2010  Ken Wagener  
University of Florida  
*Using Metathesis to Control Macromolecular Morphology*

9/28/2010  Dong Hee Son  
Texas A&M University  
*Dynamics of Energy Relaxation and Energy Transfer in Nanocrystals*

9/30/2010  Sukwon Hong  
University of Florida  
*Exploring New Ligand Designs for Asymmetric Catalysis*
<table>
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<th>Date</th>
<th>Presenter</th>
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<tr>
<td>10/5/2010</td>
<td>Brian Connell</td>
<td>Texas A&amp;M University</td>
<td>Discovery and Development of Stereoselective Carbon-Carbon Bond-Forming Re-actions</td>
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<td>10/12/2010</td>
<td>Debra Dunaway-Mariano</td>
<td>The University of New Mexico</td>
<td>Enzyme Evolution: Where Darwin Encounters Ohno</td>
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<td>10/12/2010</td>
<td>Scott Medalist</td>
<td>University of Illinois</td>
<td>Discovering and Predicting New Functions in the Enolase Superfamily</td>
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<td>10/12/2010</td>
<td>John Richard</td>
<td>University at Buffalo</td>
<td>A Role for Flexible Loops in Enzymatic Catalysis</td>
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<td>10/13/2010</td>
<td>David Tyler</td>
<td>University of Oregon</td>
<td>Coordination Chemistry of H₂ and N₂ in Aqueous Solution: Activation Reactions and the Formation of Ammonia</td>
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<td>10/14/2010</td>
<td>Jung-Mo Anh</td>
<td>University of Texas, Dallas</td>
<td>Mimicking α-Helices for Modulating Protein Functions</td>
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<td>10/20/2010</td>
<td>Raphael Raptis</td>
<td>University of Puerto Rico</td>
<td>Redox-Active Octanuclear Complexes Containing Fe₄O₄-Cubancs; Possible Metal-loprotein Models and MRI Contrast Agents</td>
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<td>10/21/2010</td>
<td>Eike Bauer</td>
<td>University of Missouri</td>
<td>New Chiral Ruthenium Phosphoramidite Complexes for the Catalytic Activation of Propargylic Alcohols</td>
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10/26/2010  Daniel Nocera  
Massachusetts Institute of Technology  
*The Global Energy Challenge*

10/27/2010  Daniel Nocera  
Massachusetts Institute of Technology  
*Personalized Energy for the Non-Legacy World*

10/28/2010  Ken Johnson  
University of Texas, Austin  
*New Insights into how Substrate-induced Conformational Changes Govern Enzyme*

11/1/2010  Daniel Neumark  
University of California, Berkeley  
*Frequency and Time-Domain Studies of Gas-Phase, Cluster, and Solution Dynamics Using Photoelectron Spectroscopy*

  Daniel Neumark  
University of California, Berkeley  
*Slow Photoelectron Velocity-Map Imaging of Negative Ions: A New Tool for Molecular Spectroscopy and Dynamics*

11/2/2010  Daniel Neumark  
University of California Berkeley  
*Spectroscopy and Dynamics of Excess Electrons in Clusters and in Solution*

11/3/2010  Daniel Neumark  
University of California, Berkeley  
*Femtosecond and Attosecond Soft X-Ray Science: Applications to Molecules and Clusters*

11/9/2010  Lane Baker  
Indiana University  
*Measuring Holes and Gaps with Ion Conductance Microscopy*

11/11/2010  Charles Garner  
Baylor University  
*New Nitrogen and Phosphorus Ligands: Pyrazolylpyridines and the First C-2-Chiral Phosphinine*

11/16/2010  Richard Mabbs  
Washington University  
*Cluster Anions as Molecular Scale Electron Beam Instruments: Photodetachment Angular Distributions as Indicators of Electron-Molecule Interactions*
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<th>Date</th>
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<td>11/17/2010</td>
<td>Adam Matzger</td>
<td>University of Michigan</td>
<td><em>Coordination Polymers: The Good, the Bad, and the Ugly</em></td>
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<td>11/18/2010</td>
<td>David Perrin</td>
<td>University of British Columbia</td>
<td><em>Two Challenges on the Interface of Chemistry and Biology</em></td>
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<td>11/23/2010</td>
<td>Stephan Link</td>
<td>Rice University</td>
<td><em>Collective Plasmon Modes in Nanoparticle Assemblies</em></td>
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<td>11/29/2010</td>
<td>Josef Michl</td>
<td>University of Colorado</td>
<td><em>Designing Highly Oxidized Matter</em></td>
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<td>Josef Michl</td>
<td>University of Colorado</td>
<td><em>Designing Ferroelectric Surfaces</em></td>
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<td>University of Colorado</td>
<td><em>Designing Sensitizers for Singlet Fission</em></td>
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<td>Julius Rebek</td>
<td>The Scripps Research Institute</td>
<td><em>Reversible Encapsulation</em></td>
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<td><em>The Inner Space of Molecules</em></td>
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<td>The Scripps Research Institute</td>
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<td>12/9/2010</td>
<td>Brent Sumerlin</td>
<td>Southern Methodist University</td>
<td><em>New Stimuli-Responsive Macromolecules: Polymer-Protein Bioconjugates and Sweet Tooth Micelles</em></td>
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<td>12/13/2010</td>
<td>Elisabeth Bouwman</td>
<td>Leiden University</td>
<td><em>Development of Biomimetic [NiFe] Catalysts for Hydrogen Production</em></td>
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12/14/2010  Rachel Martin
University of California, Irvine
Switched Angle Spinning NMR Instrumentation and Methods Development for Oriented Membrane Systems
Colloquium and Seminar Speakers, 2011

Frontiers Lecture Series
1/24/2011 Christopher Cummins
Massachusetts Institute of Technology
_Dinitrogen cleavage by a three-coordinate molybdenum(III) complex and related chemistry_

1/25/2011 Christopher Cummins
Massachusetts Institute of Technology
_Phosphorus ligand transfer reactions including the synthesis and properties of AsP3_

1/26/2011 Christopher Cummins
Massachusetts Institute of Technology
_New approaches to CO2 fixation via group 4 and 5 metal systems_

2/28/2011 Phil Cole
Johns Hopkins School of Medicine
_Past, present, and future in drug discovery_

3/1/2011 Phil Cole
Johns Hopkins School of Medicine
_Chemical approaches to sorting out signaling pathways_

3/2/2011 Phil Cole
Johns Hopkins School of Medicine
_Targeting acyltransferases in cancer and metabolism_

3/7/2011 Hisashi Yamamoto
University of Chicago
_Designer Brønsted acid catalyst - Rapid synthesis of polyketides_

3/8/2011 Hisashi Yamamoto
University of Chicago
_Designer Lewis acid catalyst - Combined acid and cis-alpha/cis-beta metal catalysts_

3/9/2011 Hisashi Yamamoto
University of Chicago
_Asymmetric oxidation_

3/29/2011 Professor Joel Harris
University of Utah
_Quantitative Analysis of Interfacial Chemistry at the Single-Molecule Level_
3/30/2011  Professor Joel Harris  
University of Utah  
Raman Spectroscopy of Liquid/Solid Interfaces and Dispersed Particles

3/31/2011  Professor Joel Harris  
University of Utah  
*Multidimensional Spectroscopic Measurements for Unraveling Interfacial Chemistry*

10/10/2011  Henry F. Schaefer III  
University of Georgia  
*Preface – Comments on Professor F. Albert Cotton. Followed by Historical Lecture – The Third Age of Quantum Chemistry*

10/11/2011  Henry F. Schaefer III  
University of Georgia  
*Lesions in DNA Subunits: Foundational Studies of Molecular Structures and Energetics*

10/12/2011  Henry F. Schaefer III  
University of Georgia  
*From Donor-Acceptor Complexes to Gallium Nitride Nanotubes*

10/24/2011  Dr. Richard Crooks  
University of Texas, Austin  
*Dendrimer-encapsulated nanoparticles: synthesis, characterization, electrocatalysis, and a little DFT*

10/25/2011  Dr. Richard Crooks  
University of Texas, Austin  
*Bipolar electrodes: concentration, separation and detection in microelectrochemical systems*

10/26/2011  Dr. Richard Crooks  
University of Texas, Austin  
*Now What? A few cool ideas I could use some help with*

10/31/2011  Dr. Jeff Long  
University of California, Berkeley  
*Hydrogen Storage in Metal-Organic Frameworks*

11/1/2011  Dr. Jeff Long  
University of California, Berkeley  
*Carbon Dioxide Capture in Metal-Organic Frameworks*

11/2/2011  Dr. Jeff Long  
University of California, Berkeley
Applications of Coordination Chemistry in the Synthesis of Single-Molecule Magnets

11/14/2011  E.W. Meijer
Eindhoven University of Technology, The Netherlands
Supramolecular Polymers; A Modular Approach to Biomaterials

11/15/2011  E.W. Meijer
Eindhoven University of Technology, The Netherlands
Amplification of Chirality in Dynamic Supramolecular Assemblies

11/16/2011  E.W. Meijer
Eindhoven University of Technology, The Netherlands
Non-covalent Synthesis of Complex Supramolecular Systems
Seminar Speakers

1/18/2011  **Dr. Xin Chen**  
Harvard University Physical/Analytical Seminar  
*Water and Ions at Interfaces, from Protein Surfaces to Surfaces of Everything’’*

1/27/2011  Prof. Rich Carter  
Oregon State University /Organic Seminar  
*Natural Products that Inspire: Synthesis and Reaction Development’’*

2/1/2011  Dr. Radoslav R. Adzic  
Brookhaven National Laboratory Physical/Analytical Seminar  
*Recent Developments in Platinum Monolayer Electrocatalysts for the Oxygen Reduction Reaction and Electrocatalysts for Ethanol Oxidation to CO₂*

2/2/2011  Dr. John Berry  
University of Wisconsin, Madison Inorganic Seminar  
*Coordination Complexes with Multiple Inorganic Functional Groups*

2/8/2011  Dr. Romauldo DeSouza  
Indiana University Physical/Analytical Seminar  
*Exploring a neutron star’s crust with nuclear reactions*

2/10/2011  Sheo Singh  
Merck Laboratories/ Organic Seminar  
*Discovery and Development of Platensimyin*

2/15/2011  Professor Wei Zhan  
Auburn University Physical/Analytical Seminar  
*Molecular Photovoltaics: A Lipid-Based Approach*

2/16/2011  Jerome Lacour  
University of Geneva/ Inorganic Seminar  
*Investigations in Asymmetric Synthesis and Catalysis*

2/17/2011  Karl Scheidt  
Northwestern University /Organic Seminar  
*New Directions with Carbene Catalysis*

2/22/2011  Professor YuYe Tong  
Georgetown University /Physical/Analytical Seminar  
*In situ Spectroelectrochemical Investigation of Pt-based Electrocatalysts*
<table>
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<th>Date</th>
<th>Speaker</th>
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<th>Topic</th>
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<tr>
<td>2/23/2011</td>
<td>Professor Christine Thomas</td>
<td>Brandeis University/ Inorganic Seminar</td>
<td>Metal-Metal Multiple Bonds in Early/Late Heterobimetallic Complexes: Applications Towards Small Molecule Activation and Catalysis</td>
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<td>2/24/2011</td>
<td>Dr. Vy Dong</td>
<td>University of Toronto/ Organic Seminar</td>
<td>Stereoselective Strategies for Transforming C-H Bonds, Simple Olefins and Carbon Dioxide</td>
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<td>3/24/2011</td>
<td>Professor Jared Shaw</td>
<td>University of California, Davis/ Organic Seminar</td>
<td>Multicomponent Approaches to Stereoselective Synthesis and Chemical Biology</td>
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<td>3/25/2011</td>
<td>Steven Mansoorabadi</td>
<td>University of Texas, Austin/ Biological Seminar</td>
<td>(S)-2-Hydroxypropylphosphonate Epoxidase: Mechanism, Reactivity, and Substrate</td>
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<td>4/5/2011</td>
<td>Richard Loomis</td>
<td>Washington University, St. Louis/ Physical/Analytical Seminar</td>
<td>Colloidal Semiconductor Nanowires: Can They Behave as Model 1-D Quantum Systems</td>
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*Asymmetric Boronate Reactions: Catalysis and Synthesis*

9/7/2011  Professor Greg Grant  
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*Squares, Triangles, Square Pyramids, and Trigonal Bipyramids in Thiacrown Complexes: Adventures in Research with Undergraduate Students*

9/8/2011  John E. Anthony  
University of Kentucky /Organic Seminar  
*Small Molecule Semiconductors for Organic Electronics*

9/9/2011  Professor Ian A. Blair  
University of Pennsylvania /Physical/Analytical Seminar  
*Stable isotope labeling by essential nutrients in cell culture (SILEC) and LC-MS for assessing mitochondrial dysfunction*

9/14/2011  Professor Brad Pierce  
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9/22/2011  Dr. Guorong Sun  
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9/28/2011  Seth Cohen  
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10/5/2011  Curtis Berlinguette
University of Calgary/ Inorganic Seminar
Rational Design of Transition Metal Complexes for Solar Energy Conversion Schemes

10/13/2011  Professor Brad Moore
University of California, San Diego /Biological Seminar
Genomics-Inspired Discovery and Bioengineering of Natural Product Drug Leads

10/17/2011  Barry M. Trost
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10/19/2011  Marc R. Knecht
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Probing and Exploiting the Biological/Inorganic Interface to Control the Activity of Bio-Inspired Nanomaterials

10/20/2011  Steve Almo
Albert Einstein College of Medicine/ Biological Seminar
Flexibility of an Unusual Non-heme Iron-dependent Enzyme

10/27/2011  Tom Miller
California Institute of Technology /Physical/Analytical Seminar
Bridging lengthscales and timescales in the simulation of condensed-phase reaction dynamics

11/3/2011  Dr. Tracey Rouault
NIH /Biological Seminar
Synthesis of mammalian iron-sulfur clusters and relevance to human disease

11/8/2011  Catalina Achim
Carnegie Melon University/ Inorganic Seminar
Hybrid Inorganic-Peptide Nucleic Acid Structures

11/9/2011  Professor Charles Casey
University of Wisconsin, Madison/ Inorganic Seminar
Design Evolution Leading to the Discovery of an Efficient Iron Catalyst for the Chemoselective Hydrogenation of Aldehydes and Ketones
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A11. Texas A&M Department of Chemistry- Bylaws
This statement sets forth policies and procedures for conducting the affairs of the faculty of the Department of Chemistry, Texas A&M University. It conforms with the superior documents on Policies and Procedures for Texas A&M University.

I. Faculty Organization

A. Membership of the Faculty of the Department of Chemistry

1. All persons holding half-time or greater academic appointments wholly or primarily in the Department of Chemistry at the ranks of Distinguished Professor, Professor, Associate Professor, Assistant Professor, Senior Lecturer and Lecturer shall be voting members of the faculty of the Department of Chemistry (hereinafter, Department). A full-time appointment is defined as 100% time during the nine academic months.

2. Faculty holding Full Joint appointments within the department and college shall be voting members of the faculty. Associate Joint membership does not include the right to vote, but faculty holding Full Joint appointments may vote on all matters. Visiting and other temporary or part-time faculty are welcome to attend faculty meetings but cannot vote. A vote on tenure and promotion matters is restricted to appointments to be made at an equivalent rank or lower rank than the voting faculty member.

B. Meetings of the Department Faculty

1. There will be at least four regular meetings of the Department faculty during each academic year. Regular meetings shall be held at even intervals. The Department Head shall publish an agenda for each regular meeting at least two days in advance.

2. At each regular meeting of the Department faculty the Department Head shall report on the actions and recommendations of the Executive Committee since the previous regularly scheduled faculty meeting.

3. The Department Head shall provide for reports at meetings of the Department faculty from the Department standing committees and from the Department’s representatives to the Faculty Senate, Faculty Advisory Council and the
Executive Committee of the Faculty of Science as needed.

4. Special meetings of the Department faculty for stated purposes may be called by the Department Head, and shall be called by the Head upon the request of four members of the Executive Committee or the request of thirty percent of the Department faculty. Seven days notice is required.

5. The Department Head, or designee, shall preside at each meeting of the Department faculty.

6. Privilege of attendance and of the floor at regular meetings of the Department faculty also shall be extended to visiting and part-time faculty members in the Department, and to one representative from each Departmental student organization recognized by the Academic Operations Council.

7. Guests may be invited to meetings of the Department faculty by the Department Head, or by a member of the Department faculty with concurrence of the Department Head. State of Texas Law on open meetings allows the presence of non-participating visitors.

C. Administrative Positions in the Department

1. Department Head

The Department Head is the administrative and executive officer of the department and its spokesperson to the University administration and communities outside the University.

a. Term of Office

The term of office of the Department Head shall be four years, and is renewable. The Department Head shall be reviewed in the third year of the term according to the procedures established by the Dean for all College of Science department heads.

b. Procedures for Selection of the Department Head

i. The Dean will establish a search committee following consultation with the faculty of the department and will appoint the chair of the committee. A majority of the committee should be elected by the faculty of the department. The Dean may appoint additional members. Faculty from outside the department may be included on the search committee, but may not chair the committee.

ii. The search committee will advertise the position, will review all applications and nominations, and will make recommendations to
the faculty of the department regarding their preferred candidate(s). Pursuant to the Texas Open Records Act, all non-confidential material pertinent to applications and nominations will be available to the entire faculty for review.

iii. Following a written ballot vote of the faculty, the candidate(s) receiving a majority affirmative support will be recommended to the Dean, ranked if the faculty or committee so desires. If the vote of the faculty as a whole differs from the opinion of the search committee, that information will also be reported to the Dean. Candidates who do not receive a majority of faculty support by written ballot also will be reported to the dean, along with the vote recorded. The Dean will select and appoint the Department Head.

c. **Duties of the Department Head**

i. The Department Head, through direct action or delegation,

   (1) in consultation with the Executive Committee and appropriate department committees, formulates and implements policies of the department;

   (2) consults regularly with departmental committee chairs, division chairs and research interest groups;

   (3) presides at departmental faculty meetings and ensures that accurate minutes are kept, and that a summary of the minutes is distributed;

   (4) formulates and manages the departmental budget;

   (5) manages office operations;

   (6) evaluates faculty and staff;

   (7) encourages faculty development;

   (8) assigns teaching loads and schedules;

   (9) carries on departmental correspondence;

   (10) resolves student complaints and other potential conflicts;

   (11) seeks advice from individual faculty members, from committees, and from the faculty as a whole.

   (12) is an *ex officio* member of all duly constituted departmental committees.
d. Authority of the Department Head

i. The Department Head, in consultation with the Executive Committee, appoints the committee chairs. The Department Head makes other appointments to fill unexpired terms on committees and to assist in the daily operation of the department.

ii. It is expected that the Department Head will usually support the decisions of the committees and the faculty. If the Department Head is unable to support a recommendation made through usual procedures, he or she should, in a timely manner, give a written explanation to the faculty or to the appropriate committee. In cases of disagreement, the Department Head should include relevant votes of committees and the vote of the faculty when reporting to the College and the University.

iii. The Department Head, serving as principal financial officer of the Department, shall:

(1) supervise receipt and expenditure of all monies;

(2) prepare an annual operating budget and previous year-end financial report.

iv. The Department Head, in conjunction with appropriate faculty committees, shall supervise and coordinate the recruiting of new faculty members.

v. The Department Head shall make recommendations for faculty salary increases to the Dean of the College of Science.

vi. The Department Head shall be responsible for initiating meetings of the Promotion and Tenure Committee in order to ensure timely recommendations for promotion and tenure and post-tenure review decisions in the Department and at the College level.

2. Associate Department Head

a. The appointment of the Associate Head is recommended to the Dean by the Department Head, in consultation with the Executive Committee.

b. The term of office of the Associate Head shall be four years, renewable at the discretion of the Department Head and Dean.

c. The duties of the Associate Head include:

i. Serving in the capacity of the Department Head whenever the
Department Head is unavailable.

ii. Serving as a member of the Academic Operations Council.

iii. Functioning in the capacity of Department Head in all matters delegated by the Department Head.

3. **Assistant Department Head**

a. The appointment of the Assistant Department Head is recommended to the Dean by the Department Head, in consultation with the Executive Committee.

b. The term of office of the Assistant Department Head shall be four years, renewable at the discretion of the Department Head and Dean.

c. The duties of the Assistant Department Head include:

   i. Serving as an *ex officio* member of the Academic Operations Council.

   ii. Functioning in the capacity of Department Head in all matters delegated by the Department Head.

4. **Other Administrative Positions and Units**

a. **Graduate Advisor**

   i. Is appointed by the Head for an initial term of three years. The appointment is renewable.


   iii. Chairs the Faculty/Graduate Student Working Group and the Graduate Curriculum Committee. Administrates functions involving graduate academic affairs. Some (but not all) of these duties include:

   (1) Graduate student advising
   (2) Administration of teaching and research assistantships and fellowships
   (3) Administration of cumulative examinations and seminar programs of graduate students
   (4) Coordination of research advisor selection, committee formation and degree completion procedures for graduate students
   (5) Coordination of industrial recruiting schedules
iv. Functions in the capacity of the Department Head in all matters delegated by the Department Head.

v. Depending upon departmental needs, an *Associate Graduate Advisor* may be appointed by the Head with duties and terms of office commensurate with those of the Advisor.

b. Coordinator of Graduate Recruiting, Admissions, and Review

i. Is appointed by the Head for an initial term of three years. The appointment is renewable.

ii. Serves as an alternate to the Graduate Advisor on the Academic Operations Council.

iii. Chairs the Graduate Admissions and Review Committee.

iv. Is responsible for all aspects of the admissions and graduate recruiting process.

c. Undergraduate Advisor

i. Is appointed by the Department Head for an initial term of three years. The appointment is renewable.


iii. Administrates functions involving undergraduate academic affairs. Serves *ex officio* on Undergraduate Affairs Committee.

iv. Functions in the capacity of the Department Head in all matters delegated by the Department Head.

v. Depending upon departmental needs, an *Associate Undergraduate Advisor* may be appointed by the Head with duties and terms of office commensurate with those of the Undergraduate Advisor.

d. Divisions

The Department of Chemistry is organized into five research and teaching units called Divisions. These five divisions, *Analytical, Biological, Inorganic, Organic, and Physical* represent a coherent specialization in chemistry, including training in that unit leading to a Ph.D. degree in Chemistry. Faculty members may join a division of their choice upon approval from the department head. Those that qualify as voting faculty also qualify as voting faculty in their chosen division. Voting privileges of joint and visiting faculty shall be the same as for regular faculty meetings.
All faculty may affiliate with only one division for purposes of election of departmental committee representatives but may affiliate as associate members with more than one division or research interest group for other purposes.

A **Division** is:
- an educational unit responsible for organizing and delivering specialized research and teaching programs in the unit of specialization. Chemistry degrees may be completed using the guidelines developed by a division. Some departmental guidelines apply as well.

A **Chair** of each division is elected by the Division for an initial term of two years. Division Chairs will not serve more than four consecutive terms. The Division Chair

i. Chairs the meetings of the division, and sets the meeting agenda.


iii. Is responsible for the administrative and educational functions of the division such as seminar, colloquium and Frontiers schedules.

iv. Works with the faculty in the division to suggest teaching duties of division faculty to the Department Head and to committees responsible for student affairs.

e. First-Year Chemistry Program

The First-Year Program is an education unit comprised of a Director and Associate Director, both appointed by the Head, and those faculty involved in teaching 100-level chemistry courses. The directors and associated faculty, which vary from semester to semester, are responsible for coordinating the lecture and laboratory content in, primarily, CHEM 101 and 102. They work with the instructors of CHEM 103/113, 104/114, 106/116 and 107, although the latter are more autonomous classes since they usually involve a smaller number of instructors and sections.

f. Research Interest Groups

Faculty with common interests in an area of research not represented in the five divisions are encouraged to form coalitions to foster efforts in the area.

*Examples of Designated Research Interest Groups include:*

- Environmental Chemistry
- Materials Chemistry
- Nuclear Chemistry
II. Faculty

A. New Faculty

1. Priorities for new faculty recruitment shall be discussed by the Executive Committee with input from the major divisions and research interest groups within the department.

2. Prospective tenure-track faculty positions shall be advertised nationally. Applicants shall be requested to supply a professional vita, along with a statement of research interests, proposals, and at least three letters of recommendation. All applications received shall be considered by the Department Head and shall be made available for consideration by the Department faculty. The Department Head shall consult with Department faculty members especially competent to evaluate the qualifications of the applicants, shall then select, with the concurrence of the Executive Committee, those applicants to be invited to visit the Department.

