



Dear members of the UVM Biology community,

I hope you have had a healthy and productive spring, and are enjoying a return to the warm weather and abundant greenery of summer! The Biology department has been busy, fledging our latest batch of Biology, Biological Science, Zoology and Neuroscience majors who will head out into the world with the knowledge, skills and passion needed for fantastic careers in the life sciences. We had five honors award winners this spring, and you can read about their research and academic accomplishments on p. 7 of the newsletter. At our annual Honors Day ceremony, we also celebrated the careers of two amazing UVM alumni, Graduate Accomplished Alum Dr. Declan McCabe and Undergraduate Accomplished Alum Dr. Jack Cioffi. In fact, the ceremony was particularly meaningful this year, as Dr. Cioffi had himself received one of our undergraduate awards back when he graduated in 1983! Both gave inspiring talks to our department about the winding paths that led them to successful and distinguished careers in research and teaching. They are profiled on p. 2; we are so proud to have contributed to building the educational and intellectual foundation that served them well.

Our department has continued its tradition of the active teacher-scholar model, with students engaging in cutting-edge, federally-funded research projects across many disciplines of Biology from cellular biochemistry to community ecology. This year we welcomed our newest faculty member, Prof. Jaeda Coutinho-Budd, who has embraced all aspects of her role as a teacher in Introductory Neuroscience, a mentor to multiple students assisting with her research on the function of glial cells in the nervous system of the model system *Drosophila melanogaster*, and service to the department and university. We are so excited to have her as a member of Biology and look forward to her many future successes. And she has plenty of fantastic, award-winning models to learn from: our latest award recipient is Prof. Alicia Ebert, who won the 2019 Dean's Lecture Award from the College of Arts and Sciences for teachers "who have consistently demonstrated the ability to translate their professional knowledge and skill into exciting classroom experiences for their students and who meet the challenge of being both excellent teach-

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ers and highly respected professionals in their own discipline." She also received the Graduate Student Senate Graduate Advisor of the Year Award this year for her exemplary mentorship of new graduate Dr. (!) Sarah Emerson, profiled on p. 11.

We hope you enjoy reading about everything that's been going on this spring. If you are an alum, we'd love to know what you are up to and let others know on these pages, so please get in touch (scahan@uvm.edu)! And if you are in town, please don't hesitate to stop by and catch up.

All the best,
Sara Helms Cahan
Chair, Biology Department

McCabe and Cioffi Are 2019's Biology Accomplished Alumni

On May 17, 2019, the Biology Department honored two former students with Accomplished Alumni awards. The recipient of the Accomplished Graduate Alumnus award was Dr. Declan McCabe (G'00), and the Accomplished Undergraduate Alumnus was Dr. George A. (Jack) Cioffi ('83).

Dr. McCabe is the chair of the Biology Department at Saint Michael's College in Colchester, Vermont. Since his earliest foray into teaching as a summer camp nature instructor, he has always loved sharing science with others. At that early point in his career, it was difficult to see that a career could come from that, so he started out his professional life as a lab technician. His supervisors in those positions had higher degrees, so he pursued a master's degree and paid his way as a teaching assistant. This experience clearly illustrated that in fact there were many college students in need of passionate teachers, so he sought out PhD programs.

Dr. McCabe says he encountered many excellent teachers during his time at UVM and learned from them that there was no substitute for depth of knowledge. He also learned techniques and tips along the way. "Nick Gotelli illustrated the importance of clarity in mathematical presentation, Alison Brody modeled hands-on lab preps, and Joe Schall's lectures were entertaining performance art," he writes.

As a liberal arts college professor, Dr. McCabe has the opportunity and responsibility to tie science into the larger fabric of knowledge. He also has significant freedom to choose diverse scholarly pursuits that hold his attention. He continues to publish on the aquatic macroinvertebrate communities that were the foci of his graduate degrees, and he shares these amazing organisms with high school students in Vermont EPSCoR's outreach programs. He has also branched out into pedagogical publication, some teaching and research publication on mammalian skulls, and most recently natural history essays aimed at broader audiences.

Currently, Dr. McCabe is looking forward to passing the role of department chair on to a colleague. He will

shortly step out of administrative tasks and into a sabbatical and his first book contract. The book on aquatic habitats and the fascinating cast of characters therein will combine several of his published essays with several more yet to be written. While he is writing, his students will continue to accumulate mammalian community data

based on camera traps in the 142-hectare Saint Michael's College Natural Area. Research in this newly established natural area will most likely be his focus for the next several years.

Dr. Jack Cioffi is the Edward S. Harkness Professor with Tenure and Chairman of the Department of Ophthalmology at Columbia University Vagelos College of Physicians and Surgeons since 2012. He also holds the Jean and Richard

Deems Endowed Professorship and is the Ophthalmologist-in-Chief at New York-Presbyterian/Columbia University Irving Medical Center. In 2014, Dr. Cioffi was elected as the President of the Columbia Physician Organization, a multi-specialty faculty clinical practice of more than 1,900 clinicians and is concurrently appointed as the Vice Dean of Clinical Affairs at Columbia University.

