



ANNUAL REPORT FOR
THE COLLEGE OF MARINE SCIENCE
DEAN JACQUELINE E. DIXON

JANUARY 1 – DECEMBER 31, 2015

Locally Applied, Regionally Relevant, Globally Significant!

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THE VIEW FROM THE BRIDGE

The View from the Bridge



Florida is an ocean state. In Florida, coastal tourism contributes over 200,000 jobs and \$50 billion annually. Seafood sales contribute more than \$30 billion annually. The fishing industry contributes more than cattle and citrus industries combined. Florida's economic strengths depend on a clean coastal environment and a sustainable fishery. In addition, Florida is highly susceptible to negative impacts of a changing climate, such as coastal flooding due to extreme events and sea level rise, salt-water intrusion, ocean acidification, and who can forget the impact of the Deepwater Horizon oil disaster.

We cannot protect what we don't understand. A sustainable Florida requires a fundamental understanding of how the ocean system works and how we are changing it. Our mission is to increase and apply fundamental knowledge of global ocean systems and human-ocean interactions through research, graduate education and community engagement. The College of Marine Science's 27 faculty, along with 100 graduate students and 47 research staff, are committed to this goal.

The core strength of CMS is our incredible faculty. In 2015, Kendra Daly, Steve Murawski, and myself were named as American Association for the Advancement of Science Fellows. With the addition of these three new awardees, twenty percent of our faculty are now AAAS Fellows, the highest percentage of any college at USF. This is just one indication of how CMS faculty enhance the reputation of USF. CMS faculty perform at the highest levels with respect to research metrics, such as external grant funding, publications, citations, and awards. Their accomplishments and discoveries are highlighted in this annual report. Our great faculty attract great students and we celebrate their success as well.

This annual report summarizes our research, education, and outreach activities for an exciting and event-filled 2015. From welcoming new donors and grants to participating in the ever-expanding St. Petersburg Science Festival and Blue Ocean Film Festival, the folks in the College of Marine Science have been busy. I'm pleased to be at the helm as we build on a foundation of excellent work by our faculty, staff, and students, and expand our role in the community.

COLLEGE OF MARINE SCIENCE SNAPSHOT

College of Marine Science Snapshot

The Establishment of the CMS!

As we approach a fifty-year anniversary, it is good to look back and see how far we've come as a prelude to the exciting research and education that was accomplished in 2015 and that continues today. The USF College of Marine Science began in 1967 as the Marine Science Institute of the University of South Florida and was located in an old U.S. Merchant Marine training station on what would become the 11-acre USF branch campus near the Bayboro Harbor in St. Petersburg, Florida. The first three faculty – Harold Humm (Director, and a marine phycologist), Thomas Hopkins (marine plankton and micronekton ecology), and Hugh Dewitt (ichthyology) – set up laboratories in that facility and began to mentor graduate students working toward master's degrees. By 1969 the group doubled in size and included Thomas Pyle (marine geology), Kendall Carder (optical/physical oceanography) and Ronald Baird (ichthyology). When Peter Betzer (chemical oceanography) joined the faculty in 1971, all of the major sub-disciplines of oceanography were represented, and the Institute was re-designated as the Marine Science Department within the USF College of Natural Sciences. It was later incorporated into the USF College of Arts and Sciences. In 2000, the Department formally became a separate USF College located on the USF St. Petersburg campus while reporting directly to the USF Provost on the main Tampa Campus.

In the 48 years since its official beginning, Marine Science at USF has greatly expanded in size and capability and is widely recognized as a leader in ocean science. There are now 27 faculty covering the sub-disciplines of oceanography and other earth sciences, ~100 graduate students, ~\$16 million in annual research, a total endowment of ~\$18 million, two Research Faculty, 12 Postdocs, 57 Research Staff and 20 Administration Staff.

We are strongly engaged with the community as a member of the St. Petersburg Marine Science District, a group of organizations including USF CMS, USFSP, Eckerd College, the U.S. Geological Survey, the Florida Fish and Wildlife Research Institute, Florida Institute of Oceanography, SRI International, NOAA Fisheries Service, the Tampa Bay Estuary Program, and others. The Marine Science District contributes to the economic well-being of St. Petersburg through employment of approximately 800



researchers, engineers, technicians and support staff (an estimated 75% of those employed have advanced degrees; at least 30% of those at the PhD level), an estimated annual payroll of \$64M, and an additional (external market) financial impact of ~\$30M annually.

College of Marine Science Leadership Team

Jacqueline Dixon

Dean, College of Marine Science

University of South Florida

Ph.D., California Institute of Technology, 1992

(727) 553-3369

jdixon@usf.edu



Dr. Jacqueline Dixon is Dean of the College of Marine Science at the University of South Florida. She received her bachelor's and master's degrees in geology from Stanford University in 1981 and 1983, respectively, and her Ph.D. in geochemistry from the California Institute of Technology in 1992. From 1992 through 2010, Dr. Dixon was at the University of Miami, where she served as Director of the Abess Center for Ecosystem Science and Policy's Undergraduate Program, Senior Associate Dean for the Life and Physical Sciences, and Interim Dean of the College of Arts and Sciences. She received an Early Career Development award from the National Science Foundation for excellence in research and education, and is internationally recognized for her research on submarine volcanoes and the role of volatiles in magmatic processes. In 2015, Dr. Dixon was elected Fellow of the American Association for the Advancement of Science.

Dr. Dixon is serving on the External Review Committee for Nanyang Technical University in Singapore. Nationally, she serves on the Executive Board of the Consortium for Ocean Leadership and is a member of the NOAA Ocean Exploration Advisory Board. Within the community, she serves on the board of the Secrets of the Sea Marine Exploration Center and Aquarium, and as a member on the St. Petersburg Ocean Team, the St. Petersburg Downtown Partnership, and the St. Petersburg Chamber of Commerce Grow Smarter Initiative Committee. She has recently been appointed to the Board of Governors for the St. Petersburg Chamber of Commerce.

Gary Mitchum

Associate Dean, College of Marine Science

University of South Florida

Ph.D., Florida State University, 1984

(727) 553-3941

mitchum@usf.edu



Dr. Mitchum is presently a Professor of Physical Oceanography and the Associate Dean in the College of Marine Science at the University of South Florida. After receiving his Ph.D. from the Department of Oceanography at the Florida State University in 1985, he spent 11 years in the Department of Oceanography at the University of Hawaii, first as a postdoctoral researcher and then as a member of the research faculty and as the Director of the University of Hawaii Sea Level Center. He came to the University of South Florida in 1996. His research interests emphasize short-term climate changes, ranging from interannual variations such as ENSO, to decadal processes, to the problem of long-term sea-level rise. He has also done work on continental shelf dynamics, mesoscale eddy interactions with mean flows, internal tide generation and propagation, physical controls on fisheries variables, and storminess changes in the southeastern United States. Although he has used many types of data in his research, he is especially interested in analyses of tide gauge and satellite altimetric data, and notably proposed and developed the presently accepted method of estimating temporal drift in altimeters via comparisons with the global tide-gauge network.

COLLEGE OF MARINE SCIENCE LEADERSHIP TEAM

David Naar

Associate Professor, Director of Academic Affairs

College of Marine Science

University of South Florida

Ph.D., Scripps Institution of Oceanography, UCSD, 1990

(727) 553-1637

naar@usf.edu



Dr. Naar is the Director of Academic Affairs in the College of Marine Science at the University of South Florida. He received his bachelor's degree in Geology with an emphasis in Geophysics from University of California, Santa Barbara in 1982, and his Ph.D. in Earth Sciences from Scripps Institution of Oceanography, at the University of California, San Diego in 1990. From 1990 until present, Dr. Naar has been at the University of South Florida's College of Marine Science as an assistant professor and an adjunct professor at the University of Rhode Island's Graduate School of Oceanography. In 1996 he became an associate professor and subsequently the co-director of the Center of Coastal Ocean Mapping. In 2012, he became the Director of Academic Affairs. His research in Marine Geophysics over this time period came from the National Science Foundation, Office of Naval Research, the United States Geological Survey, the American Chemical Society Petroleum Research Fund, and the National Ocean and Atmospheric Administration. He has been cited by the Journal for Geophysical Research for excellence in refereeing. He is internationally recognized for his research on microplate tectonics, plate motions, seamount chains, and seafloor mapping from deep ocean trenches to the shoreline, including mapping several marine protected areas from American Samoa to Florida. Dr. Naar has served on the site characterization panels for several scientific international Ocean Drilling Programs and on the United States Scientific Advisory Committee (USSAC). Dr. Naar has co-published over 61 peer-reviewed manuscripts and has an H-index of 25 and is currently advising five graduate students, who are investigating benthic habitats and marine resources.

Chris Schwint

Budget Director

College of Marine Science

University of South Florida

(727) 553-1038

cschwint@usf.edu



Chris Schwint is the Budget Director for the College of Marine Science. He received his BA in 1981 from USF. Worked for the US Department of Labor and the University of South Florida in Budget and Policy Analysis.

Tim Trowbridge

Unit HR Administrator

College of Marine Science

University of South Florida

(727) 553-3375

ttrowbridge@usf.edu



Tim Trowbridge is the Unit HR Administrator for the College of Marine Science. He received his bachelor's degree in business management and minor in leadership studies from the University of South Florida in 2008. Since that time he has been employed by the University of South Florida serving as the Unit HR Coordinator for the Student Affairs Shared Services Center from 2009-2011 and in the College of Marine Science from 2011-2012. In May

COLLEGE OF MARINE SCIENCE LEADERSHIP TEAM

2012, Tim Trowbridge was promoted to Unit HR Administrator for the College of Marine Science and continues to serve in this role. He earned his Professional in Human Resources (PHR) certification in December 2013 and earned Certified Research Administrator (CRA-USF/basic) designation in August 2015.

Joseph Donnelly

Facilities Manager, College of Marine Science

University of South Florida

M.S., University of South Florida, 1986

(727) 553-1190

donnely@usf.edu



Mr. Donnelly is the Facilities Manager for the College of Marine Science at the University of South Florida. He received his bachelor's degree in marine biology from The University of West Florida in 1980 and master's degree in marine science from USF in 1986. From 1985 through 2006, he was an assistant/associate in research at CMS working with Dr. José Torres studying the biology and ecology of midwater fish and invertebrates. From 1988 to 1997 he also worked as an adjunct instructor in Earth Science and Oceanography at St. Petersburg Junior College (now St. Petersburg College). After recovering from a serious work-related accident in 2006, he took on the newly-created position of CMS Facilities Manager in 2008. Mr. Donnelly currently serves on several CMS committees (Space, Safety, and Computer) and is also a member of the USFSP campus Gold Team, which deals with all matters relating to the USFSP Campus Emergency Management Plan (CEMP).

E. Howard Rutherford

Director of Development

College of Marine Science

University of South Florida

(727) 553-3376

hrutherford@usf.edu



E. Howard Rutherford holds a Bachelor of Science degree in Marine Chemistry from Eckerd College, St. Petersburg, FL and attended graduate school at USF CMS. He returned to CMS as Director of Development after a 13-year tenure as President/CEO with The Pier Aquarium d/b/a Secrets of the Sea Marine Exploration Center and Aquarium. Before his tenure at the aquarium, Howard was a research associate in the nutrient chemistry laboratory at USF-CMS where he participated in research projects from the Bering Sea to the Arabian Sea to the Southern Ocean. He has witnessed firsthand the value and fragility of the marine environment, fueling his passion to share these discoveries with the public. His influence extends beyond Tampa Bay as a leader in ocean science education reform. Currently, Mr. Rutherford is Past-President to the National Marine Educators Association, a national organization powered by 17 individual, regional chapters that provide the on-the-ground efforts that support and promote national initiatives in education and conservation such as ocean literacy. He actively participates on the City of St. Petersburg's Ocean Team, of which the College of Marine Science plays a major role. As founding Co-Chair, Howard helped to establish the St. Petersburg Science Festival, and currently participates on the Science Festival Alliance (SFA) Council at MIT. The SFA Council oversees the activities of over 41 Festivals across the United States. Howard is also Co-PI on the *Creating a Community of Practice Around a Proven Teen Science Cafe Model*, a \$2.6 million project funded by the National Science Foundation. This project is building the first network of ocean science thematic Florida Teen SciCafes in partnership with The Florida Aquarium and Mote Marine Laboratory.

EVENTS AND HIGHLIGHTS

Events and Highlights

FACULTY AWARDS:

- **Cameron Ainsworth:** 2015 Rosenstiel Award, University of Miami (*Nominated, in review*)
- **Mya Breitbart:** Girls Incorporated of Pinellas, 2015 STEM Woman of the Year
- **Robert Byrne:** Excellence in Review Award by *Environmental Science and Technology* in 2015
- **Jacqueline E. Dixon:** American Association for the Advancement of Science (AAAS) for her distinguished contributions to the fields of marine science and geology
- **Kendra Daly:** American Association for the Advancement of Science (AAAS) for advancing the knowledge of Antarctic marine food webs and ecosystem dynamics in ice covered seas
- **Pamela Hallock Muller:** 2015 Joseph A. Cushman Award for Excellence in Foraminiferal Research
- **Steve Murawski:** American Association for the Advancement of Science (AAAS) for theoretical and empirical contributions to understanding the dynamics of exploited ecosystems
- **John Paul:** One of the five Excellence in Innovation Awards for PureMolecular which has played a role in safeguarding against seafood mislabeling fraud
Cade Museum of Science and Technology Award Quarter finalist
- **Amelia Shevenell:** IODP Distinguished Lecturer 2014-2015



Jacqueline Dixon, Kendra Daly and Steve Murawski AAAS Fellows



President Judy Genshaft and John Paul Excellence in Innovation Award



Pamela Hallock Muller 2015 Joseph A. Cushman Award for Excellence in Foraminiferal Research

EVENTS AND HIGHLIGHTS

STAFF AWARD:

- **Betty Rahn, Nancy Holloway and Anita Thompson** were recognized at the USF TRAIN Award Luncheon on April 2, 2015. About 125 USF employees were inducted into the Academy of Certified Research Administrators at USF. Members of the Academy are employees who have earned the Certified Research Administrator at USF (CRA-USF) credential, The Graduate Certificate in Research Administration (GCRA) or a certificate from the Research Administrators Certification Council (RACC).



