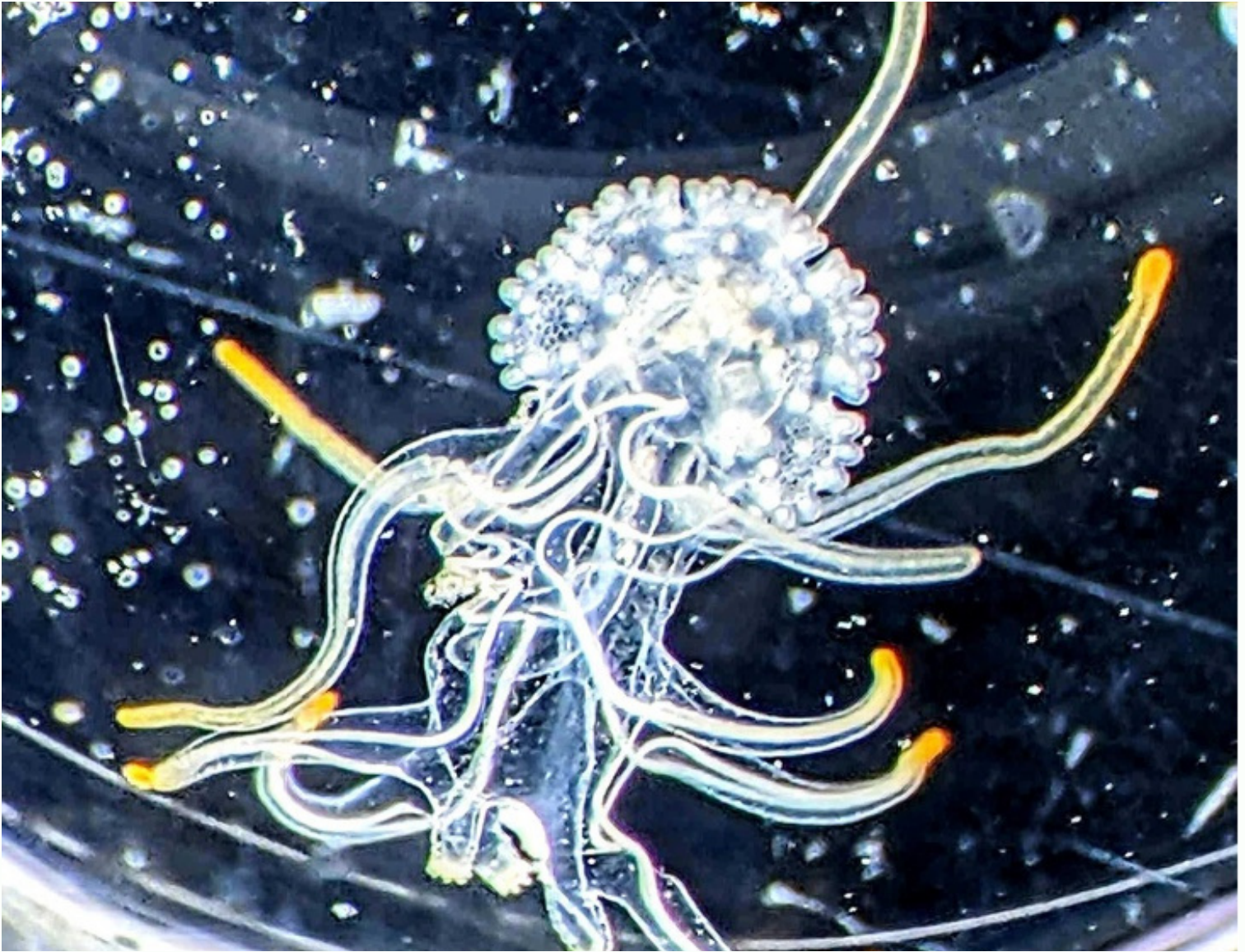


UVM BIOLOGY DEPARTMENT

2022/2023 NEWSLETTER

May 12, 2023



Winning photo of a larval sea star from the 2022 Art of Biology Photo Contest, taken by Allison Hall

A letter from the Chair of Biology:

Dear Friends, Alumni, Students, Staff and Faculty of the University of Vermont Biology Department,

It's a beautiful time of year as we are preparing for the annual celebrations of our amazing students as they successfully complete their undergraduate and graduate degrees. Like daffodils and tulips, undergraduate honors theses, and graduate theses/dissertations are springing up all around us. Professor Alicia Ebert and I were fortunate to take our senior undergraduate honors theses students last week to the Northeast Society for Developmental Biology meeting in Woods Hole, MA (see picture to the right). It was inspiring to see them present their work. We were so proud! These endeavors



Left to right: Bryan Ballif (Chair), Alicia Ebert, Gillian Berglund, Jordan McGuire, & Nicole Tessier

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are the result of lots of work, thought, and creativity, by not only the students, but also by all of the staff and faculty who teach, mentor, and provide endless support. Some projects have also greatly benefitted by important funding from friends and alumni. Thank you all for your incredible efforts and contributions!

There are several wonderful, noteworthy highlights in this newsletter. The articles speak for themselves. However, I congratulate our new faculty member, Dr. Molly Stanley, and the amazing Science Communication interns, Julia Williamson and Eve Phillips, who produced this newsletter. Molly has created a new model for the newsletter, engaging students to create content while also getting Biology internship credit toward their degrees. I hope you will agree how impressive this approach and the newsletter are.

I send my warmest wishes to each of you!

Sincerely,

Bryan Ballif

Professor and Chair



Taxidermy mount restoration: photographer: Joshua Brown, photos accessed via Photoshelter

A NEW LIFE FOR OLD SPECIMENS – THE HISTORICAL MOUNTS OF BENEDICT AUDITORIUM GET A MUCH-NEEDED CLEANING

by Sara Helms Cahan, Interim Curator of the Zadock Thompson Zoological Collection, UVM Museum of
Natural History

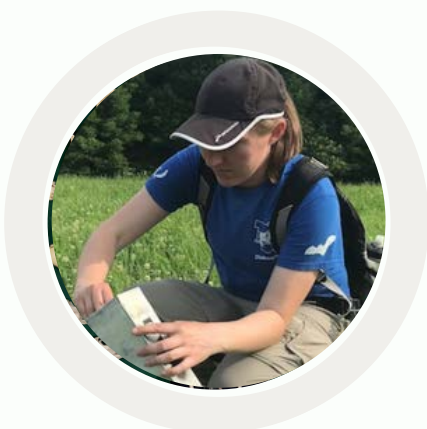
Edited by Eve Phillips

If you ever took a science class in Marsh Life Sciences 235, aka Benedict Auditorium, then you know about one of Biology's quirky hidden gems: the assortment of preserved birds, mammals and butterflies that comprise the Zadock Thompson Zoological collection's biological display mounts, housed in the front entryway. Maybe you stopped for just a minute, on your way into an exam, and thought: "Wow, that polar bear is huge!" or, "Wait, is that actually a passenger pigeon???", or, "Gosh, these guys could really use a clean-up, they're falling apart!"

Well, thanks to a grant from the Institute of Museum and Library Services awarded to Curatorial Associate and UVM alum Sonia DeYoung ('17), the vertebrate display mounts have finally received a thorough cleaning and some remedial restoration in June of 2021. Guided by a professional conservator and with assistance from staff from the Shelburne Museum and UVM History and Museum Studies student volunteers, Sonia methodically addressed the mounts with some much needed attention.

Emily Beasley, Ph.D.

Vertebrate Collections Manager



Congratulations to Emily Beasley who defended her dissertation this March! As a part of the Gotelli Lab, Emily's work included investigating disease ecology and small mammal/ectoparasite interactions using a Bayesian hierarchical detection model. Her approach used three different methods: a statistical design, existing rabies model systems, and theoretical mathematics. Emily also worked extensively in the research collections, cataloguing and organizing the specimens. Along with her work for her doctorate and in the research collections, Emily acted as a Graduate Teaching Assistant for the BIOL 196 class and Mammalogy labs. She will be receiving the 2023 GTA of the Year Award!

