Self-Study 2008-2015
Oceanography, College of Geosciences
Texas A&M University
Self-Study 2008-2015

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Executive Summary

The Department of Oceanography at Texas A&M University, founded in 1949 as the first oceanographic department established at an academic institution, is deeply committed to the unique mission of an AAU member institution with Land-, Sea-, and Space-grant status. With strengthened ties to other marine related units at the College Station and Galveston campuses, and significant investments from the University, we are poised to realize our strategic vision to join the nation’s top rank of institutions for oceanographic research and education at public universities. As part of our 2014 strategic planning effort, we have restructured our departmental educational, research and engagement activities into four interdisciplinary areas of strength: Ocean Observing Science and Technology, Marine Ecosystems Science and Health, Ocean Climate, and Ocean Energy. Observations, in a very broad sense, form the baseline for all of our strategic interdisciplinary themes, and are at the core of our vision to transform STEM education through a focus on big data competency. To this end we are innovating a series of new degree programs designed to 1) integrate disciplinary training within the College of Geosciences, 2) build bridges to STEM programs throughout the University, 3) recruit more students to our undergraduate and graduate programs, and 4) meet the demands of an evolving workforce. Accomplishing these goals is central to our strategic vision to elevate the scholarly reputation of the department, because our operating resources are directly tied to our impact on the University’s education mission.
Welcome from the Department

On behalf of the Department of Oceanography, welcome to Texas A&M University (TAMU) and thank you very much for your service as external reviewers of our academic program. Your visit coincides with an exciting and critical point in our evolution, as we approach the end of the second year of our current strategic plan and strive to contribute to the university’s strategic mission. Thus we are thrilled to have the opportunity to showcase our accomplishments and share our challenges, in the spirit of enhancing our positive momentum.

This self-study report reflects an inward and outward evaluation of the education and research programs within the Department. The report includes a brief overview of TAMU, an introduction to the origin and organization of the Department of Oceanography at TAMU, together with information about our faculty, students and facilities. The report also details the academic curricula and the different degree programs we offer, highlighting our role in the College of Geosciences as the innovators in truly interdisciplinary educational offerings. Our graduate education mission is teaching through research, so we provide an introduction to our interdisciplinary research strengths and investments. We also include in the document an overview of our present and planned educational and research innovations.

Thank you once again for your efforts – we are grateful for your time and assessment, and we are happy to answer any questions you may have prior to, during, and after your visit.

Debbie Thomas
Professor and Department Head
Chapter 1. Introduction to TAMU and TAMU Oceanography

1.1 Texas A&M University

Texas A&M University (TAMU) was the first public college in Texas. Established in 1876, it is now among the largest institutions of higher learning in the nation, with a student body of about 64,600 (undergraduates and graduates on all campuses, with 59,129 on the College Station campus alone). The University offers degrees in 139 undergraduate and 268 graduate courses of study. TAMU is a member of the Associate of American Universities (AAU), while also holding the rare distinction of serving as a land-, sea- and space-grant institution. TAMU’s 3,500 faculty conduct more than $850 million worth of sponsored research projects, assisted by about 15,000 graduate and professional students. Yet as is evident from our mission statement, the University is committed to preserving the legacy of Morrill Act under which we were founded:

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 as it addresses the needs of an increasingly diverse population and a global economy. In the 21st century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

1.2 TAMU Oceanography and Closely Aligned Ocean Science Units at TAMU

The Department of Oceanography at TAMU was established in 1949 under the auspices of the University Land Grant mission to assist the State with emerging challenges in
the Gulf of Mexico dealing with oyster diseases, coastal disasters, and oil platform and pipeline design. Beginning with four professors, the Department of Oceanography at TAMU became the first university department of oceanography in the country. The Department added meteorology to its program early in the 1950s and officially became the Department of Oceanography and Meteorology. In 1966 the Department of Meteorology was established as a separate department in the new College of Geoscience (now comprised of the four departments Geology and Geophysics, Geography, Atmospheric Sciences, and Oceanography). The Texas Sea Grant College Program was added to the College of Geosciences in 1966. Ocean engineering studies also initially were taught in the Department of Oceanography, but that discipline ultimately developed into a separate program in the Department of Civil Engineering at TAMU, and now as a new Department of Ocean Engineering.

From its inception, the Department of Oceanography has maintained significant research programs in Galveston. In 1952 the Marine Laboratory at Galveston was created to support oceanography and biological research, and the Texas Maritime Academy began operations at Galveston in 1962. The institution became the Texas A&M University at Galveston in 1979 and began offering Bachelor of Science degrees through the Departments of Marine Biology and Marine Science. The Texas A&M University Galveston Campus, as it is now officially titled, is a vibrant and growing special-purpose institution that fully integrates marine and maritime studies into all of its degree programs, and is among the nations leaders in conferring bachelors degrees in the marine affairs and marine science. Currently, thirteen faculty in the Departments of Marine Sciences and Marine Biology at TAMUG have Joint Appointment or Graduate Faculty affiliations in Oceanography and support the Oceanography graduate programs through student advising, mentoring, and funding.

The Department's first research vessel (R/V) was the sailing ship R/V *Jakkula*. In the mid-1950s, it was replaced by the R/V *Hidalgo*, a converted mine sweeper, and in the early 1960s a second naval vessel was completely converted and renamed the R/V *Alaminos*. The intermediate class R/V *Gyre* was built in 1973 and was sold in December 2005. The Department is presently working to acquire access to another ship on a regular basis.

The Department of Oceanography is closely aligned with the Geochemical and Environmental Research Group (GERG). GERG was founded in 1981 as a center of excellence in applied geosciences within the College of Geosciences. GERG is organized as three interrelated groups that provide field acquisition, analyses, and interpretation of data across several interlocking themes in environmental sciences, ocean sciences, and resource geosciences. Staff and partners include geologists, inorganic and organic geochemists, analytical and
contaminant chemists, biological, chemical, geological, and physical oceanographers, biologists, ecologists, and toxicologists.

In 1983 Texas A&M was awarded the contract to host the operations of the Ocean Drilling Program and the Gulf Coast Repository core storage and research facility. In 2003, we successfully competed to retain the U.S. component of the first phase of the Integrated Ocean Drilling Program. TAMU secured the bid to again retain the science operator distinction for the second phase, the International Ocean Discovery Program, in 2013.

TAMU was one of the first Sea Grant Institutions established through the National Sea Grant College and Program Act of 1966. Texas Sea Grant is part of a national network of Sea Grant programs in coastal and Great Lakes states, funded by NOAA in partnership with the states to help connect the research conducted at Sea Grant Institutions with the public. Texas Sea Grant unites the resources of the federal government, the State of Texas, local governments, industry and universities across the state. Sea Grant is NOAA’s primary university based program, dedicated to helping citizens use scientific information to support a vibrant economy while ensuring ecological sustainability.

TAMU hosts the office of the Gulf Coast Ocean Observing System (GCOOS), one of eleven networks forming the U.S. Integrated Ocean Observing System conceived to serve a broad range of societal needs. GCOOS represents the five gulf coast states, and hosts the data of numerous TAMU Oceanography observing systems, including the Imaging Flow Cytobot, the TABS buoys, the glider fleet, and the forecast surface currents ROMS current model.
Chapter 2. The Mission and Goals of TAMU Oceanography

The 2014 Strategic Plan is included as Appendix 1 and below we include an excerpt of our vision, mission, values and goals.

2.1 Vision
To join the nation’s top rank of institutions for oceanographic research and education at public universities by uniting the critical mass of energetic and talented ocean scientists and educators at Sea Grant, GERG, IODP, TAMU Galveston, and TAMU College Station.

2.2 Mission Statement
To advance discovery and understanding of the ocean sciences, technology and resources. To prepare the next generation of ocean scientists and citizens in general for the challenges facing a growing human population with limited resources.

2.3 Values
The department embraces the role of a public university in improving the lives of Texans and fosters a culture of scholarly excellence, diversity, and a nurturing workplace environment.

2.4 Goals
Our goals, action plans and challenges are detailed in the accompanying strategic plan implemented in 2014. Below we highlight the three primary, general goals that guide our short and longer term planning.

- Elevate the scholarly reputation of the department. Enhancing the scholarly reputation of the department is crucial to addressing the critical issues of recruitment, diversification and retention of faculty and staff. Excellence perpetuates excellence, and we are striving to create a culture of trust, teamwork and excellence in which collaboration occurs organically.

- Double the enrollment in Oceanography and Ocean Sciences degree programs in the next five years. Our operating resources are directly tied to our impact on the University’s education mission. This ultimately controls our ability to elevate the scholarly reputation of the department.

- Enhance the impact of our service course offerings in both quality and in the number of
non-geoscience Aggies that we educate. We are taking steps to contribute to the College’s vision of making the Geosciences the most relevant discipline of the 21st century through our introductory lecture and lab course offerings as well as the new OCNG 600 oceanography for educators course.
Chapter 3. Evolution of the Department of Oceanography Since 2008

3.1. Recent New TAMU and TAMUS Investments in Oceanography

GERG and the Department of Oceanography, with strong support from the College, have received more than $9M from TAMU and the Texas A&M System for compelling regional and international interdisciplinary initiatives. While most of these financial resources are allocated directly to GERG, the Department of Oceanography benefits directly and indirectly through research and educational access to the state of the art observational capacity. Furthermore these investments add a new dimension to our high impact educational offerings. The Department therefore shares the responsibility for translating these investments in infrastructure into impactful research and educational opportunities that benefit the University and State. The recently funded NSF-Research Experience for Undergraduates (REU): Observing the Ocean is just one example of the transformative educational potential of the OCNG/GERG partnership (http://ocean.tamu.edu/academics/reu/index.html).

- **GERG Reinvestment**  
  ($1.45M from the VPR, with significant contributions from the Department and College) Beginning in 2012, the Department of Oceanography, the College of Geosciences, and the Vice President for Research committed to a multi-year reinvestment in GERG’s analytical, human and built environment resources. This initiative led to the expansion of the initial Slocum glider fleet and construction of the glider facility, among other facilities enhancements. This reinvestment gave rise to the SmartGulf vision – a holistic approach to ocean observations that consists of a network of sensors, radars, buoys, glider fleet, and AUVs that
build on existing infrastructure to collect, integrate, and interpret oceanographic, atmospheric, chemical and biological data in real and near-time. This observational capacity is complemented by numerical simulations that add a synoptic dimension to the network. Once established as the initial test-bed, the SmartGulf observing strategy can be exported to any coastal region.

- **Chancellor’s Research Initiative ($4.5M from TAMUS)** In 2014 GERG/OCNG were awarded a Chancellor’s Research Initiative grant associated with a Presidential Faculty Hire in the Environmental “Grand Challenge” theme (Gerardo Gold-Bouchot). This award provided the funds to purchase the SeaSonde coastal high-frequency radars, additional gliders, and to design, build, and install the ferry box flow through instrumentation described below in 6.1.2.

- **Texas A&M – Haifa University Eastern Mediterranean Observatory ($3.05M from TAMU)** On December 14, 2015, TAMU and the University of Haifa signed a memorandum of agreement to establish university level collaborations in research and education. The first project associated with this partnership is to establish the Texas A&M – Haifa University Eastern Mediterranean Observatory (THEMO), consisting of two moorings that will provide for the first time critical continuous observations in the eastern Mediterranean to add to the international observing array. This represents the first translation of the SmartGulf concept to another societally critical body of water. We are building on this partnership by creating a college-level dual degree PhD program, to be implemented January 2017, pending the required approvals.

- **IODP Faculty Lines ($0.5M from TAMU)** As part of the University’s deepening commitment to the International Ocean Discovery Program, four new faculty lines for scholars engaged in drilling science were allocated to the College of Geosciences. Two faculty members were hired in OCNG (Jason Sylvan, Yige Zhang) with significant start-up contributions from the Provost as part of this initiative.

### 3.2. Internal Improvements Through Strategic Planning

The collection of Ocean Sciences
centers at SeaGrant, GERG, IODP, TAMU - Galveston, and TAMU – College Station represents a truly unique concentration of interdisciplinary research and education capacity. Our goal is to function as a true team with highly complementary human and infrastructure resources, providing us with the capacity to rival any other institution. To this end, the Department of Oceanography has taken the lead in aligning the individual units as the ‘Ocean Science Alliance.’ These efforts over the past two years are beginning to reap significant dividends in educational and research collaborations, and provide a brilliant example of how similar and broader scaled-up efforts across the units, colleges, and campuses of TAMU can affect the vision of TAMU as a nationwide leader in incubating innovative inter- and multi-disciplinary education and scholarship.

One immediate benefit of strategic planning in the context of the collective resources of the Ocean Science Alliance was to identify the mutual strengths that cross-cut the individual units:

- **Ocean Observing Science and Technology**
- **Marine Ecosystems Science and Health**
- **Ocean Climate**
- **Ocean Energy**

The Department of Oceanography embraced these strengths to the point of eliminating our historical structuring along “sections” (i.e., the traditional geological, chemical, biological, and physical branches of oceanography). This restructuring had the immediate effect of transforming our approach to research and education. Below we highlight one profound example of the benefit to our research enterprise - a true interdisciplinary Ocean Observing research and education partnership between Oceanography and GERG.

Observations, in a very broad sense, form the baseline for all of our strategic interdisciplinary themes, and are most powerful when interpreted within the context of numerical simulations. We are only beginning to realize the potential of the OCNG/GERG partnership and the way it can revolutionize support for and analysis of the data obtained from the moorings, gliders, high frequency coastal radars (awaiting installation), and a growing array of chemical and biological sensors. To this end, we invested the remaining $287,000 from the sale of the R/V Gyre to procure 1) Glider enhancements to expand the depth and density range of operation; 2) non-standard (interdisciplinary) instrument systems for moored applications such as dissolved oxygen, alkalinity, pCO₂, and fluorometry; and 3) a flow-through instrumentation system that includes a SeaBird SBE45 (conductivity, temp and salinity), environmental characterization optics (ECO) sensors (fluorometer and backscatter sensor), and a meteorological package mounted on the R/V Manta to exploit repeat transits between Galveston and the Flower Gardens National Marine Sanctuary.

The growing observational capacity
through SmartGulf and our international initiatives provides the opportunity to transform STEM education through a focus on big data literacy. The Department of Oceanography constructed the Robert O. Reid Ocean Observing Educational Facility in the O&M Building to bring the observations to our students for collaborative classroom instruction and teaching through research. Our new interdisciplinary educational programs in part emphasize experiential learning and applied methods mastery using the state of the art instrumentation operated by GERG team members, and this allows us to immediately apply the TAMU/TAMUS investments for the benefit of the State.

The recognition that ocean observing science is intricately related to the technological advancement required to improve communications, batteries, anti-biofouling, sensors, and propulsion has led to an intensive effort, facilitated tremendously by the College, to establish a highly collaborative partnership with Engineering (Ocean, Civil, Aerospace, Biomedical, Materials Science, Electrical, the Energy Institute, among others). At the same time we realize that ocean observing is merely one component of the Earth system, and we continue to deepen research and education collaborations within the College of Geosciences drawing from partnerships with Geography, Atmospheric Sciences, and Geology & Geophysics.

### 3.3 Response to the Improvements

#### Promoted by the 2008 APR

Below we list a bulleted summary of the recommendations from the 2008 External Review Team, and briefly highlight our associated activity in bold text. We also detail more extensively in subsequent sections our completely overhauled program to assess the effectiveness of how we achieve our student learning outcomes, the creation of innovative graduate degree and fast-track degree programs, and a proposal to partner with our TAMUG Marine Sciences teammates to offer the Marine Sciences Bachelor of Science degree to students in College Station. The underlying goal of all these activities is to broaden and deepen our impact on the Ocean Sciences, locally, nationally, and internationally.

- A need for a strategic vision, mission and plan to serve as an active guide for planning and hiring. Specific suggestions for strategic initiatives included continuing to develop a strong, interactive relationship with IODP, taking advantage of international partnerships, and engaging more deeply with GERG and existing observational capabilities.

  We have a strong strategic plan and documented above our efforts to engage in a true ocean observing partnership with GERG, IODP and international partners.

- The Review Team recommended leading a coalition of institutions to pursue a regional class research
vessel to support both the research and educational missions of the Department.

We currently are pursuing collaborations to compete for one of the new regional class research vessels.

- Recommendations for enhancing our undergraduate teaching mission focused on increasing participation in the Environmental Geosciences major, citing “the trend in higher education is for more integration within geosciences rather than for discipline-specific majors.”

We have deepened our contributions to the Environmental Programs, with 11 Oceanography faculty teaching GEOS courses required in the Environmental Program majors. Dr. Richardson has provided $520,000 in scholarships through her “Geoscience Scholars” NSF S-STEM award over the last six years to 92 academically talented Geoscience undergraduates.

At the same time, given the advances in ocean observing platforms, and our department and university ocean observing initiatives, we believe that a STEM-rigorous interdisciplinary degree in the Marine Sciences with an ocean observing focus is tremendously valuable. To this end we are partnering with our colleagues at TAMUG in a proposal to offer the Marine Sciences BS to students in College Station.

- Implement a consistent process of appointing Research Professors.

We are creating a culture that eliminates the perception that Research Professors outrank Research Scientists and are taking steps to consistently appoint personnel based on position description rather than the idea that one track is more prestigious than another. This involves identifying permanent funds for the educational portion of a Research Professor’s salary.

- Engage more meaningfully in the Marine Biology interdisciplinary PhD program.

We recognize that a truly successful Ocean Science Alliance must have a vibrant Marine Biology graduate program and that we must support the program deeply and meaningfully with more course accessibility and by including the MARB IDP students in OCNG
related graduate functions.

- IT requirements need to improve for graduate students. This includes the lack of an effective video conferencing and teaching link to Galveston.

  The College centralized IT services and has agreed to take responsibility for video conferencing capabilities. We are continually pressing for progress on these fronts, but the university-wide adoption of Blackboard Collaborate represents a significant improvement over the TTVN system and our faculty are beginning to embrace this option in a variety of courses.

- Core course instruction needs to be better coordinated to reduce redundancy that should be reduced and to teach core courses (e.g. biological oceanography) at a sufficiently challenging level.

  A highly successful Ocean Science Alliance retreat in April 2013 led to numerous curricular improvements, including improved instruction through the core courses. Students do need to recognize, however, that these courses are inherently interdisciplinary and much of the perceived redundancy is important to train our students to become interdisciplinary problem solvers.

- Recommended identifying ways to attract more highly qualified Ph.D. students and to increase retention and graduation rates. They highlighted the dual degree program with OUC as a way to substantially increase numbers.

  Our innovative national recruiting efforts lead within our College – we routinely send talented representatives to SACNAS, the major disciplinary meetings, and the Big Ten recruiting conference. Furthermore our efforts to deepen and broaden participation extend to a newly funded NSF REU
program (begins Summer 2016). However, our international partnerships should not be viewed as ways to substantially increase our numbers – these provide 1-2 students per year currently.

- Ensure that students receiving competitive external scholarships or fellowships are not disadvantaged by policies regarding tuition, fees, and insurance coverage. We have competitive internal scholarships that provide students with opportunities to receive in-state tuition that help us overcome a few of the hurdles but we are still working to identify ways to streamline student support when they successfully compete for major external fellowships. One immediate strategy we now implement is to augment the stipend award for the College Merit Fellowship to include sufficient additional funds to pay for the student health care plan.

Furthermore, Dr. Gardner and Dr. Richardson have been able to award 42 OCNG graduate students $610,000 in scholarships and travel grants through their two 5-year NSF S-STEM program. $470,000 additional funds will be awarded to OCNG graduate students over the next four years.

- Provide much better graduate student professional development that includes directed career counseling. Through graduate student feedback, we continue to strive to find ways to provide career and professional development counseling beyond the individual student-advisor relationship. We have several innovative “learning community” type ideas that we seek to implement to provide our students additional access to career counseling, opportunities to improve communication skills and a more solid sense of scholarly
community within the department.

• Improve graduate stipends to make offers more competitive.

*In 2012 we increased teaching assistant stipends for students in College Station from $1650/month (MS students) and $1750/month (PhD students) to $2000. The TAMUG administration is taking steps to achieve parity in stipends for students with teaching assistants through Marine Sciences and Marine Biology.*

• Provide graduate students an opportunity to present the results of their research to the faculty and receiving feedback at a regular departmental seminar course.

*This now occurs through the new Communicating Ocean Sciences course and through numerous other opportunities (College and University student research symposia, scholarship learning communities, S-STEM lunch seminars, etc).*

• Appoint a faculty member to oversee the curriculum, course scheduling, admissions process and graduate student affairs and provide compensation for the duties.

*Since 2012 this has become the primary duty of the Assistant Department Head, who receives 6 weeks of compensation for these heroic duties.*

• Create and implement a viable and meaningful assessment program.

*Through a college led initiative, we now have a highly functional and meaningful assessment program and have made several notable curricular improvements that were directly informed by our assessment data, notably the implementation of a Communicating Ocean Sciences course requirement and the gift of Dr. Patricia Goodson's *Becoming an Academic Writer* to all incoming graduate students.*
Chapter 4. Departmental Structure and Personnel

4.1 Departmental Administration
The Department Head oversees the research, education, and engagement/advancement operations of the Department and reports to the Dean of the College of Geosciences. The Assistant Department Head, appointed by the Department Head, is critical to the departmental leadership, and oversees course scheduling, assessment of degree programs, and curricular functions.

4.2 Departmental Personnel
All members of the Oceanography team play a vital role in our education, research and engagement mission. Below we briefly describe the manner in which different team members contribute via the different types of appointments. All current department members are listed in Table 4-1. Curriculum Vitae of all Ad-loc,

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<thead>
<tr>
<th>Name</th>
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<tr>
<td>Jack Baldauf</td>
<td>Professor/Exec. Assoc. Dean</td>
<td>Oceanography</td>
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<td>Doug Biggs</td>
<td>Professor</td>
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<td>David Brooks</td>
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<td>Steve DiMarco</td>
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<tr>
<td>Jessica Fitzsimmons</td>
<td>Assistant Professor</td>
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<td>Wilford Gardner</td>
<td>Professor</td>
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<td>Gerardo Gold-Bouchot</td>
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<td>Robert Hetland</td>
<td>Professor</td>
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<td>Anthony Knap</td>
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<td>Alejandro Orsi</td>
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<tr>
<td>Mary Jo Richardson</td>
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<td>Kathryn Shamberger</td>
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<td>Niall Slowey</td>
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<td>Achim Stoessel</td>
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<td>Jason Sylvan</td>
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<tr>
<td>Debbie Thomas</td>
<td>Professor/Department Head</td>
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<td>Daniel Thornton</td>
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<tr>
<td>Shari Yvon-Lewis</td>
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<tr>
<td><strong>Adjunct Faculty</strong></td>
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<tr>
<td>Carlos Alvarez Zarikian</td>
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<td>Isaac Ginis</td>
<td>Professor</td>
<td>University of Rhode Island</td>
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<tr>
<td>Adam Klaus</td>
<td>IODP Supervisor of Science Support</td>
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<td>Mitchell Malone</td>
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<td>Jose Sericano</td>
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<td><strong>Business/Advising Staff</strong></td>
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<td>Andrea Dawson *</td>
<td>Academic Advisor</td>
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<td>Janet Dudding</td>
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<td>Sarah Moya</td>
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<td>Jessica Radnitzer</td>
<td>Lead Office Assistant</td>
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<td>Debra Stark</td>
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<td>Karl Kaiser</td>
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<td><strong>Instructional Faculty</strong></td>
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<tr>
<td>Chrissy Wiederwhol</td>
<td>Instructional Assistant Prof.</td>
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<tr>
<td><strong>Joint Appointed Faculty</strong></td>
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<tr>
<td>Rainer Amon</td>
<td>Professor</td>
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<td>Ayal Anis</td>
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<td>Robin Brinkmeyer</td>
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<td>Timothy Dellapenna</td>
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<td>Patrick Louchouarn</td>
<td>Professor</td>
<td>Marine Sciences</td>
</tr>
<tr>
<td>Franco Marcantonio</td>
<td>Professor</td>
<td>Geology &amp; Geophysics</td>
</tr>
<tr>
<td>Gerald North</td>
<td>Professor</td>
<td>Atmospheric Sciences</td>
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<tr>
<td>Antonietta Quigg</td>
<td>Professor</td>
<td>Marine Biology</td>
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<tr>
<td>Gilbert Rowe</td>
<td>Professor</td>
<td>Marine Biology</td>
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<tr>
<td>Peter Santschi</td>
<td>Professor</td>
<td>Marine Sciences</td>
</tr>
<tr>
<td>Anja Schulze</td>
<td>Associate Professor</td>
<td>Marine Biology</td>
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</table>

*Ms. Dawson took an advising position in the Statistics Department effective March 2, 2016.*
### Research Professors

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<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Zhankun Wang</td>
<td>Assistant Research Scientist</td>
<td>Oceanography</td>
</tr>
<tr>
<td>Pamela Plotkin</td>
<td>Texas SeaGrant Director/Assoc. Res. Prof.</td>
<td>SeaGrant/OCNG</td>
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<td>Terry Wade</td>
<td>Research Professor</td>
<td>GERG/Oceanography</td>
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### Research Scientists

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<tr>
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<td>Scott Socolofsky</td>
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<td>Masako Tominaga</td>
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<td>Geology&amp;Geophysics</td>
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<td>Pete van Hengstum</td>
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<td>Marine Sciences</td>
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<tr>
<td></td>
<td>Postdoctoral Researchers</td>
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<tr>
<td>Daijiro Kobashi</td>
<td>Postdoctoral Researcher</td>
<td>Oceanography</td>
</tr>
<tr>
<td>Jaison Kurian</td>
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<td>Xiaohui Ma</td>
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<td>Rachel Scudder</td>
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<tr>
<td>Kerry Whilden</td>
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### Research Personnel

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<tr>
<td>Laura Caldwell</td>
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<tr>
<td>Robert Currier</td>
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<td>Susan Martin</td>
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<td>Marion Stössel</td>
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### Instructional Faculty

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<tr>
<td>Brendan Roark</td>
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<td>Chrissy Wiederwhol</td>
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### Joint Appointed Faculty

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<td>Ayal Anis</td>
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<td>Robin Brinkmeyer</td>
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<td>Pete van Hengstum</td>
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### Postdoctoral Researchers

- Daijiro Kobashi
- Jaison Kurian
- Xiaohui Ma
- Rachel Scudder
- Kerry Whilden

### Research Scientists

- Steve Baum
- Darren Henrichs
- Matthew Howard
- Ann Jochens
- Barbara Kirkpatrick
- Shinichi Kobara
- Christine Simonello
- Kristen Thyng

### Research Professors

- Pamela Plotkin
- Terry Wade

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4.2.1 Business, Office, and Advising Staff

Oceanography has a dedicated business staff of four, led by the Business Administrator. The College of Geosciences centralized business functions approximately two years ago, and now the business team reports to the Assistant Dean of Finance and not the Department Head. The Oceanography Business team is responsible for all accounts payable and payment card transactions for the College (other departmental teams handle human resources and payroll, scholarship accounting, and travel and international support). In addition to these duties, the Business staff assist in the operations of the department. The Oceanography Lead Office
Assistant assists office operations and business functions. The Department shares an Academic Advisor with the Department of Geology and Geophysics, and the advisor reports to the Associate Dean of Undergraduate Affairs and not to the department head.

4.2.2 Research Assistants and Associates
Research Assistants and Associates support the Departmental research mission through both scientific and administrative efforts. The Department employs five team members in this capacity.

4.2.3 Research Scientists
The highly interdisciplinary Research Scientist team in the Department of Oceanography is critical to our research mission, and consists of talented scholars at the Assistant, Associate and Full Research Scientist Rank who dedicate all of their time and effort to the research enterprise. Promotion through the ranks is based on rigorous assessment of research impact, productivity and leadership. Financial support is derived entirely through contract and grant support. Currently, eight Research Scientists spanning all three ranks are on the Oceanography team, and contribute to our educational mission through exceptional graduate mentoring and occasional (compensated) classroom teaching.

4.2.4 Research Professors
Research Professors consistently contribute directly to the educational mission, typically the equivalent of one course per semester (~25% time and effort) for which there is departmental financial support. With the voluntary and limited, education role, Research Professors form part of the Academic Professional Track (APT) at TAMU. For Research Professors, the remainder of the salary is raised through research funds. The Department considers the distinction between the Research Scientist and Research Professor tracks merely one of position description, not rank or prestige. Currently, two Oceanography team members are appointed in the Research Professor track. Our Oceanography Research Professors are dedicated graduate advisors with a strong record of funding and mentoring students in Oceanography and the Marine Biology Interdisciplinary PhD Program.

4.2.5 Instructional Professors
The Instructional Academic Professional Track at TAMU distinguishes those team members who contribute primarily to the education and engagement missions of the department and college. Our single Instructional Assistant Professor contributes to the overall pedagogical enhancement of our course offerings, in addition to classroom instruction.
4.2.6 Tenure Track/Tenured Faculty

Members of the tenure track and tenured faculty in the Department of Oceanography reside in both College Station and Galveston and have several types of affiliation. The ad-loc faculty are those hired by the Department of Oceanography and paid entirely with departmental Education and General funds. Oceanography has 22 ad-loc faculty (referred to as the “core faculty” by the Texas Higher Education Coordinating Board), two of whom serve as full time administrators and thus do not teach.

Joint Appointed faculty (all non-salaried) contribute significantly to Oceanography as their host department, primarily through graduate student mentoring and service on key Oceanography committees. Our 14 Joint Appointed faculty reside in the home departments of Marine Sciences (TAMUG), Marine Biology (TAMUG), Atmospheric Sciences, Geology & Geophysics, and Civil Engineering.

We also affiliate faculty from other units (MARS, MARB, and Geography currently) as members of the Oceanography Graduate Faculty, and these four faculty provide our graduate students with unique access to interdisciplinary mentoring and research that complements the expertise represented by our ad-loc and joint appointed faculty.

4.3 Standing Committee Structure – 2015/2016

The Department Head, in consultation with the Assistant Department Head, crafts committee membership. The goal is to place faculty in service roles that best match individuals’ skill sets and preferences, as well as to maximize synergies with research and teaching efforts (to the extent this is possible). Committee assignments reflect a departmental culture to enhance professional development for all faculty in terms of both service load and service assignments. Committee assignments rotate, and service loads for individual faculty wax and wane depending on other contributions, so it is important to note that this list only reflects the current committee composition and structure. Many individual faculty members have contributed heavily to departmental service over the past seven years through chairing the major committees and these efforts have markedly improved committee contributions – a notable example is the banner recruiting year under the newly constituted Recruiting and Admissions Committee (chaired by Achim Stoessel in 2012/2013).

4.3.1 Curriculum Committee:
S. Yvon-Lewis, chair; A. Dawson (Academic Advisor); D. Biggs; G. Gold-Bouchot; J. Fitzsimmons; C. Wiederwohl; A. Orsi

The Committee’s goals are to strategically plan for the growth of all of our programs in creating new degree programs and identifying which course offerings need to be created or revised to best meet the needs of all our students. Note that the committee will scrutinize all future new course
proposals to ensure that these are strategic.

4.3.2 Recruiting and Admissions Committee: C. Wiederwohl, standing chair; M. Richardson; K. Shamberger; G. Gold-Bouchot; A. Anis; J. Dudding (Business Administrator); A. Dawson (Academic Advisor)
The charges of this committee are 1) to strategically and actively recruit nationally and internationally throughout the calendar year, and 2) to evaluate applicants for admissions for all of our graduate programs (3+2s, nonthesis, and thesis programs).

4.3.3 Tenure and Promotion Committee: R. Hetland (Chair, college rep); P. Chapman; A. Knap; G. Gold-Bouchot
The Tenure and Promotion Committee coordinates all departmental tenure and promotion processes, including 3-year reviews and any post-tenure reviews. The committee also conducts annual performance evaluations in parallel with the Department Head. Requests for graduate faculty, joint appointments, and adjunct status are vetted through the committee.

4.3.4 Ship Committee: P. Chapman (co-chair); A. Knap (co-chair); W. Gardner; M. Tominaga; N. Slowey
The Ship Committee leads departmental efforts to respond to the impending UNOLS RCRV request for proposals, as well as identify potential development targets for other vessel opportunities.

4.3.5 Strategic Planning Committee: D. Thomas (Chair); S. DiMarco; B. Giese; D. Brooks; N. Slowey
The strategic plan is a living document and this committee continuously evaluates our goals and progress, identifying ways in which to remain nimble in our efforts to fulfill our vision and achieve our mission. For Fall 2015 this committee was charged with drafting the initial Self-study document for the 2016 APR.

4.3.6 IT Committee: P. Chang (Chair); A. Stössel; M. Howard
The IT Committee serves as the connection between the department and the College IT Team. The IT Committee also will serve as the department’s representation in College High Performance Computing initiatives. The IT Committee will proactively identify research and educational IT needs/problems and actively engage with Paul Stine to fill the needs and solve the problems.

4.3.7 Advisory Committee: D. Thomas (Chair); R. Hetland; S. Yvon-Lewis; P. Chang; C. Wiederwohl; P. Plotkin; R. Amon; A. Knap
This committee consists of the chairs of the standing committees, a representative from our Galveston team, the SeaGrant Director, the GERG Director, the Assistant Department Head, and the Business Administrator. The DH engages the Advisory Committee to strategically advance our Ocean Sciences Alliance, and as needed for other departmental issues.
Chapter 5. Departmental Resources

5.1 Facilities

5.1.1 OCNG controlled classrooms
The department maintains and controls four small classrooms (<40 seats), including the new Robert O. Reid Ocean Observing Educational Facility. The ROR room comprises an 8-panel Tilex video wall with collaborative seating to promote the teaching through research mission, and the inner room is a state-of-the-art teaching through technology space designed for complete flexibility and collaborative education.

5.1.2 Ocean Observing infrastructure and Oceanographic Resources at GERG
GERG and the Department of Oceanography have established an equipment base for oceanic and coastal marine research including sample collection and analyses capabilities. GERG’s analytical capacity includes two Dionex Accelerated Solvent Extractors (ASE). A multitude of gas chromatographic detectors are available including flame ionization, electron capture, mass spectrometers and a high resolution mass spectrometer. GERG’s organic analyses are provided by 6 gas chromatograph with mass spectrometer (GC-MS) detectors, 1 dual-channel gas chromatographs with two electron capture (GC-ECD) detectors, 2 gas chromatographs with micro-electron capture (GC-uECD) detector, 4 gas chromatographs with flame ionization detectors (GC-FID). GERG has a GC with a high resolution mass spectrometers (GC-HRMS) for the analysis of dioxin/furan and dioxin-like PCBs. For other trace organic analyses, GERG has 2 high performance liquid chromatographs (HPLC), 1 HPLC coupled to a mass spectrometer (HPLC-MS), and a LC-MS/MS. GERG has a six channel Astoria analyzer for nutrient analyses and 3 automated oxygen titrators. GERG can perform salinity analyses and 1 perchloric acid hood housed in an isolated controlled access area where samples are digested. The laboratory has a PerkinElmer cold vapor mercury atomic absorption spectroscopy (CVAAS) system.
Since 1995, GERG has designed,
deployed, operated, and maintained the Texas Automated Buoy System (TABS). The buoy operations have a dedicated facility of more than 5000 sq. ft. of air-conditioned space for buoy maintenance, construction, construction, and repair. The facility includes space for electronic, computer, and sensor maintenance and calibration. There is additional concreted apron space for buoy storage and servicing and a dedicated machine and welding shop.

Currently, TAMU owns and operates four Teledyne Webb Research (TWR) Slocum G2 Ocean Gliders and two autonomous surface vehicles. The gliders are rated for operations in depths of up to 200 m; one glider (S/N 199) rated to 1000 m is owned by TAMU-Galveston and is operated by GERG. All gliders are currently equipped with SeaBird CTD (designed for glider application), ECO-PUC fluorometer, and RINKO fast response dissolved oxygen sensor. GERG also has several buoyancy pumps to efficiently task G-2 gliders with shallow (fresh) or deep (salty) missions. We also own two autonomous surface vehicles: the Autonaut and the Wave Glider. The Autonaut, (MOST, Inc.; http://www.autonautusv.com), harvests energy from waves for propulsion, but it makes use of a combination of solar energy and methanol fuel cells for system power and is equipped with conductivity, temperature, and ADCP for measuring underway current profiles, a Wetlabs ECO FLNTU for measuring turbidity and chlorophyll. The Liquid Robotics (http://www.liquidr.com) surface SV3 Wave Glider is equipped with a flow through system for measuring waves, pH, CO2, water temperature, conductivity, CDOM, chlorophyll and turbidity. Like the Autonaut, the Wave Glider uses surface gravity waves for propulsion. Both surface vehicles also collect wind speed and direction, air temperature and barometric pressure. The air-conditioned 1250 square-foot dedicated glider facility for servicing, preparing and testing autonomous underwater vehicles is maintained by two full time glider pilot/technicians. The lab is equipped with a gantry system to help move gliders in and out of two salt water test tanks (900 and 2244 gallons) used for ballasting and testing the underwater gliders.

GERG/Oceanography are installing coastal ocean SeaSonde stations from the US-Mexico border to the Texas state border with Louisiana. The SeaSondes (manufactured by CODAR Systems) will provide real-time and continuous surface current mapping and wave monitoring with ranges of up to 200 km from the coast. The observations will supplement the in
situ observations of the TABS network and produce accurate two-dimensional maps with 0.5 to 3 km resolution within the system footprint.

TAMU is designing, constructing, and preparing to deploy autonomous ship-based systems to be placed on volunteer ships-of-opportunity (ferry-boxes). Typical ferry-boxes use a ship flow-through system and provide observations of temperature, salinity, and fluorescence along ship tracks. Advanced systems can be configured to provide water quality, biological information, current velocity, meteorological parameters, and chemical contaminants. All ferry-box systems telemeter data to a shore-based receiving station where data are processes and disseminated to interested parties. Furthermore, we purchased a flow-through system that is mounted on the R/V Manta, operated by the NOAA Marine Sanctuaries Program to serve the Flower Gardens Bank, and this array of instruments is beginning to yield observations along the Manta ship track to complement the suite of observing instrumentation.

5.1.3 R. Ken Williams ’45 Radiogenic Isotope Geosciences Laboratory
The College of Geosciences’ R. Ken Williams ’45 Radiogenic Isotope Geosciences Laboratory contains Class 100 and 1000 clean chemistry laboratories, a mass spectrometry lab and a sample preparation lab (2600 square feet). The clean laboratories are designed for low-blank (contamination free) chemical preparation of samples for U, Th, Pb, Sm-Nd, Re-Os and Sr isotopic analyses. The mass spectrometry lab houses a Thermo Scientific Triton thermal ionization mass spectrometer (TIMS) and a Thermo Scientific Element XR high-resolution, inductively-coupled plasma mass spectrometer (HR-ICP-MS) with a laser ablation system.

5.1.4 Stable Isotope Geosciences Facility
The College of Geosciences hosts the Stable Isotope Geosciences Facility which is supported in part by the Department of Oceanography. Located in the Eller O&M Building, SIGF currently consists of two instrument laboratories, two sample preparation laboratories, and a facilities manager’s
office. Current instrumentation within SIGF consists of two light stable isotope ratio mass spectrometers (IRMSs) and six peripherals with the capabilities of performing high precision H, C, N, and O analyses on carbonates, sediments, waters, and organic material. The present configuration includes a ThermoFinnigan MAT253 with a Kiel IV for carbonate mineral analyses, and a ThermoFinnigan Delta Plus XP with an EA, TCEA, and a Gas Bench II for analyses of bulk organic matter, water and carbonate samples. SIGF also has a Picarro L2130i Cavity Ring-Down Spectroscopy H₂O isotopes analyzer capable of high precision liquid and vapor analyses in both laboratory and field environments.