Dr. Cioffi formerly held the Richard G. Chenoweth Chair of Ophthalmology at the Devers Eye Institute and was the Chief Medical Officer & Senior Vice President at Legacy Health System in Portland, Oregon. He received his undergraduate degree at the University of Vermont, his medical degree at the University of South Carolina, did a residency in ophthalmology at the University of Maryland where he also served as Chief Resident, and completed his training with a fellowship in Research & Clinical Glaucoma at Devers Eye Institute under Dr. E. Michael Van Buskirk. In addition, he completed the inaugural Harvard Business School program in Managing Healthcare Delivery.

Dr. Cioffi is the Editor-in-Chief of *Journal of Academic Ophthalmology*, the official journal of the Association of University Professors of Ophthalmology. As well, he is Editor Emeritus of the *Journal of Glaucoma*, after serving for 10 years as the Editor-in-Chief, and he is the immediate past Chairman of the Basic and Clinical Science Course for the American Academy of Ophthalmology.



Drs. Declan McCabe (left) and George A. (Jack) Cioffi

Accomplished Alumni (cont.)

gy (AAO). He is the Chairman of the Scientific Advisory Committee for the Glaucoma Research Foundation (GRF) in San Francisco. He is a past President of the Oregon Academy of Ophthalmology and has served as a member of the FDA Ophthalmology/Dermatology Advisory Committee for drug approval. He also was selected by Governor John Kitzhaber to serve on the Oregon Health Policy Board's Outcomes & Quality taskforce.

Dr. Cioffi has published over 250 articles and book chapters, as well as two books. His research has been supported by the National Eye Institute of the N.I.H. for more than 20 years and has focused on the vascular physiology of the optic nerve and the pathophysiology of glaucoma.

He has given more than a hundred visiting professorships and named lectureships. Dr. Cioffi has received a variety of honors including Phi Beta Kappa and the Moody Biology Research Award at UVM; the Clinician-Scientist Award from American Glaucoma Society; the Knapp and Wheeler Teaching Awards at Columbia; the Innovators Award from the GRF; the Senior Honor Award and two Secretariat Awards from the AAO; and being listed in *Best Doctors in America* since 2002. He has mentored more than 40 clinical and post-doctoral fellows and countless students and residents. These clinicians and scientists are now at institutions across the United States, Canada, Europe, Africa, Asia, and Australia.

Alum Tyler Picariello Featured in *Journal of Cell Science*

Tyler Picariello, who received his PhD from the Department of Biology in 2015, was recently featured in profile in the *Journal of Cell Science* alongside the paper, "A global analysis of IFT-A function reveals specialization for transport of membrane-associated proteins into cilia", on which he is listed as the first author. Dr. Picariello is currently a postdoc at the University of Massachusetts Medical School in Worcester, MA, where he works in the lab of George B. Witman. To read the full interview and find a link to his paper, please visit jcs.biologists.org/content/132/3/jcs229872.



Biology's Laura May-Collado Collaborates on New Publications



Dr. Gabriel Melo-Santos (seen here at upper right) visited UVM in 2017 from Brazil to work with Dr. Laura May-Collado on the acoustic

repertoire of a newly discovered species of river dolphin, *Inia araguaiaensis* for his PhD. He is currently a Postdoc at St. Andrews University under the supervision of Dr. Vin-

cent Janik. One of his doctoral chapters was recently published in *PeerJ* and made it to several science news organizations including: *Newsweek*, *Smithsonian*, *Gizmodo*, *Earth*, *EurekAlert*, *New York Post*, *Science Times*, and others.

Jeff Wakefield of University News and Public Affairs prepared a very nice press release for the paper: uvm.edu/uvmnews/news/mysterious-river-dolphin-helps-crack-code-marine-mammal-communication.

Additionally, Dr. May-Collado is a co-author of a paper entitled "The newly described Araguaian river dolphins, *Inia araguaiaensis* (Cetartiodactyla, Iniidae), produce a diverse repertoire of acoustic signals." The paper can be found on *PeerJ* at peerj.com/articles/6670/.

UVM to Guatemala: A Study in Chagas Disease Vectors

Professor Lori Stevens and Computer Science Graduate student Brendan Case traveled to Guatemala in March to search for Chagas disease vectors at two Mayan archaeological sites.

As a step in trying to understand the taxonomy and vector competence of the more than 150 species of Triatominae that can transmit the causative parasite *Trypanosoma cruzi*, they went to Yaxha and El Naranjo in the department of Peten to collect the insect vectors. Collaborating with colleagues from Guatemala, New Orleans and the Smithsonian/Walter Reed they are trying to understand diversity in *Triatoma dimidiata*, the most important vector in Central America.

There are 6-7 million people infected worldwide including some 300,000 cases of Chagas disease in the US. Worldwide over 2 million and 100,000 in the US are likely to die from associated heart



disease. Their work is important in trying to understand transmission dynamics of this devastating disease.



Photos by Patricia Dorn, Loyola University New Orleans

In the Field with Second Graders!

On May 23rd, Professor Alison Brody and graduate student Erin O'Neill hosted 60 second graders from Rick Marcotte Central School in South Burlington at UVM's Horticulture and Research Center. During the morning field trip, children learned about the diverse interactions among plants and animals. A walk past the farm's goats engaged the second graders in thinking about how different animals get their food—including vertebrate herbivores that feed only on vegetation, to humans as omnivores, and bee pollinators as a highly specialized group of vegetarians that subsist on only pollen and nectar. Their



typically visit and pollinate plants. Donning masks that mimicked flowers or the mouthparts of pollinators, and taking the part of “flower” or “pollinator”, helped the young students to understand how the effectiveness of pollinators is often driven by the match in shape and size between flowers and their animal visitors. A trip into the woods showed them that flowers don't need to be as showy as they are on apple trees to attract insect visitors...even the Jack-in-the-pulpit, hidden to the eye, attracts gnats to transfer their pollen from male to female

flowers.