The spiffed up specimens are now shiny, intact, and ready for you to come by and admire them. There really is nothing like standing next to the real thing, up close and personal, if you want to learn about the incredible diversity of the natural world. Our collection of loons, woodpeckers, raptors, and more do not disappoint.

One of the most remarkable specimens in the display is a rather poorly taxidermied, ragged-looking cougar now at home and on display on the first floor of the Davis Center. Don't let its freaky, owl-eyed expression fool you—this catamount is both scientifically and historically precious! It is not an import from the west but a local, part of a once-thriving population of mountain lions in the east that were slowly extirpated over the last two centuries and finally declared extinct in 2011. It is thought that this was the last catamount to be taken in the Adirondacks, probably around 1895.



The historic Adirondack catamount gets a CT scan!



UVM student Sophie Feldman ('22) carefully cleans and restores a king eider duck mount (photos: Joshua Brown)

The earliest record of the mount here at UVM was in 1898, with stints in Torrey Hall, the Fleming museum, and Billings Library. And as part of the cleaning project, the Adirondack catamount was genetically analyzed to better understand the forces that led to the decline and loss of this iconic predator. It is an important reminder of the immense value of biological specimens: because they are tangible, physical objects, biological specimens are not simply static data points. They can be leveraged again and again to address new areas of research as they emerge on topics as varied as evolutionary biology, ecology, conservation, epidemiology, and anthropogenic change.



Lily Duerr

Vertebrate Teaching Collections Manager

Lily is a third year Biology and Geology double major. She first began her work in the collections in 2021 under Prof. Emeritus Bill Kirkpatrick. Following the Torrey Hall fire in 2017, the entire natural history collections were moved to Blundell and remained untouched until Lily began her work unpacking and cataloguing. She then began the enormous task of reorganizing, recataloging, repairing, and cleaning the collections. Lily then applied and received a research grant for continuing her work that following summer. During that time Lily “learned the fundamentals of skeletal articulation, catalogued over 500 specimens, created a labeled organization for the entire collection, and implemented 3D photogrammetry of skulls as a long-term project.” Now, Lily is officially the Teaching Collection Manager and a director for the BIOL 196 internship course.

The charismatic creatures that inhabit the Benedict Auditorium entryway are just a very small part of the Zadock Thompson Zoological Research and Teaching collections, which contain over 360,000 animal specimens from Vermont, New England and across the globe. The life's work of many Vermont and UVM scientists resides there, including an amazing collection of eggs from over 250 species of birds collected by Vermont State Ornithologist Karl Pember in the 1920s, an enormous entomological collection (especially beetles) from the late beloved Prof. Ross Bell and his wife Joyce, and an extensive collection of small mammals, still being studied by Emeritus Professor C. Bill Kilpatrick. Over 4,000 specimens thus far have been digitized and made available online in order to facilitate their continued use in research, with material available on loan or through in-person research visits. Multiple undergraduate courses both use and contribute to the collection, including Mammalogy, and Field Zoology of Arthropods. And through annual open houses and other outreach events, children and families from the larger community directly interact with the collection and learn about its mission.

Along with the University courses that utilize the collections in classes and labs, students can now intern in the collections under the BIOL 196 class registration as of Fall 2022. After meeting for weekly seminars on anything from vertebrate articulation to the history of type specimen cataloging, interns work on individualized projects under museum mentorship. If you have ever dreamed of working in a museum or marveled at any natural history documentary, this is the internship for you! Projects span the collections from digitization of invertebrates, cataloging the teaching collections, organizing the egg collection, to 3D modeling of skulls; there truly is something for everyone! See the full descriptions of our intern projects on the UVM Natural History Museum web page:

[Current Collections Projects](#)

The Zoological Collection needs your help!

Biological collections lie at the heart of our scientific understanding of the diversity of life on our planet. Safeguarding this irreplaceable resource is a full-time, permanent job, one that was made infinitely more challenging with the loss of our permanent museum home, Torrey Hall, to a fire in 2017. Grants from the Institute of Museum and Library Services and the National Science Foundation are helping to bring us back from the brink, but to truly thrive, the Zoological collection is going to need additional help from those of us who care about its mission and impact. We hope to develop a sustainable pool of funds to assure that we are effective stewards for many decades to come, and the collection can again become a vibrant hub of scientific research, education and community outreach. Contributions of any size are welcome. If you are interested in helping to support the Zoological collection, please reach out to the Biology department by e-mail (Biology@uvm.edu) or phone (802)656-2922 to contact Dr. Helms Cahan directly.

PUMPKIN CARVING CONTEST



The winning pumpkin, carved by The Ebert Lab.

This past fall, the UVM Biology department had a nail-biting pumpkin carving contest to celebrate Halloween. Everyone had a blast with the competition, and the pumpkins the department designed were fun and topical. The Ebert Lab, the reigning champions, came in first place again (see their pumpkin on the left).



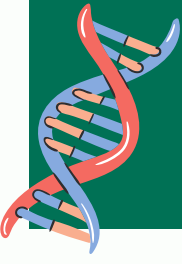
The May-Collado Lab standing next to their pumpkin which won second place.



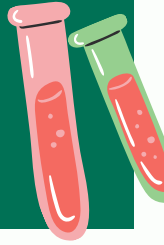
In-progress shot of the Cahan Lab's pumpkin, which came in third place.



Pumpkins carved by Matt Futia (left) and the Stanley Lab (right).



Course-based Undergraduate Research Experiences (CUREs)



Course-based Undergraduate Research Experiences, known as CURE classes, are a unique feature of our Biology department curriculum. These classes give students a real research experience in a classroom setting, and each course is based around the professor's personal research interests. Compared to traditional lab courses where the experimental results are known, CUREs investigate unknown questions and some CURE class results have been published in scientific journals. Not only do these classes give students undergraduate research experience, but they may also provide scientific journal publications to add to their CV. Chair of the department, Dr. Ballif says, "In recent years Biology has been developing more research opportunities for students using real research experiences in laboratory courses. These CURE courses can increase research capacity and can be highly successful for students to gain research experience, and to help further faculty research goals."

The CUREs offered each semester give a broad scope of different fields of study in biology. From proteomics and genetic tools to studying molecular/cellular mechanisms of development and behavior, to soundscapes of marine mammals and understanding the impact of a warming climate, there is truly something of interest for any biology student.

In these courses, students undergo the full scientific process from start to finish. First, students must think like research scientists by understanding relevant background for their projects, constructing experimental protocols, and learning research techniques. Then, they work together and independently to troubleshoot experiments and collect data. Real data can be messy, and students become better scientists as they learn to adapt their technical skills and actively problem solve. Analysis is done using a variety of computer programs and may include graphical figure construction and complex statistical tests. Finally, students present their work in cumulative oral presentations, posters, or a written final paper.

To learn more about specific CUREs taught in the department and to hear what students think of these classes, read the full article:

[CURE classes provide undergraduate research opportunities in the Biology Department](#)

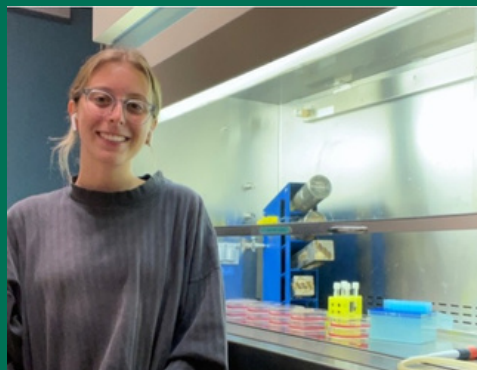
2022 Undergraduate Summer Research Awards

We would like to thank Dr. Barbara Clark Kay, UVM class of '67, for her continued support of undergraduate summer research in the Biology Department. In 2022, the Barbara Clark Kay Research Fund supported the following students & projects by providing summer stipends and funds for research supplies.



