



Department of Marine Sciences Spring 2022 Newsletter

GREETINGS FROM THE DEPARTMENT HEAD

Spring has arrived in New England and as the water temperatures rise the faculty, staff and students are busy planning for summer field work and research. The spring semester saw a relaxation of the COVID-19 safety guidelines allowing many to return to their offices on a more regular basis and interact with colleagues and students in a more relaxed atmosphere.

Even though we remain 'COVID-19 aware', the Department continues to move forward with many initiatives and activities. Stories about some of these can be found in the current newsletter, including: a piece about the experiences of three DMS alumni with their Knauss Fellowship (NOAA Sea Grant); a report about the work of the Department's Justice, Equity, Diversity, and Inclusion committee, and the AGU Bridge Program; a story on the Department's Financial Officer, Elise Hayes, who recently retired; a piece about our newest faculty member, Dr. Cara Manning; a story highlighting a peer-reviewed paper published by graduate student Tyler Griffin; and other interesting newsworthy items. Those interested in discovering more about the Department and its activities can visit our website at marinesciences.uconn.edu.

Finally, if you have not done so already, please join the Partners of Marine Sciences by signing up at marinesciences.uconn.edu/partners-of-marine-sciences. Doing so will keep you up-to-date on all of the exciting activities ongoing in Marine Sciences, and allow us to reach out to you with special initiatives. I wish everyone a healthy, happy, and productive summer.

J. Evan Ward

PROFESSOR AND HEAD, DEPARTMENT OF MARINE SCIENCES

ALUMNI SPOTLIGHT

Reflections on the Knauss Fellowship

The John A. Knauss Marine Policy Fellowship Program, sponsored by Sea Grant and the National Oceanic and Atmospheric Administration (NOAA), is a one-year paid fellowship that places graduate students in either an executive or legislative position within the federal government. Fellows are given the opportunity to have direct experience working on the latest issues in ocean, coastal and Great Lakes management and research. Several alumni of our department have been selected to participate in this fellowship in the past. This article discusses the experiences of Dr. Terill Hollweg ('10, PhD), Alec Shub ('20, MS), and Halle Berger ('20, MS, PhD in progress).

The traditional path of graduate students in science has been to pursue careers in academia. As more environmental issues reach the spotlight and are discussed in a national policy context, greater numbers of graduate students are expressing an interest in working for the government in environmental policy or advising positions. Fellowships like the Knauss Fellowship offer recent graduates an opportunity to explore government policy jobs before settling on a career path. All three interviewees cited an interest in non-academic jobs as a driver for their participation in the fellowship. Dr. Hollweg reflected, "In grad school I was focused on looking at contaminants in the environment, and I enjoyed that, but I was open to anything where I felt that I was helping to improve the environment, and the fellowship let me see if NOAA was a place where I could actually feel like I did that."



Dr. Terill Hollweg ('10, PhD)

While a fellow, Dr. Hollweg served as a program planning and evaluation specialist in NOAA's Restoration Center. She noted that one of the biggest challenges of stepping into this role was the contrast between her time in grad school, where her day-to-day life comprised mostly individual projects and lab work to the fellowship, where she participated in multiple meetings per day, worked on several different projects, and helped to put together deliverables on tight schedules. Despite the challenges of her new role, she enjoyed the fellowship and made many lifelong connections. "One of my favorite things was having the cohort of fellows who all started at the same time. Going to DC and having this group that cares about the same things you do helps you get through being in a new city for the first year. Some of my best friends now are from my cohort of Knauss fellows."

When her time as a fellow came to an end, Dr. Hollweg transitioned to a full-time contractor positioned in the same NOAA Restoration Center, performing high-level program work. In order to return to some of her more technical roots, she soon took a job with an environmental consulting firm that worked closely with the Restoration Center, where she spent the next 6 years. When a full-time position in the Restoration Center opened up, she transitioned back into working for the Federal government. Reflecting on her experiences with the fellowship, Dr. Hollweg commented “The Knauss Fellowship started my career path and set my career path. If I hadn’t done the fellowship I don’t know what I’d be doing now but I doubt it would be this position. I am so happy they have the fellowship, it’s such a wonderful opportunity to get young people into the government and learn how the government works.”



Alec Shub ('20, MS)



Halle Berger ('20, MS, PhD in progress)

Since the start of the COVID pandemic, many jobs have transitioned to teleworking, and the Knauss Fellowship was no exception. Shub and Berger were both Fellows in the 2021-2022 cycle, and both cited performing the fellowship virtually as one of their biggest challenges during the experience. The inability to form more personal bonds with other fellows or coworkers was an added complication when stepping into management and organizational roles. Shub served as the International Climate Fellow in NOAA’s Climate Program Office, while Berger worked as a Coastal Stressors Program Coordinator in both the Ocean Acidification Program and the National Center for Coastal and Ocean Science Competitive Research Program within NOAA. Despite the challenges of teleworking, the flexibility of the fellowship and the time built in for personal professional development were invaluable resources. Shub and Berger both discussed how appreciative they were for the many different experiences they were able to have, even outside of their main responsibilities. Post-fellowship, Shub is continuing on as a Program Specialist in the same office where he served his fellowship. The opportunities he was exposed to during his fellowship have given him new perspectives on what kind of career he would like to pursue. Berger has returned to UConn Avery Point to complete her PhD with new perspectives on career opportunities.