Kudos to Erin for masterminding this event!



first main stop was to snack on Fig Newtons, Honey Grams, and apples. When asked what these foods have in common, the children quickly sang out “they all require pollinators!”

As they went from station to station, amidst a profuse display of flowering apple trees, the children got to “handle” live, captive bees, played games in which they gathered “pollen” and delivered that pollen to flowers, and learned how to distinguish among the types of insects that



Many thanks to Alex Burnham, Lauren Kerwien, Meg McDonald, Alexis Meyer, Braden Meyer, Owen Molind, Patrick Mulhern, Nabil Nasser, Nikita Puranik, Jo Robertson, Gretchen Saveson, Ryan Stuart, Laney Williams, for helping with the fun-filled morning. Financial support was provided by an NSF grant; DEB-1754280.



Staffing Updates: Department of Biology Administrative Office

After 17 years as an administrative assistant with the Department of Biology, Wendy Chagnon is set to retire at the end of UVM's fiscal year in June.



Wendy Chagnon at her luncheon

at the end of UVM's fiscal year in June. Aside from welcoming people to the Biology main office, Wendy's duties include arranging travel for faculty and guests, coordinating purchasing card journals and expense reports, supervising the arrival of packages, assigning undergraduate advisors, and many more. She has been a fixture in the office under multiple chairs and business managers.

The faculty, staff, and graduate students threw Wendy a congratulatory potluck luncheon on May 7, where her service to the department was celebrated with a variety of dishes, and she was recognized with house plants, a knitted UVM blanket, various gift cards, and a cake. A number of emeriti faculty were in attendance to wish her good luck in her new adventure.

A devoted mother and grandmother outside of Marsh Life Science, Wendy is looking forward to settling into her new home and taking a break for a while. Having worked steadily since she was a teenager, Wendy has told everyone that she is excited to "do nothing" for a change. We wish her the very best!

At the end of February, Aaron Robin-son joined the office staff as an administrative assistant for academics, replacing Marty Allen, who transferred to the Larner College of Medi-



cine. He most recently spent several years as the department administrative coordinator for the Department of Classics, Department of Religion, and Jewish Studies Program.

Aaron is a UVM alum ('07) with a BA in Theatre. His previous work includes several years as a high school guidance assistant, theatre director, and day camp counselor. In addition to working full time for the Department of Biology, he is currently enrolled as a part-time graduate student in the Department of English's MA program. He resides in Montpelier and is very pleased to be part of such a great department!

First-year advisor Sarah Howe is leaving us at the end of this semester. Sarah has been a vital part of the first-year experience in Biology, and we are very sad to lose to her. She is moving to Philadelphia to enroll in the genetic counseling graduate program at the University of Pennsylvania. We celebrated Sarah's service to Biology on May 3 during our cricket cook-off (more on that later). We will miss her!



Sarah was very surprised!

Graduating Seniors Recognized at College Honors Ceremony

The Department of Biology recognizes five outstanding seniors each year at the Honors Day celebration. The five awards are named for distinguished scholars who were either members of the Department (both very recent and many years ago), or in one case, George Perkins Marsh, a founder of the environmental movement. We congratulate the following awardees.

Daron Forohar

George M. Happ Award in Biology

This award is presented to a student with outstanding academic performance in Biology. Dr. Happ arrived at the University of Vermont as a Professor and Chair of the Department of Zoology in 1978. Dr. Happ was instrumental in transforming the faculty to a teacher-scholar model and prioritized obtaining funding to stimulate research. His research interest focused on the physiology and immunology of dogs, and he has collaborated with the University of Alaska on prions in moose and caribou and avian disease.

Daron is a Biology major and Chemistry minor. He works in Dr. Emmett Whitaker's lab in the Department of Anesthesiology, researching how stressors such as major surgery and stroke affect the neonatal brain. In the lab, he assists with animal surgeries and performs assays, in addition to being available to help in any way needed. Dr. Whitaker says, "Daron is an exemplary student. He has very quickly become an invaluable member of the team. He is destined for success."

After graduation, Daron will continue working on his research in Dr. Whitaker's lab as he prepares for medical school. He says, "The more time I spend in the lab, the greater my appreciation grows for the people who dedicate their lives to broadening our understanding of biology. I am excited to be on the frontlines with them in the coming years."

Aubrey Pelletier

George Perkins Marsh Award in Ecology & Evolution

George Perkins Marsh is regarded as the founder of the environmental movement with his 1864 publication of *Man and Nature*, which is still in print. The book influenced many important scientific and political figures,

including Theodore Roosevelt, and some argue that it was this influence that led President Roosevelt to establish the National Park system. The Marsh farm was a model for sustained agriculture and was later purchased by Frederick Billings, who set out to test Marsh's ideas. The Marsh-

Billings Farm is now a national park, the first and only in Vermont. Marsh was also a diplomat, holding the record for longest service to our nation, and was the primary designer of the Washington Monument. The Marsh Life Science building is named in his honor.

