NC STATE UNIVERSITY

The Center for Marine Sciences and Technology

MAY 2016

Semester @ CMAST!

NC STATE UNDERGRADS EMBARK ON AN EDUCATIONAL ADVENTURE THEY'LL NEVER FORGET

All Semester @ CMAST photos by Emily McGuirt

NC STATE
CMAST

Discovering Coastal Solutions

CMAST welcomed its inaugural cohort of undergraduate students for the 2016 Spring Semester@CMAST Program. With seed funding from the Provost's Office, the Semester @ CMAST is the first-of-its-kind NC State commitment for a semester-long, academic coastal and marine program for a large class of undergraduate students, and offered courses taught by experts in their respective fields, as well as courses not offered on main campus. Courses ranged from Oceanography, to Fisheries Ecology, to Marine Mammal Biology & Aquatic Animal Health, to Applied Marine Ecology, to Marine Resource Management and Policy, to Experiential Learning courses that provided hands-on research and internship experiences.

Students divided their time between the classroom and the field to gain hands-on experience that transcends the textbooks. .

The experiential learning opportunities ranged from assisting with wild horse population studies on the nearby Shackelford Banks barrier island, to characterizing light levels along Atlantic Beach that might impact sea turtle nesting success, to necropsies of stranded dolphins to determine the cause of death, to quantifying ecosystem services provided by shellfish aquaculture in nearshore waters, to characterizing the timing of larval ingress of fish from the Atlantic Ocean that replenish fish populations in estuaries.

Coastal and marine sciences are a vital part of the environmental make-up of North Carolina, and an essential part of the socioeconomic fabric of the state. NC State University has a large and growing commitment to CMAST, and to activities there that span

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FROM THE DIRECTOR

The passion that a majority of people have for their chosen career in the sciences, especially the marine sciences, can be traced to a spark from a life changing experience outside of the classroom-- a research cruise, a summer research experience at a marine laboratory, an internship at a university, or a work-study experience. As the U.S. struggles to bolster the numbers of students entering STEM fields of science, technology, engineering, and mathematics, it is critical that universities provide the types of educational innovation and life changing experiences that will spark a passion for the sciences. In this issue of our newsletter, we highlight how CMAST has been used, and can be used, as a tool for educational innovation. For example, the new Semester@CMAST Program provided 15 undergraduate students a full semester's curriculum of courses unique to NC State, and taught by experts in their respective fields. We also provide an update on other CMAST hands-on educational opportunities, such as K-12 outreach via The Science House @CMAST, as well as our CMAST Summer Fellows Program for undergraduates. All of these educational programs support one of NC State's strategic goals, to "enhance the success of our students through educational innovation". Lastly, we highlight several noteworthy awards by our faculty and former students, and update you on our recent graduates.

With best wishes,

Dave Eggleston

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Semester@CMAST students spending time in the field. The program allows for hands-on field work not possible in a main campus setting.

the missions of the University. CMAST Director David Eggleston indicated that, "with the Semester@CMAST Program, we created a special, repeated opportunity for NCSU students to experience the North Carolina coastal and oceanic environments. The academic experience for our undergraduates students spanned the interdisciplinary themes of the environment, natural resources, physical sciences, health, policies and economics ensuring students learned how coastal and marine systems are linked, and relate to human activities".

Coastal and marine resources in North Carolina are among the most valuable, and yet are also among those that are changing most rapidly. The proximity of the CMAST facility in the "coastal research triangle" of marine science facilities in Carteret County, encourages multi-institutional and cross-disciplinary research.

Justin Harker, an NC State undergraducate particpating in this year's Semester @ CMAST class had this to say about the program as his semester unfolded:

"I am loving this semester! It has definitely been my favorite semester of school by far! There have been so many opportunities to do and see things I have never experienced before. I've worked with scientists from NOAA in my research project, I went on an expedition to photo ID bottlenose dolphins,

Our first Semester@CMAST class, Spring 2016

An average day for Semester@CMAST students contains above-average experiences.

fed sharks at the aquarium, participated in necropsies on sea turtles and bottlenose dolphins, and I have assisted in rearticulating a bottlenose dolphin skeleton! Not to mention the area is amazing. I wake up to sunrises over the water and my breaks between classes consist of going to the beach and ending the day with a beautiful sunset. "

The environmental issues of coastal and marine resources engage studies in biology, oceanography, atmospheric sciences, chemistry, physics and engineering, economics, and policy. All of these academic themes define the socio-economic systems that support the residents and visitors to the shores. Students at NC State University are interested in learning about our coastal and marine resources, and the University is well-poised to take existing courses, and create a unique academic program that will be in high demand by students from all academic colleges.