All three had great advice for students who are interested in pursuing the Knauss fellowship. During the finalist stage of the interview process, candidates spend a week in DC (or virtually during COVID) participating in a series of ~20 interviews to determine their placement. Berger advised that applicants plan their interviews strategically, participate in “ask a current fellow” events, and remain open to every opportunity. “Just go into it with an open mind, interview for things you wouldn’t think on paper are good for you, because you might be surprised at what interviews end up being super interesting.” Shub suggested that applicants consider what kind of position they would like to be in, whether it’s more research based or management focused, rather than focusing specifically on what kind of subject material they find interesting. Dr. Hollweg recommended that applicants think about which supervisor will be a good fit, since you will work closely with your supervisor during the experience and they will help advocate for you. All three interviewees strongly recommended the fellowship to students who are interested in policy or government work post-graduation.

Learn more about the Knauss Fellowship here: seagrant.noaa.gov/knauss-fellowship-program

JEDI Committee Bridge Program

In response to the increased focus in recent years on improving diversity in higher education, particularly STEM fields, the Department of Marine Sciences created a Justice, Equity, Diversity, and Inclusion (JEDI) committee. This committee includes professors Dave Lund and Samantha Siedlecki, Research Operations Manager Dennis Arbidge, graduate student Mikayla Baer, and undergraduate Larissa Tabb. The committee primarily focuses on JEDI issues that affect our department, but has met with the director of UConn's Office of Diversity and Inclusion and presented about our department's efforts on UConn's main campus. Dr. Lund explains the goal of the committee: "The overall goal of the JEDI committee is to enhance the diversity of the department and make it more inclusive to people with a range of backgrounds (including gender, racial and sexual orientation). In doing so, our hope is to improve access to resources and education in DMS, which in the long term will make our field a more just place. Additional details about our mission and goals can be found at marinesciences.uconn.edu/justice-equality-diversity-inclusion."

The department as a whole raised questions and concerns about diversity and inclusion through a climate survey. The JEDI committee took the results of this survey as well as their observations of areas of need to develop specific goals. Dr. Lund said, "One of the main concerns raised amongst committee members is the lack of racial diversity in our speaker series, which we have started to address by gathering demographic information on the invited speakers. We need some baseline information to understand how we're doing and where we can improve. One other issue that's come out of the committee is the lack of transparency in the university's bias reporting process (an issue originally raised in our departmental URGE pod). As a result of this input, we approached the Avery Point administration and they have set up workshops on the topic in collaboration with university representatives from main campus, including one for faculty and staff on April 7 and one for students that we're told will occur later in the term. One of the other main topics we're trying to address is that of diversity in our student body. Unfortunately, this is a common issue for Earth science departments around the country. To address this issue, there have been two main activities. The first is that the GRE requirement for admissions has now been waived, given its expense, poor predictive ability, and apparent bias towards racial minority groups. The other activity was to become a partner with the AGU Bridge Program, whose goal is to match students from underrepresented minority (URM) groups with graduate Earth science programs around the country." DMS has had several success stories of URM graduates who have secured academic positions at Scripps Institution of Oceanography, Connecticut College, and the Harte Research Institute, among other positions. The goal of partnering with the Bridge Program was to further DMS efforts in this area."

The AGU Bridge program has been in place since 2019 and is intended to increase opportunities for students from historically marginalized populations to obtain graduate degrees and create a network of peers, mentors, and advisers to support and serve them before, during, and after grad school. Applications to this program are competitive, with a success rate of 28% in 2021. Dr. Lund explained that the decision to apply to the Bridge program was straightforward based on the concerns raised by the department and committee. The application process involved writing a proposal that made the case that our department was deserving of a partnership based on previous progress in the JEDI area, such as the departmental climate survey, removal of GRE requirements, and URGE pod (see the Spring 2021 newsletter to read more about this).

Additionally, the JEDI committee worked on putting together a Bridge fellowship fund to match funding for this program received from the Dean through a separate proposal, and raised nearly three times their initial goal. Dr. Lund comments, "Our hope is that by becoming a Bridge partner we will have access to a group of students that typically wouldn't apply to DMS. Given that this is our first year, it's hard to know how it will go, but we're optimistic that we'll be able to attract

strong applicants, in part because of ongoing JEDI activities in DMS and in part because faculty have come together to contribute funds to help create a Bridge fellowship. Our discussions with the Bridge program indicate that we are the only department amongst the current 46 partners to have the fellowship subsidized by faculty research funds. So I think that's something to celebrate: DMS faculty collectively came together to demonstrate that we're committed to improving diversity in the department."

Elise Hayes

LONGSTANDING DMS BUSINESS MANAGER

STAFF SPOTLIGHT



Elise Hayes on her farm with her recently acquired lambs.