Aubrey

has a major in Zoology and a minor in Chemistry. Over the past few years, she has been instrumental in several ventures in Dr. Melissa Pespeni's lab, assisting in several sea urchin experiments, keeping urchins, sea stars, and abalone alive and happy as the lab's animal caretaker. Her research focused on how marine invertebrates such as the purple sea urchin cope with ocean waters that are increasingly acidic as they absorb more and more carbon dioxide. Her thesis was entitled, "Carbonic anhydrase: Genetic variation and resiliency in acidifying oceans".

In speaking about Aubrey's research and thesis, Dr. Pespeni says, "Aubrey's success with this project required monumental effort—troubleshooting and protocol development at each step of the way. Her success with this project is a testament to her hard work and ingenuity in the lab and her dedication to the process of discovery. I'm looking forward to see how and where Aubrey channels her dedication to the process of discovery in the future, in teaching, outreach, field research, or a combination!"

The research that Aubrey did on her project ties into her broader interests of working in the ocean and evaluating human impacts on the environment. "As I graduate," she writes, "I am looking for opportunities to



Awardees (from left) Haya Alshaabi, Neil Wood, Daron Forohar, Keira Goodell, and Aubrey Pelletier (far right), with Dr. Sara Helms Cahan at the Ira Allen Chapel on May 17.

Senior Honors (continued)

spend time doing fieldwork and getting some experience before thinking about coming back to school.”

Haya Alshaabi

Joan M. Herbers Award in Biology

Joan M. Herbers arrived at UVM in 1979 as the first tenure-track female Professor in the history of the Department of Biology, which is one of the oldest departments on campus, and quickly rose to full Professor, the highest rank for a faculty member. Her exciting classes drew wide praise from students, and Dr. Herbers mentored many undergraduate and graduate students in her laboratory and at field sites. Dr. Herbers has been for many years one of the world's most important researchers in animal behavior, especially the social behavior of ants. Her landmark studies examine the factors driving the sex ratio, foraging behavior, and social organization within colonies. Her work has appeared in many publications. Dr. Herbers was named a Fellow of the American Association for the Advancement of Science, one of the highest honors for an American scientist. She left UVM in 1993 to take a position of Chair of Biology at Colorado State University and subsequently as Dean of Arts and Sciences at Ohio State University, where she remains as Professor of Biology. Professor Herbers has remained a close friend of the UVM Department of Biology to this day.

Haya is a Biological Science major who is interested in the fields of cardiology, cardiothoracic surgery, and pathology. These interests led her to join the research laboratory of Drs. Nicholas Heinz and Brian Cunliff in the Department of Pathology and Laboratory Medicine, where she has been fully trained in cell culture, protein western blotting, fluorescent microscopy, and other lab techniques. She has also completed EMT training and gotten her EMT license in order to enrich her patient care experience. Her own research project focused on cellular production of reactive oxygen species, a product of metabolism that can have both beneficial functions and cause damage and aging. Her thesis is titled, “The Influence of Mitochondrial Positioning on ROS Levels and Protein Redox Status”.

When asked about Haya's successes in the lab, Dr. Cunliff said, “Work conducted by Haya provided substantial evidence that mitochondria must be strategically positioned in cells to support localized signaling through mitochondrial metabolites. Haya's exciting discoveries provide a framework for the investigation of the role of

mitochondrial positioning in supporting cancer metastasis and development of therapeutic options for the treatment of metastatic cancer.”

After graduation, Haya is hoping to join a local DMS unit and was accepted into the highly competitive Office of Chief Medical Examiner Internship. She plans to continue shadowing in the cardiothoracic surgery department at the UVM Medical Center, and she says, “I am also planning to contact other physicians to enrich my experience in multiple fields of medicine, including family medicine, emergency medicine, oncology, and neurology.”

Keira Goodell

Bernd Heinrich Award in Physiology or Evolution

Bernd Heinrich, Emeritus Professor of Biology, has been a member of the Biology Department since 1980. He has a long career in science in ecological physiology, animal behavior, and evolutionary ecology. Dr. Heinrich is a popular teacher, and he still teaches the famous “Winter Ecology” course each year at his estate in the wilds of Maine. Dr. Heinrich has produced hundreds of publications in the best journals and is often regarded as one of the world's foremost ecologists and naturalists. He has also written many award-winning books, including classics such as *Bumblebee Economics* and *Ravens in Winter*. His biography of his family and his remarkable life, *The Snoring Bird*, is one of the best accounts of why children grow up to be biologists. He is a member of the American Academy of Arts & Sciences.

Keira is a Biological Science major with minors in Chemistry and Pharmacology. Her research interests are in the regulation of autophagy, the process by which lysosomes degrade and recycle damaged proteins and organelles in order to promote cell survival under situations of nutrient deprivation and homeostatic stress, within ovarian cancer. Her study tests the hypothesis that a particular molecule responsible for building proteins, Tereonyl-tRNA synthetase (TARS) inhibits this process human ovarian cancer cells in a mouse model of ovarian cancer.

Keira's advisor, Dr. Karen Lounsbury, says of her work, “Keira is a rare combination of exceptional academic ability, patience with experimental procedures, and an endlessly positive attitude. She is ambidextrous with her hands and also with her mind.” Keira will take her skills with her as she joins the incoming first year class of UVM's Larner College of Medicine this fall.