3. Divisions may recommend new faculty appointments of any rank to the Department Head. The Executive Committee will discuss all offers at ranks above the assistant professor level before they are extended. The Promotion and Tenure Committee must make recommendations on appointments above the rank of lecturer and assistant professor. A faculty vote follows.

4. Appointments at the rank of Lecturer may be made by the Department Head with the concurrence of the Executive Committee. Such appointments shall be subject to annual renewal, and shall not lead to tenure consideration.

B. Renewal of Term Appointments

1. Departmental recommendation for renewed term appointment shall require the approval of the Department Head and a favorable recommendation from the division or first-year program director.

2. In the event of non-renewal of a term appointment, the affected faculty member shall receive from the Department Head, upon request, a verbal explanation of the decision not to renew.

C. Joint Faculty

The goal of joint appointments in the Department of Chemistry is to promote outreach and teaching collaborations between members of the Department and others with strong research and/or teaching interests in Chemistry. Such collaborations will strengthen both primary and joint appointments by encouraging interactions between
faculty members with similar interests across departmental boundaries.

1. Full vs. Associate Joint Faculty Appointments and Criteria for Consideration

In general, the qualifications required for an appointment with Full Joint Membership will be the same as those required of candidates for primary appointment at the equivalent rank in addition to a demonstrated commitment to involvement in the Department. In essence, appointments with Full Joint Membership will be offered only to individuals with well established reputations in an area generally recognized as Chemistry. Specific criteria which must be met are:

a. Full Joint Faculty Appointments

i. An internationally-recognized research program in chemistry.

ii. Ongoing interactions with members of the Department: Examples of such interactions are collaboration in research or teaching, service on graduate student advisory committees, and involvement in recruitment of students.

iii. A tenured appointment in another department at Texas A&M University.

Rights and Privileges of Joint Appointments: Faculty with Full Joint Membership in the Department may serve as Chair of graduate student committees in Chemistry and vote in faculty meetings on all issues except those specifically dealing with joint membership. Full Joint Faculty will be included in Departmental recruiting materials and will have full access to Chemistry graduate students.

b. Associate Joint Faculty Appointments

i. A nationally-competitive research program in chemistry.

ii. Initiated or ongoing interactions with members of the Department: Examples of such interactions are collaboration in research or teaching, service on graduate student advisory committees, and involvement in recruitment of students.

iii. A tenured or tenure-track appointment at one of the Texas A&M University System campuses, or a leadership position at an industrial or government laboratory.

Associate Joint Membership may be offered to individuals who meet some, but not all, of the criteria for Full Joint Membership in the Department. Associate membership does not include the right to vote in faculty meetings, nor to serve as Chair of chemistry graduate student committees.
2. **Application for a Joint Appointment**

Applications for joint appointments should be made to the Head of the Department. The application will include a statement indicating how such an appointment would benefit both the Department and the individual, and stating his or her qualifications as a chemist. The Department Head will solicit a recommendation from the primary division with which the applicant would be associated. The credentials of the individual will be reviewed by the Promotion and Tenure Committee. Upon a favorable vote from the Promotion and Tenure Committee, the applicant will be invited to present a seminar in the Department, and then the recommendation for a joint appointment will be brought forward for consideration at a faculty meeting. After discussion at a faculty meeting, a vote will be taken by written ballot as specified in the department of Chemistry Bylaws. If the nomination receives a majority affirmative vote of the faculty, joint membership will be recommended to the Department Head.

3. **Responsibilities of Faculty with Joint Appointments**

a. Attendance at faculty meetings and seminars in the Department.

b. Service on Departmental committees.

c. Participation in teaching Chemistry courses.

d. Participation in recruiting and “outreach” activities.

e. Continuing collaboration with members of the Department.

4. **Term of Joint Appointments**

Joint Appointments will be awarded for a period of five years. Near the conclusion of the five-year term, a new application, which also includes a description of how the applicant has fulfilled the responsibilities stated above, should be made to the Head of the Department. This new application will undergo review by the Promotion and Tenure Committee. The Promotion and Tenure Committee will then make a recommendation to the Department Head. In the absence of a new application, the Joint Appointment will terminate automatically at the end of the five-year term.

5. **Visiting Faculty Appointments**

a. The Department may recommend the appointment of visiting faculty members in Chemistry at the rank of Visiting Professor, Visiting Associate Professor, or Visiting Assistant Professor. The purpose of such appointments shall be to bring within the Department for a limited period chemical scientists whose interactions with the faculty, students, and programs of the Department can be expected to benefit the Department
substantially.

b. Visiting faculty appointments in Chemistry shall be for a period of no more than one year.

c. Visiting faculty appointments in Chemistry shall not lead to tenure consideration.

d. The terms of visiting faculty appointments in Chemistry shall be determined by the Department Head with the concurrence of the Executive Committee.

D. Faculty Leaves of Absence

1. Applications for sabbatical leaves shall ordinarily be submitted to the Department Head not later than nine months before the proposed leave.

2. Faculty will be granted leave in accordance with the Family and Medical Leave Act of 1993 or any currently applicable federal law.

E. Lecturers

A lecturer is a non-tenure track faculty member whose primary function is classroom teaching. Appointment as a lecturer is generally restricted to persons who possess a Ph.D. in chemistry or its equivalent. The term of initial appointment is one year; subsequent one-year appointments may be offered. Lecturers will be recruited, to the extent possible, by an open announcement of position. An Ad Hoc committee will review the applications and recommend candidates for employment.

1. Contract Terms

   a. The title Senior Lecturer is to be used for faculty who meet the criteria of Lecturer, and who have at least five years experience as a full-time Lecturer or its equivalent. Initial appointment to the rank of Senior Lecturer requires a recommendation of the Promotion and Tenure Committee, the division or teaching unit, the Department Head, and approval by the Dean.

   b. The term of appointment of a faculty member with the rank of Lecturer or Senior Lecturer, who has held any faculty position other than Assistant Lecturer for five or more academic years of full-time service, will be three years. Such faculty shall receive one year notice if it is the intention of the Department not to renew the appointment.

   c. A Lecturer with one to four academic years of full-time service will be notified by March 15 if it is the intention of the Department not to renew the appointment for the following academic year.

   d. One year unpaid leave may be granted to Senior Lecturers upon application to the Department Head.
2. Status, Expectations, and Professional Development

a. Lecturers are members of the Department faculty and will be afforded respect and status comparable to that of tenured and tenure track faculty.

b. Lecturers will be included in all Departmental academic affairs including faculty meetings, division meetings, committee service, and curriculum development.

c. Lecturers will be provided office space and the computer facilities necessary to fulfill their teaching responsibilities.

d. Lecturers will be encouraged to initiate and/or participate in scholarly activities associated with all aspects of chemical education.

e. Lecturers will be encouraged to participate in the research activities of established research groups in the department. Such participation, however, must be compatible with the Lecturer’s primary teaching function.

f. Lecturers may apply for associate membership on the graduate faculty in accordance with University Office of Graduate Studies guidelines. When a Lecturer serves on a chemistry graduate student’s advisory committee, it must be as an additional member of the committee and not as a replacement for one of the tenure-track Department members.

3. Annual Review

a. The performance of all Lecturers will be reviewed by the Department Head annually.

b. Performance criteria will be based primarily on teaching and related activities, with additional recognition given to research participation, publications, and service.

III. Teaching

A. Academic Year Teaching Assignments

1. The Department Head shall solicit recommendations for teaching assignments from the divisions, and the first-year program director and associate director. Teaching assignments shall be made by the Department Head in consultation with the Division Chairs and with the individual faculty members concerned.

2. Teaching assignments should be made so as to provide an equitable distribution of teaching loads, with the possibility for periods of special relief in individual cases.
3. To facilitate the transfer of teaching responsibilities between faculty members, teaching assignments shall normally be determined one year in advance.

B. Departmental Summer Appointments

1. Prospective summer teaching positions shall be advertised to the Department faculty by the Department Head.

2. Department faculty members shall apply for summer teaching appointments in writing to the Department Head, in accordance with a time schedule announced by the Department Head.

3. Summer teaching appointments shall be made by the Department Head. Priority in summer teaching opportunities will be given first to Department faculty.

4. Certain activities which normally take place during the academic year, such as graduate examinations, may occasionally require faculty participation during the summer. Faculty members who can comply without serious inconvenience may be called upon to perform such minor duties without additional compensation.

IV. Research

A. Selection of Graduate Research Advisors

1. Process

a. A departmental research poster session will be held before the beginning of the fall semester, typically during the week before classes start, for the purpose of introducing new graduate students to departmental research opportunities. The poster session will be organized by the Graduate Advisor.

b. Divisions are encouraged to develop informal seminars or other activities designed to expose interested students to the research being done in the division. All faculty must be invited to participate in any designated divisional activity. The format of such activities should be distributed by the division chair to the graduate faculty with sufficient lead time to insure maximum faculty participation. Division chairs will be responsible for disseminating scheduling information to graduate students.

c. Students are encouraged to attend the group meetings of faculty in their areas of possible interest and to interact with the group members.

d. All graduate students entering in the fall semester must interview a minimum of five faculty members as potential research advisors by October 15. Students who enter during the summer to start research in the summer, international students supported by Graduate Assistant Research
appointments, and students who came to Texas A&M to work with a specific faculty member are included in this group. Students who enter in the spring semester should complete interviews prior to March 15.

e. Prior to the formal advisor selection process, a student may start work in a research group upon approval of a committee consisting of the four division chairs or their designates.

f. The department will adopt an advisor selection process based on students’ rank-ordered lists.

i. When a student has completed five faculty interviews, signatures of those faculty members are provided to the GSO. The GSO provides the student with a form requesting a rank-ordered list of choices for research advisor. Students must submit this list to the GSO by October 15.

ii. Upon receiving the rank-ordered lists, the Graduate Advisor notifies each faculty member named as a first choice. If a faculty member declines to accept a student, the Graduate Advisor notifies the next choice faculty member. This process continues until all students have been accommodated.

iii. A student selection committee consisting of the division chairs or their designates will resolve problems and conflicts which may arise during the advisor selection process. Pairing will remain the product of mutual consent of the student and the faculty member, and under no circumstances will a student be placed in a group without the student’s or faculty member’s consent.

iv. The Department Head will adjudicate disagreements which may arise between the faculty and/or students with the action of the student selection committee.

2. Change of Advisor

a. The selection of a research advisor is a serious matter and usually it is expected that a student will remain with his/her chosen advisor for the duration of the degree program. However, provision is made for the rare case in which a student may wish to change to another advisor. After consultation with the advisor and upon petition in writing by the student to the Graduate Advisor, a student may receive approval for such a change.

b. Faculty no longer willing to serve as the advisor for a student who is in good standing with the graduate school shall inform the student and request in writing to the Graduate Advisor that the student seek a new advisor within a specified period of time. The student is expected to select a new
advisor, with approval from the Graduate Advisor, prior to the start of the following semester. If the student is supported as a Graduate Assistant Research at the time of the request, the current faculty advisor will continue to support the student for a minimum of 30 days or until the student has been accepted by another advisor. In return, the student is expected to make a smooth and orderly transition.

B. Postdoctoral Appointments

All appointments to staff positions at the postdoctoral level must be approved by the Department Head, regardless of the source of salary funds. This requirement is normally satisfied via the employment documents which bear the Department Head's signature. Appointment periods must be stated clearly on the appropriate employment documents.

C. Assignment of Faculty Research Facilities

1. Allocation of research space shall be the responsibility of the Department Head in consultation with the Space committee.

2. Negotiations concerning facilities and space will be the explicit responsibility of the Department Head, who shall confer with the Space committee regarding details.

V. Committees

A. General Procedures

1. Service on departmental committees is considered to be a normal part of each faculty member’s duties. All faculty members are welcome, indeed are encouraged, to raise issues to be considered by any committee. Meetings of committees will be held only when a majority of the voting members of the committee are present. Unless otherwise specified, all committee members serve in a voting capacity. Any committee may elect to hold a closed meeting by a majority vote of the members present. However, all decisions made and all votes taken by any committee will be communicated through appropriate channels to the faculty as a whole.

2. The agenda for each meeting will be determined by the committee chair in consultation with committee members.

3. Except as otherwise noted, all committees will establish their own procedures, provided that the following conditions are met:
   a. Members of the department concerned with a given matter should be afforded an opportunity to present their views.
   b. Any faculty and staff member of the Department may make proposals to
the committee in writing. Such proposals will normally be given consideration within 45 days.

c. Each committee will establish procedures for receiving and considering proposals from undergraduate and graduate students as appropriate.

d. Some committees include student representation. During discussion involving the evaluation of particular students or faculty members, the student representatives will be excused.

B. Operational Committees

Unless explicitly stated below, departmental committees will be selected by the Head, with the proviso that at least one member shall serve a two-year term to provide continuity.

Active Departmental Committees:

Executive Committee - The purpose of the Executive Committee is to review major departmental actions and make recommendations to the Department Head, and to serve as a resource for long-range planning and policy issues related to research activities within the department.

Academic Operations Council - The purpose of the Academic Operations Council is to advise the head and serve as his or her resource for long range planning and policy issues relevant to the academic operations of the Department.

Advisor to the American Chemical Society Student Affiliate Chapter - Advises and encourages development of professional interests of undergraduate chemistry majors.

Colloquium and Seminar - Organizes and coordinates departmental colloquium and seminar program; coordinates and supervises Department's participation in Southwest Speakers Exchange program.

External Faculty Awards - Solicits and reviews nominations of department faculty members for external professional society awards.

Internal Faculty Awards - Solicits and reviews nominations of department faculty members for internal and University-administered awards.

Faculty/Graduate Student Working Group - Student faculty group concerned with graduate student affairs (see details below).

Graduate Admissions and Review - This committee is chaired by the Coordinator of Recruiting, Admission, and Review. It establishes and periodically reviews departmental standards for admission of prospective graduate students; reviews academic records and qualifications of marginal applicants; reviews progress of
probationary graduate students and makes recommendations to the Graduate College.

**Graduate Awards** - Reviews applications and nominations for awards to Department graduate students.

**Graduate Brochure** - Plans and annually prepares departmental brochure materials used for graduate student recruitment.

**Graduate Curriculum** - Establishes and reviews departmental standards related to graduate instructional programs; periodically reviews departmental policies regarding preliminary examinations, degree programs, student research proposals, and course requirements; reviews faculty proposals for new graduate courses.

**Graduate Recruiting and Visitation** - Establishes divisional contacts with prospective graduate students; arranges student visits to the department, arranges faculty visits to various campuses for recruiting of graduate students.

**IUCCP Advisory Board** - Serve as departmental representatives on the Advisory Board for the Department's Industry-University Chemistry Cooperative Program

**Library** - Reviews and expedites acquisitions by the University Library.

**Promotion and Tenure** - (elected) Reviews instructional/research performances and professional activities of departmental lecturers and tenure track faculty members; advises Department Head on promotion, tenure, and appointment recommendations (see details below).

**Staff Advisory Committee** – Serves the Head in an advisory capacity on a regular basis; represents the staff in the governance of the department. This committee serves as a communication link between the staff, faculty, and department administration. Member elections and appointments are self-governed.

**Space** - Advises Head concerning use of departmental space.

**Undergraduate Curriculum** - Reviews curricula and requirements of undergraduate B.A. and B.S. chemistry majors; plans program modifications and improvements (see details below).

**Undergraduate Student Awards** - Reviews and identifies nominees, from among undergraduate chemistry majors, for various awards, scholarships, and honors.

**C. User Groups**

Faculty organized to develop policy and procedures regarding specialized equipment. Recommendations are presented to Department Head.

Computer User Group
ESR User Group
Electronics and Machine Shop User Group  
Glassblowing Shop User Group  
Information and Communications Technology  
Mass Spectroscopy User Group  
NMR User Group  
Stockroom User Group  
Trace Element Analysis User Group  
X-ray Diffraction User Group  
XPS User Group;

D. Executive Committee (EC)

1. Structure and Membership

The committee shall be chaired by the Department Head and include seven tenured faculty members administratively located in the department. The committee members will be elected by majority vote by ballot of the tenure-track faculty administratively located in the Chemistry Department, with one representative elected from each division (analytical, biological, inorganic, organic, physical-nuclear), and two representatives elected "at-large." No more than two members from any division may serve on the committee. Three-year terms begin January 1 and are staggered to avoid complete replacement of the committee in a single year. No one can be re-elected to the committee without a break of one year between terms of service. As soon as possible following the resignation of a committee member, a special election will be held. The newly elected member will serve only the remaining portion of the term. A quorum of any five members can act on all matters.

2. Meetings and Agendas

The Executive Committee will meet at the pleasure of the Department Head but at least four times per year. The Agenda for these meetings will be determined by the Department Head, with input by the members. Minutes will also be distributed to the faculty after each meeting, giving members the opportunity to correct minutes by email but aiming for faculty distribution within two weeks. The agreement of any two members shall be sufficient to put a topic on the agenda or bring a proposition to a vote. Votes shall be recorded in the minutes, as shall any recommendations overruled by the Department Head. If necessary, minutes distributed to the faculty may contain sections that are redacted because sensitive information was discussed. The presence of such redacted material will be noted in the minutes with a general heading indicating the nature of the redacted text (e.g., "start-up offer to Dr. X", "plans for retention of Dr. Y").

3. Responsibilities

The purpose of the Executive Committee is to review major departmental actions and make recommendations to the Department Head, and to serve as a resource for long range planning and policy issues related to research activities within the
Department. The Executive Committee will represent the department as a whole in facilitating meeting the missions of the department, including its teaching mission. As part of these responsibilities, the Executive Committee shall:

a. review recommendations by the department head concerning annual tenure-track faculty salary raises.

b. review the departmental budget recommended by the department head

c. make recommendations regarding areas for faculty recruiting. If the Executive Committee does not approve a particular recruitment effort, a faculty group proposing the effort may petition the faculty as a whole to get approval for the hiring plan in question. Faculty recruitment proposals that fail to get the approval of either the Executive Committee or the faculty as a whole will not proceed.

d. formulate a vision for the department that leads toward excellence in both research and teaching, and communicate this vision to the department. This vision should include the overall hiring, space, and infrastructure priorities that are guiding the committee and Department Head in making decisions.

e. make recommendations regarding faculty start-up and retention packages. It is understood that the Department Head may act unilaterally when rapid action is required.

f. make recommendations regarding graduate student recruitment and remuneration policies

g. review controversial recommendations by the space committee and suggest issues to be addressed by the space committee

h. review recommendations by the department head for major administrative assignments

i. make recommendations on new initiatives such as centers

j. review and assess programs and infrastructure issues

k. take over the current duties of the post-tenure review committee

l. make recommendations on research-related departmental committees and membership

m. review matching funds and support requests at the discretion of the Department Head
E. Academic Operations Council (AOC)

1. Structure and Membership

The AOC shall be composed of the division chairs plus the Director of First-Year Programs, the Graduate Advisor, the Undergraduate Advisor, the Associate Head, a Senior Lecturer elected to a three-year term by the non-tenure track faculty, and the Department Head. (Senior Lecturers may not serve consecutive terms on the committee.) The Assistant Head, the president of GSAC, and the president of the undergraduate AOC student affiliates shall participate as *ex officio* non-voting members. The Department Head shall chair the meetings of the AOC.

2. Meetings and Agendas

The AOC will establish a regular time for its meetings but at least once every two months. The Agenda for these meetings will be determined by the Department Head, with input by the members, and will be distributed prior to the meeting to all departmental faculty. The agreement of any two members shall be sufficient to put a topic on the agenda or bring a proposition to a vote. Votes shall be recorded in the minutes, as shall any recommendations overruled by the Department Head. Minutes will also be distributed to the faculty after each meeting, giving members the opportunity to correct minutes by email but aiming for faculty distribution within two weeks. It is expected that special AOC meetings may be called by the Head. For voting purposes, 6 or more members shall constitute a quorum.

3. Responsibilities

The purpose of the AOC is to advise the head and serve as his or her resource for long range planning and policy issues relevant to the academic operations of the Department. As part of these responsibilities, the AOC shall offer advice or make recommendations regarding:

a. the undergraduate and graduate curricula. The AOC would not displace the undergraduate or graduate curricula committees, but it could suggest issues for study by those committees and review recommendations by those committees.

b. funding for academic operations and teaching

c. controversial or disputed teaching assignments

d. improving instruction

e. all committee actions that have major academic implications for the faculty and Department

f. staff and personnel issues

g. building security/resources

h. short-term issues regarding research support services
F. Promotion and Tenure Committee

1. Structure and Membership
The committee consists of seven (7) members from the ranks of tenured, full-time, full professors administratively located (ADLOC) in the department. Committee members are elected by ballot by majority vote of the tenure-track assistant, associate, and full professors administratively located in the Chemistry Department, with one representative elected from each division (analytical, biological, inorganic, organic, physical-nuclear), and two representatives elected “at-large.” No more than two members from any division may serve on the committee. Elections are held during the first week of November. Three-year terms begin January 1 and are staggered to avoid complete replacement of the committee in a single year. No one can be re-elected to the committee until one full year has expired since a previous term of service. As soon as possible following the resignation of a committee member, a special election will be held. The newly elected member will serve only the remaining portion of the term. Committee members elect the chair, vice-chair, and secretary. No member may serve more than one year as chairman in any three-year term on the committee. A quorum of any five members can act on all matters, except promotion and tenure, at any meeting of the committee. A vote of all seven members is required for promotion and tenure decisions.

2. Responsibilities
The Chemistry P&T Committee gives the Department Head its advice and recommendations on the granting of tenure, promotions, and appropriate rank for chemistry faculty. The committee also makes recommendations on chairs, joint appointments, visiting faculty, emeritus status, Honorary degrees, and appointments to the rank of Distinguished Professor.

3. Mode of Operation
The P&T Committee meets as required throughout the year. It reviews the files of all proposed tenure-track appointments and advises the Department Head on the solicitation of evaluations by off-campus professionals and other needed documentation of teaching, research, and university and public service. Records are kept of the final disposition of committee recommendations.

4. Operating Procedures
a. Procedures for Annual Review of Non-tenured Faculty
   i. Each spring the P&T Committee prepares a written evaluation of the progress of each of the non-tenured faculty members in tenure-track positions. These evaluations are based primarily upon updated
vitae solicited from the faculty members and written appraisals by the appropriate division chair. The Department Head meets with each of the untenured faculty members and reviews the P&T Committee’s evaluation. This review should occur in the spring semester of each year.

The Department Head does not participate in making the written evaluation. The committee does not discuss the written evaluation with the faculty.

b. Generating Recommendations

i. Tenure

(a) The timing of a candidate’s tenure evaluation will be determined by the candidate’s initial offer letter. In general, the tenure review will begin at the end of the candidate’s fifth year for candidates whose initial appointment is at an assistant professor level. Candidates can, however, request a one-time delay of one year in their consideration based on personal considerations. This request must be made to the Department Head before the time when an evaluation is scheduled to begin. Requests may be approved by a simple majority vote of the P&T Committee. If the candidate has missed eight or more workweeks due to reasons enumerated in the Family and Medical Leave Act, the department specifically encourages the request for a one-year extension and will automatically support this request. To be considered for tenure, a candidate is required to supply all information relevant to the tenure decision before the tenure evaluation begins. This information should consist of the following and should follow the same suggested format as used for his/her departmental file:

1. Ten copies of his/her curriculum vitae which should include a record of publications, research, presentations, seminars, research grants, graduate students, postdoctorals, visiting scholars, teaching and service.

2. Ten complete sets of his/her most recent and important publications (up to six reprints/preprints of original contributions to the refereed literature).

3. A list of six outside referees who are qualified to evaluate the candidate’s research; these referees should be distinguished, active research leaders in the candidate’s field, but not previous mentors or supervisors.

4. A narrative statement of up to three pages in length, which describes the candidate’s major accomplishments in
teaching, research, and service.

(a) Letters are solicited from at least three of the suggested referees, plus others selected by the committee. The letters of recommendation will be held in confidence as permitted under a ruling by the Attorney General of the State of Texas.