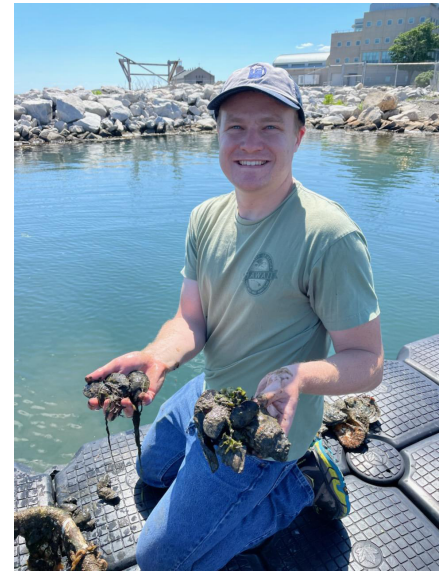
For 30 years, Elise Hayes served as the Department of Marine Sciences Business Manager, called the Marine Sciences Institute at the time of her hiring. She began her time at UConn Avery Point as an undergraduate student, spending breaks working with the National Undersea Research Center and ultimately earning a bachelor's degree through the UConn Account program. During her tenure, she worked with six department heads/center directors including Richard Cooper, Robert Whitlatch, James O'Donnell, Ann Bucklin, James Edson, and Evan Ward.

During her time at UConn, Hayes had the opportunity to participate in many exciting moments. She recalls the opportunity to join a research cruise in the Gulf of Maine and participate in a dive on a 2-person submersible, attending the christening and launch of the RV Connecticut in Maine, and participating in an RV Connecticut cruise to release two pilot whales that were rehabilitated at the Mystic Aquarium as highlights of her time here.

As Business Manager, Hayes managed all administrative activities including pre-award and post-award grant management as well as payroll and oversight of purchasing, accounts payable, and recharge center activities, among other duties. Her valuable ability to manage the many moving parts of dozens of grants and accounts earned her the gratitude and respect of faculty, staff, and students, and the department will sorely miss her after her retirement at the end of March this year. Post-retirement, she plans to spend more time on her hobby farm where she raises a horse and donkey, goats, and recently acquired some lambs, and spend time at her cottage in Maine.

Antibiotics as a Method to Perturb the Gut Microbiome

Nearly all living organisms have a collection of bacteria that live within or on their body and provide essential functions, such as aiding digestion and neutralizing toxins. An important community of microbes primarily located in the gastrointestinal tract of animals is known as the gut microbiome. Scientists are working to understand the complex interactions between the gut microbiome and both essential body functions and disease. One way to study the benefits of the microbiome is to analyze organisms with reduced or eliminated microbiomes. These organisms are lacking the bacteria that may help them mediate environmental stressors.



Tyler Griffin

Griffin et al. (2021) presents the development of a methodology to perturb the gut microbiome in bivalves using antibiotics. This methodology can be valuable to further research by providing a technique that produces animals with reduced or eliminated gut microbiomes without killing the hosts. The project began with the PhD work of Dr. Melissa Pierce, a previous student in Prof. Ward's lab. Her work exposed oysters (*Crassostrea virginica*) to a cocktail of antibiotics for 4 days, but didn't observe any significant changes in the diversity of gut microbes. Tyler Griffin's work extended the exposure period to 3 weeks and used the blue mussel (*Mytilus edulis*), which is a commonly used bivalve for lab experimentation. As this was his first PhD research project, Griffin reflected that learning when to be independent and learning when to ask for help were some of his biggest challenges. He cited the help of Bridget Holohan and former Ward lab postdoc Dr. Lisa Nigro as invaluable.