Senior Honors (continued)

Neil Wood

Kurt Milton Pickett Award in Biology

Kurt Milton Pickett arrived in the Biology Department as an Assistant Professor in 2007 and was promoted to Associate Professor shortly before his death in 2011 after a seven-year courageous struggle with cancer. Dr. Pickett was one of the world's foremost experts in the systematics of wasps and the evolution of social behavior in insects, and traveled extensively to collect and observe wasps in a wide variety of habitats. His research combined the time-honored discipline of taxonomy with modern computationally-based molecular phylogenetics methods. During his too-short time at UVM he became highly respected for his probing intellect, dedication to science and teaching, and wonderful sense of life and humor. Dr. Pickett's natural affection for his students at both the undergraduate and graduate level garnered him respect and admiration.

Neil completed his program this past December with a major in Biology. His work in Dr. Jim Vigoreaux's lab examines the molecular structure of a protein crucial

to the structure and function of *Drosophila* flight muscle using a specialized technique called circular dichroism spectroscopy that bounces polarized ultraviolet light off of proteins to infer their structure and characterize their interaction with other molecules. Before working in Dr. Vigoreaux's lab, Neil had no prior research experience, but his appetite for investigation and discovery manifested day one in the lab and has grown unabated ever since. Dr. Vigoreaux writes, "Neil takes on big challenges with the same enthusiasm and thoroughness as he takes on routine, daily chores, and in both fronts he has been greatly successful."

In December, Neil attended his first scientific conference, the annual joint meeting of the American Society for Cell Biology and the European Molecular Biology Organization. He presented a poster of his work and received an Honorable Mention in the elevator speech competition. Now that he is working as a lab technician in the Larner College of Medicine, Neil hopes to build on his technical experience while continuing to work in a research setting.

Lauren Ash Named Biology and Graduate College's GTA of the Year

The graduate program in Biology is very proud of the effort and dedication of our graduate teaching assistants. Biology courses present a big intellectual challenge to our students, who simultaneously have to learn lots of specialized content while employing their quantitative and reasoning skills to solve problems.

The winner of the Department's Graduate Teaching Assistant of the Year Award is Lauren Ash, who was selected out of the pool of department and program winners as the 2019 university-wide GTA of the Year award winner by the Graduate College. This is only the second time one of Biology's GTAs has won at that level, the first time being last year.

Lauren is a fourth-year PhD student advised by Dr. Nick Gotelli, whose research concerns emerging infectious diseases in New England amphibian communities. In the past few years, the department has made a concerted effort to incorporate quantitative skills, including pro-

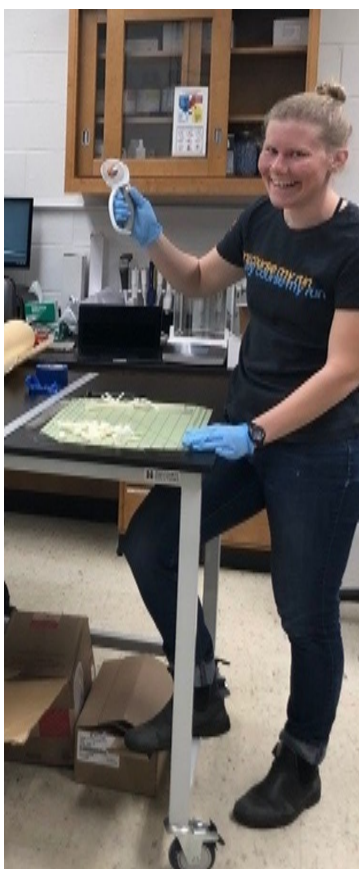
gramming-based statistical analysis and visualization, across our curriculum from advanced graduate coursework through to our undergraduate core courses. During this process, Lauren has been a shining star, serving as a teaching assistant and coach for students at every stage, prior experience, and comfort level with computer programming. She excels at breaking down complicated processes into easily-accessible steps, with unending patience as students struggle through the "aha" moment when everything is right and they get the answer they were seeking.

Here is a typical comment from a student: "Lauren was a very helpful and knowledgeable TA. She went above and beyond the lab work and helped me with my own code for my own research project." One of her instructors com-

ments that Lauren offers advice, help, and great teaching in the lab and is more of a co-instructor than a TA. We are fortunate to have Lauren as a member of our department.



BISC Senior Accepted to Summer Program



Karen Rand, a senior Biological Science major, has been accepted into a summer program at the Rocky Mountain Biological Laboratory (RMBL) in Gothic, Colorado. She will be taking part in independent research as well as enrolling in a Rocky Mountain Ecosystems course. She will be working on a project under the supervision of Rubenstein School Professor Aimée Classen and her graduate student Kenna Rewcastle, researching the effects of climate change on forage plants in high alpine environments. Karin's research derives from the question, how does warming affect

the nutritional composition in forage plants?