(b) One committee member is selected to be responsible for assembling a complete file that contains all relevant information about a candidate’s research, teaching, and service performance. Relevant information may vary with the individual, but can include the candidate’s (i) departmental vitae, (ii) past annual reviews by the P&T Committee, (iii) solicited and unsolicited evaluations from internal and external referees, (iv) evaluation of teaching and performance from student surveys and faculty comments, including ones derived from classroom observation, (v) material published or submitted for publication by the candidate, and (vi) other material considered relevant and reliable by the committee. If desired, the candidate may submit other materials to the committee or discuss procedures with the Department Head. The candidate is also required to give a departmental seminar. The committee does not meet with faculty members under evaluation.

(c) The complete file is circulated to the committee for their individual review prior to consideration by the committee. A recommendation is prepared, discussed, and modified until a general consensus on wording is reached. A vote is then taken by secret ballot and the resulting recommendation is transmitted to the Department Head by the committee chairman. The Department Head does not participate in the committee’s evaluation of faculty.

ii. Promotion to Associate Professor

Promotion to associate professor normally is considered concurrently with the tenure decision, and one will not normally be awarded without the other.

iii. Recognition of AAUP Tenure Probation Period

The timing of the recommendations of the committee is set so that the Department Head receives them before October 1 of the sixth
year of the candidate’s probationary period. After final action is taken by the Administration (spring of the sixth year), the candidate is notified so that the decision is known before the beginning of the seventh year. Thus, an evaluation must begin in the Spring of a candidate’s fifth year of service.

iv. Promotion to Full Professor

Eligible associate professors are reviewed annually. Recommendations for promotion to Professor are made on the basis of criteria set forth in the Department of Chemistry P&T guidelines. The first complete evaluation for promotion to full professor will be made no later than the year after a faculty member has served in the associate professor rank for four years. Each year the associate professors are sent a memorandum that requests that their files be updated. When a candidate is to be considered for promotion, the file is reviewed and outside letters are solicited to evaluate the quality of the candidate’s research. The details for the review procedures, evaluation, and vote are the same as for the tenure recommendation procedure. The deadline for a recommendation for a regularized promotion usually occurs in mid-October in any given year.

v. Promotion to Distinguished Professor

Upon recommendation of the P&T committee, a faculty member may be considered for promotion to the rank of Distinguished Professor. Upon consultation with each Distinguished Professor in the Department, a document will be prepared which demonstrates that the candidate is in the upper 5% of his or her sub-discipline of chemistry and that the candidate has made at least one seminal contribution which has redirected the thought of his or her field of investigation. Letters will be solicited from prominent individuals world-wide for inclusion in the nomination package. Support by the departmental Distinguished Professors is required to submit the nomination through the College Dean to the Dean of Faculties.

vi. Tenure Recommendation for New Faculty Hired at the Associate and Full Professor Level

The committee advises the Department Head on all appointments which involve the granting of tenure. The committee participates in an evaluation and recommendation procedure that is equivalent to that outlined for granting of tenure.
G. Undergraduate Curriculum Committee

1. Composition

The Undergraduate Curriculum Committee shall be composed of three to five members appointed by the Head from among those faculty who are actively involved in teaching the major undergraduate course offerings of the department.

2. Meetings and Agendas

The Undergraduate Curriculum Committee shall meet as often as necessary to carry out its functions and responsibilities, but at least once each semester. The agenda for these meetings will be set by the chair, appointed by the Head, partly in response to requests by the committee members and any other faculty members of the department. For voting purposes, four or more members shall constitute a quorum.

3. Function

The purpose of the Undergraduate Curriculum Committee is to oversee matters relating to the conduct of the Department's undergraduate teaching program. This committee will periodically review the chemistry undergraduate curricula and recommend to the Department Head and faculty ways of making the program better serve the needs of the students. It will continuously monitor new developments in innovative teaching methods, techniques, and equipment and act as an information resource for the faculty.

4. Responsibilities

a. Reviewing all proposed changes to the undergraduate curricula, including major modifications of current courses and additions of new courses.

b. Formulating and recommending new initiatives relating to the undergraduate teaching program.

c. Advising the Department Head on ways to motivate, evaluate, and reward excellence in teaching.

d. Providing liaison with the College of Science Undergraduate Curriculum Committee and with the Undergraduate Advisors in other departments within the university through the Undergraduate Advisor.

H. Faculty/Graduate Student Working Group

It is in the best interest of the Chemistry Department to promote open lines of communication between Graduate Students and Faculty Members. Therefore, the Faculty/Graduate Student Working Group (henceforth, the Working Group) has been
The Working Group has two principal missions:

a. To provide a forum for all Graduate Students, via their elected GSAC representatives, to voice their concerns and opinions regarding issues of interest to Graduate Students;

b. To provide a direct conduit for information flow from the Chemistry Department Administration to the Graduate Students.

2. Composition

The working Group shall be comprised of all duly elected officers of the Graduate Student Association Chemistry (GSAC), the Department Head, the Graduate Advisor, the Associate Graduate Advisor (optional), and four additional members of the Chemistry Graduate Faculty. These four faculty members, each representing a different sub-discipline within the Chemistry Department, will be nominated by GSAC and approved by the Department Head. The Graduate Advisor will serve as the chair of the Working Group. In the absence of the Graduate Advisor, the Associate Advisor will assume the duties of chair.

a. Term of Membership

The terms of all appointments shall be one year, commencing on 1 October.

b. Meetings

At least two meetings of the Working Group will be held per year; one each during the Fall and Spring semesters.

I. Ad hoc Review Committees

1. From time to time the Department Head, upon consultation with the Academic Operations Council, may appoint small committees to review various aspects of departmental activity. These performance reviews may evaluate academic programs as well as operational efforts involving shops, facilities, and support groups. Written reports shall be reviewed by the Head prior to distribution to the faculty.

2. Individual administrative performance will be reviewed periodically as required, consistent with re-appointment schedules for faculty and with periods no longer than four years for staff. The committee reviewing the performance of the department Head will be appointed by the Dean and contain a majority of persons elected to represent the department.
J. Appointments to Committees

1. The Department Head, with the concurrence of the Academic Operations Council, shall appoint the members of the Undergraduate Affairs, the Faculty/Graduate Student Working Group, and the Departmental Services Committees to one year terms commencing in May. The Department Head shall solicit from Departmental student organizations recognized by the Academic Operations Council nominations for student appointments to these committees.

2. No faculty member shall serve simultaneously as chair of more than one standing committee. No faculty member shall serve as chair of a standing committee for more than three years consecutively.

VI. Amendment of the Bylaws

Amendments to the Department of Chemistry Bylaws shall require a favorable recommendation by the Executive Committee and a majority affirmative vote of the faculty.

VII. Conflict between the Department of Chemistry Bylaws and other Regulations.

Should any part of these Bylaws be in conflict with regulations of the College of Science, Texas A&M University or the State of Texas, those regulations take precedence over the Chemistry Department Bylaws.

BYLAWS ACCEPTED AT FACULTY MEETING NOVEMBER 26, 2002
Revised 7/8/08
Revised 3/1/12
Family and Medical Leave Guidelines
for Graduate Students of the Department of Chemistry, TAMU

Preamble: In recognition of the fact that situations arise where students will, because of childbirth, adoption, or illness, be necessarily unable to meet their obligations to the Department and University, guidelines for the acceptable procedures to be followed are outlined below. The fundamental principle behind these guidelines is that the Department of Chemistry is committed to maintaining the student’s viability as a contributing member to the research and educational mission of the Department. It is hoped that these procedures will assure a secure environment which will minimize disruption by and the impact of such momentous personal events. No set of guidelines will cover all exigencies. In all cases, communication between student, research mentor, instructors, and the Department officials will be necessary for flexible responses to unique situations.

Childbirth Policy. The following applies to a full-time female graduate student. It is expected that a typical leave period following childbirth will be on the order of six weeks. Salary and benefit payment during this time will continue irrespective of the source unless strictly forbidden by a granting agency. In the latter case, the Department, through the Graduate Student Office will provide the salary and benefits at the level of a Departmental RA or TA.

The graduate student is strongly encouraged to inform her mentor of her pregnancy status as early as possible, and no later than five months prior to anticipated childbirth. Such a planning period is necessary for careful joint consideration, by the student, her mentor and the Department, of adjustments to be made in research, timing of research reports and seminars, preliminary examinations, and advisability of TA/RA assignments. During the months preceding childbirth, it is to be expected that the pregnant student will be transferred from any laboratory position where potential exists for exposure to hazardous chemicals or solvents. Whether the student should be completely removed from the lab should be a decision to be made between the student and her mentor in consultation with her physician. Faculty are expected to modify research programs to provide a work environment appropriate to the capabilities of the student.

Family Leave: The following applies to a full-time graduate student who is the parent of a newborn child or adopted child. Under normal circumstances it is expected that the father will be granted a short term leave as typically associated with vacation leave days. Longer terms and salary continuances may be requested on a case by case basis and negotiated between the student, their mentor, and an official of the Department as designated by the Head of the Department.

Medical Leave: The following applies to all full-time graduate students and applies to both childbirth and medical emergencies. Normally, such events will halt the academic and research clocks with regard to coursework assignments, reports due, and program hurdles such as cumulative examinations, seminars, and oral examinations. Faculty are expected and encouraged to make individual arrangements with students for completion of requirements, and the removal of any grades of “I” when the student returns.

A12. Departmental Safety Regulations
Departmental Safety Regulations Overview

A. The Chemistry Department strives continuously to provide a safe working environment in all of our instructional and research laboratories and support facilities. Despite the variety of potential hazards inherent in chemical laboratories, proper observance by all faculty, staff, and students of the safety practices outlined in this guide will minimize the possible risks and help to maintain an excellent safety record.

B. All Chemistry Department faculty, staff, and students who work in laboratories, chemical storage areas, preparation rooms, instrumentation facilities, or shops should familiarize themselves with the TAMU Environmental Health and Safety Department's (EHSD) On-line Safety Manual which serves as a guide to generally accepted safety practices in all University research and instructional laboratories.

C. All personnel in each laboratory should become familiar with simple emergency first aid methods. The department will arrange for periodic first aid training sessions, as needed.

D. No individual may perform unusually hazardous experimental work (e.g., handling potentially explosive materials or large quantities of flammable compounds) unless a second person is present in the same laboratory or within calling distance.

E. Windows on all laboratory doors must be unobstructed at all times. An exception to this regulation will exist for laboratories in which high-intensity radiation sources, such as lasers or x-ray generators, are used.

F. Interior connecting doors between laboratories must be unobstructed and unlocked at all times. The floor area beneath the arc of swing of each laboratory door should also be unobstructed.

G. Consumption of food or beverages is not allowed in laboratories that contain hazardous chemicals.

I. Safety Procedures & Information

Many operations in chemical laboratories involve dangerous materials. The well-being of an individual as well as of those around him/her demands that careful attention be given to safety. It is tragically true that the results of a moment’s carelessness or thoughtlessness can cost a life, or a lifetime of disability. Equipment which operates unattended must be posted with emergency shut-down procedures. It must be interlocked to be fail-safe in the event of failure of utility service such as power, water, compressed air, etc.

Discuss every hazardous procedure with your research director, with your supervisor, or with persons knowledgeable in the field. Any occurrence, even though improbable, that produces a highly dangerous situation must be anticipated (e.g., pressure vessels must be equipped with safety valves; highly toxic materials being processed in a glass equipment train or vacuum line will be released if the train breaks; therefore, the operation must be carried out in a suitable hood, etc.)

Reports of unsafe conditions should be brought to the attention of your supervisor, the Department Head's Office, or the departmental Business Office.
A written report on every accident involving a fire or personal injury must be filed with Judy Ludwig in Room 121, in order that procedures to replenish all fire extinguisher and to secure Workers' Compensation coverage for injured individuals will be activated. Standard forms on which these reports must be written are available from Judy Ludwig in Room 121.

A. Communications
It is imperative that any emergency be reported quickly and precisely.

Call 9-911 or 5-2345 to notify the University Police on a 24-hour basis.

Call 5-3335 to notify the departmental Business Office during regular working hours.

Outside normal business hours, contact the Physical Plant Radio Room at 5-4311.

In the event that it is necessary to evacuate part of or the entire Chemistry Building complex, each research group and instructional laboratory will be notified by a designated contact person.

B. Evacuation of Buildings
Because of the complexity of the Chemistry Building, it is impractical to assign evacuation routes. Plan your evacuation route before it becomes necessary to use it. Be familiar with it, and always have an alternative route in mind. As a rule, DO NOT USE THE ELEVATORS. (If fire alarms have been activated, elevators will not operate.) Persons who are unable to walk should be carried. All personnel should assemble in the following areas after evacuating the building:

1928 Wing - Across Ross Street in front of Reed McDonald Building

1932 Wing - On the mall west of the building by the water fountain

1959 Wing - In the plaza area south of the building between Chemistry and Francis Hall; Parking Lot 23

1972 Wing - In Parking Lot 23 south of the building

1986 Wing - Across the street in front of the Halbouty Geosciences Building or Doherty Petroleum Engineering.

C. Emergency Procedures
1. General
   a. Minor Emergency:
      Not Life Threatening (e.g., electrical power failure, water failure, nontoxic chemical spill).
      i) Report the emergency to the departmental Business Office (5-3335). Outside regular working hours, report the emergency to the Physical Plant Radio Room 5-4311. The nature of the emergency will be assessed and reported to the University Police.
      ii) Notify all people in the immediate area affected by the emergency.
   b. Major Emergency:
      Life Threatening (e.g., fire, toxic chemical spill, bomb scare)
      i) If fire, sound the fire alarm.
ii) Call the University Police, (9-911 or 5-2345); identify yourself, and give the location and nature of the accident.

iii) Call the departmental Business Office (5-3335) and report the emergency. Outside regular working hours, report the emergency to the Physical Plant Radio Room (5-4311).

iv) Notify people in the immediate vicinity.

v) Provide assistance, if possible.

vi) If it is necessary to evacuate the immediate area or the entire building, you will be contacted and instructed to go to the evacuation area.

vii) Chemical Spill/Exposure: For any chemical spill which results in skin or eye contact, immediately flood the affected area using an emergency eye wash or shower. If possible, clothes should be removed when using the shower, since they can keep toxic chemical in contact with the skin and reduce the effectiveness of the shower. After thorough irrigation, treatment should be sought at the Beutel Health Center. Detailed information on toxicity (MSDS's) and proper response to exposure for most chemicals is available in the Business Office, Room 119. MSDS information is also available on-line. If there is severe personal injury, the University Police or Beutel Health Center will provide transportation for the injured to St. Joseph's Hospital or Brazos Valley Medical Hospital, as appropriate, where full emergency facilities are available. Call 9-911 or 5-2345 to alert the University Police Department. If there is a fire, the College Station Fire Department will provide assistance.

2. Personal Injuries

a. Minor Personal Injury:

If minor injury occurs, the injured person should report to the Beutel Health Center for treatment (available on a 24-hour basis during the regular school year).

IN THE CASE OF BURNS, ANY BURN COVERING AN AREA LARGER THAN THE PALM OF A HAND OR ANY BURN WHICH OCCURS AROUND THE FACE OR HEAD SHOULD BE TREATED AS A SERIOUS INJURY.

b. Serious Personal Injury:

For serious injuries, such as the burns described above or any injury where there is the possibility of traumatic shock, the following procedures should be followed:

i) Call the University Police (9-911 or 5-2345); identify yourself and give the location and nature of the injury.

ii) Call the departmental Business Office (5-3335) and report the injury.

The University Police or an ambulance will transport the injured person to the Beutel Health Center, St. Joseph's Hospital, or Brazos Valley Medical Hospital, as appropriate.

IN THE EVENT OF ANY INJURY, WHETHER MINOR OR SERIOUS, A WRITTEN INJURY REPORT FORM MUST BE FILED WITH JUDY LUDWIG IN ROOM 121.

D. Laboratory Safety References

The following is a list of recommended manuals and handbooks dealing with safety in the laboratory. They are available in the Business Office, Room 119.
•  "Chemical Hazards of the Workplace", Proctor and Hughes
•  "CRC Handbook of Laboratory Safety" 2nd edition
•  "Effects of Exposure to Toxic Gases - First Aid and Medical Treatment"; 2nd edition, Matheson Gas Products
•  "Handbook of Reactive Chemical Hazards"; 3rd edition, Bretherick
•  "Patty's Industrial Hygiene and Toxicology" Volumes 1-3B
•  "Prudent Practices for Disposal of Chemicals in the Laboratory"; National Research Council, National Academy Press
•  "Prudent Practices for Handling Hazardous Chemicals in Laboratories"; National Research Council, National Academy Press

E. Laboratory Fume Hoods

The chemical fume hoods in our laboratories are designed to protect you from toxic and noxious vapors. They are the most important item of safety equipment in your laboratory. In order to gain the full protection these hoods afford, the following operating procedures should always be observed:

1. Call the Business Office at 5-3335 if you have any reason to suspect that your fume hood is not operating properly.

2. Never change the position of the flutes that control the exhaust in your hood. These exhaust systems are very delicately balanced, and adjusting the exhaust on one hood affects every other hood on the same system.

3. Be aware that very high face velocities will not provide a safer hood. Velocities much above 100 ft. per minute generate turbulence at the face of the hood, causing puffs of air from within the hood to contaminate the room.

4. Do not block the ventilation slots at the back of the hood. This adversely affects the operation of the hood.

5. Set up your apparatus as close to the center of the hood working surface as is practical.

6. Avoid putting your head inside the hood and stand a few inches back from the hood sashes when the experiment or reaction is in progress.

7. The vertical sliding sashes in most of our fume hoods are intended to be used as safety shields. Maximum protection is provided when the sashes are fully closed.

8. Keep hood sashes closed whenever you do not need immediate access.

9. Do not impede movement of sashes. You should be able to completely close the front of your fume hood. If sashes are missing or damaged, call the Business Office at 5-3335.

10. It is wasteful to use fume hoods as storage cabinets for noxious chemicals. Try to use ventilated storage cabinets instead.
11. Walk-in fume hoods are intended for large set-ups and you should only be inside the hood while assembling or making adjustments to your equipment. They offer no protection if you stand inside the hood.

F. Waste Mercury

F. Waste Mercury

Mercury spills should be cleaned up immediately. A vacuum cleaner for picking up mercury is available from the stockroom in Room 014. This unit has a special cell to trap the mercury and has a filtered exhaust that prevents mercury vapor from being expelled into the atmosphere and is to be used exclusively on mercury.

Use of the Mercury Vacuum:

PLEASE READ THE INSTRUCTIONS ATTACHED TO THE UNIT FOR OPERATION PROCEDURES.

To check out the unit, contact the stockroom personnel, Room 014. Sign out in the "Mercury Vacuum Log Book". A clean bag is inside the unit; please replace it with a new one (available next to the vacuum) after use. Seal the paper vacuum cleaner bag in the plastic bag provided and bring it back to the research stockroom with the vacuum during business hours, 8:00 a.m. - 5:00 p.m. Gloves are available in the research stockroom.

If you suspect the presence of mercury vapor in your area, call Ronald G. Carter at 845-3335.

II. Fire Prevention Plan

1. Potential Fire Hazards:

   • Flammable and combustible liquids: All flammable and combustible liquids in excess of 1 gallon are to be stored in spring sealing safety containers no more than 2 gallons each. In no case should there be in excess of 35 gallons stored in any one laboratory or room unless it is in flammable solvent storage cabinets.

   • Beware of ignition sources in areas where combustibles are used and stored. Remove all open flame devices. Provide grounded electrical devices in good service condition. Be very careful of open flames (e.g., glassblowing torches).

2. If there is a problem with fire alarms, fire extinguishers or other built-in fire protection, call the Business Office at 5-3335.

A. What to do If You See a Fire in the Department

1. Alert others in the building and the College Station Fire Department by pulling the fire alarm. Pull boxes are located near most main building exits

2. Assist handicapped or injured persons to evacuate the area.

3. Telephone 9-911 or 5-4311 (Physical Plant Radio Room) and calmly and clearly:

   • Give location of the fire.

   • Give the extent of the fire.

   • Give special circumstances for hazards, such as chemicals, valuable equipment, etc.
3. During normal working hours, notify the Business Office at 5-3335. At other times, contact the Physical Plant Radio Room, 5-4311.

4. Account for each person in your work area. Report all unaccounted for persons to the building coordinator and/or University Police Department.

5. If the fire occurs in any area where radiation, chemicals, or any other hazardous substances or operations exist, advise the University Police Department of the exact location and nature of the hazard. The University Police Department will notify the Health and Safety Office or emergency clean-up contractors.

B. Fighting a Fire

It is not the responsibility of our students or employees to fight fires. However, if you are trained in using a fire extinguisher and are sure that there are no hazards from which you are not protected, you may prevent further injury or damage by taking the following steps:

1. Select the proper fire extinguisher:
   - For ordinary combustibles, such as paper or wood, use a pressurized water extinguisher, located in fire hose cabinets.
   - For flammable liquids, use a CO₂ extinguisher located in the corridors and near exit doors inside laboratories.
   - For electrical fires, cut the power source at the main electrical panel, if possible, and extinguish with a dry chemical or CO₂ extinguisher.
   - For combustible metals (sodium, potassium, etc.): Do not attempt to extinguish with an ordinary fire extinguisher. Use a metal x (dry chemical) extinguisher labeled "For Metal Fires Only".

2. Before entering an area that is on fire or contains burning material:
   - Make sure that the fire does not produce toxic gases.
   - Feel the closed door near the top. If the door is hot, DO NOT OPEN IT!
   - If the door is cool, open it a crack to see if the fire is still confined and small. If not, close the door.
   - If the fire is small and you elect to enter the room, keep yourself between the fire and the door.
   - If the fire enlarges suddenly, exit the room and close the door.
   - If the fire remains small, direct the contents of the appropriate extinguisher at the base of the fire.

FOR EMERGENCIES CALL 9-911

III. Building Floods

It is an unfortunate act that floods do occasionally occur in our buildings. This is a common occurrence in most laboratory buildings where water is used extensively for cooling instruments, condensers, etc. As with most accidental incidents, preventive measures are best. Make sure that you know how to prevent them and what to do if they occur.
A. The following measures can be taken to prevent floods:

1. Be certain that all hoses are fastened properly. Use hose clamps (available in our stockrooms) at all connections between the hose and the apparatus or water outlet. Wire can be used for this purpose, but it is not as secure and can eventually the hose. Be aware that overtightening wire can cause it to break at the point where it is twisted, rendering it totally ineffective.

2. Plastic "quick-connect" fittings have sometimes caused floods. While they are a convenience, make certain that they are fastened properly to the hoses, and ensure that the friction connection is made firmly. If they pull apart easily (do not test this with the water running!!), they should be replaced or eliminated.

3. Water monitors are available from laboratory supply houses. They are expensive, but very effective. These monitors measure the flow after it leaves the instrument being cooled. If the flow stops (e.g., if a hose ahead of the flow detector comes loose), the monitor activates a solenoid that turns the water off and also turns off the instrument or heat source. This prevents overheating, an additional hazard in these cases.

4. Do not allow corks, glass, or other solid material to go down the sink drain. (Most of the blockages in our drains are caused by these materials.) Use screens to trap solids before they are washed down. Clogged drains can cause back-ups from floor drains as well as in sinks. In many cases, the only way to stop this type of flood is to turn off all the water feeding into drains above the blockage.

5. When flushing anything down the drain, use an abundant amount of water. Satisfy yourself that whatever was flushed down the drain will be so diluted that it cannot corrode the drains or harm the environment.

B. What to do when a flood has occurred:

1. Whenever possible, locate and stop the flow of water. (Learn where the shut-off valves for your laboratory are located, so that you can find them quickly in an emergency.) Be very cautious about turning off water at a valve that controls the flow of water to an area for which you are not responsible. Turning off water to instruments or experiments that require cooling can easily be more harmful than the flooding you are trying to stop. You should be thoroughly familiar with the area that a valve controls before you shut it off.

2. During normal working hours call the Business Office at 5-3335 to get help. At other times, call the Physical Plant Radio Room at 5-4311 to report the problem. If it is serious, be sure to make this clear to the person answering the call. A casual, nonchalant request elicits a casual response.

IV. Hazardous Waste Disposal Program

The TAMU Hazardous Waste Management Program is administered by the University’s Environmental Health and Safety Department (EHSD). TAMU is not permitted to treat or dispose of hazardous waste locally. Information on specific responsibilities and procedures may be obtained by calling EHSD at 845-2132. EHSD collects hazardous waste from Room 001G in the Chemistry Building, transports it, and properly store it until it is shipped for disposal and maintains permanent records of all disposed waste. Generators of hazardous chemical are responsible for following University disposal procedures, for assuring that their employees are trained in proper disposal procedures, and for properly identifying the hazardous chemical waste
generated. The following procedures are intended to assure compliance with applicable Federal and State regulations for the proper management of hazardous chemical waste and to reduce adverse effects to human health and the environment.