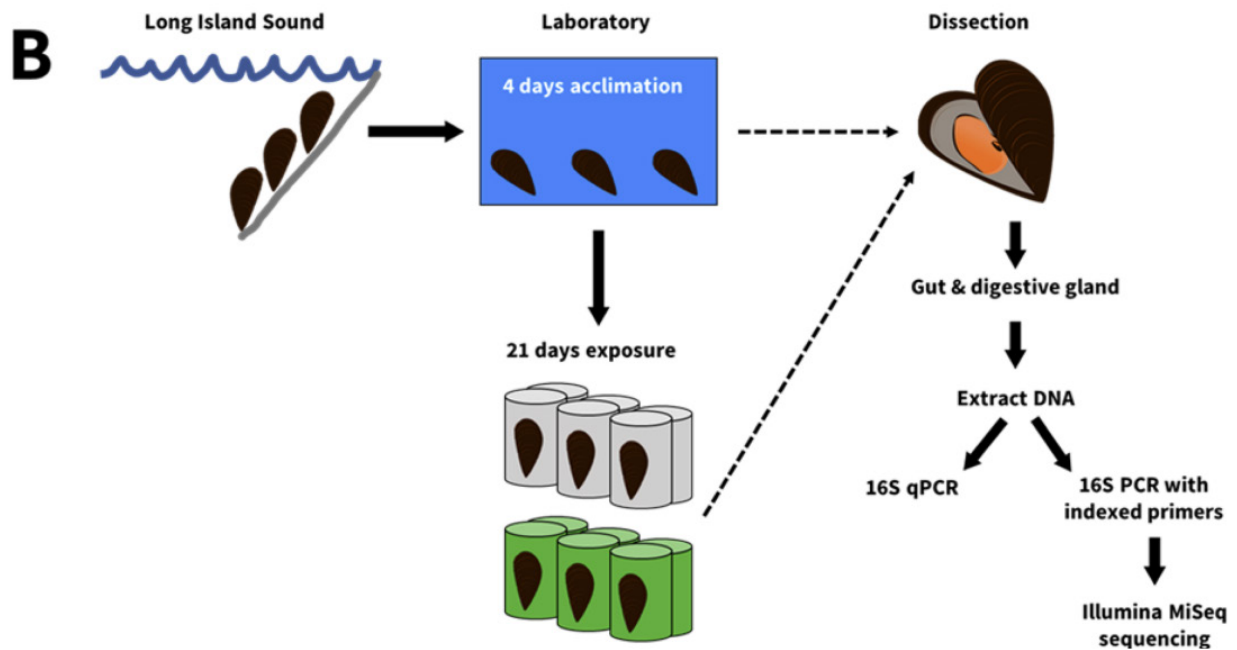
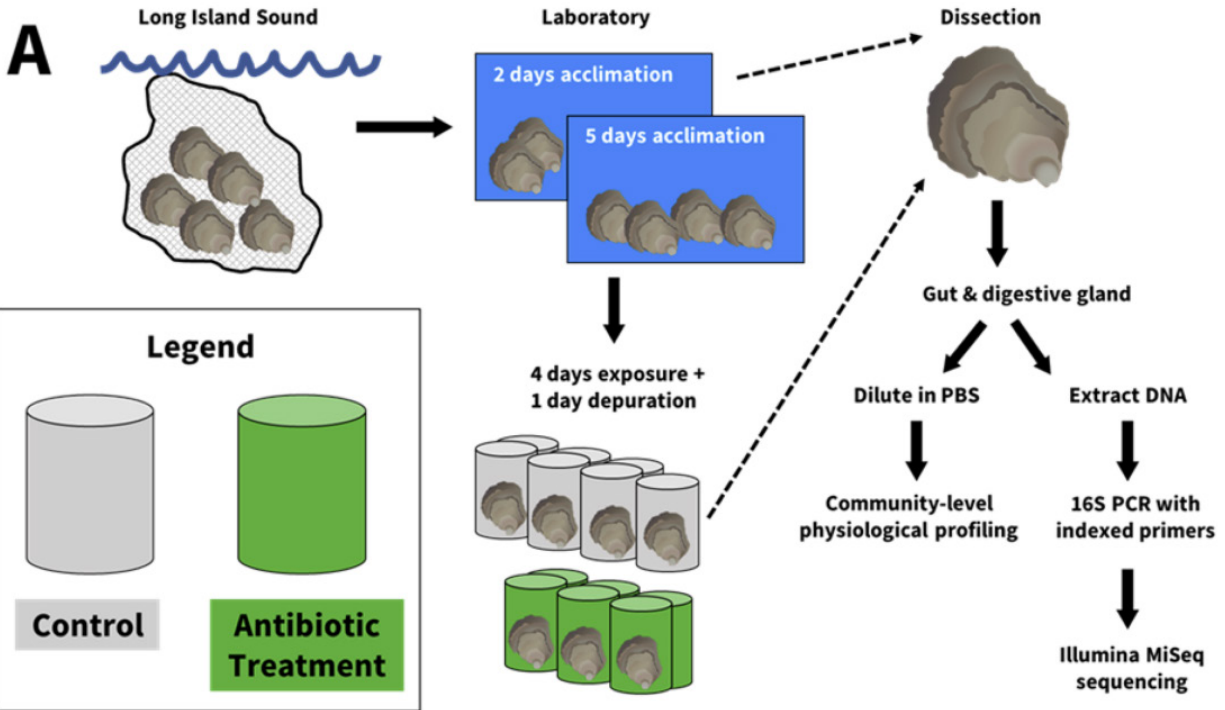
As shown in the flow chart, bivalves were exposed to antibiotics in individual microcosms, or mason jars, and fed a microalgae stock culture that was sterilized by boiling. Three antibiotics were chosen to inhibit a broad group of bacteria. At the end of the experiment, mussels were dissected and analyzed by a few different methods to determine the effect on the microbiome. Through a chance conversation with and help from Dr. Brittany Sprecher, a previous PhD student in Dr. Senjie Lin's lab, Griffin chose quantitative polymerase chain reaction, or qPCR, which is a technology used for quantifying genes, to check for the total number of bacteria in the gut. qPCR results showed that mussels exposed to antibiotics had a reduced number of bacteria, and other techniques showed reduced microbial species richness and shifts in the whole community composition. Essentially, the antibiotics had successfully reduced the number and type of the bacteria in the gut microbiome, which supported the hypothesis that prolonged exposure to antibiotics can perturb the gut microbiome of bivalves.

Moving forward, Griffin hopes other researchers can use these methods to study other bivalve species, other microbiomes on different body sites, such as the gill, or even other suspension feeders such as gastropods or ascidians.