Dr. Bill Winner, who served as Director of the Environmental Sciences Program at NC State, stated "the Semester@CMAST Program sets the stage for development of facilities, courses, and curricula for a residential program allowing students to spend a semester at CMAST in a fully developed coastal and marine academic program. The 15 credits of coursework will carry the unique approach of NC State University that provides academic rigor, interdisciplinary perspectives, and engages the community and partners. The compelling academic program will also lead to further development of instructional staff and other facilities necessary for the University to have a coastal and marine program that embraces all institutional missions".

We are already looking forward to the Spring 2017, Semester@CMAST!

The North Carolina Aquarium, Pine Knoll Shores, was one of the field trips the Semester @ CMAST students embarked upon.

Summer Fellows Program Brings Students into the World of Marine Science

Established in 2005, the *Pat McClellan-Green Summer Fellows Program at CMAST* supports summer interns working at CMAST. The 10-week summer program is available to any university or community college undergraduate student, as well as rising seniors in Carteret County or area high schools.

Students are provided a stipend and assigned a mentor to help design an independent study project as part of ongoing research at CMAST with graduate students and professional staff.

Summer Fellows get experience doing field work and lab work, as their individual projects dictate.

The students must write up a final report and give oral presentations of their results. Summer Fellows work alongside other undergraduate and graduate students working at CMAST.

Weston Smith, now a post-doctorate research associate at the UNC School of Pharmacy, was one of the 2006 Summer Fellows who studied under the program's namesake, Dr. McClellan-Green. Dr. Smith found her instruction and attention to his work to be life-changing:

"All scientists owe a great debt to the mentors who privided them with early opportunities and guidance," he said. "Pat gave me my first independant research project as a sophomore in college and later assisted me when I applied to graduate school. I will always be grateful to her for giving me a great start in my scientific career."

The Summer Fellows Program takes students out of the classroom and out into the field to work on projects that break the boundaries of textbooks and lectures.

Funding for 2016 is provided through CMAST in support of 3 to 4 summer undergraduate students. This year's 10-week summer research program will take place May 31 to August 5, 2016.

Summer Fellows get their feet wet in the field of Marine Science

Fellows Program Renamed to honor Dr. McClellan-Green

The CMAST Summer Fellows program was started and nurtured by Dr. Patricia McClellan Green for ten years, before her untimely death in 2014. To honor her and the profound effect she had on so many young students, NC State changed the name of the Summer Fellows program to the *Dr. Patricia McClellan-Green Summer Fellows Program at CMAST.*

"Pat was an integral part of our CMAST family," said Dr. David Eggleston, director of CMAST. "Naming the CMAST Summer Fellows Program after Pat recognizes her dedication and commitment to all students and enthusiastic support of educational excellence at CMAST."

While working at CMAST, Dr. McClellan-Green served as the undergraduate student coordinator from 2005-2014, and managed the Summer Fellows Program from 2005-2009 and 2011-2013. She supervised over 75 undergraduate independent study projects over her career.

CMAST Director Dr. David Eggleston (left) and Dr. David Green, husband of the late Dr. McClellan Green, with the plaque commemerating the renaming of the Summer Fellows Program.

Unmanned Surface Vehicle Greatly Expands CMAST and NC State's Marine Science Research and Education Capabilities.

The construction of a custom-built Unmanned Surface Vehicle (USV) for NC State/CMAST was funded by a grant from the National Science Foundation, and will provide a robotic, shallow-water survey platform for seafloor and water quality mapping.

Detailed knowledge of the near-shore environment is needed to assess the impacts of various activities and policies on aquatic habitats, understand coastal change in the wake of rising sea-level and changing climate patterns, and reconstruct paleo-environments through the sedimentary record.

The ability to mount acoustic receivers and sound-recording hydrophones on the USV will also open up important new research avenues in fisheries ecology and animal behavior.

In addition to research, the USV will also expand significantly the teaching resources of CMAST and the broader marine science and education enterprise in the central NC coast. Graduate students will be able to use the USV in their research.

Undergraduate science students will have opportunities to join research teams using the instrument through the *CMAST Summer Fellows Program*, the *Merial Summer Research Scholars Program*, *The Science House at CMAST*, and programs supported by the NC State Office of Undergraduate Research.

The USV will operate extensively during our annual Costal Processes Field Course, which serves as a capstone course for all Marine Science Majors at NC State and is operated out of CMAST.

The USV is being made broadly available to the marine and aquatic science research communities by conducting investigator-driven experiments as a fee-for-service facility.

Funding from these operations, along with CMAST support for an USV technician, ensure the long-term sustainability of the facility.

