OCEANOGRAPHY
TEXAS A&M UNIVERSITY

Strategic Planning 2014

May, 2014

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 fosters a culture of scholarly excellence, diversity, and nurturing workplace climate, while embracing the role of a public university in improving the lives of all Texans.

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.
    - The Department has not embraced distance education technology to improve communications and education with other campuses.
    - 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 thermosalinograph, 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.
- 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.
- 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.
- 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.

- 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.

- 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.

<u>1-2 year actions</u>

- 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 are also exploring a 3-hour communication course for first year graduate students that would encompass all aspects of oral and written communication, 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

- 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.

<u>1-2 year actions</u>

- 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.
- Explore and implement hybrid and online versions of OCNG 251.

<u>3-5 year actions</u>

- 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.