Citations:

Griffin, T. W., Pierce, M. L., Nigro, L. M., Holohan, B. A., & Ward, J. E. (2021). An examination of the use of antibiotics as a method to experimentally perturb the microbiota of suspension-feeding bivalves. *Invertebrate Biology*, 140(4), e12352. <https://doi.org/10.1111/ivb.12352>

FLOWCHART OF METHODOLOGY



CIRCA Partners With CT DEEP to Implement Climate Justice Grants Pilot Program and Environmental Justice Screening Tool

The purpose of the Climate Justice Grants project is to develop and implement a grant program to support equity and environmental justice organizations as community partners for climate planning in Connecticut. Recommendation 1 of the Governor’s Council on Climate Change (GC3) Phase 1 report (2021) reads: “Develop and identify funding for a community engagement strategy to inform the 2021 GC3 planning process and implementation, including support in the form of grants for partnering with community-based, non-governmental organizations to design the community engagement process, receive training, and co-develop recommendations to ensure meaningful input and equitable approaches to mitigation and adaptation.” The Climate Equity and Justice Grant Program will serve as a pilot to design this type of program for Connecticut. The primary purpose of the pilot will be to lower barriers and facilitate the participation of community partners in the implementation of the recommendations of the Governor’s Council on Climate Change and to support “hyper-local” climate planning in their communities.

As a recommendation of the Equity and Environmental Justice workgroup of the Governor’s Council on Climate Change (GC3), CIRCA partnered with DEEP to create the purpose of the Environmental Justice Screening tool project. The project aims to identify vulnerable populations that may be disproportionately impacted by programs, policies, or projects and inform initiatives for creating healthy communities. This project aims to build a community-state partnership to spatially represent environmental and demographic indicators, using deep community engagement and existing data efforts underway across the state. The tool intends to serve the state in various ways, including communication of the disproportionate impacts placed upon communities across Connecticut, informing department and agency actions concerning enforcement, permitting, assessing populations vulnerable to climate change, and supporting policy and legislation that seeks to address the institutional inequities.

Professor Dierssen Leads Working Group



The working group on location in Miami, FL

Professor Heidi Dierssen (pictured 4th from left) leads an international working group on Benthic Reflectance measurements. The group held their inaugural meeting at the University of Miami from 29-31 March 2022. Benthic reflectance is a measurement describing the color of the seafloor, and is an essential parameter for mapping marine habitats in optically shallow water using remote sensing techniques. Brandon Russell (pictured 2nd from right), graduate of UConn Marine Sciences, built a dive spectrometer and is a member of the group. The aim is to produce a report for the International Ocean Color Coordinating Group (IOCCG). Learn More: ioccg.org/group/benthic

NEW FACULTY MEMBER

Dr. Cara Manning Joins DMS



Dr. Manning at sea

In January of 2022, Dr. Cara Manning joined the faculty of the Department of Marine Science. Dr. Manning hails from Vancouver Island, Canada and has a PhD in Oceanography from the MIT-WHOI Joint Program in Woods Hole, Massachusetts. This interview was carried out by Emma Shipley, a current graduate student, on February 15th, 2022.

Manning's first foray into ocean sciences was during her first year in her undergraduate program. On her discovered interest in the field, she says "I really liked it because it allows you to take all these different pieces of science, like chemistry and physics and biology, and integrate them to understand the real world." After an intensive summer program in ocean sciences that included both field and lab work, she began gathering research experience. Eventually, her doctoral research focused on using oxygen as

a tracer of productivity in the ocean, and using noble gases to distinguish between physical and biological fluxes of oxygen. Following a postdoc at the University of British Columbia and a position as a research scientist at the Plymouth Marine Laboratory, Dr. Manning joined DMS during the Environment and Human Interactions cluster hire.

The cluster hire was intended to recruit professors who have complementary expertise related to human interactions with the environment, and to foster cross-disciplinary scholarship involving multiple departments within the college. Manning is working with other professors in the cluster to develop one or more courses that could cover a range of topics in marine and social sciences. She says, "We're talking about the opportunity to develop a cross-taught course that would include social sciences and science perspectives at the same time to understand environmental processes or environmental policy. We think that it's really valuable for students that are majoring in science to get the perspectives of social science and vice versa so that we're learning from each other to really understand environmental processes that have social implications." This class could cover important topics such as climate change or nutrient pollution, and would be a valuable addition to the departmental curricula.

At UConn, Dr. Manning's lab will be focused on dissolved gas biogeochemistry and other tracers, and using these measurements to understand biological, physical, and chemical processes in the ocean. She plans to begin measurements to understand the coastal biogeochemistry in Long Island Sound as well as further afield continuing her previous work in the Arctic. She is excited to start building her lab. "There's going to be a lot of field work up front, but there's also going to be a lot of method development to start. The first ocean samples that we run will be really exciting because they'll be something that my lab has set up together from scratch."

While starting as a new faculty member can be challenging, especially during uncertain COVID times, Manning is ready for the challenge. Since she has been out of the US for the last five years, some of her first priorities are understanding the funding sources and building her collaborative network. Describing herself as "a really collaborative person," Manning cites the ability to work with professors who "speak her language" right down the hall as one of the big factors that drew her to the department.

Outside of work, she enjoys the experimentation and discovery that come along with a vegan diet. During COVID she learned how to culture microbes for vegan cheesemaking, and has been working on strength training in the gym. She looks forward to discovering what Connecticut has to offer for biking trails when the weather warms up.