5.1.5 High Performance Research Computing

General supercomputing resources available at Texas A&M include the 1) ada, our IBM NeXtScale cluster that runs Linux on nodes with the Intel Xeon and Westmere processors. There are also 33 nodes with NVIDIA Tesla GPUs and 103 nodes with Intel PHIs. This is currently our main computational resource; 2) Eos, our IBM iDataplex cluster that runs Linux on nodes with the Intel Nehalem and Westmere processors. There are also 4 nodes with NVIDIA Tesla GPUs. The center also houses several Linux workstations for pre- and post-processing needs and a disk based storage archive for backing up files that are produced or used with the center’s resources. All the specific details about the High Performance Research Computing center can be found at http://sc.tamu.edu/systems/#ada.

5.1.6 Individual PI labs

Individual faculty have specialized facilities within the O&M Building and at GERG. Notable additions to the suite of laboratory capacity are the construction of two class 100 clean labs for Dr. Fitzsimmons and Dr. Sylvan (underway) and the renovations of the new organic geochemistry facility for incoming Assistant Professor Dr. Zhang.

5.2 Financial Resources

Department financial resources derive from state funds (Education and General, and Operations), external grants and contracts, and development funds. Figure 5-1 details the trends in these main sources of departmental funds between 2008-2015. It is important to note that our Education and General (essentially faculty and staff salaries) and our Operations budgets are determined by student enrollment. A combination of number of majors, number of graduates, number of student credit hours, and number of weighted student credit
hours determines the funding we receive from the University (through the College). The overall decrease in the Education and General funds directly reflects the contraction of our tenured/tenure track faculty numbers from 30 to 22 since 2008. In spite of the contraction of our tenured/tenure track faculty, both our external funding and our operations budget have increased indicating strengthening research and teaching contributions.

The Department also receives funds from the University to support graduate students, independent of the Operations budget. Figure 5-2 indicates the primary internal funding streams for graduate students. The Graduate Strategic Support line was created in 2012 by the Office of Graduate and Professional Students, to support strategic initiatives for recruiting and retention of excellent students. Graduate Student Teaching and Tuition support are allocated by the College based on enrollment in courses designated as “labs” that require Teaching Assistant support (the manner in which these funds changed significantly between 2010 and 2011). Graduate Scholarship and Fellowship funds reflect a combination of endowed funds and competitive University level awards.

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**Figure 5-1.** Primary internal (College Station) sources of funding to support graduate students.

**Figure 5-2.** Primary sources of departmental financial support 2008-2015.
6.1 Alignment of Department strategic goals with institutional goals

We seek to lead the nation in interdisciplinary ocean science education and research, and achieving this ambitious goal will directly support TAMU’s mission. As an Oceanography Department, we are inherently interdisciplinary, thus positioning us to help lead the university in its strategic pursuit to raze the academic “silos” and operate as an intensively and broadly interdisciplinary institution. Our recent innovations within the Department of Oceanography represent a unit-level vision of what the university seeks to become: a true incubator of organically innovative inter- and multi-disciplinary education and scholarship. During this ambitious final segment of the long term university strategic plan known as Vision 2020, TAMU seeks: to provide an outstanding educational experience for all students, to produce impactful new knowledge, innovations, and creative works, and to place the needs of the public good at the forefront of our mission. The Department’s goals to enhance the impact of our scholarship and to enhance the impact of our educational activities (in both depth and breadth) contribute directly and explicitly to the advancement of Texas A&M University, while at the same time serving the citizens of Texas through the dedicated observing network of the Gulf coast – the SmartGulf vision.

6.2 Research Personnel Contributions

It is absolutely critical to recognize the heroic contributions of the Research Personnel to the scholarly reputation of the Department. The Department
of Oceanography boasts an amazing team of early career Scientists who are emerging as leaders in their respective disciplines and taking advantage of opportunities to contribute to the interdisciplinary education mission. The GCOOS leadership team is another example of exceptional dedication to the Departmental mission, and we are privileged to host the GCOOS office here at TAMU. Furthermore, several GERG and IODP

Table 6-1. Ad-loc faculty external funding since 2008. Faculty indicated with an * have retired/deceased, and ^ have left the department. Note that only lead PI funding is listed here.

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<td>$5,022,618</td>
<td>$4,833,721</td>
<td>$3,924,091</td>
<td>$7,958,797</td>
<td>$8,644,187</td>
<td>$7,800,151</td>
<td>$3,061,983</td>
<td>$45,898,558</td>
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</table>
Research Scientists, currently affiliated with Oceanography as Adjunct Faculty, have contributed to the education mission of the department and college and their efforts are valued tremendously.

### 6.3. Faculty Profile and Contributions

#### 6.3.1 Research Funding and Publications

Table 6-1 lists the external funding record (all sources) for ad-loc faculty serving as PIIs from 2008 to 2015 (please note that many of the faculty contribute to these interdisciplinary collaborative efforts as co-PIIs). Only faculty with funding over that time period are included, and the table includes faculty no longer employed by the Department of Oceanography. A list of the individual grants is detailed in Appendix 3.

The department’s 2014 rankings in several federal funding metrics available through the University’s subscription to a commercial academic database, Academic Analytics (the 2015 data was not released in time to incorporate into this self study, and the commercial database always lags a year), are shown in Table 6-2 and Figure 6-1. While it is important to note that this database does not include many sources of funding important to our department’s total external funding portfolio, it is equally important to recognize that our peer and aspirant institutions are similarly disadvantaged in this metric (e.g., those programs successfully competing for federal funds are also successfully competing for non-federal funds). Regardless of the database tool, external funding is a targeted area of improvement in our current strategic planning implementation. Recent hires of exceptionally talented early career faculty, a renewed sense of interdisciplinary collaboration within the department and Ocean Science Alliance, the strategic investment in observational infrastructure, and an overall improvement in department culture will contribute to improvements in this metric. Our publication quantity and impact (with the recognition that citations are only one way to quantify impact)

<table>
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<th>Metric</th>
<th>National Rank</th>
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<tr>
<td>Total Number of Grants</td>
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<tr>
<td>Number of Faculty Members with a Grant</td>
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<tr>
<td>Total Grant Dollars</td>
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<td>Percentage of Faculty with a Grant</td>
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<tr>
<td>Grants per Faculty Member</td>
<td>20</td>
</tr>
<tr>
<td>Grant Dollars per Faculty Member</td>
<td>20</td>
</tr>
<tr>
<td>Articles per Author</td>
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</tr>
<tr>
<td>Number of Faculty with an Article</td>
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</tr>
<tr>
<td>Total Articles</td>
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<tr>
<td>Articles per Faculty Member</td>
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<td>Total Citations</td>
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<tr>
<td>Citations per publication</td>
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<tr>
<td>Total Awards</td>
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</tr>
<tr>
<td>Number of Faculty with an award</td>
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<tr>
<td>Awards per faculty member</td>
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<tr>
<td>Percentage of faculty with award</td>
<td>21</td>
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</table>

Table 6-2. National rankings of key faculty productivity metrics derived from Academic Analytics.
are also reflected in the 2014 rankings provided in Table 6-2. Appendix 4 details the publications by year of the ad-loc faculty in the Department of Oceanography since 2008. Again, our overall rankings are not commensurate with our vision of national leadership and our current emphasis is to translate the investment in state-of-the-art analytical capabilities into timely and impactful publications.

6.3.2 Graduate Mentoring and Support
One of the benefits available to graduate students in the Oceanography degree programs is the access to a
Table 6-3. List of students that have graduated from the department of Oceanography since Fall 2008

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Full Name</th>
<th>Semester/Year</th>
<th>Degree</th>
<th>Faculty Advisor</th>
<th>Degree Program</th>
<th>Job Placement</th>
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<td>Eisin, Amy Elizabeth</td>
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<td>Masters</td>
<td>Sager</td>
<td>Oceanography</td>
<td>In field</td>
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<td>Pinckney</td>
<td>Oceanography</td>
<td>In field</td>
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<td></td>
<td>Lee, Janie Anne</td>
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<td>Al Marzouqi, Mohammed S.</td>
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<td>Summer 2013</td>
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<td>Chang/Stossel</td>
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<td>Kim, Yong Sun</td>
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<td>Spencer, Laura Jean</td>
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<td>DiMarco</td>
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<td>Oceanography</td>
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<td>Zhang, Wenxia</td>
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<td>Doctoral</td>
<td>Hetland</td>
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<td>Bradley, Kelley</td>
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<td>Giese</td>
<td>Oceanography</td>
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<td>Hertzberg, Jennifer</td>
<td>Summer 2015</td>
<td>Doctoral</td>
<td>Schmidt</td>
<td>Oceanography</td>
<td>In field</td>
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<td>Alrushaid, Tariq</td>
<td>Summer 2015</td>
<td>Masters</td>
<td>Dellapenna</td>
<td>Oceanography</td>
<td>In field</td>
</tr>
<tr>
<td>Shepard, Alicia</td>
<td>Summer 2015</td>
<td>Doctoral</td>
<td>Quigg</td>
<td>Oceanography</td>
<td>In field</td>
</tr>
</tbody>
</table>
diverse array of mentoring expertise throughout the University, since our graduate students not only are mentored and supported by the ad-loc faculty, but also by the joint appointed faculty, graduate faculty members, and research personnel. Here we present data that reflect the mentoring contributions of all affiliated faculty from the list of all students who have graduated since 2008 depicted in Table 6-3.

6.3.3 Contributions to Undergraduate STEM Education and Science Literacy

**Core Curriculum – Introductory**

Table 6-4. Undergraduate enrollment in Oceanography (251) and Oceanography Lab (252) that fulfill general science credit.

<table>
<thead>
<tr>
<th>OCNG 251 enrollment</th>
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<tbody>
<tr>
<td>Academic year</td>
<td>Fall</td>
</tr>
<tr>
<td>2009-2010</td>
<td>761</td>
</tr>
<tr>
<td>2010-2011</td>
<td>816</td>
</tr>
<tr>
<td>2011-2012</td>
<td>912</td>
</tr>
<tr>
<td>2012-2013</td>
<td>793</td>
</tr>
<tr>
<td>2013-2014</td>
<td>839</td>
</tr>
<tr>
<td>2014-2015</td>
<td>879</td>
</tr>
<tr>
<td>2015-2016</td>
<td>1020</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>OCNG 252 enrollment</th>
<th></th>
</tr>
</thead>
<tbody>
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<td>Academic year</td>
<td>Fall</td>
</tr>
<tr>
<td>2009-2010</td>
<td>832</td>
</tr>
<tr>
<td>2010-2011</td>
<td>829</td>
</tr>
<tr>
<td>2011-2012</td>
<td>834</td>
</tr>
<tr>
<td>2012-2013</td>
<td>832</td>
</tr>
<tr>
<td>2013-2014</td>
<td>885</td>
</tr>
<tr>
<td>2014-2015</td>
<td>831</td>
</tr>
<tr>
<td>2015-2016</td>
<td>658</td>
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</table>

We embrace our opportunity and obligation to contribute to the science literacy of non-science majors and recognize that the growing need for a scientifically literate population combined with the increasing relevance of the ocean sciences positions us well to contribute significantly to the University mission through the education of the citizens of the State and Nation. To this end we have maintained our introductory courses in the inventory of TAMU Core Curriculum, and the Texas Higher Education Coordinating Board requires periodic assessment of the following learning outcomes in order to remain in the Core:

- **Critical Thinking Skills** – to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- **Communication Skills** – to include effective development, interpretation and expression of ideas through written, oral and visual communication.
- **Empirical and Quantitative Skills** – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
- **Teamwork** – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

Starting this summer (2016), we regularly will offer the introductory
lecture course online, and have received competitive funds from the university to develop and implement an online offering of the one-hour laboratory course.

The University Core Curriculum recently increased the number of required Life and Physical Science hours from 8 to 9, and removed the requirement for a lab course. This change is beginning to impact registration in our lab course (OCNG 252) – all of our graduate teaching assistantship funding in College Station is tied to enrollment in OCNG 252. Despite intensive advertising on campus to the other colleges, the number of students enrolled in OCNG 252 and thus the number of graduate students we are able to support from departmental funds is beginning to decline (Tables 6-4 and 6-5). We continue to innovate ways to communicate the benefits of taking ‘bundled one hour’ labs as an alternative to a 3-hour classroom course.

While teaching assistant positions available through College Station sources are declining, the number of

<table>
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<th>Academic year</th>
<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
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<tbody>
<tr>
<td>2009-2010</td>
<td>19</td>
<td>16</td>
<td>2</td>
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<tr>
<td>2010-2011</td>
<td>17</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>2011-2012</td>
<td>21</td>
<td>17</td>
<td>2</td>
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<td>2012-2013</td>
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<td>15</td>
<td>2</td>
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<td>2013-2014</td>
<td>15</td>
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<td>2014-2015</td>
<td>16</td>
<td>15</td>
<td>2</td>
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<tr>
<td>2015-2016</td>
<td>13</td>
<td>9</td>
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</table>

Figure 6-1. Support for Oceanography graduate students from TAMUG MARS and MARB departmental teaching assistantship positions.
Oceanography graduate students that receive teaching assistantships through TAMUG sources has increased. Figure 6-1 shows the number of Oceanography students (mentored by faculty in the TAMUG departments of Marine Sciences and Marine Biology) supported through TAMUG assistantships since 2010.

Contributions to the College-hosted Environmental Programs Majors
Oceanography faculty teach courses critical to the Environmental Geosciences and Environmental Studies bachelors programs, through both OCNG listed courses but also through teaching sections of critical GEOS courses such as the cornerstone (GEOS 105), capstone (GEOS 405), electives (GEOS 401, 410), and most importantly through research experiences (OCNG 491) that support the College’s high impact educational opportunities (Tables 6-6, 6-7 and 6-8).

6.3.4 High Impact Educational Experiences
Oceanography faculty contribute to

Table 6-6. Critical, essential, and desirable Oceanography course offerings for ENGS and ENST. Dark cells indicate course was taught or planned to be taught.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>2013C</th>
<th>2014A</th>
<th>2014C</th>
<th>2015A</th>
<th>2015C</th>
<th>ENGS</th>
<th>ENST</th>
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<td>401</td>
<td>Interdisciplinary Coastal, Water</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>410</td>
<td>Intro to Phys Oceanog Climate, Coastal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>Intro Biological Oceanog Bio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>425</td>
<td>Microbial Oceanog Coastal, Bio Req</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>430</td>
<td>Intro Geological Oceanog Coastal</td>
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<td></td>
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<tr>
<td>440</td>
<td>Intro to Chemical Oceanog Coastal</td>
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<tr>
<td>350</td>
<td>Marine Pollution Oceanog Coastal, human,</td>
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<td></td>
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</tr>
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</table>

Curricular Need

Table 6-7. Student credit hour production 2005-2014 for the Environmental Program degrees by Department. OCNG faculty contribute by teaching both OCNG and GEOS courses.

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<th>ENGS</th>
<th>ENST</th>
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<tbody>
<tr>
<td>SCH</td>
<td>% CLGE</td>
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<tr>
<td>ATMO</td>
<td>1,001</td>
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<tr>
<td>GEOG</td>
<td>5,442</td>
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<tr>
<td>GEOL</td>
<td>1,612</td>
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<td>GEOP</td>
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<td>GEOS</td>
<td>2,831</td>
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<td>OCNG</td>
<td>1,584</td>
</tr>
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<td>CLGE</td>
<td>12,404</td>
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</table>
Table 6.8. Number of undergraduate research and directed studies credit hours offered by faculty from the College Units. OCNG faculty support a significant proportion of student research in the Environmental programs.

Table 6.9. Oceanography faculty contributions to High Impact educational experiences from 2009-2015 based on individuals enrolled in the courses indicated (not by SCH). The * indicates only those students who registered for OCNG 491 and does not account for students performing research as paid or voluntary assistants (students now register for 0 hours so that we can account for their activities).

<table>
<thead>
<tr>
<th>Undergraduate Courses</th>
<th>Study Abroad</th>
<th>Capstone</th>
<th>Writing Intensive</th>
<th>Field-based work</th>
<th>Research</th>
<th>Learning Community</th>
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<tbody>
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<td>First Year Seminar</td>
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<tr>
<td>Introductory Oceanography</td>
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<td>Introductory Oceanography Lab</td>
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<tr>
<td>Physical Oceanography</td>
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<td>66</td>
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<tr>
<td>Biological Oceanography</td>
<td>18</td>
<td>100</td>
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<td></td>
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<tr>
<td>Chemical Oceanography</td>
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<td></td>
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<tr>
<td>Directed Studies</td>
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<tr>
<td>Undergraduate Research</td>
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<td>Environmental Programs capstone</td>
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<table>
<thead>
<tr>
<th>Graduate Courses</th>
<th>Study Abroad</th>
<th>Capstone</th>
<th>Writing Intensive</th>
<th>Field-based work</th>
<th>Research</th>
<th>Learning Community</th>
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<tr>
<td>Oceanography Cruise course</td>
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<td>13</td>
<td></td>
<td></td>
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<tr>
<td>Biological Oceanography</td>
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<td>1037</td>
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</table>
As detailed later in section 8.4, our faculty consistently provide opportunities for our students to gain meaningful interdisciplinary seagoing experience on cruises (directly related to their own research or in support of others’ projects). These opportunities have relied primarily on major funded initiatives, with PI’s inviting students to fill berths as able. However, our faculty and students have been resourceful and opportunistic in taking advantage of unique opportunities as well. One outcome of our strategic planning and curricular discussions detailed below is to institutionalize regular interdisciplinary training cruises (one per semester) to ensure that all of our students have the opportunity to acquire experience in collecting shipboard data and assessing the quality and meaning of the data.

6.3.5 Contributions to International Efforts

Oceanography is an interdisciplinary and global science, and each one of our team members engages in considerable international research and education initiatives. As a department, we have focused on three specific coordinated international partnerships.

- A dual-degree PhD program and emerging joint research center with the Ocean University of China (Qingdao, PRC). Coordinated by Ping Chang, numerous Oceanography faculty members have participated in this initiative since 2008 by mentoring students through the dual degree program, participating in the annual delegation to Qingdao to interview OUC applicants, and collaborating on a PI-level with faculty members at the OUC.
- A research and education partnership with the Ecuadorian Instituto Oceanográfico de la Armada (INOCAR) providing generous ship time and access to the Galapagos for graduate and undergraduate students. This effort has provided dozens of TAMU students with the opportunity to participate in interdisciplinary research and education cruises in the Galapagos region. This summer Drs. Slowey and Biggs will each lead a group of undergraduates to the Galapagos as part of the College of Geosciences high impact learning initiative.
- A new research and educational partnership with the University of Haifa (Israel) nucleating around the design, construction and deployment of moorings in the Eastern Mediterranean and a dual degree PhD program currently under development.

6.3.6 Contributions to Broadening Participation and Engagement

Our researchers and faculty are devoted to the mission of broadening participation in the ocean sciences through outreach and informal educational opportunities. This engagement spans the spectrum from leading activities in local schools and scout troops, to serving as mentors to early career scientists outside of TAMU, to serving as media contacts for local and national news outlets.
Two recent and coordinated efforts merit particular attention—our new on-air contribution to the local NPR station (KAMU), “On the Ocean,” and the new NSF-funded REU program. McKenzie Daughtry, a Biology graduate student working with Dr. Lisa Campbell conceived the vision of a weekly, topical (with shelf life) segment highlighting the research contributions of TAMU Oceanography. This vision is now a weekly reality made possible through Ms. Daughtry’s efforts (and voice talent!) and the contributions of our faculty to the weekly content. Drs. Campbell and Knap also led a successful and innovative proposal effort to create the first observation-based oceanographic REU program. One of the requirements of NSF is that the REU focus heavily on successfully recruiting applicants from underrepresented groups in the discipline. 18 members of the Oceanography Department are participating in the program as potential mentors and module instructors.
Chapter 7. Academic Programs and Curricula

7.1 Programs Offered
All degree programs offered through the Department of Oceanography are listed in Table 7-1.

Table 7-1. All degree programs currently offered through the Department of Oceanography.

<table>
<thead>
<tr>
<th>Degree/Certificate</th>
<th>Required Research</th>
<th>Student's Home Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor of Philosophy in Oceanography</td>
<td>Dissertation</td>
<td>Department of Oceanography</td>
</tr>
<tr>
<td>Master of Science in Oceanography</td>
<td>Thesis and non-Thesis options</td>
<td>Department of Oceanography via Interdisciplinary Program in College of Geosciences</td>
</tr>
<tr>
<td>Doctor of Philosophy in Marine Biology</td>
<td>Dissertation</td>
<td>Department of Oceanography via Interdisciplinary Program involving Departments of Biology, Oceanography, and Wildlife and Fisheries at Texas A&amp;M University, Department of Marine Science at Texas A&amp;M University - Galveston Campus, and Department of Life Sciences at Texas A&amp;M University at Corpus Christi</td>
</tr>
<tr>
<td>Master of Science in Marine Biology</td>
<td>Thesis and non-Thesis options</td>
<td>Department of Oceanography via Interdisciplinary Program in College of Geosciences</td>
</tr>
<tr>
<td>Master of Geoscience</td>
<td>Capstone project</td>
<td>Department of Oceanography via Interdisciplinary Program in College of Geosciences</td>
</tr>
<tr>
<td>Master of Ocean Science and Technology</td>
<td>none</td>
<td>Department of Oceanography professional non-thesis degree</td>
</tr>
<tr>
<td>Undergraduate Minor in Oceanography</td>
<td>research and non-research options</td>
<td>Department of Oceanography</td>
</tr>
<tr>
<td>Ocean Observing Systems Certificate</td>
<td>none</td>
<td>Department of Oceanography</td>
</tr>
</tbody>
</table>

The Department has produced 434 Ph.D. and 564 Master's graduates from its inception through December 2015 (65 and 60, respectively, since 2007). Since 2007, 57 Undergraduate students have graduated with a minor
We currently offer a dual degree PhD degree with the Ocean University of China and are developing a dual degree PhD program with the Charney School of Marine Science at the University of Haifa. To date, 13 students have graduated through the dual degree program with OUC, and six dual degree students currently are enrolled.

### 7.2 Curricula

The Department offers both MS and PhD degrees that require a research

**Table 7-2. Degree Requirements for a graduate degree with a research based thesis or dissertation from the department of Oceanography**

<table>
<thead>
<tr>
<th>Master of Science in Oceanography (M.S.)</th>
<th>Doctor of Philosophy in Oceanography (Ph.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>OCNG 603 (3cr) – Comm. Ocn Sci</td>
<td>OCNG 603 (3cr) – Comm. Ocn Sci</td>
</tr>
<tr>
<td>OCNG 608 (3cr) – Physical Oceanog.</td>
<td>OCNG 608 (3cr) – Physical Oceanog.</td>
</tr>
<tr>
<td>OCNG 620 (3cr) - Biological Oceanog.</td>
<td>OCNG 620 (3cr) - Biological Oceanog.</td>
</tr>
<tr>
<td>OCNG 630 (3cr) - Geological Oceanog.</td>
<td>OCNG 630 (3cr) - Geological Oceanog.</td>
</tr>
<tr>
<td>OCNG 640 (3cr) - Chemical Oceanog.</td>
<td>OCNG 640 (3cr) - Chemical Oceanog.</td>
</tr>
<tr>
<td>2 semesters of seminar OCNG 681 (1cr ea)</td>
<td>2 semesters of seminar OCNG 681 (1cr ea)</td>
</tr>
<tr>
<td>Courses required by advisor or committee</td>
<td>Courses required by advisor or committee</td>
</tr>
<tr>
<td>600-level Elective courses</td>
<td>600-level Elective courses</td>
</tr>
<tr>
<td>OCNG 691 Research (8cr minimum)</td>
<td>OCNG 691 Research</td>
</tr>
<tr>
<td>Proposal</td>
<td>Qualifying Exam (without MS)</td>
</tr>
<tr>
<td>Defense</td>
<td>Proposal</td>
</tr>
<tr>
<td>Thesis</td>
<td>Preliminary Exam</td>
</tr>
<tr>
<td></td>
<td>Defense</td>
</tr>
<tr>
<td></td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

**Total minimum required credits = 32**

**Total required credits = 96 (without M.S.)**

64 (with M.S.)

Prepares for possible careers in academics, environmental consulting, governmental agencies, industry (e.g., oil and gas, scientific equipment, etc.), policy advising, and other areas.
based thesis or dissertation. All students seeking these degrees are required to complete in satisfactory fashion core courses in biological, chemical, geological, and physical oceanography, as well as a course in communicating ocean science; they must also participate in oceanography seminar and research. The full list of courses offered by the Oceanography Department can be found in Appendix 5. For the PhD degree, students are required to earn a minimum of either 96 credit hours if starting from BS level, or 64 credit hours if starting from MS level. The specific requirements for each degree are listed in Table 7-2.

The Department recently received approval for a new professional, non-thesis masters degree, officially called the Master of Ocean Science and Technology (MOST) to distinguish it from the existing thesis-based Master of Science degree (Table 7-3). The purpose of the new degree is to immerse students in the collection, assessment, and interpretation of ocean observing data to meet the needs of an emerging new blue economy workforce that requires data fluency.

The Department serves as academic home for two other graduate degree programs. First, faculty in the Department may mentor students admitted into the Marine Biology Interdisciplinary Program (MARB IDP). This is an interdisciplinary academic program that spans the three campuses of Texas A&M University, the Texas A&M University - Galveston Campus, and Texas A&M University at Corpus Christi. Students in this program are required to complete a research-based dissertation. Since this interdisciplinary program began in 2007, no students have earned degrees

Table 7-3. Degree requirements for the new professional non-research thesis based graduate degree.

<table>
<thead>
<tr>
<th>Master of Ocean Science and Technology (MOST)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requirements</strong></td>
</tr>
<tr>
<td>OCNG 603 (3cr) – Comm. Ocn Sci.</td>
</tr>
<tr>
<td>OCNG 604 (3cr) – Ocean Observing</td>
</tr>
<tr>
<td>OCNG 608 (3cr) – Physical Oceanography</td>
</tr>
<tr>
<td>OCNG 657 (3cr) – Data Methods and Graphical Representation in Oceanography</td>
</tr>
<tr>
<td>2 of the following:</td>
</tr>
<tr>
<td>OCNG 620 (3cr) - Biological Oceanography</td>
</tr>
<tr>
<td>OCNG 630 (3cr) - Geological Oceanography</td>
</tr>
<tr>
<td>OCNG 640 (3cr) - Chemical Oceanography</td>
</tr>
<tr>
<td>5 OCNG 600 level elective courses</td>
</tr>
<tr>
<td>OCNG 661 – Advanced Oceanographic Data Analysis and Communication (3cr)</td>
</tr>
<tr>
<td><strong>Total minimum required credits = 36</strong></td>
</tr>
<tr>
<td>Prepares for careers in ocean observing, marine technology, data analysis, and other areas</td>
</tr>
</tbody>
</table>
an opportunity to earn a graduate degree that provides a broad overview of ocean and environmental science. It is well suited for K-12 teachers, members of the military, or other people who already have careers and to continue their education.

The Department of Oceanography has created a new sequence of 3+2 BS-Masters degrees within the College of Geosciences, with current pairings between the Environmental Geosciences BS and the MOST degree, the Geology BS and BA with the MOST degree, and the Meteorology BS with the MOST degree. These fast track programs offer motivated and exceptional students an efficient way to achieve their geoscience career goals, by completing the Bachelor of Science degree in the Environmental Geosciences program, the Meteorology program, or the Geology program, and the Oceanography MOST degree in five years. These degree pairings require a total of 150 hours of coursework. The concurrent degree program will enable students to coordinate the required BS coursework (120 hours) and MOST coursework (36 credit hours including six dual credit graduate courses) to complete the required credit hours for each degree within five years, without diminishing scope or quality of work. We are currently working to broaden the array of pairings to include the new Geographic Information Science and Technology degree (hosted by the Department of Geography), the Civil Engineering BS, and the Ocean Engineering BS.

The Department offers an Undergraduate Minor Degree in
oceanography that requires a total of 15 hours of study with at least six hours in upper division courses. Students may elect to complete all 15 hours as classroom coursework, however we strongly encourage all of our majors to incorporate research and/or a research thesis into the degree program (up to 6 hours of research may contribute to the required 15 credit hours). There are 14 undergraduate courses available in the classroom (Table 7-4) as well as course credits for individual pursuits of special topics, directed studies, and research with a member of the Department’s faculty.

In 2005 we implemented a certificate-granting program in Ocean Observing Systems as a concentration option through any Oceanography or other degree program at TAMU to train students in ocean data collection, data management, and production and distribution of products and services. Students in this program interact with other departments both within and outside the College. Students benefit from the range of training and facilities available at TAMU including in situ ocean observations, remote sensing technologies, data analysis techniques and display, geographic information systems, modeling, and an existing ocean observing system – the Texas Automated Buoy System (TABS). To date, 2 students have graduated with the Ocean Observing Systems Certificate.

The Department of Marine Sciences (TAMUG) and the Department of Oceanography are working toward a partnership in which the Marine Sciences BS degree will be offered to

<table>
<thead>
<tr>
<th>Available Undergraduate Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCNG 251 - Oceanography</td>
</tr>
<tr>
<td>OCNG 252 – Oceanography Lab</td>
</tr>
<tr>
<td>OCNG 281 – Seminar in Communication Oceanography (new in Fall 2016) (W)</td>
</tr>
<tr>
<td>OCNG 401 – Interdisciplinary Oceanography</td>
</tr>
<tr>
<td>OCNG 404 – Ocean Observing Systems</td>
</tr>
<tr>
<td>OCNG 410 – Physical Oceanography (W)</td>
</tr>
<tr>
<td>OCNG 420 – Biological (W)</td>
</tr>
<tr>
<td>OCNG 425 – Microbial Oceanography</td>
</tr>
<tr>
<td>OCNG 430 - Geological</td>
</tr>
<tr>
<td>OCNG 440 – Chemical (was W)</td>
</tr>
<tr>
<td>OCNG 451 – Mathematical Modeling of Ocean Climate</td>
</tr>
<tr>
<td>OCNG 456 - MatLab Programming for Ocean Science (new this year)</td>
</tr>
<tr>
<td>OCNG 469 - Python for Geoscientists (new last year)</td>
</tr>
<tr>
<td>OCNG 481 - (seminar – new this year) (W)</td>
</tr>
</tbody>
</table>
students in College Station through the Department of Oceanography.

7.3 Admissions Criteria for the PhD program

Applicants to the PhD program are evaluated through transcripts, the GRE examination, and letters of recommendation. A solid background in calculus, physics, and chemistry is required. Only students with identified faculty advisors are admitted; however the Recruiting and Admissions Committee has final discretion to determine the admissibility of an applicant, regardless of whether full financial support is offered by the prospective advisor.

7.4 Assessment of

Table 7-5. PhD learning outcomes, measures and findings for the past three assessment cycles.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO 1: Communicate Understanding of the Principles of Oceanography (integrating evaluation of observational and analytical data) Changed to Master the Principles of Oceanography beginning in 2013-2014 assessment cycle</td>
<td>M1: Preliminary and Qualifying Exams</td>
<td>Each exam includes oral presentations and written questions providing opportunity to improve both forms of communication, and the opportunity for direct assessment with rubrics already in place (all students passed in first attempt, 80% of students score &gt;60%).</td>
<td>Each exam includes oral presentations and written questions providing opportunity to improve both forms of communication, and the opportunity for direct assessment with rubrics already in place. All students passed in first and only attempt, with 90% of students scoring &gt;60% (passing is 70%).</td>
<td>Assessed in Annual progress report: &gt;50% of PhD students acquire meaningful skills and experience at sea in the field prior to defense. Some have multiple cruise/field experiences. Exit Interview eliminated.</td>
</tr>
<tr>
<td></td>
<td>M2: Cruise/field experience</td>
<td>Assessed in Annual progress report: &gt;50% of PhD students acquire meaningful skills and experience at sea in the field prior to defense.</td>
<td></td>
<td>This exam has undergone a revision since the last assessment cycle. The exam is now more rigorous and is written only. Rubrics are in place. All students passed in first and only attempt, with 50% scoring &gt;75% (passing is 70%).</td>
</tr>
<tr>
<td></td>
<td>M3: Exit interview that includes interdisciplinary questions</td>
<td>Require an exit interview prior to final examination (80% of students score &gt;80%)</td>
<td>Exit Interview eliminated.</td>
<td>Assessed in Annual progress report: 50% of PhD students acquire meaningful skills and experience at sea in the field prior to defense. Exit Interview was eliminated in previous assessment cycle.</td>
</tr>
<tr>
<td>SLO 2: Communicate Research</td>
<td>M4: Conference Presentation</td>
<td>Documented in Annual Progress Report (100%)</td>
<td>Documented in Annual Progress Report: 100%</td>
<td>Documented in Annual Progress Report: 100%</td>
</tr>
</tbody>
</table>
Table 7-6. MS learning outcomes, measures and findings for the past three assessment cycles.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO 1: Communicate Understanding of the Principles of Oceanography (Integrating evaluation of observational and analytical data) Changed to Master the Principles of Oceanography beginning in 2013-2014 assessment cycle</td>
<td>M1: Core Course performance</td>
<td>The final core course grades (in percentage points) collected through the Annual Progress Report (80% of students score &gt;80%)</td>
<td>The final core course grades (in percentage points) collected through the Annual Progress Report 100% of students scored &gt;80%</td>
<td>The final core course grades (in percentage points) collected through the Annual Progress Report 90% of students scored &gt;80%</td>
<td>A uniform field experience is needed. A mandatory training cruise needs to be integrated with a class on typical analytical techniques to provide more uniform and workforce relevant skills.</td>
</tr>
<tr>
<td></td>
<td>M2: Cruise/Field experience</td>
<td>Assessed in Annual Progress Report 100% of graduating MS students acquired meaningful skills and experience at sea/in the field prior to defense</td>
<td>Assessed in Annual Progress Report 100% of graduating MS students acquired meaningful skills and experience at sea/in the field prior to defense</td>
<td>Assessed in Annual Progress Report 75% of graduating MS students acquired meaningful skills and experience at sea/in the field prior to defense</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M3: Exit Interview that includes interdisciplinary questions</td>
<td>Require an exit interview prior to final examination (80% of students score &gt;80%)</td>
<td>Exit Interview eliminated</td>
<td>Exit Interview eliminated in previous assessment cycle</td>
<td></td>
</tr>
</tbody>
</table>
the past three assessment cycles for the Oceanography PhD program are detailed in Table 7-5 and those for the MS program in Table 7-6.

**Analysis of the MS and PhD Program Assessment data**

2012-2013: We eliminated the Exit Interview, as we collect similar information from the final examinations. We piloted a year-long weekly seminar for first-year graduate students (“Graduate Learning Community”) to improve communication skills, mentoring ability, leadership ability, and graduation rates with the vision of providing all students with a common baseline of mentoring. This was a valuable experience and one that should be institutionalized. Another vision that emerged from this assessment cycle was the desire to revise curricula for core courses. As part of the new strategic plan, we are reviewing and revising as needed the content and scope of the four core classes to improve students’ understanding of the basic, interdisciplinary principles of oceanography.

2013-2014: Based on the findings that: 1) only 40% of graduating PhD students scored above 80% on the dissertation ‘effective written communication rubric’ (target is >90%), 2) 80% of graduating PhD students scored better than 80% of the ‘effective verbal communication’ rubric (target is >90%), and 3) 70% of PhD students published a peer-reviewed paper as first author prior to graduation (target 80% as reported in their annual reports), we are implementing a formal 3 hour course, ‘Communicating Ocean Science,’ that is now a core requirement of all of our graduate programs.

A key critical issue identified during Department strategic planning was the need to enhance the quality and impact of our curricula. These efforts will create a dynamic modern curriculum that reflects the needs of our students and society. Our new organization is based around four interdisciplinary research themes: Ocean Observing Science and Technology, Marine Ecosystems Science and Health, Ocean Climate, and Ocean Energy. This interdisciplinary approach will facilitate the learning of key skills by our PhD students, including integrative learning, critical thinking, and enhanced communication skills. However, it is still crucial for our students to have command of a discipline in order to function as a member of an interdisciplinary team.
Thus the four ‘traditional’ core courses remain a fundamental basis of our graduate curricula.

Based on the finding that only 50% of graduate students passed the qualification exam with a score > 80% (target is 90%), we revised the qualifying examination for students with a bachelors’ degree who wish to bypass the MS degree and more onto a PhD. The qualifying examination was revised to ensure that it 1) is consistent for all students and from year to year, 2) emphasizes degree program learning objectives, 3) provides useful data for assessment, 4) challenges students to use critical thinking and communication skills, and 5) integrates into the new Department organization.

2014-2015: A criticism of the 2013-2014 Assessment was a lack of a rubric or calibration scale for the Final Examination Assessment tool, which is used by the student’s graduate committee to assess their learning and skills after their defense exam. This rubric will be used to collect more accurate and calibrated data on our students’ progress. As a result of this process, targets may have to be revised for measures related to this assessment tool for the next assessment cycle.

This assessment cycle, two of the targets associated with measures derived from the Final Examination Assessment were partially met. This may have been a calibration issue based on the qualitative rubric, but it is also an issue of bias introduced by small sample size. To overcome the bias of small sample sizes, we will explore new assessment tools that will work for students at any stage of their career. In addition, we are developing an action plan to increase student’s reporting of their achievements via the Graduate Student Annual Evaluation.

### 7.6 Degree Program Enhancements

As discussed above, we have made several curricular changes in direct response to our assessment data collection as well as in response to our strategic planning efforts. These include implementation of the new Communicating Ocean Science core course requirement, an attempt to implement a Graduate Learning Community for our first year graduate students (an effort that we must reinstate and institutionalize for our students in Galveston and College Station), and most recently the goal of offering an interdisciplinary training cruise each semester to provide our students with the opportunity to engage in meaningful at-sea training on a repeat transect data collection cruise in the Gulf of Mexico. The basic idea is to bookend each students training with an interdisciplinary cruise, and we currently are working to identify funding and an appropriate vessel to undertake these cruises.
Chapter 8. Student Profile and Contributions

8.1 Enrollment

Overall graduate student enrollment in Oceanography peaked in 2010/2011 and now is lower than in 2008, largely due to declining PhD enrollment (Figures 8-1, 8-2, and 8-3). One positive short-term indicator is the increase in total enrollment since the 2013/2014 academic year, which does coincide with the initiation of our dedicated and active national recruiting efforts. However, the increase in enrollment is not impressive. This trend in graduate enrollment is similar to other programs such as the University of Delaware School of Marine Science and Policy, which has experienced near constant enrollment at ~90 students from 2009 to 2014. However other programs, such as the University of North Carolina Department of Marine Sciences, have experienced steady growth in their graduate program since 2010 (increasing from 27 to 43). We typically do not admit students without support and only rarely have any of our thesis-degree seeking students lost funding during the course of her/his enrollment, thus our enrollment is inherently tied to graduate funding streams. Another dimension to consider is that well-funded PIs are only able to mentor a finite number of graduate students. The overall decrease in the number of ad-loc faculty may explain part of the trend, however this must be tempered with the fact that the overall mentoring capacity has been buttressed by an increase in the number of joint and graduate faculty appointments.
Figure 8-1. Student enrollment and total degrees conferred (green line) since 2008.

Figure 8-2. Enrollment of PhD students since 2008.
8.2 Diversity

The Department of Oceanography faces the same challenge in accessing the STEM talent of under-represented groups as most of our peer and aspirant institutions, based on discussions at the 2014 Ocean Sciences Educators' Retreat (convened by the Consortium for Ocean Leadership, http://oceanleadership.org/wp-content/uploads/Ocean-Sciences-Educators-Retreat-Executive-Summary-2014.pdf). The diversity of the students enrolled in the PhD and MS programs has improved slightly since 2008 (Figures 8-4 and 8-5), however this profile is not even close to reflecting State and National demographics. Over the past three years, female enrollment in the PhD program has declined relative to male enrollment, while female enrollment exceeds male enrollment in the MS program.
Figure 8-4. Self-reported diversity data for PhD Students based on Fall semester data since 2008. Non-minority students are defined as white, international and asian.

