



Department of Marine Sciences Spring 2019 Newsletter

GREETINGS FROM THE DEPARTMENT HEAD

Spring has finally arrived at the maritime region of Connecticut, and with it came a number of important changes to the UConn administration. In December, **Juli Wade** (recently at Michigan State University) was announced as the new dean of the College of Liberal Arts and Sciences, starting July 2019. In February, **Thomas Katsouleas** (recently at University of Virginia) was named the 16th president of UConn, and in March, **John Elliott** (formerly dean of UConn's School of Business) was appointed interim provost. These changes offer both challenges and, importantly, opportunities for our Department, and we look forward to working with the new administration in the years to come.

In this newsletter, we continue a multi-part story on the history of UConn marine sciences and highlight the exciting research and educational activities of our faculty, staff, and students. You can find even more information about the manifold of events within the Department on our website.

J. Evan Ward

PROFESSOR AND HEAD, DEPARTMENT OF MARINE SCIENCES

Climate change is rapidly reshaping the Long Island Sound, as citizen science data shows

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JUNE 4, 2019
BY KAYLA
MLADINICH

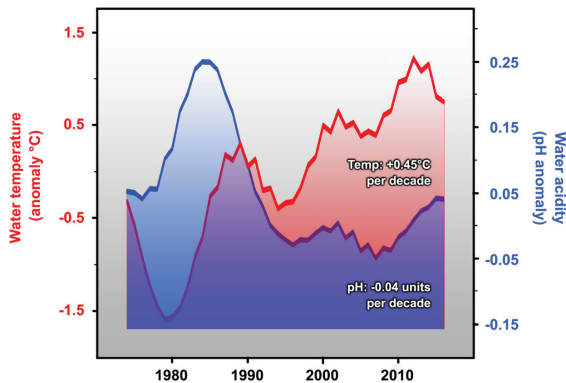
DEPARTMENT NEWS

DMS scientists digitized old records from *Project Oceanology* and discovered a treasure chest of data on warming oceans and shifting marine populations.

For more than 45 years, the non-profit *Project Oceanology* on UConn's Avery Point Campus has inspired middle and high school students to care about the ocean. Students learn how measure water temperature, pH and oxygen and sift through trawl catches of fish and crabs that many have never seen for real before. Thereby, *Project Oceanology* did something else of enormous value: it routinely collected data for decades. Steel cabinets swallowed the student's records and obviously guarded this growing treasure.

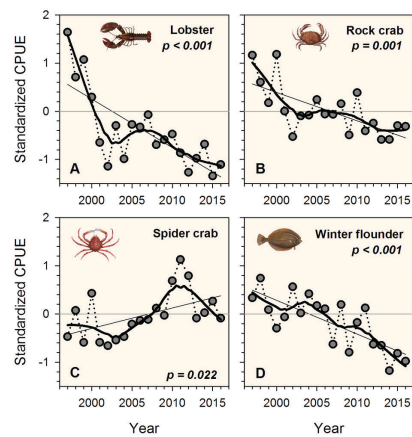
In 2016, Master's student Jacob Snyder and Professor Hannes Baumann decided to lift the treasure. They painstakingly entered every recording from every data sheet they found, anxious for the time, when the data would finally speak. The study, published in April 2019, shows how rapidly temperatures in eastern Long Island Sound have increased over the past four decades (+0.45C per decade), at a rate four times faster than in the global ocean (Levitus et al. 2000). This is also true for the larger Northwest Atlantic shelf, of which Long Island Sound is a part, where some areas have warmed faster than 99% of all ocean waters on earth (Pershing et al. 2015).

Another symptom of marine climate change is ocean acidification, measured as a pH slow decline in the ocean which swallows the increasing amounts of carbon dioxide emitted by humans (Doney et al. 2009). In coastal waters, nutrient pollution (e.g., nitrogen, phosphate) from sewers, waste water treatment plants and fertilizer runoff can intensify acidification. The *Project Oceanology* data revealed that pH declined much more rapidly in Long Island Sound than globally, which could imply worsening conditions for shellfish farmers.



Trawl records were particularly telling, showing that cold-water species such as American lobster, rock crab or winter flounder became less frequent over time. This is exactly what long-time instructors at *Project Oceanology* said they had noticed too. Lobsters once supported a proud fishery in Long Island Sound, but warmer, more acidic waters, shell disease, and overfishing have now decimated them to nearly complete absence.