Awards



Prof. Robert Mason

Received the International Conference on Mercury as a Global Pollutant (ICMGP)'s Kathryn Mahaffey Lifetime Achievement Award. This award celebrates and recognizes selected individuals who have made extraordinary lifetime achievements in mercury research, mentoring, and/or contributions to governmental policy and public outreach. Dr. Mason will formally receive this honor in July at the ICMGP conference, but he can be seen here with the physical award.

Read more about this honor here:

ilmexhibitions.com/mercury2022/lifetime-achievement-award.

Prof. Penny Vlahos

Prof. Vlahos was elected to the Connecticut Academy of Science and Engineering.

Vlahos received a Fulbright Specialist award to work on global pollutants at ETH in Zurich (May 1 to June 11 2022).

Devan Barnum (Undergraduate student, Prof. Baumann)

Received NOAA's Ernest F. Hollings Undergraduate Scholarship. This scholarship provides academic assistance as well as a 10-week full-time paid internship at a NOAA facility during the summer.

Grants

Prof. Zofia Baumann

Long Island Sound Futures Fund: Shell Recycling Planning to Restore Long Island Sound Oyster Reefs and Shorelines. (\$156k, 2022-2024). PI Baumann was awarded money to collaborate with local restaurants, the Bureau of Aquaculture, the Connecticut Sea Grant, and the Town of Groton to establish the Groton-Mystic Shell Recycling Program, which will divert oyster and clam shells from a regular waste stream, and shells will be saved for shellfish restoration projects in the future.



Profs. Julie Granger and Senjie Lin

NSF Polar Programs: EAGER: Exploring links between iron and phosphorus nutrition of Antarctic marine phytoplankton. This grant tests whether polar phytoplankton synthesize and utilize phytic acid – a molecule involved in the vacuolar storage of phosphate and iron in higher plants – potentially explaining the higher P:C ratios of phytoplankton in iron limited regions of the oceans - particularly the Southern Ocean.

Prof. Robert Mason

NSF Chemical Oceanography: The effects of terrestrial organic matter inputs on coastal mercury cycling: Methylmercury production and bioaccumulation. (2022-2025). PIs Mason, Taylor, and Chen. This funding supports 4 cruises in the Gulf of Maine and laboratory studies using mesocosms.

NSF Chemical Oceanography: US GEOTRACES GP-17-OCE and -ANT Sections. External sources, cycling and processes affecting mercury speciation in the South Pacific and Southern Oceans. (2022-2025). PIs Mason, Lamborg, Hammerschmidt, and Janssen. This funding supports one cruise from Tahiti to the Southern Ocean, then Chile, and another from Chile to Antarctica and back.

Prof. Penny Vlahos

Profs. Vlahos and Abadia were awarded a seed grant to study environmental water quality impact on cognitive development in children in target communities along the Magdalena River in Columbia.

Publications

Prof. Hannes Baumann

Baumann and colleagues publish new experimental evidence for the unusual CO₂-sensitivity of sand lance embryos. (Baumann, H., Jones, L.F., Murray, C.S., Siedlecki, S.A., Alexander, M., Cross, E.L. (2022) [Impaired hatching exacerbates the high CO₂ sensitivity of embryonic sand lance, Ammodytes dubius](#). Marine Ecology Progress Series 687:147-162.)

Baumann contributed a textbook chapter on Fish Ecology, based on his long-running undergraduate/graduate course at UConn. (Baumann, H. (2022) Chapter 11: Fish Ecology. In: Pan, J. and Pratolongo, P.D. (eds) Marine Biology: a functional approach to the oceans and their organisms. CRC Press/Science Publishers (Taylor & Francis) published March 3rd 2022.)

DMS graduate student Callie Concannon published her Masters thesis on long-term fecundity effects of high CO₂ conditions in silversides (Concannon, C.A.*, Cross, E.L., Jones, L.F.*, Murray, C.S., Matassa, C. McBride, R.S., and Baumann, H. (2021) [Temperature-dependent effects on fecundity in a serial broadcast spawning fish after whole-life high-CO₂ exposure](#). ICES Journal of Marine Science 78:3724–3734)

Profs. Ann Bucklin and Paola Batta-Lona

Profs. Bucklin and Batta-Lona, and colleagues present a study on COI metabarcoding of marine zooplankton, rapid-responders and useful indicators of climate change impacts. Species diversity of zooplankton is essential for time-series monitoring of marine ecosystems. This study used samples from the Ecosystem Monitoring (EcoMon) Surveys by the NOAA NMFS Northeast Fisheries Science Center. Comparative analysis of molecular (COI metabarcoding) and morphological (microscopic) data showed significant correlation for 5 of 6 taxonomic groups and for 5 of 7 species with >1,000 COI sequences for which both types of data were available. The results demonstrate the power and potential of COI metabarcoding for identification of species of metazoan zooplankton in the context of ecosystem monitoring. (Bucklin, A., Batta-Lona, P.G., Queste, J.M., Wiebe, P.H., Richardson, D.E., Copley, N.J., O'Brien, T.D. (2022) [COI Metabarcoding of Zooplankton Species Diversity for Time-Series Monitoring of the NW Atlantic Continental Shelf](#). Front. Mar. Sci. 9:867893)