A. General

1. A material becomes "waste" when the individual generator determines that it is no longer useful and should be discarded. A material is "hazardous chemical waste" if it listed in the Federal Regulations(40CFR, Subpart D) or it meets the definition of one of the following:
   - Ignitability (flash point < 60 C or supports combustion)
   - Reactivity (e.g., explosives, unstable chemicals, responds violently to air or water)
   - Corrosivity (pH <4 or >10)
   - EP toxicity (e.g., pesticides, heavy metals, poisons)
   - Material is not excluded from regulations.

2. Hazardous chemicals can be treated to reduce the hazard or the quantity of waste in the laboratory if the treatment procedure is included in the experimental protocol.

3. Empty compressed gas cylinders should be returned to the manufacturer or distributor whenever possible. Non-returnable cylinders should be labelled as hazardous waste.

4. "Mixed Waste" (includes both radioactive material and hazardous chemicals) should be initially routed through EHSD.

5. Chemical waste whose identity is unknown will be picked up by EHSD; however, generators will be charged for the cost of the analysis necessary to determine the chemical identity for proper disposal. In such cases, use "unknown" for the chemical description on the disposal tag.

For additional information about hazardous or non-hazardous chemicals, contact the Environmental Safety Health Department, 845-2132.

B. Classification and Segregation of Hazardous Chemical Waste

1. Hazardous chemical waste is categorized into the following hazard classes:
   - halogenated solvents
   - non-halogenated solvents
   - acids (inorganic or organic)
   - bases (inorganic or organic)
   - heavy metals (silver, cadmium, lead, mercury, etc.)
   - poisons (inorganic or organic)
   - reactives (cyanides, sulfides, water reactive chemicals, peroxides, etc.)

2. Different classes of hazardous chemical waste must not to be co-mingled in the same waste container. Do not combine inorganic heavy metal compounds and organic waste solvents. Do not combine non-hazardous waste (e.g., a mixture of water, dilute acetic acid, and sodium
bicarbonate) with hazardous chemical waste, since this then requires that the entire container of 
otherwise non-hazardous waste be treated as hazardous waste.

3. Dry material (paper, rag, towels, gloves, Kim-Wipes, etc.) That is contaminated with 
flammable or extremely toxic chemicals must be treated as hazardous chemical waste.

4. Sharps (needles, razor blades, etc.) must be encapsulated (Place the sharps in a "puncture 
resistant" container or a plastic/metal container, and then fill it with paraffin or plaster of Paris.). 
Discard the containers of encapsulated sharps as non-hazardous trash.

C. Containment and Storage of Hazardous Chemical Waste

1. Individual waste generators (i.e., teaching and research laboratories) must assure that their 
hazardous chemical wastes are accumulated in safe, transportable containers and are stored 
properly to prevent human exposure or environmental release to the waste materials.

2. Containers must be closed or sealed to prevent leakage.

3. Waste generators must use waste containers that are compatible with the chemical contents 
(i.e., do not use metal containers for corrosive waste or plastic containers for organic solvents). 
Containers must be in good condition and not leak. All containers must have suitable screw caps 
or other means of secure closure.

4. Never overfill hazardous waste containers. Expansion and excess weight can lead to spills, 
explosions, and extensive environmental exposure.
  • Containers of solids must not be filled beyond their weight and volume capacity.
  • Jugs and bottles should not be filled above the shoulder of the container.
  • Closed head cans (5 gallons or less) should have at least two inches of head space 
    between the liquid level and the head of the container.

All waste collection containers must be kept closed, except when adding or removing material.

D. Labels and Labeling

1. The original chemical label on containers used for waste accumulation must be destroyed or 
defaced.

2. EPA regulations require that waste containers be labeled with the accumulation start date, 
content identity, and the words "Hazardous Waste" when the chemical waste is first added.

3. Using string, attach a completed Hazardous Waste Disposal Tag (available from the Chemistry Business Office, Room 119) to each new waste container when the first chemical is 
added.

   Print the information on the tag legibly.

E. Disposal

1. It is illegal to dispose of hazardous chemicals in any of the following ways:
   • Disposal down the drain.
   • Intentional evaporation in a fume hood.
• Disposal in the regular trash.

2. Empty chemical containers may be disposed with other non-hazardous trash, provided that the following requirements are satisfied. EPA regulations stipulate that an empty chemical container must:
   • not contain free liquid or solid residue,
   • be triple rinsed,
   • have the label removed or defaced,
   • have the lid or cap removed, and
   • have a hole punched in the bottom (metal or plastic containers).

3. It is not necessary to break empty glass containers when placing them in a dumpster. Empty chemical containers not handled in this manner must be treated as hazardous chemical waste (very expensive).

4. EHSD will not pickup containers with improper caps, leaks, outside contamination, or improper labeling.

5. The Chemistry Department maintains a hazardous chemical waste satellite accumulation area in Room 001G. The hours that this room is open to accept hazardous waste deliveries change periodically and are posted on the door to the room, as well as on the "Safety Information" bulletin board adjacent to Room 124. When hazardous waste containers are full or ready for disposal, the tagged container(s) should be brought to Room 001G during the designated waste receiving hours. After the staff member in the room confirms that they are properly labeled, the containers will be stored in Room 001G and await collection by EHSD.

Follow the example below to properly complete hazardous waste disposal tags:

Attach a separate Hazardous Waste Disposal Tag to each waste container

Both upper and lower sections of the tag must be filled out completely and legibly. (This information is essential for record keeping).

Secure the top part of the tag to the container with a string that encircles the top of the container. Rubber bands, tape, and wire are not acceptable.

**The "REQUESTOR" is the Principal Investigator or supervisor in charge of the laboratory that generated the waste.

** For "CHEMICAL(S)," indicate the complete chemical and/or common name(s). Chemical formulas or abbreviations are not acceptable.

** List all of the chemical components in a waste container (including water). Lists may be continued on the back of the tag.

** Tags for containers of potentially explosive materials such as picric acid, silanes, nitro compounds, and ethers must indicate the percentage concentrations of these chemicals.

Place any additional hazard information about the container's contents in "REMARKS."
G. Hazardous Waste Minimization

The U.S. Congress has made waste minimization a national policy and the goal of each waste generator. The following practices will help to reduce the volume and toxicity of hazardous waste, benefitting everyone's health and safety, protecting the environment, and reducing disposal costs:

Substitute - Use non-hazardous or less toxic materials in your process, e.g., (1) use "No-Chromix", detergents, or enzymatic cleaners instead of chromic acid; or (2) use non-hazardous scintillation cocktails instead of xylene or toluene based cocktails.

Scale Down - Take a look at your process. Micro techniques will decrease the amount of solvent or reagent needed, thus decreasing the amount of waste generated.
Recycle - If you have reagents that are no longer needed, ask your colleagues if they may find them useful. Redistill your solvents when possible.

Neutralize - Chemically neutralize dilute acids and bases not contaminated by other chemicals in the lab to reduce their hazard.

Manage - Purchase only the amount of chemical actually needed for the experiment. Dispose of old reagents that are no longer needed. Keep track of the chemical inventory. When purchasing new equipment or developing new experiments, keep the type of waste generated in mind.

Training - Train everyone in waste minimization practices and correct waste disposal procedures.
A13. Faculty Survey Responses
1. What are the top 3-5 mission statements that capture the vision of our department?

**Teaching**
1. Educating undergraduates so that they have a firm understanding of chemistry as it relates to their major.
2. Advancing chemistry through state-of-the-art research involving graduate, undergraduate and postdoctoral students.
3. Providing service both within the TAMU community, nationally, and internationally in support of chemistry, science and education.

To teach students _state-of-the-art_ chemistry at both the undergraduate and graduate level, as can only be done by faculty who are performing first-class research. To advance chemistry through first-class research, both in ways that have obvious benefits to society and in basic research where the ultimate benefits cannot be foreseen. I will add nothing concerning service because, while basic service is important, too often service gets used as an excuse for people who are not really contributing to the two missions above. Considerable service has to be done, but let's face it, most of what is called service is not a "mission", it is a means to accomplish research and teaching.

excellence in research excellence in our teaching mission professional development for the success of our graduates

I do not know of any.

**Research**

Recruiting and retaining first-rate faculty

Providing high quality laboratory space for all faculty that suits their particular research needs

Equitable distribution of resources including setting up more shared facilities

Shared governance with transparency of the Administration's decisions to faculty, staff and students

This has never been discussed at any open or closed meeting I have attended during my five years in the department. Also, the previous report by an external evaluating committee has never been discussed (in the sense of "where do we stand on the recommendations") in any open or closed meeting I have attended during my five years on the department. I have a lot of experience with this sort of question and could come up with some reasonable bullets after some thought, and optimized bullets after MUCH thought, but considering the length of this survey I'm going on to questions where the reward per unit time would be greater. As a partial answer, I will assert that "administrative excellence" has to be part of the equation. There are many places noted below where too many things are falling between the cracks on an institutional or departmental level. We have to have a foundation of organizational excellence.

**Public Service**

Training of excellent chemistry students

To be or become one of the top 20 chemistry departments in the United States. This means excellence in research and teaching.

Maintaining our excellence... by hiring at primarily asst. prof. levels but also strategic hires at the senior level. Modernizing our space...both teaching (especially laboratory space) and research space in most parts of the chemistry complex are antiquated and unsafe. Improving Collegiality by Equitable Teaching and Research Responsibilities and Rewards...while there has been some improvement, the 'two tier' system remains in our Department based on those who are the 'working class' (teaching and service duties) and those with special deals/privileges (reduced teaching, professorships, departmental funding).
1. To give the best education we can to our students preparing them for future careers. 2. Maintain an environment in which faculty can be most productive in their chosen research areas. 3. To enhance Departmental facilities and space to serve our students better and remain competitive with our peer institutions. 4. To acquire commitments for sufficient resources in terms of salaries and startup to recruit the most qualified faculty candidates. 5. To enhance collegiality in the Department to enhance moral.

I don't believe the department has ever discussed our "vision" for the future other than to be the best department of chemistry given the realities of what we have now and the resources that are likely to be available.

1. Attract, develop and retain world reknowned faculty 2. Maintain state of the art research and teaching facilities 3. Recruit outstanding graduate students 4. Train and place student and post-doctoral scholars in highly sought industrial and academic positions 5. Communicate the impact of teaching, research, and service to the public

1. Excellence in Research 2. Optimal teaching of our students 3. Increasing the visibility of our department among colleagues nationally and internationally 4. Outreach to the community to improve the image of chemistry

The first vision of our department is to have a top-tier balanced research program. The second vision is to have a strong undergraduate research program that complements our graduate/postdoctoral research program. The third vision is to have a creative undergraduate teaching program that meets the needs of the 20st century society and establishes a knowledge base that is able the graduate to solve new problems and generate new ideas

Teach, research and serve at the highest possible level.

*Conduct internationally recognized research program *Provide internationally recognized educational program in chemistry at undergraduate and graduate level *Aspire to top ranking among chemistry programs in public universities nationally

The department provides internationally recognized leadership in chemical research. The department provides outstanding training for our undergraduate majors as well as for students in our service courses. The department will educate the next generation of research chemists and chemistry faculty, providing our graduate students with the tools needed to be successful in their careers.

none

1. Retain and recruit the best chemists in the current tough economic situation. 2. Breed interdisciplinary research. 3. Improve the recruited graduate student quality.

Excellence in research and education

Excellence in teaching, service, and research.

To improve our overall ranking of our department to be within the Top 10

Develop research excellence in core areas. Recognize classroom teaching excellence. Improve research infrastructure.

Provide an exceptional educational experience in terms of coursework and research for our undergraduate and graduate students. Train the next generation scientists across all areas of chemistry. Excel in the production of new knowledge through active research. Engage in the transfer of research into technological innovation.
High quality research at the frontiers of the chemical sciences
High quality education at graduate and undergraduate level
Recruitment of faculty of highest quality
Production of well-educated young chemists/scientists with leadership capability
Recognition and encouragement of top science and scientists

**Statistics**

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**2. Do we have adequate mechanisms in place for developing and following through with our departmental vision?**

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**Please enter relevant comments below.**

We have major problems on both research and teaching. On teaching, our department has absolutely no culture of contribution to teaching. There are so many special deals made, so many 1/0 or even bought-out 0/0 teaching loads (with either no transparency or arcane rules that end up being disincentives to real contribution) that everyone’s attitude has become "Well, everyone else is taking advantage of the system, with no sign of any cost whatsoever to them, so I want to do the same." There are ways in which we do a poor job with our majors, for god’s sake, and yet no one cares, and to get someone to fix a problem, as should be associated with just performing a normal teaching assignment, you have to offer people a special deal. Then there are people who, let's call it what it is, merely pretending to do research, and yet are such horrid teachers that no one wants to give them extra teaching assignments. On research, there is at least a well-understood system, if you want to call it such. If you want to resources or high salary, you have to be hired in at a high level or else get outside offers. There is little sense that doing good science has any advantage in itself.

Our efforts need to be more focused, and more cohesive

Everyone has a different vision for the department. As far as I am aware, there is no consensus or official one.

The resources of the University as well as the various decisions to cut many services and to trim muscle (and not just fat) off the Chemistry budget has led to retention problems of high-profile faculty and will likely result in more losses in the next few years.

This has never been discussed at any open meeting I have attended during my five years in the department. It has been tangentially touched upon in some closed committee meetings. I sense a fatigue in many colleagues, for example perhaps some are simply concerned with "survival" (as of late there have been many institutional pressures, as well as hostility towards higher education in Texas) and consider "vision" as an obsolete luxury of times long ago. That being said, I sense that many who would be counted among departmental leaders, including our able Head, do have a deep sense of vision.
However, vision is often "situational", with different types or flavors being required for different stakeholders (one for the Chancellor who likes to "make deals", another for the Provost who seeks a greater balance, another for the Regents, etc.) Please note also the comment in the previous box about the report by the last external evaluating committee having a rather short lifetime (i.e. a non-factor in the last five years). There certainly was no discussion of trying to update this internally. The Head has many official and ad-hoc advisory bodies (in the latter category, the division Chairs and Distinguished Professors are periodically convened) perhaps with the result that this task gets diluted as opposed to confronted.

Our dept structure works well for making decisions and less well for having discussions. We do not discuss important issues as a whole department and the division/committee approach does not seem to fit what is needed to formulate departmental-wide vision. Of course, the overall budget situation and the associated uncertainties probably make it much more difficult to go there.

Not sure what is meant by "mechanisms". Apart from the obvious (new building, more money) there are certainly things that could be done administratively that would help. There is a lot of "bureaucratic busywork" that faculty must do now, which detracts from accomplishing science. I'm referring to mindless tasks that the university requires of us. For example, we have to be "trained" continuously in many ways now (ethics, safety, information, diversity etc). Each individual piece of busywork does not take that much time, 20 min here, 10 min there - but collectively it seriously hampers our productivity. The extent of this stuff is far greater (worse) now than it was 25 years ago when I began my career here. The solution is for the administration to reevaluate the necessity of each piece of paperwork, keeping in mind the damage that it does. I don't think that this damage is realized by the university administrators. The morale of the department is damaged when special favors (money, support, instruments GANTs etc) are provided to particular faculty. All such dealings should be above board and justified publically to the faculty at large. I realize that "special deals" for recruiting and retaining hot-shot faculty are required—but they should be tied to the continued success of such faculty at bringing in grant money etc. We need more flexibility to reward excellence in research, teaching service, and also to creative methods to discourage mediocrity. We need to recruit and retain faculty more effectively. We should start the process earlier, and focus better as a single department (not as one division fighting another) in finding the best candidates. All faculty should be aware of recruiting efforts. There have been occasions where recruiting within a division has been done without the knowledge of all division members. This has a very negative effect on morale.

Micromanagement from above, lack of communication and joint input on decision making with higher administration.

With respect to graduate courses I think it was a major drawback recently that their number was limited to 5 per year and division, although we have enough faculty offering more. The students should have more choice. Time goes away from research and teaching by increased administrational demands, e.g. due to the new Concur travel system.

I would like to see more planning to improve our undergraduate education program.

No, we have never discussed our vision as a department. Generally, we are heading the right direction but we have failed to formulate a vision together. The head and EC should be leading the charge.

Many wings of the chemistry complex are in bad shape, which will detract students and new faculty hires. Faculty recruiting has diminished significantly with the budget cuts.

I would put this at 50% level. We have devoted many resources to some of these, but insufficient resources to others. Even if we define a departmental vision, the collegiality and leadership is
insufficient to formulate plans to realize that vision. We really like each other, but we don't discuss and encourage development of plans.

Total Responses 13

3. Do you think that our vision serves as a guide that impacts teaching, hiring, collegiate responsibilities?

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Text Response

We are not meeting our teaching responsibilities. We are not hiring at a level that is commensurate with faculty replacement.

I do not think that teaching serves as a guide to anything. We surely do consider whether someone will be doing great research in hiring decisions.

our vision is not well articulated.

A significant % of our agenda is carried out in "crisis management" mode and the chaos does not lend itself to a consistent vigilance on vision. One day the Chancellor is trying to give away $100 million. Another day there is a call for nominations for the "Texas Institute of Advance Studies". One day a senior hiring opportunity suddenly arises. Another day we have to cut the department budget by 10% as a legislature mandated exercise. etc. etc. Perhaps a virtue is that the Department is opportunistic, can turn on a dime, and is not hamstrung by having to worry about every action being guided by a vision statement. Did the individual soldiers participating in the invasion of Normandy on D-Day take the periodic break to study Eisenhower's vision statement? Those gunners in the bunkers on the bluff are today's "Texas tea party" types. But questionable metaphors aside, there is no doubt that a good vision statement can be of immense value as a guide.

It is intended to.

This department does not have a vision for the future that has been discussed and formulated by the faculty as a whole.

Having been Inorganic Division Chair for a few months now I have the impression that all faculty cherish our vision, and there is no doubt that everybody tries to hire the best candidates, offer the best teaching possible, and share service duties. However, the faculty has to live with many burdens that come from the higher administration, e.g. Concur, graduate course restrictions, a cumbersome seminar speaker invitation process etc.
It doesn't yet serve as a guide for teaching.

Some of us have an innate sense of what a good vision should be and yes, it does impact our teaching, hiring, collegiate responsibilities.

Did not know that we had a active vision statement

Insufficient.

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4. Do you think that this vision is shared by the University?

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</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

While paying lipservice to issues of teaching and research, the broader university leadership beyond the college level and perhaps in part at the college level is focused on things other than the university's core missions.

On teaching, the university simply pretends to care, and it does not really pretend very much. It probably does more harm than good for chemistry teaching. On research, there is a considerable disconnect between chemistry's vision (advancing the science) and the university's goals (money, with a splash of reputation).

Chemistry and the COS deserve more from the University in terms of recognition for our excellence over the decades since Al Cotton was hired by Art Martell in the golden age. Although that era has long passed, the faculty in Chemistry continue to demonstrate their competitive edge in their fields and are highly visible. The 1986 wing that houses a lot of productive faculty is a travesty yet all around us we see new buildings going up for other disciplines. I so not want to say for sure but I think that our leadership may not have been as aggressive as it needed to be to get some of our share of the pot.

The University has an excellent general vision statement, vision 2020. All departments are subsumed into this. This statement was authored by a group that has fallen out of favor with the Board of Regents. The Regents are a big problem that defy a quick or facile summary. Up until now the institutional commitment towards this vision has been quite strong, but I sense a turning point. Around 2009, a previous Provost, Jeff Vitter, attempted a comprehensive "Research Roadmap" vision statement. There was an immense amount of paper generated at college and departmental levels, which ultimately went to waste when he was fired (effectively by the Regents). My point here is that any departmental vision statement may have to be coupled to a college vision statement to have a good chance of being shared by the University.

The university seems uninterested in excellence. Rather, we are becoming the "Super Walmart" of
higher education.

Micromanagement from above, lack of communication and joint input on decision making with higher administration.

In my function as the accompanying wife of the Chair of the Distinguished Professors I often speak to the President, Chancellor, and Regents (and got to know their wives quite well) at official receptions, banquets etc. I always try to get the message out, packaged in nice stories, that in chemistry, as in medicine, 1:1 teaching is absolutely necessary, and that the student numbers in courses should be as small as possible. But like an unstoppable freight train, the tendency goes towards "efficient" teaching in large lecture halls and even long-distance teaching through the media. Beyond the president level there is dangerously little understanding about what research is all about, and why it is necessary. But at least the "celebrity researcher" concept is understood.

Only those visions that generate funds appear to have higher priority

It is tough to say. The upper administration is occasionally but not consistently responsive.

Since I do not know what our vision is, I am sure the University has no idea

I feel that this vision is shared by the university in most cases.

I think the "university" which I assume means the higher administration, would like to think they are encouraging this vision of excellence, but they are so caught up in keeping their high paying jobs, in making a legacy for themselves, that they miss the point of what are the fundamentals of understanding research programs, and promoting/encouraging the best in their faculty. My impression is the "university" wishes to have it all--thinking that if properly managed, we faculty will teach impossible loads, do cutting edge research, and be happy. No one ever asks, what can I do to help your research/teaching efforts prosper; what can we do to help chemistry prosper.

### 5. Are we deficient in any key/emerging research areas of Chemistry?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td>29</td>
<td>100%</td>
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</table>

If you answered yes, please explain below.

Text Response

Organic chemistry is in decline. The full-time organic faculty now are Bergbreiter, Burgess, Gladysz, Harding, Romo, Singleton, Wooley, and Yang, There are simply not enough faculty to even teach courses. Inorganic chemistry will be in decline in the next decade as we have failed to develop or recruit assistant professors.

I am not a fan of hiring for specific areas—I would rather that we pursue the best talent and let that...
decide where we end up.

in my opinion we are behind the curve in materials chemistry, environmental chemistry, and biophysical chemistry relative to our peers

Electrocatalysis

The department has for sometime followed a policy of "recruiting the best people, irrespective of field". This means there is some "bunching" in certain research areas, including some that are not necessarily important. I think we need more medicinal chemistry. We need a protein crystallographer, and a protein NMR specialist.

We are not as strong in organic synthesis as it should be for a department of this size

Nanoscience—a real synthetic talent like Ray Schaak—and spectroscopy—in the style of Ed Solomon, Dave Britt etc., WE have people who make and model but not enough who measure.

These days, I don't think a faculty of ca. 45 can effectively represent all key/emerging areas of Chemistry. As should be the case, chemistry is just spreading in too many directions. Witness the large number of chemistry PhDs on this campus in other departments. As a University, we have a better chance of minimizing deficiencies. But is the era of the comprehensive University over? Should Universities even try?

I'd like an emphasis on "Entrepreneurial Chemistry"—teaching and encouraging our students to start businesses in chemistry.

Synthesis generally defined and its intersection with biology...organic, inorganic, biological chemistry

This question implies following what is fashionable.

I think that it will be important to make an impact in synthetic biology for this department

The department is lacking expertise in bioinorganic spectroscopy (XAS, ENDOR, ESEEM, MCD, single molecule methods, pulsed EPR, etc.).

Biophysical chemistry Nanoscience

We should ensure that our physical/analytical program maintains a critical mass.

We are strong in inorganic chemistry, but weak in all other areas. The best department in the US have strong organic and strong physical groups

We do not have a strong chemical biology teach that bridges our strong chemistry research to biomedical applications.

Physical and Analytical

We lack a significant effort in materials chemistry. The continued retention of the traditional divisions in the Chemistry Department has impeded the ability of the department to move forward into interdisciplinary areas

Applications of synthetic inorganic chemistry to medicinal or pharmacological chemistry.

<table>
<thead>
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<th>Value</th>
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<tbody>
<tr>
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6. Sense of optimism that the Department is heading in directions that enhance the following:

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<th>Agree</th>
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<th>Disagree</th>
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<th>Responses</th>
<th>Mean</th>
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<td>National rankings</td>
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<td>10</td>
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<td>1</td>
<td>30</td>
<td>3.10</td>
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<tr>
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<td>9</td>
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<tr>
<td>4</td>
<td>A sense of a strong Departmental Community</td>
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<td>11</td>
<td>12</td>
<td>5</td>
<td>30</td>
<td>3.67</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

The last review noted problems with transparency. Current operations are much more opaque. Teaching is not a priority in the Department. This is evidenced by total number of lecture courses taught by faculty who have named professorships over the past 10 semesters versus the number of courses taught on average by assistant professors. That latter teach ca. 1.7 courses per year, the former average closer to 1 course per year because of various arrangements (editorships = teaching relief; heavy research = teaching; retention efforts = teaching relief; etc.).