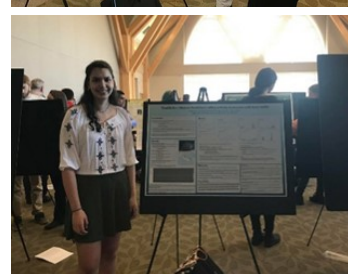
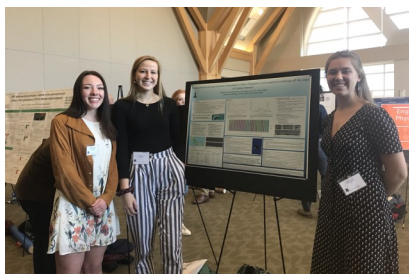
After a summer of field work, Karin will continue to work on this project throughout the fall at UVM, where she will perform chemical analyses on the field samples. She looks forward to presenting her findings at the Undergraduate Research Conference in the spring of 2020. She adds, "I am thrilled to be working under the supervision of the Classen lab and look forward to being surrounded by a wide range of ecological research this summer at RMBL!"

CURE Students Present at Conference

The following students in the Soundscape and Behavior Course-based Undergraduate Research Experience (CURE) presented research at the Undergraduate Research Conference this spring (photo sampling below):

- Izabel Mize: "Toadfish calling activity decreases with boat traffic" (poster, in preparation for submission to scientific journals)
- Kahlia Gonzales and Natalia Swack: "Female Productivity and Calf Survivorship of Bottlenose Dolphins (*Tursiops truncatus*) in Bocas, Panama" (poster)
- Amanda Jones: "Analysis of the Population Size of bottlenose dolphins (*Tursiops truncatus*) in Dolphin Bay, Bocas del Toro, Panama" (poster)
- Danielle McAree, Kate Ziegler, and Shelby Rosten: "Singing patterns of humpback whales (*Megaptera novaeangliae*) in wintering grounds off of the coast of Central America and potential negative effects of tour boat traffic" (poster)
- Jessa Houghton, Caroline Dunbar, and Jade McMillan: "Monitoring Marine Biodiversity through Soundscape Analysis: Isla del Caño, Costa Rica" (poster-interactive presentation)
- Rebecca Daw: "Diversity of Signature Whistles in Bottlenose Dolphins (*Tursiops truncatus*) of Dolphin Bay, Bocas del Toro, Panama" (oral)

Additionally, Amanda, Kate, and Jade all plan on expanding their research projects as part of their honors theses. Kahlia will also continue work on her project as part of her honors thesis, and she received an Academic Programs for Learning and Engagement (APLE) Award to continue her research project on bottlenose calf survivorship in a small population of dolphins in Panama.



Ali Sarkar Presents at AChemS

Graduate student Anish Ali Sarkar attended a Chemoreception Sciences AChemS conference during the week of March 13-17, 2019. The conference was held by the Association for Chemoreception Sciences in Bonita Springs, Florida.

Anish's presentation was titled "Cyclophosphamide-induced TNF α expression in the Taste buds: Cytoprotective effect of Amifostine". He presented research in the chemosensory system, investigating how to prevent chemotherapy-induced inflammation and preventing it in the gustatory system. He was awarded an AChemS Student Travel Award XLI 2019, with additional travel support from the Biology Department.

Ashlock and Mikucki at SICB



Emily Mikucki (left) and Lauren Ashlock in Tampa

In January, Lauren Ashlock, a 3rd year PhD candidate in Dr. Melissa Pespeni's lab, and Emily Mikucki, a 4th year PhD candidate in Dr. Brent Lockwood and Dr. Alison Brody's labs both attended the Society for Integrative and Comparative Biology (SICB) annual meeting in Tampa, Florida. SICB promotes interdisciplinary advancements in science by fostering research, education, outreach, and a broad understanding of living organisms at small (molecular biology) and large scales (ecology and evolution). The annual meeting presents an opportunity for members from broad scientific backgrounds to come together and share their novel and groundbreaking research.

At this year's meeting, Lauren presented a poster on her research titled "Differential thermal tolerance across latitude and developmental stages in the estuarine copepod *Acartia tonsa*." Emily presented a talk on her research "Winter warming threatens supercooling point and cryoprotectant production in *Pieris rapae* butterflies." Both found the meeting to be a great opportunity for sharing research progress and results, receiving feedback from a broad scientific audience, and meeting colleagues and collaborators. They are both planning on attending next year's meeting which will be held in Austin, Texas.