Betty Rahn, Nancy Holloway and Anita Thompson

NEW FACULTY:

- **Brad Seibel** is one of the top marine invertebrate physiologists in the country. His research is in marine animal physiology with a major focus on invertebrates.
- **Xinfeng Liang** has extensive seagoing experience, primarily in acquiring and processing data from Lowered/Vessel-mounted Acoustic Doppler Current Profiler (ADCP).

NEW RESEARCH FACULTY:

- **Yun Li's** research aims to better understand the physical processes and the variety of biological-physical interactions that govern the ecosystem responses to climate and human-induced changes. Her particular interests focus on the "bottom-up" effects, which encompass the changes from physical environment (e.g., stratification, circulation, sea ice) to nutrient cycling to marine primary production.

EMINENT SCHOLAR LECTURE SERIES:

Frontiers in Marine Science, April 9 to 10, 2015 with four guest lecturers: Carol Arnosti, University of North Carolina, "Small Actors Play a Big Role: Microbially-Driven Carbon Cycling in the Ocean"; Rob Dunbar, Stanford University, "Fire and Ice: Tales of Climate Change Past and Future from the Tropics to the Poles"; David A. Hutchins, University of Southern California, "Evolutionary Surprises within the Future Ocean Nitrogen Cycle"; and Alex Mahalov, Arizona State University, "Computational Marine Science: Physics and Ecology at the Crossroad".

ALUMNI SUCCESS:

- **Kelley Anderson**, MS 2008, is a Hawaii Sea Grant Extension Agent in American Samoa; previously an instructor at the Community College in American Samoa. Kelley is using her USF experience to make a difference in American Samoa.
- **Rebekah Duncan Baker**, MS 2008, was promoted to Assistant Editor of the *Journal of Foraminiferal Research* in April 2014. This is an international journal published quarterly by the Cushman Foundation for Foraminiferal Research.
- **Jennifer Dupont**, Ph.D., 2009, a former Knauss Fellow, was initially hired by the environment department for Exxon Mobil where she traveled studying effects of seismic sounds on whales. She then accepted a 2-year assignment in Doha, Qatar where she is now the director of the companies' laboratory in Doha.
- **David Mearns**, MS 1986, Director of Bluewater Discoveries, West Sussex, UK; David was part of the MUSAHI search (world's largest battleship built by the Japanese). He spent time in the Sibuyan Sea to

EVENTS AND HIGHLIGHTS

film the search and discovery of the wreck. With his team, he also created a bathymetric map of a volcanic ridge that dominates the area, which was needed in advance of the AUV search with sidescan sonar. <http://bit.ly/1CZzv0K>

- **Lee Kump**, Ph.D., 1986, has been selected as an AGU Fellow - his citation reads: *“For pioneering research on the dynamics and long-term evolution of global biogeochemical cycles and coupling to climate.”* Lee is the first CMS Alum to receive this prestigious award.

ENDOWED GRADUATE STUDENT FELLOWSHIP LUNCHEON:

October 2015 began with a lunch to celebrate our endowed graduate student fellowships and awards. Details are provided in the Graduate Education section.

ST. PETERSBURG SCIENCE FESTIVAL:

In mid-October, we proudly participated in the growing St. Petersburg Science Festival held concurrently with the Florida Fish and Wildlife Marine Quest. CMS had seven exhibits ranging from CSI Activities in the Gulf of Mexico to Symbiosis in the Sea! The festival drew in some 25,000 public visitors, including a Sneak Peek Day for 1,500 4th and 5th grade students and teachers.

A highlight of the festival was the return of “Current Collections”, the largest plastic pollution public art sculpture in the southeastern U.S., after a brief visit to the Atlanta Science Festival. Thanks to the City of St. Petersburg’s Public Art Commission, the sculpture has been purchased and will become part of the city’s permanent public art collection and help anchor Poynter Park as the home of the St. Petersburg Science Festival. In addition, communication representatives from NOAA’s National Marine Fisheries Service in Hawaii and Oregon and the Office of National Marine Sanctuaries in Maryland made a site visit to learn effective practices in the production of a science festival. For the first time, festival evaluators used iPads to collect all attendee data with a survey instrument developed by the leaders of 24 national science festivals that participate in EvalFest, a five year NSF grant to fund a community of practices designed to meet the evaluation-related needs of the growing science festival sector in the United States. One of the most important improvements noted was that the St. Petersburg Science Festival has been able to significantly increase attendance among Black/African Americans and Asian Americans.



Joseph Curtis, Jackie Dixon, Matthew Farnum

Highlighted Research

Southern Ocean Science (SOS)



Mission Statement: Our planet is a dynamically changing system. The ocean plays a critical role in this system influencing climate, the air-sea balance of carbon dioxide, sea level, and more. Nowhere is this truer than in the Southern Ocean. The Antarctic Circumpolar Current is the largest ocean current system in the world and connects three major oceans. It allows and is responsible for the exchange of heat, salt, carbon, nutrients, and other chemical and biological properties with the other oceans. It also influences and is influenced by Antarctic ice masses and melting due to climate change. To understand climate change and its impacts, a better understanding and monitoring of the Southern Ocean is needed.

At USF's CMS, a Southern Ocean Group has been established. Its mission is to conduct interdisciplinary cutting edge research in the Southern Ocean, mentor graduate students, and communicate their findings to the scientific community as well as broader audiences.

The Southern Ocean is globally significant and the Antarctic community of scholars and funding agencies are international in scope by way of the Antarctic Treaty. The USF-CMS Southern Ocean group works closely with colleagues and students from around the world and is interdisciplinary in nature. Teamwork is strongly encouraged among researchers to enable a broader understanding of ocean-earth interactions and to address long-standing problems in Antarctic science.

Specific avenues of investigation include:

- To obtain a better understanding of modern and past ice dynamics and sea level;
- To determine modern and past variability of the Antarctic Circumpolar Current;
- To identify and understand the role of nutrients and micronutrients (i.e., Iron) in governing modern and past primary production;
- To determine the response of the marine food web to human activity and climate change.

The questions investigated by the Southern Ocean group have broad implications for coastal communities globally. Here in Florida, their research has particular significance with respect to predicting future sea levels and how we respond to ongoing climate change.

HIGHLIGHTED RESEARCH

Faculty:

Kristen Buck, Chemical Oceanography



Research in the Buck lab is geared toward investigating the biogeochemical cycling of trace metals in the oceans and, in particular, the role of organic ligands in the bioavailability and cycling of the bioactive trace metals iron and copper. Buck's research in the Southern Ocean is directed primarily at improving understanding of the chemistry of iron, which serves as a limiting nutrient to phytoplankton in these waters. Her current work is funded by the National Science Foundation and employs a combination of field sampling, shipboard incubation experiments, and laboratory-based manipulation experiments.

Don P. Chambers, Physical Oceanography



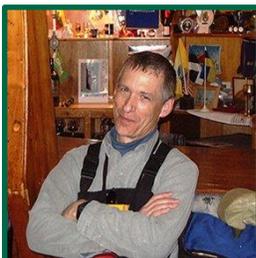
Dr. Chambers, his students, and research staff study several aspects of the changing physical state of the Southern Ocean and Antarctica, including: sea level contribution from Antarctica ice sheet melting, changes in the circulation of the Antarctic Circumpolar Current over time-periods of several years to a decade or longer, long-term changes in the eddy kinetic energy throughout the Southern Ocean, and identification of fronts and jets in the Southern Ocean. They mainly use satellite data (altimetry, gravity, winds, and sea surface temperature), but also data from in situ observations including the Argo array, CTDs, tide gauges, and bottom pressure sensors.

Kendra L. Daly, Biological Oceanography



Dr. Daly has investigated questions related to polar marine ecosystems for more than three decades. Her group seeks to improve understanding of the ecology and physiology of polar marine organisms, including their role in biogeochemical cycles, their interactions within the marine food web, and community dynamics in relation to their environment. Their investigations have addressed questions related to the response of Antarctic ecosystems to human activity and climate change in the Scotia-Weddell seas, Antarctic Peninsula, Bellingshausen Sea, Ross Sea, and McMurdo Sound using a variety of ship-based, shore-based, and remote sensing technologies, such as satellites, acoustic and camera imaging systems, and remotely operated vehicles (ROVs).

Eugene Domack, Geological Oceanography



Over the last three decades, Dr. Domack's group has focused on understanding past fluctuations of the Antarctic ice sheet, particularly the response of the Late Quaternary system to both climate and sea level forcing, using marine geologic archives. His group has advanced the use of radiocarbon dating in the marine system and how it can be used to decipher both the age of sedimentary materials and the complexities of ocean biotic interaction. In the last decade, their work has focused on the northern Antarctic Peninsula and the dramatic response of ice shelves to rapid regional warming. They have developed and deployed a network of bedrock GPS sensors and automated weather stations, which are used to evaluate the meteorological patterns of the regional warming and the rebound of the earth's crust to loss of glacial ice from the continent. More recently they have expanded their geologic perspective to examine the longer-term changes in the ice sheet from sections recovered along the East Antarctic margin.

HIGHLIGHTED RESEARCH

Xinfeng Liang, Physical Oceanography



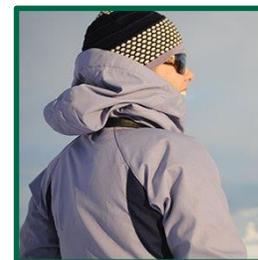
Dr. Liang is interested in using a combination of observations, numerical models and theory to understand how the ocean works and how the ocean is affected by and responds to the changing climate. In particular, he is interested in how the heat, salt, carbon and other biogeochemical tracers are transported in the global ocean. Another current research interests is the dynamic processes that can supply energy to ocean mixing, and these processes mainly include internal tides, near-inertial oscillations and mesoscale eddies.

Brad E. Rosenheim, Geological Oceanography



Dr. Rosenheim is a geochemist with interest in improving Antarctic sediment chronology and developing cold-water paleothermometers. He has developed a method to more accurately date sediments, enabling a regional approach to chronicling the last deglaciation. By developing a method that dates the organic matter in the sediment by separating old, contaminant organic matter, researchers can now make better use of cores that contain the glacial-deglacial sequence of sediment facies. Additionally, he has been at the forefront of calibrating clumped isotopes in carbonate minerals to temperature. His work on cold-water corals and other carbonate skeletons is enabling a better understanding of the cold-water end of this calibration that has proven troublesome in previous work.

Amelia Shevenell, Geological Oceanography



Ongoing interdisciplinary geochemical research in the Shevenell laboratory seeks to understand oceanic drivers of Antarctic ice dynamics on decadal to million year timescales, using marine sediment archives from both the deep Southern Ocean and from Antarctica's continental margins. The group employs inorganic and organic geochemical and micropaleontologic (foraminifera) paleoceanographic proxies for ocean temperature, ice volume, bottom water oxygen, and nutrients to determine both the evolution of the Southern Ocean system and to track the past influence of warm, nutrient-rich Circumpolar Deep Water on Antarctica's marine terminating ice sheets during climatic warmings. This work demonstrates a persistent link between Southern Ocean temperatures and Antarctic ice mass balance on geologic timescales.

STUDENTS AND THEIR RESEARCH:

Imogen Browne, Ph.D.

The effect of the westerlies on Southern Ocean climate at geologic time scales

Michelle Guitard, Ph.D.

Timing and characterization of siliceous muds and oozes from East Antarctica

Theresa King, Ph.D.

Carbon cycling in highly productive areas of the Southern Ocean

Michael Kosempa, Ph.D.

Sub-surface geostrophic currents of the Antarctic Circumpolar Current

Jessica Makowski, Ph.D.

HIGHLIGHTED RESEARCH

Understanding the transport variability in the Southern Ocean and its role in global ocean circulation, using satellite gravimetry, altimetry, and various general circulation models.

Catherine Smith, M.S.

Palynology of sediment cores from the Totten Glacier outlet in Prydz Bay

Glacial History of the Gerlache Strait

Best Student Poster award Geological Society of America and American Association of Stratigraphic Palynologists-The Palynological Society (AASP-TSP) Joint Annual Meeting, November 2015

Cristina Subt, Ph.D.

Refining geochronology of sediment cores of the Last Glacial Maximum

Published her first First Authored Paper

Kara Vadman, M.S.

Paleothermometry and paleoceanography from foraminiferal calcite in sediment cores

Ryan Venturelli, Ph.D.

Cold-water paleothermometry using clumped isotope records from Antarctic calcifying organisms



Michelle Guitard and Amelia Shevenell received NSF PLR funding to attend the Scientific Committee on Antarctic Research's (SCAR) XXII International Symposium on Antarctic Earth Sciences in Goa, India from July 13-17, 2015. Michelle presented at her first international conference and gave the only student-authored talk in her session on her MSc research "Late Quaternary variability of an East Antarctic outlet glacier: Insights from sedimentary 10Be in Prydz Channel".