There is no departmental community whatsoever, while I do get a feeling of one at some of the comparable schools that I visit. This has gone downhill since I have been here. Responsibility for teaching has gone downhill considerably since I have been here. We have fixed a few problems over the years but the attitude is much worse.

Department is barely holding on to its standing in the chemical community.

There is not much to say. The morale of the University is low and in our Department also, although maybe less so than the average TAMU faculty member. Our hands are tied and there is a sense of rampant frustration. Although we have made some big and expensive hires, I am not certain that they, although very capable, can provide the leadership and visibility to carry the Department through such tough times.

Architecture plays a strong role in shaping any institutional community. As we fragment into more and more buildings, we are bound to lose traction on our sense of community. Personally, I'm very committed to maximizing this sense. But I'm worried. My repeated suggestion that there be an annual photograph of the entire chemistry faculty (with missing members photoshopped in) only gets feeble support. I think that's a telling indication. There is also a question of whether we "form a Maginot line" about the chemistry community, or encourage joint appointments with other departments and try to encompass more of the campus community, where there are many more chemistry PhDs. This is in the musing as opposed to recommendation category.

Financial conditions in the Department are being stressed by decisions beyond the control of the
Department Head or the Dean that are adversely affecting the department. Departments in State Universities will generally lose national ranking relative to private universities because of reduction in state support and related factors. No comment. This has never been a strong characteristic in this department and seems to be deteriorating.

Although all the "more experienced" faculty are still going strong, the Department desperately needs junior hires. I am nervous that in Inorg. Chem. we are not aggressive enough to go forth with a junior hire while we are still "attractive" for the best candidates. Regarding the NMR facility we need to look for a manager to shadow Steven Silber for 1-2 years, and then take over when he is ready to retire. I don't know of any efforts in this direction, although it has been discussed and agreed upon at least 3 previous NMR meetings. Finding the right person for this immensely important job is more difficult than hiring a junior faculty candidate and I hope this issue can be pushed forward soon.

Would like to have more departmental community regarding our undergraduate teaching program. I think that we will continue to go down in national ranking if we do not address pressing issues with unproductive faculty.

The department is headed nowhere. We have been stagnating for several years now.

With our current trend of losing faculty members, our collective research capabilities and national ranking will be harmed soon. The university administration is obligated to commit enough resources for the department to recruit leading chemists to merely retain our faculty strength and size if we still want to maintain our chemistry department as a flagship department.

Would prefer the chemistry department and the COS can all parties for the foreseeable future and make a nice area that is open for coffee twice a day. We used to at least see each other in the mail room. Now not even that. The culture of departments builds from the facilities. Ours have no common meeting spaces from which casual discussions may grow into collaborations.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
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<tbody>
<tr>
<td>Total Responses</td>
<td>12</td>
</tr>
</tbody>
</table>

7. Satisfaction with the quality and number of graduate students recruited to the department and to your own research group:

<table>
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<tr>
<th>#</th>
<th>Question</th>
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<th>Satisfied</th>
<th>Neutral</th>
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<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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<tbody>
<tr>
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<tr>
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<td>Quantity of grad students</td>
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<td>6</td>
<td>1</td>
<td>30</td>
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<tr>
<td>3</td>
<td>Balance of domestic vs. int.</td>
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<td>13</td>
<td>11</td>
<td>4</td>
<td>0</td>
<td>30</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

The number of students for some areas is inadequate. The attrition rate for students is too high. We are
gradually becoming more and more dependent on foreign students but are doing so without much faculty discussion.

One always wants better and more.

We do not recruit enough graduate students, and we do not hold the existing ones to a high enough standard, partly because we do not recruit enough in the first place. Every year there is an undignified dog-fight amongst professors to get graduate students, if we recruited more than we could handle this would not happen. I do not care if we recruit a lot of overseas students. They tend to be the best students anyway. In the past the argument has been that their English can be too poor for teaching, but now I perceive standards of English amongst overseas students has risen.

On balance am encouraged by the quality of our graduate pool. There is a big mix of highly talented and some mediocre students which i think causes some issues. For example, very few students in our division ever fail either the literature seminar or the preliminary exams and I think this is a morale buster for the superb students. I like the fact that there is no longer a safety net for the students who don't pass the cumes because it lifts the burden off of the advisor who may feel bad kicking a student out.

A good department should never be satisfied with the quality of the graduate students, one can always aspire to better. But ours are quite good. The department is too conservative with regard to the numbers of admitted students. Every year one hears "the sky is falling and we have to cut back". Then *nearly* every year, there is a plea "please ask some of your RAs to serve as TAs during this semester as we have a shortage". In fact, TA monies are diverted to graduate students in other departments, as well as undergraduates, because of these shortages. TAs are valuable departmental resources and should not be so wasted.

I think that the quality of our domestic graduate students does not correspond well to the reputation we would like to have. We have plenty of very good students, but we should be able to attract even more.

This is tough - we need to be constantly vigulant about recruiting the best students. I think we need to recruit more high-quality domestic male students actually; these are becoming the minority.

Graduate recruitment in Physical Chemistry has been a problem for years. Many faculty will be unable to maintain their research programs if the current trend continues.

For this department there are too few domestic applications that come from the top-50 undergraduate schools in the country. At this point it would appear that the ratio of domestic and international students is approaching at 50/50. a more reasonable number would be 67/33.

The overall quality of the graduate students has improved lots in the last 5 years, as we can also see in the increased number of students getting NSF fellowships. But we are still far away from the quality of TU Munich, Berkeley, or Heidelberg students.

Recruitment of domestic students could possibly be increased by a stronger presence at regional conferences.

The quality of domestic students is low. This is probably a typical problem for all departments of this campus.
8. Satisfaction with university/department policy for the compensation of graduate students:

<table>
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<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
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<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
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<tr>
<td>4</td>
<td>99 hour cap</td>
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<td>8</td>
<td>13</td>
<td>5</td>
<td>2</td>
<td>29</td>
<td>2.97</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

We have fixed some problems here.

The department seems proactive on salary. My disappointment with tuition is that one has to pay it on research grants. I don't know what is meant by a 99 hour cap

Our students could very much use a raise (none in 4 years?) but if that came soon, overall the situation would be quite alright.

I don't know this issue well.

The university administration does not understand the tuition situation in Chemistry and the level of support required to keep the Department competitive with peer institutions.

Our stipend is currently $3,200 less than the students are paid in the Department of Biochemistry. I would also assume that are stipends, relative to other chemistry departments, is not below average. If this does not change soon then we will have to be satisfied with poorer students.

Here I have too little comparison with other US universities to give a well-calibrated response.

At a minimum, the university needs to cover TA salaries which are currently subsidized using part of our non-teaching budget.

Access to quality health care for graduate students could be improved, especially as it applies to students who provide care for infants. Even though students have the option to buy the comprehensive health plans offered by the university, the cost can be high.

Sources for sufficient funds is an unresolved issue. The University does not provide sufficient salary support. Sources for fees are a troublesome issue.

Since the students are not real employees, putting a 99 hour cap doesn't make any sense.

While many institutions have adopted tuition remission policies for graduate students, we continue to share a significant burden of the tuition and fees with only partial tuition being supported by the university. This diminishes the number of students that we can support and continues into departmental resources. Student salary has remained stagnant for the past 4 years due to budget cuts
and the lack of full support for our graduate students by the university while they are teaching. This has hampered our ability to recruit the best graduate students. The department is forced to make up a $400/mo shortfall on each TA, since we pay our students $1900/mo, but are only reimbursed by the upper administration at a rate of $1500/mo.

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<tr>
<th>Statistic</th>
<th>Value</th>
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<tbody>
<tr>
<td>Total Responses</td>
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</table>
9. Do you consider graduate student teaching loads to be reasonable?

<table>
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<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
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<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>16</td>
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<tr>
<td>2</td>
<td>No, too high</td>
<td>14</td>
<td>47%</td>
</tr>
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<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

This has been a well known problem for all my time at A&M. Our graduate students teach 30% more sections than our peer 2020 institutions which is hurting our recruiting efforts.

All anecdotal of course but it seems that the folks in Heldenfelds don't realize the students have another full-time job in the laboratory. I have students who typically do very well in teaching and like it and even they complain that the expectations and a general lack of sensitivity to other activities that the student may be engaged in (like cumes, prelims, important experiments for a proposal or paper etc.,)

In response to budget cutbacks over the last few years, TA loads have been increased. One of my concerns is that so few entering graduate students take three courses per semester. There even seems to be a decrease over my 5 year span here. Teaching loads are part of this equation. Personally, I would prefer to see students "forced" to work harder academically (three courses) if a reasonable mechanism could be identified.

Our graduate students' standard teaching load of 3 sections per semester is higher than at most of our peer institution. Whether that is in reality a higher commitment of effort is harder to say, but it is an obvious difference to a prospective student.

There should be more flexibility regarding teaching requirements for graduate students. It seems that currently, if a student arrives with a Masters from a US institution and had several years of TA experience during that Masters, she is required to meet the same teaching requirement for students entering with no TA experience.

For first year students they are perhaps a bit high.

Too high but Tim Hughbanks has done a good job at lowering the load of those involved in the first year program.

Teaching load of tenure track assistant professors in chemistry is higher than those in biology and biochemistry departments. Given that tenure track assistant professors need to build new and strong research programs and thrive in getting new funding, reducing the teaching load will absolutely help them grow.

Our graduate students have a 33% higher teaching load as compared to those students at peer institutions.

Total Responses 9
10. Satisfaction with course offerings:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
</tr>
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<tbody>
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<td>Level of undergraduate course offerings</td>
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<td>7</td>
<td>5</td>
<td>0</td>
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<td>Scope of undergraduate course offerings</td>
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<td>4</td>
<td>Scope of graduate course offerings</td>
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<td>7</td>
<td>7</td>
<td>1</td>
<td>29</td>
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11. Are any key courses appropriate to your research area missing in the undergraduate or graduate curriculum? Please explain below.

Text Response

Undergraduate course offerings are unique at TAMU with high quality, award-winning lecturers covering most sections of the introductory course in sections that have ca. 250 students in Freshman courses and ca. 100 students in sophomore courses, classroom courses where students actually relate to their instructor. There could be more graduate courses.

Little flexibility in graduate courses offering. Too rigid in Divisional offerings, since there is a significant difference in the size and quality of the graduate students in the various divisions. No possibility for offering minicourses.

Too many 3 credit classes. Not enough pass/fail special topics. Students will not risk a 3 credit hour class out of their area because it effects their GPA. I strongly feel we should offer intro 1 credit hour classes for students who fail placement exams in that area, and more one credit hour (pass/fail) special topics. We have multiple sections of sophomore organic, and each prof sets his/her own exam. Consequently, the syllabus in the first semester is not covered properly by some, leading to problems in the second. For years I have been advocating one large exam set by one prof who is NOT teaching a section. All grading would be centralized and more efficient. Students would stop regarding prof as enemy who takes points away, and start regarding them as helpers. Teaching of profs over time could be correlated with how well the students do in the common exam. I think current system is a farce.

Yes. It is no longer feasible to offer more than one (or none) special topics courses now that the new rules about the total number of graduate course has been instituted. I don't even know what the process was to decide this or what is driving it. For example, materials (solid-state), supramolecular and even X-ray courses are a thing of the past or heading that way in inorganic.
I have witnessed regular dialog within the divisions regarding the makeup of their graduate course offerings. Faculty members are engaged. There have been administrative pressures to reduce the scope. I see value in the historic scope, but there has perhaps been a self-serving tendency to multiply graduate courses to minimize involvement of those qualified to teach them in lower division teaching. The traditional divisionalization of this department also may be a hinderance to defining course needs. There seems to be little in the way of team teaching (sometimes unpopular with students). These are musing/observations and not recommendations.

With respect to undergraduate courses, I think that in general, we are somewhat lacking in offering advanced specialty courses to senior undergraduates (or simply encouraging them into our graduate courses). The scope of our graduate offerings is substantial. The level appears to vary.

Lack of graduate students severely restricts graduate courses offered in physical chemistry.

see comment about the reduced number of graduate courses above. Due to this reduced number the solid-state NMR spectroscopy course had to be removed from the official offering. So, I have to teach it to my graduate students "privately", and don't get credit for this. In the Inorganic Division all graduate courses should be streamlined and revised to avoid duplicating material, and adjust the time required for each teaching unit. For example, I understand that Group Theory is a historical course here at Tamu, but still, at other universities it is taught in a few sessions and does not consume a whole semester (and then being resumed in the Physical Methods for one more semester).

It may be possible to streamline graduate course offerings by establishing a master plan.

We need to realign courses so that we provide more choices for UG and fewer for Graduate students.

I find it disconcerting and depressing that a division might be criticized for not teaching enough at the undergraduate level yet faces tremendous opposition when new courses are proposed to be developed.

We lack materials chemistry courses at the undergraduate and graduate levels. In many instances we have courses at the undergraduate level that are in essence duplicates. With one version being designed for our BA majors and one for our BS majors, however these have evolved over time to be in essence the same or very similar courses. This wastes resources and diminishes the quality of the degree. Modernizing our upper division courses remains an ongoing effort.

There should be a bioinorganic, or metals in medicine/biology course offered at the undergraduate level. Classical kinetics is slighted at both the graduate and undergraduate levels. Too few courses are taken by graduate students.

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Responses</th>
<th>Mean</th>
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<td>2.27</td>
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</table>
We have historically done well in graduate education, a trend that has continued over the past decade.

These answers vary widely within research groups.

We are probably not nearly as active in counseling students for major leadership positions than some of our peer institutions. Our students ask very few questions in seminar and many only do so because of Frontiers and for a grade. They lack the confidence that I have seen in graduate students in top programs. They sometimes sleep in seminar and pass notes and doodle. The advisors need to do a better job.

Let's not forget that postdoc training is part of this equation also. For "research intensive institutions" there is no way that doctoral work alone can prepare someone.

I don't think our program is geared to preparing our graduate students for careers in research intensive institutions. For that, it lacks somewhat in its rigor and level of expectations. For example, we do not require original research proposals - hard to claim we prepare students for research faculty careers without it. It is hard to comment how well we prepare student for other areas, really. It varies too much from student to student. The good ones do very well.

Given that we do not put an emphasis on good teaching in the department, generally speaking, I feel that we do not do a very good job of preparing graduate students for undergrad institutions and also this aspect of research intensive institutions.

I think this is an area of improvement. We tend to invite academic speakers to give lectures and the students could benefit from hearing from people from other areas.

While I feel that the department provides students with a strong background and has a support network to assist them in going into industrial and government jobs, there has been less focus on formally training students to enter academia.

Could be better with industrial connections/lectures/green chemistry course at graduate level/catalysis course. Our Organometallics course is sporadic and inconsistent in content. Our view of how we organize our courses is how courses were organized a half century ago. We are inflexible. Students should be taking more courses; Many are now only required by their advisors to take 4. They are quite limited. If they were all brilliant, this would be fine. They are not. Our average student is good, which means they will perform well in their careers, but at this stage, we must work with them to help them develop their potential. Our grad office is organized towards recruitment and hurdle passing or failure. Not towards retention—or heading off failure.
### 13. Satisfaction with the current graduate program milestones:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
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</table>

**Please enter any relevant comments below.**

**Text Response**

The advisor selection process is ok but for monetary reasons it is rushed. Ideally, we should wait longer. Also, there is a feeling that people abuse the system a bit.

Cumes are as good as the prof who sets them makes them. Student seminars can be valuable, but supervisor should not be part of the evaluation. Frontiers is a waste of time and money. Should instead ask other people to come in to teach special topics for 1–2 weeks. These would be somewhat lesser known, but would be less aloof, and more useful to graduate students. I think all students should be forced to write a thesis for their "prelim". Those who pass go on to PhD, those who fail use this as a basis for a MS. Too many bad students get through prelims (mostly because most faculty have too few students. Advisor selection is terrible here. Students are asked which division they are in in their first week, then "advised" about which courses to take. We ignore the AP tests. After they have chosen courses in that division then there is no easy way to get out of it. I suggest the following. All divisions offer two fundamentals courses, 1 credit hour, running until the student-group-sign up of Oct 15-ish, and two more advanced classes (could be special topics) on the same schedule Students nominate a division, and: (i) must AP in that division or take the fundamentals (ii) must AP in at least two other divisions or take two other fundamentals (iii) students who AP out of enough divisions can take special topics. There is no formal chance for advisors to present to all the students, or even all the students in their division, instead we rely on students to seek out advisors. This has to change. All new students should hear all faculty interested in taking graduate students present on their research. There is no cap on numbers of students entering a group per year. Consequently, some groups have seven students join, many groups have none. This is absurd. There has to be a cap, Different academic requirements for different divisions is a disaster.

I think we are rushing the advisor selection process and I really dislike the way the international students who are going to lose support start to panic and pick practically anyone who takes them. It is not a good system. Cumes need to be more transparent as to what is expected and faculty who write cumes that no one can pass need to be reined in by their colleagues. Also the unfair advantage of writing cume questions that are almost exactly like the advisor's research program should be discouraged.
This department does a better job of administering cumulative exams than others I have been associated with. But can the evaluating committee clearly find the "guidelines to students" and "guidelines to faculty members" on the web? The only shortcoming in all of these requirements is that they are not periodically reviewed in a systematic manner. There are no "sunset" term limits that force an internal evaluation. In my own opinion, there are too many sub-rosa devices being used to "lock up" graduate students into research groups in advance of the fall semester. Advisor selection is not an even playing field.

The advisor selection process is excellent in every way. The Frontiers course is ok. Not sure why it needs to be a course. If we need it to ensure attendance, maybe we are not inviting the right Frontiers speakers. I am in favor of cumes as a concept and a qualifier, but consider them largely a waste of time when the passing rate is close to 100%. The prelims are ok, but they tend to happen too late for being true decision-making moments. I think that we need to have a significant and formal hurdle/milestone at the end of year 1 that weeds out students who are doing obviously poorly.

We need to evaluate EVERY graduate student the day after final grades for the spring semester have been given. A committee that DOES NOT include the research advisor should evaluate the performance of the student to determine whether they should be allowed to continue in our program. We currently identify weak students too late—after we have invested a lot of time and money on them. This detracts from our objectivity regarding whether the student can make it through our PhD program and whether they can succeed in Chemistry as a career. I also think we should have students start taking their Preliminary exams in September. This would give the committee more information upon which they would base their decision. Student seminars have become a sham—no one fails anymore, few faculty attend, and the quality has deteriorated. They should be attended by the committee and used as part of the decision making process. They should be research PROPOSALS, not superficial reviews of the literature. In this regard, the Biochemistry dept, with their ORP (original research proposal) does it better.

Our students should be giving more, but perhaps less-formal, student seminars. The proposed change of coupling the student seminar with their research presentation prior to their preliminary examination is ill-adjvised.

The level of the student seminars is to low. The ability to support graduate students should be incorporated into the advisor selection process.

Cume questions are often very specific and not answerable if students have not been in the corresponding class. In my view every cume should be doable by every good student. The topics the students choose for their literature seminars are often very close to their research area. Although I understand the faculties' desire to get the students going in their research, they should work on something at least a little different in their literature seminars. The fellow-students often complain that the quality of the student seminar and prelim presentations is very low, but that this does not make a difference for the outcome, and everybody passes anyway. The faculty might have to be stricter here and e.g. implement the rule that each single point, including the discussion section, needs to be passed for letting the student pass overall.

The prelim passing rate is too high. The same is true for our literature seminar (681).

The goal of cumulative examinations is to encourage learning and provide a bar for entering students are in principle good. The following issues have in the past reduced the efficacy of the cumulative exams: *The existence of "loopholes" to remain in or re-enter the program even after failing the exams. *The heterogeneity of exams prepared by various faculty.
Cumuses are not necessary and might be replaced by other measures of performance.

The Frontiers course serves no useful purpose. The seminar series associated with this as well as the student/faculty interaction supported by this is very useful for our students. The formal course component of written papers on the speakers however does not seem to promote better understanding of a particular area. The course objective should be re-thought. Likewise the student seminar series is to a significant degree dysfunctional in its current format.

I think we do not review and assess these requirements as a collective faculty in the various divisions. Only a few faculty take their service on student committees seriously.

<table>
<thead>
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14. Are we offering our Graduate Students educational opportunities beyond course work of adequate breadth and depth?

<table>
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</tr>
<tr>
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<td></td>
<td>Total</td>
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</table>

Please enter any relevant comments below.

Text Response

Students opportunities for conferences and outside exposure are good. There can always be improvements in this area but we do an adequate job we need to increase the number of professional development opportunities. however, faculty need to encourage their students to participate in the current opportunities.

we could do better. We offer nothing much beyond course work. Ethics. Frontiers is unsatisfactory I'm conservative here. I worry about junking up our portfolio with all sorts of touchy-feely opportunities of dubious positive value. I see our students taking field trips to Dow/BASF/etc, getting involved with student seminars, attending numerous meetings, etc. I think we are hitting the major buttons. However, I would have an open mind about trying to address the top 1-2 deficiencies that any group might identify.

Do you mean research? The answer probably depends on the individual research lab. The students travel a lot to national and international meetings, do internships, come into contact with industry, or even work on industrial projects. They also frequently mentor undergraduate students, and interact with students and faculty of different cultural background.

I think that good graduate student will be able to go outside what we are offering them, without our help.
In general yes, as there are numerous workshops offered on campus. The department could however be more proactive in encouraging students to take advantage of these opportunities.

Needed is more financial aid for travel for collaborations and for conferences, but mainly for collaborations and to use instrumentation that is not available in CS.

<table>
<thead>
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### 15. Do you think that the University appropriately contributes to graduate student support?

<table>
<thead>
<tr>
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<th>Answer</th>
<th>Response</th>
<th>%</th>
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<tr>
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<td></td>
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Please enter any relevant comments below.

<table>
<thead>
<tr>
<th>Text Response</th>
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<tbody>
<tr>
<td>the university continues to fund the graduate program at the community college level and fails to recognize the synergy between teaching and research, i.e. that recruiting excellent graduate students requires teaching loads, stipends, and tuition commensurate with a research university</td>
</tr>
</tbody>
</table>

Charging tuition while students are not taking classes, why? Why charge tuition for students who are only writing up. When a student becomes pregnant, the advisor bears tuition and support costs, university does not contribute at all.

They should pay tuition in the summer for sure when there are no teaching monies.

The mandated cutbacks of the last few years have had a negative impact; for example, some TA loads were increased. There is a tuition ding when a student has checked out of the lab but hasn’t filed a final approved thesis. The University should have a support/waiver mechanism here.

I don't understand this issue well enough. It is easy to ask for more money, but very difficult to provide it. I think we should operate within a balanced-budget mentality.

While students on Welch have a reduced tuition burden, that is not true for all grad students.

Tuition is a serious problem as discussed before.

After students have passed their preliminary examinations, they should not have to continue taking 9 credits of classes (and the tuition that is assessed to their research advisors). I should NOT have to pay the tuition/fees of my graduate students in the summer to take “research” under my direction when the University does not pay me to teach these students.

No, more TA support is needed.

With regards to students that are teaching, the university has not always provided full reimbursement to the department for the actual cost of the TA's
16. How satisfied are you with resources applied toward undergraduate education?

<table>
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<th>Question</th>
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<th>Very Dissatisfied</th>
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<td>1</td>
<td>30</td>
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</tr>
</tbody>
</table>

Please enter any relevant comments below.

Text Response

Undergraduate education is not a priority for this department and for most senior faculty is something they support in word but not in action.

No real discretionary funds.

Essentially all lower division teaching is exiled to the remote Heldenfels building, making this harder to judge. The upper division labs seem to be well equipped.

The sophomore organic labs (especially chemistry majors) are antiquated and just generally in extremely poor condition. We do a disservice to our chemistry majors to offer such labs and indeed may turn them off to organic chemistry by the value we give to their lab conditions!

Higher education is not a business, it is an investment in the future generation. This should not be a bottom line $ & cents issue.

The student support for large lecture courses should be increased (or at least returned to prior levels).

REU students are provided for very well by the REU program. Other than that I always had to pay myself for expenses or salary of undergraduates.

We need to make sure that lab access fee remain available to upgrades the labs. Currently these funds are used to make up for what the University fails to give us.