Lily Duerr

Natural History Collections
"Organization and Curation of the UVM Zadock Thompson Natural History Teaching Collection"



Phoebe Cousens
Ballif Lab

"Investigating proteasome degradation of DCBLD1 by the phosphorylation of Abl kinase."



Mariel Dunn
Brody Lab

"The Importance of Outcrossing in Highbush Blueberries"



Samuel Cranston
Martinsen Lab

"Unveiling Mixed Infections in Blacklegged Ticks (Ixodes scapularis) Across an Urbanization Gradient by Multiplex PCR"



Nicole Tessier
Ebert Lab

"The roles of Grb2 adaptor proteins in zebrafish brain development"

Dr. Kay earned 12 college credits for her research in zoology as an undergraduate student, and this experience taught her invaluable lessons in theorizing, questioning, and critical thinking. She believes that research experience is an important learning tool for one's future endeavors. Dr. Kay practiced general dentistry for over 37 years and was a volunteer clinical teacher at Tufts during those years. She also served as President of the Tufts Alumni Association, President of the American Association of Women Dentists, and Chair of the American College of Dentists, in addition to many other leadership positions in dentistry. She is presently on the UVM Alumni Association's Vermont Regional Board.

2022 Chair's Award Winners

Supporting graduate student conference attendance



Anna Schmidt at the 2022 Joint Aquatic Sciences Meeting in Michigan

Anna Schmidt: "The research I presented at the **Joint Aquatic Sciences Meeting** seeks to obtain accurate measures of *Mysis diluviana* abundance and distribution in the Great Lakes. *Mysis diluviana*, commonly referred to as the opossum shrimp, is a crustacean that plays important roles in Great Lakes food webs. *Mysis* are a vital food source for a variety of Great Lakes fishes, and they are important in linking pelagic (open-water) and benthic (lake bottom) energy pathways in lakes. Some evidence suggests that *Mysis* abundance and production have been declining recently in the Great Lakes, and researchers need to be able to obtain accurate estimates of their abundances and distributions. Our project brought together data on *Mysis* abundances using multiple sampling methods, including hydroacoustic surveying and a novel net sampling system. We used these methods to fill gaps in understanding about *Mysis* vertical spatial distribution, size structure, and density in the Great Lakes. Our findings add to the body of knowledge regarding the state of *Mysis* populations and advance the methods used by researchers to understand the roles that *Mysis* and other food web components play in key lake ecosystem processes."

Emily Beasley presented the results of her collaboration with the USDA National Rabies Management Program and National Wildlife Research Center this summer at the **American Society of Mammalogists annual meeting**. The work evaluated the effects of management strategies, characteristics of raccoon populations, and characteristics of other carnivore populations on raccoon rabies seroprevalence rates (a proxy for rabies immunity) in the greater Burlington area.

Matt Futia presented his research at the 152nd annual meeting of the **American Fisheries Society** held in Spokane, WA. Matt's talk, titled "Change is the only constant: altered food webs influence thiamin deficiency," discussed a naturally occurring vitamin B1 (thiamin) deficiency that limits offspring survival of various salmon and trout species. Matt's research demonstrated how the extent of this deficiency has changed in response to changing food webs over time for various trout and salmon populations in the Laurentian Great Lakes region.

2022 Chair's Award Winners (continued)

Supporting graduate student conference attendance

Caroline Dumas: "With the Biology Chairs Award, I was able to attend, along with my peer Helaina Stergas, a weeklong **Visual System Development conference hosted by the Gordon Research Conference series** in Southbridge, MA. It was an amazing conference for networking and learning new skills in a relaxed environment. I presented my poster titled "Biochemical and functional analysis of Sema6A reverse signaling in Zebrafish eye development" at three different times and was given the great opportunity to give a talk on my work to the whole conference. I received some great feedback and lots of advice on where I can take my project. Between all of the amazing talks and poster sessions, we had break-out groups to discuss diversity in the field of developmental biology, and we received career advice range of topics. One of my favorite things about this conference was that no one was allowed to take any pictures, therefore, everyone presented information on their most recent unpublished data. (This is why I only have this selfie of myself and Helaina to share from the conference!)"



Helaina Stergas (left) and Caroline Dumas (right) at the 2022 Gordon Research Conference on Visual System Development

2022 John Wheeler Graduate Student Research & Development Award Winners

- **Helaina Stergas**, Ebert Lab: "Functional Redundancy and Compensation: Adaptor proteins in the development of the zebrafish retina."
- **Caroline Dumas**, Ebert & Ballif Lab: "Biochemical and functional analysis of Sema6A reverse signaling in zebrafish eye development."
- **Maia Austin**, May-Collado Lab: "Utilizing Directional Recording and Machine Learning to characterize interspecific interactions of Guiana and Bottlenose dolphins."
- **Alison Hall**, Pespini Lab: "Scaling up: Does increased temperature alter copepod fatty acid content and subsequent lipid profiles of fish consumers?"
- **Lauren Berkley**, Martinsen Lab: "What is here and what is to come: Cryptic pathogens of northeastern U.S. cervids."

Helaina Stergas receives Rodney L. Parsons award



Helaina Stergas in Marsh Life Science, where the zebrafish the Ebert lab uses live.

cell migration in the central nervous system, where she focuses on how cells identify and reach their destinations in the cell migration process. Helaina certainly has a bright future ahead. She said, “I love working in the classroom, but I think I could be really happy in sharing science with more of the public sector, too. And also I have become someone who is pretty passionate about science advocacy, or advocacy for people who do science, like undergraduate students and graduate students.” In fact, Helaina and fellow graduate student Caroline Dumas recently launched a site called LabBites with some alumni.

The website is dedicated to science communication, and helping high schoolers and college students become more familiar with what it’s like to work in a lab.

Read the full story here: <https://tinyurl.com/helainastergas>

Helaina Stergas is a fourth-year PhD student in the UVM Biology Department. In her role as a PhD student, she is completing research in Dr. Alicia Ebert’s lab and teaching undergraduate Biology courses. Recently, Helaina was awarded the 2022-2023 Rodney L. Parsons Anatomy and Neurobiology Award which is given to one UVM doctoral student each year who demonstrates exemplary work in both research and teaching in an anatomical science field. Helaina’s work in the Ebert lab is on eye development. Her main area of interest is



A zebrafish forebrain cross-section, highlighting the retina in a wildtype.



[LabBites](#) is a science communications website catered to undergraduate students and advanced high schoolers interested in learning about what it’s like to participate in a lab setting. Founded by Ashley Waldron, Riley St Clair, Sarah Emerson, Caroline Dumas, and Helaina Stergas, the mission of the site is to educate students about specific practices, techniques, and general skills that are critical to lab work. The website launched in 2022 and has since featured articles including data analysis, reproducibility, and locating reliable sources. LabBites is currently seeking early career scientists and graduate students to contribute content to their website—[click here to apply!](#)

Maia Austin receives Dr. Roberto Farbri Fialho Research Award



Maia Austin in the field.

There, she will investigate the impacts of genetic relatedness and social networks on a population of bottlenose dolphin's communication. Maia will also continue assessing population density, habitat use, and acoustic behavior with a population of Guiana dolphins that she worked with on her most recent trip to Costa Rica with Dr. May-Collado. This time, she will study the population over on the Panama side of the border.

Maia Austin is a third year Biology Ph.D. candidate in the May-Collado lab. Focusing on applied machine learning techniques, her project uses novel computational methods on acoustic analysis of dolphins and toothed whales to better understand their communication. Maia plans to use the funding from this award to do field work and a Short Term Fellowship at the Smithsonian Tropical Research Institute in Bocas del Toro, Panama.