INTERNATIONAL ANTARCTIC/SOUTHERN OCEAN INITIATIVES

The Southern Ocean group is currently busy analyzing data, writing up their results, and preparing for future research efforts. Several researchers are slated to participate in an upcoming Antarctic expedition to examine the long-term evolution of the East Antarctic Ice Sheet. In addition, several proposals from USF CMS investigators and their collaborators are currently under revision or await scheduling for use of the deep-sea drilling ship JOIDES Resolution. These projects will continue the group's work to better understand ice sheet evolution, potential for melting, and climate change connections.

HIGHLIGHTED RESEARCH

One of the overarching programs to study the Southern Ocean is the International Ocean Discovery Program (IODP). USF's Dr. Amelia Shevenell currently serves on the advisory committee and served on their international science evaluation panel (2011-2015). Dr. Shevenell was also named a 2014-2015 IODP Distinguished Lecturer to bring the scientific explorations and discoveries of the program to students at both the undergraduate and graduate levels and to the geoscience community in general. Her lecture entitled: The Southern Ocean Reveals its climate secrets: Paleotemperatures from Antarctic margin marine sediments, was given at Rensselaer Polytechnic Institute, Wesleyan University, University of Texas Arlington, University of Arkansas, Winona State University, Bowling Green State University, Case Western Reserve, and Virginia Tech.

CURRENT FUNDING:

Collaborative Research: Investigating iron-binding ligands in Southern Ocean diatom communities: The role of diatom-bacteria associations, NSF, July 2015 3 years, \$276,593, Kristen Buck (PI)

An Earth System Data Record of Earth's Surface Mass Variations from GRACE, Geodetic Satellites, and GPS, NASA, June 2013 5 years, \$251,000, Don Chambers (PI)

Improved Estimates of Southern Ocean Transport by Combining Satellite Altimetry and Temperature/Salinity Profile Data, NASA, March 2013 4 years, \$349,000, Don Chambers (PI)

Investigating low-frequency barotropic transport fluctuations in the Southern Ocean, North Pacific, and Atlantic using GRACE, NASA, August 2012 4 years, \$522,000, Don Chambers (PI)

Benthic-pelagic coupling in an intact ecosystem: The role of top predators in McMurdo Sound, NSF, June 2011 4 years, \$374,459, Kendra Daly (PI)

Collaborative Research: Investigating iron-binding ligands in Southern Ocean diatom communities: The role of diatom-bacteria associations, NSF, August, 2012 4 years, \$153,965, Kristen Buck (PI)

Continuation of the LARISSA GPS network in view of observed dynamic response to Antarctic Peninsula Ice Mass Balance and Required Geologic Constraints, NSF, June 2012 5 years, \$182,453, Eugene Domack (PI)

Late Quaternary Evolution of the Lambert Glacier/Amery Ice Shelf System, Prydz Bay, Antarctica, NSF, March 2013 3 years, \$267,712, Amelia Shevenell (PI)

Totten Glacier System and the Marine Record of Cyrosphere-Ocean Dynamics, NSF, 2013-2016, \$166,285, Eugene Domack (PI) and Amelia Shevenell (PI)



Research Overview

Research at CMS focuses on **Assessing and Predicting the Health of Ocean, Human Interactions**. The aim is to understand these interactions well enough to maintain and hopefully improve the health of this intimately and intricately interconnected global ocean system. The CMS research umbrella emphasizes five areas, including Healthy Ecosystems, Climate Change (past, present, and future), Impacts of Ocean-Human Interaction, Ocean Observing, and Impacts of Frontier Drilling for Fossil Fuels. Highlights of research in each of these areas is listed below. A brief summary for each faculty member is given at the end of this section.

Healthy Ecosystems

- Ernst Peebles and his student Jen Granneman re-created lifetime histories of oil exposure in fish by using a laser beam to analyze 24 chemical elements within ear stones (a time-layered structure that helps fish hear and keep their balance). They also developed a method for analyzing a huge data set to reveal oil-exposure histories.
- Cam Ainsworth and his team completed development of a GOM Atlantis ecosystem model that was published as a NOAA Technical Memorandum and is being used to evaluate Deepwater Horizon oil spill impacts, marine protected area placement strategies, and multispecies fisheries management strategies.
- Mya Breitbart and her lab are at the forefront of research into small, single-stranded DNA viruses in the oceans. Their current work establishing a DNA-based marine biodiversity observation network that tracks biodiversity across multiple trophic levels from bacteria to vertebrates in the Florida Keys has the potential to transform the way marine sanctuaries are assessed and managed.
- Frank Muller-Karger continued to develop satellite-derived products for use in shallow and deep coastal waters, which were used to guide the first official NOAA cruise around Cuba in May 2015.
- Kristen Buck and Frank Muller-Karger secured USF ORI funding for a new instrument to be used in part for the CARIACO time-series program, which Buck has joined as a Co-PI.

Climate Change

- Al Hine, Don Chambers, and Gary Mitchum have completed a book entitled, “Sea Level Rise in Florida; Science, Impacts, and Options” which has been accepted for publication by the University Press of Florida. The volume should be released in late summer 2016.
- Mark Luther and Thomas Wahl recently published work on compound flooding events in the US in the journal *Nature Climate*. Their analysis showed that over the past century, the number of compound flood events from both storm surge and high rainfall has increased for many US coastal cities.
- Don Chambers and colleagues from Australia and the United Kingdom published the first observations showing an increase in turbulent energy in the Antarctic Circumpolar Current (ACC) over the last 20 years.
- Eugene Domack completed significant field research in the Oneida Basin, in Tasmania, which resulted in the discovery of the first ever cap carbonates associated with Late Paleozoic ice sheet decay.
- Boris Galperin and a colleague in Israel have developed an analytical theory of turbulence that explained the observed atmospheric kinetic energy spectra with very high accuracy. These spectra have been known for about 30 years but the physics has never been fully understood.

RESEARCH OVERVIEW

Impacts of Ocean-Human Interaction

- Chris Stallings' lab is playing a major role in an impending U.S. Supreme Court trial between the states of Florida and Georgia. Their research will provide critical insight on how upstream freshwater removal from a large watershed can affect ecosystem dynamics in a downstream estuary.
- Chuanmin Hu's near real-time satellite imagery provided an instrumental role in supporting efforts by local communities in the Caribbean to track *Sargassum* beaching events.
- John Paul and Co-PI Kate Hubbard were the recipients of a new NOAA ECOHAB research grant entitled "PCMHAB: Implementing the *Karenia* "tricorder" to Improve Red Tide Monitoring and Management in the Gulf of Mexico", this is a collaborative research program between USF CMS, FWC, Mote Marine Lab, the Gulf Coastal Ocean Observing System (GCOOS) and is funded at nearly \$800K.

Ocean Observing

- Kendra Daly completed a large field research program in McMurdo Sound of the Southern Ocean.

Impacts of Frontier Drilling for Fossil Fuels

- Steve Murawski and David Hollander along with the leadership council of C-IMAGE executed over \$7 million in research grants that included 5 CO-PIs within the University of South Florida, and 17 other research institutions.
- Steve Murawski and his lab executed three major research programs funded by the Gulf of Mexico Research Initiative, the National Fish and Wildlife Foundation, and the National Science Foundation.
- Bob Weisberg and his group produced a model that explained why west Florida reef fish were affected by Deepwater Horizon oil, despite no oil being observed on the sea surface, and established a circulation model capable of predicting oil movement along the entire west Florida coast and into our critically important estuaries in the event of another spill.
- David Hollander began an international collaborative research project with the Universidad Nacional Autónoma de México (UNAM) to study the 1979-1980 IXTOC-1 oil well blowout in the Bay of Campeche (Southern Gulf of Mexico).



RESEARCH OVERVIEW

TECHNOLOGY TRANSFER

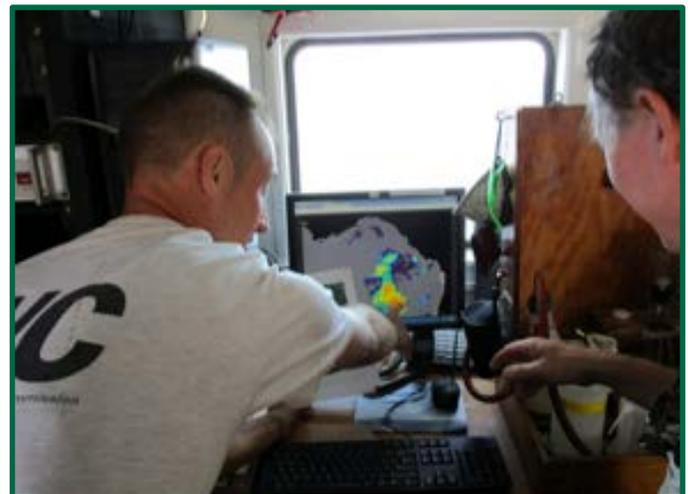
John Paul's research has led to the formation of a USF Tech spinoff company, PureMolecular LLC (www.puremolecular.com) that specializes in seafood authentication and genetic identification using handheld detection devices. His company has purchased the exclusive license for grouper detection from USF, which is based on a US patent of which he and his research associates are co-inventors. PureMolecular entered into an agreement with Douglas Scientific to be a distributor of the AmpliFire™ handheld detection device. In March, Dr. Paul's company exhibited at the Seafood Expo of North America in Boston, the largest seafood expo in North America.

CMS OCEAN TECHNOLOGY (COT) GROUP

The Ocean Technology group at the CMS is proud of its continued excellence and work in the frontiers of marine-based technology. COT continues to expand its glider operations with funding for multiple deployments, including a new project led by Chad Lembke to use gliders to support fisheries studies. COT is supporting the \$4.5 million grant obtained last year from the National Fish and Wildlife Foundation for habitat mapping and video characterization studies on the west Florida Shelf. The group is also contributing to a NSF project led by Tim Dixon in the College of Arts and Sciences to revolutionize seafloor geodesy using buoys and GPS receivers. And in partnership with the USGS, COT is developing a battery-operated portable pH sensor that will be used for citizen science applications.

COT provides critical support for externally funded projects and in return, the funding from these projects is essential to COT. With increasing pressure on state salary funding, the group is striving to increase the number of projects that are externally funded by contracts and grants, and to increase salary support from these sources.

In 2015, there were sixteen active projects, eleven of which, or about 70%, were in support of funded projects. Over \$10K of salary support was provided by these funded projects. Nine of the projects were new starts in 2015 and five projects were completed during the past year. To put 2015 in perspective, in 2014 there were seventeen projects, ten of which were completed, and ten of which were new starts. Ten of the seventeen, or about 60%, were externally funded and ~\$8K of salary support was generated from external sources. The proportion of externally funded to college funded projects continues to increase, but to date salary support has been modest. Improving this is a focus for the coming year.



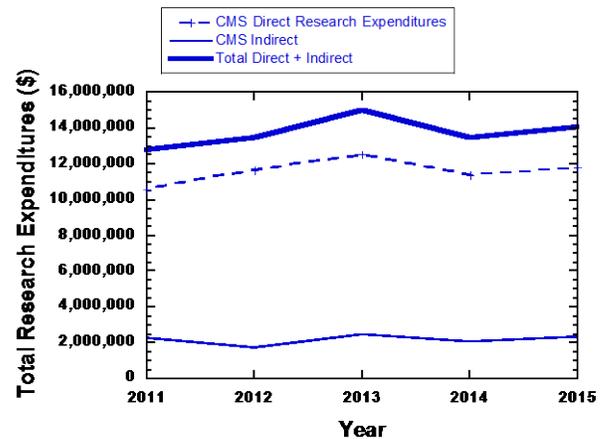
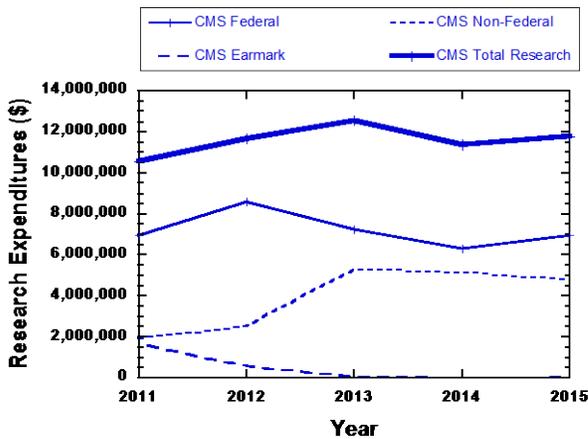
RESEARCH OVERVIEW

RESEARCH ACTIVITIES IN THE DEAN'S OFFICE

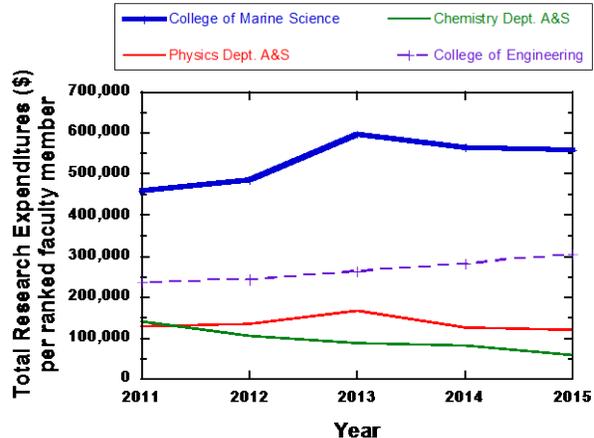
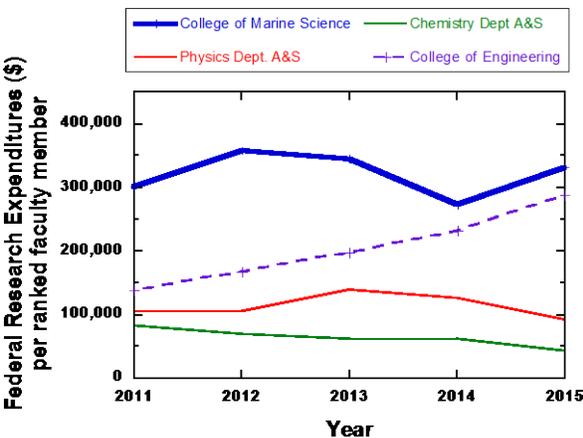
Gary Mitchum continues his work as the USF lead for the Florida Climate Institute (FCI), a consortium of nine Florida universities seeking support for climate-related research. In the past year, Gary has contacted potential partners in four other colleges and will soon be forming a USF-FCI Executive Board.