PhD Spotlight: Sarah Emerson

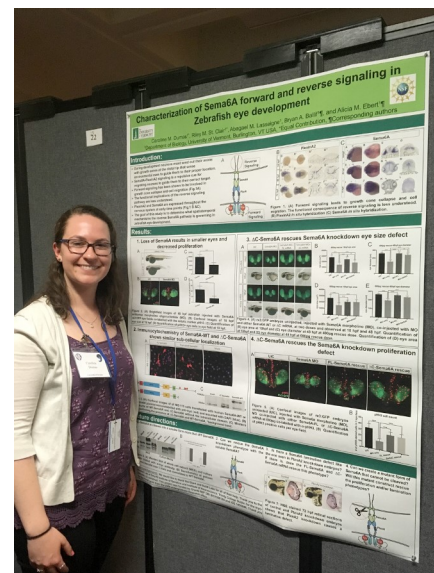
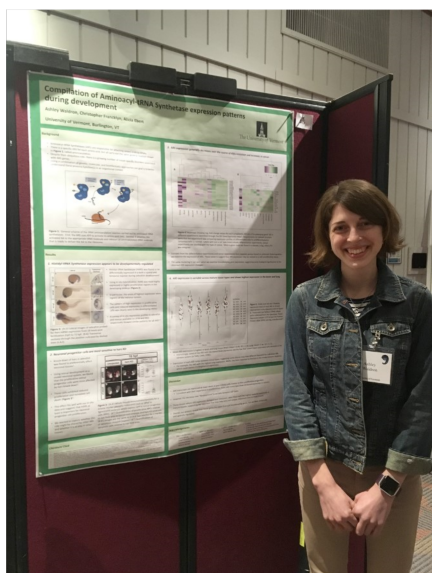
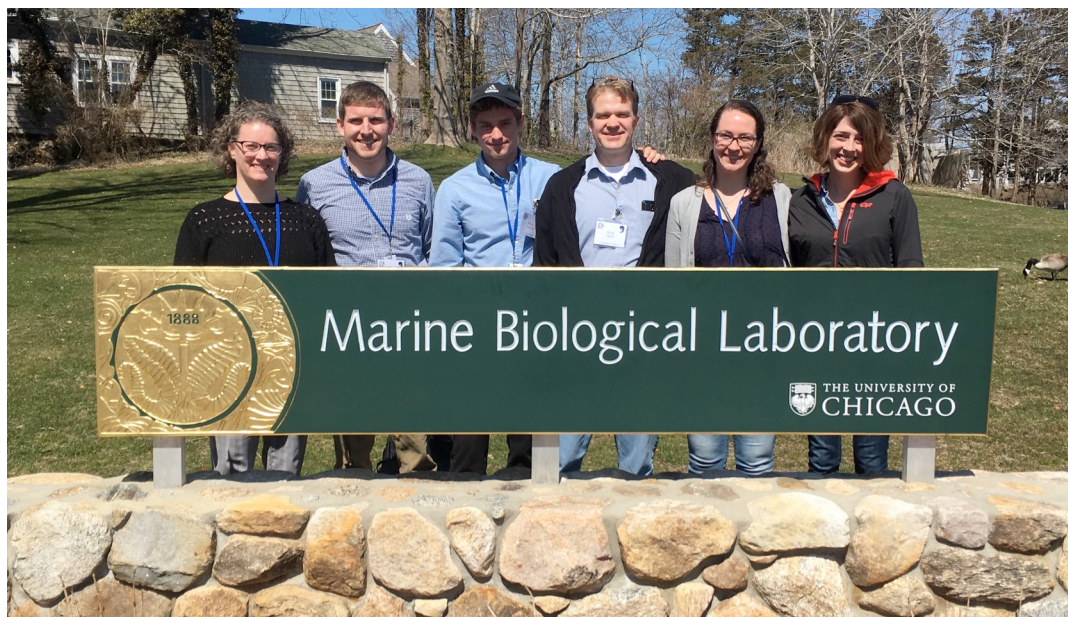


Sarah Emerson, a student in Dr. Alicia Ebert's lab, graduated with her Ph.D. in Biology this May. Her research focused on using zebrafish (*Danio rerio*) as a model system to investigate the roles of an axon guidance signaling pair, Semaphorin6A (Sema6A) and PlexinA2 (PlxnA2), in neurodevelopment. Her dissertation explored a novel mechanism of Sema6A/PlxnA2 signaling, influencing the transcription of 58 downstream target genes. In an investigation into the roles of two candidate genes, *rasl11b* and *shtn-1*, it was shown that Sema6A/PlxnA2 repression of *rasl11b* is important for the proliferation of retinal precursor cells (RPCs) in the early developing eyes, and that the negative regulation of *shtn-1* is important for RPC migration and separation of optic vesicles, as well as optic, motor and sensory nerve patterning. The spatial and temporal expression patterns of PlxnA1a, 1b, 2, 3 and 4 were also investigated in early zebrafish development, providing a key resource of information to those interested in the study of the PlxnA family. Sarah will be continuing to follow her passion for research in the field of developmental biology, starting with a post-doc at Yale in the lab of Dr. Daniel Colón Ramos in August.

Students Attend Northeast Society for Developmental Biology

The Ballif and Ebert labs, as well as two students from Norwich University, attended the Northeast Society

for Developmental Biology in April. All four students presented posters, and Caroline Dumas won a poster prize!



Congratulations to this year's Beta Beta Beta: Upsilon Tau Chapter Inductees! Tri Beta is the National Biological Honor Society.

Biology Students Rank in ASCB Elevator Speech Contest

At the last meeting of the American Society for Cell Biology (ASCB), two UVM students entered the elevator speech contest. According to the ASCB website, "When time is limiting (e.g., an elevator ride), it helps to have a 30-60 second summary of exactly what it is that you do and how you, as an individual, are contributing to your respective field." The goal was for students to explain their research in such a way that a broader audience could understand the importance of it, or as ASCB explains, to engender "trust between the research community and the general populace."

Graduate student Lynda Menard and senior Neil

Wood entered the contest. Lynda's speech related her study of muscle structure and function to more general architecture where "nuts and bolts" were related to the proteins that allow mechanical function. Neil's compared *Drosophila* flight muscle filaments to strings on a guitar, as he felt his research could be better understood in some ways as analogous to a finger on a guitar string: hold down the string, and it makes a different noise when plucked.