Figure 8-5. Self-reported diversity data for MS Students based on Fall semester data since 2008. Non-minority students are defined as white, international and asian.
8.3 Retention and Graduation Rates

Table 8-1 and Figures 8-6 through 8-9 detail the data related to retention and graduation rate. PhD student retention for statistically significant years varies from 60-92%, while that for MS students varies considerably more (from 50-100%). One reason for the difference is that MS cohorts potentially lose students to the PhD program once they pass the qualifying examination (if they choose to bypass) and the accounting system does not accurately capture this process.

Average graduation rates for PhD students remain significantly above 6 years and this needs to be improved. MS graduation rates have fluctuated significantly since 2008 and we need to take steps to maintain the average.

Table 8-1. Enrollment data for PhD and MS Students from 2004. Student enrollment and full-time student are based on number of students pursuing a degree objective.
Figure 8-6. Retention of students enrolled as PhD students and the number of graduates from each cohort (e.g., of the 13 students in the 2008-2009 cohort, 12 have graduated).

Figure 8-7. Graduation rates for students in the Oceanography PhD program since 2008.
Figure 8-8. Retention of students enrolled as MS students and the number of graduates from each cohort (e.g., of the 7 students in the 2008-2009 cohort, 6 have graduated).

Figure 8-9. Graduation rates for students in the Oceanography MS program since 2008.
consistently below 3 years.

### 8.4 Graduate Student Contributions to the Research and Education Missions - Professional Development and Job Placement

Seagoing experience and access to state of the art technology are central to the professional development of our graduate students. Since 2010, at least 50% of our graduate students sail on at least one cruise per year. Every student who has sought the opportunity to sail has been able to gain some seagoing experience, with the recognition that many choose not to sail.

With a renewed emphasis on essential skills that translate throughout the job market, we seek to provide our graduates the opportunity to not only gain employment, but to lead within their chosen career path. The ability to communicate with scientists and non-scientists alike is absolutely critical to this vision, and to that end we are innovating new ways to provide meaningful professional development for our graduate students. One innovation we’ve implemented is to offer our senior level PhD students the opportunity to teach independently a section of our Introductory Oceanography course. This opportunity is available to students who hold a MS degree or who have successfully passed the Preliminary Examination if they chose to bypass the MS. Since 2013, six PhD students (as well as three early career Research Scientists) have taken advantage of this opportunity, and have performed very well as instructors. The benefit of the energetic and pedagogically mature Graduate Assistant Lecturers contributing their talent to our educational mission, while also gaining the experience of instruction in a moderate to large classroom setting is clearly mutual and is gaining in popularity among our students.

Graduate students are critical to our research mission, and student led publications and conference presentations demonstrate a level of intellectual independence and maturity that employers in all aspects of the workforce desire (Table 8-2). Since

<table>
<thead>
<tr>
<th>Year</th>
<th>Publications</th>
<th>Conference</th>
<th>Cruise</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/2011</td>
<td>17</td>
<td>37</td>
<td>70</td>
</tr>
<tr>
<td>2011/2012</td>
<td>21</td>
<td>50</td>
<td>55</td>
</tr>
<tr>
<td>2012/2013</td>
<td>30</td>
<td>54</td>
<td>57</td>
</tr>
<tr>
<td>2013/2014</td>
<td>12</td>
<td>44</td>
<td>60</td>
</tr>
<tr>
<td>2014/2015</td>
<td></td>
<td></td>
<td>53</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Graduates</th>
<th>Jobs within the Field</th>
<th>Percent Retention in Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008/2009</td>
<td>10</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>2009/2010</td>
<td>8</td>
<td>7</td>
<td>88</td>
</tr>
<tr>
<td>2010/2011</td>
<td>18</td>
<td>16</td>
<td>89</td>
</tr>
<tr>
<td>2011/2012</td>
<td>19</td>
<td>17</td>
<td>89</td>
</tr>
<tr>
<td>2012/2013</td>
<td>24</td>
<td>20</td>
<td>83</td>
</tr>
<tr>
<td>2013/2014</td>
<td>18</td>
<td>15</td>
<td>83</td>
</tr>
<tr>
<td>2014/2015</td>
<td>14</td>
<td>11</td>
<td>79</td>
</tr>
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the 2010/2011 academic year, at least 10% of our students have been lead author on a peer-reviewed publication each year, and over 35% have been lead author on a conference presentation each academic year.

Since 2008, our graduates have been successful gaining employment within the Marine and Geosciences workforce, in jobs spanning academia, industry, and government agencies (Table 8-3).
Chapter 9. Concluding Observations

We have made numerous and significant improvements within the Department since our last Academic Program Review. These improvements, combined with innovations in our educational programs and research strategies, are helping us contribute to the overall strategic mission of the University. However we clearly have more work to do to achieve our strategic vision. Recruiting and retention of exceptional students, particularly from underrepresented groups is critical, and it is clear that our only chance of achieving our strategic goal of doubling enrollment lies in broadening and deepening our contributions to undergraduate education. We are extremely grateful for the efforts of the External Review Team and very much look forward to the candid guidance in the forthcoming report.
Appendix 1: May 2014 Strategic Plan

*Please note that this is the original approved Strategic Plan from May 2014 and we have annotated some updates in brackets below. However some of the elements have not been implemented or updated (or may not be implemented as our strategy evolves). The intent is to revisit this plan once we have had the chance to assimilate the ERT’s suggestions.

**VISION**
To join the nation’s top rank of institutions for oceanographic research and education at public universities by uniting the critical mass of energetic and talented ocean scientists and educators at Sea Grant, GERG, IODP, TAMU Galveston, and TAMU College Station.

**MISSION STATEMENT**
To advance discovery and understanding of the ocean sciences, technology and resources. To prepare the next generation of ocean scientists and citizens in general for the challenges facing a growing human population with limited resources.

**VALUES**
The department embraces the role of a public university in improving the lives of Texans and fosters a culture of scholarly excellence, diversity, and a nurturing workplace environment.

**SWOT Analysis**
  - **Strengths**
    - The alliance of Ocean Sciences centers at SeaGrant, GERG, IODP, TAMU - Galveston, and TAMU – College Station represents a truly unique concentration of interdisciplinary research and education capacity. This alliance positions us to fully implement and realize the SmartGulf initiative.
    - The Department excels in interdisciplinary research in Ocean Observing and Technology (OOST), Marine Ecosystems Science and Health (MESH), Ocean Climate (OC), and Ocean Energy (OE), and collaborations between Oceanography and the other academic units within the College of Geosciences (Atmospheric Sciences, Geography, and Geology & Geophysics) provide outstanding opportunities to enhance our strengths.
    - The Department’s graduate instruction program exemplifies education through research, incorporating high-impact experiences (such as sea-going activities) and highly diverse coursework and training options.
    - The Department commands a significant research presence in the global oceans ranging from the tropical oceans and Gulf of Mexico, to the Arctic and Southern Oceans.
    - Connections with Industry provide sources of funding, data, and a demand for our graduates in many fields.
  - **Weaknesses**
    - The Department does not contribute sufficiently to the education mission of a public land-grant university, and the graduate enrollment has been declining for the past several years.
    - The alliance of Ocean Sciences at TAMUG-TAMU, and, more broadly, the state of Texas, lacks a
regional class research vessel for education, training and research endeavors.
- The ability of the Department to recruit and retain world-class faculty has declined, and the Department currently only has one Assistant Professor. [Please note, two years into the Strategic Plan, we now have three Assistant Professors, with a fourth to join us in May 2016.]
- The Department has not embraced distance education technology to improve communications and education with other campuses. [The University adoption of Blackboard Collaborate has helped us tremendously and more courses are more seamlessly taught from College Station to Galveston]
- The composition of the Faculty does not reflect the composition of the graduate or undergraduate student populations. This is an issue facing all oceanographic institutions and is not unique to TAMU Oceanography.
- Recent loss of faculty has impaired the Department’s capacity to meet the education needs of our undergraduate and graduate students, as well as to conduct cutting-edge interdisciplinary research (and several more faculty are projected to retire in the next 5 years).

External Opportunities
- The demand for a workforce trained in offshore science and technology sector is growing, as is the demand from onshore industries seeking interdisciplinary skillsets. Such a demand is creating industry-academic partnerships for which we are ideally suited and could promote stronger ties to Ocean Engineering.
- The growing need for a scientifically literate population combined with the increasing relevance of the ocean sciences positions us well to contribute significantly to the University mission through the education of the citizens of the State and Nation.
- Future federal funding opportunities that emphasize “big data” (e.g., informatics), international interdisciplinary research, and Gulf of Mexico research initiatives (e.g., GoMRI, NAS) are a significant opportunity for the Department.
- International programs and collaborations with Ecuador, Brazil, China, and Mexico (among others) provide significant opportunities for interdisciplinary education, research, and funding. Engaging more in these opportunities would naturally strengthen the international reputation of the Department.
- Expansion of high performance computing facilities at TAMU will enable us to enhance our incorporation of numerical modeling and data-intensive time series analysis in Departmental education and research endeavors.
- The recent IPCC report identifies the ocean as a dominant component of global climate and global climate change. Stronger ties with Atmospheric Sciences, with the Texas Center for Climate Studies, and with major national and international research centers working on ocean climate change (e.g., NCAR, GFDL, MPI, IPSL) will enhance the Department’s existing expertise and reputation in this area of research (OC).

External Threats
- Changes in the University Core Curriculum could significantly impact our student credit hours resulting in diminished funding from the University to the College and Department. A reduction in the number of students taking the lab course would reduce the number of TA positions ultimately limiting our ability to support graduate students.
- Other marine science institutions face the same threats and are competing for the same resources and for preeminent status.
- Federal funding is not increasing and proposal success rates are declining. These issues will impact our ability to conduct high-impact interdisciplinary research and our ability to support graduate students.
The lack of underrepresented minority engagement in the ocean sciences perpetuates the lack of diversity among ocean science educators and professionals.

**Critical Issues**

**Research**

*Challenge: Elevate the scholarly reputation of the department*

*Why is this issue strategic?*

The Department's reputation, both quantitative and qualitative, is the most significant aspect of recruiting and retention of world-class students, staff, and faculty. What is the first impression imparted by the mention of TAMU Oceanography? Has-been, up-and-coming, outstanding? Our ability to achieve a critical mass of faculty in each strategic theme is intricately tied to our scholarly reputation – excellence breeds excellence.

*What are the consequences of failure?*

We will never achieve our vision. Faculty will not achieve promotions. Graduate students will not make a successful transition into the workforce.

**Education**

*Challenge: Enhance the quality and impact of our curricula*

*Why is this issue strategic?*

In order to recruit more students to our undergraduate and graduate programs, and to meet the demands of an evolving workforce, our curricula must continuously adapt to incorporate cutting-edge research and improving educational technology and pedagogy.

*What are the consequences of failure?*

Our operating resources are directly tied to our impact on the University's education mission. Failure to attract more students and provide them with the knowledge and skills needed to succeed in the workforce would result in loss of operating funds and faculty lines, precluding our ability to perform research and compete for external funding. This ultimately controls our ability to elevate the scholarly reputation of the department.

**Human Capital**

*Challenge: Recruit, diversify and retain faculty and staff*

*Why is this issue strategic?*

In order to achieve excellence, and to achieve our mission to advance discovery and prepare the next generation of ocean science leaders through education and research, we must recruit and retain diverse and talented staff and faculty. The composition of our staff and faculty directly impacts our ability to recruit talented students. The diversity of the state and student body of Texas is highly diverse and the composition of the Department needs to better reflect this in order to attract more students into Oceanography.

*What are the consequences of failure?*

We will not maintain a critical mass of talented faculty in each strategic theme or achieve our mission to advance discovery and prepare the next generation of ocean science leaders through education and research if we fail to recruit, diversify and retain faculty and staff. Without a talented faculty, we cannot attain the education mission or elevate the scholarly reputation of the department through research.

**Goals**

- Elevate the scholarly reputation of the department.
- Double the enrollment in Oceanography and Ocean Sciences degree programs in the next five years.
• Enhance the impact of our service course offerings in both quality and in the number of non-geoscience Aggies that we educate.

**Action Plans**

**Elevate the scholarly reputation of the department** – We are actively restructuring the department into the four interdisciplinary research themes, and over the next 6 months, 1-2 years and 3-5 years we will focus resources in three of these four areas of interdisciplinary research strength: Ocean Observing Science and Technology (OOST), Marine Ecosystems Science and Health (MESH), and Ocean Climate (OC). The Department has a critical mass of faculty and research staff in these three areas, and we are poised to transform our reputation by increasing the scholarly impact of our publications and increasing the number and value of proposals submitted in these three areas. While we are committed to rebuilding in the fourth interdisciplinary theme, Ocean Energy, we recognize that we cannot accomplish strategic growth and enhanced scholarly impact in all four themes during this strategic planning cycle. This will become a priority once we have accomplished our goals for OOST, MESH and OC.

Enhancing the scholarly reputation of the department is crucial to addressing the critical issue to recruit, diversify and retain faculty and staff. Excellence perpetuates excellence, and we are striving to create a culture of trust, teamwork and excellence in which collaboration occurs organically.

**6-month actions**

• We are investing the remaining $287,000 from the sale of the R/V Gyre to enhance the Department’s Ocean Observing instrument capabilities. The remaining funds will be divided equally among: 1) Glider enhancements to expand the depth and density range of operation; 2) non-standard (interdisciplinary) instrument systems for moored applications such as dissolved oxygen, alkalinity, pCO$_2$, and fluorometry; and 3) a flow-through instrumentation system that includes a thermostalinograph, Imaging FlowCytobot, fluorometer, tranmissometer, and Picarro analyzer to mount on the R/V Manta to exploit repeat transits between Galveston and the Flower Gardens NMS. [We have procured, installed, and using all but the mooring enhancements – these await buoy recovery and installation]

• Increase the citation impact and number of our publications by broadening the implications of our work and submitting our scientific findings to high profile journals.

**1-2 year actions**

• Implement the SmartGulf initiative in collaboration with GERG and ATMO. Hire a Presidential Professor with the Chancellor’s Research Initiative funding awarded to the College. [We have hired Dr. Gerardo Gold-Bouchot, and the coastal radars and ferry box instruments are funded through this initiative].

• Hire 3 new assistant professors to fill key, top-priority needs in the OOST, MESH, and OC themes (this includes at least one of the advertised IODP hires that meets our strategic needs). A scientist who specializes in biogeochemical modeling is crucial for the OOST, MESH, and OC groups to compete for large, interdisciplinary proposal efforts. An equally high-priority need is a molecular ecologist. Such a specialist would fill an interdisciplinary niche in both OOST and MESH. [We have hired three new Assistant Professors that fill top-priority interdisciplinary needs, and just hired a Visiting Assistant Professor joining us in August 2016 to contribute to OOST education and research. The biogeochemical modeler remains a top priority.]

• Retain the GCOOS Regional Association office at TAMU.

• Increase the citation impact of our publications by writing more papers, broadening the implications of our work and submitting our scientific findings to high profile journals.

• Improve the communication of our societal impact through better engagement with Texas SeaGrant and our College Communications staff– the work we do impacts government agency policies, decision-making, and ultimately legislation. Impacting policy in parallel with scholarship adds significant value to the interdisciplinary research in OCNG and we will actively engage in “in-reach” as well as outreach activities to communicate the societal value of our scholarship. Another measure of the scholarly and societal impact...
of our work is through citation in major international assessment reports such as the IPCC. [We created the new local NPR weekly contribution “On the Ocean” as part of this effort.]

- Increase the number of high profile, interdisciplinary proposal efforts and the value of the proposals submitted. This is one opportunity to strengthen ties to ATMO, TCCS, and other colleges/units. However, high-risk/high-reward efforts should be part a balanced portfolio of research activities to ensure a stable baseline of research expenditures while striving for overall growth.
- Increase the number of faculty serving as academic editors for journals.

3-5 year actions

- Successfully nominate 3 faculty members for Society fellowships through a focused and dedicated effort by the Department Head and Advisory Committee. At present we have one faculty member under consideration for AGU and AMS Fellowship, and in order to position additional faculty for society fellowship consideration, we must pursue supporting awards (awards beget awards). This not only includes our senior faculty, but our junior faculty as well (e.g., AGU Macelwane Medal, young investigator awards, etc).
- Increase the number of faculty serving on national and international planning groups and committees.
- Increase the number of faculty contributing to major interdisciplinary and international assessment reports (e.g., the IPCC).

Double the enrollment in Oceanography and Ocean Sciences degree programs in the next five years - We outline actions on a 6-month, 1-2 year, and 3-5 year timeline to produce world-class degree programs that attract traditional thesis and non-thesis professional students to our graduate programs through intensive evaluation of our program learning outcomes.

6-month actions

- We will complete the paperwork for the new non-thesis M.S. in Ocean Sciences and Technology that will serve professional students as well as TAMU students admitted to the new 3+2 concurrent B.S./M.S. programs. Currently we have 3+2 degrees pairing the ENGS B.S. and GEOL B.S. (in development) with the OCNG M.S. in Ocean Sciences and Technology. We will also work with Geography and Atmospheric Sciences to develop programs pairing the GIST B.S. program with the OCNG M.S. in Ocean Sciences and Technology (emphasis in the Ocean Observing Science and Technology theme), as well as the METR B.S. with the OCNG M.S. in Ocean Sciences and Technology. [We have to route the paperwork for the GIST pairing but the others launched]
- Branding and advertising the approved and pending 3+2 and non-thesis MS programs will involve a significant web presence through coordination with the Communications Director’s office, as well as other social media and traditional advertising within the college and at major recruiting, orientation and outreach functions.
- We will develop an active, sustained and highly visible recruiting program in partnership with the new Director of Recruiting as well as Associate Dean Riggs. We propose to use a portion of the Graduate Strategic Funds to develop recruiting materials and participate in key recruiting venues such as SACNAS, NSTA, GSA, AGU, OS/ASLO.
- We will work with the College to ensure that the Academic Advising capacity in the Department is able to keep pace with the new degree offerings and projected enrollment increases. This will involve streamlining the responsibilities of the Academic Advisor, to ensure that the Advisor is not burdened with business- and accounting-oriented tasks that detract from the position duties. The College will need to standardize this among the academic units to ensure that all units handle this streamlining in a consistent manner.
1-2 year actions

- We seek to expand our 3+2 offerings to include potential partnerships with MARS, MARB, and other TAMU STEM majors. This will require cross-college collaboration to overcome Enrollment Incentives concerns.
- Undergraduate curriculum development focused on the four interdisciplinary themes will help attract more minors to the OCNG programs and potentially provide more applicants to the 3+2 programs.
- We have initiated a discussion of graduate curriculum revision, beginning with a highly successful retreat on March 21 that brought together representatives from each member of the TAMU Ocean Sciences Alliance (GERG, IODP, MARB, MARS, OCNG). The significant developments from the retreat center on revisions to our traditional core curriculum. In the coming months we will explore the potential of requiring a different set of core courses that emphasizes the skills and competencies required of oceanography graduates in the 21st century workforce in addition to baseline content knowledge (background in programming, data methods, communication skills for a range of audiences, and baseline oceanographic knowledge). One potential path would be to require incoming graduate students to take a two-semester interdisciplinary survey of oceanography rather than immerse them immediately into the four traditional core courses. Students with appropriate background could waive this requirement and move on to higher-level courses. The four core courses would remain, but could be taught at a more sophisticated level and would still remain highly popular within the College and with civil engineering students. [We have tabled these ideas for the time being to accommodate other educational innovations] We are also exploring a 3-hour communication course for first year graduate students that would encompass all aspects of oral and written communication [this is now a new requirement in all of our graduate programs], as well as a core course in data analysis and methods that includes some component of programming (Matlab, python, and data visualization tools). We envision implementing a set of core curriculum revisions for the Fall 2015 semester concurrent with the advent of the new non-thesis M.S. degree.
- We will initiate discussions of how to enhance our impact through distance and online courses that would serve our students physically based in Galveston as well the professional non-thesis M.S. program (to reach professionals in Houston, for example).

3-5 year actions

- We will collaborate in complete partnership with the MARA, MARB and MARS units at TAMUG to consider joint or dual undergraduate degree programs that would increase enrollment on both campuses. Together, the two campuses offer a truly unique concentration of educational opportunities that cannot be matched by any other public university in the country – the “urban coast” of Galveston with its tremendous waterfront resources paired with the “Aggie experience” positions TAMU to be the top undergraduate ocean sciences education program in the U.S.
- Complete our efforts to develop a fully online degree program in Ocean Observing Science and Technology.
- Pursue permanent funds (e.g., endowment or permanent budget item) to provide all graduate students with the opportunity to go to sea. This is envisioned as a highly desirable elective rather than a requirement for all students.
- Pursue permanent funds (e.g., endowment or permanent budget item) to provide faculty the ability to mentor undergraduate research projects through OCNG 491. These funds are envisioned to cover analytical/field work costs and could be awarded on a competitive basis.

Enhance the impact of our service course offerings in both quality and in the number of non-geoscience Aggies that we educate - Over the next 6 months, 1-2 years and 3-5 years we will take steps to contribute to the College’s vision of making the Geosciences the most relevant discipline of the 21st century through our introductory lecture
and lab course offerings as well as the new OCNG 600 oceanography for educators course. To do so we must embrace cutting-edge classroom technology and pedagogical practices, with learning outcomes that prepare the nonscientist to make informed decisions regarding climate change, sustainable coasts and ocean health.

6-month actions [all in progress or accomplished]

- We have hired our first Instructional Assistant Professor dedicated to overhauling the Introductory Oceanography laboratory class and enhancing the quality of the lecture course.
- Build on faculty efforts to coordinate and share “best practices” among the instructors teaching OCNG 251, potentially contributing to discipline based education research in the ocean sciences.
- OCNG faculty and the Academic Advisor will actively engage the advisors in Liberal Arts and Business to advertise our core course offerings.
- We will use enthusiastic and exceptionally capable Graduate Assistant Lecturers (GALs) (instead of outside lecturers) to teach introductory lecture sections as needed. GALs, with proper mentoring and support, should have a better connection to undergraduate students than those outside of the academic department and will strengthen our overall reputation as an education-forward department.
- We will initiate discussions of how to hybridize OCNG 251 to enable us to increase the number of sections within the constraints of available classrooms.
- Make more efficient use of available GANT resources to develop and implement impactful demonstrations for lecture course meetings. Removing the burden of development/preparation/demobilization from individual instructors will enhance the likelihood that high impact demos would be incorporated into the day-to-day structure of a course.
- Provide guidance to instructors to make more efficient and impactful use of clickers for student teamwork and as a daily “assessment” tool.
- Revise OCNG 252 laboratory exercises more on current hot-topics in oceanography and more relevant to Texas citizens
- Transition the lab manual to eCampus at no cost to the student – this directly addresses the most common complaint on student evaluations (the high cost lab manual).
- Ensure that many lab exercises employ common everyday equipment. With our goal to broaden the participation of Education majors in our courses, we need to identify exercises that are simple and safe enough for future teachers to translate them to K-12 classrooms.

1-2 year actions

- The Department will provide resources to faculty to facilitate participation in education enhancement workshop such as those offered by On the Cutting Edge. The Department Head will actively circulate announcements and encourage/reward participation.
- We will foster and reward a culture that embraces the education of non-science majors in a truly impactful manner. To this end we will provide the necessary support all faculty to reinforce the broad societal relevance of the ocean sciences and geosciences.
- Explore and implement an online version of the Oceanography for Educators course to serve the distance education students enrolled in Science Education programs. [this is the only action not currently being pursued]
- Explore and implement hybrid and online versions of OCNG 251.

3-5 year actions

- Explore and pilot potential college-wide interdisciplinary introductory geoscience offerings. Enrollment incentives are based at the college-level, thus it would be strategic of the units within the college to pool resources to create highly attractive and impactful core-course offerings.
Appendix 2: Faculty Curriculum Vitae

JACK G. BALDAUF, Ph.D.
Executive Associate Dean and Associate Dean for Research College of Geosciences; Professor, Department of Oceanography, Texas A&M University

Address: 202 O&M Building, 3146 TAMU, College Station, TX, USA 77843-3115
Phone: 979-845-3651
Email: jbaldauf@tamu.edu

Education:

Appointments:
Professor – Oceanography, Texas A&M University (2000-present); Associate Professor, Oceanography, (1993-2000) and Assistant Professor in Oceanography, Texas A&M University (1987-1993).

Enhancement of the College of Geosciences Research Enterprise and Impact (selected activities that are in progress)

GERG Reinvestment: ~$4.7 M investment to stabilize and rejuvenate the marine technology capacity of the college. Achieved: successful recruitment of a Director, retention of staff, and advancement of observing capacity.

SmartGulf CRI: ~$4.4 M investment to establish a leadership position for TAMU in ocean observing. Achieved: placed TAMU as a recognized international player in ocean observing/modeling in the Gulf of Mexico and low latitudes; successful recruitment of a presidential hire to improve collaborations with universities in Mexico.

GEOSAT: $2M investment to establish a Board of Regents approved center for geographical information sciences. Achieved: development of cross campus synergy and research collaborations and external partnerships associated with geoinformatics.

High Performance Computing: $2M investment to enhance the College’s computational capacity and ability to manipulate and integrate large data sets. Achieved: provided the ability to improve modeling capacity; developed a framework for a HPC computational geosciences certificate.

Microprobe: $2M investment and partnership with the College of Engineering to integrate the new microprobe into the shared Material Characterization Facility. Achieved: maximized cost effectiveness and multi-college instrumentation use.

Food-Water-Energy Nexus: $573K seed funding from Chancellor for concept development. As a team member contributed to the development of the initial multi-college proposal to explore interconnectivity between water, energy, and food. Achieved: created an initial concept for proposal development focused on the San Antonio
Texas Water Observatory: Initiated the concept that evolved through the Environmental Grand Challenge workshop to establish a system integration approach for understanding water quality and availability in Texas. Achieved: initial multi-college partnership to establish real-time observatories, data integration, and integration of ground, surface, and climate models to improve decision making and policy (proposals for funding being developed).

Western Gulf Institute NOAA Cooperative Institute: Initial efforts toward building a blue water and atmospheric observing network partnership with NOAA for refinement of oceanic, atmospheric, ecosystem and coastal sustainability modeling. Achieved: established a solid relationship with the federal agency; continued to build the national/international reputation of TAMU in ocean observing and modeling; and will provide leverage for partnerships with Mexico. (Numerous meetings with NOAA and state representatives have been completed; proposal team being formed).

Gulf of Mexico Research Center – CINVESTA/CONACYT – TAMU Partnership: Establishing framework for a blue water and atmospheric observing network partnership similar to that with NOAA. Achieved: working to provide a holistic approach to scientific research and resource management for the Gulf of Mexico. (Should be discussed during upcoming CONACYT visit).

NASA WB57/G3 remote sensing program: Contributing to the exploratory conceptual design for a potential partnership with NASA as part of the GEOSAT center. Achieved: Continue to work on laying the foundation for numerous opportunities for collaboration. (Awaiting feedback from NASA).

Gdansk University of Technology et al., possible EU Center – TAMU as International partnership: Exploring with Gdansk University the possibility of proposing research centers in geoinformatics and/or unconventional energy. Achieved: potential to strengthen the TAMU presence in Europe. Provides collaborative synergistic activities with multiple college units (meetings scheduled for Sept).

Services (current/previous select):

TAMU International Planning Committee (member); Oversight committee for the Microscopy and Imaging Center (member); Materials Characterization Facility oversight committee (member); University Research Council (member); University Research Council working group on interdisciplinary research (Chair); TAMU Council of Principle Investigators (member/Chair).

Teaching Activities:

Introduction to Oceanography (OCN 251); Applied Micropaleontology (Geol. 689); Deep sea sediments (OCN 689); Biotic response to climate change (Geol 681); Marine diatoms (OCN 689); Paleoceanography (OCN 689); Scientific ocean drilling (OCN 689), Special problems (OCN 689).

Research Activities (recently completed):

Lyle, M. Baldauf, J., and Olivarez-Lyle, A. Neogene productivity and biogenic sedimentation in the equatorial Pacific ($353,000- ended December 2014).

Note: from 1996-2008 responsibilities included management of the Science Services and Technical and Analytical Services Departments of the International Integrated Ocean Drilling Program and Ocean Drilling Program. This included personnel management, budget planning and resource management; management of the scientific and technological deliverables including vessel schedule, expedition planning and implementation, logistics, scientific QA/QC, analytical systems including data acquisition, data quality and upload to the database, and engineering development. The annual budget approximated $8 million depending on specific scientific and technological requirements.

Ocean Drilling Program Liaison to various international Joint Oceanographic Institutes for Deep Earth

Publications (selected):

> 50 scientific articles and >100 abstracts or non-refereed articles published.

Jan Backman¹, Jack G. Baldauf², Marina Ciummelli³ and Isabella Raffi⁴. Accepted for publication 2015. Data report: a revised biomagnetostratigraphic age model for Site U1338, IODP Expedition 320/321. For publication in IODP expedition 320/321.


DOUGLAS C. BIGGS, Ph.D.
Professor of Oceanography, Texas A&M University

Education
Ph.D., 1976, Joint Program in Oceanography, M.I.T.-Woods Hole Oceanographic Institution
B.A., 1972, magna cum laude with Dept Honors in Biology, Franklin & Marshall College

Professional Experience
Professor, Department of Oceanography, Texas A&M University, College Station TX, 1996 to date, and scientific advisor to US Marine Mammal Commission, 2011-2015.
Postdoctoral Research Associate, Marine Sciences Research Center, State University of New York at Stony Brook, 1976-1977. Post-doc sponsor: C.F. Wurster (retired)

Research Collaborators Outside TAMU Since 2000
Rebeca Gasca (Ecosur Mexico), Jonathan Gordon (Univ St Andrews UK), Chuanmin Hu (Univ South Florida), Robert Leben (Univ Colorado), Bruce Mate (Oregon State Univ), Frank Muller-Karger (Univ South Florida), Keith Mullin (NOAA-NMFS), Aaron Thode (Univ California), Peter Tyack (Woods Hole Oceanographic Institution), John Walsh (Univ South Florida)

Externally Funded Research Projects Since 2000
Since 2000, I’ve collaborated in five oceanographic research programs in the Gulf of Mexico: NASA, NEGOM, DGOMB, SWAMP, and SWSS. My research focus in these programs that were externally funded by MMS, NASA, and NOAA was on bridging physical with biological oceanography. In addition, I received funding from the US Marine Mammal Commission for “Building Partnerships for Long-Term Ecological Monitoring of Marine Mammals in the Galapagos Islands and in other Marine Reserves in Ecuador”. This was a cooperative project with the Instituto Oceanografico de la Armada del Ecuador (INOCAR); my $34,969 award included 1.5 months of my research time/effort for six months 1 Sept 2009 – 28 Feb 2010, plus support for travel to Washington DC and to several domestic and international meetings.

NASA: I was co-PI for “Impact of Large River Plumes on Carbon and Salt Fluxes in the surface ocean” (RF 455731), which awarded to me in collaboration with the University of South Florida. Funding period was May 2001 – April 2004. Total subcontract funding to me from USF was $63,826; Biggs grad student supported was Will Fletcher.

NEGOM: I was one of many co-PIs for the “NorthEast Gulf of Mexico Hydrography and Chemical Oceanography” contract (RF 438691), funded by MMS. Funding period was Sept 1997 – Aug 2001. Funding for the subaccount on which I had budgetary authority (438691-01001) was $112,521; Biggs grad student supported was Rebecca Scott.

DGOMB: I was one of many co-PIs for “Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology” contract (TEES 32525-5913), funded by MMS. Funding period was Aug 1999 – Aug 2003. Funding for the two subaccounts on which I had budgetary authority (5913F and 5913Z) was $19,055 and $45,145, respectively. Biggs grad student supported was Laurie Sindlinger.

SWAMP: I was PI for the oceanographic habitat characterization part of “Sperm Whale Acoustic Monitoring Program” (RF 452851), funded by NOAA. Funding period was Jun 2001 – Aug 2002. Funding for me was $68,892; Biggs grad student supported was Laurie Sindlinger.
**SWSS:** From 2002-2007, I served as TAMU lead scientist (Project Scientist) for “Sperm Whale Seismic Studies” (RF 455731), a five-year cooperative research program funded by the U.S. Minerals Management Service (MMS) in partnership with the Office of Naval Research (ONR), the National Science Foundation (NSF), and an Industry Research Funders Coalition (IRFC) of the major oil and gas companies that support geophysical surveys for oil and gas in the Gulf. The five-year omnibus funding for SWSS was $9,301,380; the five-year funding for TAMU-Oceanography (Biggs & Jochens) was $3,512,226. PIs from other institutions partnered with TAMU to determine the potential impact of geophysical exploration on sperm whales in the northern Gulf of Mexico. I was lead PI for ship and satellite characterization of the oceanographic habitat of the whales. Biggs grad students supported were Amanda Kaltenberg, Alyson Azzara, and Julia O’Hern.

**Refereed Publications (last 5 years; asterisk denotes author was one of Biggs’ graduate students)**


**Graduate Students Whom Biggs Has Chaired (last 5 years)**

**Julia E. O’Hern** (MS 2007; PhD 2012) did post-doc in Oceanography at A&M also worked at Flower Gardens Marine Reserve as marine tech on Manta & as master of Fling

**Kerri J. Smith** (MS 2012) worked 2012 for East Coast Observers and worked other contractor jobs 2013-2015 (I think KJS entered PhD program, Fall 2015)

**Stephanie M. Durkacz** (MS 2014) worked 2015 as contractor for TDI Brooks and is currently RA in a lab in BIOL at A&M

**M.L. Johnston Sculley** (MS 2011) worked 2011-2012 as MMO for RPS Group then entered PhD program at U Miami, Fall 2012 (PhD expected from U Miami, 2016)

**Roxanne Duncan** (MS 2012) worked 2012-2013 for SE Fishery Science Center (NOAA Nat’l Marine Fisheries Service, Miami, FL) then entered MARES-EU PhD program in Belgium, Fall 2013

**Lindsay M. Martin** (entered Fall 2014) is working toward MS (graduation expected Spring 2016) and is applying for PhD program (WHOI or SIO), Fall 2016
DAVID A. BROOKS, Ph.D
Professor of Oceanography, Texas A&M University

Education:
1975  Ph.D.  Physical Oceanography, University of Miami, Florida
1971  M.S.  Ocean Engineering (Acoustics), University of Miami, Florida
1965  B.S.  Electrical Engineering, University of Maine, Orono

Academic/Professional Appointments
1987-  Professor of Oceanography, Texas A&M University
1997-2002  Executive Associate Dean and Associate Dean for Research, College of Geosciences, Texas A&M University
1994- 1997  Department Head of Oceanography, Texas A&M University
1988- 2013  Adjunct Scientist, Bigelow Laboratory for Ocean Sciences
1983 -1987  Associate Professor of Oceanography, Texas A&M University
1978 -1983  Assistant Professor of Oceanography, Texas A&M University
1979 -1980  Adjunct Assistant Professor, North Carolina State University, Raleigh
1975 -1978  Research Associate and Graduate Faculty Member, North Carolina State University, Raleigh
1969 -1975  Research and Teaching Assistant, University of Miami, Florida
1965 -1969  Systems Engineer, General Electric Company

Teaching
Graduate
   Dynamics of Oceans and Atmospheres (OCNG 615)
   Geophysical Fluid Dynamics (OCNG 614)
   Ocean Waves and Tides (OCNG 612)
   Analysis of Oceanographic Time Series (OCNG 689)
   Introduction to Physical Oceanography (OCNG 608)
   Oceanography for Science Teachers (OCNG 600)

Undergraduate
   Introduction to Physical Oceanography (OCNG 410)
   Environmental Geoscience (GEOS 405)
   Introduction to Oceanography (OCNG 401)
   Oceanography (OCNG 251 and OCNG 251 honors)
   Introduction to Ocean Studies (OCNG 205)
   First-Year Seminar (UGST 181)
   Geosciences First-Year Seminar (GEOS 101)

Research Interests and Experience
   Observations and models of shelf, coastal and marginal seas
   Western boundary currents
   Tides and tidal power schemes
   Ocean observing systems

Appendix 2-80
Ecosystem dynamics and sustainability

**Professional Societies:**
- The Oceanography Society (Founding Life Member)
- American Geophysical Union

**Research (Title, funding source, active dates, PI or co-PI unless otherwise noted)**
- Scallop fertilization in a tidal estuary – model studies of particle transport and residence times (unfunded)
- Dynamics of a tidal environment: The lower Kennebec River estuary in Maine (unfunded)
- Ecosystem modeling in a trabecular coastal environment (NOAA continuation; 2006-7)
- Regional circulation models for Antigua and St. Croix (2006)
- Penobscot Bay coastal front drifter study (Northeast Consortium, 2004-05)
- Impact of transport processes on lobster fishery (NOAA, 2002-05)
- Ocean health observing system (TAMU Life Sciences Program of Excellence, 2002-04)
- Circulation modeling in Penobscot Bay, Maine (NOAA/Island Institute, 1999-01)
- Simulation of Larval Transport from the Texas coastal ocean to a bay (Texas Sea Grant, 1997-01).
- A study of currents over the inner Texas-Louisiana shelf (MMS/LSU, 1996-99).
- A Circulation Model for the Kara Sea in the Arctic Ocean (ONR/UW, 1994-96).
- Louisiana-Texas Shelf Circulation Study (participating scientist) (MMS, 1991-94).
- Simulation of the Summer Circulation in the Gulf of Maine (NSF, 1992-95).
- Circulation in the Gulf of Maine (NSF, 1984-91).
- Upwelling and Mixing in the Gulf of Maine (NSF, 1982-84).
- Dispersion of Loop Current eddies in the western Gulf of Mexico (MMS, 1985-87).
- Development and Testing of a telemetry system for oceanographic use (NSF, 1984-85).
- Investigation of low-frequency currents in the Gulf of Mexico (Conoco/Amoco, 1983-84).
- Analysis of observations from the western Gulf of Mexico (NSF, 1983-84).
- Current and Hydrographic observations in the western Gulf of Mexico (NSF, 1980-82).
- Long wave coupling of the Middle and South Atlantic Bights (NSF, 1978-79).
- A theoretical study of topographic Rossby waves in the Gulf Stream (ONR, 1977-78).
- Project MIMI: Acoustic Propagation in the Straits of Florida (graduate student) (ONR, 1969-71)

**Other Professional Activities**

**Department of Oceanography**
- Executive Committee (2009-11; 2013)
- Tenure and Promotion Advisory Committee, Chair (2009-11; 2013)
- Curriculum Committee (2012 - )
- Research Advisory Committee (2007-8)
- Graduate Recruiting and Academic Advisory Committee, Chair (2003-4)
- Department Head (1994-97).
- Section Head for Physical Oceanography, (1987-94).
Graduate Student Advisor, Physical Oceanography (1980).