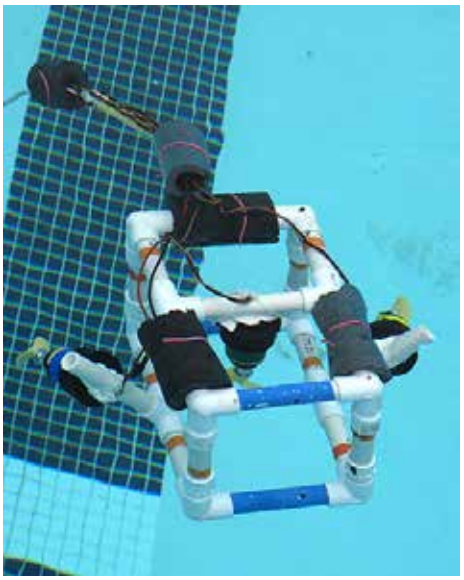
The vehicle can be remotely controlled and programmed from a data station on land..

To encouraging their widest possible use, USV sensor data and data-derived products will be made openly available through NSF's Biological and Chemical Oceanography Data Management Office and the Marine Geoscience Data System.

The NC State/CMAST Unmanned Surface Vehicle with 3 of 4 Principal Investigators (PI) shown from left to right: Drs. David Eggleston, Del Bohnenstiehl and Chris Osburn (PI Dr. Jeff Buckel is not shown).

The Science House @ CMAST: Forging Ahead

The Science House @ CMAST has a busy spring planned with programs serving a wide range of students and teachers. There have also been programs which have come to fruition in the late winter that have put *TSH @ CMAST* at the top of its game.



Upper Elementary and Middle School students competed in building and operating ROV devices in February.

TSH @ CMAST held a pilot competition for the MATE ROV Competition for Upper Elementary and Middle School students in coastal NC in February. The competition was held April 23 at the Sports Center in Morehead City, NC. The workshop was for coaches who wished to have teams participate in the MATE Competition. Coaches received a loaner ROV to use for the competition.

COASTAL CONNECTIONS WORKSHOP

A new workshop series designed to prepare educators to lead field trips with hands on experiences on the barrier islands of the southern Outer Banks kicks off this spring, with workshops on "Surf Fishing for Educators," "Educational Trawling," and "Birding by Boat."

CUSTOMIZED DEVELOPMENT

TSH @ CMAST can help your school or group develop and deliver customized STEM training and programs. For additional information or to schedule an appointment, please contact Dr. Pat Curley at pwcurley@ncsu.edu.

JOIN THE SEA WOLVES!

The CMAST Sea Wolf Program is a 4-H program for students age 13-18 who are interested in pursuing careers in marine science, environmental science, marine technologies, and science communications.

The Sea Wolves meet at CMAST at 7 pm on the first and third Wednesday of each month.

All students who are interested are encouraged to attend. For more information call 252.222.6376 or email pwcurley@ncsu.edu.

Teachers got hands-on Earth Science experience, training on Vernier Labquest II devices.. These devices will be available through the Science House Loan Program..

Where Are They Now?

CMAST Ph.D. graduate **Nate Bachelor** was one of 105 recipients that President Obama honored as extraordinary early-career scientists. The Presidential Early Career Awards for Scientists and Engineers is the highest honor bestowed by the United States Government on science and engineering professionals in the early stages of their independent research careers. The winners will receive their awards at a Washington, DC ceremony this spring.

Sasha Doss, a former intern with the Jeff Buckel lab, is getting her Masters Degree in Fisheries Conservation at Virginia Tech.

Ryan Dowdy: 2016 Arla Foods Graduate Fellowship in Food Science awarded at Robert Mondavi Institute for Wine and Food Science. Dowdy, a second year doctoral student in the Department of Food Science and Technology at UC Davis. Ryan works in the laboratory of Professor Christopher Simmons, a food engineer. His research project will combine renewable desalination of dairy waste streams

Dr. Trey Clarke,who was a CVM resident at CMAST had a cameo in the Jurassic Park sequel recently. When not performing for the camera with dinosaurs, Trey works for the Audubon Aquarium of the Americas in New Orleans.

Dr. Ashlee Lillis, MEAS, PhD degree 2014 is now a post-doctoral scholar at Woods Hole Oceanographic Institute in Woods Hole, MA.

Shannon Brown (now Shannon Ricci), MEAS, MS degree 2015, is now a Research Technician at NC State with Dr. David Eggleston.

Jason Peters, MEAS, MS degree 2014 is a Biologist with the NC Division of Marine Fisheries in Morehead City, NC.

CMAST Prof Honored

On March 15, 2016, the Stewards of the Future, Research for Ocean Health and Community Sustainability, Regional Exchange Group recognized CMAST's Dr. Michael K. Stoskopf, Professor of Aquatics and Wildlife Medicine, NC State University, CMAST, as a Steward of the Future.

This award was given for Dr. Stoskopf's lifelong dedication to the care and health of all animal species through research, teaching and mentoring, research on the environmental impacts on captive and free-ranging/swimming animals, establishment of aquatic and zoological programs for hundreds of veterinary, graduate and undergraduate students, and providing expertise and service to state, national and international panels and commissions aiding in the protection of aquatic species in North Carolina and globally.