If the resources were available, it would be nice to have more TA support for upper division lecture courses.

Our labs still require additional modernization.

More and more ugs wish to do research. A donation of a few hundred for supplies would be nice. More upper division electives are needed. Yet offerings to do so are not accepted. Innovations are not encouraged as much as they should be. We spend too much time on one faculty who are generally perceived as slackers.--

Total Responses

17. Satisfaction with personal salary and salary policies within the department:

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<tr>
<th>#</th>
<th>Question</th>
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<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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</table>
Please enter relevant comments below.

Text Response

Not at all happy that my salary is significantly below many of my younger colleagues with less impressive records. Salaries are tied to persons coming in from other institutions or who take advantage of outside offers.

I don't think the yearly review is anything but a pro forma stamp of approval. Ever in my very best years, my letter says that my teaching, research and service are "adequate". to me this seems like a way to make everyone look average so that any lack of salary increase for a particular faculty member can be backed up by a lukewarm letter. I also take issue with letters that have been drafted by colleagues on the Tenure review committees who have much worse records than I do and they are writing that I am merely Meeting the basic requirements of the job...

At an institutional level, several years without raises is unhealthy. At a departmental level, I would rather go without a raise than cannibalize our budget.

Two different questions here! I am very satisfied with my own personal salary. I get paid a significant amount for doing what I truly enjoy. The salary policies of the department I am not as satisfied with. I think that we are lacking provisions for faculty who become research-inactive to take on increased teaching and/or administrative loads. In addition, I think that some aspects of teaching relief and summer salary "awards" from the department deserve to be revised. I think that offering something reasonable to people taking on a significant service role or people running especially large and well-funded groups is appropriate. Not so sure about the logic of rewarding journal editorships, for example.

Of course I’d like a higher salary, but realize the financial constraints. That being said, I think that salaries should be adjusted both upward and downward as warranted by performance, adjusted by the Department head.

Do not think about it any more.

Clearly an occasional cost-of-living increase would be welcome.

...we will know more after the September paycheck...

The administration only responds to external offers.....

The wide range of salaries and salary inversion with lower ranks being paid more than higher ranks is a cause of some dissatisfaction.

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**18. Satisfaction that all faculty are treated fairly in the areas listed below:**

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<thead>
<tr>
<th>#</th>
<th>Question</th>
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</table>
Teaching assignments amongst the tenured faculty are not fairly assigned for several reasons mostly related to the prioritization of research over classroom lecturing.

Main problem is lack of uniformity between teaching assignments in different divisions. Too many push-over courses in some divisions.

Faculty get break from teaching for journal work. Other than that I have no idea how the others get lighter teaching loads. Some folks do Frontiers and other lab courses that require mostly admin work and very little grading or even face time with the students. Of course, various faulty treat these jobs differently and some are real slackers according to the students. Grad and UG students talk amongst themselves about these things and it is harmful to our reputation. I think that asking a capable grad student to teach your course while traveling should be allowed but it must be discussed on a Departmental and Divisional Level. I was surprised to find out that this seems to happen more than one might realize.

There are probably some faculty who should be teaching more. There are probably some faculty who are less responsible with respect to committee work. However, different colleagues have different aptitudes and this would not be a top concern. However, at an institutional level, this Department desperately needs faculty members who are willing to serve on the Council of Principal Investigators and even the Faculty Senate. There needs to be a stronger commitment on the part of the faculty, and/or incentives for this type of service.

I have to remain "neutral" concerning salary increases... as there have been none for a while!

I don't know enough details about this to answer. I don't feel that there is enough transparency in these decisions - no justification. This (rather than the inequities themselves) detracts from the morale of the department.

There continues to be a two tier system in many respects in the Chem Dept at A&M with clear preference given to those who are recruited into the department as 'stars' and those who do the 'grunt work' of the department and those who get 'outside offers.' While teaching relief has been moderated lately due primarily to budget cuts, there are still some serious discrepancies with several faculty having (presumably university paid) 1/0 assignments. Apparently some of these are tied into editorships, grants (this was instituted by the last dept head and only recently has been supposedly eliminated), and other non-transparent reasons such as 'part of their recruiting package.' Certain faculty appear to be protected from committee work. Recently, 'all' faculty were required to go from having a full-time administrative assistant to sharing 50/50 with another faculty member. However, this apparently was not completely implemented as certain faculty have 'full time' assistants including those who are not directing a Laboratory beyond their own research group that is meant to be a collaborative Laboratory.

When a BOR describes faculty as just hired hands, the rest is all predictable.

Unfortunately committee work and teaching (if it is only small classes) are not very well respected and do not play a role in salary increases. Only research and funding is recognized as "real work".
Some add feathers to their hat without doing much in terms of teaching and service.

Larger teaching loads for semi-research active and non-research active faculty would be better.

The department lacks a clearly spelled out set of metrics for assigning teaching loads. In some instances faculty that are less active still teach the same load as those that are much more research active or active in administrative or other university tasks. Assignment of teaching loads have been handled in an entirely ad hoc process. Many faculty do not actively participate in the business of the department. As such committee assignments are born by only a subset of overburdened faculty.

<table>
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### 19. Satisfaction with Faculty teaching assignments:

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</table>

Please enter relevant comments below.

Text Response

I have generally been satisfied or very satisfied with my teaching assignments

Faculty should not be allowed to teach a course for more than 3 years before rotating out. We have many faculty that have taught only 1 or 2 courses in more than a decade. There are clear pedagogical reasons for having faculty switch courses. However, if we are to have substantial discussions about the graduate and undergraduate curricula we need faculty to have taught more than 1 course in a sequence. We have become too detached from the curricula in my opinion.

see previous comment

Our Division is generally amicable about how the assignments go but more meetings are needed to discuss long-range teaching goals and the possibility of teaching in a modular fashion to make the best of our individual expertise levels and to benefit the students maximally

As a former divisional chair (thus with responsibility for teaching assignments), I sense most faculty are pretty satisfied.

no complaints really

There appear to be several courses where historically there has been TA support even for graduate courses which in particular is not common for organic courses. Either this should be spread out between 'divisions' or removed completely.

We need to think of the students rather than ourselves. I find ongoing egoistical trends very bothersome.

Too many faculty get teaching relief without actually buying themselves out.

We have uneven teaching loads. Amongst our most productive, hardest working research faculty there are those who always have 2 full courses per year, while others have only one. The department is killing
the geese that laid the golden eggs!!

<table>
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<tbody>
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20. Satisfaction regarding space and facilities:

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<td>Quality of instructional laboratory space</td>
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<tr>
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<td>5</td>
<td>12</td>
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</tr>
</tbody>
</table>

Please, enter relevant comments in this dialog box. If you provide comments on the quality of your research space, please indicate in which part of the complex you are currently housed (ie 72 wing, 86 wing etc...).

Text Response

The research complex in the '28, '32, '5?, and '72 wing (aside from Wooley's floors) is old and decrepit, space that is not attractive to prospective faculty or prospective students. Undergraduate laboratories are unattractive and some laboratories, notably Chem234, have inadequate instrumentation that is inferior to what was available to the same course 15 years ago.

It is well known (and has been discussed for years) that we lack sufficient common areas. The need for such space has not been well-articulated but is a priority for me. Whether this improves the graduate
student experience or faculty congeniality is uncertain, but I believe it will.

There are no gathering spaces. Look around the rest of the University.

I am in the ILSB so my space is good. Need one room to hold massive exam for all sections of organic at once.

The lab space is not well designed in the 86 wing. Student desks are right next to the hoods, which do not help to improve safety. No space for student to have lunch and take break.

The chemistry complex is cobbled together and there is not a god system for knowing where the space is and how it would best be used. Faculty could use a coffee lounge and a large meeting space so we can actually run into each other for a change.

Not one lecture room has adequate blackboard space. I would happily supply a photograph of a room with good blackboard space to anyone interested. There should be a FRONT board and a MIDDLE board and a REAR board and any of these three can be slid (slided) to one of two positions above such that two or three panels are simultaneously visible. There was HORRIBLE vision in the design of all current classrooms. There are no reserveable rooms that can accommodate group meetings of 18-25 individuals. There are no gathering/socialization spaces, which in my opinion hurts collegiality and scientific interactions. However, we are so spread out now that this type of space is not going to be maximally effective.

We are obviously in dire need of modern research space. Most of whatever dissatisfaction I might have ultimately comes from the outdated buildings that were not built for 21st century operations.

The 72 wing is in need of remodeling. CHEM 255 is a terrible lecture room, and was without A/C for most of the Spring semester.

Can't really answer this. Yes, I'd like 10 million dollar renovations of my lab, but I realize there are financial constraints.

Common areas for initiating collaborations within the department between both students and faculty are completely lacking.

The Department needs 100,000 sq ft of new space.

My research space is of exceptional quality (ILSB).

My space will be renovated soon. As it currently stands, my labs are 40 years old. We need more hoods for the advanced inorg. lab (CHEM 433). We need more classroom as well as larger classrooms. We have no gathering space to speak of.

Some laboratory areas in '72 wing are in need of renovation. A departmental break room with coffee maker, informal meeting space, etc. would be a nice addition.

Facilities are aging and are not up to the highest caliber.

The 72 wing is desperately in need of renovation.

The students and faculty don't have places to really gather other than right before a seminar.

Overall the facilities in the chemistry department are on average sub-standard. The facilities are not well maintained and no plans appear to be in place to improve these conditions. The department is at a significant disadvantage nationally due to the poor space conditions. There is insufficient space on campus to teach large class sections. This has hindered our ability to streamline the teaching of large
undergraduate sections. The laboratory teaching space is sub-standard and in many cases do not represent the state of the art. There are no common spaces (at least within the main chemistry complex) for gathering and discussion. Space such as this has had to be carved out of individual faculty member space

My students have "offices" in the laboratory. Side by side with solvent cabinets. I do not like having young people of child-bearing age spend half the day in the midst of chemicals. However it has been like this for 30 years and will I guess continue. Poor design. My own meeting space is fine, and thankfully so as the above mentioned students can have lunch there. But department wise, meeting and gathering spaces are poor. As stated above, collaborations do not develop if we never talk to each other.

<table>
<thead>
<tr>
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<tr>
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### 21. Satisfaction regarding technology and equipment:

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<td>28</td>
<td>2.64</td>
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</table>

Please enter relevant comments below.

Text Response

Teaching laboratory equipment is old and poorly maintained in the organic laboratories in general, classrooms are horrible

Again, organic laboratories and equipment are old and in need of serious modernization. Really a new building for both teaching of synthesis (organic/inorganic) and research is desperately needed.

Total Responses 3

### 22. Satisfaction with university/department support of your research program:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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<th>Responses</th>
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</table>

Please enter relevant comments below.

**Text Response**

There is no clear line of funding of my research program by the university/department other than support for infrastructure. The business office is exceptional in my opinion and I have been very satisfied with administrative support. Research Foundation/OSRS support is in decline. The OTC is a joke.

OTC is useless. University should fire all these people and start again, or turn all IP over to professors.

The IT personnel simply cost too much to be useful. Chemistry faculty have IT needs in connection with departmental and instructional assignments all the time but have to pay full rates - seems a little harsh. I'd also suggest that the external evaluators try to find the rates associated with any service on the departmental web site -- so many of these things are "effective secrets".

The staff in our department and at the RF or whatever it has become now are excellent. It does appear, however, that the recent changes in the RF/OSRS structure have led to slower turnaround. I wouldn't be surprised if it was because of a smaller number of staff tasked with the same amount of work.

The parity for department support of administrative assistants appears skewed and should be possibly put into writing so faculty understand why and how certain faculty are able to have full-time assistants while others have none or 50%.

The takeover of the Research Foundation by the University was a grave mistake.

The university has very limited bridging funds for supporting new research endeavors instead of research initiatives chosen by the university. For assistant professors, usually several share one personal assistant.

The department and university support for research programs has in general been good. Matching funds (until recently) have been provided when asked. The business office personnel and OSRS staff have been helpful and supportive. The department has a serious problem in the assignment of administrative staff support, whereby more junior faculty are forced into sharing arrangements that seem to not take into account group size, funding level or needs in any logical way, while senior faculty, in some instances less well funded or active, generally are provided with more administrative support than they need or require. The IT staff more often than not present a "we can't do that" attitude that lacks an appreciation of the fact that their job is to support the department and the faculty's IT needs.

**23. Satisfaction with the infrastructure/services provided by the department/university including recharge rates:**
<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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<th>Neutral</th>
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<td>6</td>
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<td>29</td>
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</tbody>
</table>

*Please enter relevant comments below.*

**Text Response**

MS facility very poor at handling polymeric samples.

For those who have one aspect of their program that needs a service, there is not parity. NMR has a cap, X-ray does not and most service charges other than NMR are too expensive for the heavy users.

The NMR department has three ca. doctoral-level technicians, but the one in charge of the solid state operation has never done his share of work; there are also succession-retirement issues and the flow of information has been worrisome. I think other Chemistry Departments get more out of a similar staffing level. The MS department has a lot of fancy stuff and the staff are helpful, but difficulties remain processing routine organometallic compounds (EI often works well but is essentially unavailable) The IT personnel simply cost too much to be useful. Chemistry faculty have IT needs in connection with departmental and instructional assignments all the time but have to pay full rates - seems a little harsh. I'd also suggest that the external evaluators try to find the rates associated with any service on the departmental web site -- so many of these things are "effective secrets".

Our shared research facilities are our significant asset. They are generally very well and professionally run, and they are run explicitly for the benefit of our research programs. I think they are also run in a fair and equitable fashion.

Hours main library open are totally inadequate.

We are not regular users of the X-ray facility, so we submit single crystals occasionally for service measurements and calculations. The waiting time with recently 2 weeks is long. We often get air-sensitive compounds back decomposed, have no structure result, but have to pay anyway. The last structure we got measured produced "red alerts" in the checkcif file, and I wrote to the personnel, whether this can be worked on 5 days ago. I just did not get any response, so I will have to go "begging" over there. Previously, we got "green light" from the X-ray facility for submitting a structure in a manuscript. The reviewers found lots of flaws in the structure determination, and we ended up re-measuring newly-produced crystals. Especially when personnel of the X-ray facility is listed as co-authors, and I additionally pay for the measurements and calculations, I would expect them to take the leadership of this section in the manuscript and not just "let it go" and let it be the faculty's responsibility. The Mass spectrometry facility is simply not equipped for air-sensitive molecular
compounds, it is optimized for large biomolecules. I often regret in my research that we cannot just get a normal EI or FAB mass anymore.

Mostly OK. The library should not drop journals.

The computational facility is set up for analysis of small molecules and does not extend to protein or DNA.

My research needs epr and Mossbauer. The epr facility is very unreliable.

| Total Responses | 9 |

### 24. Satisfaction with size and distribution of your current research group relative to optimal target size:

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<tr>
<th>#</th>
<th>Question</th>
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</table>

Please enter relevant comments below.

<table>
<thead>
<tr>
<th>Text Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot get enough graduate students</td>
</tr>
</tbody>
</table>

In my opinion, the department never gets it right with regard to the size of the entering graduate class. Every year, it seems like "the sky is falling and we have to cut back". And *nearly* every year, there is the plea "we have insufficient numbers of TAs for the xx semester and please release RAs to help". In fact, departmental funds have been used to support TAs from outside of the department, and/or undergraduate TAs.

Difficult to answer this. I'd like a slightly larger group, but need more funds to be able to do this.

In recent years, primarily due to an inability to recruit a senior organic synthesis person, the numbers of students wanting to do organic synthesis are dwindling.

I find it impossible to attract good postdocs from Europe. There is too much prejudice about the hot summers etc, and Texas A&M is still not known well enough internationally. Undergraduate students follow their trodden pathways into the groups that host many already, and other than REU students from outside, and occasionally a student from Heidelberg, they do not find their ways into my labs.

| Total Responses | 5 |
25. Satisfaction with your ability to form collaborations inside the department and throughout the University:

<table>
<thead>
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<th>Question</th>
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<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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</table>

Please enter relevant comments below.

Text Response

University suffers from not having a strong medical school.

I guess I'm mildly dissatisfied, but the fault may be entirely my own. I continue to muse introspectively (I have some great potential computational chemistry collaborations, but also have not been able to draw external interest to date).

Collaborations mostly function via solid-state NMR spectroscopy and involve both short- and long-term projects. Outside the department we mostly collaborate with the Department of Mechanical Engineering via the Polymer Technology Center.

Total Responses 3

26. Satisfaction with the level of collegiality in the department:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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</tbody>
</table>

Please enter relevant comments below.

Text Response

The level of collegiality could be greatly improved with increased transparency in our governance. There is the impression, right or wrong, that resources and responsibilities are allocated unfairly.

There isn't much.

People are not as collegial as they should be. Morale is low when faculty feels that only a subset of people have a voice in decision making. This leads to paranoia and distrust.

I think we are quite collegial and I don't detect cliques, but I tend to assume the best in others and be quite positive, whereas others may perceive darker sides and intentions. I think we have physical barriers to collegiality. There is no common ground or meeting or socializing area within the Department, and this is probably an unsolvable problem without all of us in one building. I find it sort of depressing that there is no "annual picture of departmental faculty", this is a collegiality building exercise. Faculty meetings are conducted in a primitive classroom with an uncomfortable seating arrangement. Any collegiality or interaction guru would have a heart attack. Personally, I think there
should be a room with a circular or u-shaped table that could accommodate 30 or so people, with a second perimeter of seating for another 30 (chairs against the wall).

Perhaps this is not a comment on collegiality. I am absolutely satisfied with the professionalism and courtesy in the relationships within the department. But I believe the department is socially somewhat disjointed. When we do come together, we play well together, but we do not seem to be to keen on coming together regularly. The fact that the group locations are completely haphazard certainly contributes to this.

This of course varies from individual to individual. It is hard to give a "sum estimate".

While my colleagues are generally great (an occasional exception), we could be even more so if there was opportunity to informally meet i.e, more opportunity (other than the Christmas party) to have coffee, discussions, etc. I like them, but we don’t interact enough. Everyone is busy for sure, but the informal discussions would help form collaborations.

27. Satisfaction with the department in the following areas:

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<th>Responses</th>
<th>Mean</th>
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</table>

Please enter relevant comments below.

Text Response

Governance is opaque. Information is disseminated more by gossip than by other routes.

There is no transparency. Our governance is essentially purely that of a benevolent dictator. Our dictator is extremely good at some things, probably the most important things, but misses on a few other things. There is no point in pretending to change any governance procedures because they will be ignored at will.

as a department we should be promoting our faculty more strongly outside the university

governance procedures are poorly defined and not adhered too many decisions made without consulting whole faculty

Things happen and then we hear about it. If not for a few vigilant faculty who tell me things, I would not
know much. This is because I don’t go around and talk to my colleagues over coffee or lunch- not that this is not a good idea - but it should not be the main method of communication. There appear to be cliches of people in-the-know. Maybe not but there is a sense that a handful of people are running the Department and, as we all know, knowledge is power.

I have comments on both sides (too little, too much) of dissemination. (1) I may also make this point elsewhere. There are major gaps in our quest for "excellence in institution administration". A serious study of "e mail pollution" should be done. Let’s say the President has a pronouncement. The Provost writes an e mail "the President thinks everyone should know this". Then all of the Deans write e mails to the same people, "the President thinks everyone should know this". Then all of the Chairs write the same e mails, etc. (2) Critical departmental information is transmitted haphazardly. Perhaps one macroscopic reason is the lack of faculty meetings, or the lack of substitutes such as mailings (newsletter) or webinars (which the ACS is using administratively with great success -- faculty members can participate from remote locations, or replay at later dates). One could start with faculty hiring -- probably there are few outside of the Executive Committee who are aware of what types of faculty positions we are seeking to fill this year. I mentioned elsewhere the cost of IT services. When has this ever been announced? My secretary was unable to find the data anywhere this summer.

I think our governance generally works. I am completely comfortable with the situation of a Head with executive power. However, I do think we need a functioning mechanism for having department-wide discussions and making department-wide resolutions.

Information seems to flow through very limited channels within the Department, and many of the faculty seem to be completely in the dark.

Should be more transparency and justification in decisions. If they gave real power to committees, faculty would be more willing to participate. Currently the committees serve as "advisors" to the DP, but ultimately decisions are made by the DP in what is essentially a dictator mode. It would be nice to have a distribution of power - more like a true democracy.

Further transparency needed especially with respect to 'special deals' made for recruiting or retaining faculty which is touchy but needs to be discussed at least at the Ex Comm level.

There is lack of transparency.

Recently, the department, as a whole, has not been made aware of the on-going efforts for faculty recruiting. The efforts to recruit Chen from Cornell were quite poorly handled.

Nominations are pushed forward by a few faculty. The Head's office supports these but could be a little more pro-active.

The governance remains somewhat obscure. There are too few faculty meetings. Meetings of key committees such as the executive or academic operations committee are also sporadic. Failure to make tough decisions is also an issue. Many personnel problems that need to be solved aren't.

Clear communication between the administration and faculty is lacking.

| Total Responses | 15 |

28. Agreement with the idea that serious space inventory and reallocation could alleviate space problems.
Given the number of faculty that have left we have plenty of space - it is just mostly poor quality space (with the exceptions of the ILSB, the Gladysz/Bluemel/Singleton space, and the Wooley floors).

we should be more proactive in assessing space in the department

I applaud the Head's constant efforts to get us a new building.

Quantity is NOT the problem, it is the quality so simply reallocating may solve some faculty's problems but it will not solve a serious modernization problem this department is facing and has been facing for the past decade. The ability to convert existing space into modernized space was demonstrated by Wooley upgrades and is welcome to show what can be done with renovations, but this only serves to remind loyal faculty of the lower priority they are given when they have been in the same space for 20 years that is now unsafe and just 'ugly' despite the fact that they continue to have a vibrant research program. This has hampered recruiting junior faculty and I believe has hampered recruiting graduate students when these same students are touring the state and country and seeing newly updated labs.

The department is in need of 100,000 sq. ft of new space. Quality is more important than quantity. Some faculty think they can usurp space assigned to other faculty. This is disgraceful.

I am satisfied with my current space. However, it would be better in some cases if groups that are doing similar research project would be co-located with one another. The real issues are of space quality.

One has to consider whether the commotion and angst stirred among the faculty by the inventory process (not to mention all the time needed to do it right) would be worth the outcome of scraping together little disconnected space units. Maybe it would be better to push the New Chemistry Building forward.

Yes, and we need to be more attentive to the needs of new talents. Faculty with small research program must downsize. Some of space management is a bit disconcerting at time, with a lot of space allocated to groups with hardly any research.

If a space inventory is done, it should include various items, such as the amount of space, the quality, age, fitness for purpose, etc.

Total Responses

29. Satisfaction with the current mechanism for the selection and evaluation of faculty candidates

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Selection of faculty</td>
<td>3</td>
<td>10</td>
<td>12</td>
<td>3</td>
<td>1</td>
<td>29</td>
<td>2.62</td>
</tr>
</tbody>
</table>
Faculty recruitment at all levels is poorly managed and decisions and evaluation has been carried out by small groups of select faculty with minimal broader faculty input.

Faculty candidates? It would be nice to have some at the junior level. At higher levels, it is a random target of opportunity process.

too divisional

There should be more involvement of a broader range of faculty interests in the hiring process.

Decisions made by too few people. No vision in selection process. Tenure committee seems very fair.

Names do not get circulated generally even for senior hires. The system of having one Committee recommend all of the hires has not worked to serve all faculty. Some Divisions never report back to their colleagues about what is going on. Some faculty (me for one) has never even served one time on a committee to vet candidates. It is typically the same people who get asked.

I think this department has made outstanding hires the last six years. I believe the evaluation procedures are reasonable. Certainly during interviews, excellent procedures are in place. But with possible senior candidates, some evaluation must be done prior to an interview or even simple consideration. Some faculty members seem to be less engaged on this side of things. Since the Chancellor committed $100 million this August to superstar hires, there needs to be considerable engagement or chemistry will be left on the sidelines.

I think we are not attracting as many strong candidates as we should.

see previous comments

Lack of startup in College of Science is restricting faculty recruitment in Chemistry.

The real problem is for senior faculty candidates. The faculty, excluding the executive committee, has very little input in these decisions.

We all should be more alert about potential new junior hires and pursue more aggressive hiring strategies than just placing an ad in C&E News. Most of the great hires like Gladysz, Wooley, Ozerov were made by approaching the candidates directly.