However, a winner of dubious qualities emerged too. Over the past decades, spider crabs have moved into Long Island Sound from the south and are now the dominant crab species in the trawls. Spider crabs are no equivalent to lobsters, humans do not like to eat them and they can alter the ecosystem, as they eat much more plant-based food than lobsters.



Long Island Sound has been rapidly changing, and the data collected by generations of middle and high school students re-affirmed this. Other time-series from Norwalk Harbor and the Connecticut Department of Energy and Environmental Protection (CTDEEP) have shown similar trends. It is therefore undeniable that marine climate change is happening right now in Long Island Sound.

Snyder, J., Whitney, M., Dam, H., Jacobs, M., and Baumann, H. Citizen science observations reveal rapid, multi-decadal ecosystem changes in eastern Long Island Sound. *Marine Environmental Research* 146:80-88

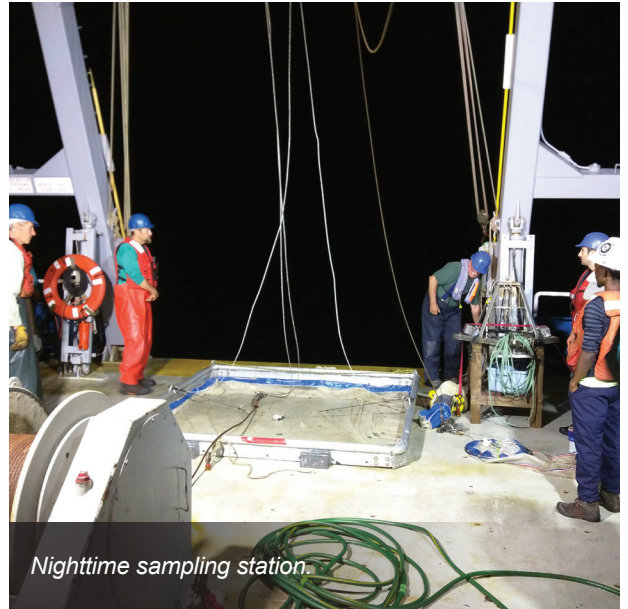
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Project Oceanology: 1084 Shennecossett Road, 06340 Groton, CT www.oceanology.org, Twitter: @Proj_Oceanology



The graduate student class with faculty.



Nighttime sampling station.

The First Ocean Expedition Course

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DEPARTMENT NEWS

On October 17-19, 2018, six graduate students from Department of Marine Sciences participated in the first ocean expedition course ever offered by the university. Students have long lobbied for a course that teaches ship-based oceanographic methods, and after much logistical and scientific preparation by faculty, staff, and students, the team set sail aboard the R/V *Connecticut*. The objective of the cruise was to sample oceanographic data from Long Island Sound outwards to the continental shelf break. The team was led by Professors Jim O'Donnell, Frank Bohlen, Samantha Siedlecki, and Hannes Baumann, with research support from Kay Howard-Strobel and David Cohen. The student participants were Molly James, Jimmy deMayo, Alec Shub, Michael Mathuri, Amin Ilia, and Callie Concannon.

The course was designed to give students a chance to experience data collection aboard a research vessel from all oceanographic disciplines. Students oversaw around-the-clock deployment of CTD/rosette casts, sediment grabs/cores, Methot net trawls, and vertical plankton tows at a total of 7 stations. On board the ship, students analyzed pH and prepared samples for later analysis. Unfortunately, weather conditions limited the trip to just 36 hours instead of the intended 48 hours, but the team still managed to collect the data they intended to analyze. With the help of Dr. Claudia Koerting, students used analytical spectroscopy techniques to measure dissolved oxygen, nutrients, and chlorophyll concentration. After all the data was analyzed, the final cruise report was constructed, and the results were presented the following semester at the weekly Brown Bag seminar series hosted by the Marine Sciences Graduate Students. This course provided students with great hands-on experience and introduced the students to areas of oceanography previously beyond their knowledge levels.

To access all the data that was collected during the expedition, log on to ftp://nopp.dms.uconn.edu/ocean_course.