College and University

College Assessment Committee (2010-11)
College Tenure and Promotion Advisory Committee (2008-10, 2012-13)
College Chairs and Professorships Committee (2009-10)
University Graduate Appeals Committee (2007-10)
Dean's Search Committee for Oceanography Department Head (2007).
Executive Associate Dean and Associate Dean for Research (1998-2002)
Dean’s Search Committee for Meteorology Department Head, Chair (1995).
Dean's Search Committee for Oceanography Department Head (1986-87).
Texas A&M University Committee on Diversity in Education (1995-96).
Texas A&M University Tenure Advisory Committee (1988-91), Chair (1990-91).
Provost’s Advisory Committee for Geosciences Dean Search (1990-91).
Texas A&M University Science and Journalism Award Committee (1988-89).
Board of Directors, Memorial Student Center Opera and Performing Arts Society (1994-97).
Covey Leadership Series, 29 Aug - 13 Nov (1994).
Texas A&M University Academic Administrators' Development Program (1993).
Geosciences Committee for Academic Issues, Galveston merger (1990-91).
Geosciences College Committee on Tenure and Promotion (1987-90).

External

Science planning, policy and leadership:
Antigua/St. Croix All-Hands planning meeting, St. Croix, June, 2007
Faculty Development Leave, Bigelow Laboratory for Ocean Sciences, Fall Semester 2006.
IOCARIIBE/GOOS planning meeting, University of the Virgin Islands, St. Thomas, February, 2004
Arctic Research Consortium of the United States, TAMU Representative (2000-04).
Southeastern Universities Research Association, TAMU Representative (2000-02).
Board of Governors (TAMU Alternate), Consortium for Ocean Research and Education (1995-96).
Regional Association for Research on the Gulf of Maine, Steering Ctte (1996-97), Member (1993-98)
Southeast Consortium for Oceanographic Research, Steering Committee (1996-97).
Earth and Atmospheric Sciences Panel, National Research Council (1996).
Coastal Physical Oceanography Science Steering Committee (1989-90).
Appendix 2-83

Review and Advisory:
Internal Review Team, Sea Grant Program, University of Maine, Spring (2001)
Review Committee for Ocean Sciences at the University of New Hampshire, Fall (2000)
Review Team for Curriculum in Marine Sciences, Univ. of North Carolina, Chair (1997).
ONR Ocean Engineering Board of Visitors, invited member (1990-91).
Experimental Program to Stimulate Competitive Research (NSF), (1982-83).
Advisory Panel on Physical Oceanography, National Science Foundation (1982-83).

Editorial:
Founding Editor and Publisher, Oceanography Magazine, (1987-91).

Service and Education:
Committee on Radio Frequencies, National Academy of Sciences (1997-99).
Chair, Session on Marginal and Semi-Enclosed Seas, IUGG/IAPSO XXI, Honolulu (1995).
Co-Chairman, AGU Technical Committee on Ocean Data Telemetry (1987-89).
Committee on History in Geophysics, American Geophysical Union (1984-86).
Program Chairman, Ocean Sciences, AGU Spring Meeting, Baltimore (1986).

Publications (since 2008)

Refereed Articles


Brown, C.A., G.A. Jackson, and D.A. Brooks, 2000: Particle transport through a narrow tidal inlet due to tidal
Published Abstracts and Seminars


Modeling the tides and their impacts in the lower Kennebec River. Invited seminar, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine, August, 2012.

Book Reviews, Magazine Articles, Essays, Manuscripts
(single author unless otherwise noted)

The Cutler Code. Maritime adventure (manuscript in elongated progress). 2010-12: Maximum summer tidal range, Boothbay Harbor, Maine. At: boothbay.tamu.edu

2008: The "strange tide" in Boothbay Harbor, October 28, 2008. BHYC newsletter, Fall 2008 (see: boothbay.tamu.edu)
LISA CAMPBELL, Ph.D
Professor, Texas A&M University

Education
Ph.D. Biological Oceanography, SUNY Stony Brook, New York, 1985
M.S. Marine Environmental Science, SUNY Stony Brook, New York, 1983
B.A. Biology, with honors, University of California at Santa Cruz, 1976

Professional Experience
Professor, 2006- current, Department of Oceanography, Texas A&M University
Joint-Appointment, Professor, 2002- current, Department of Biology, Texas A&M University
Guest Investigator, Woods Hole Oceanographic Institution, 2008-
Graduate Faculty, 2015-2018, University of North Carolina Wilmington
Associate Professor, Department of Oceanography, Texas A&M University, 1996-2006
Associate Researcher, Department of Oceanography, University of Hawaii, 1995-1996
Assistant Researcher, Department of Oceanography, University of Hawaii, 1988-1995
Postdoctoral Fellow, Bigelow Laboratory for Ocean Sciences, Maine, 1986-1987

Published papers (last five years, full citation, peer-reviewed, include recently (2015) submitted papers, does not include in prep papers)
Henrichs, D.W., R.D. Hetland and L. Campbell. 2015. A spatially explicit individual-based model to identify origins of blooms of the toxic dinoflagellate Karenia brevis in the western Gulf of Mexico. Ecological Modelling doi 10.1016/j.ecolmodel.2015.06.038


**Funded Research (last five years, Short title, Agency, period of performance, amount of award)**

“A new early warning tool to mitigate the impacts of Dinophysis, an emerging threat in coastal ecosystems”; Sea Grant, Texas A&M University, 2/1/2016- 1/31/2018; $194,879

“PCMHAB: Expanding Harmful Algal Bloom Mitigation in the Gulf of Mexico with Operational Support and Training for the IFCB Network”; National Oceanic and Atmospheric Administration; 9/2015- 8/2018; $899,322 ($479,412 LC portion)

“Transition of Imaging Flow Cytobot to operational support for harmful algal bloom mititation and research;” National Oceanic and Atmospheric Administration; 9/2015- 8/2018; $1,500,000 ($272,961 Campbell and Knap portion)


“REU Site: Ocean Observing Technology for Emerging Ocean Scientists;” National Science Foundation; 4/2015-3/2018; $351,880

“Student Engagement and Ways to Experience Research (SEAWATER)”; College of Geosciences, TAMU; 6/1/2015-5/2018; $43,500


“Continued development of GCOOS” (subcontract); Gulf of Mexico Coastal Ocean Observing System; 1/2013- 5/2016, $46,401

“Osmoregulation in Marine Dinoflagellates;” National Science Foundation, IOS, 1155376; 3/2012 – 2/28/2015, $436,080

“ECOHAB: Mechanism of harmful algal bloom initiation in the western Gulf of Mexico”; National Oceanic and Atmospheric Administration; 9/1/2009- 2/28/2015; $895,000 ($585,233 LC portion)

“Role of microzooplankton in coastal ecosystems: Viewing windows of opportunity;” Sea Grant, Texas A&M University; 2/1/2010 – 12/31/2013. $159,892
**Graduate student committees chaired or co-chaired (last five years, Student name, years mentored, degree, year of matriculation if appropriate)**

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Years Mentored</th>
<th>Degree</th>
<th>Year of Matriculation</th>
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<tbody>
<tr>
<td>Darcie Ryan</td>
<td>2011- current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mckensie Daugherty</td>
<td>2014- current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Darren Henrichs, 2007-2012</td>
<td></td>
<td>PhD 2012</td>
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</tr>
<tr>
<td>Reagan Errera, 2009-2013</td>
<td></td>
<td>PhD 2013</td>
<td></td>
</tr>
<tr>
<td>Laura Harred, 2011-2014</td>
<td></td>
<td>MS 2014</td>
<td></td>
</tr>
<tr>
<td>Natalie Thompson, 2009-2011</td>
<td></td>
<td>MS 2011</td>
<td></td>
</tr>
</tbody>
</table>
PING CHANG, Ph.D.

Tenured Professor, Departments of Oceanography and Atmospheric Sciences, Texas A&M University

**Education (degree, institution, year):**
- **Ph. D.**, Princeton University, 1988
- **M.A.**, Princeton University, 1986
- **M.E.**, City College of New York, 1984
- **B.S.**, East China Engineering Institute, 1982

**Professional Experience:**
- 1988-1990, Postdoctoral Research Associate, Joint Institute for the Study of the Atmosphere and Ocean, University of Washington, Seattle, WA
- 1990-1995, Assistant Professor, Department of Oceanography, Texas A&M University, College Station, TX
- 1995-1998, Associate Professor, Department of Oceanography, Texas A&M University, College Station, TX
- 1998-present, Professor, Department of Oceanography, Texas A&M University, College Station, TX
- 1995-2000, Head of Physical Oceanography, Department of Oceanography, Texas A&M University, College Station, TX
- 2000-present, Adjunct Professor, Institute of Oceanology, Chinese Academy of Sciences
- 2002-present, Adjunct Senior Research Scientist, The International Research Institute for Climate and Society, Columbia University, New York
- 2007-present, Joint Appointment, Professor, Department of Atmospheric Sciences, Texas A&M University, College Station, TX
- 2010-present, Louis & Elizabeth Scherck Chair in Oceanography, Texas A&M University
- 2010-2014, Director of the Texas Center for Climate Studies
- 2011-present, Thousand Talents Program (Short-Term) Professor, Ocean University of China
- 2014-present, Fellow of the Research Center for Advanced Science and Technology, University of Tokyo

**Journal Publication (last five years):**


Balaguru, K., Chang, P., Saravanan, R., and Jang, C. J. 2011: The Barrier Layer of the Atlantic Warmpool: Formation Mechanism and Influence on the Mean Climate, Tellus A, 64, 18162, doi: http://dx.doi.org/10.3402/tellusa.v64i0.18162.


Patricola, C.M., P. Chang and R. Saravanan, 2015: Degree of Simulated Suppression of Atlantic Tropical Cyclones Controlled by Flavour of El Nino, Nature Geoscience, accepted.


Peer-reviewed Book Chapter and Report (last five years):


Funded Research (US funded projects with start date after 2010):

1. Title: Modulation of extremes in the Atlantic region by modes of climate variability/change: A mechanistic coupled regional model study (PIs: R. Saravanan and P. Chang)
   Sponsor: DOE
   Period: 9/1/2010-8/31/2013
   Amount: $736,649 for 3 years

2. Title: Role of Atmospheric Internal Variability in the Atlantic Meridional Overturning Circulation (PIs: P. Chang and R. Saravanan)
3. **Title:** A Study of Frontal-Scale Air-Sea Interaction along the Gulf Stream Extension Using a High-Resolution Coupled Regional Climate Model (PIs: P. Chang, R. Saravanan, J.-S. Hsieh)  
   **Sponsor:** NSF  
   **Period:** 9/1/2011-8/31/2014  
   **Amount:** $538,585 for 3 years

4. **Title:** A Combined Paleo-Proxy and Modeling Study of Abrupt Climate Change in the Tropical Atlantic and Its Relation to Atlantic Meridional Overturning Circulation Variability (PIs: M.W. Schmidt and P. Chang)  
   **Sponsor:** NSF  
   **Period:** 9/1/2011-8/31/2014  
   **Amount:** $495,424 for 3 years

5. **Title:** Collaborative Project: Understanding Climate Model Biases in Tropical Atlantic and Their Impact on Simulations of Extreme Climate Events (PIs: P. Chang, R. Saravanan, R. Leung and R. Montuoro)  
   **Sponsor:** DOE  
   **Period:** 9/1/2011-8/31/2014  
   **Amount:** $937,865 (TAMU portion: $750,363) for 3 years

6. **Title:** Gulf of Mexico Integrated Spill Response Consortium (Lead PI: Piers Chapman and Scott Socolofsky, Co-PIs, S. DiMarco, R. Hetland, P. Chang, and others)  
   **Sponsor:** Consortium for Ocean Leadership, Inc.  
   **Period:** 9/1/2011-8/31/2014  
   **Amount:** $14,403,000 (Chang’s portion: $371,855) for 3 years

7. **Title:** Collaborative Project: Collaborative Proposal: Impacts of Aerosols and Air-Sea Interaction on Community Earth System Model (CESM) Biases in the Western Pacific Warm Pool Region (PIs: R. Saravanan, Salil Mahajan, P. Chang)  
   **Sponsor:** DOE  
   **Period:** 10/1/2012-9/30/2015  
   **Amount:** $623,272 (TAMU portion) for 3 years

8. **Title:** Understanding the Dynamics Behind the Recent Rapid Warming off the Coast of US and China’s Eastern Seaboard (PIs: P. Chang and Dexing Wu)  
   **Sponsor:** TAMU  
   **Period:** 9/1/2012-8/31/2013  
   **Amount:** $25,000 for 1 year

9. **Title:** Understanding Causes of Climate Model Biases in the Southeastern Tropical Atlantic (PI: P. Chang, Co-PI: Christina Patricola)  
   **Sponsor:** NSF  
   **Period:** 9/1/2013-8/31/2016  
   **Amount:** $796,305 for 3 years

10. **Title:** Collaborative Research: Understanding Changes in the Atlantic Meridional Overturning Circulation (AMOC) During the 20th Century Using IPCC AR5 Model Ensembles (PI: P. Chang, Co-PI: Gokhan Chang, L. Ji and B.P. Kirtman)  
   **Sponsor:** NOAA  
   **Period:** 9/1/2011-8/31/2014  
   **Amount:** $530,765 (TAMU portion: $440,787) for 3 years

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Danabasoglu and Stephen Yeager)  
Sponsor: NOAA  
Period: 9/1/2013-8/31/2016  
Amount: $561,563 (Chang’s portion) for 3 years

11. Title: The Impact of Canonical and Non-canonical El Nino and the Atlantic Meridional Mode on Atlantic Tropical Cyclones (PI: C.M. Patricola, Co-PIs: P. Chang and R. Saravanan)  
Sponsor: NSF  Period: 2/1/2014-1/31/2017  
Amount: $220,314 for 3 years

12. Title: Role of Ocean Mesoscale Eddy Atmosphere Feedback in North Pacific and Atlantic Climate Variability: A High-Resolution Regional Climate Model Study (PI: P. Chang, Co-PIs: R. Saravanan and R. Montuoro)  
Sponsor: NSF  
Period: 3/15/2015-3/14/2018  
Amount: $798,215.00 for 3 years

Sponsor: TGLO  
Period: 9/1/2015-8/31/2017  
Amount: $215,963.00 for 2 years

International Research (non-US funded projects with start date after 2010):

1. Title: Air-sea interaction mechanism in Kuroshio Extension and its Climate Impact (Lead PI: Lixin Wu, Co-PIs: X. Lin, P. Chang and B. Qiu et al.)  
Sponsor: China’s National Basic Research Priorities Program (973 program)  
Period: 1/1/2013-12/31/2017  
Amount: ¥20,000,000 (~$3,200,000) for 5 years (Chang’s portion: ~ $113,000)

2. Title: Mesoscale and submesoscale eddy dynamics in the South China Sea (Lead PI: Jiwei Tian, Co-PIs: P. Chang and B. Qiu et al.)  
Sponsor: China’s National Basic Research Priorities Program (973 program)  
Period: 1/1/2014-12/31/2018  
Amount: ¥20,000,000 (~$3,200,000) for 5 years (Chang’s portion: ~ $200,000)

Graduate student committees chaired or co-chaired (Graduation date after 2010):

2. Who M. Kim (2006-2013), Ph.D, Oceanography, Co-Chair  
3. Zhao Xu (2008-2013), Ph.D, Oceanography, Chair  
4. Xiaohui Ma (2009-2014), Ph.D, Oceanography, Chair  
5. Guanglin Tang (2010-2015), Ph.D, Atmospheric Sciences, Co-Chair  
6. Zhao Jin (2012-present), Ph.D, Oceanography, Chair  
7. Chuan-Yuan Hsu (2012-present), Ph.D, Oceanography, Chair  
8. Dan Fu (2013-present), Ph.D, Oceanography, Chair  
9. Xu Liu (2013-present), Ph.D, Oceanography, Chair  
10. Wei-Ching Hsu (2013-present), Ph.D, Oceanography, Chair  
11. Pin Li (2013-present), Ph.D, Oceanography, Chair

Appendix 2-93
PIERS CHAPMAN, Ph.D.
Professor, Department of Oceanography

Address:  
Texas A&M University  
College Station, TX 77843-3146

Email: piers.chapman@tamu.edu  
Tel: 979-845-9399  
Fax: 979-845-6331

Education:

University of Wales (Bangor, Wales)  
Chemistry  
B.Sc. (Hons)  1971

University of Wales (Bangor, Wales)  
Marine Chemistry  
Ph.D.  1982

Professional Experience:

Professor, Department of Oceanography, Texas A&M University, October 2007 – present

Department Head, October 2007-July 2013

Director, CREST Program, Louisiana State University, 2002-2007

The Coastal Restoration and Enhancement through Science and Technology (CREST) Program was a federally funded (NOAA) initiative between 12 universities in southern Louisiana and Mississippi to improve the science of coastal habitat restoration.

Director, U.S. WOCE Office, and Research Scientist, Texas A&M University, 1990-2002

The World Ocean Circulation Experiment (WOCE) was the largest global oceanographic program. The office coordinated the U.S. contribution, with funding from five federal agencies.

Assistant Specialist Scientist, Sea Fisheries Research Institute, Cape Town, 1987-1989;

Oceanographer (II/III), Sea Fisheries Research Institute, Cape Town, 1980-1987;

Senior Professional Office, Sea Fisheries Research Institute, Cape Town, 1977-1980;

Chemist, Yorkshire Water Authority, Beverley, UK, 1976-1977;

Senior Research Associate, University of East Anglia, Norwich, UK, 1974-1976.

Honors:

Fellow, Royal Society of Chemistry, U.K. (Chartered Chemist), Sigma Xi,

Honorary Visiting Professor, School of the Environment, Flinders University, Adelaide, Australia  
March-April 2014

Research Activities and Grants:

2009-2014  

2011-2015  

2016-2020  

Publications:


Appendix 2-94
deep northern Gulf of Mexico. *Journal of Geophysics Research* (submitted)


**Students mentored (last five years; all TAMU):**

Xinxin Li (PhD, co-chair). Graduated May 2013
Michael Evans (PhD, chair)
Jong-sun Kim (PhD, chair)

**Committee member for:**

Yang Feng (PhD), Ruth Mullins (PhD), Li Shen (MS), David Finneran (PhD), Andrea Howson (MS), Sarah Stryker (M.S.), Alison Smyth (MS), Dawei Shi (PhD), Jordan Young (MS).
STEVEN F. DIMARCO, Ph.D.
Professor, Department of Oceanography & Ocean Observing Team Leader, Geochemical and Environmental Research Group

Address: 3146 TAMU, Texas A&M University, College Station, TX 77843-3146
Office: (979) 862-4168 or (979)-458-9323
Email: sdimarco@tamu.edu

Education
Doctor of Philosophy in Physics University of Texas at Dallas August 1991
Master of Science in Physics University of Texas at Dallas May 1988
Bachelor of Arts (Physics major) University of Dallas December 1985

Employment
2013-present Professor, Department of Oceanography, Texas A&M University
2013-present Ocean Observing Team Leader, Geochemical and Environmental Research Group, Texas A&M University
2004-2013 Associate Professor, Department of Oceanography, Texas A&M University
2000-2004 Associate Research Scientist, Department of Oceanography, Texas A&M University
1994-2000 Assistant Research Scientist, Department of Oceanography, Texas A&M University
1993-1994 Postdoctoral Research Associate, Texas A&M University
1991-1993 Postdoctoral Research Associate, Center for Advanced Studies, Univ of New Mexico
1992 Visiting Scientist, Max-Planck-Institut für Quantenoptik, Munich, Germany
1986-1991 Research Assistant, Center for Applied Optics, University of Texas at Dallas;
1985 Undergraduate Research Assistant, Center for Applied Quantum Electronics, North Texas State University (Summer)

Peer-reviewed Publications (‡ = student led paper)
‡Zhao Jing, Ping Chang, SF DiMarco, Lixin Wu, 2015. Role of near-inertial internal waves in sub-thermocline diapycnal mixing in the northern Gulf of Mexico. Accepted JPO 21 Sept 2015.

Appendix 2-96


DR Forrest, RD Hetland, SF DiMarco, 2012. Corrigendum: Multivariable statistical regression models of the areal extent of hypoxia over the Texas–Louisiana continental shelf, Environmental Research Letters 7 (1), 019501


**Funded Research (Active)**


**Funded Research (Completed)**


Texas General Land Office. Operation and Development of the Texas Automated Buoy System (TABS) Contract


National Science Foundation (CBET-Fluid Dynamics, Award No. 1045831). Rapid Award. Multi-scale plume modeling of the Deepwater Horizon oil-well blowout environmental impact and assessment. Lead PI: S. Socolovsky (OCEN), Co-PI DiMarco, Eric Adams, (MIT), and Thorsten Stoesser (GA Tech U). 2010 – 2013. TAMU Award Amount: $37,438. (DiMarco amount $18,000)


Graduate Students Advised (* = degree completed)

Chair or co-Chair

PhD
Saud al-Busaidi: Chair, PhD committee: 2012 -
*Li Bo (OCNG): Chair, PhD committee: TAMU-OUC Joint Degree Program (co-chair is Dr. X. Li, OUC): 2008-2013
*Yang Feng (OCNG): Chair, PhD committee (co-chair is G. A. Jackson): 2006-2011
*Shelton Gay (OCNG): Chair, PhD committee (co-chair is D. Brooks) 2006-2013
*Valeriya Kiselkova (OCNG): Chair, PhD committee 2004-2008
*Ruth Mullins-Perry (OCNG): Chair, PhD committee 2008 - 2013
Christian Nygren (OCNG); Chair, PhD committee 2013 -
Hilal al-Shaqri (OCNG): Chair PhD committee 2009 -
*Xiaoqian Zhang: (OCNG) Chair, PhD committee 2005-2009

Master of Science
*Alyson Azzara (OCNG): co-Chair (w/D. Biggs) 2004-2006
*Kelly Cole (OCNG): Chair 2006-2008
*Sudeshna Lahiry (OCNG): Chair, 2004-2007
*Michael Lalime (OCNG): Chair, 2004-2010
*Amanda Olson-Kaltenberg (OCNG) co-Chair (w/D. Biggs), 2002-2004
*Stuart Pearce (OCNG): Chair, 2006-2011
*Rebecca Scott (OCNG): co-Chair (w/D. Biggs), 1998-2001
*Laurie Sindlinger (OCNG): co-Chair (w/D. Biggs), 2000-2002
*Laura Spencer (OCNG) Chair, 2011 - 2014
*Sarah Stryker (OCNG) Chair, 2009 – 2011
*Heather Zimmerle (OCNG) Chair, MS committee, 2011 - 2014
Luz Areli Zarate Jimenez (OCNG) Chair, MS Committee, 2015 -

Master of Geosciences
*Ashley Sears (GEOS): Chair MGs, (non-thesis) 2006-2008
*Saud al-Busaidi (GEOS): Chair MGs, 2010 - 2011
*Mohammed al-Marzouqi (GEOS): Chair (MGs) 2011 – 2013
JESSICA N. FITZSIMMONS, Ph.D.
Assistant Professor, Department of Oceanography, Texas A&M University

Address: 3146 TAMU, O&M 408,
College Station, TX 77843

Phone: (979) 862-8342
Email: jessfitz@tamu.edu

Education
2008 - 2013 Ph.D. in Chemical Oceanography
MIT/Woods Hole Oceanographic Institution Joint Program, Advisor: Edward Boyle

2004 - 2008 B.A. in Chemistry and Biology with a Specialization in Marine Science
Boston University, summa cum laude, with Distinction and College Honors

Experience
2015 - current Assistant Professor, Texas A&M University, Department of Oceanography
2014-2015 Postdoctoral Research Associate, Rutgers University; Advisor: Robert Sherrell
2013 Postdoctoral Research Associate, MIT; Advisor: Ed Boyle
2008-2013 Ph.D. student, MIT/WHOI Joint Program in Chemical Oceanography; Advisor: Ed Boyle
Dissertation: “The marine biogeochemistry of dissolved and colloidal iron”
2006 Hollings Scholar Intern, NOAA, Atlantic Oceanographic and Meteorological Laboratories, Miami
Advisor: Peter Ortner. “Nutrient dynamics of the Southwest Florida Shelf as they relate to the Comprehensive Everglades Restoration Plan”

Publications
Submitted Manuscripts

Published Articles


**Funded Research**


**Graduate Student Committees Chaired**

Laramie Jensen (2015-current), PhD student in Oceanography
WILFORD D. GARDNER, Ph.D.

Earl F. Cook Professor of Geosciences, Department of Oceanography
http://ocean.tamu.edu/people/faculty/gardnerwilford.html

Education:

S.B. Massachusetts Institute of Technology, February 1972, Earth Sciences
Ph.D. Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography, November 1977; Graduation 1978

Professional Experience:

2010-present Earl F. Cook Professor of Geosciences
2011-Fall Santa Chiara Study Abroad Program, Castiglion Fiorentino, Italy Geoscience program created and delivered
2009 Fulbright Scholar, Hellenic Center for Marine Research, Athens, Greece
1990-present Professor, Department of Oceanography, Texas A&M University
2000-2005 Head, Department of Oceanography, Texas A & M University
1996 Faculty Development Leave, NOAA/PMEL, Seattle, WA
1987-1995 Chair, Geological/Geophysical Oceanography Section, Department of Oceanography, Texas A & M University
1985-1990 Associate Professor, Department of Oceanography, Texas A&M University
1983-1985 Associate Research Scientist, Lamont-Doherty Geological Observatory
1977-1983 Research Associate, Lamont-Doherty Geological Observatory of Columbia University

Participated in 43 oceanographic cruises totaling 652 days at sea on 25 different ships, submersibles and submarines in 6 oceans

Published Papers (Peer-Reviewed):

Author of 75 published papers; >5100 citations; >68 citations per paper; H index of 42


**Funding - Last 5 Years:**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Title</th>
<th>Amount</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSF</td>
<td>Multi-Decadal Global Surveys of Benthic Nepheloid Layers</td>
<td>$208,394</td>
<td>2015 –2017</td>
</tr>
<tr>
<td></td>
<td>PIs, Gardner, W.D. and Richardson, M.J.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Goal is to determine the distribution and forcing functions of sediment resuspension in the ocean.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAMU</td>
<td>Earl F. Cook Professor in Geoscience</td>
<td>$70,000</td>
<td>2010 –2016</td>
</tr>
<tr>
<td>NSF</td>
<td>Oceanography Scholars</td>
<td>$621,528</td>
<td>2014 –2019</td>
</tr>
<tr>
<td></td>
<td>PIs, Gardner, W.D., Richardson, M.J., Thornton, D., Yvon-Lewis, S., Giese, B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>The Oceanography Scholars S-STEM (Scholarships in Science, Technology, Engineering and Mathematics) Program facilitates recruitment of academically-talented, financially needy graduate students to become oceanographic scientists who will solve environmental, social and economically important challenges facing the nation.</em></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>PIs, Gardner, W.D., Richardson, M.J., Lyle, M., Sager, W., Schmidt, M.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>The Oceanography Scholars S-STEM (Scholarships in Science, Technology, Engineering and Mathematics) Program facilitates recruitment of academically-talented, financially needy graduate students to become oceanographic scientists who will solve environmental, social and economically important challenges facing the nation.</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Student Committees:**

<table>
<thead>
<tr>
<th>Student’s Name</th>
<th>Department</th>
<th>Level</th>
<th>Started</th>
<th>Graduated</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emma Cochran</td>
<td>Oceanography</td>
<td>M.S.</td>
<td>2010</td>
<td>2013</td>
<td>Co-Chair</td>
</tr>
<tr>
<td>Nikki Zuck</td>
<td>Oceanography</td>
<td>PhD</td>
<td>2012</td>
<td>2014</td>
<td>Co-Chair</td>
</tr>
<tr>
<td>Rebecca Gray</td>
<td>Oceanography</td>
<td>M.S.</td>
<td>2014</td>
<td></td>
<td>Co-Chair</td>
</tr>
<tr>
<td>Han Sang Kim</td>
<td>Ocean Engineering</td>
<td>Ph.D.</td>
<td>2012</td>
<td></td>
<td>Member</td>
</tr>
<tr>
<td>Kittipong Somchat</td>
<td>Geology</td>
<td>M.S.</td>
<td>2013</td>
<td></td>
<td>Member</td>
</tr>
</tbody>
</table>
BENJAMIN S. GIESE
Professor, Texas A&M University

Education
Ph.D. Oceanography, 1989, University of Washington, Seattle WA.
M.S. Oceanography, 1985, University of Washington, Seattle WA.
B.A. Physics, 1981, University of Chicago, Chicago IL.

Employment History
2011 - present: Professor, Department of Oceanography, Texas A&M University.
1999 - 2011: Associate Professor, Department of Oceanography, Texas A&M University.
7/04-12/04: Visiting Scientist, IPRC, University of Hawaii.
1994 - 1999: Assistant Professor, Department of Oceanography, Texas A&M University.
1991 - 1994: Assistant Research Scientist, Department of Meteorology, University of Maryland.
1989 - 1991: Postdoctoral Researcher, Scripps Institution of Oceanography, UCSD.
1982 - 1989: Research Assistant, Department of Oceanography, University of Washington.

Funded Research Projects
9/14-8/19, Oceanography Scholars, NSF, $621,659, Co-Principal Investigator.
2/11-1/14, Developing and Implementing Ocean-Atmosphere Reanalyses for Climate Applications (OARCA), NSF, $443,748, Principal Investigator.
8/10-9/13, Ocean climate variability in the 20th Century, NOAA, $435,691, Principal Investigator.
6/08-5/11, Exploring centennial changes in ocean circulation with SODA, NSF, $353,098, Principal Investigator.
6/06-5/10, ENSO – Decadal variability in SODA-POP, NOAA, $229,324, Principal Investigator.

Publications (* Designates student)


T. Lee, et al., 2010: Consistency and fidelity of Indonesian-throughflow total volume transport estimated by 14 ocean data assimilation products, Dynamics of Atmospheres and Oceans 50 (2), 201-223.

Graduate Students Advised

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelley Bradley</td>
<td>Oceanography</td>
<td>Chair</td>
</tr>
<tr>
<td>Otoniel Palacios</td>
<td>Oceanography</td>
<td>Chair</td>
</tr>
<tr>
<td>Chunxue Yang</td>
<td>Oceanography</td>
<td>Chair</td>
</tr>
<tr>
<td>Chunxue Yang</td>
<td>Oceanography</td>
<td>Chair</td>
</tr>
<tr>
<td>Carlos Perugachi</td>
<td>Oceanography</td>
<td>Chair</td>
</tr>
<tr>
<td>Ephraim Paul</td>
<td>Oceanography</td>
<td>Co-Chair</td>
</tr>
<tr>
<td>Wei-Ching Hsu</td>
<td>Oceanography</td>
<td>Member</td>
</tr>
<tr>
<td>Xiuquan Wan</td>
<td>Oceanography</td>
<td>Member</td>
</tr>
<tr>
<td>Woo-Guen Cheon</td>
<td>Oceanography</td>
<td>Member</td>
</tr>
<tr>
<td>Karthik Balaguru</td>
<td>Oceanography</td>
<td>Member</td>
</tr>
</tbody>
</table>
GERARDO GOLD BOUCHOT, Ph.D.
Professor, Oceanography Department, Texas A&M University

Education
1979 B. Sc. Oceanology (College Of Marine Sciences, State University Of Baja California, Ensenada, Mexico)
1983 M. Sc. Chemistry (University Of The Pacific, Stockton, California)
1991 Sc. D. Marine Sciences (Center For Research And Advanced Studies, Merida, Mexico)

Teaching
*I have tried to motivate the students to pursue a career in science, to give their best effort, and always maintain their scientific integrity. I use textbooks, but also emphasize reading and analyzing the recent literature so the students have up to date information, but also learn how to read scientific papers. I enjoy teaching, and challenging the students to think critically.*

Marine Pollution, graduate programs, Marine Resources Department, Cinvestav Merida, 1985 to date.
Biochemistry I and I for undergraduates in the Oceanology major, School of Marine Sciences, State University of Baja California. 1979.
Teaching Assistant. General Chemistry I and I, Quantitative Analysis, and Experimental Physical Chemistry, Chemistry Department, University of the Pacific. 1979-1982.
Professor of Biochemistry I and I, and Electrochemistry, for undergraduates in Chemical Engineering, Universidad Autónoma del Carmen. 1984-1985.

Service
Member of different advisory boards in Mexico, such as: Advisory Board for Sustainable Development, Region IV; National Advisory Committee for the Commission for Environmental Cooperation in North America.
President of the Latin American chapter, Society of Environmental Toxicology and Chemistry (SETAC). 2005 to 2006.
Member of Mexico’s National Advisory Board on Compounds Subject to International Conventions. 2012 to date.
Member of the Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), 2013 to date.
Member of the Gulf of Mexico Research Program Advisory Group of the United States of America National Academy of Science. 2013 to 2014.

Experience
Director of the Merida campus, Cinvestav, from December 1997 to January, 2002.
Coordinator of the Project Development Facility (PDF-B) for the Project of the Gulf of Mexico Large Marine Ecosystem, 2004 to 2006.
Coordinator of the pilot Project on Environmental Monitoring and Assessment, of the Project of the Gulf of Mexico Large Marine Ecosystem, from June 2009 to May, 2013.
Coordinator of the project: Gulf of Mexico Large Marine Ecosystem, funded by the Global Environmental Facility (GEF) through the United Nations Industrial Development Organization (UNIDO), from May 2013 to date.

Research
My research has involved working on environmental levels of pollutants in marine and coastal ecosystems, and their biological effects at different levels. I have been involved in the use and validation of biomarkers of effect, from the molecular (gene expression, enzyme activities, etc.) to community levels (benthic fauna structure, parasites, etc.).

Papers in Scientific Meetings (since 2008)


L. Alpuche-Gual; V. Ceja-Moreno; D. Espínola-Pantí, P. Ku-Chan, G. Gold-Bouchot. 2009. Biomarkers in the white grunt (Haemulon plumieri) and levels of organic pollutants in sediments from the Mesoamerican Barrier Reef. Society of Environmental Toxicology and Chemistry (SETAC) 30th Annual Meeting. New Orleans.


Theses Advised (since 2008)

M. Sc.


Miguel Ángel Cahuich López. 2010. Evaluación del Transporte Atmosférico a Escala Interregional de Policlorodibenzo-p-Dioxinas (PCDDs) y Policlorodibenzofuranos (PCDFs) hacia el Municipio de Celestún, Yucatán. Tesis de Maestría en Ingeniería Ambiental, Facultad de Ingeniería, Universidad Autónoma de Yucatán.


Doctorate


Appendix 2-110
Papers Published (since 2008)

**Book Chapters**


**Papers in Peer-reviewed Journals**


**Membership in Scientific Societies**

- Society for Environmental Chemistry and Toxicology (SETAC)
- Sociedad Iberoamericana de Química y Toxicología Ambiental (SIQTA)
ROBERT D. HETLAND, Ph.D.
Professor, Department of Oceanography

Address:
3146 TAMU, Texas A&M University
College Station, TX 77843-3146

Phone: 979-458-0096
Email: hetland@tamu.edu
Web: http://pong.tamu.edu/

Professional Preparation:
Saint Olaf College, Northfield, MN, B. A. in Physics and Mathematics May 1992
University of Maine, Orono, ME, M. S. in Oceanography Aug 1996
Florida State University, Tallahassee, FL, Ph. D. in Oceanography Apr 1999

Appointments:
Professor, Texas A&M University, College Station, TX Sept 2013 – present
Associate Professor, Texas A&M University, College Station, TX Sept 2006 – Aug 2013
Assistant Professor, Texas A&M University, College Station, TX Sept 2000 – Aug 2006
Graduate Research Assistant, Florida State University, Tallahassee, FL, Aug 1996 – Apr 1999
Graduate Research Assistant, University of Maine, Orono, ME Aug 1993 – Aug 1996
Fulbright Senior Researcher, IOW, Warnemünde, Germany Aug 2007 – Aug 2008

Other Affiliations:
Woods Hole Oceanographic Institution, Adjunct Scientist, 2014 – present.

Publications, last five years (students/postdocs in bold):


Hetland, R. D., and Hsu, T.-J. (2013) Freshwater and sediment dispersal of large river plumes, in


Funded research, last five years

| PI: P. Chapman | 9/1/11 - 12/31/15 | $14,403,000 |
| Gulf of Mexico Research Initiative | Gulf Integrated Spill Research (GISR) |
| Pl: R. Hetland | 9/1/15 - 8/31/17 | 1 mo/yr |
| Texas General Land Office | $376,560 |
| Improving Hydrodynamic Predictions of Surface Currents Near the Texas Coast Used for rapid Oil Spill Response – Phase 4 |
| Pl: R. Hetland | 9/1/13 - 8/31/15 | 1 mo/yr |
| Texas General Land Office | $161,192 |
| TABS modeling effort renewal: FY 2014-2015 |
| Pl: K. Thyng | 9/1/15 - 8/31/17 | 1 mo/yr |
| Texas General Land Office | $186,988 |
| Design of a modern web interface to TGLO TABS model and data products – Phase 2 |
| Pl: R. Hetland | 9/1/15 - 8/31/18 | 1 mo |
| NOAA | $60,000 |
| TAMU contribution to the US IOOS Coastal & Ocean Modeling Testbed (COMT) |
| NOAA | $135,183 (TAMU portion) |
| A Super-Regional Testbed to Improve Models of Environmental Processes on the U.S. Atlantic and Gulf of Mexico Coasts |
| Pl: R. Hetland | 9/1/09 - 8/31/11 | 1 mo/yr |
| Texas General Land Office | $353,789 |
| Improving Hydrodynamic Predictions of Surface Currents Near the Texas Coast Used for rapid Oil Spill Response |
| PI: R. Hetland | 9/1/09 - 8/31/11 | 1 mo/yr |
| Texas General Land Office | $160,000 |
| TABS Modeling Effort |

| PI: R. Hetland | 1/1/09 - 12/31/12 | 1 mo/yr |
| NASA (ROSES) | $142,792 |
| Origins and mechanisms of Karenia brevis bloom formation along the Texas coast |

| PI: R. Hetland | 9/1/11 - 8/31/13 |
| Texas General Land Office | $369,046 |
| Improving Hydrodynamic Predictions of Surface Currents Near the Texas Coast Used for rapid Oil Spill Response |

| PI: R. Hetland | 9/1/11 - 8/31/13 |
| Texas General Land Office | $159,921 |
| TABS Modeling Effort |

| PI: L. Campbell | 9/1/09 - 8/31/13 |
| EPA (ECOHAB) | |
| Mechanism of harmful algal bloom initiation in the western Gulf of Mexico |

| PI: R. Hetland | 3/15/09 - 2/29/14 |
| NSF (PO) | $308,328 (TAMU portion) |
| Collaborative Research: Creation of a coastal current – The transition of an energetic river discharge from buoyant jet to geostrophic plume |

| PI: X. Zhang | 11/1/12 - 3/31/14 | 0.5 mo |
| Texas Water Development Board | $20,000 |
| Salinity Assessment Using the Texas-Louisiana Shelf ROMS Model |

| PI: S. DiMarco | 7/1/09 - 6/30/14 | 1 mo/yr |
| NOAA | $3,828,448 |
| Mechanisms Controlling Hypoxia: Integrated Causal Modeling |

| PI: R. Hetland | 9/1/13 - 8/31/15 | 1 mo/yr |
| Texas General Land Office | $378,848 |
| Improving Hydrodynamic Predictions of Surface Currents Near the Texas Coast Used for rapid Oil Spill Response – Phase 3 |

| PI: R. Hetland | 9/1/13 - 8/31/15 | 1 mo/yr |
| Texas General Land Office | $159,467 |
| TABS modeling effort renewal: FY 2014-2015 |

| PI: R. Hetland | 9/1/13 - 8/31/15 | 1 mo/yr |
| Texas General Land Office | $225,136 |
| Design of a modern web interface to TGLO TABS model and data products |

| PI: R. Hetland | 9/1/13 - 8/31/15 | 0.5 mo total |
| NOAA | $20,000 |
| TAMU contribution to the US IOOS Coastal & Ocean Modeling Testbed (COMT) |
Graduate student committees

Committee Chair Or Co-Chair, Current Students:
  Wenxia Zhang, Ph. D. candidate (Oceanography, Joint with Ocean University China) Lixin Qu, Ph. D. candidate (Oceanography, Joint with Ocean University China)
  Veronica Ruiz-Xomchuk Ph. D. candidate (Oceanography)

Committee Chair Or Co-Chair, Graduated Students:
  Willington Renteria, M. S. candidate (Oceanography)
  Marcus Ogle, M.S. (Oceanography)
  Zhaoru Zhang, Ph. D. (Oceanography)
  Kelly Cole, Ph. D., (Oceanography)

Committee Member, Current Students:
  Laura Harred, M. S. candidate (Oceanography)
  Darcie Ryan, Ph. D. candidate (Oceanography)
  In Ok Jun, Ph. D. candidate (Ocean Engineering)

Committee Member, Graduated Students:
  Boyang Jiang, M. S. (Ocean Engineering, 2010)
  Karthik Naidu, Ph. D., (Oceanography, 2011)
  Feng Yang, Ph. D. candidate (Oceanography, 2011)
  Pak Leung, Ph. D. candidate (Oceanography, 2011)
  James J. Erickson, M. S. candidate (Physics, 2012)
  Reagan Errera, Ph. D., candidate (Oceanography, 2013)
  Bo Li, Ph. D. candidate (Oceanography, 2013)
  Zhao Xu, Ph. D. candidate (Oceanography, 2013)
  Zheng Zhang, Ph. D. candidate (Oceanography, 2013)
  Youn Kyung Song, Ph. D. candidate (Ocean Engineering, 2014)
  Xiaohui Ma, Ph. D. candidate (Oceanography, 2014)
  Kerri Whilden, Ph. D. candidate (Ocean Engineering)
ANTHONY HAYDEN KNAP, Ph.D.