No problem for open searches. Our approach to senior recruiting is more debatable.

As we haven't hired in my division in years, I have forgotten all about the mechanism.

| | | | | | | |
|---|---|---|---|---|---|
| 2 | Evaluation of faculty candidates | 3 | 17 | 8 | 2 |
| | | 0 | 30 | 2.30 |

Please enter relevant comments below.

Text Response

Faculty recruitment at all levels is poorly managed and decisions and evaluation has been carried out by small groups of select faculty with minimal broader faculty input.

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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>14</td>
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</tbody>
</table>

30. Satisfaction with the effort/resources extended by the department/university in faculty recruiting and retention:
<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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</thead>
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<tr>
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<td>Start-up Funds</td>
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<td>19</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>31</td>
<td>2.23</td>
</tr>
<tr>
<td>4</td>
<td>Research Space</td>
<td>3</td>
<td>16</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>31</td>
<td>2.58</td>
</tr>
<tr>
<td>5</td>
<td>Teaching Relief</td>
<td>3</td>
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<td>10</td>
<td>2</td>
<td>2</td>
<td>31</td>
<td>2.55</td>
</tr>
<tr>
<td>6</td>
<td>Legacy Support of Research Staff</td>
<td>1</td>
<td>7</td>
<td>16</td>
<td>2</td>
<td>1</td>
<td>27</td>
<td>2.81</td>
</tr>
<tr>
<td>7</td>
<td>Legacy Support for Expandables</td>
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<td>11</td>
<td>3</td>
<td>1</td>
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<td>2.61</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

I have no idea what 'legacy support for expendables' means. There is more than enough teaching relief provided on a long term basis for faculty retention and hires with a strong departmental commitment to alleviating professors of the need to teach 1 course/semester.

On "Teaching Relief", I would want to make it clear that I think we do way too much. It is destructive to the culture of teaching.

I have little knowledge to adequately answer several of these queries.

Too much money on some star hires has been spent, and too much teaching relief has been granted.

At the rate we are going, we will not remain competitive. Vision 2020 is a far cry from what we are headed towards.

I think this is one the department's great strengths, helped along by a series of great Chairs and Deans. I do not know what is meant by "legacy support of research staff". If this means "departmental staff for the support of research" I think we are slipping. All state Universities have had recent pressures here, but from a reference point of 5 years ago we critically need additional staff to help support departmental facilities, research infrastructure, etc.

I think it is mistake not to seek more asst prof hires. Other than that, when we do recruit, the resources are impressive.

I'm running of time—survey is taking over an hour....

All faculty should teach at minimum 1/1 unless they are 'buying out' a semester. There has to be a system implemented whereby 'legacy support' is reviewed every 5 or 10 years just like a grant and also
chairs. When faculty are no longer producing at a level expected for a 'star' or 'chair' these perks should be provided to those faculty who are producing at a high level. Chairs for existing faculty are for the most part non-existent and when they have become available (e.g. Davidson), they have been distributed by Division rather than by a system where the greatest strengths are rewarded in the department.

The Department Head has been very diligent under difficult circumstances.

I have no idea what is meant by "legacy support" for research staff and expendable (not expandables).

I am not aware of any New Chair being established in Chemistry in the last couple years. There is no transparency on any of the other points, so I can just guess.

Our current junior faculty hiring rate is not cutting it. I believe that we have passed a tipping point and we are heading downward as a department. We should have at any time around 6-10 assistant professors. We have been far from this number for many years. I do not think that legacy support should exist. Extra support should only be given to those at the top of their game. Putting money into legacy programs that have passed their prime is a mistake.

The process for the approval of offers for junior recruits can be so slow that we are not able to recruit good people.

The challenge is to have a great department with a balanced faculty and a mission of producing notable research and notable products in terms of human resources. I believe the current way of thinking is in the wrong direction. Mixed signals all over the place. Many of our best and most productive faculty, especially older faculty, are rarely (once every 7 years) given teaching relief. There is talk of 2 courses a term as the normal course load! This would kill a research program. There are no mechanisms for shared courses. There is no effort spent by administration on encouraging collaborations, or building dreams. Once tenure is granted would be a great time for encouraging faculty to tackle big problems. Now, only if one gets an offer from elsewhere is one noticed. Our infrastructure is declining, and infrastructure is the basis of a great science department. Our distribution of faculty and numbers of faculty are declining precipitously. No one seems to notice. Our dedication to giving great courses to our students is declining. No one notices, and in fact, diminishing the number of advanced courses is encouraged.

| Total Responses | 15 |

31. Satisfaction with the five year tenure clock for assistant professors:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
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<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Five year tenure clock</td>
<td>11</td>
<td>14</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>31</td>
<td>1.97</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

I have been happy with the clocks used in all the individual tenure cases since my arrival here.

I would oppose any extension of it
If faculty cannot make it in 5 years, they will simply not survive long term.

Five years is too short to obtain a realistic evaluation for some assistant professors.

We should keep the half-time research presentations of assistant professors and formalize the (anonymous) feedback of the faculty. So far, one can only approach the candidates personally and give advice (that is not always welcome or even well received...).

An increase in the tenure clock would not be desirable, as it would further extend the time to the first permanent appointment. Compared to industry, the first permanent appointment already occurs very late in academia, in the best case when a person is in their mid-thirties.

It should be longer as we expect TT faculty to gain Federal grants and National stature, but decreases in Federal budgets hamper their ability to achieve what is expected.

With the current tough funding situation, five year tenure clock is relatively short. Extension of the tenure clock to six years will give tenure track assistant professors more time to expand their research and secure funding.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>total responses</td>
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</tbody>
</table>

### 32. Satisfaction with the level of mentoring provided to assistant professors:

<table>
<thead>
<tr>
<th>#</th>
<th>question</th>
<th>very satisfied</th>
<th>satisfied</th>
<th>neutral</th>
<th>dissatisfied</th>
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<th>responses</th>
<th>mean</th>
</tr>
</thead>
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<tr>
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<td>15</td>
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<td>0</td>
<td>30</td>
<td>2.80</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

We developed a system. It was ignored.

this needs improvement. a committee on faculty mentoring never met after being constituted

No mentoring system beyond chat with head.

There are several things that concern me with the overall PT treatment of Assistant Professors in this Department; in fact, I would refuse an invitation to serve on the PT committee. In my opinion, any Assistant Professor has the right to know, when being hired, the exact instructions that will be given to external reviewers when tenure letters are requested. And in my opinion these should be constant, or only changed infrequently as a result of careful review. To the best of my knowledge, these letters are sent by the Head's Office independent of the PT committee (the committee has no right to standardize them), and have varied haphazardly during my time here (and when I have looked at them do not seem as organized with respect to evaluation points and criteria as those I receive from other peer departments). I'm not faulting individuals, my point is that our process is not of the same quality as with other institutions that I have been associated with. It's a self-inflicted shortcoming, we have considerable flexibility with the Dean of Faculties. This is another case where there should be a sunset on departmental regulations, or a mandatory review. Dave Bergbreiter can speak to other issues. I believe that no faculty member can view or form an independent opinion of the tenure letters until the PT committee has reviewed the letters and made an official written recommendation supported by a formal vote; why is it necessary to prejudice thinking -- don't we trust colleagues to form their own opinions?
It would be better if we had more asst profs. I believe that not having a very social department affects asst profs negatively. I think that on some issues (far from all), asst profs are not made to feel as being fully a part of the department.

From some of the unhappy outcomes in recent years I assume that there could be improved mentoring, see also above to take the pressure off of only one pair of shoulders. It should be the responsibility of the whole faculty, or at least the division to look after the junior faculty.

Assistant profs should be sufficiently outgoing to seek mentoring from their senior colleagues. A formal scheme is in my view meaningless.

It is questionable whether a more formal mentoring program would improve results; a mentor/mentee relationship works best if chosen out of own initiative.

We could do more.

Total Responses 9

### 33. Satisfaction with the administrative and research support (including space) provided to assistant professors:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Administrative support</td>
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<td>12</td>
<td>11</td>
<td>5</td>
<td>1</td>
<td>30</td>
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<td>2</td>
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<td>6</td>
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<td>0</td>
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<tr>
<td>3</td>
<td>Space</td>
<td>2</td>
<td>18</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>29</td>
<td>2.38</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

**Text Response**

Administrative support for junior faculty is critical, and requires experienced staff who can provide useful assistance.

My impression is that this is ok, but there should have been a "not qualified to judge" field in the answers allowed to this question. Chemistry faculty members now occupy 5+ buildings, I'm sure many have never laid eyes on the space of some Assistant Professors.

Since we have no assistant professor in the Inorganic Division and have only little contact to other divisions, I cannot tell.

We need to offer better space to new junior recruits. Our current approach which consists in giving old space is simply insulting. Young faculty also talk negatively about their space, for good reasons. This is certain to affect our recruiting ability.

The department has been providing strong research support for assistant professors. However, administrative support is inadequate. One administrative assistant, Jennifer Belcik is helping seven faculty members including most of assistant professors. The space allocated to assistant professors is in a very bad shape. The same kind of space will be a detrimental factor in the future faculty recruiting.
34. Have you ever sought "bridge funding"?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
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</table>

If you answered yes, how satisfied were you with the mechanism leading to its allocation?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>1</td>
<td>0</td>
<td>8</td>
<td>2.38</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

I didn't even know there was such a thing until someone told me. How can there be a mechanism for something that is not even advertised..?

There should be enough resources to solve the problem. The Head of Chemistry has been most helpful and the Dean has done what he could. Apparently, there are effectively no extra funds for bridge support from the VPR office. This is a policy that will prove destructive to research capabilities of this university.

What is “bridge funding”? Since I don't even know this, perhaps the information of the faculty could be improved here.

I could not find any bridging funding within the university that support original ideas besides research initiatives specifically chosen by the university.

35. Satisfaction with the mechanism for the allocation and disbursement of matching funds:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
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<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
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<tbody>
<tr>
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<td>9</td>
<td>7</td>
<td>0</td>
<td>29</td>
<td>2.79</td>
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</tbody>
</table>

Please enter relevant comments below.

Text Response

I have not received any matching funds for my research but am satisfied with matching funds for major instrumentation.

Matching funds have seemed to dry up in recent years. I just received a $700,000 DURIP grant and was
unable to secure even minimal matching. Matching commitments appear to be much better in Engineering than in Science

Ill defined.

There don't seem to be much matching funds up for grabs. These decisions appear to be pre-ordained to make sure the proposal that goes forward is the one that was chosen ahead of time.

our VPR and Dean seem very enlightened here

The deans and heads of department have to be given adequate support for this purpose.

More transparency on the mechanism of obtaining matching funds would be useful.

N/A

<table>
<thead>
<tr>
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<th>Value</th>
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<tbody>
<tr>
<td>Total Responses</td>
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36. Agreement that Centers, Laboratories, and Institutes are currently configured in areas appropriate to respond to:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
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<th>Responses</th>
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<tr>
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<td>31</td>
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<td>2</td>
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<td>15</td>
<td>4</td>
<td>2</td>
<td>31</td>
<td>2.87</td>
</tr>
</tbody>
</table>

Please enter relevant comments below.

Text Response

I am rather skeptical of all "Centers, Laboratories, and Institutes." I am waiting to be convinced that they are not largely boondoggles to support the research of particular groups. If that is what it takes to get the university to support research, then I suppose there is no choice, but they cannot be the ideal way to distribute resources.

Nothing is done for this.

My guess would be that there are many areas with strong funding opportunities etc where we do not have centers, laboratories, or Institutes. Although any discordance could be used as a basis for action, I opined elsewhere that perhaps the era of the comprehensive University is over. A department or institution can't be everywhere.

don't know

The Centers, Laboratories and Institutes are not needed

We have a rather old fashion alignment of divisions that does not match national priorities.

The university in general has too many isolated centers along similar themes that need to be consolidated in order to be more effective in competing for national research initiative. University support for these centers varies dramatically from department to department
37. Satisfaction in general with the University support of basic research in the Sciences:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>11</td>
<td>11</td>
<td>7</td>
<td>1</td>
<td>31</td>
<td>2.87</td>
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</tbody>
</table>

Please enter relevant comments below.

Text Response

One plus is that I think science gets its share of matching funds (noted elsewhere). One minus is the staffing provided for research infrastructure, shared facilities, etc. This can be greatly improved. Deficiencies in support to graduate students who do the basic research were noted elsewhere.

see section on busywork burdens.

Historically, chemistry has been well supported but in recent years (last decade) the University has neglected the mounting need of a new building for Chemistry and desperately needed major renovations to maintain its prominence in the University and the nation. Despite the hiring of an external engineering/architectural firm to evaluate all chemistry space with major deficiencies and needed renovations noted, plans drawn up for a C01 (that was not funded) nothing has been done to implement these plans/ideas save for the Wooley space and some cosmetic work around the Dept. Again, things are only done when someone receives an outside offer otherwise you are expected to be satisfied with the space you have been in for 2 decades and when that is organic synthesis space it is well-used and thus in desperate need of major renovation!

Decisions made by administrators with no experience in science. Individual research programs are considered of no consequence.

See also comments above for higher level University. At the Dean's level the support for research is great.

The 'faculty reinvestment' program was a good idea, but the University failed to make good on their promise of adequate funding. We have suffered since and are close to being back where we started 10 years ago.

The university does not provide sufficient research infrastructure support or facilities to be a top research 1 university

38. Satisfaction with the safety practices of our department:

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Safety</td>
<td>4</td>
<td>15</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>31</td>
<td>2.42</td>
</tr>
</tbody>
</table>
We need a thorough evaluation of current safety practices and to develop a careful plan to address this issue. I think that we are not alone in this problem but it is a serious concern.

We need a standardized plan and then each lab has to tailor it to their needs. Given the UCLA incident, tragedies do happen and if it should happen here, we would be in the same shoes probably as that faculty member and the University (although the charges apparently have been dropped against the BOR there).

The University safety inspections are taken seriously. There are regular e-mail reminders of various "good housekeeping" practices (sharps in trash cans, etc.) There was a committee formed to study the upshot from the recent student death at UCLA, but this seems to have disappeared like so many other things—no report, no news that the committee did anything or was perhaps sent to a figurative Siberia.

Given that grad students typically remain in the department ~5 years, a Safety Refresher should be required at 2.5 years or so. In addition, certain safety equipment such as fire retardant lab coats should be mandated for relevant research labs beyond just safety googles.

A discussion on whether the department should provide additional guidelines on safety practices might be helpful. For example, currently we mainly rely on inspections that can be strict when carried out, but do not necessarily improve work safety on a daily basis. Clear departmental operating procedures could improve safety and at the same time protect individual PIs from personal liability should an accident occur. For example, this could include standard procedures for working with certain types of chemicals and machinery, guidelines for students regarding laboratory dress code, working late at night, etc. In any such discussion, it would be imperative to ensure that new procedures or guidelines do not restrict projects, but merely are concerned with how certain types of work are done safely.

The general safety practices within the department do not provide sufficient training for our students. Follow-up training should be added to keep safety at the forefront of people’s minds.

| Total Responses | 7 |

39. Departmental Divisions: Do departmental divisions provide a venue for: the support of scholarship, the development of new courses and curricula, the hire and support of new faculty, the development of a collegial atmosphere? In your opinion, are departmental divisions still needed?

Still needed

Divisions do not support scholarship but are an effective way to deal with teaching responsibilities. The absence of divisions would not contribute to more effective teaching.

The divisions used to serve some useful purposes. Now, they serve almost no purpose, and it is causing problems. Divisions need to be strengthened considerably, not weakened.
Not needed. The strong divisional nature of the department hampers hiring and retention in my opinion. I think that this is an issue which is viewed differently depending on age as most younger faculty do not see the need for our formal divisions. NSF has eliminated these divisions, and I fear we are behind the curve.

They are not needed, and they promote inequality and mindless restrictions.

I think the Divisions are still necessary no matter what we would like to see. Interdisciplinary Divisions might fill a void but teaching practicalities still require much cooperation in core areas. The Divisions have seemed to vote as a body at times and be hostile towards each other (an "us against "them" mentality that is silly except that it speaks volumes about why this would even happen). Hiring in areas where there is clearly no critical need has happened and this has depend the rift between faculty who were on different sides of the issue.

In my opinion, departmental divisions have been propagated mainly for the administrative convenience of the vice Head. Without the divisions, the vice Head would have to enter into more individual consultations with faculty members about their teaching assignments. Another factor is that the administrative structures for accomplishing things within the department are so rotten, that divisions become a convenient crutch. If there were more developed governance traditions -- from the full faculty meetings to the many other faculty bodies and committees -- I think divisions would naturally atrophy. As noted elsewhere, divisions cannot cover all the bases in terms of new courses and curricula. In my opinion, they can contribute to an UNcollegial atmosphere. I recent meeting of the organic division included synchronized fist-pounding about the evil biochemists who has snapped up all of the seminar slots.

Yes, I think the divisions are still needed, but continuous discussion and remaking of them is a healthy need, as well.

There seems to be a great deal of in homogeneity among divisions, which makes the above question difficult to answer. Some divisions provide a venue for many of the items listed above. Other Divisions are nearly non-existent and serve only to hand out teaching assignments. Such Divisions provide a venue for few if any of the items listed above. I see little benefit of Departmental Divisions, which are based on rather outdated categories. The main result of the Division system seems to be inciting "competition" among Divisions regarding teaching assignments, student recruiting, seminar invitations, hiring, etc. The current system also forces incoming students to identify with a particular Division even though many students (and many of the faculty) do not fit neatly into the Divisions as currently defined.

yes, our department is so large that we need to be divisionalized.

Yes, for teaching purposes, still needed.

Divisions used to contribute to the great benefit of the department. It is very unfortunate that this is no longer so. This and the lack of collegiality is one of the root causes of the lack of transparency in the department.

the current division structure is still appropriate for a department of our size.

Yes. This is one of the few mechanisms to discuss these issues.

The Chemistry Department is too large for one big "melting-pot". It needs to be split up in smaller units, the divisions, for administrational reasons alone, but also for identity. However, regarding the curricula, cooperation will be necessary to avoid duplicating teaching efforts. This has already begun, also "loaning" faculty from one division to the other for teaching (Bluemel, NMR spectroscopy) in case of emergency. Furthermore, regarding hiring, the divisions seem to cooperate, as in the case of the
Wooley hire, which formally required the Welch Chair to be moved from Inorg. to Org. Chemistry.

Yes

Yes, they are needed, at least for administrative reasons.

Yes, departmental divisions still fulfill an important role in teaching assignments, seminars, mentoring.

The divisions provide an important forum where open discussions can occur. They also provide a good way to organize the courses and ensure a distribution of faculty on departmental committees which have divisional representatives.

Some internal structure is needed. It might be good to think about having teaching divisions and research divisions.

The current five divisions are definitely necessary in providing good communications between faculty members, choosing seminar speakers, hiring new faculty, and allocating teaching responsibilities. But the division setup should not be a deterring factor for faculty members to sought collaborations between divisions and student mentoring.

I think departmental divisions are still needed, particularly in the case of teaching responsibilities and faculty hiring. In a dept of this size it would be chaotic without it.

Divisions are needed as long as undergraduate courses are designed traditionally.

The five "traditional" divisions within the department are best suited to planning and coordinating faculty teaching assignments, developing new or revised courses, and serving as an initial selection process for recruitment of junior faculty. The traditional divisions are not, however, necessarily well-suited for development of research collaborations or a collegial atmosphere across the department, because these types of interactions are cross-disciplinary.

The departmental division serves no remaining purpose. The department should be organized along research themes and topics. The divisions are impediments to modern chemistry which is cross-disciplinary.

Yes. We interact well, and there are crossover faculty in all divisions.

<table>
<thead>
<tr>
<th>Text Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce visiting seminar speakers</td>
</tr>
</tbody>
</table>

In the absence of information about how the Departmental budget is distributed, it is impossible to suggest changes. For example, I do not know if the Department provides support to students as GATs, GANTs or in other ways for course development, instrumentation maintenance, or as a retention or recruitment ploy. Thus, it would be impossible to suggest a way to reduce the extent of that sort of support.
Teaching loads for professors with active research programs and four or more graduate students should be 1/1. Stop giving “teaching relief,” as it makes not more sense than “breathing relief.” Stop making deals for less than 1/1 in order to hire or retain people or to have them take an editor’s position or whatever. Offer them something else instead, but support the idea that teaching is something we do every semester. Stop teaching buyouts (I know these "save money," because after all the teaching of any lecturer must be perfectly equivalent to that of world-famous professors, but in the long run the lack of teaching makes people ask why we pay so much for world-famous professors in the first place, and this is a source of budget problems.) If your research program cannot sustain four graduate students, then the teaching load should be increased. Fear of horrid teaching cannot be used as blackmail to discourage this. Take a hard look at what courses constitute a full teaching load. Take a hard look at whether courses are supportive to the teaching needs of the department or merely a lark or research-group support. Take a hard look at whether Centers, Laboratories, etc, have maintained their original justification.

I think that I would first need to understand our current budget to make an informed recommendation. I am unsure how our departmental resources are allocated and how decisions are made. This issue is the source of much unrest as there is a perception that there are significant funds allocated disproportionately to a minority of faculty. I have no idea how to address this issue but providing information about the budget would help.

Get rid of numerous unnecessary summer salaries, research personnel support for individual research groups, reduced teaching loads that are unwarranted.

Too many business office staff.

I cannot comment on this without a survey of spending being provided.

(1) tax joint appointments; if there is an imbalance in joint appointments between department A and B, the department which is less reciprocating should contribute an amount in support of the cost of the activities of its faculty member in the other department (one solution might involve overhead kickbacks)

(2) eliminate any "right" of individual faculty members to invite "x" seminar speakers per year, or junior faculty members to have extraordinary input or dinner subsidies; put the seminar programs in the hands of "divisional seminar czars" or "post-divisional seminar czars" who are furthermore instructed to maximize sharing options with Austin, etc.

Again, I think that the dept should have a mechanism to pass and review department-approved regulations.

It seems that a great deal of money has been spent installing "technology" in the classrooms. I see little benefit to having a large TV, a "smartboard", an LCD projector, and a blackboard in every classroom. Most colleagues I have spoken to are unsure what the "smartboards" are for, let alone how to use them. I have no idea what the TV's are for in a Chemistry classroom.

Can't answer because I have little idea how funds are allocated to various groups - more transparency

All faculty not paying off their teaching relief should be moved to 1/1. Some support services such as NMR and X-ray subsidies could be lowered e.g. costs to faculty reasonably increased. Departmental Laboratories that are defunct or with no or little research and grant activity should be eliminated.

The Head deserves considerable credit for minimizing the effects of budget shortfall on the department up to now. What is really scary is if there are further cuts. Simply treat everyone fairly.

Since the faculty in this department have no real idea about how money in our department is allocated I don't see how we can be asked where "legitimate" cuts are to be made.
I don’t have sufficient information to make any recommendations.

Our only luxury left seems to be the number of invited speakers allowed. Reduce their numbers? Yes, and of course not paying for “Concur” would save lots of money. One or our assistants could book all the travels of the visitors to make sure they don’t take the most expensive flight, without getting the $$ per booked trip.

Can’t think of any. We run a pretty lean ship. No obvious areas that seem superfluous.

Make faculty that have little research teach more. Let go of lecturers. Cut legacy funding from groups whose output does not meet the bar.

-Require more extensive sharing of administrative staff. Since many tasks are now efficiently done electronically, the allocation of individual administrators to faculty is less important than in the past. The number of administrative staff can be reduced through non-renewal of positions vacated by retirements. -Audit and improve energy efficiency of building, in particular heating/cooling (window sealing, regulation of air conditioning system, increase building temperature by a degree or two), lighting, fume hoods, .... -Reduce the use of licensed software on department owned computers (departmental servers, business office...). Viable, free open source alternatives exist in most cases. E.g. replace the expensive server licenses for departmental backup, e-mail server, server virtualization. Use Linux and LibreOffice instead of Windows and Microsoft Office on desktop computers. -The NMR facility could operate with two full-time staff. Staff reduction could be done through retirement. -Reduce the use of traditional telephone lines and move towards IP telephony. -Reduce the use of copied and printed materials in administration (e.g. invoices...) and for courses (handouts) - move towards electronic distribution.

If we had to make cuts, we could make them in several areas, but the level/quality of service would drop.

I think any additional cut will hurt the department more.

It is difficult to suggest specific cuts without knowing exactly where the money is going and how it is budgeted and allocated. You would have to have a good sense of the inner workings of the department.