RESEARCH PRODUCTIVITY

The research profile of the college remains strong in spite of increased competition for external grants. In 2015, our total research expenditures were roughly ~\$14.1 M, with ~\$11.8 M in direct research expenditures and ~\$2.3 M in indirect. Anita Thompson, our unit research administrator, continues to the research enterprise running smoothly.



As expected for a research-intensive unit, our faculty have some of the highest per faculty research performance metrics in the university, though the College of Engineering is catching up with respect to federal research expenditures! Below research expenditures per CMS faculty member are compared with those in other highly research active units (Physics, Chemistry, and the College of Engineering).



Faculty Highlights

Below are highlights from faculty, along with their students and staff, and accomplishments in 2015. Publications for CMS faculty are listed in a separate section.

Cameron Ainsworth

In 2015, Dr. Cam Ainsworth, his students, and a post-doctoral associate worked with a broad range of numerical and statistical models to investigate ecological and fisheries management-related research questions in the Gulf of Mexico (GOM). Their published GOM Atlantis ecosystem model (a NOAA Technical Memorandum) is now being used to evaluate Deepwater Horizon oil spill impacts, marine protected area placement strategies, and multispecies fisheries management strategies. This model is contributing to five PhD dissertations. A Campeche Bay Atlantis model is in development to simulate the 1979 IXTOC oil spill as an analog to Deepwater Horizon. Other modeling work includes: 1) Ecopath food web models that were employed to evaluate trophic structure of the Northern GOM and sampling efficiency in fisheries independent monitoring programs; 2) an OSMOSE ecosystem model that was used to estimate natural mortality rates in gag grouper; 3) a Lagrangian particle transport model that was developed to investigate larval source-sink dynamics; 4) a Markov state-transition matrix model that is under development to compare succession dynamics on natural and artificial reefs; and 5) a West Florida Shelf Ecosim model that was used to study harmful algal blooms. The Ainsworth lab also contributed original fish stomach sampling to a new trophic database and published a meta-analysis of previous food web descriptions. Two Ph.D. students advanced to Doctoral Candidacy. Over 20 proposals for funding were submitted. Fourteen peer-reviewed articles were published or submitted, as well as six technical reports.

Mya Breitbart

Dr. Mya Breitbart's microbial ecology and genomics laboratory had an extremely successful year, publishing 12 peer-reviewed scientific manuscripts and obtaining funding for four new research projects. Notable research results include the first identification of viruses in several marine organisms such as gelatinous zooplankton (comb jellies), development of immunological tests for screening sea lions for a recently identified respiratory virus, connecting marine viral community structure to water column stratification in the Sargasso Sea, identifying new plant viruses through screening of insect vectors (whiteflies), and testing both rudimentary (e.g., wastewater treatment ponds in Bolivia) and highly advanced (electrocoagulation techniques in the United States) treatment techniques for their ability to remove pathogens from sewage and reduce risk from water reuse. The Breitbart lab is at the forefront of research into small, single-stranded DNA viruses in the oceans. Their current work establishing a DNA-based marine biodiversity observation network that tracks biodiversity across multiple trophic levels from bacteria to vertebrates in the Florida Keys has the potential to transform the way marine sanctuaries are assessed and managed. Finally, the Breitbart lab participated in numerous outreach activities to share their research with the public and Dr. Breitbart was recognized as Girls Incorporated of Pinellas 2015 STEM Woman of the Year for her efforts to encourage young girls to pursue careers in science.



Breitbart's Lab Holiday Gathering



Breitbart's Lab Science Festival

FACULTY HIGHLIGHTS

Kristen Buck

Dr. Kristen Buck received a new NSF grant in 2015, which made for three active NSF grants in her lab; this was her first from the Office of Polar Programs. She secured state funding in 2015 for shiptime on the *R/V Weatherbird II*, and was Chief Scientist on a four-day cruise in the Gulf of Mexico, which provided student training and generated a novel dataset. With Frank Muller-Karger, Dr. Buck secured USF ORI funding for a new instrument to be used in part for the CARIACO time-series program, which Dr. Buck has joined as a Co-PI. She graduated her first student, William Abbott, in 2015. She also hosted a visiting Ph.D. scholar from Italy for six months in 2015 and was invited to serve as a Guest Editor for Oceanography's 10th anniversary Women in Science issue. Dr. Buck was a Guest Editor for two more special issues in 2015, in *Marine Chemistry* and in *Frontiers*. These two special issues were products of the SCOR Working Group that Buck co-chaired in 2015. She continued her service as Chemical Oceanography Councilor for The Oceanography Society (TOS), and as a member of the Scientific Steering Committee (SSC) of the Ocean Carbon and Biogeochemistry (OCB) program; Dr. Buck began service on a GEOTRACES synthesis workshop committee. Finally, Dr. Buck was invited to serve as an Associate Editor for Limnology and Oceanography: Letters, which launched in December 2015.

Robert Byrne

Federally-funded research in Dr. Byrne's labs includes the development of improved models for describing the molecular behavior of carbon dioxide in seawater. Along with colleagues at SRI St. Petersburg, personnel in Dr. Byrne's labs are developing novel sensor systems that will be used by the oceanographic community to measure the growing impacts of ocean acidification. Dr. Byrne's students and postdoctoral associates are working with colleagues at the US Geological Survey and the USF Center for Ocean Technology to develop accurate but inexpensive pH probes for use in local waters by high school students and citizen scientists. Two of Dr. Byrne's recently graduated students each had two first-authored, peer-reviewed manuscripts in 2015. These two students, Mark Patsavas and Bo Yang, had 11 publications with Dr. Byrne, with seven of these as first author. Dr. Byrne was also given an Excellence in Review Award by *Environmental Science and Technology* in 2015.

Don Chambers

Dr. Don Chambers, along with his students and staff, published several important studies last year, all in the *Journal of Geophysical Research-Oceans*, a leading journal of physical oceanography and geosciences. At the beginning of the year, Dr. Chambers and colleagues from Australia and the United Kingdom published the first observations showing an increase in turbulent energy in the Antarctic Circumpolar Current (ACC) over the last 20 years. This had previously been predicted from models to be a consequence of a warming climate, but had never been observed in real data. In April, Dr. Chambers and his Ph.D. student, Jessica Makowski, published a paper demonstrating the first use of satellite gravity measurements from space to observe low-frequency, interannual transport variations of the ACC. They also found evidence of decadal-scale differences in transport between the Indian Ocean and Pacific Ocean sectors of the ACC, which they linked to a bimodal fluctuation in winds. Finally, Dr. Chambers and his post-doc, Thomas Wahl, published a paper demonstrating multi-decadal variations in extreme sea level (e.g., storm surge) in the 20th Century around North America that was not related to mean sea level. This has important implications for modeling future sea level extremes – typically, these predictions are currently based solely on projections of global mean sea level rise. Wahl and Chambers argue that these additional multi-decadal fluctuations must be considered for future projections, or else engineering design limits for coastal structures may be exceeded many years earlier than expected.

FACULTY HIGHLIGHTS

Kendra Daly

Dr. Kendra Daly was elected a Fellow of the American Association for the Advancement of Science (AAAS). She completed a large field research program in McMurdo Sound of the Southern Ocean. She was awarded two new grants, both funded by the Gulf of Mexico Research Initiative. The grants were entitled, “Oil-Marine Snow-Mineral Aggregate Interactions and Sedimentation during the 2010 Deepwater Horizon Oil Spill and Center for Integrated Modeling” and “Analysis of the Gulf Ecosystem II” (C-IMAGE II). She also was a co-author on four peer-reviewed publications, on which two publications had students as first authors. The topics ranged from technological advances for investigations on ocean acidification, the adaptations of zooplankton living in low oxygen environments, the diversity of small animals living in coral reefs, and a model of the fate of plankton after the Deepwater Horizon oil spill.

Eugene Domack

Among Dr. Domack’s major accomplishments in 2015 are the successful mentoring of Ms. Katie Smith and the acceptance, maintenance and redeployment of the *R.V. Price* (a 28’ research vessel passed along to him by Dr. Al Hine). Other notable achievements include the submission of five major National Science Foundation research proposals, publication of five manuscripts, and completion of significant field research in the Oneida Basin, in Tasmania, and on Antarctic sediment cores related to on-going funding from the NSF. Ms. Smith’s research began to accelerate after acceptance of her M.S. thesis proposal in the spring of 2015. Her work has demonstrated an Eocene age (likely middle Eocene) for two unusual sediment cores collected just off the coast of Western Wilkes Land, East Antarctica. This work is already gaining attention. Her poster presented at the annual GSA meeting in Baltimore garnered not only Outstanding Student Paper but also Best Paper Overall, by the American Association of Stratigraphic Palynologists. Much of Dr. Domack’s own work involved using the *RV Price* to research the stratigraphy and geologic history of the largest lake in New York State. The study of this lake and its catastrophic drainage has implications to both global climate and global sea levels.

Boris Galperin

Dr. Galperin’s student, Esa-Matti Tastula, defended his Ph.D. dissertation in 2015. Dr. Tastula published three papers in highly respectable journals. Dr. Galperin continued his collaborative research with the experimental group at the University of Rome and obtained important results regarding meridional and longitudinal spread of particles and clouds of dispersants in oceans and atmospheres. Dr. Galperin was invited to present his results at several prestigious UK Universities, at the high caliber Leverhulme Workshop at the University of Oxford, and Geophysical Turbulence workshop at the National Center for Atmospheric Research, Boulder, CO. Dr. Galperin and a colleague in Israel developed an analytical theory of turbulence that explained the observed atmospheric kinetic energy spectra with very high accuracy. These spectra have been known for about 30 years but their physics have not been fully understood. Dr. Galperin’s research not only elaborated on their physics but also showed that these spectra can be derived from first principles. Even more exciting, Dr. Galperin has found that these results apply not only to Earth but also to the Martian atmosphere. Finally, Dr. Galperin made major progress with a book on Zonal Jets that he is co-editing. The publication of this book is expected in 2016.

Albert Hine

Dr. Albert Hine, along with four other co-authors including Drs. Don Chambers and Gary Mitchum, both faculty members in the College of Marine Science, have completed a book entitled, “Sea Level Rise in Florida; Science, Impacts, and Options” which has been accepted for publication by the University Press of Florida. The volume should be released in late summer 2016. Dr. Hine was also selected to participate in a St. Petersburg delegation

FACULTY HIGHLIGHTS

to visit Cuba and engage appropriate officials in that country in an effort to bring a Cuban consulate to St. Petersburg.

David Hollander

Dr. Hollander was the Co-PI and Chief Science Officer (CSO) on a successful Gulf of Mexico Research Initiative (GoMRI) grant for \$20.48 Million awarded to the Center for the Integration, Modeling and Analysis of the Gulf Ecosystems II (C-IMAGE II) to study the fate and impacts of the Deepwater Horizon (DWH) oil well blowout. As C-IMAGE's CSO, Dr. Hollander was responsible for the development of the science plan, research product integration and the investigation of sedimentary oil deposition. In 2015, results of Dr. Hollander's research resulted in the publication of 12 scientific papers, 26 conference presentations, two invited talks and numerous public outreach interactions (talks and in print). Dr. Hollander's efforts extended from local to international audiences and included a two-page Tampa Bay Times newspaper article in the Perspectives (Editorial) Section that provided an overview, graphic representation, and an editorial marking the 5th Year Anniversary of the DWH Blowout as well as a National Geographic news article on the role of oil spill response strategies and the processes controlling sedimentary oil deposition. During 2015, Dr. Hollander began an international collaborative research project with the Universidad Nacional Autónoma de México (UNAM) to study the 1979-1980 IXTOC-1 oil well blowout in the Bay of Campeche (Southern Gulf of Mexico). Dr. Hollander was the chief-scientist on a two-week long ocean going research-cruise aboard the Mexican run vessel the *R/V Justo Sierra* to study the fate and impacts of the IXTOC-1 blowout with 21 researchers representing 7 nationalities from 8 partner institutions.



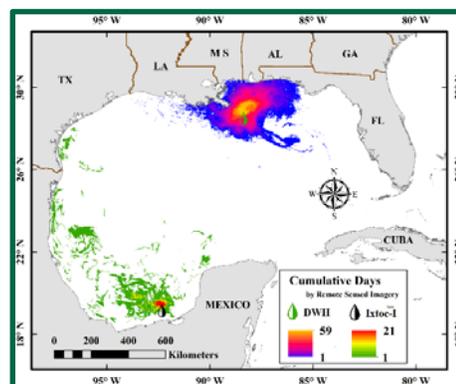
Dr. Hollander (seated in center with visor) with his team of 20 research scientists studying the 1979-1980 IXTOC-1 oil well blowout aboard the R/V Justo Sierra in the Bay of Campeche, Mexico (Southern Gulf of Mexico). The research team included scientists from nine C-IMAGE partners representing seven different nationalities.