Director, Geochemical and Environmental Research Group, Professor of Oceanography, James Whatley Endowed Chair of Geosciences, Texas A&M University

Education

1978 Doctor of Philosophy (Chemical Oceanography), University of Southampton, UK
1972 Master of Science (Oceanography), University of Southampton, UK
1971 Bachelor of Science, Wisconsin State University, USA

Experience

2015-present Member, International Advisory Board, Institute of Oceanology, Chinese National Academy of Sciences
2015-present Member Texas One-Gulf Center of Excellence Leadership Committee – Restore
2014-present National Academy of Sciences, Gulf of Mexico Research Program Board
2014 Member Review Board, Chinese National Academy of Sciences, Qingdao, China
2014-present Board of Directors, Maritime Insurance Solutions, Ltd. Bermuda
2014 Member Review Committee for Institute of Basic Science, Seoul, Korea
2013-present James R. Whatley Endowed Chair of Geosciences, Texas A&M University
2013-present Director, Geochemical and Environmental Research Group, Professor of Oceanography, Texas A&M University
2012–2015 Member, International Steering Committee for the Global Ocean Observing System
2010-2011 Advisory Council – Offshore Energy Institute, Portland, Maine
2010-present Board of Directors, Parhelion Underwriters, London, UK
2009-2015 Board of Directors, Arvak Management
2008-2010 Member, Geneva Association Panel for Climate Change
2008-present Board of Directors, Shoreline Insurance Managers
2007 Honorary Fellow, Plymouth Marine Laboratory
2007-2015 Executive Committee, Partnership for Observations of the Global Ocean (POGO)
2006-2012 President and Director, BIOS
2006-2012 Appointed to Underwriting, Audit and Compensation Committees, Flagstone Reinsurance
2005-2012 Member of Board of Directors, Flagstone Re-insurance Holdings
2003-2006 President and Director, BBSR
2003-2006 Rapporteur for IOC/COOP/GOOS to WMO/JCOMM
2000-2006 Co-Chairman Coastal Observing Panel, GOOS
1999 Coordinator of the NIEHS/UNESCO sponsored workshop on Ocean and Human Health.
1998-2001 Chairman IOC/WMO/UNEP Health of the Ocean Panel for the Global Ocean Observing System
1998-2001 Officer Global Investigation of Pollution of the Marine Environment (GIPME)
1997-1999 Member Heinz Foundation/FEMA/NOAA Panel on True Costs of Natural Hazards
1996-1999 Member, Executive Council, The Oceanographic Society
1995-2002 Member, Executive Committee Plus, US JGOFS Executive Committee
1995-present Member, Explorers Club
1995-present Honorary Professor, University of Plymouth, UK
1994-2000 Member of Health of the Ocean Panel of the Global Ocean Observing System
1994-present Fellow, Royal Geographical Society
1994-2004 Member, Institute of Directors, London
1993-2004 Fellow, International Institute of Biotechnology
1993 SCOR representative of JGOFS for the Health of the Ocean Panel of the Global Ocean Observing System
1992 Member Steering Committee, National Association of Marine Laboratories.
1992-2011 Executive Director, Atlantic Global Change Institute, BBSR
1988-1998 Chairman, Group of Experts of Methods, Standards and Intercalibration (GEMSI),
                   Intergovernmental Oceanographic Commission (IOC), UNESCO.
1988-2011 Senior Scientist, Bermuda Biological Station for Research, Inc.
1988-1993 Member, Executive Committee Southern Association of Marine Laboratories.
1986-2006 Director, Bermuda Biological Station for Research, Inc.
1984-present Adjunct Professor, College of Marine Studies, University of Delaware, U.S.
1984-present Adjunct Professor, Oceanography Department, NOVA University, Ft. Lauderdale, Florida, US.
1984-1988 Vice-Chairman, Group of Experts of Marine Standards and Intercalibration (GEMSI),
                   Intergovernmental Oceanographic Commission (IOC)
1981- 1986 Member, Scientific Advisory Committee Norwegian Institute for Water Research (NIVA)
1981-1985 Associate Director, Bermuda Biological Station for Research, Inc.
1980-2005 Director, Marine and Atmospheric Program, Responsible for all Bermuda Government marine environmental research.
1980-2011 Scientific Advisory/Coordinator, Marine Pollution Contingency Steering Committee Government of Bermuda.
1980-1984 Coordinator, IOC/WMO/UNEP Intercalibration Exercise, Background Levels of Marine Pollutants in Open Ocean Waters.
1977-1981 Research Associate, Bermuda Biological Station for Research, Inc.

**Journal Articles last 5 years**


**Books and Book Chapters (last 5 years)**


Appendix 2-120
Funded Research (last 5 years)

Knap was active in Bermuda until December 2011 and started at Texas A&M in April 2013. Over the two years he has written a number of proposals.

D-TOX – Deep-sea ecotoxicology of marine organisms to PAH. 1/1/2015- 12/30/2018. This program has just been funded for 3 years by the Gulf of Mexico Research Initiative for $1,952,000. The grant does not have a number as yet.
Role: PI

M15020903 Campbell and Knap (PI) 04/01/15 – 03/30/19
NSF – REU site Ocean Observing Technology for Emerging Ocean Scientists. A training grant for 3 years for REU students in learning new observing technologies.
Role: Co-PI

Role: Co-PI

Chancellors Research Initiative TAMU 11/01/2015-10/31/2018
GERG was funded internally for $4.2 million to develop Texas A&M as the Observing Center for the Gulf of Mexico. The funding has been broken into many subsets.
Role: Co-PI

Restore Hypoxia (4/1/2016 – 8/31/2017) Glider operations for the State of Texas. Texas Restore. $450,000
Role: Co-PI

SA 15-22 # 10-S151005 1/01/15-30/12/18
Gulf of Mexico Research Initiative: Role of microbial exopolymers in aggregation and degradation of oil and dispersants. This is a 3 year program to determine the creation of particles by microbes in oil spills. Natural dispersion versus chemical dispersion.
Role: Co-PI

THEMO – The Texas A&M/University of Haifa Eastern Mediterranean Observatory
This was funded in December 2015 for 5 years at $5,800,000 to build an observing system for Israel.
Role: PI

M1503746 – Integration of HF Radars, Autonomous Vehicles and TABS. 9/1/2015 – 8/31/2017 Anthony Knap and Steven Dimarco. This is to integrate various observing technologies for the whole of the Texas coast. Funded by The Texas General Land Office ($458,000).
Role: Co-PI

Biomarkers in IODP Cores (9/1/2015-3/1/2016) Repsol ($32,000)
Role: Co-PI

M1600242 – Operation of the Texas Automated Buoy System (TABS) 9/1/2-15 – 8/31/2017 This is the yearly operating costs for our ocean monitoring systems ($715,000)
Role: Co-PI

Role: Co-PI

Transitioning of imaging FlowCytobot to operational support for HAB mitigation and research. NOAA (1/6/2015 -5/31/2018) $300,000 of $1,500,000.
Role: Co-PI
The effect of oil and Oil Dispersants on Corals. (1/1/2015 – 12/30/2017) Clean Caribbean and Consortium of oil companies. $30,000 of $300,000.

Role: Co-PI


Role: Co-PI

Bermuda Atlantic Time-series Study. Founder and PI of BATS at Bermuda (1988-2012) NSF. With shiptime $5,000,000 per year.

Role: Founder and PI

The Panulirus Hydrographic Stations. PI for 33 years (1978-2012). The longest continuous time-series in the world. Approx $1.2 million per year including shiptime (NSF).

Role: PI

The Risk Prediction Initiative (1992-2012). The connection between the insurance industry and climate science. $1,300,000 to $750,000 per year. Various companies.

Role: Founder and PI

Graduate Students

Maya Morales McDivitt (M.S. Candidate) Chair of Committee Lindsey Martin, (M.S.) candidate) Member of Committee
PATRICK LOUCHOUARN, Ph.D.
Executive Associate Vice President of Academic Affairs, TAMUG, Associate Provost, TAMU

Address: 1001 Texas Clipper Rd, Bldg 3029, TX 77554
Phone: (409) 740-4409
Cell phone: (713) 263-4528
Email: loup@tamug.edu

Education
Post-Doc. (NSERC) Chemical Oceanography, University of Texas at Austin, 1998-1999
Ph.D. Environmental Sciences, University of Québec in Montréal (UQAM), 1997
M.Sc. Environmental Sciences, University of Québec in Montréal (UQAM), 1992
B.Sc. Marine Biology - McGill University, 1989

Administrative Experience
Executive Associate Vice President of Academic Affairs, TAMUG, Associate Provost, TAMU - 2012-present
Serve as Chief Academic Officer and chief research administrator for Texas A&M University's branch campus at Galveston. Also serve as Associate Provost at Texas A&M University.
- Manage the academic infrastructure of a campus with seven Departments, 150 Faculty, and an annual budget of ~$67M.
- Interface and coordinate with the Office of Executive Vice President and Provost on main campus.
- Developed strategic plan for growth in enrollment (+20% in next 5 years), Faculty recruitment (rejuvenation of 50% of tenure track Faculty in 5 years), and research programs and Office of Graduate Studies (three PhD and five Masters programs).
- Developed a proposal, in coordination with the Dwight Look College of Engineering, to create a new Department of Ocean Engineering across two campuses, along with a collaborative first year engineering experience on the Galveston Campus.
- Work with Legislature representatives and System's government office to raise funds for the construction of a new academic building on campus and legislative center of excellence.
- Lead the strategic positioning of Texas A&M University at Galveston in Texas A&M’s Capital Campaign (first time TAMUG is integrated in the campaign of the Texas A&M Foundation).
- Evaluate Department Heads' annual performance and campus wide P&T dossiers (humanities, social sciences, business, maritime transportation, engineering, and natural sciences).

Department Head, Dept. of Marine Sciences. Texas A&M University at Galveston - 2010-2013
Serve as chief administrative officer for academic and research activities of a highly multidisciplinary department at Texas A&M University at Galveston.
- Managed an academic unit of 44 Faculty, staff, and postdocs with an annual budget of ~$2.5M and generating an average of $3-4M per year in extramural research funds.
- Developed the research and scholarship activities of the Department at both undergraduate and graduate levels: Successfully attracted funds from private foundations and philanthropic organizations to support the development of research programs in environmental/marine sciences.
- Lead the development of a) a Ph.D. program in Marine and Coastal Resources Management, b) a five-years combined B.Sc-M.Sc. professional program in Ocean and Coastal Resources, and c) a pre-health degree (Ocean and One Health).

 Appendix 2-123
• Initiated the process of Faculty rejuvenation in spite of a very difficult budgetary climate: Through the restructure of expenditures, Recruit and retain qualified and diverse faculty/staff.
• Serve on University level committees including advisory committees. Evaluate Faculty/Staff annual performance. Mentor junior Faculty towards P&T evaluations.

Director of Research, Dept. of Marine Sciences, Texas A&M University at Galveston. 2009-2010
Coordinated the post-award research activities of one of the most active and funded academic departments on campus.
• Management of administrative staff for post-award management of extramural research funds.

Associate Director, Masters Program in Public Administration (MPA), Columbia University. 2003-2006
Developed and monitored the science curriculum of a new professional graduate degree (MPA) in Environmental Science and Policy at Columbia University’s School of International and Public Affairs. Recruited and retained qualified and diverse professional adjunct faculty. Managed teaching assistants. Ensure the full integration of the science curriculum in the program’s social science structure.
• Develop and teach courses in Environmental Chemistry and Regulatory Toxicology, Ecosystem Functioning and Biogeochemical Cycling, and Hydrology and Climate).
• Contribute to increased enrollment (~40% over 4 years).

Professional Experience
2011-present Professor, Dept. of Marine Sciences (Texas A&M University at Galveston) and Dept. of Oceanography (Texas A&M University).
2006-2011 Associate Professor (Tenured by Texas A&M University), Dept. of Marine Sciences (Texas A&M University at Galveston) and Dept. of Oceanography (Texas A&M University).
2002-2006 Associate Professor, Columbia University, Dept. of Earth and Environmental Sciences & School of International and Public Affairs.
2000-2002 Assistant Professor, Texas A&M University-Corpus Christi, Dept. of Physical and Life Sciences.
1998-1999 Post-Doctoral Fellow (NSERC), University of Texas at Austin, Marine Science Institute.
1997 Post-Doctoral Fellow, University of Québec in Montréal.
1992-1997 Adjunct Professor, UQAM, Dept. of Earth and Atmospheric Sciences.

Educational Activities
Teaching at the university level, since 1992, courses that can be grouped into the three following thematic “threads”: Courses that address the needs of the university core curriculum for general science classes and which are integrated into a “liberal arts” degree structure; courses that are specifically designed as upper level electives for technical careers in science and technology (biotechnology, environmental science, medicinal chemistry) and can be used towards minors in chemistry or as pre-med electives; courses that integrate science analysis into non-research professional majors (pre- and in-service teacher certification, environmental and natural resource management, public policy).

Undergraduate: General Core Curriculum (Science)
- Earth System Science (bilingual: English & Spanish; Online version)
- Environmental Sciences
- Oceanography (also as upper level elective)
**Appendix 2-125**

**Undergraduate: Upper Level Curriculum in Environmental Sciences**
- Instrumental Analysis (for biotechnology, environmental science, medicinal chemistry)
- Quantitative Chemical Analysis (for biotechnology, environmental science, medicinal chemistry)
- Sophomore and Senior Seminars

**Graduate: Curriculum in Environmental Management**
- Climate Change and Water Resources (Masters in Public Administration)
- Ecosystem Functioning and Biogeochemical Cycling (Masters in Public Administration)
- Environmental Chemistry and Regulatory Toxicology (Masters in Public Administration)
- Environmental Economics in Oceanography (Masters in Marine Resource Management; Online)

**Research Activities**
Collaborative funding through a diversity of State to National level programs (NSF, NOAA, NASA, USGS). Some of these applied research efforts provide environmental agencies with the scientific information needed to support effective policies related to water and air quality management at the regional scale. All of these projects supported a number of graduate and undergraduate students.

- Attracted $1.7M directly to my group out of a total of $3.7M in collaborative grants (2007-2015).
- 29 Grants since 1997 (see complete list of funded projects below).
- Since joining Texas A&M University – Galveston, raised ~$1.2M from internal and external funding sources to renew and expand instrument “park” in support of the environmental geochemistry research (2 GC/MSMS, Hg analyzer, CHN analyzer, ASE extractor, LA-ICPMS, LC/MSMS).

**International Activities**
2010-present: Permanent Jury Member (Co-Chair in 2012): International Partner University Fund - Grant Foundation. U.S. member of a team of 8 jury (4 from U.S. and 4 from France) that recommend funding of international projects (10-12/year) in humanities, social sciences, and natural sciences collaboratively undertaken by French and American institutions (supported by the Institute for International Education and the Mellon Foundation).

2005 Invited Professor (Sabbatical), École de Sciences Politiques (Sciences Po)/American Center - Paris. Participated in a joint project with a consortium of French universities towards the development of a professional Master program in sustainable development.

2005 Invited Professor (Sabbatical), Institut National de Recherche Agricole (INRA) - Versailles-Grignon. Biogeochemistry of soils and sediments.

2001-2002 Developed a bilingual course (Spanish and English) in Earth System Science to fulfill curricular needs in universities of Mexico, Chile, and Puerto Rico thanks to a NASA grant and a MOU with the international Consorcio Educativo para la Protección Ambiental.

**International Research Collaborations**
Dr. Gerard Cornelissen (Norway) - Norway Geotechnical Institute
Dr. Yves Gélinas (Canada) - Concordia University
Dr. Toru Ishikawa (Japan) - University of Tokyo
Dr. Chonlin Lee (Taiwan) - National Sun Yat Sen University
Dr. Kurt H. Kjær (Denmark) - Dir. of Research Natural History Museum, University of Copenhagen
Dr. Marc Lucotte (Canada) - University of Quebec in Montreal
Dr. Tibisay Perez (Venezuela) - Venezuelan Institute for Scientific Research (IVIC)
Dr. Cornelia Rumpel (France) - National Institute of Agricultural Research
Dr. Laura Sánchez-Garcia (Spain) - Zaragoza University
Dr. Camilla Snowman Andresen (Denmark) - Geological Survey of Denmark and Greenland
Dr. Roman Teisserenc (France) - National Polytechnic Institute of Toulouse

External Reviews and Service


External Reviewer:

Institutional Reviews:
- On-Site Reaffirmation Committee for SACSOC – University of South Florida (April 2015).
- Department of Marine Sciences – University of Connecticut (2014)


External Tenure and Faculty Dossiers:
- National University of Singapore (Associate Professor of Chemistry)
- University of Georgia (Tenure/Associate Professor of Marine Sciences)
- Georgia State University (Associate Dean - Education)
- Concordia University (Full Professor of Chemistry)

Proposals - NSF, ACS-PRF, Hudson River Foundation, Irish Research Council for Science, Engineering and Technology (IRCSSET), Fonds de recherche du Québec - Nature et technologies (FRQNT), French Agence Nationale de la Recherche, Netherlands Science Council, Norway Science Council; Swiss NSF.

Journals – Analytical and Bioanalytical Chemistry; Analytical Chemistry; Applied Geochemistry; Biogeochemistry; Biogeosciences; Chemosphere; Environmental Pollution; Environmental Science & Technology; Estuarine, Coastal & Shelf Science; Geochimica et Cosmochimica Acta; Global Biogeochemical Cycles; J. of Environmental Radioactivity; J. of Exposure Science & Environmental Epidemiology; J. of Geophysical Research-Biogeosciences; Limnology & Oceanography; Marine Chemistry; Marine Pollution Bulletin; Organic Geochemistry; Quaternary International; Soil Science Society of America J.; Wetlands.

Institutional Service
- 2012-present: Member of Advisory Councils of the Executive Vice President and Provost (Texas A&M University) and of the Vice Chancellor (Texas A&M System).
- 2015: Member of search committee for Dean of Faculties.
- 2010-2012: Member, Advisory committees of the V.P. of Academics and Research, Assessment Council Committee, and Academic Advisory Council Committee (Texas A&M Galveston)
- 2006-present: Member, Graduate Instruction Committee (Texas A&M Galveston)
- 2008-2011: Member, Faculty Senate and Diversity Sub-Committee (Texas A&M University)
- 2007: Chair, Tenure & Promotion Review Committee (Texas A&M Galveston, Dept. Marine Sciences)
- 2007-2011: Member, University Research Advisory Committee (Texas A&M Galveston)
- 2007-2010: Member, Graduate Recruiting and Academic Advisory Committee (Texas A&M)
- 2007-2008: Member, University Academic Enhancement Steering Committee (TAMUG)
- 2007: Member, Chemical Oceanography Faculty Search (Texas A&M)
- 2003-2006: Associate Director and Science Curriculum Director – Masters of Public Affairs in Environmental Science and Policy (Columbia University)
- 2003-2006: Graduate Admissions Committees – Columbia University
Awards
1) 2010: Distinguished Achievement Award. Texas A&M University - Association of Former Students.
2) 1998-2000: Post-Doctoral - NSERC
3) 1994-1996: Eco-Research, Canadian Ministry of the Environment (Ph.D.)
6) 1991-1992: Fondation Université du Québec (M.Sc.)

Professional Memberships
American Chemical Society
American Society of Limnology & Oceanography
American & European Geophysical Union

Graduate And Undergraduate Students
- Allison Myers-Pigg, Ph.D. ongoing (Advisor): Texas A&M University - Oceanography.
- Anne Tamalavage, M.Sc. admitted (Advisor): Texas A&M University - Oceanography.
- Ching-Ping Lu, Ph.D. ongoing (Thesis Committee). Texas A&M University - Oceanography.
- Josh Williams, Ph.D. ongoing (Thesis Committee). Texas A&M University - Oceanography.
- NSF-REUs: Kandice Williams (2011); Heili Lowman (2010); Stacey Moller (2010)
- Omar R. Harvey, Ph.D. (Thesis Committee). Texas A&M University - Geology & Geophysics. 2010
- Li-Jung Kuo, Ph.D. (Co-Advisor). Texas A&M University - Geology & Geophysics. 2009
- Danielle Aguirre, B.Sc. Senior Thesis. (Advisor). Texas A&M University. 2010
- Lillian Pitts, MPA (Advisor). Columbia University. 2004
- Stephane Houel, Ph.D. (Thesis Committee). University of Québec in Montréal. 2003
- April Patterson, MPA (Advisor). Columbia University. 2003

Post-Doctoral Associates
- Dr. Stephane Houel, University of Québec in Montréal. 2003-2005
Peer-Reviewed Publications (Students/Post Docs underlined)

**Papers in Preparation (Draft in existence)**


**Papers in Review**


**Papers in Print**


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Appendix 2-130


**Peer-Reviewed Technical Reports**


**Non Peer-Reviewed**


Brandenberger, J., E. Crecelius, P. Louchouarn et al. (2008). Reconstructing trends in hypoxia using multiple paleoecological indicators recorded in sediment cores from Puget Sound, WA. NOAA Coastal Hypoxia Research Grant Number: NA05NOS4781203

**Presentations**


Western Gulf of Mexico. AGU Fall Meeting 2015, Dec. 14-18, San Francisco, California.


expansion on the Texas coast: implications for blue carbon storage in coastal wetlands. 22nd Biennial Conference of the Coastal and Estuarine Research Federation. 3-7 Nov. San Diego, CA.


Appendix 2-132


Deposition of Inorganic Air Toxics to the Waters of the Urban Ecosystem of Puget Sound, WA, USA. ASLO/AGU Ocean Meeting, Feb. 22-26, Portland, Oregon.


Grants and Contracts

Pending Research:

NSF RAPID (Division of Environmental Biology): “Collaborative Research: How does fire impact immediate and hydrological event-driven export of different pools of pyrogenic carbon in streams?”. 2014-2016. (PI).


Awarded Research:


Cameron Corp: “Locating a CDX Pilot Plant on the TAMUG Campus, Site Preparation, Installation, and
Appendix 2-135


The Welch Foundation: Departmental grant to enhance undergraduate research in chemistry at Texas A&M University-Galveston. 2010-2015. (PI)

NOAA-Northern Gulf of Mexico Institute: “Responses of Benthic Communities and Sedimentary Dynamics to Hydrocarbon Exposure in Neritic and Bathyal Ecosystems”. 2010-2011 (Co-PI).


Northern Gulf of Mexico Institute: “Responses of Benthic Communities and Sedimentary Dynamics to Hydrocarbon Exposure in Neritic and Bathyal Ecosystems. Phase I & II”. (Sub-contract) 2010-2011.


Texas A&M University-Pathways to Doctorate: Fellowship support for a Ph.D. student. 2008-2010.

NOAA – Coastal Hypoxia Research Program: “Historical evaluations of increased hypoxia in three basins of the Puget Sound” (Co-PI) - 2005-2008.

Alliance Program (Columbia/Sciences-Po/Polytechnique): “Science Education: The role of authentic inquiry for building practice and scientific literacy in graduate multidisciplinary professional programs” (PI) - 2005.


Columbia University - LDEO: “Testing the efficacy of probability maps as a means of communicating climate forecasts to policy makers” (Co-PI) - 2003.

Earth Institute - Columbia University: Funding for Post-doctoral Associate (PI) – 2002-2005.


NSF: “MRI: Acquisition of Instrumentation for the Chemical and Biological Characterization of Factors Affecting the Distribution and Phytoremediation of Seagrasses in Coastal Bays and Estuaries” (Co-PI) - 2001-2003.


Appendix 2-135
TAMUCC College of Science & Technology - Equipment Grant (Carbon Analyzer): (PI) - 2000.
NSERC: Equipment Grant (GC/MS), (Co-PI) – 1997
FRANCO MARCANTONIO, Ph.D.
Professor, Department of Geology and Geophysics

Texas A&M University
College Station, TX  77843

Phone: 979-845-9240
Email: marcantonio@tamu.edu

Education:
- BSc (1986) (highest honors), Double major: Chemistry and Geology, Carleton University
- MSc (1988) Geology, McMaster University
- MPhil (1992) Geological Sciences, Columbia University, Lamont-Doherty Earth Observatory
- PhD (1994) Geological Sciences, Columbia University, Lamont-Doherty Earth Observatory
  Dissertation title: The application of rhenium-osmium isotope systematics to crustal and mantle processes, Advisor: Alan Zindler

Professional Experience:
- 1996-2002: Assistant Professor, Department of Geology, Tulane University.
- 2002-2006: Associate Professor, Department of Earth and Environmental Sciences, Tulane University
- 2006-2010: Associate Professor, Department of Geology and Geophysics, Texas A&M
- 2010-: Professor, Department of Geology & Geophysics, Texas A&M
- 2011-2014: Assistant Department Head, Department of Geology & Geophysics, Texas A&M
- 2012-: Holder of the Robert R. Berg Professorship of Geology and Geophysics, Texas A&M
- 2015-: Associate Department Head, Department of Geology & Geophysics, Texas A&M

Citation Record

Google Scholar citations: http://scholar.google.com/citations?user=CrpJNHkAAAAJ&hl=en&oi=ao

Journal Articles (Since 2008):


**Abstracts (Since 2008):**


Reimi, M. S.* and Marcantonio, F. (2014) Dust Deposition and Migration of the ITCZ through the Last Glacial Cycle in the Central Equatorial Pacific (Line Islands), Eos Trans. AGU, Fall 2014 meeting.


Reimi Sipala, M.* and Marcantonio, F. (2015) Inter-Tropical Convergence Zone Shifts During the Last Glacial Cycle near the Line Islands Ridge, Eos Trans. AGU, Fall 2015 meeting.
Current Research Awards:
Source: NSF
Total Amt Requested: $235,121
Role: PI
Title: Collaborative Research: Dust deposition, paleo-export production, and migration of the ITCZ through the last glacial cycle in the west-central Pacific (Line Islands)
Dates: 5/1/2015-4/30/2018

Pending Research Awards:
Source: NSF
Total Amt Requested: $1,121,909
Role: co-PI
Title: Acquisition of a Multicollector Inductively Coupled Plasma Mass Spectrometer and Laser Ablation System for Investigating the Evolution of the Earth's Climate, Oceans, and Tectonics at Texas A&M University
Dates: 10/01/2015-09/30/2018

Source: NSF
Total Amt Requested: $156,781
Role: PI
Title: Collaborative Research: Reconstructing Millennial-Scale Variability in the West African Monsoon and Primary Productivity in the Niger Delta Across the Last Glacial Period
Dates: 08/16/2015 to 08/15/2017

Past Research Awards (since 2008):
Source: National Science Foundation
Amount: $176,421 (TAMU only)
Role: co-PI (with co-PI Tom Bianchi, Oceanography, TAMU, and PI Mead Allison, UTIG)
Title: Collaborative Research: Developing a high-resolution late Holocene sediment record of rapid Arctic climate change from the Beaufort Sea coastal zone
Dates: 07/01/2012-06/30/2014

Source: National Science Foundation
Amount: $234,035
Role: Principal Investigator
Title: Constraining Temporal Movement of the ITCZ in the Eastern Equatorial Pacific Using Radiogenic Isotopes
Dates: 07/01/2011-6/30/2013

Source: National Science Foundation
Amount: $401,841
Role: Principal Investigator (co-PI M. Lyle, Dept of Oceanography, TAMU)
Title: $^{230}$Th dynamics in the Eastern Equatorial Pacific Ocean: testing the $^{230}$Th-normalization method to estimate sediment fluxes
Dates: 07/01/09-06/30/12

Source: National Science Foundation
Amount: $450,000
Role: Principal Investigator (co-PIs E. Grossman, B. Miller, M. Schmidt, D. Thomas)
Title: Acquisition of a High-Resolution Inductively-Coupled Plasma for Earth & Environmental Science Research at Texas A&M University
Dates: 08/01/08-07/31/11
Source: National Science Foundation  
Amount: $136,000 ($211,000 to WHOI)  
Role: Principal Investigator (co-PI J. McManus at WHOI)  
Title: Investigating the He-3/Th-230 ratios as a proxy for deep-sea sediment redistribution  
Dates: 10/01/05-09/30/08 (in no-cost extension)

Source: State of Louisiana CREST program  
Amount: $74,000  
Role: co-PI (PI Mead Allison, Tulane University)  
Title: Quantifying Subsidence in Barataria Bay and Surrounding Areas and its Impact on Recent Bay Evolution  
Dates: 07/01/06-06/30/08

**Invited Lectures-Department Seminars (Since 2008):**

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<thead>
<tr>
<th>Year</th>
<th>Institution</th>
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<tbody>
<tr>
<td>2015</td>
<td>Old Dominion University</td>
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<td>2014</td>
<td>University of Kentucky</td>
</tr>
<tr>
<td>2012</td>
<td>Rosenthel School of Marine and Atmospheric Sciences, University of Miami</td>
</tr>
<tr>
<td>2011</td>
<td>University of Houston</td>
</tr>
<tr>
<td>2010</td>
<td>Texas A&amp;M University—Oceanography Dept</td>
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<td>2010</td>
<td>University of Texas - EL Paso</td>
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**Courses Taught (Texas A&M)**

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<td>Fall/2007</td>
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Spring/2015: GEOL 489: Team Research in Geochem and Paleoclimate (3.0 SCH)
Summer/2015: GEOL 311: Principles of Geological Writing (1.0 SCH)
Fall/2015: GEOL 302: Introduction to Petrology (3.0 SCH)

University Service (Texas A&M)

2015-2016: Associate Department Head
2015-2016: College Tenure and Promotion Committee
2014-2015: Undergraduate Curriculum Study Group
2012-2014: College Committee for IODP XRF scanner
2011-2012: Departmental Executive Committee
2012-2014: College Tenure and Promotion Committee
2011-2014: Assistant Department Head
2013-2014: College Chemistry Lab teaching Committee
2014: Alternate for IODP faculty Search Committee
2013: Hydrogeology Search Committee
2012: Chair of Search Committee, Departmental Academic Advisor
2011: Search Committee, Departmental Academic Advisor
2007-2011: Departmental Tenure and Promotion Committee
2007-2011: Departmental Space Committee
2007-2011: Departmental Seminar Committee
2009-2011: University Committee for Laboratory Safety
2010-2011: Search Committee, Associate Dean of Research of College of Geosciences
2009-2010: College of Geosciences Climate and Energy START Committee
2009-2010: College of Geosciences AFS Faculty Award Selection Committee
2007-2010: College of Geosciences Faculty Committee
2006-2007: Search Committee, Department Head for the Department of G & G

Teaching Awards

2003: Mortar Board Award for Teaching Excellence at Tulane University

Research Proposal Review Panels

2001: NSF panelist (Ocean Sciences/Chemical Oceanography Panel)
2004: NSF panelist (Ocean Sciences/Marine Geology & Geophysics Panel)
2011: NSF panelist (Ocean Sciences/Marine Geology & Geophysics Panel)

Special Session Convener

2005: co-Convener of AGU special session “New isotope tools in paleoclimatology”
2008: co-Convener of GSA special session “Geochemical tracers of changes in seawater chemistry”
2008: Member of GEOTRACES international intercalibration study of seawater trace element and isotopes
2011: co-Covener of AGU special session “Abrupt changes in intermediate water penetration into North Atlantic on deglacial timescales

Other Honors And Awards:

2015-: Elected as Fellow of the GSA
2012-: Holder of the Robert R. Berg Professorship
1997-2006: Member of the Speaking of Science Program (Louisiana BoRSF)
1997-1998: Oak Ridge Associated Universities Junior Faculty Enhancement Award
1988-1994: Graduate Fellowship, Columbia University
1986-1988: H. L. Hooker Scholar, McMaster University
1986-1988: NSERC Graduate Scholarship, McMaster University, Carleton University
1982-1986: Senate Medal for Outstanding Academic Achievement, Carleton University
1982-1986: J. P. Bickell Scholar, Carleton University
1982-1986: Dr. M. Ralph Berke Award in Chemistry, Carleton University
1982-1986: Dr. Frederick William Charles Mohr Scholarship, Carleton University

Graduate Students

**Current students**

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Degree</th>
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<tbody>
<tr>
<td>Matt Loveley</td>
<td>Chair</td>
<td>PhD Geol</td>
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<tr>
<td>Maya Reimi</td>
<td>Chair</td>
<td>PhD Geol</td>
</tr>
<tr>
<td>Jenna Newman</td>
<td>co-Chair</td>
<td>PhD OCNG</td>
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<tr>
<td>Cait Kelly</td>
<td>Chair</td>
<td>MS Geol</td>
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<tr>
<td>Ryan Wilcoxson</td>
<td>Chair</td>
<td>MS Geol</td>
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<tr>
<td>Ben Prince</td>
<td>Chair</td>
<td>MS Geol</td>
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<tr>
<td>Noura Randle</td>
<td>Member</td>
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<tr>
<td>E. Dylan Laird</td>
<td>Member</td>
<td>MS WMHS</td>
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<tr>
<td>Jessica Garcia</td>
<td>Member</td>
<td>PhD Geol</td>
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<tr>
<td>Alex Van Plantinga</td>
<td>Member</td>
<td>PhD Geol</td>
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<tr>
<td>Amy Price</td>
<td>Member</td>
<td>PhD Geol</td>
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<tr>
<td>Richard Van Winkle</td>
<td>Member</td>
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<tr>
<td>Julia Shackford</td>
<td>Member</td>
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<tr>
<td>Jindang Cai</td>
<td>Member</td>
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<tr>
<td>Claire McKinley</td>
<td>Member</td>
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<tr>
<td>Zach Rolewicz</td>
<td>Member</td>
<td>PhD Ocng</td>
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**Past students:**

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<th>Degree</th>
<th>Employment at Graduation</th>
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<tbody>
<tr>
<td>Ruifang Xie</td>
<td>Chair</td>
<td>PhD Geol (2013)</td>
<td>Post-doc at Max Planck -Mainz</td>
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<tr>
<td>Ajay Singh</td>
<td>Chair</td>
<td>PhD Geol (2012)</td>
<td>Instructor at Univ of Houston</td>
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<td>Grecia Lopez</td>
<td>Chair</td>
<td>MS Geol (2015)</td>
<td>Industry, Atlanta, GA</td>
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<tr>
<td>Rami Ibrahim</td>
<td>Chair</td>
<td>MS Geol (2015)</td>
<td>Houston, TX</td>
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<tr>
<td>Jayme McBeee</td>
<td>co-Chair</td>
<td>MS Geol (2012)</td>
<td>Houston, TX</td>
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<td>Bree McClennning</td>
<td>co-Chair</td>
<td>MS Geol (2011)</td>
<td>Instructor Blinn College</td>
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<tr>
<td>Zeynep Dincer</td>
<td>co-Chair</td>
<td>MS Geol (2013)</td>
<td>Turkish Petroleum Company</td>
</tr>
<tr>
<td>Yingfeng Xu</td>
<td>Chair</td>
<td>PhD Geol (2004)</td>
<td>Geochem technician Florida State Univ</td>
</tr>
<tr>
<td>Ali Pourmand</td>
<td>Chair</td>
<td>PhD Geol (2006)</td>
<td>Post-doc Univ Chicago, Asst Prof at Univ of Miami (RSMAS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD Geol (2006)</td>
<td>Professor at MIT</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Environmental Consulting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PhD student at Univ S. Florida</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Asst Prof at U Minn--Duluth</td>
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<tr>
<td></td>
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<td></td>
<td>Post-doc at Univ Connecticut</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PhD student at Virginia Tech</td>
</tr>
<tr>
<td></td>
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<td>PhD Geol (2010)</td>
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</tr>
</tbody>
</table>

Appendix 2-144
Matthew Berg  Member  PhD ESSM
Joshua Litt  Member  MS WMHS  Environmental Consulting
Kelly Brooks  Member  MS Ocng  EOG
Joseph Hill  Member  MS Geol  Anadarko
Danl Lewis  Member  MS Ocng  Chevron
Christina Piela  Member  MS Ocng (2010)  BP
Bill Weinlein  Member  MS Ocng  Environmental Consultant
Li-Jung Kuo  Member  MS Geol (2009)  Post-doc Batelle National Labs
Dan Murphy  Member  PhD Ocng (2010)  Post-doc, University of Southampton
Stella Woodard  Member  PhD Ocng (2011)  Post-doc Rutgers University
Richard Smith  Member  PhD Ocng (2011)  Post-doc University of CT
Laura Wysocki  Member  PhD Biol (2007)  Professor at USL-Hammond
Troy Sampere  Member  PhD Biol (2009)  Professor at USL-Hammond

**Undergraduate Students**

*Texas A&M undergraduate graduate students who have performed research in my lab:*
Marilyn Wisler (Geology major), Justin Schley (Geology major), Matthew Patrolia (Geology major), Garrett Naiser (Chemistry major) Thinh Nguyen (Geology major), Ezriq Kushairi (Geology major), Grecia Lopez (Geology major), Cameron Nikmard (Geology major), Precious Nkoro (Geology major) Thomas Hull (Geology major), Alyssa Franklin (Geology major), Tengku Faisal (Geology major)

*Tulane undergraduate students who have performed research in my lab:*
Mike Takaichi (Geology major), Nicole Templin (Geology major), Joe Levitt (Environmental Geosciences major), Tyler Kinley (Earth Sciences major), Colin Caplan (Earth Science minor), Stephanie Thomas (Geology major)
ALEJANDRO H. ORSI, Ph.D.
Professor, Department of Oceanography, Texas A&M University

3146 TAMU,
College Station, TX 77843-3146

Phone: 979-845-4014
Email: aorsi@tamu.edu

Education
Ph.D., Oceanography, Texas A&M University, 1993
M.S., Oceanography, Texas A&M University, 1990
Licenciatura, Oceanografía, Instituto Tecnológico de Buenos Aires, Argentina, 1985

Professional Experience
Professor, Texas A&M University, Sept. 2013-present
Associate Professor, Oceanography, Texas A&M University, Oct. 2005-Aug. 2013
Research Scientist, Oceanography, Texas A&M University, Jan. 2003-Sep. 2005
Associate Member, Graduate Faculty, Oceanography, Texas A&M University, Oct. 2001
Associate Research Scientist, Oceanography, Texas A&M University, Dec. 1998-Dec. 2002
Assistant Research Scientist, Oceanography, Texas A&M University, Jan. 1997-Nov. 1998
Research Associate, Texas A&M University, Jan.-May 1994
Graduate Research Assistant, Texas A&M University, Aug. 1987-Dec. 1993
Research Scientist, Argentine Antarctic Institute, Buenos Aires, Argentina, Mar. 1985-Jul. 1987

Teaching Interests
• Physical Oceanography
• General Ocean Circulation and Water Mass Transformations
• Descriptive Oceanography from Mesoscale to Global Scale
• Ocean Variability and Climate Change

Courses Taught
OCNG 410: Introduction to Physical Oceanography. Fall 2009, 2010: 32, 30 students
OCNG 489/689: Special Topics in the International Polar Year. Fall 2007: 22 students
OCNG 611: Global Scale Oceanography. Fall 2006, 2007, 2008, 2013: 11, 6, 6, 6 students

Student Advisory Committees
Chair, current (M.S.): Natalie Zielinski, Cody Webb.
Chair, graduated (2 Ph.D., 2 M.S., 2 B.S.):
Christina L. Wiederwohl: Ph.D., OCNG.
Yongsun Kim: Ph.D., OCNG, 2012
LT Benjamin P. Morgan: M.S., OCNG, 2011

Appendix 2-146
Christina L. Stover: M.S., OCNG, 2006
Genevieve Genest: B.S., GEOS, Undergraduate Research Scholar, 2012
Melanie Thornton: B.S., GEOS, Undergraduate Research Scholar, 2011

**Member, current (5 Ph.D., 6 M.S.):**
Eric Monternson: Ph.D., OCNG, FSU, Tallahassee, 2011
Jamin Greenbaum: Ph.D., GEOS, UT, Austin, 2011
Fahad Al Senafi: Ph.D., OCNG
HyungChul Kim: Ph.D., OCNG
Hoii Siang Kang: Ph.D., OCEN
Joseph Girani, M.S., OCEN
Lei Jiang: M.S., OCEN
Taesung Eom: M.S., OCEN
Oyenike Oyebisayo Olaniyi: M.S., OCEN
Bo Zhang: M.S., OCEN

**Member, graduated (6 Ph.D., 6 M.S.):**
Zhang Zheng, Ph.D., OCNG, 2013
Who Kim: Ph.D., OCNG, 2013
Sally Walker: Ph.D., OCNG, 2012
Dan Murphy: Ph.D., OCNG, 2010
Woo-Guen Cheon: Ph.D., OCNG, 2008
Meyre DaSilva: Ph.D., OCNG, 2005
Rachel L. Holder: M.S., OCEN, 2012
Nick Loder: M.S., OCEN, 2008
Ronald Lee McPherson: M.S., OCEN, 2008
Rachael Via: M.S., OCNG, 2005
Mithali Shetty: M.S., ENG, 2003
Tao Yu: M.S., CPSC, 2002

**Research Interests**

- Ocean circulation and transports
- Ocean climate and its variability from seasonal to decadal scales
- Convection near continental margins and ocean interior, deep overflows
- Interpretation of tracer distributions on mesoscale to global, direct current measurements
- Development of hydrographic database and online atlas
- Ocean Observing Systems: GOOS, SOOS

**Publications (since 2008)**


ONG SUN KIM, and ALEJANDRO H. ORSI, 2014: On the Variability of Antarctic Circumpolar Current


Orsi, A. H., S. S. Jacobs, A. L. Gordon and M. Visbeck, 2001: Cooling and ventilating the Abyssal Ocean,


Dissemination

http://corona.tamu.edu presents informative material and pictorial illustrations of work in the field during my recent research programs in the Southern Ocean.

http://woceSOatlas.tamu.edu offers interactive ways to browse and create illustrations with custom tools. It uses an extensive quality controlled database compiled for the Southern Ocean Hydrographic Atlas of the World Ocean Circulation Experiment (WOCE), by Orsi, A. H. and T. Whitworth III.

http://sassi.tamu.edu compiled progress by different nations during the planning stages of the Synoptic Antarctic Shelf-Slope Interactions (SASSI) program, an International Polar Year (IPY) cluster project and the 6th coordinated contribution of the International Antarctic Zone (iAnZone).

