

Fellowship supports diversity in marine, coastal research

By Judy Benson



From left, Andrew Tienken, Larissa Tabb and James Hannon are the first recipients of Connecticut Sea Grant's new undergraduate research fellowships for underrepresented and underserved students in marine and coastal sciences. Photos: Judy Benson (Tienken); Kamaria Miller (Tabb); Samantha Hannon (Hannon)

Three undergraduate students helping pave the way for greater diversity in the sciences have been chosen as the first recipients of Connecticut Sea Grant's new undergraduate research fellowships for underrepresented and underserved students in marine and coastal scientific research.

UConn students Andrew Tienken and Larissa Tabb and Western Connecticut State University (WCSU) student James Hannon were each chosen to receive a \$5,000 stipend to conduct research projects over the summer under the guidance of a faculty mentor.

"We are pleased to support more students in their pursuit of a career in the sciences and look forward to learning about the outcomes of their individual projects," said Nancy Balcom, associate director of CT Sea Grant.

The program is designed to provide early career experience, training and mentorship to underrepresented minorities and socioeconomically disadvantaged students as well as students of color, indigenous students, members of the LGBTQ community and students with disabilities.

"This fellowship is the result of several years of visioning efforts that I was involved in within the National Sea Grant program which focused on enhancing diversity, equity and inclusion," said Syma Ebbin, who led the creation of the program as CT Sea Grant's research coordinator. "Funding was made available from the National Sea Grant program for state programs to push this visioning agenda forward. The motivating idea is that in order to have greater diversity in marine and coastal sciences, more efforts are needed to engage and mentor students earlier on in their academic careers. This

effort is being made to prime the pipeline, so to speak, so in the future there will be a greater diversity of highly trained individuals working in marine research."

Tienken, Hannon and Tabb, who are all juniors majoring in environmental science, biology and marine science, respectively, said they are grateful for the support Connecticut Sea Grant is providing to help increase diversity in their fields of interest.

"There aren't that many minorities in marine science, and I want to be an inspiration and help to change that," said Tabb, a New Britain resident who is African American.

Tienken and Hannon shared similar experiences of being one of very few students in their programs identifying with the LGBTQ community. The fellowship gives them the chance to advance their prospects for future success and longevity in their fields, ultimately serving as role models for future students.

"It's a really, really wonderful opportunity," said Hannon, a Danbury resident.

The three were chosen for the fellowships in the spring of 2020. Due to restrictions on undergraduate field research due to the COVID-19 pandemic, Tabb and Hannon elected to defer beginning their projects until the summer of 2021. Tienken, however, worked with his faculty advisor, Professor Beth Lawrence, to revise his original plan for field research into a data analysis project he could do from his home in Wilton.

He used data collected in 2017 at 20 wetlands sites along the Connecticut coast by Lawrence and her research team, Aidan Barry and Sean Ooi, both of whom have since earned their master's degrees. With that information, Tienken spent last summer quantifying the ecosystem services of the common reed grass phragmites. Although it is an invasive species, phragmites can remove excess carbon and nitrogen from the environment. He also assessed the carbon and nitrogen removal functions of native grasses.

"I've been wanting to do this work for some time," said Lawrence. "It was just waiting for the right student and opportunity to come along."

Tienken said the project required him to learn how to use ArcGIS software to combine data from individual marshes with marsh maps and determine which areas are colonized primarily by phragmites and which by native grasses. Ten restored and 10 unrestored marshes were compared. Both he and Lawrence hope the work will ultimately contribute to a better understanding of the important services of wetlands and how they should best be managed and preserved, especially in light of climate change.

"I've been fascinated by how efficient wetlands are at sequestering carbon," Tienken said at the start of the project last June. "These are efficient and powerful ecosystems."

As the fall semester began in late August, Tienken reflected on his first experience doing independent research. Weekly web meetings with Lawrence and graduate students involved in similar projects provided a helpful way to check in and confirm his processes, he said, and he was hoping to present his preliminary findings at a campus forum for undergraduate research.

He found that restored wetlands that have larger proportions of phragmites than unrestored wetlands can help the soil hold higher levels of organic carbon and ultimately improve soil quality. But those dominated by native grasses host more robust microbial communities that help move excess nitrogen into the air. Ultimately, this work could inform more nuanced approaches to wetlands restoration and management, in which the valuable services of both phragmites and native grasses are recognized.

"This was the first time I dipped my toe in wetlands science, and it was really, really rewarding," Tienken said.



Professor Beth Lawrence, right, works with a student to collect data at Barn Island Wildlife Management Area in Stonington. Data collected by Lawrence and her students from Barn Island and other marshes in the state was used by Andrew Tienken, one of the diversity fellowship recipients, in his research project. Photo: Emily Couture

For his project, Hannon, working with WCSU Professor Michelle Monette, will be collecting Atlantic killifish from Long Island Sound and placing them in tanks in labs at WCSU with water at various temperatures and salinities. After exposure, tissue samples from the fish will be extracted and examined to determine how various conditions impact these important forage fish, also called mummichog. The different temperatures and salinities will mimic how marine waters could

change due to climate change. Hannon said the project could help answer an important question about the future fate of killifish.

"As these fish are being pushed to their thermal limits, are they going to be overwhelmed by rising water temperatures and maybe not able to survive?" he asked.

Tabb, for her project, will be working with Professor Evan Ward to study whether types of plastic that are labeled as biodegradable actually break down when exposed to water and soil, and whether microbes are consuming them. These will be compared with the fate of plastics not identified as biodegradable that will also be exposed to water and soil.

Having worked on other research projects involving plastics in Ward's lab at UConn's Avery Point campus in Groton, Tabb is very aware that plastics are a major issue in the marine environment and a critical area of research.

"Seeing the effects of plastics on the oceans is so concerning," she said. "I'm glad to be part of any effort we can make to learn more about it."

Professor Lawrence said the new fellowship program not only benefits these three students, but also the quality of the science and research they are involved in.

"It's great that Connecticut Sea Grant is promoting diversity in the sciences," she said. "We need scientists from different backgrounds to ask better questions. We need a diversity of perspectives."

Balcom said the program is slated to continue.

"We look forward to supporting more undergraduate students through this mentored research fellowship opportunity in 2021 and beyond," she said.

For information about the program, visit: <https://seagrant.uconn.edu/funding/fellowships/>.

Sea Grant sponsors a variety of marine research, outreach and education projects, primarily through the 34 state Sea Grant programs.