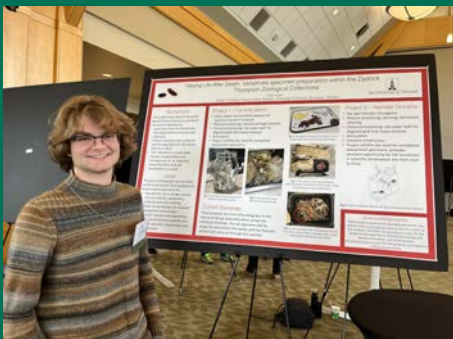


A group of dolphins from Costa Rica

To learn more about Maia, check out the feature on the Biology department website:

[Dr. Roberto Fabri Fialho Research Award Anounced](#)

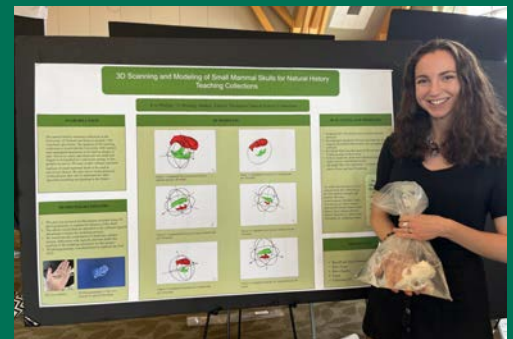
Undergraduate Student Research Compilation



Cole Logan at the Student Research Conference

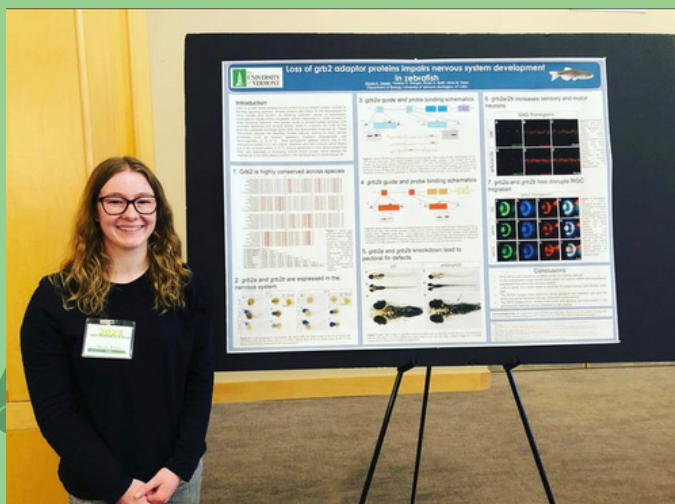


Samy Slamani & Liam Kelliher in the Stanley Lab

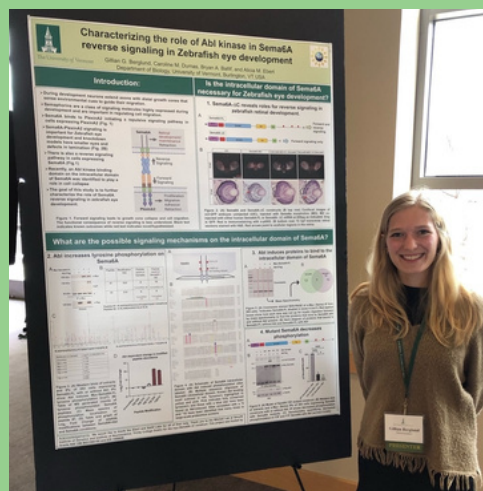


Eve Phillips at the Student Research Conference

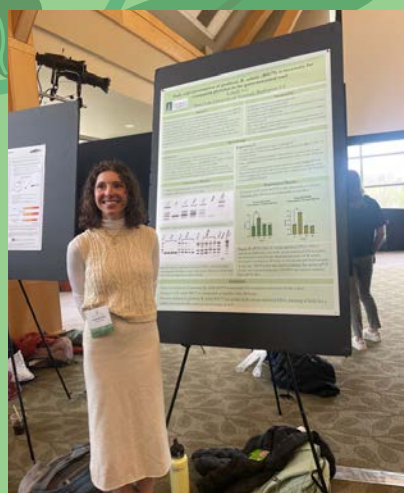
Undergraduate Student Research Compilation Cont.



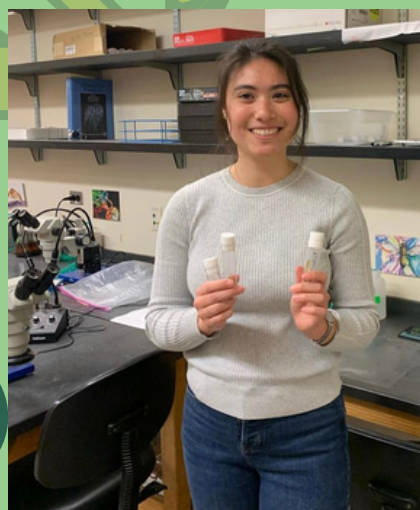
Nicole Tessier at the NBH Forum



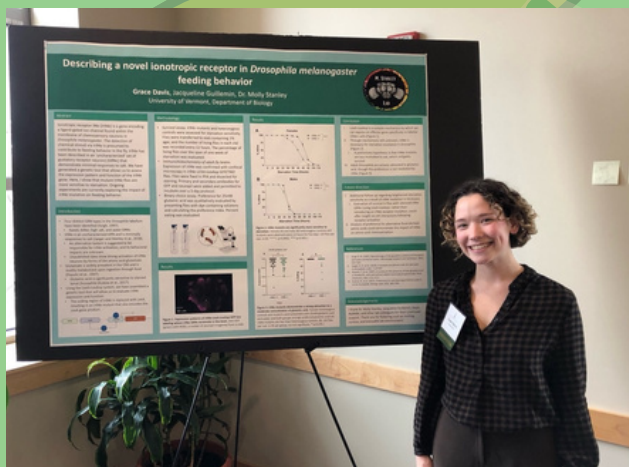
Gillian Berglund at the Student Research Conference



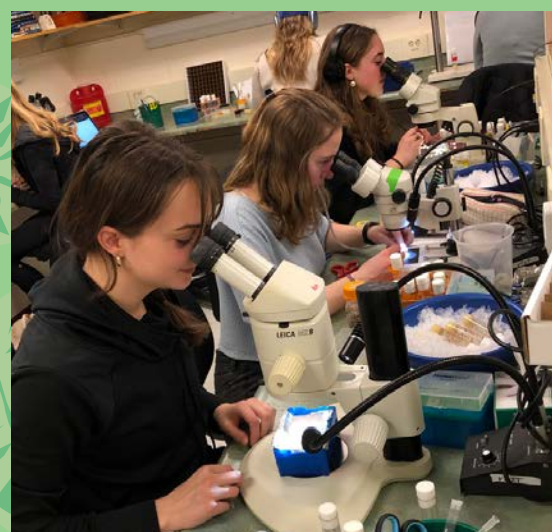
Isabella Ley at the Student Research Conference



Toni Nakatsugawa
in the Lockwood
Lab



Grace Davis at the Student Research Conference



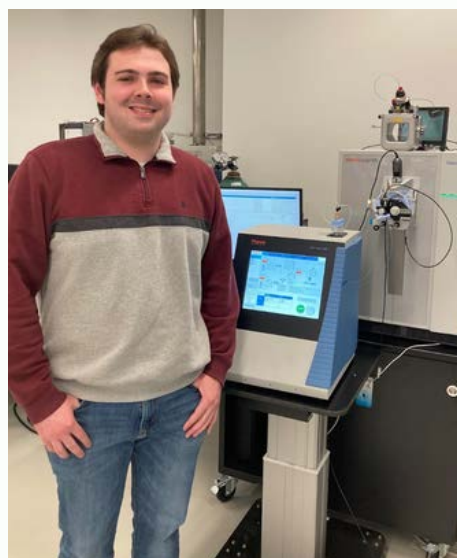
Madelyn Wheeler, Hailey Rosenfield, and
Marlana Winschel in a CURE class

New Proteomics Internship on Campus

Meet the Proteomics Facility's Spring 2023 interns, Lucas Leon and Brian Boyle. Lucas is a junior Biology major at UVM and Brian is a senior Biochemistry major. Overall, it seemed that both students found the independent nature of the lab to be its biggest strength. Brian said his favorite aspect of working in the facility is its experiential nature. He said, "I feel like normally when you start in a lab, for the first couple of weeks or months, they don't really trust you a lot. It's a lot of shadowing, a lot of watching. But they...really let us get hands-on real quick, so it's been a really good experiential learning process." For Lucas, his major takeaway has been that unlike typical academic labs on campus, the Proteomics Facility is



Lucas Leon centrifuges samples.



