ECOLOGY AND EVOLUTIONARY BIOLOGY

FALL/WINTER NEWSLETTER 2019

NUMBER 35

EEB RECEIVES $3 MILLION GIFT FOR RESEARCH

Impressed by EEB's research accomplishments, an anonymous donor has given $3 million to endow two research positions. The unprecedented gift means the EEB Department will be able to continue to recruit and retain the best scientists in the field.

"This gift will elevate the College's already innovative research and education in the ecological sciences, which are increasingly relevant in the modern world," says Juli Wade, Dean of the College of Liberal Arts and Sciences. "Transformative gifts like these help us attract and keep the best researchers and educators, who enrich the entire University and the State of Connecticut."

The gift speaks directly to UConn President Thomas Katsouleas's goal of doubling UConn's research enterprise over the next 10 years. UConn, a top 25 public research university, carries out research within its 14 schools and colleges and 80 research centers and institutes.

"This is completely unprecedented," says Eric Schultz, professor in Ecology and Evolutionary Biology. "No department in the University has been granted two endowed chairs simultaneously like this. It represents a substantial and absolutely incredible opportunity for us."

Ecology and Evolutionary Biology faculty and staff investigate and teach about the earth's heritage of biological diversity, an important area of research given the high rate of human-caused extinctions, says Schultz.

The two positions can be used to recruit scholars to the department or to support current faculty members. The chairs will be named after the Shakespearean characters Titania and Prospero in honor of the donor, a lifelong student of the Bard.

Learn more about UConn's Ecology and Evolutionary Biology Department at https://eeb.uconn.edu/. To make a donation, please visit https://eeb.uconn.edu/giving/

TWO EEB FACULTY NAMED 2019 HIGHLY CITED RESEARCHERS

The 2019 Highly Cited Researchers list, released recently by the Web of Science Group, identifies scientists and social scientists who produced multiple papers ranking in the top one percent by citations for their field and year of publication, demonstrating significant research influence among their peers.

Daniel Bolnick's research focuses on evolution and ecology of variation within species; evolutionary immunology; host-parasite co-evolution; speciation. Dan combines observational natural history with experiments, theory, and genomics. He is a member of the UConn's Institute for System Genomics. For more information about Dan's research, please visit: https://bolnicklab.wordpress.com/

Mark Urban's research focuses on community ecology; eco-evolutionary dynamics; microgeographic adaptation; global climate change; metacommunity ecology. Mark is the Director of the Center of Biological Risk. For additional information about Mark's research, please visit: http://hydrodictyon.eeb.uconn.edu/people/urban/

UCONN RAINFOREST ACQUIRES MAJOR COLLECTION OF GINGER RELATIVES

During the summer 2019, over 200 species of rare ginger relatives were acquired and established into cultivation by staff at EEB's Education and Research Greenhouses aka The UConn Rainforest.

This exceptional collection was made available to UConn by Dr. W. John Kress, Distinguished Scientist and Curator Emeritus at the Smithsonian Institution, who has conducted "over forty years of tropical field research and plant collecting across the globe" and is one of the world's foremost experts on this plant group.

Dr. **Carlos Garcia-Robledo,** former Smithsonian Postdoctoral Fellow in Kress' lab initiated the contact between the institutions to acquire this unique plant collection. Garcia-Robledo noted: "this is one of the most outstanding collection of living plants in the world. When John told me that he wanted to share his collection with UConn, I was ecstatic."

Clint Morse, UConn's Living Plant Collections Manager, orchestrated the acquisition over the summer months. "During my 25+ year tenure here at UConn I've had the good fortune to acquire a number of unique species from colleagues at the Smithsonian that helped fill critical gaps in our collections. But the breadth of diversity and species rarity of this particular acquisition arguably make the UConn collection the most extensive living ginger collection outside of the tropics."

The collection spans all 8 families of Zingiberales (a major order of charismatic plants that include bananas, gingers, cardamom, turmeric, birds of paradise and prayer plants) and includes over two-thirds of all currently recognized genera, many of which are rarely seen in cultivation. A number of the species acquired are presently new to science and will be formally described, named and published in the near future by Kress and students at UConn.

The collection serves as a foundation for investigations by a number of UConn researchers as well as a repository of living material available to scientists at peer institutions. Garcia-Robledo notes "with the support of the National Science Foundation, National Geographic and Smithsonian, my research team uses Neotropical Zingiberales to understand the effects of global warming on biotic interactions. This collection represents a unique opportunity to answer new questions at a global scale."

Plant species are becoming extinct at an unprecedented rate. Garcia-Robledo notes "In the last two and a half centuries, more plant species became extinct than bird, mammal and amphibian species combined". The Zingiberales are also threatened by global environmental change, Kress notes "As their native habitats are irrevocably degraded and altered it is imperative to keep them alive and available for continued research."