Chuanmin Hu

Dr. Hu's research continued to focus on the use of optics and remote sensing to understand coastal ocean environments. In 2015, Dr. Hu authored or co-authored 23 refereed articles, with another 10 refereed articles in press. He submitted 12 proposals in 2014, of which five were selected for funding. One of his students, Mr. Robert Hardy, won the best USF student thesis/dissertation award in 2015. Notably there were only four awards given to all M.S. and Ph.D. graduates at USF. One paper led by his student produced the first-ever oil footprint and trajectory map (shown below) for the 1979 Ixtoc-I oil spill in the southern Gulf of Mexico (from Sun et al., 2015).

The map not only provided the first overview of the surface oil content, but also helped researchers to conduct field sampling. Another paper by his postdoc detailed the sediment plumes induced by the Port of Miami dredging, which reportedly lead to coral mortality. The U.S. Army Corps of Engineers and Florida DEP are both interested in continuing this type of work for future dredging activities.

Dr. Hu's team has gone beyond research and education. In 2015, his near real-time satellite imagery was instrumental to local



FACULTY HIGHLIGHTS

communities in the Caribbean in tracking *Sargassum* beaching events. He received numerous media interviews including one from the Washington Post to comment on the events. During 2015, Dr. Hu also served as a chief editor of the journal *Remote Sensing of Environment*, the #1 ranked journal among its peers.

Mark Luther

Dr. Mark Luther and his post-doctoral associate, Thomas Wahl, recently published work on compound flooding events in the U.S. in the journal *Nature Climate*. Their analysis showed that over the past century, the number of compound flood events from both storm surge and high rainfall has increased for many U.S. coastal cities. The research attracted a great deal of national media attention and was the subject of a USF press release. Dr. Luther is working with the Port of Tampa on related issues of resilience, sustainability, and security of port operations and infrastructure. He established a Memorandum of Understanding between the university and the Tampa Port Authority to collaborate on workforce development, research in sustainable and resilient maritime operations, test and evaluation of maritime sensor technologies, and community education and outreach on maritime transportation issues. Dr. Luther is developing a new on-line curriculum in multiple aspects of the maritime transportation system. The first course in this curriculum was offered in the Fall 2015 semester. One of the students in that course was awarded a paid internship with the Tampa Port Authority under the MOU for the Spring 2016 semester and is working with the port on sustainability issues. The maritime and port studies course is cross-listed in the College of Public Health Homeland Security certificate program and in the College of Global Sustainability Coastal Sustainability certificate program.

Pamela Hallock Muller

Over her 30+ year career at USF, Dr. Pamela Hallock Muller's more than 75 graduate students have come from diverse backgrounds, from STEM disciplines to the arts, all with an interest in interdisciplinary research. Her work with students and colleagues have produced more than 150 scientific publications and have included studies of the roles of nutrient pollution and ozone depletion in the decline in coral-reefs; the biology and ecology of foraminifera, corals and their algal symbionts; development of bioindicator protocols applicable to coastal environments; and effects of ocean acidification on marine organisms. This research has implications ranging from cell biology to global environmental change and Earth history, with applications ranging from coastal management to hydrocarbon exploration. Her former students' careers are taking them from the Polar Regions to the equator, and from satellite observations to studies of deep-sea sediments. In 2013, Prof. Hallock was recognized as one of the Top 25 Women Professors in Florida. She is an elected Fellow of the Geological Society of America and the Paleontological Society, and currently serves as Editor of the *Journal of Foraminiferal Research*. Her career awards include the 1999 Association for Women Geoscientists' Outstanding Educator, the 2012 Alfred P. Sloan Foundation Minority Ph.D. Program's Mentor of the Year, and, most recently, the 2015 Joseph A. Cushman Award for Excellence in Foraminiferal Research.



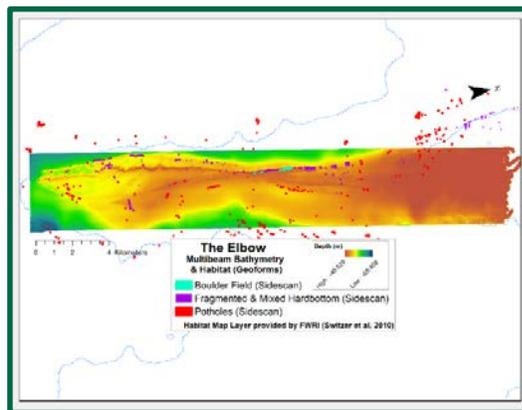
*2015 Joseph A. Cushman Award for Excellence in Foraminiferal Research
Awards Ceremony in Baltimore, Maryland, November 3, 2015*

FACULTY HIGHLIGHTS

Frank Muller-Karger

Dr. Muller-Karger published 15 peer-reviewed papers on topics ranging from ocean policy to climate change, and two more have been accepted for publication. He recorded a one-hour program for Discovery Channel/Science Channel, What on Earth (WAG TV producers) that will be aired in 2016. Dr. Muller-Karger coordinated partner efforts in community engagement activity for the "Clean Community Clean Coast partnership" with the City of St. Petersburg. The sculpture in St. Petersburg (Current Collections: <http://news.usf.edu/article/templates/?a=6573&z=219>) went on a tour of several U.S. cities and was brought back to St. Petersburg. Dr. Muller-Karger's group continued to develop satellite-derived products for use in shallow and deep coastal waters. These were used to guide the first official NOAA cruise around Cuba in May 2015. A detailed study of the satellite data also clearly identified the Amazon River plume as a source of water quality issues around the Virgin Islands, and this helped interpret NOAA reef fish data for the northern Caribbean Sea. Dr. Muller-Karger's website continues to be a resource to the community through which they access scientific information about the CARIACO time series and satellite images. The CARIACO Ocean Time Series that was created by Dr. Muller-Karger celebrated its 20th year of monthly cruises and continued funding from the NSF and the Venezuelan government. A major ecological shift in the Caribbean Sea has been documented, which is related to the largest temperature and salinity anomalies observed in the Atlantic Ocean in a century. Finally, Dr. Muller-Karger's Belmont Forum research (METROPOLE) on values and beliefs that affect climate change adaptation policies has successfully completed workshops in Florida, the UK, and Brazil.

Steve Murawski



(Photo on left) US and Mexican Scientists and Students aboard the R/V Weatherbird II in Ciudad de Carmen, Mexico, September, 2015. (Map on right) The "Elbow" region off St. Petersburg, FL mapped via multibeam sonar during the R/V Bellows cruise, December, 2015.

Dr. Murawski's laboratory executed three major research programs funded by the Gulf of Mexico Research Initiative (GoMRI), the National Fish and Wildlife Foundation (NFWF), and the National Science Foundation. GoMRI activities included two major research expeditions to Mexico to collect marine sediment cores and to collect fish specimens. Dr. Murawski acted as chief scientist on a cruise that made port calls in Puerto Progreso, Ciudad de Carmen, and Tuxpan in Mexico. Sampling during this cruise included longline fishing at 25 locations, including the exclusion zone near the sunken IXTOC-I rig. The samples from this cruise provide important comparative data on contaminant levels and community dynamics between the northern and southern Gulf. As well, Murawski served as co-chief scientist on the 2015 "Mud and Blood" cruise collecting time series data on fish and sediments in the northern Gulf. The data from these cruises forms the scientific basis for three current Ph.D. programs. With funding from NFWF, the Murawski team initiated an ambitious effort to double the amount of habitat mapped on the west Florida shelf. The first cruise used the newly acquired RESON SeaBat

FACULTY HIGHLIGHTS

system to multibeam a 1102 km section of the “Elbow” region on the west Florida shelf. Subsequent cruises will verify and count fishes and classify habitats in important shelf regions. The NSF funding has supported an effort to understand fisherman’s behavior using vessel monitoring systems and logbook records. Ph.D. student Marcy Cockrell, scientists from Cal-Davis and Murawski successfully analyzed 27 million position records and developed algorithms to understand complex behaviors. These studies will be presented at the Ocean Sciences meeting in 2016.

David Naar

Dr. David Naar provided a short course in the summer of 2015 on plate tectonics, marine geophysics, and seafloor mapping, with training workshops for multibeam bathymetry and backscatter data processors. Following this course, he worked with many others in the College and the Florida Institute of Oceanography to install and test Dr. Murawski’s new Reson 7125 (200/400 kHz) multibeam sonar system on the *R/V Bellows* in September. The system was accepted and then used to map several areas in Tampa Bay and the Eastern Gulf of Mexico during the fall of 2015. His students have been busy processing and interpreting the collected data for their theses. A manuscript co-authored by Norris Comer, a graduate from Eckerd College and Drs. Hollander and Peebles was submitted to *Marine Pollution Bulletin* describing the spatial extent of a ~400 m deep submerged plume in the Northeastern Gulf of Mexico resulting from the Deepwater Horizon / BP Oil Spill, and is now under revision. The conversion of five college courses into online courses was completed in 2015 and overseen by Dr. Naar from start to finish with assistance of many from the College and Innovative Education. Dr. Naar and Ms. Brittany Sheehy assisted in preparing for a successful accreditation College site visit from a SACS review board and preparing for a new College Strategic Plan.

John Paul

In November 2015, Dr. Paul was awarded the USF Excellence in Innovation Award for his research in seafood authentication. His research has led to the formation of a USF Tech spinoff company, PureMolecular LLC (www.puremolecular.com) that specializes in seafood authentication and genetic identification using handheld detection devices. His company has purchased the exclusive license for grouper detection from USF, which is based on a US patent of which he and his research associates are co-inventors. PureMolecular entered into an agreement with Douglas Scientific to be a distributor of the AmpliFire™ handheld detection device. In March, Dr. Paul’s company had its first exhibit at the Seafood Expo of North America in Boston, the largest seafood expo in North America. PureMolecular has been a subject for 41 media outputs (TV News items and press articles). In September, Dr. Paul was the recipient of a new NOAA ECOHAB research grant entitled “PCMHAB: Implementing the *Karenia* “tricorder” to Improve Red Tide Monitoring and Management in the Gulf of Mexico” along with his Co-PI, Kate Hubbard, the director of FWC’s Harmful Algal Bloom program. This is a collaborative research program between USF CMS, FWC, Mote Marine Lab, the Gulf Coastal Ocean Observing System (GCOOS) and is funded at nearly \$800K.

AmpliFire™ handheld detection device



FACULTY HIGHLIGHTS

Ernst Peebles

Dr. Ernst Peebles and his students made two exciting research breakthroughs during 2015. After years of effort, doctoral student Jen Granneman prevailed in her quest to re-create lifetime histories of oil exposure in fish. She used a laser beam to analyze 24 chemical elements within ear stones (a time-layered structure that helps fish hear and keep their balance). After obtaining literally millions of measurements, Jen was able to develop a method for analyzing her huge data set to reveal oil-exposure histories. She examined various fish species from different parts of the Gulf of Mexico, and was able to demonstrate that >99% of unhealthy individuals (fish with open sores) had unusually high concentrations of nickel and zinc within their ear stones. Nickel and zinc are two of nine metals that have been associated with oil from the Deepwater Horizon disaster. In another breakthrough, doctoral student Amy Wallace made substantial refinements to a method that allows re-creation of the geographic histories of individual fish. The most notable achievement was the development of a correction factor that dramatically improves accuracy. Amy is using chemical information recorded within fish-eye lenses to achieve these reconstructions. When combined, Jen's and Amy's new methods allow researchers to determine whether a fish was exposed to oil, when it was exposed, and also where it was exposed. These methods will also have a wide variety of applications to fisheries management.

Brad Rosenheim

Dr. Rosenheim's laboratory group continued to grow at USF in 2015, while his final students from Tulane University also achieved notable successes. Cristina Subt, a USF-CMS student that moved from Tulane with Dr. Rosenheim, spent more than two months in Antarctica in an international collaboration with the Korean Polar Research Institute. During that time, she prepared a manuscript to follow her first first-author publication, which was published in August in *The Holocene*. Also in January, Dr. Rosenheim graduated his second Ph.D. student, Dr. Alvaro Fernandez, from Tulane University. Dr. Fernandez is currently a postdoctoral investigator at ETH-Zurich, one of the top ten universities in the world. His first Ph.D. student, Dr. Elizabeth Williams, spent 2015 as a postdoctoral investigator at University of California, Merced, but accepted a new postdoctoral position at the University of Pennsylvania to begin in 2016. Dr. Rosenheim was invited to deliver a keynote address at the 22nd International Radiocarbon Conference in Dakar, Senegal, in November 2015. This conference was originally planned for April, however postponed due to the Ebola outbreak. His presentation was well-received at the meeting and has led to an invitation to speak in Northern Ireland in 2016.