Brian Boyle by the mass spectrometer, where he analyzes data from samples.

a lab where students can gain industry experience. His favorite memory so far has been a presentation he did for the VBRN last fall. Lucas was the lab's first-ever undergraduate intern, so the presentation served as an opportunity for him to prove himself as an asset to the lab. He said, "they just wanted to know if I'm helping, what I am doing and simply if I was worth the time required to train me." Though there was pressure, in the end "they really appreciated the presentation and it was a big step for me to act as a colleague rather than an undergrad, to many professors well known in their field who I had no previous relation to. I thought that was cool."

The VBRN Proteomics Core Facility is currently seeking student interns for future semesters. The internship takes place on-campus and requires 80 hours minimum of commitment over each semester. For the first 6 weeks of the semester, students train in the facility. Once prepared, they help to directly improve current proteomics methods in the lab and gain industry experience as consultants and scientists. [Click here to see the facility's website](#), and [click here to learn more about the internship and how to apply](#). Internship schedules can be flexible. Students should feel free to visit the facility (FMRB 143) and discuss before applying. Students can register for BIOL 190 for internship credits.

Read the full story here: <https://tinyurl.com/proteomicsinterns>



QuEST

An integrative Ph.D. program focused on
diversity, communication, and applied internships

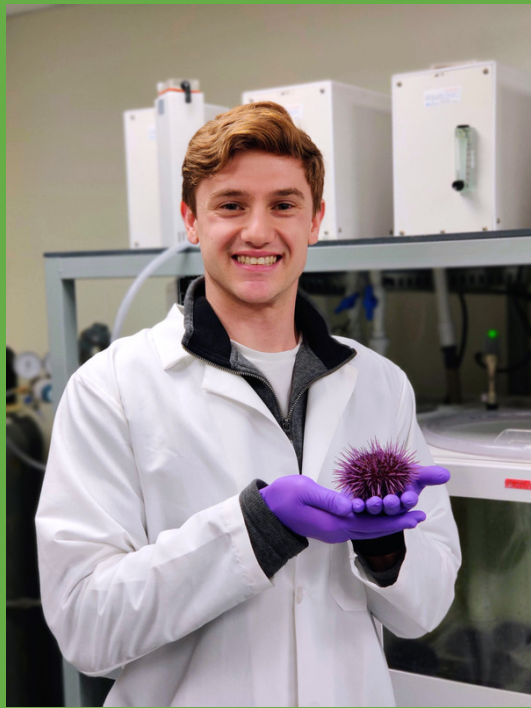
NSF NRT Award Number: 1735316



What is QuEST?

The Quantitative and Evolutionary STEM Training (QuEST) program is a UVM-wide, cohort-based, cross-departmental graduate program that provides enhanced quantitative training, professional development, and community building for doctoral students pursuing fundamental research in environmental and global health problems. It equips students with the big-data analytical, science communication, diversity and inclusion, and collaboration skills needed to address basic and applied ecological and evolutionary problems with an eye to sustainability, equity, and justice.

Feature Story: Andrew McCracken's research at UVM



Andrew McCracken in the lab

UVM Bio PhD student, QuEST trainee, and recent NSF GRFP awardee Andrew McCracken is a 2nd-year PhD student working in the Pespini Lab. He is interested in investigating the extent to which organisms respond and adapt to disease outbreaks in a changing climate. With the Pespini lab, he's studied the roles of the microbiome and thermal stress on disease dynamics in marine invertebrates including sea urchins and starfish.

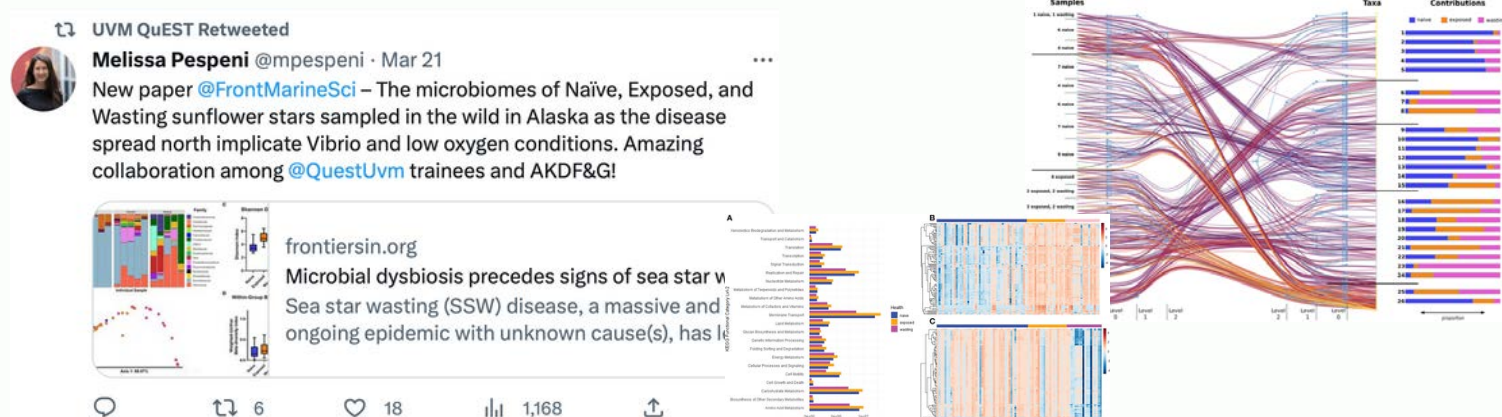
For a school project Andrew and his fellow QuEST trainees Blair Christensen and Daniel Munteanu began analyzing data from a sea star wasting disease outbreak that was collected by the Pespini lab. The class project transformed into a full investigation as the team determined its potential. The team needed someone well-versed in Computer Science, though, so

they reached out through the network of QuEST trainees to collaborate with Brendan Case in the Computer Science Department. Their combined research resulted in a publication and exemplifies the value of QuEST's interdisciplinary approach to collaboration. This summer, Andrew is funded by QuEST to conduct an internship with the Hakai Institute. He'll be based out of a lab off the coast of Washington near Seattle, and he'll spend a week doing field surveys in northern British Columbia.

The QuEST trainees have produced 23 QuEST-funded publications since 2018!

QUEST TRAINEE PUBLICATIONS

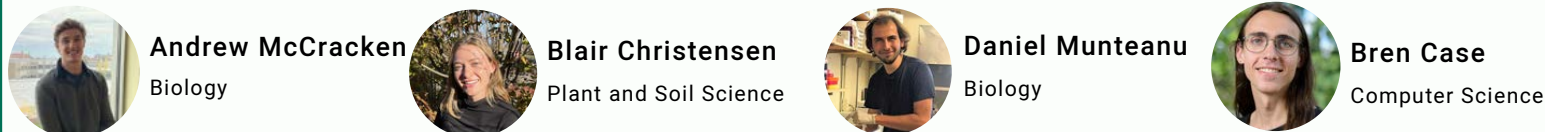
NEW Collaborative publication from UVM Bio student/QuEST trainees in 2023



Tweets about the publications from QuEST trainees and some figures from the publication

McCracken, A. R., Christensen, B. M., Munteanu, D., Case, B. K., Lloyd, M. M., Herbert, K. P., & Pespeni, M. H. Microbial dysbiosis precedes signs of Sea Star Wasting Disease in wild populations of Pycnopodia helianthoides. Frontiers in Marine Science, 10, 407.