Look for many of these new ginger species to start blooming in Spring 2020.

CLIMATE CHANGE WATER VARIABILITY HURTS SALAMANDER POPULATIONS

Streamflow variability brought on by climate change will negatively affect the survival of salamanders, according to a new study by the University of Montana, the University of Connecticut, and the Cary Institute of Ecosystem Studies.

The researchers discovered that streamflow variability — fluctuations between low and high flows brought about by climate change — can kill salamanders while they are metamorphosing from larvae to adults. The work was published in the Sept. 5 issue of the Proceedings of the National Academy of Sciences.

"In our studies, we find that rivers are changing and not for the better. They are getting saltier, warmer, and more alkaline," says study author **Gene E. Likens,** Distinguished Research Professor in EEB and President Emeritus of the Cary Institute. "It is a concern and it is a surprise to see that this is happening all over the world."

Likens and colleagues studied spring salamanders living in five New Hampshire streams. Using a 20-year data set from Merrill Brook in New Hampshire, the researchers showed the abundance of spring salamander adults declined about 50% since 1999.

The researchers then studied whether streamflow variability at Merrill Brook and streams in the nearby Hubbard Brook Experimental Forest affected the survival of salamanders metamorphosing from larvae to adults. They found that fewer salamanders survived metamorphosis during years when steamflow variability was high, leading to the decline in the adult population.

"Increasing environmental variability may be especially challenging for species that undergo metamorphosis – like many insects and amphibians – because that's a vulnerable period when they rely on stable environments for survival," says study author Winsor Lowe, Professor of Forestry and Conservation at the University of Montana.

Small headwater streams are home to diverse species and the source of clean water to downstream communities. However, these ecosystems are also losing protection under proposed Clean Water Act revisions, says Lowe. "Our work underscores the vulnerability of headwater ecosystems in this era of climate change, the need for protection of vulnerable headwater species, and the value of long-term monitoring efforts," says Lowe. "This work … expands our knowledge about the effects of climate change on a diverse group of species that are often overlooked because they spend most of their lives under rocks and logs in small, headwater streams."

Likens notes the importance of studying the details within an ecosystem. "Oftentimes when we think of climate change, we think of the large, visible effects like melting glaciers. Those aspects are very important but it is also important to realize that all components of the ecosystem are impacted by climate change. As we unravel what those effects are, we see more and more change, often leading to the degradation of the ecosystem," says Likens.

"Whether it is birds, salamanders, grizzly bears, or maple trees, how everything interacts and functions is important because all are part of robust ecosystem function, which is the life support for the planet." Likens and Lowe collaborated on the research with Leah K. Swartz and Brett R. Addis of the University of Montana.

The research was funded by the Sweet Water Trust, the National Science Foundation (Grants DEB-0105091, DEB-1114804, DEB-1050459, DEB-1637685, and DEB-1655653), and The Andrew W. Mellon Foundation.

Adapted from a UConn Today Article—combined reports
UConn Communications

PROVIDING AN EVOLUTIONARY BACKBONE FOR TAPEWORMS

What animal has grappling hooks on its anterior end, a stomach on the outside of its body, and can tell us a lot about evolution? That would be the tapeworm.

As a result of a recent large-scale global survey, tapeworms, a class which encompasses more than 5,000 species, are now one of the most well-known groups of multi-cellular parasites. But that project raised intriguing questions regarding the evolution and classification of these organisms. Perhaps most importantly, it revealed the remarkably central role tapeworms that use elasmobranchs (i.e., sharks and stingrays) as hosts appear to have played in the evolutionary history of the group.

University of Connecticut Board of Trustees Distinguished Professor **Janine Caira,** and her colleagues **Elizabeth Jockusch** and **Jill Wegrzyn,** and UConn **alumna Kirsten Jensen,** now on the faculty of the University of Kansas, have received a $1.5 million grant from the National Science Foundation to tackle some of the questions raised by the team's earlier survey work. The generation of a robust phylogenetic framework for the major lineages of tapeworms is a key interest for the group; the researchers then hope to use this "backbone" to revise the higher classifications of the group.

The focus of the grant will be on the remarkably diverse tapeworms of sharks and stingrays (elasmobranchs). Of the 19 major lineages of tapeworms currently recognized, nine parasitize elasmobranchs. However the team's recent survey work indicates that the tapeworms of elasmobranchs may represent as many as 10 additional independent major lineages, some of which are more closely related to the tapeworms of birds, mammals, and bony fish than they are to other groups of elasmobranch tapeworms, raising some fascinating evolutionary questions.

To generate the evolutionary tree, Caira and her team will use a targeted gene capture approach to identify hundreds of new genes that they will then sequence for about 1,000 species of tapeworms. They will also use morphological data from light and scanning electron microscopy to study the physical characteristics of many of these species. In combination, genetic and morphological similarities will allow Caira and her team to better understand the evolutionary relationships among the tapeworms overall.