Cruise and Data Reports


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Scientific Expeditions (since 2008)


Research Grants from NSF (since 2008)

NASA ROSES – Earth Ventures 2 Program. Land-Ice/Ocean Network ExplorationWith Semiautonomous Systems (LIONESS). Total Cost to NASA: $29,744,636 - Total Project Cost: $31,962,636 ($2,218,000 contribution from the Jackson School of Geosciences and the Institution for Geophysics with two years logistics from the Australian Antarctic Division and three years logistics from Laboratoire de Glaciologie et Géophysique de l’Environnement, Grenoble, France); Orsi (TAMU, $472,871) (declined)


Lead Principal Investigator; NSF-OPP Pending Collaborative Research: Interplay of Eastern Ross Sea Currents with the Atmosphere and Ice – a potential trigger for accelerated marine and continental ice mass loss?, A. H. Orsi (TAMU, $1,678,435), L. Padman and S. Springer (ESR), J. Hutchings (UAF); June 2013-May 2016 (declined).

Principal Investigator; NSF-AISS Award 1143836; Collaborative Research: Totten Glacier System and the Marine Record of Cryosphere – Ocean Dynamics; A. H. Orsi (TAMU, $411,611), A. Levener (Colgate University), D. Blankenship (UT), E. Domack (Hamilton College), B. Huber (Columbia University); September 2012-August 2015

Principal Investigator; NSF-OCE Award 0961523; Intermediate-depth Ventilation of the Antarctic Circumpolar Current in the Southwestern Scotia Sea; A. H. Orsi (TAMU, $392,356); April 2010-March 2013

Lead Principal Investigator; NSF-OPP Award 0839005; Collaborative Research: Atmosphere-Ice-Ocean Interactions in the Eastern Ross Sea; A. H. Orsi (TAMU, $388,477), Jacobs and Cullather (LDEO), Holland (NYU); June 2009-July 2013
Principal Investigator; NSF-OPP Award 0818061; SGER: Direct Cross-Slope Ventilation of the ACC at the Western Scotia Ridge; A. H. Orsi (TAMU, $199,996); June 2008-May 2009

Contracts (since 2008)

Scripps Institution of Oceanography (NSF-OCE); Cruise S4P of the US Global Ocean Carbon and Repeat Hydrography Program; A. H. Orsi (TAMU, $41,994); February 2011-April 2011

Scripps Institution of Oceanography (NSF-OCE); CLIVAR Repeat Hydrography Cruise P18; A. H. Orsi (TAMU, $37,963); December 2007-November 2008

University of the Balearic Islands; E-SASSI Moorings in Antarctica; A. H. Orsi (TAMU, $105,448); July 2008-May 2010

University of the Balearic Islands; E-SASSI Tracers: CFC and Oxygen Isotopes Measurements on the Spanish Antarctic Shelf Slope Interactions; A. H. Orsi, S. Yvon-Lewis and N. Slowey (TAMU, $48,498); August 2007-November 2008

Professional Service (since 2008)

Department of Oceanography

2012: Search Committee for Oceanography Faculty/Director of GERG. Member.
2012: Search Committee for Ocean Observing Team Leader. Member.
2012-present: Curriculum Committee, Strategic Plan Committee, Ship Committee
2011-present: Recruiting Advisory Committee. Member
2009-2011: Instructional & Graduate Program Enhancement and Equipment Fund. Member
2008-2010: Research Committee. Chair
2007-2008: Instructional & Graduate Program Enhancement and Equipment Fund Com. Chair

College of Geosciences

2011-present: TAMU-Brazil Collaboration. Climate Theme Leader.
2011-present: College Work Life Committee.
2006-2009: Graduate Faculty Advisory Committee. Member

Texas A&M University

2007-2008: International Programs Enhancement and Coordination Committee. Member

National

2008: National Science Foundation Ocean Sciences Research Section Panel. Member

International

2011-present: International CLIVAR Southern Ocean Panel. Member
2006-2010: IAPSO/SCOR Working Group on Deep Ocean Exchanges with the Shelf. Member
2005-2010: International Antarctic Zone (iAnZone). Co-Chair

Editorial

2012-present: Editorial Board Member, Ocean Dynamics, Springer-Verlag.

Professional Societies

1988-present: The Oceanography Society. Member
1987-present: American Geophysical Union. Member
Invited Presentations
2010, U.S. CLIVAR Summit, Denver, CO
2009, MOCA09 IAMAS/IAPSO/IACS Joint Assembly, Montreal, Canada
2008, Oceanography Lectures, NOAA Atlantic Ocean Marine Laboratory, Miami, FL
2008, Oceanography Lectures, University of Balearic Islands and IMEDEA, Mallorca, Spain

Abstracts, Oral Presentations and Posters (Session Chair)
Ocean Sciences: 2012, Salt Lake City (5); 2006, Honolulu (2); 2004, Portland (3); 2000*, San Antonio (3);
San Diego 1998 (2); 1996
European Geosciences Union, Vienna, Austria: 2012, 2009 (2), 2008 (2), 2007 (2)
Petersburg, Russia (2); 2005, Hobart, Australia
International Polar Year: 2012, Montreal; 2010 Oslo, Norway (3)

Workshops and Science Meetings
2012*, Brazil-TAMU Science and Education Internationalization, Porto de Galinhas, Brazil
2011, Brazil-TAMU Steering Committee, Sao Paulo, Brazil
2010, SASSI Workshop, Oslo, Norway
2009, DOES SCOR Working Group 129, 3rd Meeting, Montreal, Canada
2009, 11th iAnZone Coordination Meeting and SASSI Workshop, Montreal, Canada
2008*, DOES SCOR Working Group 129, 2nd Meeting, Cape Town, South Africa

Reviews
National Funding Agencies: American Chemical Society, National Science Foundation (OCE, OPP, CHEM divisions); National Aeronautics and Space Administration; National Oceanic and Atmospheric Administration
International Funding Agencies: Australian National Antarctic Research Expeditions (Australia); Natural Environmental Research Council (U.K.); French Polar Institute Paul-Emile Victor (France); South African National Research Foundation (South Africa)

Honors and Awards
Distinguished Achievement Award: Research Faculty, College of Geosciences, TAMU, 2012
Distinguished Achievement Award: Research Scientist, College of Geosciences, TAMU, 2005
Antarctic Service Medal, Department of Defense, 2000
NASA Fellowship to First Summer School for Earth Sciences, CALTECH, 1990
Organization of American States (OAS) PRA Scholarship, 1988

U.S. Collaborators:

Appendix 2-152
International Collaborators:

Germany: P. Koltermann, V. Gouretski, M. Visbeck
Italy: A. Bergamasco, E. Zambianchi, G. Budillon
Sweden: A. K. Wahlin, L. Arneborg, G. Björk, M. Jakobsson
Argentina: A. Piola, R. Guerrero, G. Tosonotto
Brazil: E. Campos, O. Sato, L. Jovane, I. Wainer, M. Mata, C. Garcia, R. Kerr
Australia: S. Rintoul, N. Bindoff, T. McDougal, S. Downes
Spain: M. Flexas, D. Gomis
South Africa: I. Ansorage, S. Stuart
France: S. Speich
Belgium: H. Goosse
PAMELA PLOTKIN, Ph.D.

Director of Texas Sea Grant College Program & Associate Research Professor, Department of Oceanography

**Education:**


**Experience:**

2011 – current: Director, Texas Sea Grant College Program; Associate Research Professor, Texas A&M University, Department of Oceanography; Graduate Faculty, Marine Biology Interdisciplinary Program; Graduate Faculty, Texas A&M University at Galveston.
2007 - 2011: Deputy Director, Cornell University, Office of Sponsored Programs.
2002- 2007: Assistant Vice President for Research, East Tennessee State University.
2000 – 2002: Director of Research & Sponsored Programs, Frostburg State University.
1999 - 2000: Senior Scientist, Center for Marine Conservation
1997 - 1999: Assistant Professor of Ecology, University of Delaware.

**Funded Research:**

- DOC-NOAA, 2010–2015, ~$10,000,000, Texas Sea Grant College Program (research, extension and education).

**Peer-reviewed Publications:**


**Graduate Students:**

2012- 2013: Kathryn Wedemeyer, Committee chair
2014-present: Christine Figgener, Committee Chair
MARY JO RICHARDSON, Ph.D.
Regents’ Professor, Department of Oceanography, Department of Geology and Geophysics

Texas A&M University,
College Station TX 77843

Phone: 979-845-7966
Email: mrichardson@ocean.tamu.edu

Education:

A.B. Smith College, June 1975 (Geology/Mathematics) Magna Cum Laude
Ph.D. Massachusetts Institute of Technology/Woods Hole Oceanographic Institution - Joint Program in Oceanography, May 1980.

Experience:

2006-present Texas A&M University, Oceanography and Geology and Geophysics Regents’ Professor
2011 Santa Chiara Study Abroad Program, Castiglion Fiorentino, Italy Geoscience program - Created and delivered
2009 Hellenic Centre for Marine Research, Anavysos, Greece Faculty Development Leave - Invited
1994-2006 Texas A&M University, Oceanography and Geology and Geophysics Professor
2002-2004 Texas A&M University, College of Geosciences Interim Dean
1993-2002 Texas A&M University, College of Geosciences Associate Dean for Academic Affairs
1996 NOAA/ Pacific Marine Environmental Lab Faculty Development Leave - Invited
1990-1994 Texas A&M University, Oceanography and Geology Associate Professor
1986-1990 Texas A&M University, Geology Visiting Assistant Professor
1985-1986 Texas A&M University, Oceanography Research Associate
1981-1985 City University of New York (Lehman), Geology and Geography Assistant Professor
1981 State University of New York (Purchase), Natural Science Physical Geology Professor, Summer Session
1980 Woods Hole Oceanographic Institution, Woods Hole, Massachusetts Post-Doctoral Investigator

Funded Research:

NSF Multi-Decadal Global Surveys of Benthic Nepheloid Layers
PIs, Gardner, W.D. and Richardson, M.J.
$208,394 2015-2017
This grant’s long-term goal is understanding the surface to bottom water particle processes in the ocean.

NSF Oceanography Scholars
PIs, Gardner, W.D., Richardson, M.J., Thornton, D., Yvon-Lewis, S. Giese, B.
$625,742 2014-2019
The Oceanography S-STEM (Scholarships in Science, Technology, Engineering and Mathematics) Program facilitates recruitment of academically-talented, financially needy graduate students to become oceanographic scientists who will solve environmental, social and economically important challenges facing the nation. Financial support for the M.S. and Ph.D. students will also include partial teaching or research assistantships.
NSF ADVANCE: Promoting Success of Women Faculty through a Psychologically Healthy Workplace
P.I.: Yennello, S. (M.J. Richardson as senior personnel)
$3,499,980 2010-2015
NSF ADVANCE program goal is increasing the participation and advancement of women in academic science and engineering careers.

NSF Geological and Geophysical Scholars of Continental Margins
PIs: Gardner, W.D., Richardson, M.J., Lyle, M., Sager, W., Schmidt, M.
$598,287 2008-2013
The Geological and Geophysical Scholars of Continental Margins S-STEM (Scholarships in Science, Technology, Engineering and Mathematics) Program facilitates recruitment of academically-talented, financially needy graduate students to become oceanographic scientists in continental margin processes who will solve environmental, social and economically important challenges facing the nation. Financial support for the M.S. and Ph.D. students will also include partial teaching or research assistantships.

NSF Geoscience Scholars
PIs: Richardson, M.J., Bowman, K., Cairns, D., Pettibon, J
$600,000 2007-2012
The Geoscience Scholars S-STEM (Scholarships in Science, Technology, Engineering and Mathematics) Program facilitates recruiting new graduate and undergraduate students into the Geosciences with assistance of scholarship funds to defray the cost of attendance when they would otherwise not have had the resources to do so.

Published Papers (Peer-Reviewed):

Published Papers (Not Peer-Reviewed):
Richardson, M.J. 2015. “Women in Oceanography: A Decade Later”, Biographic Sketch, The Oceanography Magazine, Vol 27, No 4, Supplement, p 160. An issue compiled “to illuminate both the progress that has been made in addressing career barriers since the last volume was published and areas where further attention might still be needed.”

Student Committees:

<table>
<thead>
<tr>
<th>Student’s Name</th>
<th>Department</th>
<th>Level</th>
<th>Started</th>
<th>Graduated</th>
<th>Capacity</th>
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<tr>
<td>Emma Cochran</td>
<td>Oceanography</td>
<td>M.S.</td>
<td>2010</td>
<td>2013</td>
<td>Co-Chair</td>
</tr>
<tr>
<td>Nikki Zuck</td>
<td>Oceanography</td>
<td>PhD</td>
<td>2012</td>
<td>2014</td>
<td>Co-Chair</td>
</tr>
<tr>
<td>Rebecca Gray</td>
<td>Oceanography</td>
<td>M.S.</td>
<td>2014</td>
<td></td>
<td>Co-Chair</td>
</tr>
</tbody>
</table>
GILBERT THOMAS ROWE, Ph.D.

Professor, Department of Marine Biology Interdisciplinary Degree Program, TAMUG System

Educational Background:

B.S. Texas A&M University, 1964
M.S. Texas A&M University, 1966
Ph.D. Duke University, 1968

Professional Experience:

Undergraduate Teaching Asst., Comparative Anatomy, TAMU 1962-64
Summer Trainee, Texas Game and Fish Commission 1962
Graduate Fellow, Dept. Oceanography, TAMU 1964-65
NDEA Fellow, Zoology, Duke University 1965-66
NSF Pre-doctoral Oceanographic Trainee, Duke University Marine Laboratory 1966-68
Research Associate, Florida State University 1968
Postdoctoral Fellow, Woods Hole Oceanographic Institution 1968-69
Assistant Scientist, Woods Hole Oceanographic Institution 1969-73
Associate Scientist, Woods Hole Oceanographic Institution 1973-79
Oceanographer, Brookhaven National Laboratory 1979-87
Head, Oceanographic Sciences Division, BNL 1985-87
Head, Dept. of Oceanography, Texas A&M 1987-93
Professor, Dept. of Oceanography, Texas A&M 1987-present
Head, Dept. of Marine Biology, Texas A&M-Galveston 2003-07
Associate Vice President for Academic Affairs, TAMUG 2007-09
Professor, Dept. of Marine Biology, TAMUG 2003-present
Chair, Marine Biology Interdisciplinary Degree Program, TAMUG System 2011-15

Honor and Professional Societies:

Phi Kappa Phi Honor Society 1963
Honorary Deep-Sea Biological Society 1973
Sigma Xi
American Society of Limnology and Oceanography
The Oceanography Society, Life Member
Fulbright Scholar, Universidad de Concepcion, Chile 2000
Regents Professor, Texas A&M University System 2007

Professional Activities (since 2008):

Census of Marine Life (CoML), Continental Margin Ecosystems (COMARGE) program Steering Committee 2005-2010
Deep Ocean Environmental Long-term Observation System (DELOS) Steering Committee 2003-present
Texas Sea Grant Advisory Council 2008-13
Juror, “Into the Abyss” student art competition, Art Dept., LSU 2011
Courses Taught:

Biological Oceanography and Marine Pollution, a mid-winter short course at the Woods Hole Oceanographic Inst., 1971
Intro. to Biological Oceanography, ZOO 114, Duke Marine Lab., 1977, 78
Biological Oceanography, OCNG 620, at TAMU
Ecology of the Continental Shelf, OCNG 627, at TAMU
Introduction to Oceanography, OCNG 251, at TAMU
Succeeding in Science, MARB 101, at TAMUG
Seminar (reading, writing and presenting scientific literature), MARB 482, at TAMUG
Marine Fisheries Population Dynamics, MARB 460, at TAMUG
Living Marine Resources, MARB 620, at TAMUG
Biogeochemistry of Marine Sediments, U. Concepcion, Chile, as Fulbright Scholar, 2000

Publications (since 2008):


results. **Limnology and Oceanography.** Methods 11, 304-315. DOI 10.4319/lom.2013.11.304


Al-Ansari, E; G.T. Rowe; Mohamed A Abdel-Moati; Ibrahim A Al-Maslamani; Mehsin A Al-Yafei; Ismail M Al-Shaikh; Robert C Upstill-Goddard; Oguz Yigiterhan, 2016. Hypoxia in the central Arabian Gulf Exclusive Economic Zone (EEZ) of Qatar during Summer Season. **Estuarine, Coastal and Shelf Science** DOI:10.1016/j.ecss.2016.03.0.22


*student or former student of GTR
KATHRYN E. F. SHAMBERGER, Ph.D.
Assistant Professor, Department of Oceanography, Texas A&M University

Department of Oceanography
Texas A&M University
College Station, TX 77843, USA

Phone: 1-979-845-5752
Email: katie.shamberger@tamu.edu
Lab Website: http://coastalcarboncycle.weebly.com/

Education:

UNIVERSITY OF WASHINGTON, Seattle, WA.
Ph.D. in Chemical Oceanography, 2011.
Dissertation title: Calcification, Organic Production, and Carbon Dioxide on a Hawaiian Coral Reef.
Advisor: Dr. Richard A. Feely

UNIVERSITY OF HAWAII-MANOA, Honolulu, HI.
M.S. in Chemical Oceanography, 2005.
Advisor: Dr. Fred T. Mackenzie

UNIVERSITY OF SAN DIEGO, San Diego, CA.
Graduated with honors

Positions Held:

Assistant Professor, Texas A&M University (2014 – present)
Postdoctoral Investigator, Woods Hole Oceanographic Institution (2013)
Postdoctoral Scholar, Woods Hole Oceanographic Institution (2011 – 2013)
Graduate Research Assistant, University of Washington (2005 – 2011)
Graduate Research Assistant, University of Hawaii (2002 – 2005)
Intern, Center for Tropical Research, Mote Marine Laboratory (2001)

Research Experience:

Postdoctoral Research, Woods Hole Oceanographic Institution, Woods Hole, MA (08/11 – present)
Advisers: Dr. Anne L. Cohen and Dr. Daniel C. McCorkle
– Characterization of the spatial and temporal variability of, and the biogeochemical controls on, the seawater CO2 system of Palauan coral reefs.
– Investigation of the relationships between CO2 and ecosystem calcification rates on Pacific coral reefs with varying CO2 levels, nutritional status, community composition, and flow regimes.

Doctoral Research, University of Washington, Seattle, WA (09/05 – 06/11)
Adviser: Dr. Richard A. Feely
Committee Members: Dr. Chris Sabine, Dr. Paul Quay, Dr. Parker MacCready, Dr. Ken Sebens
– Measured diel time series of the seawater CO2 system and net ecosystem calcification, organic production, and respiration rates of the barrier coral reef in Kaneohe Bay, Oahu, HI.
– Determined the relationship between net ecosystem calcification and pCO2 on the Kaneohe Bay barrier reef.

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Utilized calcification and organic production rates and mooring pCO₂ data to determine the processes controlling CO₂ in Kaneohe Bay on diel, seasonal, and annual time scales.

Master’s Thesis Research, University of Hawaii-Manoa, Honolulu, HI (08/02 – 12/05)
Adviser: Dr. Fred T. Mackenzie
Committee Members: Dr. Marlin Atkinson and Dr. Edward Laws
- Performed a bi-monthly time series study of the seawater CO₂ system in the lagoon waters of Kaneohe Bay, Oahu, HI.
- Determined the processes controlling air-sea CO₂ exchange for the lagoon waters of Kaneohe Bay on seasonal and annual time scales.

Intern at Mote Marine Laboratory, Center for Tropical Research, Summerland Key, FL (10/01 – 12/01)
Advisers: Dr. Erich Mueller and Dr. Jane Hawkridge
- Investigated the effects of pesticides on gorgonians by performing laboratory exposure experiments.
- Performed coral disease and health surveys and assisted in the collection of Black Band Disease via SCUBA.
- Maintained coral aquaculture facilities.

Undergraduate Research, The School for Field Studies, Turks & Caicos Islands, British West Indies (02/00 - 05/00)
- Evaluated the health of coral reefs surrounding South Caicos Island by surveying coral, algae, and fish using the Atlantic and Gulf Rapid Reef Assessment protocol.

Funded Research Grants:

Publications:
*Shamberger previously published as Fagan.


Scholarships And Honors:
Woods Hole Oceanographic Institution Postdoctoral Scholarship Award. (2011 – 2013)
Best poster award, Surface Ocean Lower Atmosphere Study (SOLAS) Summer School. (2007)
Anderson Scholarship for internship with Mote Marine Laboratory, Center for Tropical Research. (Fall 2001)
Graduated from University of San Diego with honors. (2001)
Member of Mortar Board Senior Honors Society, Alcala chapter, University of San Diego. (2000 – 2001)
Alcala Leadership Program, University of San Diego. (1999)
University of San Diego Honors Program. (1997 – 2001)
Trustee Scholarship (academic scholarship), University of San Diego. (1997 – 2001)

Teaching Experience:
Assistant Professor, Texas A&M University, College Station, TX (current)
- Introduction to Oceanography (OCNG 251): Undergraduate introduction to the field of oceanography for non-science majors.
- Communicating Ocean Sciences (OCNG 603): Graduate course that provides instruction and practice with presenting scientific information on the ocean to science and non-science audiences.

Lecturer, Woods Hole Oceanographic Institution, Woods Hole, MA (September 2012)
- Gave a lecture on ocean acidification to a group of about twenty BP employees who were taking an ocean science short course at WHOI.

Guest Lecturer, Sea Education Association (SEA), Woods Hole, MA (March 2012)
- Gave a lecture on ocean acidification and coral reefs to undergraduate students participating in a semester of marine research through the SEA Semester program.

Guest Speaker, Palau Community College, Korror, Palau (September 2011)
- Gave a lecture on my research in Hawaii and how it relates to Palauan reefs, emphasizing the effects of ocean acidification and the variability in the seawater CO$_2$ system of coral reefs.
Guest Lecturer, Seattle area schools, WA (2006 – 2011)
  - Gave lectures on climate change and ocean acidification to high school, community college, and undergraduate classes at several schools in the Seattle area, WA.

  - Taught introduction to oceanography laboratory course. Gave short lectures and ran laboratory, computer, and field trip exercises.

Tutor, University of San Diego (1998 – 1999)
  - Tutored freshman and sophomore undergraduate students in biology, college algebra, calculus I, and calculus II.

**Student Advising:**
PhD Students: Andrea Kealoha (started Fall 2014)
  Graduate Student Committees: Dawei Shi (PhD committee, chair: Terry Wade); Michael Evans (PhD committee, chair: Piers Chapman); Jordan Young (MS committee, chair: Shari Yvon-Lewis); John Schiff (PhD committee, chair: Brendan Roark); Constance Previti (MS committee, chair: Shari Yvon-Lewis).

**Presentations:**
*Shamberger previously presented as Fagan.*


**Shamberger, K. E. F.** 2013. Variable Responses of Coral Reefs to Ocean Acidification: Lessons from the Field.

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Department of Earth, Ocean, and Atmospheric Science, Florida State University, Tallahassee, FL, USA.

Invited talk.


Shamberger, K. E. F. 2013. Coral Reef Responses to Ocean Acidification: Lessons from the Field. Department of Oceanography, Texas A&M University, College Station, TX, USA. Invited talk.


Workshops:


ADVANCE Center Roadmap for a Successful Academic Career Workshop, Texas A&M University, College Station, TX, April 2014

Coral Reef Ocean Acidification Monitoring Portfolio Workshop, NOAA and Nova Southeastern University Oceanographic Center, Ft. Lauderdale, FL, August 2012


Ocean Acidification Workshop, Scripps Institution of Oceanography, La Jolla, CA, October 2007.

Workshop on the Impacts of Increasing CO$_2$ on Coral Reefs and Other Marine Calcifiers, St. Petersburg, FL, April 2005.

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Research Cruise Experience:
Many months of time on small boats investigating coral reef biogeochemical cycling in Hawaii, American Samoa, Palau, the Great Barrier Reef in Australia, Taiwan, and the Gulf of Mexico.

One month research cruise onboard the NOAA R/V Hi‘ialakai to investigate the seawater CO₂ system in the coral reef systems of the islands of American Samoa (02/06 – 03/06)

One day research cruise onboard the R/V Thomas G. Thompson to do repeat water sampling in the Puget Sound, WA (Winter 2004)

One day research cruise to characterize the benthic and phytoplankton community off the coast of San Diego, CA (Fall 2000)

One day research cruise onboard the R/V Sea Watch to investigate the morphology, geology, and water chemistry of the California Continental Borderland off the coast of Long Beach, CA (Fall 1999)

Professional Activities And Outreach:

Postdoctoral Association, Secretary, Woods Hole Oceanographic Institution, 2012-2013.
Co-organizer and session chair for the Graduate Climate Conference at the University of Washington, WA, October 2007.

Member of ASLO since 2005.

Member of AGU since 2004.

Invited Earth Day speaker for New Hampton School, a boarding high school in New Hampshire. Gave a talk to the entire student body and faculty entitled “Climate Change, Double Trouble for Tropical Coral Reefs: Warming and Acidification.”

Participated in the Synergy project, a collaboration between artists and MIT/Woods Hole Oceanographic Institution scientists that produced an exhibition at the Boston Museum of Science that let viewers explore oceanography through art: http://www.whoi.edu/website/synergy/about-synergy.

Participated in Woods Hole Oceanographic Institution’s Public Ocean Acidification Event by running a table with information and activities on coral reef ocean acidification field research.

Worked with high school students in Bellevue, WA via the Educurious website on science projects as part of an interactive Ecological Impacts of Climate Change course.

Gave overview of effects of ocean acidification to science educators during Centers for Ocean Science Education Excellence - Ocean Learning Communities event.

Volunteered for National Ocean Science Bowl several times in Honolulu, HI and Seattle, WA.

Judged high school science fairs in Honolulu, HI and Seattle, WA areas.

Gave outreach talks on climate change and ocean acidification at the Woods Hole Oceanographic Institution, University of Washington, Seattle, WA; NOAA Pacific Marine Environmental Laboratory, Seattle, WA; Ballard High School, Seattle, WA; and Garfield High School, Seattle, WA.

Certifications And Proficiencies:
Analytical Techniques: Total alkalinity (TA) using an open cell potentiometric titration and dissolved inorganic
carbon (DIC) using semi-automated coulometry coupled with a Single Operator Multi-parameter Metabolic Analyzer (SOMMA). I have analyzed TA and DIC separately and also simultaneously using a VINDTA 3C. Dissolved oxygen using Winkler Titration.


Computer Language: Matlab.

U.S. Coast Guard approved Boat U.S. Foundation General Boating certification.

Scientific diver, advanced, wreck, and stress rescue SCUBA diving certifications.
NIALL C. SLOWEY, Ph.D.
Professor of Oceanography, Texas A&M University

Education
Ph.D., Oceanography, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography, 1991
M.S., Marine Science, University of North Carolina at Chapel Hill, 1986
Geology Field Camp in the Rocky Mountains, Indiana University at Bloomington, 1981
B.S., Geology, Tufts University, 1980

Professional Experience
Professor, Department of Oceanography, Texas A&M University, 2003 – Present
Associate Professor, Department of Oceanography, Texas A&M University, 1997 – 2003
Assistant Professor, Department of Oceanography, Texas A&M University, 1991 – 1997
Lamont Postdoctoral Fellow, Lamont-Doherty Geological Observatory of Columbia University, 1990 – 1991
20 Research cruises

Refereed Publications (* = student)

Woodworth-Lynas, C.M.T., J. Dingler, S. Blasco, N. Slowey (in review) A Buried Fully Preserved Late Quaternary Ice Keel Turbate, Upper Continental Slope, Canadian Beaufort Sea.

Sahin*, H., N. Slowey, and R. Lytton (reviewed, revised, awaiting acceptance) Application of a volume measurement method during the characterization of the shrinkage and swelling indices of expansive soils, American Society Civil Engineers (ASCE) Journal of Materials in Civil Engineering.


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Recent Funded Research

“Students at Sea Program to be Expanded as Summer Program for Integrated Undergraduate Field Research in the Galápagos”, High-Impact Undergraduate Research in College of Geosciences, 2015-2016, $15,502 (PIs Biggs, Slowey, Giese, & Filippi).


“Coral-Reef Ocean-Acidification Mooring at the Flower Garden Banks”, Shell Exploration & Production Company, 2015-2016, $150,000.


“Seafloor imaging of Alacran Reef and related features”, CONACYT–Texas A&M University, 2011-2013, $24,000 (PIs Slowey & Ardisson).

“High-resolution mapping of reefs and banks (Gulf of Mexico)”, National Fish & Wildlife Foundation, Private Foundation, & Texas A&M University, 2009-2013, $400,455 (PI Slowey).

Recent Graduate Student Advising

Advisor, Oceanography Graduate Student Council, 2011 – 2012

<table>
<thead>
<tr>
<th>Student</th>
<th>Position</th>
<th>Degree Program</th>
<th>Years Mentored</th>
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<tbody>
<tr>
<td>Daniel Brooks</td>
<td>co-chair</td>
<td>M.S. Oceanography 2014</td>
<td>3</td>
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<tr>
<td>Katherine Crabill</td>
<td>chair</td>
<td>M.S. Oceanography (current)</td>
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<tr>
<td>David Hoffmann</td>
<td>chair</td>
<td>M.S. Oceanography (current)</td>
<td>2.5</td>
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<tr>
<td>Adrian Miner</td>
<td>chair</td>
<td>M.S. Oceanography 2013</td>
<td>3</td>
</tr>
<tr>
<td>Vance Nygard</td>
<td>chair</td>
<td>Ph.D. Oceanography (current)</td>
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<tr>
<td>Andreas Pazmino</td>
<td>chair</td>
<td>Ph.D. Oceanography (current)</td>
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<tr>
<td>Edwin Pinto</td>
<td>chair</td>
<td>Ph.D. Oceanography (current)</td>
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Appendix 2-170
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<th>Name</th>
<th>Title</th>
<th>Degree Program</th>
<th>Years</th>
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<tbody>
<tr>
<td>Elda Ramirez</td>
<td>chair</td>
<td>M.S. Geosciences 2013</td>
<td>2</td>
</tr>
<tr>
<td>Marco Santos</td>
<td>chair</td>
<td>M.S. Oceanography 2011</td>
<td>2</td>
</tr>
<tr>
<td>Eric Schall</td>
<td>chair</td>
<td>M.S. Geosciences 2011</td>
<td>3</td>
</tr>
<tr>
<td>Yasuto Shigei</td>
<td>chair</td>
<td>M.S. Geosciences (current)</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Laura Stanley</td>
<td>chair</td>
<td>M.S. Geophysics (current)</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Eleanor Yudelman</td>
<td>chair</td>
<td>M.S. Oceanography 2014</td>
<td>2</td>
</tr>
</tbody>
</table>
SCOTT A. SOCOLOFSKY, Ph.D.
Professor
Texas A&M University

Address
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Contact
Ph. (979) 845-4517
FAX (979) 862-8162
socolofs@tamu.edu
http://ceprofs.tamu.edu/ssocolofsky/

Expertise
Environmental Fluid Mechanics, multiphase flow, subsea oil well blowouts, lake and reservoir oxygen management, direct ocean carbon sequestration, stratified fluids, shallow flow stability, shallow starting jet vortices, tidal inlet mixing, and wave transformation through constructed wetlands.

Education
Ph.D. Massachusetts Institute of Technology. ................. Civil & Envirn. Engrg., 2001
M.S. Massachusetts Institute of Technology. ................. Civil & Envirn. Engrg., 1997
B.S. University of Colorado at Boulder. ....................... Civil & Envirn. Engrg., 1994
Junior Year Abroad, University of Stuttgart, Germany. ........ Civil & Envirn. Engrg., 1992

Appointments
Professor, Zachry Department of Civil Engineering, Texas A&M University. ....... 2015–present
Associate Director, Offshore Technology Research Center......................... 2015–present
Professor, Joint Faculty in Department of Oceanography, Texas A&M University. .... 2015–present
Associate Professor, Texas A&M University. ........................................... 2009–2015
Assistant Professor, Texas A&M University. ........................................... 2003–2009
Research Assistant, Parsons Laboratory, Massachusetts Institute of Technology. .... 1995–2001
Research Fellow, Parsons Laboratory, Massachusetts Institute of Technology. ....... 1994–1995
Engineer, Wright Water Engineers, Inc., Denver, Colorado. 1994

Honors and Awards
Zachry Development Professor II
Zachry Department of Civil Engineering, 2011-present.

2010 IgNobel Prize in Chemistry
For, “Disproving the old adage that oil and water don’t mix.” Received jointly with E. Eric Adams (MIT), and Steve Masutani (U Hawaii) along with British Petroleum. For more information, see http://improbable.com/ig/

Freese and Nichols Faculty Fellow
Zachry Department of Civil Engineering, 2009-2011.

Karl Emil Hilgard Hydraulic Prize

TEES Select Young Faculty Award
Texas Engineering Experiment Station, Dwight Look College of Engineering, Texas A&M University, 2005.
National Science Foundation CAREER Award

Montague Center for Teaching Excellence (CTE) Scholar
Dwight Look College of Engineering, Texas A&M University, 2008.

Zachry Award for Excellence in Teaching
Zachry Department of Civil Engineering, Texas A&M University, 2007.

Ketchum Award

Research Leadership

Gulf Integrated Spill Research Consortium: Chief Scientist. .................since 2011
Chief Scientist (head of research activities) for the Gulf Integrated Spill Research (GISR) Consortium, with project manager Piers Chapman (TAMU Oceanography) and funded by the BP/Gulf of Mexico Research Initiative (GoMRI). This project includes 23 PIs at 10 different institutions, including the Departments of Oceanography, Atmospheric Sciences, and Civil Engineering at Texas A&M. Socolofsky was lead author of the successful proposal. The vision of the GISR consortium is to understand and predict the fundamental behavior of petroleum fluids in the ocean environment. This capability is critical to inform decisions during response to oil spills and for development of mitigation plans, ultimately yielding significant environmental and financial savings. The Mission of the current block grant to GISR is to develop a coupled, tested modeling and observational system to track and predict the pathways of transforming hydrocarbons released from oil spills in the Gulf of Mexico and to validate this modeling system through new, targeted field and laboratory experiments. In addition to his role as chief scientist, Socolofsky’s research roles include applying and coupling of his numerical blowout model to a far-field transport model, conducting new laboratory experiments on multiphase plumes, and leading two field experiments to study natural seeps and a controlled injection of gas to simulate a blowout plume (to be conducted in summer 2014 and 2015, respectively).

NSF Collaborative Grant: Principle Investigator. .........................since 2010
Principle investigator and lead proposal author for a collaborative research project funded by the National Science Foundation, Division of Chemical, Biological, and Environmental Transport, in the Environmental Engineering Program. The project studies the effect of aeration plumes on sediment oxygen demand in lakes. The collaboration brings together researchers from Texas A&M University, Virginia Tech, University of Granada, Spain, and the Swiss Federal Institute of Aquatic Science and Technology (Eawag). This project conducted field measurements in lakes in Virginia (2011 and 2013) and Switzerland (2012) along with near-field and far-field modeling and will produce two Ph.D. students in 2014 to 2015.