Meet the QuEST Trainee Authors



Follow US on Twitter @QuestUvm to Learn More

QuEST Applied Internship Program



Since 2018, QuEST program has funded 16 UVM PhD trainees to conduct applied internship with non-academic partners across the globe. In spring/summer 2023, the QuEST program is funding another 14 trainees to conduct their 6-10 weeks long QuEST Internships in different regions and countries such as Vermont, Massachusetts, New York, Chicago, Oregon, Puerto Rico, Canada, Germany, and the United Kingdom.

QuEST PROGRAM NEXT STEPS

The QuEST program is in its final year of the non-renewable NSF Research Traineeship Award. We are actively looking for news sources of funding. If you CARE ABOUT: Diversity in STEM, applying quantitative and evolutionary approaches to better understand and solve global and environmental health challenges to climate change, creating strong community in graduate education, providing applied internships for graduate students with non-academic partners, then DONATE TODAY! <https://www.uvm.edu/quest>

ART OF BIOLOGY PHOTO CONTEST

The Fall 2022 semester marked the 11th annual installment of the Art of Biology photo contest, hosted by the UVM Biology Department. For the contest, students are encouraged to submit photos that they've taken in their time researching within the department, and the entries are judged by faculty and staff. The two winning photos featured in this issue are taken by Alison Hall, the 2022 winner, and Maia Austin, the 2022 runner-up. Below are the photos and descriptions provided by each student photographer.



"Seastar Metamorphosis"

"This is a photograph of a larval sea star undergoing metamorphosis into adulthood. This picture shows the stage which precedes a juvenile sea star. Here, you can see 5 tube feet, three on the bottom and two on the left side and the beginnings of the spiny body crowning the top. I saw this while sorting copepods collected from the East coast of Canada and was very excited to be able to see a seastar in this early stage of life. I captured the picture through a microscope on my cell phone."

—Alison Hall, winner of the 2022 Art of Biology Contest

"A humpback whale breaching off of Isla de Caño, Costa Rica. This area serves as a breeding ground for two populations of Humpback Whale (Breeding Stock-G and Central American), which are genetically and acoustically distinct despite this overlap. While conducting acoustic surveys of humpback whales in this breeding ground, we saw a massive splash in the distance in the distance and sped over to get a closer look. The whale breached four or five more times as we watched from our boat! Photo taken with a Nikon D3500 camera."



"Jumping for Joy"

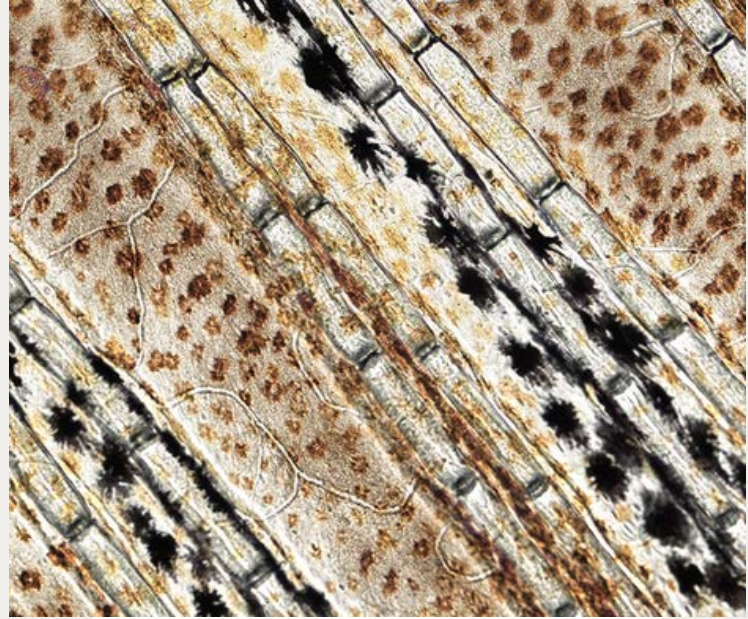
—Maia Austin, runner-up of the 2022 Art of Biology Contest

ART OF BIOLOGY PHOTO CONTEST

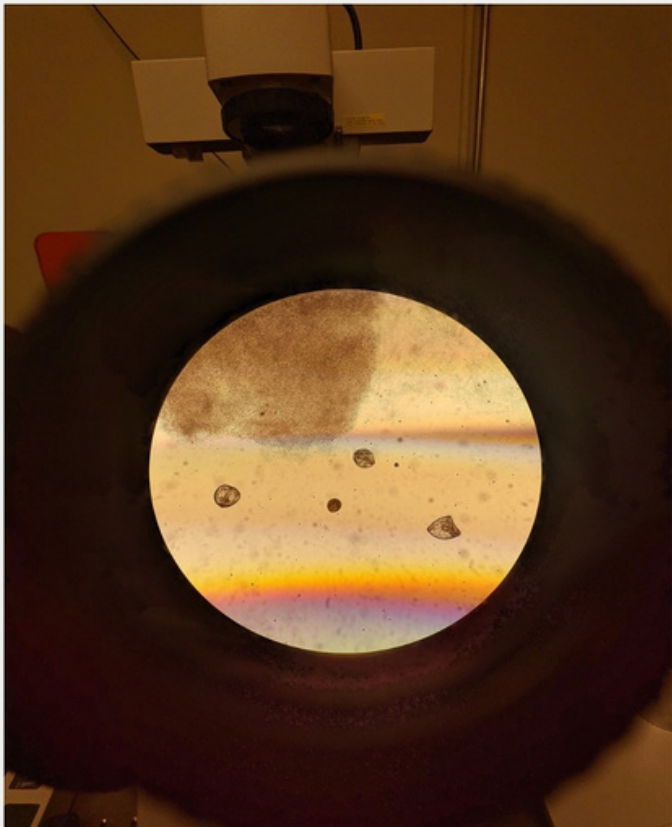
Additional entries: see all photos displayed in Marsh Life Science!



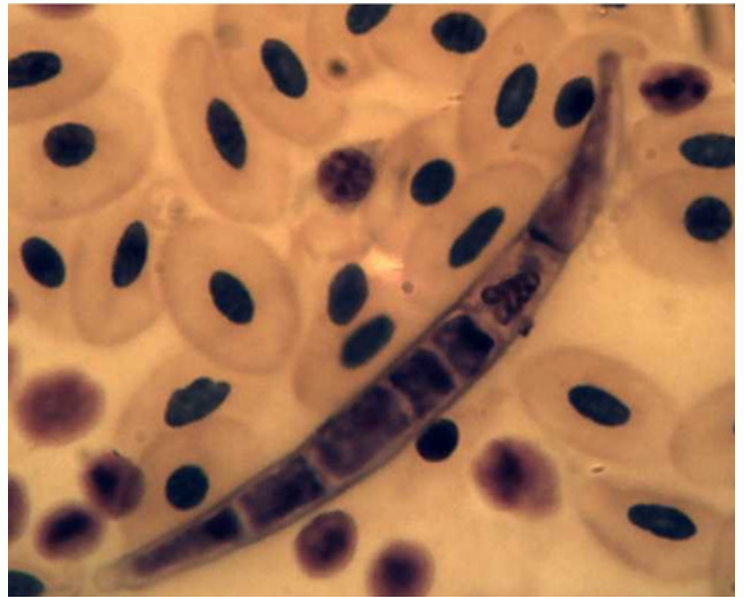
"Glia cells are beautiful too"
photographer: Caroline Dumas



"Tail fin or art? You decide..."
photographer: Helaina Stergas



"Life is in the eye of the researcher"
photographer: Csenge Petak



"Worm"
photographer: Ruby Higgins

2022 BIOLOGY HONORS AWARDS

Every year the department honors two of alumni, one at the graduate level and one at the undergraduate level, who have translated the skills and knowledge they learned at UVM into successful, productive, and purposeful careers.