Amelia Shevenell

Dr. Amelia Shevenell was selected as a 2014-2015 Distinguished Lecturer for the International Ocean Discovery Program (IODP), a long-running research collaboration that conducts seagoing expeditions to recover geologic records of Earth's history and dynamics. Distinguished Lecturers are peer-nominated scientists selected for their high quality research and ability to broadly communicate IODP's scientific discoveries. Dr. Shevenell travelled to eight small and/or remote institutions chosen by IODP for their program interest and lack of outside speaker funding. Since 1998, Dr. Shevenell has been involved in scientific ocean drilling as a scientist, member of the IODP Science Evaluation Panel, and as of 2015, she is a member of U.S. Advisory Committee for Scientific Ocean Drilling, which advises U.S. participation in IODP. In 2018-2019, IODP will sail two expeditions proposed by Dr. Shevenell and colleagues to test scientific hypotheses related to Antarctic ice sheet, global sea level, and Earth's climate evolution over the past 65 million years. One expedition will study the dynamic history of the East Antarctic Ice Sheet, while the second expedition, aboard the *D/V JOIDES Resolution*, will focus on West Antarctic Ice Sheet evolution. In 2015,



FACULTY HIGHLIGHTS

Dr. Shevenell was nominated as co-chief scientist on the second expedition. Dr. Shevenell and colleagues also received NSF funding for an international workshop in 2016 for 50-75 scientists interested in Southern Ocean IODP expeditions.

Chris Stallings

In 2015, Dr. Stallings continued his research program on several high-profile topics affecting the health of the marine environment. His work on the invasive lionfish garnered widespread attention and culminated in his being chosen as a finalist in the inaugural Gulf Coast Community Challenge. His leadership on the topic of the lionfish invasion has taken Dr. Stallings to numerous invited seminars and panels, from discussions with the international science community in Panama, to meeting with members of congress in Tallahassee. Dr. Stallings has also developed and tested novel approaches for fisheries scientists to collect the data required to make management and policy decisions. His new methods have been adopted by the state of Florida and will likely also be incorporated into those used at the federal level. Finally, Dr. Stallings' lab is playing a major role in an impending U.S. Supreme Court trial between the states of Florida and Georgia. Their research will provide critical insight on how upstream freshwater removal from a large watershed can affect ecosystem dynamics in a downstream estuary.

John Walsh

Dr. John Walsh, a senior USF Distinguished University Professor of Marine Science, submitted three lead-authored publications on the human health impacts of increased red tides and one book proposal to peer-reviewed Elsevier Journals and Acquisitions Book Editor for *Aquatic and Atmospheric Sciences*; forging collaborations among the Colleges of Marine Science, Medicine, and Pharmacy. He also co-authored another two papers. His findings include that in response to overfishing in the Gulf of Mexico and reduced amounts of herbivores, ~48% of uneaten micro-algae in 1965-2001 became wind-borne onshore aerosols within sea sprays and pulmonary triggers of concurrent asthma morbidities and pneumonia mortalities. Dr. Walsh's work also focuses on the connection with coinciding mercury aerosols and has found that mercury poisoning may result from breathing the air, not just from eating fish, within 100 km of the sea shores of both developing and developed nations.

Robert Weisberg

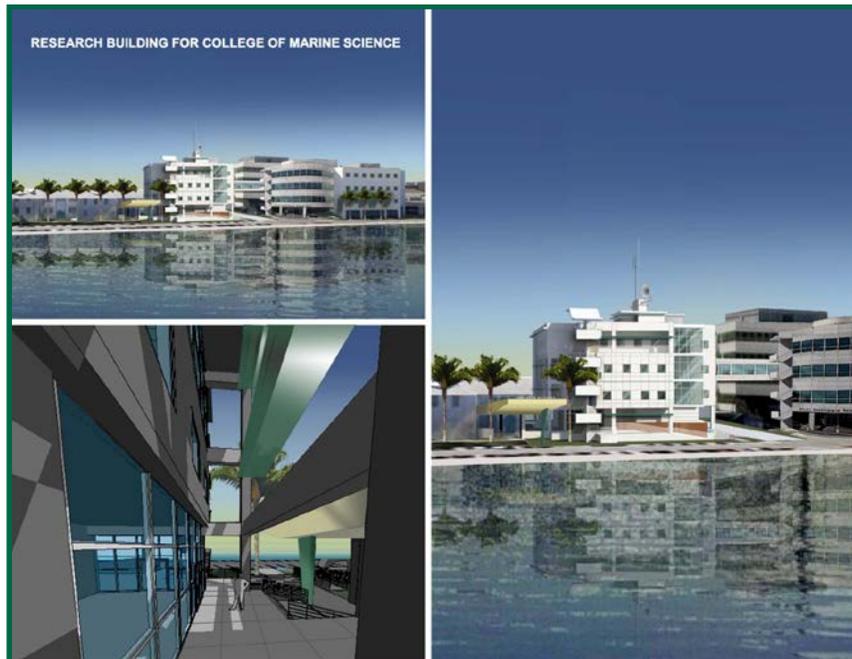
Dr. Robert Weisberg continued his efforts to apply coastal ocean circulation physics to help explain ecological phenomena on the West Florida Continental Shelf. Following insights gained last year, his group successfully predicted the persistent red tide bloom occurring (and continues), and, together with colleagues from the Florida Wildlife Commission, daily updates were provided (and continue to be provided) on red tide location and trajectories. Along with these applications, real time data on winds and currents, plus model simulations were provided to the general boating and beach-going public for use in planning and enjoying safe and productive marine outings.

Facilities

Major projects accomplished in 2015 include replacing the Marine Science Laboratory (MSL) boiler and re-roofing the Marine Shop & Warehouse (MSW). Numerous minor projects were also completed throughout the year including the installation of security cameras on the exterior of KRC and MSW; improvements to the front entrance of MSL (new awning, painting and gutter repairs); remodeling of the CMS file room and Travel Coordinator's office; replacement of several HVAC fan assemblies in KRC; and new insulation on the exterior chilled water piping supplying MSL. Design planning and engineering was also completed for reconfiguring the supply water for the compressors that service the three KRC environmental rooms and this project is currently underway.

After a long discussion with the university, plans for replacing the four air-handling units that service all the wet laboratories in the Knight Oceanographic Research Center (KRC) were finally approved. This long-awaited and badly needed project has now been scheduled for the summer of 2016. This is a huge win for our college, and is a testament to the tenacity of Joe Donnelly in his lobbying for this critical repair.

The new VP for Administrative Services for USF, Calvin Williams, visited the campus for very positive discussions and a wide-ranging tour. Mr. Williams requested a 5-year master plan for major maintenance and improvements, which was completed late in 2015. Briefly, the 5-year plan, which has also been incorporated into the 5-year Strategic Plan, details MSL upgrades that include renovations to the middle section of the 2nd floor, HVAC upgrade to the south end of the building, replacement of the roof and an upgrade to the north end of the MSL that is essentially a new building. The picture below shows an artist conception of the new addition. The strategic plan outlines the plans for enhancing the research and teaching capabilities with this new space.



Graduate Education and Awards

ACADEMIC AFFAIRS

A new format for the Ph.D. Comprehensive Exams was implemented in the Fall Semester of 2015 after months of faculty and student deliberations at curriculum meetings, faculty meetings, and then at a focused early summer faculty retreat in 2015. The motivation of this new format was to make insure that the progress of Ph.D. students was monitored at an earlier stage rather than wait until their third, fourth, or even fifth year before taking this type of exam. Thus, the concept was to divide the comprehensive exam into two parts, an Integrated Marine Science Exam (IMSE) and then a Ph.D. Candidacy Exam (PCE). The IMSE is given after Ph.D. students have completed their four core courses: Biological Oceanography, Chemical Oceanography, Geological Oceanography, and Physical Oceanography, usually at the beginning of their second or third year. Four professors, one from each discipline, provide and grade a written exam that tests the student's ability to integrate concepts from the four core courses. The exam is given in early September and an oral follow-up exam is given within five months for those students whose written answers were marginal. During this first exam, only one of the two Ph.D. students passed and the other will retake it next September. Three other students took the exam as an option. Two were MS students and one was a "grandfathered" Ph.D. student. Out of these three, only one M.S. student passed. The other two students can retake the exam if they choose to do so. The next exam, the PCE, is administered by the student's dissertation committee a year or two later. Further details can be found in the USF Graduate Catalog.

Five new online courses are now being offered by CMS thanks to funding from the Provost Office provided to the Office of Innovative Education. *Marine Aquaculture*, *Marine Microbiology*, *Geological History of Florida*, *Port Sustainability*, and *Introduction to Oceanography* were developed by Drs. Kevan Main, John Paul, Al Hine, Mark Luther, and Teresa Greely. Support was provided by the Office of Innovative Education and by the College of Marine Science, including Drs. Monica Wilson, Monica Cook, and Ana Arellano. Several TA's also provided additional material, including Devon Firesinger, John Gray, Juan Millan, Robert Ulrich, and Shane Dunn. These courses combined have tripled the average annual enrollment of students for the College of Marine Science, primarily from the undergraduate sector.

Twenty-one graduate students entered the Marine Science Program in Fall 2015 with a total GRE mean of 308. They attended Orientation Week, including taking the required two-day NSF Presentation Boot Camp with faculty, which has led to an improvement in the quality of presentations made by our students and faculty. Many students from this year and previous years were very active in educational outreach activities such as the NSF Spoonbill High School Competition, the Oceanography Camp for Girls, the St. Petersburg Science Festival, and the Graduate Student Symposium, which several of our first year students received best presentation awards. These training activities and the students' strong efforts have paid off as documented by the numerous honors, awards, presentations, and publications listed in this annual report. Thirteen students graduated, including three Ph.D. and ten M.S. students, leaving 102 students in Fall 2015.

GRADUATE EDUCATION AND AWARDS

DIVERSITY

Sixteen out of our 102 students are underrepresented minorities in the field of Oceanography, including twelve Hispanic, two African-American, and two Native-American students, which amounts to about ~ 16% diversity which is slightly greater than the national average reported for Oceanography programs (~12%). Our goal is to recruit the best students from all backgrounds, train and prepare them for success, assist them in finding employment in the field of their training, and continue to promote them in their career. Funding from the Sloan Foundation (provided to USF as an Alfred P. Sloan Foundation University Center of Exemplary Mentoring (UCEM)), the NSF Bridge-to-the-Doctorate, and private funding from the USF Foundation (managed by PIs: Dr. Frank Muller-Karger, Mr. Bernard Batson, and others at the College of Engineering) have been instrumental in attracting and training underrepresented minority students who have demonstrated excellence as undergraduates, usually due to support from the NSF LSAMP program.

One of the important themes stressed at the Annual Compact for Faculty Diversity is that underrepresented minority graduate students benefit from exposure and interaction with others like them who have succeeded in academia. To this end, the Colleges of Marine Science and Engineering invited two speakers, one who is at the start of his career and one who is much more senior. Furthermore in 2015, the College of Marine Science nominated Dr. Samuel George Philander to receive an honorary doctorate from the College of Marine Science in 2016. He holds the Knox Taylor Professor of Geosciences at Princeton University and is a distinguished researcher of climate change and has improved conditions in academia for minorities in South Africa as well as the USA.

In late March, Dr. Christopher Blaszcak-Boxe, Assistant Professor, Medgar Evers College of the City of University of New York (CUNY), met with the students from the Colleges of Marine Science and Engineering for lunch, with Mr. Bernard Batson (College of Engineering) and Dr. Frank Muller-Karger serving as hosts. He then gave the Marine Science weekly seminar, "A Mechanism for Biologically-Induced Iodine Emissions from Sea-Ice" to the College as well as met with several faculty working in Antarctica within the College of Marine Science.



Dr. Christopher Blaszcak-Boxe with Marine Science and Engineering Students

In late November, Dr. Warren Washington, gave a memorable joint seminar to the College of Marine Science and the College of Engineering in the Marine Science Conference Room. In addition to his seminar, "My Journey as a Climate Modeler and How the Earth's Climate is Likely to Change." He also met the students from both Colleges for lunch to sign his new book, *Odyssey in Climate Modeling, Global Warming, and Advising Five Presidents*. He

GRADUATE EDUCATION AND AWARDS

also gave some good advice to the students on how to achieve success in their future careers. It was an inspiring presentation for the faculty and staff, as well as for the students, because in addition to publishing more than 150 manuscripts, serving as a Senior Scientist at the National Center for Atmospheric Research (NCAR), and receiving the National Medal of Science by President Barack Obama, the nation's highest science award, he also gave a very engaging presentation and demonstrated his sincere interest, "... to support a diverse science and engineering workforce."



Dr. Warren Washington Seminar

DEGREES OFFERED

The following degrees are offered at the College of Marine Science. For more information please [visit our website](#).

Graduate Certificate

Teaching & Communication Ocean Sciences Broader Impacts

Master's of Science (M.S.)

Biological, Chemical, Geological, Marine Resource Assessment (MRA), and Physical Oceanography Concentrations

Doctoral (Ph.D.)