Prof. Hans Dam

In collaboration with University of Vermont researchers Brennan and Pespeni, Dam, Baumann and former DMS student James DeMayo demonstrate a plasticity cost in the ability of copepods to express genes in response to ocean warming and acidification. This is further evidence that population adaptation to climate change is no free lunch. (Brennan, R. S., J.A. Demayo, H.G. Dam, M.B. Finiguerra, H. Baumann, and M.H. Pespeni. 2022. Loss of transcriptional plasticity but sustained adaptive capacity after adaptation to global change conditions in a marine copepod. *Nature Commun.* 13: 1147)

Prof. Senjie Lin

Lin led a team of international researchers, including UConn alumni and visiting scholars, to carry out this molecular ecological study. Results showed that metazoans, dinoflagellates, and proteobacteria dominated the sinking carbon particles, contrary to common notion that diatoms, haptophytes or cyanobacteria are the dominant carbon exporters. RNA data also showed that bacteria were active to degrade various compounds, contributing to particle decay. (Lin, S., Li, T., Yuan, H., Li, H., Yu, Y., Zhuang, Y., Li, L., Huang, B. and Liu, G. 2022. Sediment trap study reveals dominant contribution of metazoans and dinoflagellates to carbon export and dynamic impacts of microbes in a subtropical marginal sea. *J. Geophys. Res. Biogeosci.* 127: e2021JG006695)

Prof. David Lund

Lund and former UConn graduate student Matt Lacerra co-author a new study that uses proxy and model results to explain how atmospheric CO₂ levels changed during the last deglaciation. (Yu, J., Oppo, D.W., Jin, Z., Lacerra, M., Ji, X., Umling, N.E., Lund, D.C., McCave, N., Menviel, L., Shao, J. and Xu, C. (2022) [Millennial and centennial CO₂ release from the Southern Ocean during the last deglaciation](#). *Nature Geoscience* 15:293-299)

Prof. Cara Manning

Prof. Manning and colleagues characterize interannual variability in the distributions of the potent greenhouse gases methane and nitrous oxide in the rapidly-changing Arctic Ocean using measurements from 13 research cruises between 2015 to 2019. (Manning, C.C.M., Zheng, Z., Fenwick, L., McCulloch, R.D., Damm, E., Izett, R.W., et al. (2022) [Interannual variability in methane and nitrous oxide concentrations and sea-air fluxes across the North American Arctic Ocean \(2015–2019\)](#). *Global Biogeochemical Cycles*, 36, e2021GB007185.)

Prof. Robert Mason

Prof. Mason and colleagues present a review of Mercury cycling in the Arctic, a synthesis of the information compiled for the Arctic Monitoring and Assessment Program (AMAP) mercury report that was published in 2021. (Dastoor, A., Angot, H., Bieser, J., Christensen, J.H., Douglas, T.A., Heimbürger-Boavida, L-E., Jiskra, M., Mason, R.P., McLagan, D.S., Obrist, D., Outridge, P.M., Petrova, M.V., Ryjkov, A., St. Pierre, K.A., Schartup, A.T., Soerensen, A.L., Toyota, K., Travnikov, O., Wilson, S.J., Zdanowicz, C. (2022) [Arctic Mercury Cycling](#). *Nature Reviews - Earth and Environment*.)

Prof. Mason and colleagues from the Zhao chemistry lab at UConn Storrs present the results of laboratory studies examining how cadmium selenide nanoparticles, produced for a variety of industrial applications, could impact mercury and methylmercury cycling in the environment. (Shi, X., Zhao, J., Wang, Y., Mason, R.P. (2021) [The transformation of inorganic and methylmercury in the presence of L-cysteine capped CdSe nanoparticles](#). *Frontiers in Environmental Chemistry* Art. # 762052.)

Prof. Mason and colleagues present work from a past cruise, showing data of mercury in all its forms in the central Arctic Ocean: water, ice cores, snow, brine, and ice ponds. (Jonsson, S., Michelle G. Nerentorp Mastromonaco, Gardfeldt, Mason, R.P. (2022) [Distribution of total mercury and methylated mercury species in central Arctic Ocean Water and Ice](#). Marine Chemistry, 242, Art. # 104105.)

Prof. Mason and colleagues present the final product of a study done in Canada in the Experimental Lakes Area where stable isotope additions of Hg were made to a small lake and its watershed simulating atmospheric deposition to track the rate and pathways of Hg into fish. After the additions stopped, the recovery of the lake and the decrease in concentrations of Hg in biota were tracked, as detailed in the paper. Overall, the recovery was rapid, indicating that decreasing anthropogenic Hg emissions will have an immediate impact. (Blanchfield, P.J., Rudd, J.W.M., Hrenchuk, L.E., Amyot, M., Babiarz, C.L., Beaty, K.G., Bodaly, R.A., Branfireun, B.A., Gilmour, C.C., Graydon, J.A., Hall, B.D., Harris, R.C., Heyes, A., Hintelmann, H., Hurley, J.P., Kelly, K.A., Krabbenhoft, D.P., Lindberg, S.E., Mason, R.P., Paterson, M.J., Podemski, C.L., Sandilands, K.A., Southworth, G.R., St. Louis, V.L., Tate, L.S., Tate, M.T. (2022) [Experimental evidence for the recovery of mercury-contaminated fish](#). Nature, 601, 74-78.)