Multiphase Plume Modeling: Invited Proposals. .................since 2010
Through Socolofsky’s publications and research on laboratory experiments and integral plume modeling of multiphase plumes, he has become a recognized expert in the area. He has targeted a wide range of applications, including lake and reservoir aeration, deep ocean carbon sequestration, fundamental physics studies, and subsea oil well blowouts. He was selected by Deltares, The Netherlands, to submit a work scope and budget (invited, non-competitive) for laboratory experiments on bubble plume destratification as a solution to salt-wedge intrusion in the Rotterdam Waterway. He received similar invitations for multiple research projects from Chevron and Shell oil companies following the Deepwater Horizon disaster. In addition to his role as Chief Scientist on the GISR consortium, he is the lead near-field modeler for another BP/GoMRI Consortium, C-IMAGE, led by the University of South Florida. Socolofsky is a member of the American Petroleum Institute Technical Advisory Committee for the D3 Task Force on Subsea Dispersant Effectiveness for mitigation of accidental oil-well blowouts. The National Oceanic and Atmospheric Administration (NOAA) is embedding his blowout model (see Other Scholarly Contributions, below) in their next
generation operational spill model ( GNOME). NOAA has also contracted Socolofsky to review their near-field modeling work for the Deepwater Horizon Natural Resource Damage Assessment (NRDA). British Petroleum also invited Socolofsky to consult for their NRDA work, but he was prevented from working with them due to the prior commitment to NOAA. In the last four years, these projects have brought in over $4.1M, supporting laboratory and field experiments, numerical modeling, and the on-going activities of five Ph.D. students and two post doctoral researchers.

Refereed Journal Articles


In the following † indicates a student author.


**Journal Articles in Review**


**Books and Authoritative References**


**Conference Publications**


8. Wang, Z., DiMarco, S. F., and Socolofsky, S. A., “How was the deep scattering layers (DSLs) influenced by the Deepwater Horizon spill? Evidences from 10 year NTL oil/gas ADCP backscattering data collected at the spill site,” Abstract published in Gulf of Mexico Oil Spill & Ecosystem Science Conference, Tampa, FL, 1-4, February, 2016.


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Significant Research Reports for Sponsors


Other Scholarly Contributions

**Texas A&M Oilspill Calculator (TAMOC).** Since 2006

Through funding from the National Science Foundation (NSF), Socolofsky developed a numerical modeling system to predict the dynamics of multiphase plumes in lakes and reservoirs, primarily for application in aeration. The model follows an integral modeling approach and employs a double-plume solution, following the work of Asaeda & Imberger (1993) and Crounse et al. (2007). The validation of the model and application to deep ocean carbon dioxide sequestration was published in Socolofsky et al. (2008) and Socolofsky & Bhaumik (2008). At that time, the model was coded in Matlab and included only air, oxygen, or carbon dioxide as the multiphase fluid; the model was known as the Stratified Multiphase Integral Plume in Matlab (SMIP-M) model and was an open-source code.

During the Deepwater Horizon disaster, the model was upgraded to handle oil, natural gas and non-ideal fluid behavior, following equations of state in McCain (1990) and McGinnis et al. (2006), through a RAPID grant from NSF. This updated model was used in a project funded by Shell International to study the behavior of gas hydrates and their effects on oil well blowouts; this work is published in Anderson et al. (2012).

Since receiving funding from the BP/Gulf of Mexico Research Initiative (GoMRI) through the C-IMAGE consortium, the model has been significantly expanded and ported to the Python and Fortran programming languages. The new modeling suite is called the Texas A&M Oilspill Calculator (TAMOC) and is available online as open source at:

https://github.com/socolofs/tamoc
The modeling package includes extensive equations of state for petroleum fluids, methods to handle ambient water column data and for coupling to ocean circulation models, and numerical modules to predict the fate of a single bubble or droplet rising through the water column (e.g., a natural seep) or the plume dynamics of a collection of released fluids (e.g., a pipeline leak or subsea accidental blowout). Several publications on model methods and demonstrating applications of this new modeling suite are in preparation with Socolofsky’s Ph.D. students and post doctoral researchers.

The National Oceanic and Atmospheric Administration (NOAA) is currently coupling this model to the next generation release of the General NOAA Operational Modeling Environment (GNOME). The model is also being coupled to the Connectivity Modeling System (CMS, through C-IMAGE funding in collaboration with Claire Paris) and the Lagrangian TRANSPORT model (LTRANS, through the GoMRI funded GISR consortium with Elizabeth North). The open-source code is also being used by Shell International and Chevron Energy Technology Corporation for exploration and internal risk assessment.

**Shallow Water Enhanced Stability Calculator in Matlab (SWESC-M).** Since 2004
This is a state-of-the-art Matlab computer program for solving the linear stability problem for shallow water shear flows. The program has a complete Graphical User Interface (GUI) and User’s Manual, and is distributed under the GNU General Public License. SWESC-M incorporates many innovative automation and search methods developed by Socolofsky for finding critical stability points. It also provides for batch-processing and efficient post-processing. The program has been used by researchers at the University of Karlsruhe, Germany (Prof. G. Jirka), the Hong Kong University of Science and Technology (Prof. M. Ghidaoui), Texas A&M University (Prof. S. Socolofsky), and the Massachusetts Institute of Technology (Prof. H. Nepf). Publications using this model by Socolofsky include Negretti et al. (2008) and Socolofsky & Jirka (2004). Other publications Socolofsky is aware of that apply SWESC-M include White & Nepf (2007, *Journal of Fluid Mechanics*, 593, pp. 1-32.).

**Ph.D. Thesis:** S. A. Socolofsky. February 2001
“Laboratory Experiments of Multiphase Plumes in Stratification and Crossflow”
MIT Dept. of Civ. & Envrn. Engrg.
Thesis Supervisor: Dr. E. Eric Adams
Committee Members: Drs. Ole S. Madsen & Heidi M. Nepf
Conducted laboratory experiments to help understand deep ocean (> 1000 m) multiphase plumes both for the design of ocean outfalls of CO₂ (for carbon sequestration) and for clean-up planning of deepsea accidental oil-well blowouts. Experimental techniques included laser-induced fluorescence (LIF), shadowgraph visualization, salinity and dye concentration profiling, and crossflow generation using both a towed source and a recirculation pump. Numerical techniques included integral and box models. Project goals were three-fold: 1. to classify the different modes of plume behavior, 2. to quantify plume dilution for calibration of numerical models, and 3. to develop a modeling algorithm to account for the effect of crossflows.

**M.S. Thesis:** S. A. Socolofsky. May 1997
“Hydrologic and Bacteria Modeling of the Upper Charles River Watershed using HSPF”
MIT Dept. of Civ. & Envrn. Engrg.
Thesis Supervisor: Dr. E. Eric Adams
The Hydrological Simulation Program in Fortran (HSPF) was applied to the upper Charles River watershed in Massachusetts. Development of a disaggregation scheme to convert daily rainfall to hourly intensity patterns extended the calibration dataset and increased the reliability of the model.

**Research Projects Funded**
Since spring 2003 (start of Dr. Socolofsky’s appoint at Texas A&M University): 24 projects totaling $49,414,886; total amount for Dr. Socolofsky $5,687,126.

**Texas General Land Office**
PI: B. R. Hodges (UT Austin), Co-PIs: S. A. Socolofsky, K. Thyng.
2015-2017

“The Center for the Integrated Modeling and Analysis of Gulf Ecosystems II,” Applies Socolofsky’s TAMOC blowout modeling suite to study the range of potential subsea blowout types and their impacts on aquatic ecosystems. Socolofsky provides predictions of chemical exposure used by biologists in the project to assess risk and effects. $20,247,046; amount for Dr. Socolofsky: $265,000.

“REU Site: Ocean Observing Technology for Emerging Ocean Scientists,” This grant supports undergraduate research students to work on ocean observing systems. Socolofsky will supervise students as they apply to the program and demonstrate interest in observations in Environmental Fluid Mechanics. $359,489; amount for Dr. Socolofsky: $0—this grant funds undergraduate research students.

“Answering the Challenge of Arctic Conditions on Oil Spill Incidents: A Proposal to Assist the Federal On-Scene Command” Expands Socolofsky’s numerical model for subsea blowouts to include ice interaction at the free surface. Socolofsky’s blowout model will also be embedded in the next generation General NOAA Operational Modeling Environment (GNOME). Subcontract to Socolofsky for $88,712.

Chevron U.S.A. PI: S. A. Socolofsky 2013-2014
“Numerical simulation of accidental subsea oil-well blowouts,” Performs simulations using Socolofsky’s numerical model for subsea blowouts to establish expected conditions at the response zone for a range of conditions relevant to Chevron oil and gas well. The model results are summarized to create a screening tool used for hazard preparation and emergency response. $44,430; amount for Socolofsky $44,430.

Deltares PI: S. A. Socolofsky 2012-2013
“Bubble plume destratification in a tidal flow” Conducts laboratory experiments on bubble plumes under the combined influence of stratification and crossflow to assess their efficiency for destratification of the Rotterdam Waterway, the Netherlands. $102,000; amount for Socolofsky $102,000.

Shell International PI: S. A. Socolofsky 2011-2012
“Physical and numerical modeling of subsea spills and containment structures.” Applies integral plume numerical models with full chemistry and thermodynamics of released oil and natural gas to assess performance of subsea oil spill containment structures with particular emphasis on gas hydrate formation and flow assurance. $62,000; amount for Socolofsky $62,000.

“Gulf Integrated Spill Research (GISR) Consortium.” Develops and validates an integrated, multi-scale suite of numerical models, linked by data assimilation to an adaptive observing system designed for rapid deployment during a spill, and tested through a multi-scale suite of field and laboratory experiments that target critical deficiencies in our understanding of the physical, chemical, and biological behavior of petroleum fluids as they transit the Gulf from an oil spill to the beach, marsh, estuary, or atmosphere. $14,405,881; amount for Socolofsky $3,111,093.


National Science Foundation  PI: S. A. Socolofsky. Co-PI: J. C. Little 2010-2013 “Collaborative Research: Managing oxygen demand in lakes and reservoirs—a competition between natural and artificial forcing.” Combines laboratory, field and numerical modeling to assess the role turbulence caused by natural seiches and artificial aeration (bubble plumes) plays in oxygen transport at the sediment water interface in lakes and reservoirs. Supports two graduate students. $480,843; amount for Socolofsky $262,517.

National Science Foundation  PI: S. A. Socolofsky. Co-PIs: T. Stoesser, S. DiMarco, & E. E. Adams 2010-2011 “RAPID: Collaborative Research: Multiscale plume modeling of the Deepwater Horizon oil-well blowout for environmental impact assessment and mitigation.” Performs laboratory and numerical modeling to develop a highly resolved model of the subsurface oil and dissolved natural gas plume resulting from the accidental oil-well blowout of the Deepwater Horizon and applies the results to interpret measurements of changes in the vertical migration pattern of fish and plankton in response to the spill. $59,998; amount for Socolofsky $19,144.

NOAA Sea Grant.  PI: J. Irish. Co-PI: S. A. Socolofsky. 2010-2012 “Wave hydrodynamics in segmented wetlands with application to hurricane damage reduction and wetlands management and preservation.” Performs experiments and numerical simulations of constructed wetlands islands subject to waves using the three-dimensional wave basin in the Haynes Coastal Engineering Laboratory at Texas A&M University. Applies the results to develop appropriate coastal numerical modeling schemes. Supports one graduate student. $200,000; amount for Socolofsky $100,000.

Dewberry.  PI: S. A. Socolofsky. 2009 “Testing program for concrete masonry unit (CMU) piers supporting manufactured homes in special flood hazard areas.” Performs stability experiments in crossflow at the Haynes Coastal Engineering Laboratory at Texas A&M University. Results used to support FEMA design guidelines. $52,529; amount for Socolofsky $52,529.

coast.” Takes field measurements using towed acoustic Doppler current profilers and measures injected dye concentration to document starting jet vortices and secondary vortices in tidal inlet exchange flows. Uses results to validate Boussinesq-type wave models. $196,471; amount for Socolofsky $78,588.


National Science Foundation PI: S. A. Socolofsky. ………………………………… 2007-2008 “IREE: CAREER: The role of turbulence, coherent structures, and intermittency for controlling transport in multiphase plumes in the environment.” Supports two undergraduate students and one graduate student from Texas A&M University for three months in summer 2008 to participate in research projects at the University of Karlsruhe, Germany. This is a supplemental agreement to Dr. Socolofsky’s CAREER award. $38,477.


National Science Foundation PI: S. A. Socolofsky. ………………………………… 2006–2007 “IREE: Experimental studies of mixing and transport in the environment as a model for student foreign exchange programs.” Supports two undergraduate students and one graduate student from Texas A&M University for three months in summer 2007 to participate in research projects at the University of Karlsruhe, Germany. This is a supplemental agreement to Dr. Socolofsky’s CAREER award. $33,939.

National Science Foundation PI: S. A. Socolofsky. ………………………………… 2004–2009 “CAREER: The role of turbulence, coherent structures, and intermittency for controlling transport in multiphase plumes in the environment.” Applies particle image velocimetry and laser induced fluorescence to measure turbulent mixing properties in multiphase plumes and derives sub-grid scale turbulence closure schemes for large eddy simulation models. $400,000.


Professional Consulting


Invited Significant Seminars and Lectures


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Socolofsky, S. A., “So how to oil and water mix?” Ig Nobel Prize Ceremony and Informal Lectures, Massachusetts Institute of Technology, October 2, 2010.


Socolofsky, S. A., “Stability and mixing problems in shallow flows,” Department of Civil Engineering, Hong Kong University of Science and Technology (UST), Hong Kong, China, December 13, 2004.


Other Presentations


Teaching Activities

Socolofsky has had teaching appointments at both the University of Karlsruhe, Germany (2001-2002) and Texas A&M University (since 2003). Significant accomplishments include:

- As a measure of teaching effectiveness, Socolofsky’s course average evaluation scores range from 4.13 (ENGR 111 in fall 2003) to 5.00 (OCEN 677 in spring 2007 and OCEN 475 in spring 2011) on a scale of 1 to 5 with 5 being the best score. His average evaluation score is 4.67 across all 28 course sections taught at Texas A&M University.
- Student written comments are mostly positive, focusing on his organization, passion for the material, ability to communicate effectively, and the sense that Socolofsky cares that students learn the material well.
- As course coordinator for CVEN 302 (Computer Applications in Engineering and Construction), Socolofsky led an effort to improve the programming aspects of the course by adding three hours of laboratory time and a block of 12 major programming assignments to the course. Student feedback is that the laboratory time and programming assignments are beneficial to the class and help their later progression through upper-level undergraduate courses.
- Developed a new course sequence at Texas A&M University in Environmental Fluid Mechanics (see New Courses Developed, below).
- Continually updating and adapting OCEN 678 (Fluid Dynamics for Ocean and Environmental Engineering) to accommodate the growing class size (35 students in 2013). This includes a comprehensive set of notes and recorded lectures posted on the course website as well as innovative use of student groups for the homework assignments and course project.

New Courses Developed

Since coming to Texas A&M University in 2003, Socolofsky developed two new courses in Environmental Fluid Mechanics. These began as independent undergraduate and graduate courses, and were each co-taught the first time with Dr. Kuang-An Chang (in 2004 and 2005). Since 2007, these courses have been taught in a stacked format (undergraduate and graduate sections meet together for the lecture; coursework is differentiated by level):

While a Research Associate at the University of Karlsruhe from 2001-2002, Socolofsky also developed two new courses under the Institute for Hydromechanics:

- **Environmental Fluid Mechanics III: Modeling Applications.** Application of numerical methods to problems in environmental fluid mechanics. Topics include numerical diffusion; numerical stability; use of standard numerical models HSPF, QUAL2E and CORMIX; benchmark cases and model testing. Elective course offered for Undergraduate Students.

- **Advance Environmental Fluid Mechanics.** Derivation of governing equations in environmental fluid mechanics (Navier-Stokes equations, diffusion equation, vorticity transport), applications of advanced solution methods (Fourier transforms and numerical methods), and introduction to mathematical descriptions of turbulence. Seminar course developed for Graduate Students.

**Other Courses Taught**

In addition to the courses listed above (see New Courses Developed), the following is a list of established courses that have been taught by Socolofsky since 2003 while at Texas A&M University. 100- to 400-level courses are undergraduate courses and 600-level courses are graduate courses.

- **OCEN 407 Design of Ocean Engineering Facilities.** Design of structures, equipment, and systems for the ocean; emphasizes environmental, logistical, and reliability requirements. Complete design process followed through a group design project. Delineation of alternatives, constraints, economics, and environmental consequences included to strengthen real-life problem solving skills. Co-taught with Dr. Patrick Lynett in spring 2007.

- **CVEN 311 Fluid Dynamics.** Fluid properties; statics; kinematics; basic conservation principles of continuity, energy and momentum; similitude and hydraulic models; incompressible flow in pipes; fluid dynamic drag. Taught in fall 2008.

- **CVEN 302 Computer Applications in Engineering and Construction.** Application of computers to solve civil engineering problems using various numerical methods; mathematical modeling and error analysis; solution of algebraic and differential equations; numerical differentiation and integration; curve-fitting. Taught in spring 2003, spring 2004, fall 2005, spring 2006, and fall 2009.

- **OCEN 481 Ocean Engineering Seminar.** Responsibilities and obligations of new ocean engineers; professional ethics, membership in professional societies and professional registrations; case studies and lectures presented by staff and practicing engineers. Taught in fall 2004 (cross-listed with OCEN 681).

- **ENGR 111 Foundations of Engineering I.** Introduction to the engineering profession, ethics and disciplines; development of skills in teamwork, problem solving, logic processing, design and drawing; emphasis on computer applications and CAD tools. Taught in fall 2004.

- **ENGR 212 Conservation Principles in Thermal Sciences.** Theory and application of energy methods in engineering; conservation principles to investigate “Traditional” thermodynamics and internal flow fluids. Taught in fall 2003.


- **OCEN 681 Ocean Engineering Seminar.** Reports and discussion of current research and selected published technical articles. Taught in fall 2004 (cross-listed with OCEN 481) and spring 2008.

Socolofsky also taught the following established courses at the University of Karlsruhe between 2001–2002:

- **Environmental Fluid Mechanics I: Mass Transfer and Diffusion.** Taught in fall 2001 and fall 2002.
Education and Research


Development of Course Materials

Textbook on Environmental Fluid Mechanics
Socolofsky has written a textbook-style manuscript for a two-semester course on Environmental Fluid Mechanics together with Gerhard H. Jirka (professor from the University of Karlsruhe; since deceased). The text is appropriate for a senior level technical elective or a first-year graduate class. The first semester portion of the book is being used as the primary textbook for his courses in Environmental Fluid Mechanics (OCEN 475 and 677), and is available for download from:

https://ceprofs.civil.tamu.edu/ssocolofsky/OCENx89/book.html

The second semester portion of the book was used in the OCEN 677 when it was offered as a graduate-only section. The chapters for this section (Chapter 8 through 11) are available for download from:

https://ceprofs.tamu.edu/kchang/ocen689/ocen689.htm

These chapters are used by many other faculty around the world. Socolofsky has email communication with faculty at 16 different institutions who have used the text in the courses they offer.

Extensive set of Course Websites
Socolofsky maintains an extensive set of web-sites for his courses at TAMU following content guidelines developed by the Massachusetts Institute of Technology OpenCourseWare program. Each website contains a complete calendar with downloadable lecture notes (where applicable), a complete syllabus, a listing of assignments and their due dates, an announcements page, a list of links to related resources, and, if allowed by copyright laws, downloadable handouts and other course materials. These course websites are listed under the “Teaching” tab at:

https://ceprofs.tamu.edu/ssocolofsky/

Student Research Advising

Doctoral Student Advising as Chair or Co-Chair

Masters Student Advising as Chair or Co-Chair


**Undergraduate Thesis Advising as Chair or Co-Chair**


5. Christian Bergmann, University of Karlsruhe, Germany. “Physical and numerical studies of multiphase plumes,” 2004 (Bergmann worked with Socolofsky as a visiting scholar to Texas A&M University from the University of Karlsruhe).

**Undergraduate Student Research Advising**


Service Activities

Editorships

Editorial Board Member: *Environmental Fluid Mechanics.* ...............2015–present
Advise the Editor-in-Chief and Associate Editors in scientific and publication matters and occasionally to review papers or to act as an arbitrator in cases where the referees could not agree on the merits of a particular paper.

Associate Editor: *Journal of Hydraulic Engineering–ASCE.* ...............2010–present
Handle papers on environmental fluid mechanics related to bubble plumes, multiphase flow, jets and plumes, river mixing, and aerated flows, among other related topics.

Served on behalf of the Fluids Committee and handled papers on a wide variety of topics in fluid mechanics.

Service on National-Level Professional Committees

Technical Advisory Committee: American Petroleum Institute. ...............2012–present
Member of the Technical Advisory Committee of the Subsea Effectiveness Program of the Joint Industry Task Force for Oil Spill Planning and Response, Subcommittee D3 Dispersant Effectiveness within the American Petroleum Institute.

Fluid Dynamics Committee: Engineering Mechanics Institute, ASCE. ...............2013-present
Helped lead the joining of the Fluids Committee and Turbulence Committee to form the new, joint committee on Fluid Dynamics. Continue to serve as member of the new committee.

Fluids Committee: Engineering Mechanics Institute, ASCE. ...............2005-2013
Member of the Fluids Committee. Helped organize the annual EMI conference sessions for Environmental Fluid Mechanics; attended annual meetings; served as associate editor of the Journal of Engineering Mechanics–ASCE on behalf of the committee from 2011–2014 (see Editorships, above).

Turbulence Committee: Engineering Mechanics Institute, ASCE. ...............2005-2013
Member of the Turbulence Committee. Helped organize the annual EMI conference sessions for Turbulent Mixing; attended annual meetings.

Conference and Short-Course Organization

2nd Nearfield Modeling Workshop. .................................................................2014
Technical organizer co-chair with William Dewar. This half-day workshop was part of the 2014 Gulf of Mexico Oil Spill & Ecosystem Science Conference in Mobile, AL, January 2014. Wrote the session proposal to the conference organizing committee, solicited presentations, organized the agenda, and hosted the workshop.
Member of the scientific committee. Reviewed abstracts and organized session agendas for the Fluids and Turbulence Committees of EMI. Notre Dame, Indiana, June 2012.

3rd International Symposium on Shallow Flows. ................................................. 2012
Member of the scientific/advisory committee; chaired session. Iowa City, Iowa, June 2012.

2nd International Symposium on Shallow Flows ............................................... 2008
Member of the organizing committee. Hong Kong, China, December 2008.

15th U.S. National Congress on Theoretical and Applied Mechanics. ............ 2006

IAHR Short Course on Environmental Fluid Mechanics. ......................... 2004–2006
Member of the organizing committee and a guest lecturer at the Environmental Fluid Mechanics short course sponsored by the International Association of Hydraulic Engineering and Research (IAHR) European Graduate School Environment Water (EGW). Gave lectures in 2004 in Budapest, Hungary, on gas exchange at the air-water interface and on atmospheric mixing and in 2006 in Karlsruhe, Germany, on multiphase plumes and shallow water flows.

Major University Service

**Associate Director:** Offshore Technology Research Center, Texas A&M University Engineering Experiment Station ................................................................. fall 2015-present
Manage existing research project as directed and develop new initiatives.

**Division and Program Head:** Coastal and Ocean Engineering Division, Ocean Engineering Program, Zachry Department of Civil Engineering ............................ fall 2011-2014
The Coastal and Ocean Engineering Division is one of four Divisions in the Zachry Department of Civil Engineering and represents nine faculty in the department. As Division Head, Socolofsky serves on the Department Head’s Council of Division Heads, administers the approval process for a diverse range of paperwork, allocates division space among faculty, staff, visiting scholars, post doctoral researchers, and students, directs the activities of the Division Administrative Assistant and Senior Laboratory Technician, provides communication lines between the Department Head and Division Faculty, recommends appointments of Division Faculty to Division, Departmental, and external Committee service, assigns Division Faculty teaching loads, helps to perform Faculty and Staff annual performance reviews, and manages a diverse range of other day-to-day activities of the division.

The Ocean Engineering Program is an independent degree-granting program within the Zachry Department of Civil Engineering and includes an ABET accredited Bachelor of Science degree and graduate degrees of Master of Science, Master of Engineering, Doctor of Philosophy and Doctor of Engineering all in Ocean Engineering. As Head of the Ocean Engineering Program, Socolofsky manages an external, industrial advisory committee that meets twice per year with the Program faculty, appoints and oversees faculty and staff as undergraduate and graduate program advisors, helps the department set enrollment caps for the undergraduate program, helps the graduate advisor set enrollment caps and admission standards for the graduate program, administers a committee in charge of the ABET process (working together with Civil Engineering and the College), and oversees a Program curriculum committee, honors and awards committee, and scholarship and fellowships committee.

While the Ocean Engineering Program is an independent degree-granting program, its budget is administered by the Civil Engineering Department Head, and the Program Head reports to the Department Head as a service role.

**Assistant Department Head for Academic Programs:** Zachry Department of Civil Engineering. ................................................................. spring and summer 2011
Assisted the Associate Department Head (Prof. Roger Smith) on activities related to the undergraduate program, including ABET accreditation, review of faculty teaching performance, interfacing with parents of students on various issues, and administration of student petitions to the Department when they disagreed with decisions made by the Undergraduate Student Services Office within the Department. Also served on the Departmental Curriculum Committee and assisted the Department Head as a replacement on a number of University- and College-level committees when the Department Head was on travel.

**Undergraduate Advisor:** Ocean Engineering Program. .......................... 2009-2010

Served as the first point-of-contact for undergraduate students pursuing the degree of Ocean Engineering; activities included admission decisions for change of major and transfer students, approval of petitions for course substitutions, administration of the academic advising process, setting of program standards, making and enforcing decisions on probation and expulsion, organization of new student conferences, and recruiting.

During his time in this role, Socolofsky successfully petitioned the Civil Engineering Department to budget for a full-time staff person to serve undergraduate advising for Ocean Program students. By the fall of 2010, a full-time assistant was hired who reported directly to the Undergraduate Student Services Office Head in the Civil Engineering Department with responsibility for students in the Ocean Engineering Program. This new position has relieved the Faculty Undergraduate Advisor from having to administrate the many standard day-to-day advising approvals; the Faculty Advisor is now responsible for setting standards and making decisions in unique cases (e.g. transfer of course hours from other institutions).

**Service on Committees within the University**

Serve or have served on the following committees at the Departmental, College or University level:

1. Committee on the formation of a new Environmental, Water Resources, and Coastal Engineering Division within the Zachry Department of Civil Engineering, Chair, 2015–present.
2. OCEN *ad hoc* Committee to Explore Establishing a New Ocean Engineering Department, Dwight Look College of Engineering, 2013–2014.
7. Search Committee for Water Resources Faculty Member, Zachry Department of Civil Engineering, 2011–2012.
8. Sensors Committee, Zachry Department of Civil Engineering, 2011-2012. Committee established a new undergraduate course on Sensors for the Built Environment that also serves as a substitute for Thermodynamics and Electric Circuits.
9. Engineering Faculty Advisory Council (EFAC), Dwight Look College of Engineering, Representative for the Zachry Department of Civil Engineering, 2010.
17. Search Committee for Environmental Engineering Faculty Member, Zachry Department of Civil Engineering, 2005–2006.
18. Webpage Focus Group, Zachry Department of Civil Engineering, 2005.

Peer-Review Activities

Regularly review manuscripts in a variety of journals, including the following:

1. American Geophysical Union Monographs
2. Arctic and Marine Oil Spill Program
3. Canadian Journal of Civil Engineering
4. Canadian Journal of Chemical Engineering
5. Environmental Fluid Mechanics
6. Environmental Science and Technology
7. Experiments in Fluids
12. Journal of Fluids and Structures
14. Journal of Hydro-Environment Research
15. Journal of Geophysical Research: Oceans
17. Journal of Offshore Mechanics and Arctic Engineering
18. Journal of Water Resources Planning and Management–ASCE
19. Limnology and Oceanography
20. Marine Pollution Bulletin
21. Nuclear Engineering and Design
22. NSF iNEER Special Volumes
23. Physics of Fluids
24. Proceedings of the National Academy of Science


Regularly review research proposals for several agencies, including the following:

1. California Bay-Delta Authority
2. Israel Science Foundation
3. National Science Foundation
4. NOAA Sea Grant
5. Research Grants Council of Hong Kong, China
6. Swiss National Science Foundation

Total number of reviews in the last five years by year: 2010: 8, 2011: 2, 2012: 2, 2013: 3, 2014: 1.

Membership in Professional Societies

American Geophysical Union (AGU), Member. .................................................. since 1999
American Society of Civil Engineers (ASCE), Member. ................................. since 2001
International Association of Hydraulic Engineering and Research (IAHR), Member. ...since 2001
American Physical Society (APS), Member. ..................................................... since 2008
ACHIM STÖSSEL, Ph.D.
Associate Professor, Department of Oceanography, Texas A&M University

Education: all degrees
Ph.D.(Doktor rer.nat.) Physical Oceanography, University of Hamburg, 1990
M.Sc.(Diplom) Physical Oceanography, University of Hamburg, 1985
B.Sc.(Vordiplom) Physical Oceanography, University of Kiel, Germany, 1977
M.Eng.(Dipl.Ing.) Nautical Engineering, Maritime College, Hamburg, 1982
High-School Degree (Abitur), German School Helsinki, Finland, 1975

Experience

Long-term professional appointments
Associate Professor, Dept. of Oceanography, Texas A&M University, since 2000
Assistant Professor, Dept. of Oceanography, Texas A&M University, 1994-2000
Research Scientist, Max-Planck-Institute for Meteorology, 1990-1994
Graduate Research Assistant, Max-Planck-Institute for Meteorology, 1987-1990
Nautical Officer, Merchant Marine, 1982-1986 (2 years total)
Deckhand/Cadet, Merchant Marine, 1975-1981 (2 years total)

Visiting scientist appointments
Max-Planck-Institute for Meteorology, 1998-2015 (12 months total)
Department of Geophysics, University of Helsinki, 2000-2002 (3 months total)
Royal Netherlands Meteorological Institute, De Bilt, 1999 (2 months)
German Climate Computing Center, Hamburg, 1996, 1997 (4 months total)
Finnish Meteorological Institute, 2010, 2011, 2013 (2 months total)
Catholic University of Louvain-la-Neuve, Belgium, 1997, 1998, 2013 (1 month)

Peer-reviewed publications

Funded research
Research at Max-Planck-Institute for Meteorology, Max-Planck Society, 2012-2015, 8.5 months total, total stipend: Euro 25,500.- (about $30,000.-) + 4 x travel expenses.

Graduate students
Who Myung Kim, start Fall 2007, Ph.D. in Spring 2013, chair until March 2010, co-chair with Chang thereafter.

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Benjamin Morgan, start Fall 2008, M.S. in 2011 (co-chair with Orsi).
Prajvala Kurtakoti, start Fall 2014, current Ph.D. student.
Research Interests
microbial ecology of marine hydrothermal ecosystems and subseafloor basaltic crust, molecular ecology, geobiology, biogeochemistry and nutrient cycling

Education
Ph. D., January 2008, Rutgers University, Biological Oceanography, New Brunswick, NJ. Title: “Assessing Multiple Indicators of Nutrient Limitation in Marine Phytoplankton on the Louisiana Continental Shelf”
M. Sc., 2004, Rutgers University, Biological Oceanography, New Brunswick, NJ. Title: “Mapping Evidence of Phosphorus Limitation in the Mississippi Plume”
B. Sc., 1999, Brandeis University, Biology, Waltham, Massachusetts
   Minors: Environmental Science & Music

Appointments
Aug. 2015 - present  Assistant Professor  Texas A&M University
Feb. 2013 - July 2015  Assistant Professor (Research)  University of Southern California
July 2011 - Jan. 2013  CDEBI Postdoctoral Fellow  University of Southern California
Feb. 2008 - June 2011  Postdoctoral Fellow  University of Southern California

Publications (Last 5 Years)
Lee, MD, NG Walworth, JB Sylvan, KJ Edwards & BN Orcutt. in review. Microbial communities on seafloor basalts at Dorado Outcrop reflect level of alteration and highlight global lithic clades. *Frontiers in Microbiology.*


Meyers, MJ*, JB Sylvan* and KJ Edwards. (2014) Extracellular enzyme activity and microbial diversity...
measured on seafloor exposed basalts from Loihi Seamount indicate importance of basalts to global
biogeochemical cycling. Applied and Environmental Microbiology, 80(16): 4854-4864.
*both authors contributed equally to this work

Orcutt, BN, DE LaRowe, JF Biddle, FS Colwell, BT Glazer, BK Reese, JB Kirkpatrick, LL Lapham, HJ Mills, 
JB Sylvan, SD Wankel and CG Wheat. (2013) Microbial activity in the marine deep biosphere: progress 

geomicrobiology follows host rock composition along a geochemical gradient in Lau Basin. Frontiers in 

during spring and summer 2004: implications for annual hypoxia development. Marine Chemistry, 154: 
113-123.

Koppers, AAP, T Yamazaki, J Geldmacher, JS Gee, N Pressling, H Hoshi, L Anderson, C Beier, DM Buchs, 
L-H Chen, BE Cohen, F Deschamps, MJ Dorais, D Ebuna, S Ehman, JG Fitton, PM Fulton, E Ganbat, 


fmicb.2011.00285.

hydrothermal plumes at 9˚50’N East Pacific Rise reveals distinct, heterogeneous bacterial populations. 

Microbiology, 9: 703-712.

river impacted continental shelf: testing a multifaceted approach. Estuaries and Coasts. 34: 1220-1233.

Orcutt, BN, JB Sylvan, N Knab & KJ Edwards. (2011) Microbiology of the dark ocean: Microbial life in the 
dark at, above and below the seafloor. Microbiology and Molecular Biology Reviews, 75(2): 361-422.

west: role of phosphorus limitation in expanding primary production across the Louisiana shelf. Aquatic 
Geochemistry, 17: 519-544.


Sylvan, JB, AG Turner and KJ Edwards. (2011) Microbe-metal interactions on endolithic seafloor basalts, 
p. 65-76. In: Stolz, JF and RS Oremland (eds.) Microbial Metal and Metalloid Metabolism: Advances and 
Applications. ASM Press, Washington DC.

Funding History
Pending
RM Coggon, GL Christeson, M. Leckie, BK Reese, DAH Teagle, NW Hayman, JB Sylvan, J Zachos and

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10 others. A Multidisciplinary IODP Investigation along a Crustal Flow-line across the Western Flank of the Southern Mid-Atlantic Ridge: The South Atlantic Transect. pre-proposal to the International Ocean Discovery Program (IODP)

*note - as of July 2014, a full proposal was requested*

K-U Hinrichs, F Inagaki & 23 others. Constraining the temperature limit of the microbial deep biosphere in the Nankai Trough subseafloor.

*note - sent to Chikyu review board for scheduling, IODP*

**Funded**

Paytan, A, D Defforey, **JB Sylvan** & BK Reese. Metagenomic sequencing of sediments from North Pond, site U1382 (IODP Expedition 336), to elucidate microbial phosphorus cycling strategies. Deep Carbon Observatory. Census of Deep Life; metagenomic sequencing of 3 samples, valued at ~$20,000.


A Quigg, PH Santschi, T Knap, TL Wade, W-C Chin, U Passow, PG Hatcher, **JB Sylvan** & Z.Finkel. Role of microbial exopolymers in aggregation and degradation of oil and dispersants. Gulf of Mexico Research Initiative; $7.2 million total, $658,111 to Sylvan


**JB Sylvan**, EK Field & D Emerson. Combining omics approaches to gain a comprehensive understanding of microbial diversity and activity in subsurface igneous basement along the Louisville Seamount Trail (IODP Expedition 330). Center for Dark Energy Biosphere Investigations; $149,964, November 2013-October 2015


**JB Sylvan** & EC Salas. Quantification and Spatial Heterogeneity of Microbial Biomass in Subsurface Igneous Marine Basement. Center for Deep Biosphere Investigations (Research Grant); $49,417, November 2012-March 2014

**JB Sylvan** & KJ Edwards. Subsurface microbial communities in volcanic basement along an ancient hotspot seamount trail. Deep Carbon Observatory, Census of Deep Life; pyrotag sequencing of 16 samples plus metagenomic sequencing of 3 of these samples, valued at ~$25,000, June 2011-December 2013.


**JB Sylvan**. Metagenomic Insight from Hydrothermally Influenced Rocks at East Lau Spreading Center and Valu Fa Ridge using 454-Pyrosequencing and Ion Torrent Sequencing. Center for Dark Energy Biosphere Investigations (Postdoctoral Fellowship); $100,000, June 2011-January 2013

**Thesis Advisor and Postgraduate Scholar Sponsors over the Last Five Years (3 total)**

*Postdocs:*

Shawn Doyle - TAMU, started June 2015

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Roman Barco - USC, May 2014-August 2015
Jean-Paul Baquiran - USC, September 2014-July 2015

**Graduate Students:**

- Emily Whitaker - TAMU, MS candidate, matriculated Fall 2015, 1 year mentored
- Gustavo Ramirez - USC, PhD candidate, matriculated Fall 2010, 5 years mentored
- Delphine Defforey - UC Santa Cruz, PhD candidate, matriculated Fall 2010, 1 year mentored
- Roman Barco - USC, PhD, May 2014

**Undergraduate Students (2010-present):**

*Summer 2014*  
Arik Joujhadjian, rising junior at UCLA, was transferring from Pasadena Community College. Arik was part of a pilot program targeting undergraduate research experience for community college students. Arik worked on enrichment incubations from the Louisville Seamount cruise.

*Fall 2013*  
Jordan Hoese, sophomore at USC. Jordan is working on enrichment incubations present from the Louisville Seamount cruise.

*Spring 2013*  
Pallavi Mynampati, sophomore at USC. Pallavi worked on enrichment incubations from the Louisville Seamount cruise.

*Spring 2011-Fall 2011*  
Kathy Lee, senior at USC. Kathy worked on cell counts to estimate biomass in marine subsurface rocks.

*Fall 2010-Spring 2012*  
Tiffany Sia, currently a junior at USC. Tiffany extracted DNA and built clone libraries from seafloor rocks collected at the Eastern Lau Spreading Center. She is second author on the submitted manuscript of this work.
DEBORAH J. THOMAS, Ph.D.
Professor & Department Head, Department of Oceanography, Texas A&M University

Phone: (979) 862-7248 Email: dthomas@ocean.tamu.edu

Education:
- Ph.D. Geological Sciences (2002), University of North Carolina, Chapel Hill
- M.S. Marine Sciences (1998), University of North Carolina, Chapel Hill
- B.S. Geological Sciences (1995), Brown University

Appointments:
- Professor, Texas A&M University, Sept 2015 - present
- Department Head, Oceanography, Texas A&M University, June 2015 - present
- Interim Department Head, Oceanography, Texas A&M University, Sept 2013 – May 2015
- Assistant Department Head, Oceanography, Texas A&M University, Sept 2012 – August 2013
- Associate Professor, Texas A&M University, Sept 2010 – Sept 2015
- Joint Appointment, Department of Geology & Geophysics, 2005 - present
- Assistant Professor, Texas A&M University, Jan 2004 – Sept 2010

Awards and Honors:
- Freshman Convocation Keynote Speaker, Texas A&M University, 2010
- Distinguished Lecturer, Consortium for Ocean Leadership, 2008-2009 (8 talks nationwide)
- Montague Center for Teaching Excellence Scholar Award, Texas A&M, 2008
- Distinguished Achievement Teaching Award (College Level), Texas A&M Association of Former Students, 2007

Funding Record:
- Collaborative Research: Evolution of the Deep South Atlantic Since the Last Interglacial Period Inferred from a Depth Transect of Cape Basin Sediment Cores National Science Foundation, $382,092, 9/11-8/15 (under extension)
- Collaborative Research: The role of deep-ocean circulation in Greenhouse climates: Integrating numerical simulations with proxy data of water mass composition National Science Foundation, $476,171, 8/09-7/14
- Lead Proponent IODP Drilling Proposal, “South Pacific Latitudinal Transect (SPLAT)” awaiting scheduling at OTF stage for FY 2017 or 2018
- Collaborative Research: History and Timescale of Paleoceanographic Change in the Arctic Ocean, National Science Foundation, $51,180 (Texas A&M award), 3/06 – 2/09
- The impact of orbital variations of insolation during intervals of high atmospheric CO₂, Texas Higher
Education Coordinating Board, $137,000, 5/08-5/11

- Did Deep Waters Form at High Latitudes During the Middle to Late Cretaceous Greenhouse? National Science Foundation, $155,585, 9/06 – 8/11
- MRI: Acquisition of a High Resolution Inductively Coupled Plasma Mass Spectrometer for Earth and Environmental Science Research at Texas A&M University, National Science Foundation, $450,000, 8/08-8/10
- Co-proponent, US Scientist support to attend the 2012 Southwest Pacific Ocean Drilling workshop, Consortium for Ocean Leadership, $30,000 (October 2012, Sydney)
- Carboniferous chemostratigraphy: Do epicontinental seas reflect global ocean conditions? National Science Foundation, $290,801, 10/07 – 12/12
- Lead Proponent and Convener, Transect Drilling Workshop, Consortium for Ocean Leadership, $40,000 (November 2013, College Station)

Refereed Publications (* indicates my student as author):


Thomas, D.J. and *Tilghman, D., 2014, Geographically Different Oceanographic Responses to Global Warming During the Cenomanian - Turonian interval and Oceanic Anoxic Event 2, Palaeogeogr., Palaeoclim., Palaeoecol., http://dx.doi.org/10.1016/j.palaeo.2014.06.014.