Getting to know our staff: Bob Dziomba – Machine Shop

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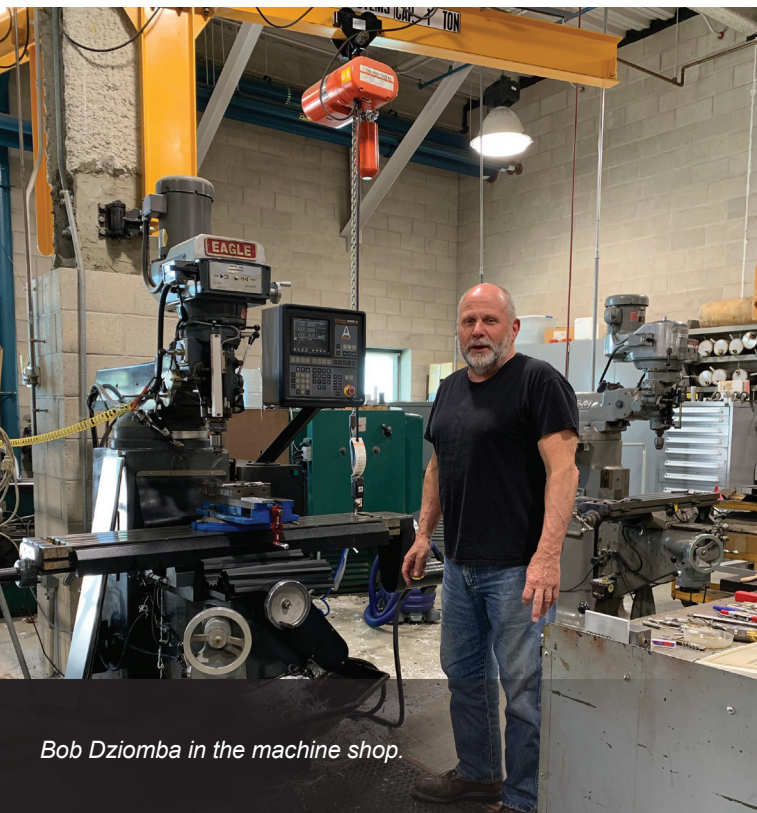
DEPARTMENT NEWS

After a 13-year stint working on nuclear reactors for the US Navy, Bob has been our marine research technician in the machine shop for 26 years. After Gary Grenier's retirement in 2017, he now has to manage the workload in the shop himself. Bob simply describes his day-to-day job as "fix and repair," which is an understatement. Without his skills, the Department of Marine Sciences (DMS) would be at a loss.

As a trained machinist, Bob has contributed to a majority of DMS research projects by helping faculty design, build, and test prototype equipment, while also maintaining and repairing it when it breaks. Earlier during his tenure, Bob also enjoyed servicing the departments' small submersibles and remotely operated vehicles (ROV), which required particular care due to the nature of high-pressure equipment. Over the years, he helped shape the machine shop into the highly functional facility that it is today.

Major experimental setups like the flow-through system in the Rankin Seawater Lab were constructed with Bob's input and hard work. Bob also helped building the Larval Fish Rearing System that allows experimental manipulations of water temperature, CO2 and oxygen levels to study potential effects of marine climate change on marine organisms. In Bob's spare time, he helps other technicians with repairs on our marine vessels and teaching laboratories. Outside the machine shop, Bob's friends and family value his mechanical skills.

DMS research operations rely on Bob's expertise to construct prototypes and conserve functional equipment. As a department we fortunate to have such a skilled and caring technician.



Bob Dziomba in the machine shop.



The automated Larval Fish Rearing System in Rankin Lab. Photo credit: Hannes Baumann

Where Are They Now? One Year After Avery Point

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DEPARTMENT NEWS

In 2018, seven graduate students from the Department of Marine Sciences completed their degrees, five with master's and two with doctorates. We checked in a year later to see what they've been up to.

Michelle Fogarty landed a postdoctoral researcher position in Marine Energy Resource Characterization at the National Renewable Energy Laboratory in Boulder, Colorado. On the other side of the country, **Ellen Johnson** is in San Diego, California working as a content writer and science communicator. Check out her blog, currentseablog.com, to read some of her articles about sustainability and the ocean. After completing his undergraduate and master's studies at UConn, **Matthew Lacerra** began his doctorate at Princeton University where he is studying paleo-oceanography in Dr. Daniel Sigman's group. **Almariet Palm** scored a position as a Project Geologist with HRP Associates Inc in Farmington, Connecticut. **Gihong Park** conferred his doctorate and continued at Avery Point as a postdoctoral research associate with his PhD advisor, Dr. Hans Dam. **Julie Pringle** moved back to Martha's Vineyard, Massachusetts and began working as a Field Science Coordinator for a local non-profit called the Great Pond Foundation. She commented on being back in the field, "after spending the majority of my graduate research in the lab, I'm really enjoying all the field work!" Last but not least, **Heidi Yeh** started her doctorate studying oyster aquaculture at Rutgers University in New Jersey. She is "employing genetic techniques to promote sustainable seafood production."