Biological, Chemical, Geological, Marine Resource Assessment (MRA), and Physical Oceanography Concentrations

STUDENTS GRADUATING IN 2015

Masters (10)

Abbott, William advised by Kristen Buck, fall. "The Development of a Fluorescence-based Reverse Flow Injection Analysis (rFIA) Method for Quantifying Ammonium at Nanomolar Concentrations in Oligotrophic Seawater"

Chancellor, Emily advised by Steven Murawski, summer. "Vulnerability of Larval Fish Populations to Oil Well Blowouts in the Northern Gulf of Mexico"

Guitard, Michelle advised by Amelia Shevenell, fall. "Millennial-scale Variability of a Major East Antarctic Outlet Glacier during the Last Glaciation"

Hipes, Jacqueline advised by Steven Murawski, spring. "Population Dynamics of the Little Gulper Shark (*Centrophorus uyato*) and Community Analyses of Elasmobranch Species in the Northern Gulf of Mexico"

Houston, Brock advised by Ernst Peebles, fall. "Comparison of otolith-based growth rates and microchemistry in Red Drum before, during, and after the Deepwater Horizon oil spill"

GRADUATE EDUCATION AND AWARDS

Huelster, Sheri advised by Ernst Peebles, summer. "Comparison of Isotope-Based Biomass Pathways with Groundfish Community Structure in the Eastern Gulf of Mexico"

Knudsen, Richard advised by Mark Luther, fall. "Integration of Multivariate MetOcean, Ocean Circulation, and Trajectory Modeling Data with Static Geographic Information Systems for Better Marine Resources Management and Protection During Coastal Oil Spill Response – A Case Study and Gap Analysis"

Lizza, Kaitlyn advised by Al Hine, summer. "Historical and Current Population Patterns of the Staghorn Coral (*Acropora cervicornis*) in Dry Tortugas National Park"

Millan-Otoya, Juan advised by Frank Muller-Karger, fall. "Understanding Climate Change and Sea Level: A Case Study of Middle School Student Comprehension and An Evaluation of Tide Gauges off the Panama Canal in the Pacific Ocean and Caribbean Sea"

Parks, Ashley advised by John Walsh, fall, "Dissolved Nutrient Distributions in the Gulf of Mexico Following the Deepwater Horizon Oil Spill"

Ph.D. (3)

Cook, Monica advised by Mya Breitbart, spring, "Endocrine-Disrupting Compounds: Measurement in Tampa Bay, Removal from Sewage and Development of an Estrogen Receptor Model"

Tastula, Esa-Matti advised by Boris Galperin, summer, "Insights into the Challenges of Modeling the Atmospheric Boundary Layer"

Yang, Bo advised by Robert Byrne, summer, "Field Observations and Novel Methodologies for Carbon System Assessments in Coastal Waters"

STUDENT AWARDS FOR 2015



Sean Beckwith
Joseph A. Cushman Award
for Student Research



Imogen Browne
New Zealand Fulbright Science &
Innovation Graduate Award



Marcy Cockrell
Guy Harvey Scholarship



Kristina Deak
Watkins Award for Excellence in
Research



Lindsey Dornberger
Watkins Award for Excellence in
Research
Best student presentation, GOMRI
Conference
NSF Graduate Research Fellowship
(Honorable Mention)



Michael Drexler
Marine Resource Assessment
Fellowship



Kate Dubickas
NSF Fellowship



Christian Haller
Loeblich and Tappan Student
Research Award

GRADUATE EDUCATION AND AWARDS



Michelle Guitard
NSF Division of Polar
Programs Travel Award



Devon Firesinger
National Ocean Sciences
Accelerator Mass Spectrometer
(NOSAMS) Woods Hole
Oceanographic Institute Research
Internship



Robert Hardy
USF Outstanding Thesis Award



Abdiel Laureano-Rosario
NASA Earth and Space Science
Fellowship



Michelle Masi
Fish Florida Scholarship



Natasha Mendez-Ferrer
Joanna M. Resig Award



Amanda Reinert
Follow-On Science,
Mathematics, And Research
for Transformation (SMART)
Fellowship



Elizabeth Simpson
Marine Resource Assessment
Fellowship



Catherine Smith
Winner of 7th Annual Graduate
Student and Postdoctoral
Symposium
“Best Student Paper Award” by the
American Association of
Stratigraphic Palynologists



Cristina Subt
Published her first First-
Authored paper



Kelly Vasbinder
Presidential Doctoral
Fellowship



Kara Vadman
Society for Sedimentary Geology
(SEPM) Gary Jones & Brian O’Neill
Memorial Grants for North American
Micropaleontology Section (NAMS)
Student Research



Julie Vecchio
Roche / Advancing Science
in America (ARCS)
Foundation Scholarship

Education & Outreach

Teresa Greely and Angela Lodge led the college's education and outreach (E&O) activities. The 2015 accomplishments in E&O reflect a diversity of programs and events that have advanced ocean literacy and research amongst K-12 teachers and their students, undergraduate and graduate students, and the general public.

With NOAA B-WET funding, E&O continued to bring Florida teachers together to explore and experience Tampa Bay's coastal environments. Through the marine science field course teachers and their students have collected several hundred hydrologic and atmospheric measurements for the GLOBE International program.

Other education programs included:

- GLOBE teacher professional development for 41 Florida and Louisiana teachers with training to make K-12 students citizen scientists;
- Marine sciences courses for the USF Honors College and USFSP College of Education;
- Partnering with NOAA Ocean Exploration to enable 49 Florida teachers to participate in the *How and Why We Explore the Oceans* professional development series as part of the *Okeanos Explorer* program;
- Hosting school groups for Ocean Day visits and lab explorations.
- Leading coastal field trips throughout Tampa Bay and the Gulf for USF Tampa Precollege Programs;
- Visits from local schools and USFSP College of Education Precollege STEM programs.



NOAA Gulf BWET – TB Teacher Program

- The Spoonbill Ocean Sciences Bowl. USF once again hosted this annual academic brain bowl with over 150 participants, including high school students and teachers from across West Florida. Volunteers, both returning and new, represented the FWCC, Eckerd College, USGS, Clearwater Aquarium, FMSEA, FL Sea Grant, Florida Aquarium, Ocean Optics, USFSP, and USF Marine Science. Congratulations to Eastside High School from Gainesville, Florida who advanced to the NOSB Finals competition.



EDUCATION & OUTREACH



Eastside High School from Gainesville, Florida



Oceanography Camp for Girls Team

- The Oceanography Camp for Girls. In its 25th year, this summer camp is a pre-college STEM program that encourages teenagers to consider careers in the sciences while developing a positive sense of self, science, and the environment. In 2015, there were 30 participants, representing 15 Pinellas county schools, along with 28 college students and professional staff, and 20 participating scientists from FWCC, USGS and USF Marine Science.



Research Cruise Measuring Fishes



Caladesi Island Coastal Geology – Substructure

- Participation in research expeditions in the Gulf. Some 20 students gained invaluable field experience and posted daily blogs to engage other students in the research happening at sea. Visit blogs from Sea during the IXTOC revisited expedition, <http://www.marine.usf.edu/c-image/our-blog>. Through C-IMAGE Outreach and Open Mind Media, two additional podcasts were completed providing Gulf research to public radio listeners. Listen to all CIMAGE blogs, <http://www.marine.usf.edu/c-image/education-and-outreach/download-our-podcasts>.
- The 5th annual St. Petersburg Science Festival. This is a College-wide outreach effort, which brought over 25,000 visitors to campus to experience the research and E&O programs taking place in the marine sciences. <http://www.stpetescifest.org/>.



EDUCATION & OUTREACH

OTHER OUTREACH ACTIVITIES

In addition, many faculty and students engaged with the community in creative ways. The Breitbart lab continued working with the Girl Scouts of West Central Florida through an outreach activity for a Junior Girl Scout Troop in the Marine Science Lab at Camp Wai Lani. The girls performed plankton tows, viewed zooplankton under the microscope, and designed their own plankton to optimize buoyancy in the water column.

The Breitbart Marine Genomics lab and the Stallings Fish Ecology lab also ran a workshop for Girls Incorporated of Pinellas, where the girls learned about plankton and fish morphology, viewed plankton in the microscope, designed their own fish species, and participated in a squid symbiosis activity.



Finally, the Breitbart lab put a novel twist on the squid symbiosis story by adding information about a recent shuttle mission that examined the effects of microgravity on the relationship between the squid and the bacteria for the space-themed Science Night at Bay Point Elementary School.



Development

FELLOWSHIPS

On October 9, 2015, CMS recognized fellowship recipients and their generous supporters at the Fourth Annual College of Marine Science Fellowships and Awards Luncheon held at the Staybridge Suites - St. Petersburg Downtown. Through the leadership of Dean Jacqueline Dixon and former Deans Peter Betzer and William Hogarth, our \$8.7M endowment provides ~\$353K/yr for endowed fellowships to CMS graduate students. The luncheon provides an opportunity for fellowship and award recipients to meet the individuals and families who have helped to make it possible for these students to pursue a degree at the College of Marine Science.



2015-2016 Endowed Fellowship Recipients

The 2015-2016 Endowed Fellowships were provided to the following students:

- Shuangling Chen**- Gulf Oceanographic Charitable Trust Endowed Fellowship in Marine Science
- Kaitlyn Colna** - Sanibel-Captiva Shell Club / Mary & Al Bridell Memorial Fellowship
- Claire E. Crowley**- William Hogarth Marine Mammal Fellowship
- Kristina Deak**- Gulf Oceanographic Charitable Trust Endowed Fellowship in Marine Science
- Lindsey Dornberger** - The Jack and Katharine Ann Lake Fellowship in Marine Science
- Christian H. Gfatter** - The Wells Fargo Fellowship in Marine Science
- Alexander Ilich** – Von Rosenstiel Endowed Fellowship
- Benjamin N. Kurth** - William and Elsie Knight Endowed Fellowship for Marine Science
- Abdiel E. Laureano-Rosario**- Linton Tibbetts Fellowship
- Jacqueline Long** - Carl Riggs Fellowship in Marine Science
- Makenna Martin**– Von Rosenstiel Endowed Fellowship
- Michelle D. Masi** - C. W. Bill Young Fellowship
- Brianna Michaud** - Paul Getting Endowed Memorial Fellowship
- Benjamin J. Ross** - St. Petersburg Downtown Partnership Fellowship in Coastal Science
- Jonathan Sharp** – Von Rosenstiel Endowed Fellowship
- Catherine D. Smith**- George Lorton Fellowship in Marine Science
- Susan Snyder** - Garrels Memorial Fellowship in Marine Science
- Lewis Stewart** – Mahaffey Family Graduate Fellowship
- Kara Vadman** - Southern Kingfish Association's Fellowship
- Maria Vega-Rodriguez** – Bridge to the Doctorate
- Ryan Venturelli** – Von Rosenstiel Endowed Fellowship
- Amy A. Wallace** - Tampa Bay Parrot Head Fellowship in Marine Science
- Mengqiu Wang** - William and Elsie Knight Endowed Fellowship for Marine Science

Also recognized were achievements of students, alumnae, and researchers through the Bernstein Outstanding Authorship Award, the Sackett Prize for Innovative Research, and the Costello Interdisciplinary Award. The 2015-2016 Award Recipients were:

The 2015-2016 Award Recipients:

Jennifer Cannizzaro – David K. Costello Interdisciplinary Engineering Award

Erin Symonds – Renate E. Bernstein Outstanding Authorship Award

Philip Thompson – Sackett Prize for Innovative Research

FUNDRAISING



In addition to fellowship support, alumni, faculty, staff and friends donated \$434,400 in support for current and new endowment funds as well as for current operations. This year the St. Petersburg Downtown Partnership made an additional \$150,000 pledge toward fully endowing the **Abby Sallenger Memorial Endowment**. This memorial fund will support educational expenses, such as thesis or dissertation research activities, that are not otherwise funded by grants, contracts, or other sources. In addition, thanks to the generosity of Drs. Peter and Susan Betzer, CMS will be able to support graduate student research

and educational activities within the college through a planned gift. The **Peter & Susan Betzer Innovation Fund for Marine Science** endowment will ensure that graduate students have the support needed to be successful for generations to come. As a result, CMS will also continue to attract and retain the best and the brightest graduate students.

While the college currently has many of the basic components in place for achieving preeminence among oceanographic institutions, it seeks to create the critical mass of intellectual capital necessary to ensure advancement to the next level of national and international prominence.

Specifically, support is needed in the following areas:

Dean's Innovation Endowment for Research Support: To recruit and retain top caliber faculty, significant resources needed for acquisition and maintenance of state-of-the-art instrumentation, for seed funds for research and commercialization of new technologies, and for competitive start-up and retention packages.

Graduate Excellence: The College of Marine Science strives to attract and retain the highest quality graduate students, while also ensuring that its educational programs are available to all qualified students without regard to financial circumstances.

Postdoctoral Fellowship Program: Postdoctoral research fellow programs are a long-standing tradition at the nation's best research universities and oceanographic institutions. Implementation of a successful postdoctoral research program is pivotal to the success of the college.

Endowed Chairs and Professorships: To further enhance its ability to undertake fundamental research, CMS seeks to attract and retain key faculty operating on the frontiers of their respective fields.

Publications

Bold indicates Faculty and Research Staff/Faculty; Underline indicates CMS graduate student or post-doc

CMS BOOK

Liu, Y., H. Kerkering, and **R.H. Weisberg** (Editors) (2015) *Coastal Ocean Observing Systems*, 461 PP., ISBN 978-0-12-802022-7, Elsevier, London, UK.