Lynda won her category, and Neil received an honorable mention. You can view Lynda's speech at <https://youtu.be/kDk57oktQtk> and Neil's at <https://youtu.be/OEvraedGsnk>.

Biology Seminars Spring 2019

The following were guests of the Department of Biology this spring as speakers for the weekly Biology Seminar series:

- **Ehab Abouheif, McGill University:** "What solider and supersoldier ants teach us about the development and evolution of complex biological systems"
- **Elizabeth Sherman, Bennington College:** "Herbivory and coral reef health: do sea urchins up-end the parrotfish paradigm?"
- **Jason Stumpff, University of Vermont:** Centering the genome: how and why do chromosomes align during mitosis"
- **Peter Girguis, Harvard University:** "The Seas We've Hardly Seen: The Physiology and Ecology of Deep Sea Animals and Microbes"
- **Arminja Kettenbach, Dartmouth College:** Phosphorylation signaling by Phosphoprotein Phosphatases"
- **Jennifer Koop, University of Massachusetts Dartmouth:** "Where did you come from and how did you get here?: Understanding the ecology and evolution of parasite invasions"
- **Anna Hargreaves, McGill University:** "Local adaptation, biotic interactions, and species range limits"

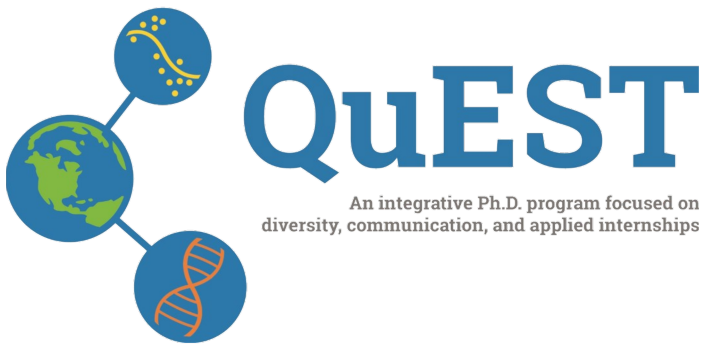


Congratulations Graduates!

Pictured are (from left) Dr. Bryan Ballif, Dr. Riley St. Clair, who graduated from the Ballif lab with a PhD in Neuroscience, Dr. Sarah Emerson, who graduated from the Ebert lab with a PhD in Biology, and Dr. Alicia Ebert.

Attention Alumni!

If you have items you'd like to include in the next issue of our semi-annual newsletter, please send them to Aaron Robinson at aaron.robinson@uvm.edu.



The Quantitative and Evolutionary STEM Training (QuEST) Program provides doctoral student with the skills, knowledge, and competencies needed to solve environmental and global health problems in an ever-changing workforce and research environment.

Greetings from the QuEST Leadership Team!

Our recruitment and admissions of the second cohort are complete. Ten graduate students accepted offers into the program. They will begin the traineeship this fall semester 2019 with the twelve trainees currently enrolled.

The collaboration of interdisciplinary studies now spans across several academic units (i.e., Mathematical Sciences, Computer Science, Complex Systems and Data Science, Natural Resources, Plant and Soil Science, Biology, and Plant Biology).

What's more, the first cohort successfully completed their first year of the QuEST traineeship. Accomplishments include taking the Foundations of Quantitative Reasoning and Computational Biology courses, attending a weekly QuEST seminar, and par-



ticipating in Interest Group Networks. Trainees engaged in research activities involving trips to Costa Rica and Guatemala. They also hosted guest speaker Dr. Melissa Nolan, PhD MHP, Assistant Professor in Epidemiology and Biostatistics from the University of South Carolina. Finally, our recent community gathering occurred on Friday, May 3, for trainees and leadership to celebrate the end-of-semester triumphs!



Department Celebrates End of Academic Year with Entomo-fun!

Striving for some end-of-semester levity, the faculty, staff, and graduate students of the Biology Department engaged in some entomology-themed fun on May 3: cooking with crickets! Participants were given 1/3 cup of cricket powder to use in the recipe of their choice. The dishes were sampled at a group tasting, and each attendee voted for their favorite dish. Lecturer Dr. Sarah Wittman won the grand prize, our first annual entomo-trophy, with her cricket sourdough bread. In second place was graduate student Lauren Ash with some choco-cricket macarons, and department chair Dr. Sara Helms Cahan came in third with some cricket enchiladas. Enjoy the pictures below!



From left: second-place winner Lauren Ash, first-place winner Sarah Wittman, and third-place winner Sara Helms Cahan



Sarah Wittman's winning cricket sourdough bread.



Lauren Ash's second-place choco-cricket macarons.



Sara Helms Cahan's third-place cricket enchiladas.



For the warier eater, cricket-free cake and grasshopper (mint) cupcakes, made by Karen Duncan and Laura Newman.

Stay Connected and Get Involved!

UVM Connect

UVM Connect is *your community* and it is exclusive to the UVM family—Grads, students, and parents. Everyone you interact with on UVM Connect has the unique experience of being a part of the UVM family. By joining you can leverage the collective power of UVM's global alumni network.

www.UVMConnect.org

Donate to Biology

Undergraduate research gets students truly engaged in learning. By supporting research at UVM, you can ensure that all students have the opportunity to work side-by-side with faculty—to advance technology, change policies, building understanding, and improve lives.

<https://tinyurl.com/y63xmqr1>

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