Some recent alumnae/i entered the next step in academia, while others moved into the work force. This just goes to show that a graduate degree from the Department of Marine Sciences can prepare you for a variety of career paths. It will be interesting to see where they wind up next!

A History of the R/V *Connecticut*

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S P O T L I G H T

Prior to the launch of the original R/V *Connecticut* in 1998, the University had operated a former U.S. Army-Transport boat (a T-441) acquired from Scripps Institution in 1969 and renamed the R/V *UConn*. Because it had a limited capacity for research instrumentation, it only spent about 20 days per year at sea. To develop modern marine research, the Department of Marine Sciences (DMS) and the former Marine Sciences and Technology Center eventually proposed a purpose-built coastal research vessel.

In 1996, Roger Long and the Elliott Bay Design Group designed the R/V *Connecticut* followed by construction in the fall of 1997. J. Turner Cabaniss, our current Marine Operations Manager, was hired in 1998 as captain and to provide onsite supervision of the construction. The boat's design and construction were funded by state economic development funds through a state agency called Connecticut Innovations in addition to a loan from the University. The original R/V *Connecticut* was a 76' research vessel with 12 bunks and a small lab space. It was equipped for heavy-duty oceanographic research with features like a stern A-frame for lifting buoys and a deck crane. It could house 7 scientists and 5 crew members and spent about 125 days at sea a year; being repeatedly chartered by other research institutions and federal agencies including NOAA, Woods Hole Oceanographic Institution, and the University of Maine.

The vessel operates as a university service center that is largely self-supporting through funding from federal agencies, making it realistic for UConn to house the boat, charter it to other researchers, and use for DMS research. The R/V *Connecticut* is well traveled along the east coast, particularly in Long Island Sound and Gulf of Maine waters. It has even spent some time in the great lakes, when Dr. Bob Ballard chartered the vessel for ROV work in the Thunder Bay NOAA Marine Sanctuary. To support Ballard's work, NOAA provided funds to incorporate dynamic positioning into the R/V *Connecticut's* existing propulsion. Dynamic positioning works through a computer integration of the bow and stern thrusters to maintain the boat's position above ground. For a small research vessel, this is an extraordinary feature.

However, more recently the ship's limited bunk and lab space proved to be an obstacle for larger collaborations and research expeditions. According to Dr. James O'Donnell, this was apparent during projects like the LISICOS program (Long Island Sound Integrated Coastal Observing System, 2004-2006), a large interdisciplinary estuarine project with more than a dozen researchers involved. People had to be shuttled on and off the ship throughout an expedition to meet project needs. With funding from the Provost and the College of Liberal Arts and Sciences, the R/V *Connecticut* was refitted in 2017, with the addition of a 14' mid-body extension, making it a 90' vessel. The ship now holds double the lab space and 18 bunks for 5 crew members, a technician, and 12 scientists. The refitted boat is already benefiting DMS's education program in the form of a graduate level course for ocean expeditions and will allow for greater collaboration opportunities at UConn and other marine research programs.



*The R/V Connecticut out on an expedition,
Photo Credit: James O'Donnell*



*The R/V Connecticut,
Photo Credit: Turner Cabaniss*

Achievement Highlights

STUDENT PUBLICATION

A research article co-authored by Ph.D. student **Amin Ilia** and professor **Jim O'Donnell**, titled "An Assessment of Two Models of Wave Propagation in an Estuary Protected by Breakwaters," was recently published in the *Journal of Marine Science and Engineering*.

FACULTY AWARD

Sandra Shumway was awarded the FUCOBI Foundation Award for Outstanding Contributions by Women in Aquaculture, the APEX Award for Publishing Excellence (*Journal of Shellfish Research*), and the Association Trends Gold Award (*Journal of Shellfish Research*).

STUDENT ACHIEVEMENT

Jo-Marie Kasinak was awarded the Torrey Botanical Society's Greller Graduate Student Research Award for the Conservation of Local Flora and Ecosystems.



marinesciences.uconn.edu/partners-of-marine-sciences/

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