Prof. Leonel Romero

This study shows that a recently developed wave-breaking model significantly improves our ability to predict the short wind-wave spectrum, which has important implications for improving the prediction of microseismic noise in the ocean. (Romero, L., Lubana, K. (2022) [On the Bimodality of the Wind-Wave Spectrum: Mean-Squared-Slopes and Azimuthal Overlap Integral](#). Journal of Physical Oceanography.)

Profs. Samantha Siedlecki and Evan Ward

Profs. Siedlecki and Ward and graduate student Halle Berger present work on statistical modeling of marine biology. This paper highlights the importance of incorporating physiological mechanisms into statistical species distribution models and illustrates that even species that have a high tolerance for low oxygen, such as Sablefish, may undergo distribution shifts in the face of growing oxygen depletion in coastal ecosystems. (Essington, T.E., Anderson, S., Barnett, L., Berger, H., Siedlecki, S., Ward, E. (in production) Advancing statistical models to reveal the effect of dissolved oxygen on the spatial distribution of marine taxa using thresholds and a physiologically based index. Ecography.)

Halle Berger (Graduate student, Profs. Matassa and Siedlecki)

This paper describes a framework for conducting interdisciplinary research using a hybrid model (in person + remote components) to make collaboration more efficient, equitable, and inclusive. (Rudzin, J.E., Soule, D.C., Whitaker, J., Berger, H., Clayton, S., Fogaren, K.E. (2022) [Catalyzing Remote Collaboration During the COVID-19 Pandemic and Beyond: Early Career Oceanographers Adopt Hybrid Open Science Framework](#). Frontiers in Marine Science, 9:855192.)

Emma Shipley (Graduate student, Prof. Penny Vlahos)

Shipley and colleagues presented a study of agrochemical risk assessment and water quality in well and river waters in Wilgamuwa, Sri Lanka. This study helps identify primary areas of water quality concern for rural farmers in this region. (Shipley, E.R., Vlahos, P., Chandrajith, R., Wijerathna, P. (2022) [Agrochemical exposure in Sri Lankan Inland Water systems](#). Environmental Advances, 7, 100150.)

Mengyang Zhou (Graduate student, Prof. Julie Granger)

Zhou and colleagues present a study showing volume effects on the denitrifier method for nitrate N and O isotope ratio analyses, and what we should do to achieve improved measurement accuracy and foster inter-comparability. (Zhou, M., Granger, J., Chang, B X. (2022) [Influence of sample volume on nitrate N and O isotope ratio analyses with the denitrifier method](#). Rapid Communications in Mass Spectrometry, 36(4), e9224.)

Graduations

DMS is proud of our most recently graduated Master and PhD students.

Christina Menniti (M.S. 2021)

Major advisor: Michael Whitney

Thesis: Assessing the Importance of Variability in Oxygen Concentrations and Horizontal Fluxes in Western Long Island Sound

Maryam Mirhakak (M.S. 2021)

Major advisor: Heidi Dierssen

John Speers (M.S. 2021)

Major advisor: James O'Donnell

Thesis: The effect of sea level rise on flooding statistics

Melissa Wojcicki (M.S. 2021)

Major advisor: Ann Bucklin

Thesis: Understanding Deep-Sea Trophic Interactions by Metabarcoding Mesopelagic Fish Diets

Raymond Graham (M.S. 2021)

Major advisor: James Edson

Thesis: Investigation of the moisture budget within the Tropics, under the ITCZ

James deMayo (Ph.D. 2021)

Major advisor: Hans Dam

Dissertation: Costs and Consequences of Adaptation to Combined Warming and Acidification for Two Estuarine Copepods

Lucas Jones (M.S. 2021)

Major advisor: Hannes Baumann

Thesis: Using Low-Coverage, Whole Genome Sequencing to Study Northern Sand Lance (*Ammodytes dubius*) Population Connectivity in the Northwest Atlantic

Josiah Grzywacz (M.S. 2021)

Major advisor: George McManus

Thesis: Quantum Efficiency (Fv/Fm) and Performance of Retained Plastids in an Oligotrich Mixotroph and Its Prey

Hannah Collins (M.S. 2022)

Major advisor: Evan Ward

Thesis: Examining the effects of nylon microfibers on the gut microbiome and gut tissues of the blue mussel, *Mytilus edulis*

Kelly McGarry (M.S. 2022)

Major advisor: Samantha Siedlecki

Kelli Mosca (M.S. 2022)

Major advisor: Hannes Baumann

Thesis: Atlantic sturgeon (*Acipenser oxyrinchus*) Growth and Habitat Use in the Connecticut River and Long Island Sound

Peter Ruffino (M.S. 2022)

Major advisor: Craig Tobias

Thesis: Tracing the fate of phytoplankton-derived nitrogen: effects of oysters on recycling, denitrification, and burial

Samantha Linhardt (M.S. 2022)

Major advisor: Catherine Matassa

Thesis: Consumer pressure interacts with recruitment to shape the effects of an intertidal foundation species (*Semibalanus balanoides*) at local and regional scales



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