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- Simons, J., **C. Ainsworth**, M. Vega Cendejas, M. Yuan, A. Sosa, K. Rose, K. Rice, J. Martinez, M. Theresa, C. Bird, S. Furiness, T. Weatherall, J. Corona, X. Cai, L. Jones, K. Johnson, D. Ramsey, and T. Haskins (2015) Welcome to the GoMexSi Project. Product of MARFIN Grant #NA13NMF4330171. Video available here (in March 2016): <http://gomexsi.tamucc.edu>
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ACTIVE RESEARCH AWARDS

Active Research Awards

Award PI Name	Name - Co PI If Applicable	Sponsor Name	Actual Total Costs	Award Begin Date	Award End Date
Ainsworth		Florida Sea Grant College	16259.24	2/1/2012	1/31/2015
Ainsworth		Alfred P. Sloan Foundation	17516.98	9/15/2013	9/15/2016
Ainsworth		Florida State University	6614.49	8/1/2013	12/31/2015
Ainsworth		Texas A & M University	70195.76	9/1/2013	8/31/2016
Ainsworth		Stratus Consulting	46803.33	3/20/2014	9/22/2016
Ainsworth		The Water Institute of the Gulf	22218.42	10/7/2014	8/31/2015
Murawski	Ainsworth	Consortium for Ocean Leadership	47039.96	1/1/2015	12/31/2017
Breitbart		US Environmental Protection Agency NV	72.00	8/1/2011	10/31/2014
Breitbart		National Science Foundation	310267.39	12/1/2012	11/30/2017
Breitbart		National Science Foundation	2403.01	12/1/2012	11/30/2017
Muller-Karger	Breitbart	National Aeronautics & Space Admin	71730.65	8/18/2014	8/17/2019
Buck		National Science Foundation	85059.89	2/1/2014	2/29/2016
Buck		National Science Foundation	35889.42	3/1/2014	8/31/2016
Byrne		Natl Oceanic & Atmospheric Admin	8365.96	9/1/2009	8/31/2014
Byrne		National Science Foundation	252437.08	9/15/2012	8/31/2016
Byrne		National Science Foundation	12572.15	8/1/2014	7/31/2017
Byrne		US Geological Survey	37286.93	9/1/2014	8/31/2016
Chambers		University of Colorado	19694.65	8/8/2011	12/31/2015
Chambers		National Aeronautics & Space Admin	124200.91	8/6/2012	8/5/2016
Chambers		National Aeronautics & Space Admin	101985.08	3/13/2013	3/12/2017
Chambers		NASA Jet Propulsion Laboratory	71632.31	6/1/2013	5/31/2017
Daly		National Science Foundation	171596.20	6/1/2011	11/30/2016
Murawski	Daly	Gulf of Mexico Research Initiative	208207.92	9/1/2011	9/17/2015
Daly		University of Washington	16496.56	5/1/2014	8/31/2014
Murawski	Daly	Consortium for Ocean Leadership	48407.93	1/1/2015	12/31/2017
Murawski	Dixon	Gulf of Mexico Research Initiative	38935.08	9/1/2011	9/17/2015
Dixon	Mitchum	US Geological Survey	33566.63	8/1/2012	7/31/2017
Dixon	Mitchum	US Geological Survey	1108252.00	8/1/2012	7/31/2017
Dixon	Breitbart, Naar	US Geological Survey	198.02	8/19/2013	8/18/2014
Dixon	Naar	US Geological Survey	26887.07	1/2/2014	12/31/2014
Dixon	Naar	US Geological Survey	8857.74	8/1/2014	7/31/2015
Dixon	Naar	US Geological Survey	28691.64	10/1/2013	9/30/2015
Dixon	Breitbart, Naar	US Geological Survey	29768.23	8/19/2014	8/18/2015
Dixon	Naar	US Geological Survey	12799.19	1/2/2015	12/31/2015
Dixon	Naar	US Geological Survey	5626.10	3/26/2015	3/25/2016

ACTIVE RESEARCH AWARDS

Award PI Name	Name - Co PI If Applicable	Sponsor Name	Actual Total Costs	Award Begin Date	Award End Date
Domack		National Science Foundation	1107.48	1/1/2014	9/30/2014
Domack		National Science Foundation	59852.62	1/1/2014	2/29/2016
Domack		National Science Foundation	7887.62	1/1/2014	6/30/2017
Greely		Natl Oceanic & Atmospheric Admin	11098.25	7/1/2012	11/30/2014
Greely		National Marine Sanctuary Foundation	1240.60	10/15/2012	10/14/2014
Greely		National Marine Sanctuary Foundation	3160.46	10/1/2014	10/1/2016
Murawski	Greely	Consortium for Ocean Leadership	34076.60	1/1/2015	12/31/2017
Murawski	Hollander	Gulf of Mexico Research Initiative	160121.21	9/1/2011	9/17/2015
Weisberg	Hollander	Florida State University	98514.32	10/1/2011	12/31/2015
Murawski	Hollander	Consortium for Ocean Leadership	320079.84	1/1/2015	12/31/2017
Hu		Florida Fish and Wildlife Conservation	43471.40	4/5/2010	9/30/2014
Murawski	Hu	Gulf of Mexico Research Initiative	40639.59	9/1/2011	9/17/2015
Hu		UAV Collaborative	2108.52	10/1/2011	9/30/2014
Hu		Florida State University	41278.09	8/17/2012	2/26/2016
Hu		National Aeronautics & Space Admin	189540.68	1/1/2013	12/31/2015
Hu		National Aeronautics & Space Admin	5621.96	7/15/2013	6/30/2016
Hu		National Aeronautics & Space Admin	93460.13	8/5/2013	8/4/2016
Hu		Kent State University	60954.10	8/1/2013	12/31/2015
Hu		University of Miami	10770.16	10/1/2013	9/30/2016
Hu		University of Miami	101815.28	7/1/2013	9/30/2015
Hu		Bubbleology Research International	76796.01	8/1/2013	6/30/2016
Hu		National Aeronautics & Space Admin	185090.13	7/8/2014	7/7/2017
Hu		National Aeronautics & Space Admin	34813.70	1/15/2015	1/14/2018
Hu		National Aeronautics & Space Admin	41568.14	8/29/2014	8/28/2016
Hu		Bubbleology Research International	7400.67	7/1/2013	6/30/2016
Hu		National Aeronautics & Space Admin	48384.38	10/9/2014	10/8/2016
Murawski	Hu	Consortium for Ocean Leadership	4145.46	1/1/2015	12/31/2017
Hu		Nova Southeastern University	28779.14	1/1/2015	12/31/2017
Hu		National Aeronautics & Space Admin	12432.35	3/1/2015	2/29/2020
Lembke		University of Miami	24045.57	7/1/2013	9/30/2014
Lembke		Mote Marine Laboratory	13334.16	3/3/2015	8/31/2015
Lenes		Florida Fish and Wildlife Conservation	49623.40	9/17/2014	4/30/2015
Locker		Florida Fish and Wildlife Conservation	45863.92	5/31/2011	3/31/2014
Weisberg	Locker	Florida State University	102706.82	10/1/2011	12/31/2015
Luther		Greater Tampa Marine Advisory Council	879.89	4/9/2004	3/6/2019
Luther		University of Maryland	29263.06	6/1/2011	5/31/2016
Luther		Texas A & M Research Foundation	40386.41	6/1/2011	5/31/2016

ACTIVE RESEARCH AWARDS

Award PI Name	Name - Co PI If Applicable	Sponsor Name	Actual Total Costs	Award Begin Date	Award End Date
Luther	Merz	Southeast Coastal Ocean Observing Region	29847.77	9/1/2013	2/28/2015
Luther		US Geological Survey	44400.79	4/21/2014	4/20/2015
Luther		Southeast Coastal Ocean Observing Region	37271.33	9/1/2014	8/31/2015
Mitchum		National Aeronautics & Space Admin	5592.37	7/12/2008	7/11/2014
Chambers	Mitchum	University of Colorado	16494.82	8/8/2011	12/31/2015
Mitchum		US Geological Survey	17393.00	7/15/2012	7/14/2017
Mitchum		NASA Jet Propulsion Laboratory	72361.62	10/1/2013	9/30/2017
Mitchum		US Geological Survey	15773.54	9/13/2013	9/14/2018
Mitchum		University of Colorado	22582.44	3/14/2013	3/13/2017
Muller		Florida Fish and Wildlife Conservation	25805.44	10/4/2010	6/18/2015
Muller		Florida Fish and Wildlife Conservation	31554.08	10/4/2010	6/18/2015
Muller		Florida Fish and Wildlife Conservation	10813.29	10/4/2010	6/18/2015
Muller		Consortium for Ocean Leadership	445.63	2/3/2012	1/31/2016
Muller		Consortium for Ocean Leadership	4148.29	1/26/2014	1/31/2016
Muller		Florida Fish and Wildlife Conservation	2306.89	6/19/2015	6/30/2018
Ryan	Muller-Karger	National Science Foundation	391.69	9/15/2010	8/31/2014
Muller-Karger		National Science Foundation	152182.14	7/31/2009	11/30/2014
Muller-Karger		National Aeronautics & Space Admin	62441.21	11/1/2009	10/31/2014
Muller-Karger		Roffers Ocean Fishing Forecasting Srvce	219851.33	9/1/2011	8/31/2016
Muller-Karger		Environmental Protection Agency	229549.53	6/1/2012	5/31/2016
Muller-Karger		National Aeronautics & Space Admin	27750.67	9/1/2012	8/31/2016
Muller-Karger		National Aeronautics & Space Admin	16072.08	1/28/2013	1/27/2015
Muller-Karger		National Science Foundation	192517.19	9/1/2013	8/31/2017
Muller-Karger		National Science Foundation	1782.00	9/1/2013	8/31/2017
Muller-Karger		National Aeronautics & Space Admin	35473.98	8/1/2013	7/31/2015
Muller-Karger		National Science Foundation	240978.87	2/1/2014	1/31/2017
Muller-Karger		Natl Oceanic & Atmospheric Admin	38958.04	8/1/2014	12/31/2016
Muller-Karger		National Aeronautics & Space Admin	38244.24	8/4/2014	5/17/2016
Muller-Karger		National Aeronautics & Space Admin	160637.76	8/18/2014	8/17/2019
Muller-Karger		University of Central Florida	5696.42	8/1/2014	5/1/2016
Muller-Karger		Stratus Consulting	32525.84	1/27/2015	11/30/2015
Muller-Karger		Stratus Consulting	6370.47	1/27/2015	11/30/2015
Murawski		Natl Oceanic & Atmospheric Admin	18725.94	10/1/2011	3/31/2015
Murawski		Gulf of Mexico Research Initiative	1898024.78	9/1/2011	9/17/2015
Murawski		Gulf of Mexico Research Initiative	70395.16	9/1/2011	9/17/2015
Murawski		Gulf of Mexico Research Initiative	2243.03	9/1/2011	9/17/2015
Murawski		Gulf of Mexico Research Initiative	52518.79	9/1/2011	9/17/2015

ACTIVE RESEARCH AWARDS

Award PI Name	Name - Co PI If Applicable	Sponsor Name	Actual Total Costs	Award Begin Date	Award End Date
Murawski		University of Miami	21593.77	9/1/2012	8/31/2014
Murawski		National Science Foundation	80206.98	10/1/2013	9/30/2016
Murawski		Gulf of Mexico Research Initiative	1564.13	9/5/2013	11/30/2013
Murawski		Stratus Consulting	97329.76	1/15/2014	1/14/2016
Murawski		University of Miami	38377.33	8/1/2014	3/31/2015
Murawski		Consortium for Ocean Leadership	63699.57	1/1/2015	12/31/2017
Murawski		Consortium for Ocean Leadership	110376.33	1/1/2015	12/31/2017
Murawski		Gulf of Mexico Research Initiative	52518.79	9/1/2011	9/17/2015
Murawski		National Fish and Wildlife Foundation	67542.31	1/1/2015	1/31/2018
Paul		University of Georgia	11253.12	1/8/2010	4/30/2015
Murawski	Paul	Gulf of Mexico Research Initiative	64707.70	9/1/2011	9/17/2015
Murawski	Paul	Consortium for Ocean Leadership	77405.61	1/1/2015	12/31/2017
Peebles		University of Miami	291317.12	8/1/2012	11/30/2016
Peebles		Tampa Bay Estuary Program	17321.10	12/10/2013	2/28/2015
Peebles		Florida Fish and Wildlife Conservation	4924.41	12/4/2013	1/31/2015
Murawski	Peebles	Consortium for Ocean Leadership	42835.32	1/1/2015	12/31/2017
Peebles		Florida Fish and Wildlife Conservation	20613.66	11/17/2014	7/31/2015
Rosenheim		University of Miami	276631.32	1/1/2014	12/31/2015
Shevenell		National Science Foundation	46412.65	4/1/2013	3/31/2016
Stallings		Florida State University	38382.57	9/1/2011	8/31/2016
Stallings		Department of Commerce	25793.88	9/1/2012	8/31/2014
Stallings		Florida Sea Grant College	61334.65	10/1/2012	12/31/2015
Stallings		Florida Fish and Wildlife Conservation	31699.71	4/10/2013	10/30/2015
Stallings		FL Department Environmental Protection	90270.90	5/30/2014	6/30/2016
Stallings		FL Department Environmental Protection	49859.61	5/30/2014	6/30/2016
Stallings		Florida Fish and Wildlife Conservation	17364.64	1/29/2015	9/30/2015
Murawski	Walsh	Gulf of Mexico Research Initiative	81309.51	9/1/2011	9/17/2015
Murawski	Walsh	Consortium for Ocean Leadership	84099.89	1/1/2015	12/31/2017
Weisberg		National Aeronautics & Space Admin	128918.07	1/10/2013	1/9/2017
Weisberg		Southeast Coastal Ocean Observing Region	42959.82	6/1/2013	11/30/2014
Weisberg		Southeast Coastal Ocean Observing Region	247.50	6/1/2013	5/31/2014
Weisberg		Southeast Coastal Ocean Observing Region	151441.21	6/1/2014	11/30/2015
Weisberg		Southeast Coastal Ocean Observing Region	151611.45	6/1/2014	11/30/2015
Weisberg		Woods Hole Oceanographic Institute	9616.22	8/1/2014	12/31/2014
Lenes	Weisberg	Florida Fish and Wildlife Conservation	49998.05	9/17/2014	4/30/2015
Weisberg		Southwest Florida Water Management	35470.55	12/24/2014	8/31/2015
Weisberg		Southeast Coastal Ocean Observing Region	42521.16	6/1/2015	5/31/2016