Cuts could be made through increasing the teaching loads of less active faculty, reducing the need for some of the lecturers in the department. Metrics for teaching load assignments would need to be put in place however for this to occur

This is ridiculous. We have 25% more students than 20 years ago, 20% less faculty, and we have covered and are asked to do more. We should not be under a budget shortfall.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>24</td>
</tr>
</tbody>
</table>
A14. Staffs Survey Responses
1. Please select the area that best describes your position.

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic (First Year Program, Organic Program, Graduate Office, Graduate Office)</td>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>Administrative (Business Office, Head's Office, Administrative Assistants)</td>
<td>29</td>
<td>60%</td>
</tr>
<tr>
<td>3</td>
<td>Technical (Instrumentation Specialist, Services, Shops)</td>
<td>14</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>48</td>
<td>100%</td>
</tr>
</tbody>
</table>

2. How many years have you been employed by the Department of Chemistry?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Five or less</td>
<td>18</td>
<td>38%</td>
</tr>
<tr>
<td>2</td>
<td>Six or more</td>
<td>30</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>48</td>
<td>100%</td>
</tr>
</tbody>
</table>

3. Within the last 3 years has your workload:

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increased</td>
<td>37</td>
<td>79%</td>
</tr>
<tr>
<td>2</td>
<td>Stayed the Same</td>
<td>9</td>
<td>19%</td>
</tr>
<tr>
<td>3</td>
<td>Decreased</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>4</td>
<td>I have not been employed in the Department to evaluate this question</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>47</td>
<td>100%</td>
</tr>
</tbody>
</table>

4. Is your current workload?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Too Much</td>
<td>15</td>
<td>41%</td>
</tr>
</tbody>
</table>
### 5. Do you believe the Department of Chemistry provides adequate opportunities for training in the following areas as they relate to your job duties?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>All of the Time</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overall</td>
<td>4</td>
<td>6</td>
<td>13</td>
<td>13</td>
<td>8</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>Procedures</td>
<td>5</td>
<td>8</td>
<td>13</td>
<td>12</td>
<td>7</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>Software Programs</td>
<td>5</td>
<td>8</td>
<td>14</td>
<td>9</td>
<td>10</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>Technical Skills</td>
<td>7</td>
<td>9</td>
<td>13</td>
<td>10</td>
<td>6</td>
<td>45</td>
</tr>
</tbody>
</table>

### 6. Do you believe you have been provided with adequate resources, equipment, and funding to effectively perform your job?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>All of the Time</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Resources</td>
<td>2</td>
<td>1</td>
<td>11</td>
<td>13</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>Equipment</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>15</td>
<td>18</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>Funding</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>11</td>
<td>14</td>
<td>39</td>
</tr>
</tbody>
</table>

### 7. Are you encouraged by your supervisor and/or the Department of Chemistry to pursue professional growth? (encouraged to take training classes, pursue certifications, continuing education, etc.)

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>All of the Time</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Encouraged by Supervisor</td>
<td>10</td>
<td>4</td>
<td>11</td>
<td>22</td>
<td>47</td>
<td>2.96</td>
</tr>
<tr>
<td>2</td>
<td>Encouraged by Department of Chemistry</td>
<td>15</td>
<td>7</td>
<td>11</td>
<td>13</td>
<td>46</td>
<td>2.48</td>
</tr>
</tbody>
</table>

### 8. How effectively do you think your skills are being utilized within the Department of Chemistry?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very</th>
<th>Ineffectively</th>
<th>Neutral</th>
<th>Effectively</th>
<th>Very</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Utilization of professional skills</td>
<td>Ineffectively</td>
<td>Effectively</td>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------</td>
<td>---------------</td>
<td>-------------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>47</td>
<td>3.55</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>9</td>
<td>46</td>
<td>3.67</td>
<td></td>
</tr>
</tbody>
</table>

### 9. Do you believe that your job title accurately represents the work you perform?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>17</td>
<td>40%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>26</td>
<td>60%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>43</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 10. Do you believe that you are fairly compensated for the work you perform?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>20</td>
<td>43%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>26</td>
<td>57%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>46</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 11. Do you feel the Department of Chemistry values you as an employee?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Not at All</th>
<th>Somewhat Valued</th>
<th>Neutral</th>
<th>Valued</th>
<th>Very Valued</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>value 8</td>
<td>6</td>
<td>9</td>
<td>14</td>
<td>10</td>
<td>47</td>
<td>3.26</td>
</tr>
</tbody>
</table>

### 12. Are you rewarded for your professional growth within the Department of Chemistry?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>All of the Time</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rewarded for Professional Growth</td>
<td>12</td>
<td>8</td>
<td>17</td>
<td>7</td>
<td>3</td>
<td>47</td>
</tr>
</tbody>
</table>

### 13. Do you believe that your achievements made within the Department of Chemistry are appropriately recognized?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>All of the</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 14. Rate your level of satisfaction with the opportunities for career advancement provided within the Department of Chemistry.

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Dissatisfied</th>
<th>Dissatisfied</th>
<th>Neutral</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quantity</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>10</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>Quality</td>
<td>8</td>
<td>10</td>
<td>16</td>
<td>10</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>3</td>
<td>Attainability</td>
<td>10</td>
<td>8</td>
<td>16</td>
<td>10</td>
<td>2</td>
<td>46</td>
</tr>
</tbody>
</table>

### 15. Do you feel loyalty towards the Department of Chemistry?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>35</td>
<td>80%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>9</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>44</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 16. Rate the communication between the __________ and the staff.

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Poor</th>
<th>Poor</th>
<th>Neutral</th>
<th>Good</th>
<th>Very Good</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Department Head (Head's Office)</td>
<td>5</td>
<td>9</td>
<td>8</td>
<td>17</td>
<td>8</td>
<td>47</td>
</tr>
<tr>
<td>2</td>
<td>Associate Department Head (Head's Office)</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>15</td>
<td>8</td>
<td>47</td>
</tr>
<tr>
<td>3</td>
<td>Assistant Department Head (Business Office)</td>
<td>4</td>
<td>6</td>
<td>9</td>
<td>20</td>
<td>8</td>
<td>47</td>
</tr>
<tr>
<td>4</td>
<td>Faculty</td>
<td>9</td>
<td>4</td>
<td>17</td>
<td>9</td>
<td>7</td>
<td>46</td>
</tr>
</tbody>
</table>

### 17. Is information communicated from the Department of Chemistry to the staff in a timely fashion?
<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>All of the Time</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication is timely</td>
<td>2</td>
<td>3</td>
<td>19</td>
<td>16</td>
<td>6</td>
<td>46</td>
</tr>
</tbody>
</table>

**18. Is the Department of Chemistry forthcoming with information?**

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>All of the Time</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication is forthcoming</td>
<td>6</td>
<td>7</td>
<td>19</td>
<td>8</td>
<td>7</td>
<td>47</td>
</tr>
</tbody>
</table>

**19. How satisfied are you with your overall work environment?**

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overall Work Environment</td>
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<td>6</td>
<td>8</td>
<td>13</td>
<td>13</td>
<td>48</td>
</tr>
</tbody>
</table>

**20. Have you felt the need to raise a concern in the Department of Chemistry about your work environment or something that negatively affected your ability to do your job?**

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>22</td>
<td>46%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>26</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>48</td>
<td>100%</td>
</tr>
</tbody>
</table>

**21. With whom did you raise your concern(s)? Select all that apply.**

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Department Head (Head's Office)</td>
<td>5</td>
<td>23%</td>
</tr>
<tr>
<td>2</td>
<td>Associate Department Head (Head's Office)</td>
<td>2</td>
<td>9%</td>
</tr>
<tr>
<td>3</td>
<td>Assistant Department Head (Business Office)</td>
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<td>41%</td>
</tr>
<tr>
<td>#</td>
<td>Question</td>
<td>Very Dissatisfied</td>
<td>Dissatisfied</td>
</tr>
<tr>
<td>----</td>
<td>---------------------------</td>
<td>-------------------</td>
<td>--------------</td>
</tr>
<tr>
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<td>Receptiveness</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Appropriateness</td>
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</tr>
<tr>
<td>4</td>
<td>Resolution</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

22. Rate your satisfaction with how the Department Head (Head's Office) handled your concern(s)?

23. Rate your satisfaction with how the Associate Department Head (Head's Office) handled your concern(s)?
24. Rate your satisfaction with how the Assistant Department Head (Business Office) handled your concern(s)?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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<th>Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>9</td>
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<tr>
<td>2</td>
<td>Effectiveness</td>
<td>1</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Appropriateness</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>9</td>
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<td>4</td>
<td>Resolution</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

25. Rate your satisfaction with how the Faculty member handled your concern(s)?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
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<th>Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Effectiveness</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Appropriateness</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>4</td>
<td>Resolution</td>
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<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
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</tbody>
</table>

26. Rate your satisfaction with how your supervisor handled your concern(s)?

<table>
<thead>
<tr>
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<th>Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Mean</th>
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</thead>
<tbody>
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<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>5.07</td>
</tr>
<tr>
<td>2</td>
<td>Effectiveness</td>
<td>4</td>
<td>0</td>
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<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3.93</td>
</tr>
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<td>3</td>
<td>Appropriateness</td>
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<td>0</td>
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<td>1</td>
<td>4</td>
<td>2</td>
<td>4.21</td>
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<td>Resolution</td>
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<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3.36</td>
</tr>
</tbody>
</table>

27. Rate your satisfaction with how your concern(s) was handled by the person or office that you specified in the other category?
<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Very Dissatisfied</th>
<th>Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receptiveness</td>
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<td>1</td>
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<td>1</td>
<td>6</td>
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<td>2</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
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<td>6</td>
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<tr>
<td>3</td>
<td>Appropriateness</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>6</td>
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<td>4</td>
<td>Resolution</td>
<td>4</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

### 28. If you chose to not raise your concern(s), why? (Check all that apply)

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concern was resolved before it was raised</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>Feared repercussions of raising the concern</td>
<td>1</td>
<td>33%</td>
</tr>
<tr>
<td>3</td>
<td>Felt that nothing would be done about the concern</td>
<td>3</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>Another Reason (Please Specify)</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

### 29. Do you believe that the information from this survey will be utilized to effect positive change within the Department of Chemistry?

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Definitely will not be used</th>
<th>Probably will not be used</th>
<th>Don’t know</th>
<th>Probably will be used</th>
<th>Definitely will be used</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The information from this survey</td>
<td>6</td>
<td>11</td>
<td>18</td>
<td>12</td>
<td>1</td>
<td>48</td>
</tr>
</tbody>
</table>

### 30. Please provide any final comments you may have about the work environment, communication, and/or other topics within the Department of Chemistry.
I think this Department is not effective in dealing with major issues that go on in regards to some personnel issues in different groups (I am speaking about one group of which I do NOT work in). There are major issues being swept under the rug, have been for years, and I think some people are too scared/apathetic to do the right thing. If things were handled appropriately, later consequences would not occur. I feel the Department is reactive as opposed to proactive. It is not right, in my opinion.

When a faculty member was under investigation proper information was not sent out to let ALL know this particular faculty member was not allowed in certain buildings or could be a danger to anyone.

There are many variation of the work level and work load in administrative positions. The Human Resource and/or University Administration should look into fair distributions and perhaps some way to form standardized performance module. How about rotation program? Rotate within the unit (academic, fiscal business office, grant administration, athletic, services, etc.) and/or across the University every 5 or 7 years!? I have been working with the Assistant Department Head for the past year to resolve the situation of my hostile work environment with little satisfaction from him. My issue involves my supervisor who is a very powerful faculty member so I do not expect a favorable resolution, despite the fact that my supervisor is unreasonable, unconscionable and irrational at times. At the very least, I believe that all members (despite their rank/power)of the department should be subject to observe ethical and civil behavior. Unfortunately, neither the department nor the University have rules against poor management practices.

It would be helpful upon arrival for staff to have a manual of SOPs for administrative procedures within the department and at the university level. The department provides only annual, very brief meetings of staff. It takes quite some time to learn who does what and what they need from me to do those things. When I first began this job I felt as though not knowing how things work from the start made me a nuisance for people in the business office, but I had to ask someone to learn procedure.

The department currently and historically has poor communication, a lack of respect for employees, micromanagement, and no willingness or desire to improve. These same faults have been pointed out repeatedly in previous self studies and no work or effort has been put into improving. Apathy has become the norm and it is difficult to find anyone with the energy remaining to even try to make improvements in the overall environment. Communication is a key element in all the issues that the department suffers, if the willingness to communicate and the methods of communication were greatly improved this would go a long way towards improving the department.

Consult the building occupants about their concerns and requirements before any building remodeling is done. For example we have huge mirrors in the men's room but a very small trash which overflows within an hour it is emptied.

The department does a good job considering the times we are in.

Members of both tenured and non-tenured faculty have shown very little respect for the time and authority of the staff in this office. It makes working here difficult at best.

Faculty and administration are not proactive with staff issues. Communications being passed from university through department administration to staff are being communicated well. Issues arising within the department that should be comminucated from the administration to the staff are not. Often times, changes in workflows and operations are made without consultation of those affected by the change, creating missed opportunities.
I have no positive comments that will be useful.

in the department of Chemistry it has very good work environment, communication.

Many staff, myself included, feel left out of the loop on issues that affect us indirectly as members of the dept; i.e. many issues relating primarily to faculty but secondarily to us as members of the chemistry team. Dept is very lacking in providing courtesy information to the staff that would make them feel more like members of the team.

There is no reward for doing well or going above-and-beyond our job descriptions. There is only punishment for slight performance lag; which is based completely on the very poor work environment. There is little to no support for most staff, favorites are clearly marked and rewarded and those who are honest in the system are never recognized.

It would be nice if there were some sort of career ladder in the chem dept. You can work here for years and years, with ever increasing duties and responsibilities, but unless you yourself push and shove for a promotion, it will never happen. If the current job market was stronger, I would have been gone long ago because of this fact.

Comments relate to the questions at the beginning of survey regarding the adequate resource, funding and equipment. As I understand most of faculty provide most of the resource not from department. Department should be more supportive. Department do not provide opportunity for career advance. Even faculty would like to give his/her assistant opportunity would be stopped by the business office. Per previous years experience, looks like staffs in business office are more likely being able to receive job performance recognition.

Communication has improved. Work environment is still somewhat less than nice.

Although immediate supervisors are mostly supportive, it is the administration that ties their hands. Concerns are "stopped" at the next level. In order to advance, employees of the department are forced to leave. There are almost no opportunities to advance and training for specific jobs is non-existent. It is almost always trial by fire. Many faculty members have no management skills have should not be in a supervisory position.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>18</td>
</tr>
</tbody>
</table>
A15. Graduate Students Survey
1. Which of the following options describes your gender?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>123</td>
<td>64%</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>70</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>193</td>
<td>100%</td>
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</table>

2. Are you a domestic (includes permanent residents) or international student?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Domestic</td>
<td>101</td>
<td>52%</td>
</tr>
<tr>
<td>2</td>
<td>International</td>
<td>93</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>194</td>
<td>100%</td>
</tr>
</tbody>
</table>

3. In which degree program are you currently enrolled?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MS</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>PhD</td>
<td>189</td>
<td>98%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>193</td>
<td>100%</td>
</tr>
</tbody>
</table>

4. Have you passed your doctoral preliminary exam?

<table>
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<th>Answer</th>
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<th>%</th>
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<tbody>
<tr>
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<td>2</td>
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</tr>
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<td>Total</td>
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</table>

5. Which of the following subclasses of chemistry best represents your chemical research?

<table>
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<th>%</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>Analytical</td>
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<td>18%</td>
</tr>
<tr>
<td>2</td>
<td>Biological</td>
<td>30</td>
<td>16%</td>
</tr>
<tr>
<td>3</td>
<td>Inorganic</td>
<td>60</td>
<td>31%</td>
</tr>
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<td>4</td>
<td>Organic</td>
<td>40</td>
<td>21%</td>
</tr>
<tr>
<td>5</td>
<td>Nuclear</td>
<td>10</td>
<td>5%</td>
</tr>
<tr>
<td>6</td>
<td>Physical</td>
<td>16</td>
<td>8%</td>
</tr>
<tr>
<td>7</td>
<td>Other</td>
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<td>1%</td>
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<td></td>
<td>Total</td>
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<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>192</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Other

polymer chemistry

### 6. Are departmental divisions (Analytical, Biological, etc.) needed?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>158</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td></td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>192</td>
</tr>
</tbody>
</table>

### 7. Which classification best describes the highest level of degree in chemistry you received prior to entering the graduate program in chemistry at Texas A&M?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bachelor's degree from a US institution</td>
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<td>99</td>
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<tr>
<td>2</td>
<td>Bachelor's degree from an international institution</td>
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<td>49</td>
</tr>
<tr>
<td>3</td>
<td>Master's degree from a US institution</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>Master's degree from an international institution</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>Other</td>
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<td>1</td>
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<tr>
<td></td>
<td>Total</td>
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<td>187</td>
</tr>
</tbody>
</table>

Other

Chemical Engineering Degree at LSU

### 8. How would you classify your undergraduate institution?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small - 4-year institution that primarily serves undergraduates</td>
<td></td>
<td>52</td>
</tr>
<tr>
<td>#</td>
<td>Medium institution with graduate programs (10,000 - 20,000 students)</td>
<td>17</td>
<td>17%</td>
</tr>
<tr>
<td>----</td>
<td>------------------------------------------------------------------</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>3</td>
<td>Large - institution with graduate programs (&gt;20,000 students)</td>
<td>29</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>98</td>
<td>100%</td>
</tr>
</tbody>
</table>

9. Do you feel that your prior chemical education sufficiently prepared you for your graduate studies at Texas A&M?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>Yes</td>
<td>163</td>
<td>87%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>24</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>187</td>
<td>100%</td>
</tr>
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</table>

10. Does the department have a clearly stated vision?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>108</td>
<td>59%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>74</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>182</td>
<td>100%</td>
</tr>
</tbody>
</table>

11. Satisfaction with your ability to participate in interdisciplinary research projects inside the department and throughout the university.

<table>
<thead>
<tr>
<th>#</th>
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<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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<tbody>
<tr>
<td>1</td>
<td>Inside department</td>
<td>29</td>
<td>71</td>
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<td>11</td>
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<tr>
<td>2</td>
<td>Outside the department</td>
<td>27</td>
<td>60</td>
<td>70</td>
<td>15</td>
<td>2</td>
<td>174</td>
<td>2.45</td>
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12. Satisfaction with the level of collegiality in the department.

<table>
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<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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<td>29</td>
<td>86</td>
<td>46</td>
<td>13</td>
<td>0</td>
<td>174</td>
<td>2.25</td>
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13. Sense of optimism that the Department is heading in directions that enhance the following:

<table>
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<th>Agree</th>
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<th>Disagree</th>
<th>Strongly Disagree</th>
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<th>Mean</th>
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<td>99</td>
<td>30</td>
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<td>181</td>
<td>2.09</td>
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<tr>
<td>2</td>
<td>National rankings</td>
<td>30</td>
<td>80</td>
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<tr>
<td>3</td>
<td>Teaching capabilities</td>
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<td>49</td>
<td>18</td>
<td>3</td>
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14. Are we deficient in any key/emerging research areas in Chemistry?

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<td>54</td>
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</tr>
<tr>
<td>2</td>
<td>No</td>
<td>55</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>Unable to assess</td>
<td>73</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>182</td>
<td>100%</td>
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15. Select the option that best represents your satisfaction with graduate course offerings.

<table>
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<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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<td>2</td>
<td>Scope of graduate course offerings</td>
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<td>34</td>
<td>17</td>
<td>1</td>
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16. Do you consider graduate student teaching loads to be reasonable?

<table>
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<tr>
<th>#</th>
<th>Answer</th>
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### 17. How satisfied are you with the selection of graduate teaching assignments?

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<th>Neutral</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Responses</th>
<th>Mean</th>
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</thead>
<tbody>
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### 18. Do you think we are adequately preparing our graduate students for careers in the following areas:

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<th>Agree</th>
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<th>Strongly Disagree</th>
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<th>Mean</th>
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<td>Primary undergraduate institutions</td>
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<td>Research intensive institutions</td>
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<td>0</td>
<td>179</td>
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<tr>
<td>4</td>
<td>Government jobs</td>
<td>20</td>
<td>66</td>
<td>68</td>
<td>19</td>
<td>6</td>
<td>179</td>
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<tr>
<td>5</td>
<td>Other alternatives</td>
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<td>13</td>
<td>6</td>
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### 19. Are we offering our graduate students educational opportunities beyond course work of adequate breadth and depth?

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<th>Answer</th>
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<td>87</td>
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<td>3</td>
<td>Unable to assess</td>
<td>45</td>
<td>25%</td>
</tr>
<tr>
<td>#</td>
<td>Question</td>
<td>Very Satisfied</td>
<td>Satisfied</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------</td>
<td>----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>1</td>
<td>The Advisor Selection Process</td>
<td>30</td>
<td>94</td>
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<td>2</td>
<td>Cumulative Examinations</td>
<td>32</td>
<td>92</td>
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<td>3</td>
<td>Student Seminars (681)</td>
<td>27</td>
<td>100</td>
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<td>4</td>
<td>Frontiers (Course)</td>
<td>42</td>
<td>86</td>
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<td>5</td>
<td>Preliminary Examinations</td>
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### 21. Satisfaction with university/department policy for the compensation of graduate students.

<table>
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<th>Question</th>
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<th>Responses</th>
<th>Mean</th>
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<tr>
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<td>Basic Salary</td>
<td>9</td>
<td>72</td>
<td>56</td>
<td>43</td>
<td>1</td>
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<tr>
<td>2</td>
<td>Tuition</td>
<td>58</td>
<td>86</td>
<td>36</td>
<td>1</td>
<td>0</td>
<td>181</td>
<td>1.89</td>
</tr>
<tr>
<td>3</td>
<td>Health insurance</td>
<td>23</td>
<td>80</td>
<td>46</td>
<td>24</td>
<td>7</td>
<td>180</td>
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</tr>
<tr>
<td>4</td>
<td>99 hour cap</td>
<td>13</td>
<td>43</td>
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### 22. Satisfaction with departmental support of the graduate program:

<table>
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<th>Very Dissatisfied</th>
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<td>1</td>
<td>Graduate Advisors</td>
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<td>89</td>
<td>17</td>
<td>10</td>
<td>4</td>
<td>177</td>
<td>1.95</td>
</tr>
<tr>
<td>2</td>
<td>Graduate Office staff</td>
<td>80</td>
<td>87</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>177</td>
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<tr>
<td>3</td>
<td>Departmental IT staff</td>
<td>53</td>
<td>94</td>
<td>26</td>
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<tr>
<td>#</td>
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<td>Neutral</td>
<td>Dissatisfied</td>
<td>Very Dissatisfied</td>
<td>Responses</td>
<td>Mean</td>
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<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td>4</td>
<td>Departmental stockroom staff</td>
<td>73</td>
<td>81</td>
<td>21</td>
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<td>0</td>
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<tr>
<td>5</td>
<td>Departmental shop (electronics, glass, machine) staff</td>
<td>82</td>
<td>69</td>
<td>23</td>
<td>3</td>
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<tr>
<td>6</td>
<td>Departmental instrumental facilities research staff</td>
<td>49</td>
<td>89</td>
<td>30</td>
<td>5</td>
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<tr>
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<td>Departmental Business/HR Office personnel</td>
<td>48</td>
<td>85</td>
<td>40</td>
<td>4</td>
<td>0</td>
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### 23. Satisfaction with the infrastructure/services provided by the department/university.

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<th>Responses</th>
<th>Mean</th>
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<td>85</td>
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<td>Fabrication</td>
<td>36</td>
<td>72</td>
<td>63</td>
<td>1</td>
<td>0</td>
<td>172</td>
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<td>43</td>
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### 24. Satisfaction regarding space and facilities:

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<td>82</td>
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<td>Quality of your group's research space</td>
<td>43</td>
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<td>Quantity of lecture classrooms</td>
<td>Quality of lecture classrooms</td>
<td>Quantity of instructional laboratory space</td>
<td>Quality of instructional laboratory space</td>
<td>Meeting spaces</td>
<td>Gathering spaces (such as break room areas, etc.)</td>
<td>25. Satisfaction regarding technology and equipment</td>
<td>26. Satisfaction with the safety practices of our department.</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------</td>
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<th>Very Dissatisfied</th>
<th>Responses</th>
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<td>1.84</td>
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