Dr. David Eduardo Lucero: Accomplished Graduate Alum

Dr. Lucero completed a PhD in Biology in 2013. His graduate research focused on the spatiotemporal distribution of Chagas Disease insect vectors. His research and field epidemiology work has taken him to Bolivia, Guatemala, China, the Dominican Republic, and across the U.S. Dr. Lucero has led research teams to tackle outbreaks of Ebola, West Nile Virus, Zika Virus, Measles, Legionnaires Disease, Pneumonia & Influenza, and more, and was recognized by the New York City Mayor's office and Commissioner of Health. He has over 20 research publications spanning across population genetics, epidemiology, and data science. His proudest accomplishment is the six people of color he's supported as co-chair in the Master of Science thesis from Columbia University and New York University. Dr.

Lucero has garnered experience from Columbia University, the New York City Department of Health, and a Fortune 20 healthcare company. Lately, he is focusing on health disparity research and operations with an additional focus on Diversity, Equity, and Inclusion within the workforce.



Dr. Lucero (right) accepting this award



Dr. Kleiman (left) accepting this award

Dr. Robin Kleiman: Accomplished Undergraduate Alum

Dr. Kleiman graduated with her BS in Zoology from UVM in 1986 and is a drug discovery expert dedicated to developing new medicines to treat disorders of the Central Nervous System. In addition to her BS, she holds a PhD in Neuroscience from the University of Virginia and completed post-doctoral work at the University of California, San Francisco. Dr. Kleiman contributed to the discovery and development of multiple novel clinical candidates while working at a variety of companies, including more than 12 years in the Neuroscience Research Unit at Pfizer. She was later recruited to join the faculty of Boston Children's Hospital and the Neurology Department at Harvard Medical School to help establish the Translational Neuroscience Center. Dr. Kleiman moved to Biogen in 2017 where she established the Human Cellular and Molecular Biology group within Research and Early Development, and

recently joined Alkermes as Vice President and Head of Central Nervous System Biology. She is responsible for oversight of the Central Nervous System biology research unit tasked with building a robust portfolio of early-stage research programs focused on discovery of novel medicines to treat disorders of the central nervous system with high unmet medical need. She is Chair of the NIH NINDS Blueprint Neurotherapeutics Study section, serves as a scientific advisor and/or grant reviewer for multiple patient-sponsored research foundations and has mentored dozens of research students, interns, and post-doctoral fellows.

2022 BIOLOGY HONORS AWARDS

Lily Shapiro: GTA of the Year Award

Lily is a third-year Master's student advised by Dr. Ingi Agnarsson, whose thesis is titled "Spiny spiders and spiny trees: Molecular phylogenetics and biogeographic reconstruction reveal history of recurrent overwater dispersal events, single island endemics, and new species of Caribbean *Micrathena* (Araneae: Araneidae)." She has taught labs in introductory biology, Genetics, and Field Zoology. Students consistently describe her as patient, kind and accessible for anyone who needs help. At the same time, she teaches in a careful and deliberate fashion and is highly organized, so her lab sections run smoothly no matter how complicated the exercise. What really makes Lily stand out is her exceptional service to the Field Zoology course in Fall 2021. She took a larger than normal role in the administration of the course, arranged for guest lectures, re-organized course materials and assignment schedules, kept students informed and engaged, and sometimes lectured herself as needed. In Genetics courses, Lily completely ran the recitation aspect of the course, including all instructional and grading aspects for the homework assignments, and guiding students through questions and problem sets. Students have commented on how her lab leadership makes them feel like they are "doing science" rather than taking a course.



Lily Shapiro (right) accepting this award

Outstanding Graduating Senior Awards

George M Happ Awards in Biology: Samantha Smoger and Kailey Vinacco

Samantha is Biology major and Holocaust Studies. Following graduation, Samantha plans to work as a medical assistant in Vermont while applying to medical school. Kailey is a Biology major and Emergency Medical Services minor. With her clinical research background and healthcare experience at an EMT, she is interested in pursuing a career in medicine as a physician.

George Perkins Marsh Award in Ecology and Evolution: Hannah Buscher

Hannah is a Biology major with a minor in Health and Society. She plans to move to Maine after graduation and work as a children's care coordinator with refugee children, and plans to return to research and biology after gaining more experience with cross-cultural collaboration.

Joan M. Herbers Award in Biology: Aliceson Drollette

Aliceson is a Biology major with a minor in chemistry. Aliceson plans to use the skills and knowledge she's gained as she pursues a DMD degree at McGill University.

Bernd Heinrich Award in Physiology or Evolution: Isaac Goetzke

Isaac completed a Biological Science degree and completed his honors thesis in a biochemistry lab. Isaac plans on attending Physician Assistant school.

Kurt Milton Pickett Award in Biology: Lauren Polk

Lauren is a Biological Science major with a minor in Chemistry who has research interests in phylogeny and genetics and plans to continue in the biomedical field after a year in France.

New Faculty in the Department

Laura J. May-Collado: Assistant Professor



Laura received her MSc in Biology at the University of Costa Rica studying the ecology and behavior of pantropical spotted dolphins and obtained her PhD in Biology at Florida International University studying the phylogenetic and ecological factors shaping the evolution of acoustic communication in whales. She gained research experience in soundscapes and molecular tools at the University of Puerto Rico in Rio Piedras, and University of Vermont,

respectively. Laura uses phylogenies, field observations, autonomous underwater recording systems, and unmanned aerial vehicles to study the communication and behavior of aquatic mammals, and teaches undergraduate courses on marine sciences, mammals, acoustic communication, and a CURE on Soundscapes and Behavior. Learn more about the May-Collado lab here: <http://www.lauramay-collado.com/> and follow their fieldwork adventures here @maycolladolab on Instagram

Molly Stanley: Assistant Professor

Molly received her PhD in Neuroscience from Washington University in St. Louis and gained additional research expertise as a postdoctoral fellow at the University of British Columbia from 2017-2022. Her research interests are focused on understanding the molecular and cellular mechanisms behind food-brain connections, with current research investigating how specialized taste cells detect chemicals in food to coordinate feeding behaviors through neural circuits. Molly uses genetic tools in the fruit fly, *Drosophila melanogaster*, in her neurobiology research and teaches undergraduate courses and graduate seminars related



to neurobiology and genetics, including a new CURE class where students directly contribute to her research program. Learn more about the M. Stanley Lab here:

<https://mstanleylab.weebly.com/>

New Faculty in the Department

Patrick Mullen: Lecturer

Patrick received his PhD in Neuroscience from University of Vermont, where he studied the mechanisms underlying inherited diseases of the nervous system. While completing his thesis work at UVM, he was involved in education of medical, physical therapy, and undergraduate students. In his current position, Patrick teaches undergraduate neuroscience courses including Exploring Neuroscience, Advanced Neurobiology, and Diseases of the Nervous System.



Emily Mikucki: Lecturer

Emily received her PhD in Biology from the University of Vermont where her research focused on the physiological consequences of winter warming in an overwintering butterfly species and the genetic basis of disparate heat tolerance patterns in populations of fruit flies. She joined the Biology Faculty in Fall 2022 as a full-time lecturer teaching Exploring Biology, Climate Change Genetics and Seasonal Biology.