Marcantonio, F., Thomas, D.J., *Woodard, S., McGee, D., and Winckler, G., 2009, Extraterrestrial 3He in...


Abstracts (**indicates my undergraduate student as author, * indicate my graduate student as author; #indicates A&M student as author):

• *Cobb, T., Bogus, K., Kender, S., and Thomas, D.J., When Overturning Circulation Became Global: Insight into Time of This Change, Fall Meeting of the American Geophysical Union, 2015.

2014 • *Rolewicz, Z., Thomas, D.J., McKinley, C.C., Potential Influences of Pacific Meridional Overturning Circulation on Climate Change Across the Mid Eocene Climatic Optimum (MECO), Fall Meeting of the American Geophysical Union, 2014.
• Thomas, D.J., Is it possible to reconstruct rates of oceanic overturning circulation during the Early Paleogene?, invited talk, GSA Annual Meeting
• Thomas, D.J., Early Paleogene Pacific Deep-water Lead Isotope Variations – Implications for the Evolution of Water Mass Composition, Climate and Biota of the Early Paleogene conference.

2013 • **Amaya, D. and Thomas, D.J., How dusty was the Early Paleogene greenhouse world?, Fall Meeting of the American Geophysical Union, 2013.
• **Hernandez, J. and Thomas, D.J., Record of eolian dust provenance in the North Pacific from 65-35 Ma, Fall Meeting of the American Geophysical Union, 2013.
• **Rencurel, M.C. and Thomas, D.J., Neodymium isotope provenance of eolian dust in the South Pacific from 70-30 Ma, Fall Meeting of the American Geophysical Union, 2013.
• Thomas, D.J. and *Tilghman, D., Transient increase in proto-Indian Ocean upwelling during the Cenomanian/Turonian OAE2, Fall Meeting of the American Geophysical Union, 2013.
• Thomas, D.J., Invited talk, When did the meridional overturning circulation go global, International Conference on Paleoceanography 2013.
• Thomas, D.J., The Late Paleogene evolution of southern ocean deep-water formation – the onset of the global thermohaline circulation, SC GSA Meeting 2013.
• *Tilghman, D., Thomas, D.J., Late Cenomanian-early Turonian reconstruction of intermediate- and deep-water circulation in the proto-Indian Ocean, SC GSA Meeting 2013.
• **Ahmad, S., Thomas, D.J.,Cenozoic dust accumulation in the South Pacific recorded at IODP Site U1369, SC GSA Meeting 2013.
• **Musgrove, A., Thomas, D.J.,Neogene evolution of Atlantic deep-ocean circulation from Walvis Ridge ODP Sites 1262 and 1263, SC GSA Meeting 2013.
• **Pekowski, A., Thomas, D.J., Cenozoic record of dust accumulation in the South Pacific from $^{232}$Th analyses at IODP Site U1371, SC GSA Meeting 2013.

• **Amaya, D., Thomas, D.J., Marcantonio, F., Korty, R., Huber, M., Winckler, G., Alvarez-Zarikian, C., Reconstruction of South Pacific dust accumulation during the early Paleogene greenhouse, Fall Meeting of the American Geophysical Union, 2012.
• **Rolewicz, Z., Thomas, D.J., Marcantonio, F., Paleogene seawater Osmium isotope records, Fall
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Meeting of the American Geophysical Union, 2012.

• *Subt, C., Thomas, D.J., Pb isotopic composition of Late Cretaceous and early Paleogene Pacific water masses, GSA Annual Meeting 2012.
• *Tilghman, D., Thomas, D.J., Late Cenomanian-early Turonian reconstruction of intermediate- and deep-water circulation in the proto-Indian Ocean, GSA Annual Meeting 2012.

• *Zamora, R., R. Korty, M. Huber, and D. Thomas, Extratropical lapse rates during the Paleogene and other very hot climates, Fall Meeting of the American Geophysical Union, 2011.
• *Haines, B., R. Korty, M. Huber, and D. Thomas, Simulations of the meridional overturning circulation during the Paleogene, Fall Meeting of the American Geophysical Union, 2011.

• Thomas, D.J., *Woodard, S.C., Rohl, U., Westerhold, T., Orbitally paced carbonate dissolution during the Paleocene, 2010 Fall Meeting, AGU.

• *Murphy, D.P. and Thomas, D.J., Mid-Late Cretaceous Nd isotopic composition of Southern Deep Waters, Eos Trans. AGU, 90(52), Fall Meet. Suppl., 2009.
• *Woodard, S., Thomas, D.J., Is it eolian dust? Contributions to the fine silicate fraction of deep sea sediments on Shatsky Rise, 58Ma, Goldschmidt Conference 2009.

• *Okafor, C.U., Thomas, D.J., Firth, J., High resolution Mg/Ca and calcareous nannofossil records from

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• Gleason, J.D., Thomas, D.J., Moore, T.C., Blum, J.D., Owen, R.M., 2006, Eocene history of the Arctic Ocean basin from Nd-Sr isotopes in fossil fish debris, Eos Trans. AGU, 87(52), Fall Meet. Suppl.

• *Julian, M., Raymond, A., Thomas, D.J., Alvarez Zarikian, C., 2006, Benthic Foraminiferal Faunal Changes During the Eocene-Oligocene Climate Transition at ODP Sites 1209 A and 1211A at the Shatsky Rise, Pacific Ocean, Eos Trans. AGU, 87(52), Fall Meet. Suppl. PP23C-1774

• *Cain, W., Slowey, N.C., Thomas, D.J., Charles, C.D., 2006, Neodymium as a tracer of glacial to interglacial change in Atlantic water column structure, Eos Trans. AGU, 87(52), Fall Meet. Suppl. PP31A-1737


• Thomas, D.J., Evidence for deep-water production in the North Pacific during the Early Cenozoic, Eos Trans. AGU, 85(47), Fall Meet. Suppl.


2000 • Thomas, D.J., Jones, C.E., and Bralower, T.J., 2000, Neodymium isotopic records consistent with altered deep-sea circulation during the late Paleocene thermal maximum, EOS Transactions AGU.
Thomas, D.J., Bralower, T.J., and Zachos, J.C., 2000, Evidence for subtropical warming during the late Paleocene thermal maximum - New insights from DSDP Site 527. GFF, 122: 168.


**Thesis Advisor**

- Jenna Newman: current PhD student
- Claire McKinley: current PhD student
- Ty Cobb: current MS student
- Zachary Rolewicz: current MS student
- Cristina Subt: M.S. 2013
- David Tilghman: M.S. 2013
- Jessica Schubert: M.S. 2012
- Ashley Hague: M.S. 2011
- Stella Woodard: Ph.D. 2011
- Dan Murphy: Ph.D. 2010
- Chioma Udeze: Ph.D. 2009
- Rachael Via: M.S. 2005

**Professional Activities:**

- Geology Editorial Board Member (2014-2016)
- Convener and Lead Proponent, Transect Drilling Workshop (November 2013, College Station, TX)
- Invited speaker, Antarctic Geologic Drilling Workshop (November 2013, Houston TX)
- Invited Key-note speaker, International Conference of Paleoceanography (Barcelona, Spain September 2013)
- Invited Key-note speaker, Southwest Pacific Ocean IODP Workshop (Sydney, Australia October 2012)
- Invited Key-note speaker, Antarctic and Southern Ocean Drilling Workshop (Portland, Oregon July 2012)
- Co-proponent, “Travel Support for U.S. Scientists to Attend the Southwest Pacific Ocean IODP Workshop” 2012 (coordinated travel funding for 11 US scientists to Sydney workshop)
- Steering Committee member, Integrated Ocean Drilling Program/Ocean Leadership Building U.S. Strategies Workshop 2011-2012 (workshop May 2012)
- Panel member, NSF OCE Marine Geology and Geophysics program (twice)
- Co-convened session at Fall AGU meeting 2008
- Panel member, NSF OCE Committee of Visitors 2009
- Invited participant to the NSF Proxies workshop, December 10-22, 2005
- Invited participant to the NSF Geosystems workshop, September 9-11, 2004
- Invited participant in the CHRONOS Geochemical Cycles workshop June 25-26, 2004
- ODP Leg 208 Shipboard Scientist (inorganic geochemist) March 9- May 8, 2003
- ODP Leg 198 Shipboard Scientist (sedimentologist) August 29- October 24, 2001
- Member American Geophysical Union, Geological Society of America

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University, Community, National and International Service and Outreach:

2015 • Geology Editorial Board Member
- Mentor and Steering Committee member, Consortium for Ocean Leadership Marine Geoscience Leadership Symposium http://oceanleadership.org/education/mgls/
- ADVANCE STRIDE Committee (rotated off September 2015)
- College of Geosciences representative to the Department Heads Steering Committee

2014 • Geology Editorial Board Member
- ADVANCE STRIDE Committee
- Co-convener, Teacher Training workshop on Climate Change at the Texas State Aquarium
- College of Geosciences representative to the Department Heads Steering Committee
- Participant, NSF funded Summit on the Future of Undergraduate Geosciences Education
- Invited Panelist, Undergraduate Research Mini Symposium

2013 • Science lead for the Consortium for Ocean Leadership Deep Earth Academy Regional Rocks teacher training program, Washington, D.C.
- SEPM Shepard Medal Award Selection Committee
- ADVANCE STRIDE Committee
- Keynote Speaker, Texas A&M University – Central Texas, Graduate and Research Awards Banquet
- Keynote Speaker, Phi Kappa Phi Induction Ceremony
- Invited Keynote Shell Science Seminar, National Science Teachers Association National Conference, San Antonio
- Speaker and Oceanography Liaison, Aggieland Saturday, Texas A&M
- Session Chair, 2013 Southcentral GSA Sectional Meeting

2012 • ADVANCE STRIDE Committee
- SEPM Shepard Medal Award Selection Committee
- Speaker and Oceanography Liaison, Aggieland Saturday, Texas A&M
- Faculty participant, College of Geosciences GeoX Week (IODP discovery-based activity)
- Invited presentation for TAMU System Chancellor “The Role of IODP in Education”
- Invited presentation for TAMU Board of Regents on behalf of IODP
- Faculty participant, College of Geosciences iGeo program

2011 • Speaker and Oceanography Liaison, Aggieland Saturday, Texas A&M
- Keynote Address, Zooming Out for a Global View, A Global Issues Conference for High School Students at Texas A&M
- Invited Speaker, Women in Science and Engineering Conference, Texas A&M
- Invited Panelist, Girl Genius STEM Conference, Girl Scouts of Central Texas
- Faculty participant, College of Geosciences GeoX Week (IODP discovery-based activity)
- President’s Panel, MSC Fall Leadership Conference

2010 • Speaker, College of Geoscience iGEO program


2008 • Invited lecture, UTIG TXESS Revolution science teacher training program (Kathy Ellins lead PI) October 2008 http://www.txessrevolution.org/
• Guest Lecture, Cypress Grove Middle School (College Station, TX) Earth Sciences week activities October 2008
• Instructor, School of Rock (Consortium for Ocean Leadership’s Deep Earth Academy) July 2008 http://www.oceanleadership.org/schoolofrock2008/participants.html
• Instructor, Urbino Summer School in Paleoceanography, Urbino, Italy July 2008 http://www.uniurb.it/ussp/index.html
• Invited Mrs. Jenelle Hopkins and students to assist in geological field work for NSF funded research, Arrow Canyon, NV (Jenelle and one student attended) March 2008

2007 • Guest Lecture, Centennial High School honors Earth Science class for Jenelle Hopkins (Las Vegas, NV) December 2007
• Instructor, European Consortium for Ocean Research and Drilling (ECORD) Summer School in Paleoceanography, Bremen Germany, August 2007
• Instructor, School of Rock (Consortium for Ocean Leadership’s Deep Earth Academy) July 2007 http://www.joilearning.org/schoolofrock2007/participants.html
• Instructor, JOI Learning sponsored Teacher Training Program at the Denver Museum of Natural History March 2007

2006 • Guest Lecture for climate change, JOI Learning School of Rock “post cruise meeting” August 2006
Education

1992-1995  Queen Mary, University of London, UK  
Ph.D. awarded in April 1996.  
Thesis:  Growth, mucilage production and aggregation of Skeletonema costatum.

1988-1991  Queen Mary, University of London, UK  
B.Sc. (Hons) Marine and Freshwater Biology  
First class  
Thesis:  Carbon acquisition by Pavlova lutheri

Experience

2013-2015  Assistant Department Head, Department of Oceanography, Texas A&M University, College Station, TX, USA
2010-present  Associate Professor, Department of Oceanography, Texas A&M University, College Station, TX, USA
2004–2010  Assistant Professor, Department of Oceanography, Texas A&M University, College Station, TX, USA
2003  Research Fellow, Wrigley Institute for Environmental Sciences, University of Southern California, Los Angeles, CA, USA
2000-2002  Research Fellow in Biological Sciences, University of Sunderland, Sunderland, UK
1996-1999  Senior Research Officer, Department of Biological Sciences, University of Essex, Colchester, UK

Peer-Reviewed Papers (Last 5 Years)


**External Grants (Last 5 Years):**


- National Science Foundation –Education-DUE- 1355807 ‘Oceanography scholars’. Wilford Gardner (PI), Daniel C. O. Thornton (co-PI), Shari Yvon-Lewis, Benjamin Giese, Mary Jo Richardson. $618, 826 ($0 to DCOT, grant to support graduate students). 1 September 2014 – 31 August 2019.


- Texas Sea Grant College Program – NA10OAR4170099. Project number: 404266 ‘Evaluation of Laser In Situ Scattering and Transmissometry (LISST) as a tool to monitor for harmful algal blooms (HABs) in Texas coastal waters.’ Daniel C. O. Thornton (PI) $49,000 total ($49,000 to DCOT). 1 February 2010 – 31 August 2014


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2012.

**Graduate Students (Last 5 Years)**

<table>
<thead>
<tr>
<th>Graduate Student</th>
<th>Degree(s)</th>
<th>Role</th>
<th>Graduation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elise Wilbourn</td>
<td>Ph.D.</td>
<td>chair</td>
<td>2014 - present</td>
</tr>
<tr>
<td>Jie Chen</td>
<td>Ph.D.</td>
<td>chair</td>
<td>graduated May 2014</td>
</tr>
<tr>
<td>Yina Liu</td>
<td>Ph.D.</td>
<td>co-chair</td>
<td>graduated August 2013</td>
</tr>
<tr>
<td>Lauren Drake Railey</td>
<td>M.S.</td>
<td>chair</td>
<td>graduated December 2012</td>
</tr>
<tr>
<td>Charles Rzadkowolski</td>
<td>M.S.</td>
<td>chair</td>
<td>graduated August 2010</td>
</tr>
</tbody>
</table>
TERRY L. WADE, Ph.D.
Geochemical and Environmental Research Group (GERG)

College of Geosciences
Texas A&M University
833 Graham Road
College Station, TX  77845

Email: terry@gerg.tamu.edu
Phone: 979-862-2325

Education:
Ph.D. University of Rhode Island, Kingston, Rhode Island, 1978 (Chemical Oceanography)
M.S. University of Rhode Island, Kingston, Rhode Island, 1974 (Chemical Oceanography)
B.A. Hartwick College, Oneonta, New York, 1971 (Chemistry)

EXPERIENCE:
2013-Present Deputy Director of Geochemical and Environmental Research Group, Texas A&M University
2014-Present Research Professor, Department of Oceanography, Texas A&M University
2010-2013 Interim Director of Geochemical and Environmental Research Group, College of Geosciences, Texas A&M University
1998-2013 Deputy Director of Environmental Sciences, GERG, Texas A&M University
2001-2014 Adjunct Professor, Department of Oceanography, Texas A&M University
1993-1998 Associate Director of Environmental Sciences, GERG, College of Geosciences, Texas A&M University
1992-Present Research Scientist, GERG, College of Geosciences, Texas A&M University
1986-1992 Associate Research Scientist, GERG, Texas A&M University
1984-Present Member, Graduate Faculty, Texas A&M University
1984-1986 Assistant Research Scientist, GERG, Dept. of Oceanography, Texas A&M University
1984-1986 Adjunct Assistant Professor, Dept. of Oceanography, Old Dominion University, Norfolk, VA
1982 NASA-ASEE Summer Faculty Fellowship Program, NASA Langley Research Center, Hampton, VA
1979-1984 Joint Appointment, Dept. of Chemical Science, Old Dominion University, Norfolk, VA
1978-1984 Assistant Professor of Oceanography, Dept. of Oceanography, Old Dominion University, Norfolk, VA
1971-1978 Research Assistant and Graduate Student, Graduate School of Oceanography, University of Rhode Island, Kingston, RI
1970 National Science Foundation Summer Research Assistant, Hamilton College, Clinton, NY

Publications: H factor = 46 (since 2008); Total citations 6422; I10 Index 113


Grants And Contracts ~$1,000,000/Yr Total Expenditures Per Year From 2010 To 2015
DOIF US Fish and Wildlife Service
Texas Department of Health Services
Texas General Land Office
NSF McMurdo Station Environmental Studies
Gulf of Mexico Research Imitative, GOMRI
Gulf of Mexico Research Imitative, ADDOMEX
State of Alaska
Qatar Foundation
BP
Texas A&M University Galveston
TDI Brooks
Stanford University

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CHRISTINA L. (STOVER) WIEDERWOHL, Ph.D.
Instructional Assistant Professor, Department of Oceanography, Texas A&M University

3146 TAMU
College Station, TX 77843

Email: chrissyw@tamu.edu

Education

Texas A&M University, College Station, TX USA
Concentration: Physical Oceanography
Dissertation Title: The Ross Sea response to evolving ocean-ice interactions in a changing climate.
Chair: Dr. Alejandro H. Orsi

Master of Science in Oceanography, May 2006
Texas A&M University, College Station, TX USA
Concentration: Physical Oceanography
Thesis Title: A new account of Ross Sea waters: Characteristics, volumetrics, and variability.
Chairs: Dr. Alejandro H. Orsi and Dr. Achim Stoessel

Bachelor of Science in Marine Science, magna cum laude, Dec. 2002
Coastal Carolina University, Conway, SC USA
Minor: Chemistry, Biology

Professional Appointments

Instructional Assistant Professor, Oceanography, Texas A&M Univ., Oct. 2013-present

Publications

Peer Reviewed
SHARI YVON-LEWIS, PH.D.
Associate Professor, Department of Oceanography, Texas A&M University

3146 TAMU
College Station, TX 77845
Phone: 979-458-1816 Fax: 979-845-6331
Email: syvon-lewis@tamu.edu

Education
University of Miami, Miami, FL
Ph.D. in Marine and Atmospheric Science [1994]
Advisor: Dr. Eric S. Saltzman

University of Massachusetts, Amherst, MA
B.S. Chemistry [1989]

Experience
Dept. of Oceanography, Texas A&M University, College Station, TX
Associate Professor [09/2011 – present]

Dept. of Oceanography, Texas A&M University, College Station, TX
Assistant Professor [10/2004 – 08/2011]

DOC/NOAA/Atlantic Oceanographic and Meteorological Laboratory, Miami, FL
Research Chemist [08/1997 – 09/2004]

University of Colorado, Boulder, CO
Research Associate [03/1996 – 07/1997]

DOC/NOAA/ERL/CMDL, Boulder, CO
DOE Global Change Distinguished Postdoctoral Fellow [03/1994 – 02/1996]

Courses Taught
OCNG 181 (1cr. – taught 1 time) – First Year Seminar: Oceans in the News
OCNG 205 (1cr. – taught 1 time) – Introduction to Ocean Studies
OCNG 251 (3cr. – taught 4 times) – Oceanography
OCNG 440 (3cr. – taught 5 times) – Introduction to Chemical Oceanography (writing intensive)
OCNG 350 (3cr. – taught 2 times) – Marine Pollution
OCNG 640 (3cr. – taught 8 times) – Chemical Oceanography
OCNG 689 (3cr. – taught 1 time) – Marine Trace Gas Biogeochemistry
GEOS 105 (3cr. – taught 2 times) – Introduction to Environmental Geoscience

Supervisor for OCNG 252 (Oceanography Lab – 1 Cr.) – 2010-2013
Supervised 15 teaching assistants who each teach 3 labs each week. This includes a weekly meeting of all TAs to train them for the upcoming lab, set up equipment for the next lab, and take down equipment from the last lab. The labs are run every summer, as well with 1 TA per summer term and 3 lab sections per term. I also maintained and updated the curriculum.

Graduate Student Committees
Chair:
Current:
Jordan Young (M.S., Oceanography)
Constance Previti (M.S., Oceanography)
Stanford Goodwin (M.S., Oceanography)
Graduated:
Mengran Du (Ph.D., Oceanography; Co-advisor – August 2014)
Alison Smyth (M.S., Oceanography – August 2014)
Yina Liu (Ph.D., Oceanography, Co-Chair Dan Thornton – August 2013)
Fenix Garcia Tigreros (M.S., Oceanography – May 2013)
Lei Hu (Ph.D., Oceanography – August 2012)
David Finneran (Ph.D., Oceanography, Co-Chair with John Morse - December 2010)

Member:
Current:
Kristin Collier (M.S., Atmospheric Sciences)
Jillian Mattus (M.S., Atmospheric Sciences)
Zach Rolewicz (M.S., Oceanography)

Graduated:
Leong Wai Su (M.S., Atmospheric Sciences, December 2014)
Kathryn Schreiner (Ph.D., Oceanography, May 2013)
Reagan Errera (Ph.D., Oceanography, May 2013)
Scarlett Arbuckle (Ph.D., Oceanography, August 2012)
Yongsun Kim (Ph.D., Oceanography, August 2012)
Keun-Hee Lee (Ph.D., Atmospheric Sciences, December 2011)
Changhyoun Park (Ph.D., Atmospheric Sciences; May 2010)
Dalon Stone (MS, Atmospheric Sciences)
Jason Tomlison (Ph.D., Atmospheric Sciences, December 2010)
Timothy Taylor (Ph.D., Civil Engineering; May 2009)
Amber Reynolds (MS, Atmospheric Sciences, December 2007)

Undergraduate Research Advising
Haley Brey [Honors Research] (Environmental Geosciences major; Spring 2015 – present)
Charlotte Woods (Environmental Geosciences major; Spring 2015 – present)
Audrey Housson (Geology major; Spring 2015)
David Imthurn (Biology major; Fall 2014)
Victoria Constant (Environmental Studies major; Fall 2014)
Rachel Reddig (Chemistry major; Fall 2012-Summer 2014)

Grants and Funding since 2010

NSF/Low Temp Geochem “Collaborative Research: The Role of Priming in Microbial Utilization of Terrestrially Derived Dissolved Organic Matter in the Mississippi River Plume: A Proof of Concept” (9/15/2012-8/31/2014; $111,435 with PI Thomas Bianchi and Co-Is Dan Thornton and Gary King)

Consortium for Ocean Leadership “Gulf of Mexico Integrated Spill Response Consortium” (9/1/2011-12/31/2014; $4,676,624 of which $242,594 is for my part, Chief Scientist for the Consortium is Piers Chapman at Texas A&M University; There are many other Co-Is)

TAMU/OCNG funding was received to purchase an automated Dissolved Inorganic Carbon stripping system, VINDTA-3D (Marianda Corp.) (12/2011; $35,000)
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NASA “Ocean Acidification of the Greater Caribbean Region 1999-2008” (8/1/2008 – 7/31/2011; $66,127 with Co-Is Rik Wanninkhof and C. Mark Eaton) – Note: I replaced John Morse, after his death, as the PI during the second year of this grant and completed all work necessary to finish the project.


Submitted Proposals

NSF “Using continuous culture systems to investigate the physiology of dissolved organic matter (DOM) release by diatoms in a changing ocean” (3/1/2016-2/28/2019; $701,373 with PI Daniel Thornton)

Peer-Reviewed Journal Publications (asterisk indicates student (co)author) since 2010

2015


2014


2013


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2012


2011


2010


Technical Reports/Book Chapters/Assessments since 2010

2014


2013

Published Conference Proceedings/Newsletters/Abstracts since 2010

2015

2014

Du*, M., S. A. Yvon-Lewis, D. Valentine, S. Mendes and J. Kessler (2014), High resolution measurements of methane concentrations and air-sea fluxes reveal the influence of methane seepage on greenhouse gas dynamics in a massive natural seep field near Coal Oil Point, California, 2014 Gulf of Mexico Oil Spill and Ecosystem Science Conference, Mobile, AL.


2012


2011


2010


Yvon-Lewis, S. A., E S Saltzman and S.A. Montzka, Methyl Bromide: Budget and Trends, Methyl Bromide and
Alternatives Workshop, May 11-13, 2010, Kansas State University, Invited speaker.

Appendix 3: Grants Awarded to the Ad-loc Faculty, 2008-2016

The following pages contain the tabulated Grants Awarded to Ad-loc Faculty from 2008 to present in alphabetical order. Faculty that are no longer with the Department are also included at the end.
<table>
<thead>
<tr>
<th>Faculty</th>
<th>Award Start Date</th>
<th>Award End Date</th>
<th>Project Title</th>
<th>Amount</th>
<th>Sponsor Name</th>
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</thead>
<tbody>
<tr>
<td>Biggs, Douglas</td>
<td>28-Feb-15</td>
<td>30-Mar-11</td>
<td>Long Term Ecological Monitoring On Galapagos</td>
<td>34,969</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>Campbell, Lisa</td>
<td>1-Feb-10</td>
<td>31-Jul-15</td>
<td>OCEAN OBSERVING TECH</td>
<td>-54</td>
<td>DOC-National Oceanic and Atmospheric Administration</td>
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<tr>
<td></td>
<td>1-Aug-13</td>
<td>31-Jul-15</td>
<td>Continuous Measurements of Plankton</td>
<td>25,309</td>
<td>Consejo Superior de Investigaciones</td>
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<td></td>
<td>1-Sep-14</td>
<td>31-Aug-15</td>
<td>Marine Sensor Transitions Integrati</td>
<td>3,241</td>
<td>OCEAN OBSERVING TECH</td>
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<tr>
<td></td>
<td>1-Sep-15</td>
<td>31-Aug-18</td>
<td>Marine Sensor Transitions Integrati</td>
<td>3,241</td>
<td>University of California-Santa Cruz</td>
</tr>
<tr>
<td></td>
<td>1-Sep-15</td>
<td>31-Aug-18</td>
<td>Marine Sensor Transitions Integrati</td>
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<td>University of California-Santa Cruz</td>
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<tr>
<td></td>
<td>1-Sep-15</td>
<td>31-Aug-18</td>
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<td>University of California-Santa Cruz</td>
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<td>University of California-Santa Cruz</td>
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<td>Marine Sensor Transitions Integrati</td>
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<td>University of California-Santa Cruz</td>
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<td>1-Sep-15</td>
<td>31-Aug-18</td>
<td>Marine Sensor Transitions Integrati</td>
<td>3,241</td>
<td>University of California-Santa Cruz</td>
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<td>31-Aug-18</td>
<td>Marine Sensor Transitions Integrati</td>
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<td>University of California-Santa Cruz</td>
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<td>1-Sep-15</td>
<td>31-Aug-18</td>
<td>Marine Sensor Transitions Integrati</td>
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<td>University of California-Santa Cruz</td>
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Note: The table continues with more rows and data for different projects and faculty members.
<table>
<thead>
<tr>
<th>Name</th>
<th>Start Date</th>
<th>End Date</th>
<th>Project Title</th>
<th>Organization</th>
<th>Funding</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campbell, Lisa</td>
<td>1-May-12</td>
<td>31-Jan-13</td>
<td>2012-2014 Tx S/G Support: Early Warning</td>
<td>DOC-NOAA-National Sea Grant Office</td>
<td>5,000</td>
<td>2012</td>
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<td></td>
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<td>2012-2014 Texas Sea Grant Support</td>
<td>DOC-NOAA-National Sea Grant Office</td>
<td>40,277</td>
<td>2011</td>
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<td></td>
<td>1-Mar-12</td>
<td>28-Feb-15</td>
<td>NSF-Collaborative Research: Osmoreg</td>
<td>National Science Foundation</td>
<td>147,313</td>
<td>2013</td>
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<td>1-Sep-09</td>
<td>31-Aug-12</td>
<td>Ecohab: Mechanism of Harmful Algal</td>
<td>DOC-National Oceanic and Atmospheric Administration</td>
<td>11,100</td>
<td>2011</td>
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<td></td>
<td>1-May-11</td>
<td>30-Apr-14</td>
<td>Cash Balance In Oceanography-Campbe</td>
<td>Texas A&amp;M Research Foundation</td>
<td>15,911</td>
<td>2011</td>
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<td>1-Mar-12</td>
<td>28-Feb-15</td>
<td>NSF-Collaborative Research: Osmoreg</td>
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<td>31-Jan-11</td>
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<td>79,306</td>
<td>2010</td>
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<td>1-Sep-06</td>
<td>31-Aug-09</td>
<td>Ecohab: Intraspective Variation In A Toxin-Producing Dinoflagellate</td>
<td>DOC-National Oceanic and Atmospheric Administration</td>
<td>218,068</td>
<td>2008</td>
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<td>31-Aug-11</td>
<td>Ecohab: Mechanism of Harmful Algal</td>
<td>DOC-National Oceanic and Atmospheric Administration</td>
<td>185,969</td>
<td>2010</td>
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<td></td>
<td>24-Jun-09</td>
<td>31-Oct-10</td>
<td>Detection of Karenia Brevis Blooms</td>
<td>Florida Fish &amp; Wildlife Conservation Commission</td>
<td>82,000</td>
<td>2009</td>
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<td></td>
<td>1-Sep-09</td>
<td>31-Aug-10</td>
<td>Ecohab: Mechanism of Harmful Algal</td>
<td>DOC-National Oceanic and Atmospheric Administration</td>
<td>30,108</td>
<td>2010</td>
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<tr>
<td></td>
<td>1-Sep-07</td>
<td>31-Aug-08</td>
<td>Automated Imaging and Classification</td>
<td>Woods Hole Oceanographic Institution</td>
<td>69,024</td>
<td>2008</td>
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<td>Total</td>
<td></td>
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<td>2,339,524</td>
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<tr>
<th>Name</th>
<th>Start Date</th>
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<th>Project Title</th>
<th>Organization</th>
<th>Funding</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>Chang, Ping</td>
<td>15-Sep-11</td>
<td>14-Sep-13</td>
<td>Understanding Climate Model Biases In Tropical Atlantic and Their Impact On Simulations of Extreme Climate Events</td>
<td>DOE-Chicago/Argonne National Laboratory</td>
<td>494,271</td>
<td>2012</td>
</tr>
<tr>
<td>Chang, Ping</td>
<td>1-Sep-14</td>
<td>31-Jul-15</td>
<td>A Combined Paleo-Proxy and Modeling</td>
<td>Old Dominion University</td>
<td>140,157</td>
<td>2015</td>
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<td>Chang, Ping</td>
<td>1-Sep-13</td>
<td>31-Aug-16</td>
<td>Collaborative Research: Understanding Long-term Changes In the Atlantic Meridional Overturning Circulation</td>
<td>DOC-NOAA-Climate Program Office</td>
<td>379,095</td>
<td>2014</td>
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Appendix C-231
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<tr>
<th>Name</th>
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<th>Sponsor/Institution</th>
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<th>Year</th>
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**Collaborative Proposal: Type I: Developing and Implementing Ocean-Atmosphere Reanalyses for Climate Applications**

**Grant Title:** Collaborative Proposal: Type I: Developing and Implementing Ocean-Atmosphere Reanalyses for Climate Applications (oarca)

**Principal Investigator:** Giese, Benjamin

**Start Date:** 1-Feb-11

**End Date:** 31-Jan-14

**Funding Agency:** National Science Foundation

**Total Funding:** 443,748

**Description:** This collaborative proposal focuses on developing and implementing ocean-atmosphere reanalyses for climate applications. The project aims to enhance our understanding of the climate system by improving models and data integration.

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**Collaborative Proposal: Type I: Developing and Implementing Ocean-Atmosphere Reanalyses for Climate Applications**

**Grant Title:** Collaborative Proposal: Type I: Developing and Implementing Ocean-Atmosphere Reanalyses for Climate Applications (oarca)

**Principal Investigator:** Giese, Benjamin

**Start Date:** 1-Jun-08

**End Date:** 31-May-11

**Funding Agency:** National Science Foundation

**Total Funding:** 353,154

**Description:** This collaborative proposal focuses on developing and implementing ocean-atmosphere reanalyses for climate applications. The project aims to enhance our understanding of the climate system by improving models and data integration.

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**Total Funding:** 1,263,534

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**Principal Investigator:** Giese, Benjamin

**Start Date:** 1-Jun-08

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**Total Funding:** 1,263,534
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<td>Mills, Heath</td>
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<td>Mills, Heath</td>
<td>1-Sep-11</td>
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Appendix C-243
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<td>National Science Foundation</td>
<td>292,215</td>
<td>2009</td>
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<td>Us Nuclear Regulatory Commission-Ipa</td>
<td>Nuclear Regulatory Commission</td>
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<td>Us Nuclear Regulatory Commission-Ipa</td>
<td>Nuclear Regulatory Commission</td>
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<td>2009</td>
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<td>Consortium for Ocean Leadership</td>
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<td>2010</td>
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<td>44,510</td>
<td>2010</td>
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<td>Sager, William</td>
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<td>Joi-Determination of Volcanostratigraphy</td>
<td>Consortium for Ocean Leadership</td>
<td>28,000</td>
<td>2008</td>
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<td>Student participation on A16N Leg 1</td>
<td>Scripps Institute of Oceanography</td>
<td>3,746</td>
<td>2014</td>
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<td>Schmidt, Matthew</td>
<td>1-Sep-11 - 31-Aug-14</td>
<td>A Combined Paleo-Proxy and Modeling</td>
<td>National Science Foundation</td>
<td>297,648</td>
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<td>Linking Atmospheric and Ocean</td>
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<td>Texas A&amp;M Research Foundation</td>
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<td>National Science Foundation</td>
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<td>University of California - San Diego (UCSD)</td>
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<td>Long-Term Monitoring of Human Impacts At</td>
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<td>Inventory and Synthesis of World-Wide</td>
<td>TDI-Brooks International, Inc.</td>
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<td>15-Mar-10</td>
<td>28-Feb-11</td>
<td>Group Travel Award: Sca 2010 Ipy Open</td>
<td>National Science Foundation</td>
<td>59,950</td>
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<td>28-Feb-09</td>
<td>Group Travel Award: Scar/Iasc 2008 Ipy</td>
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<td>16-Jan-09</td>
<td>High Power Density Sediment Microbial</td>
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<td>Kinetics and Mechanisms of Calcite</td>
<td>DOE-Chicago/Argonne National Laboratory</td>
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Appendix 4: Publications listed by year for the Ad-Loc Faculty

First author student publications are designated with an asterisk (*), faculty authors and co-authors are in bold.

2016

2015


Wilson, ST, Barone, B, Ascani, F, Bidigare, RR, Church, MJ, del Valle, DA, Dyhrman, ST, Ferron, S, **Fitzsimmons**, Appendix D-248
Appendix D-249


### 2014


Fitzsimmons, JN & Boyle, EA (2014). Assessment and comparison of Anopore and cross flow filtration methods for the determination of dissolved iron size fractionation into soluble and colloidal phases in seawater. *Limnology & Oceanography: Methods* 12, 244-261.


Meyers, MJ, **JB Sylvan** and KJ Edwards. (2014) Extracellular enzyme activity and microbial diversity measured on seafloor exposed basalts from Loihi Seamount indicate importance of basalts to global biogeochemical cycling. *Applied and Environmental Microbiology*, 80(16) 4854-4864. *both authors contributed equally to this work.*


2013


### 2012


Appendix D-259


Appendix D-259


2011


2010


Appendix D-262


Appendix 5: Oceanography Courses Offered

Below is the list of the courses offered by the Oceanography Department as listed in the Texas A&M University 2015-2016 catalog.

Undergraduate Courses
OCNG 251 Oceanography
OCNG 252 Oceanography Lab
OCNG 291 Research
OCNG 350 Marine Pollution
OCNG 401 Interdisciplinary Ocng
OCNG 404 Ocean Observing Systems
OCNG 410 Intro To Phys Ocngraphy
OCNG 420 Intro Biological Ocng
OCNG 425 Microbial Oceanography
OCNG 430 Intro Geological Ocng
OCNG 440 Intro To Chemical Ocng
OCNG 451 Math Model Ocean Climate
OCNG 485 Directed Studies
OCNG 489 Special Topics In
OCNG 491 Research

Graduate Courses
OCNG 600 Survey Of Oceanography
OCNG 603 Communicating Ocean Science
OCNG 604 Ocean Observing Systems
OCNG 605 Oceanography Cruise
OCNG 608 Physical Oceanography
OCNG 609 Dynamical Oceanography
OCNG 610 Math Mod Marine Ecosys
OCNG 611 Global Oceanography
OCNG 612 Elem Of Ocn Wave Thry
OCNG 615 Numerical Modeling I
OCNG 616 Numerical Modeling II
OCNG 617 Theories Of Ocean Cir
OCNG 620 Biological Ocng
OCNG 625 Current Topics Biol Ocng
OCNG 627 Ecol Of Cont Shelf
OCNG 630 Geological Ocn
OCNG 632 Sea-Level Change
OCNG 640 Chemical Oceanography
Ocng 641 Inorganic Aquatic Geoche
Ocng 644 Isotope Geochemistry
Ocng 645 Marine Org Geochem
Ocng 646 Dynamics Colloids Envir
Ocng 649 Estuarine Biogeochem
Ocng 650 Aquatic Microbial Ecol
Ocng 651 Meteorological Ocn
Ocng 652 Sediment Biogeochemistry
Ocng 654 Plankton Ecology
Ocng 657 Data Methods Graph Rep
Ocng 658 Ocng Comp Analysis Lab
Ocng 659 Ocean Observing Applicat
Ocng 662 Coastal Processes
Ocng 666 Prncpls Of Geodynamics
Ocng 668 Geol Geop Sm Ocn Basin
Ocng 670 Deep Sea Sediments
Ocng 673 High-Res Marine Geop
Ocng 674 Paleoceanography
Ocng 677 Geophys Data Assim
Ocng 678 Coastal Dynamics
Ocng 679 Paleoclimate Proxies
Ocng 681 Seminar
Ocng 684 Professional Internship
Ocng 685 Directed Studies
Ocng 689 Special Topics In
Ocng 691 Research