Ryann Guayasamin: Lecturer

Ryann received her PhD in Experimental Pathology from Yale University, where her dissertation explored the enhancement of the antitumor activities of the oncolytic virus, vesicular stomatitis virus (VSV). Ryann has focused on the teaching and mentoring of undergraduates across different scientific disciplines, including Neuroscience, Biology, and Chemistry, and is continuing this work as a Lecturer in the Department of Biology since Fall 2022.



New Faculty in the Department

Rachel Ploufee: Lecturer

Rachel received her PhD in neuroscience from the Uniformed Services University where she studied the effect of cannabinoids on an animal model of Multiple Sclerosis. Very quickly during her graduate study, Rachel realized that while she loved diving into the cellular and molecular aspects of neuroscience, she preferred to spend her time learning and helping others learn rather than doing her own research, which led her to pursue teaching full time. Rachel loves working with students to show them all the cool things our cells can do, how awesome the nervous system, and that learning is a lot of fun. Rachel teaches a variety of courses in Biology and Neuroscience including Molecular and Cell Biology, Cell Biology of Disease, and Neurobiology.



We would also like to welcome new biology staff:

David Chapnick: CAS Administrative Coordinator

Joanna Santoro: Academic Lab Assistant

Galen Burrell: Academic Lab Assistant

Lola Chen: QuEST Program Coordinator

Kayla Audette: Lab Research Technician

Manali Rege-Colt: Lab Research Technician





UVM Biology Alumni Stories



Taylor Stewart ('21), a recent PhD graduate, started working as a Postdoctoral Associate at Mississippi State University with the Mississippi Cooperative Fish and Wildlife Research Unit to develop data analytics tools to study invasive carp within the Tennessee and Cumberland Rivers. The tools developed by Dr. Stewart will provide State and Federal management agencies additional resources to address invasive carp prevention, control, and management. He now works as an Aquatic Biologist at the Utah Division of Wildlife Resources.



Dr. Taylor Stewart (credit: LinkedIn)

Pace Goodman ('09) helps energy utilities, state organizations, startups and other organizations decarbonize energy use in buildings. While at UVM, Pace graduated with degrees in Environmental Science and Applied Mathematics and conducted research into hybridizing ant species with Biology faculty Dr. Sara Helms Cahan as a participant in the NSF-funded Mathematics and Biology training program. This education pathway gave Pace background knowledge of environmental issues, a foundation in mathematics, and experience combining and applying those skills in research. After attending graduate school in civil engineering, Pace now applies his research experience for organizations implementing decarbonization strategies, including some of the largest energy utilities in the US. In reflecting back on his experiences at UVM, he says, "My time at Vermont strengthened my sense of connection with wild places as well as my commitment to conservation. I am both grateful for the work I am able to take part in at this stage of my career and for the turns in my path that brought me here."

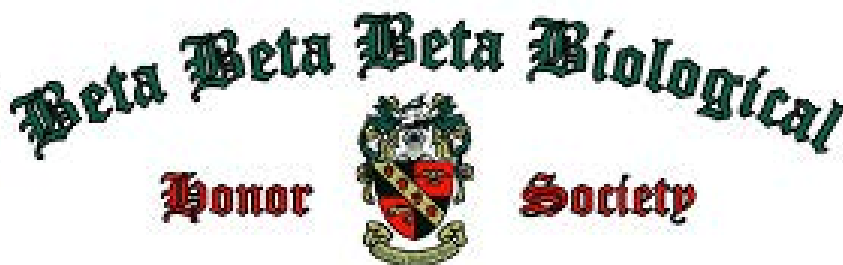
Allison Hrycik ('21), a recent PhD graduate, shares "I led a group of researchers from the Global Lakes Ecological Observatory Network (GLEON) to explore how changes in spring runoff timing affected summer chlorophyll-a (a proxy for phytoplankton biomass). The project culminated in a manuscript published in Global Change Biology. We compiled long-term monitoring data sets from 41 temperate lakes across North America and Europe that included stream runoff measurements, summer chlorophyll-a, and several co-variates. We found that years with earlier runoff had lower summer chlorophyll-a. Years with early runoff also tended to have more protracted runoff and lower runoff volume. Although early runoff correlated with early ice-out, ice-out timing was not related to summer chlorophyll-a. The result that lower summer

productivity occurs with earlier runoff is likely linked to changes in nutrient input timing and availability. In contrast, years with later runoff that occurs in a concentrated "spring flood" may be more available for entrainment in the upper water column, where they are available to summer primary producers. Our results suggest that winter conditions set the stage for open-water phytoplankton growth in lakes.



Early spring ice loss on Otsego Lake, New York. Photo by Kiyoko Yokota.

TRI BETA BAKE SALE



The Upsilon Tau chapter for Tri Beta had had a bake sale to raise funds for the Fiona Science Student Relief Fund. We donated \$115 to support undergraduate research in Puerto Rico! If you wish to donate, please use the QR code below or this website:

<https://www.cienciapr.org/en/blogs/equipo-informa/announcing-fiona-science-student-relief-fund>

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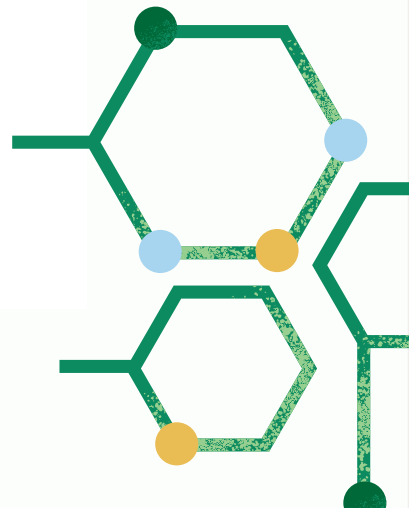
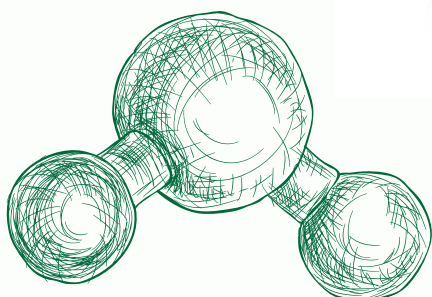
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SACNAS



SciComm Interns

Students receive internship credit hours for science communication work



Eve Phillips '23 is a Biology major with a minor in Reporting and Documentary Storytelling. She co-ran the official department Instagram (even starting a new Species of the Week series!) and co-produced the department newsletter. Along with her work in this internship, Eve interned in the vertebrate natural history teaching collections. She also assisted in the Crop Heritage Genetics lab with their cold-tolerance of pea and chickpea plant projects. In her free time, Eve is found enjoying the outdoors skiing, hiking, and swimming!



Julia Williamson '23 is a Philosophy and Biology double major. She co-produced the department newsletter and wrote articles for the Biology Department website. She worked as a TA for Philosophy courses and worked at the tutoring center as both a tutor and a General Chemistry Supplemental Instruction Leader. Since she didn't work in a lab in her time as an undergraduate, Julia loved SciComm because it gave her the chance to learn about the research happening on campus and got to add to her writing portfolio. In her free time, Julia likes to dance, design tabletop games, and learn to code.

The Science Communications Internship was started in spring 2023 and aims to provide students with the opportunity to engage in scientific media communications. The overall goal for the internship is to create content for department news across various platforms such as the official website, social media, and this newsletter publication. Interns can expect to conduct interviews, write articles, create social media posts, and apply their photography or graphic design skills.

Contact Dr. Molly Stanley, the faculty advisor, for more information: Molly.stanley@uvm.edu

Thank You to Our Recent Donors!

We would like to sincerely thank you for your contributions over the last two years. Your support has made a significant impact in the lives of our students, particularly in the aftermath of a global pandemic.

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Please email us at BiologyMedia@uvm.edu

Thank you to all of the Biology Department students, faculty, and staff that contributed to this newsletter!