"This project will help to fill the gaps in the approximately 200 million years of evolution separating these lineages," Caira says.

The project will also expand on preliminary genomic resources the team developed for tapeworms of elasmobranchs that will serve to complement genomic resources generated by other workers for the two major groups of tapeworms that parasitize humans. In combination, these resources span the taxonomic diversity of all tapeworms, enabling Caira and her team to address broad-scale questions about the evolution of parasitism in this group.

With a "backbone" in hand, Caira and her team will use genomic analyses to look for signatures of parallel molecular evolution in what appear to be multiple instances of transitions from elasmobranchs to bony fish and from the marine environment to the freshwater environment in unrelated groups of tapeworms. This work is aimed at providing some insight into the environmental factors that affect parasite evolution overall.

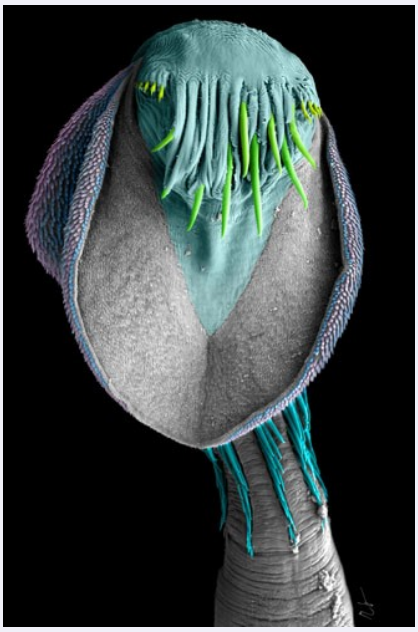


Photo courtesy of Janine Caira

PROVIDING AN EVOLUTIONARY BACKBONE CON'T

"This allows for much more robust inferences about ancestral states, gene gain and loss, and the dynamics of genome maintenance and functional integrity in extremely diverse selective environments than is possible with current data," Caira says.

The project also aims to help disseminate information on tapeworms to as wide a spectrum of audiences as possible. The Global Cestode Database, which is a public resource designed to allow anyone to search for information about tapeworms, will be updated. An online key to the major groups of tapeworms, reflecting the revised classification resulting from the project, will be created. An online version of the prototype of an interactive children's book about tapeworms, titled "Meet the Suckers" will also be developed.

Adapted from a UConn Today Article—Anna Zarra-Aldrich '20 (CLAS) OVPR

COASTAL BIRDS CAN WEATHER THE STORM, BUT NOT THE SEA

How can birds that weigh less than a AA battery survive the immense power of Atlantic hurricanes? A new study in *Ecology Letters* finds that coastal birds populations can absorb impacts and recover quickly from hurricanes—even storms many times larger than anything previously observed.

Researchers developed computational simulations that allowed them to explore how disturbances like hurricanes would affect the populations of four coastal species over time. All of the species were able to absorb the impacts of storms across a wide range in severity.

"Coastal birds are often held up as symbols of vulnerability to hurricanes and oil spills, but many populations can be quite resilient to big disturbances," says **Christopher Field, UConn alum** and now a postdoctoral fellow at the National Socio-Environmental Synthesis Center, who led the work with EEB's **Chris Elphick,** and colleagues from five other universities.

"The impacts of hurricanes, in terms of populations rather than individual birds, tend to be surprisingly small compared to the other threats that are causing these species to decline," he adds.

The researchers used models that projected population sizes into the future based on the species' birth and death rates. Then they subjected these populations to simulated hurricanes that killed a certain number of birds. They were able to look at the full range of potential hurricane sizes, from storms that caused no bird deaths to storms well beyond anything ever observed.

Resilience can be defined in many ways, so the researchers borrowed concepts from classical ecology and applied them to bird populations. They used these concepts to better understand the risk that these species could face from storms that are strengthening because of climate change.

Populations of both Saltmarsh Sparrows and Clapper Rails are declining, largely from increased coastal flooding caused by higher sea levels because of climate change, say the researchers. However, a storm could cause mortality for a third of Saltmarsh Sparrows and Clapper Rails in one year, and it would still be unlikely that their populations would deviate significantly from their trajectories over time.

COASTAL BIRDS CAN WEATHER THE STORM CON'T

If coastal birds are resilient to hurricanes, does that mean they will be resilient to climate change? "It's tempting to focus on dramatic events like hurricanes, especially as they get stronger from climate change," Field says. "But less visible threats like sea-level rise and increased coastal flooding are here to stay, and they are they are going to continue to drive coastal birds, like Saltmarsh Sparrows, toward extinction."

Elphick says there are lessons here for people, too. "After a big event like a hurricane, we often rush to rebuild and improve coastal resilience without thinking as much as we perhaps should about the longer term chronic changes in the system. Obviously, we need to respond to the damage done, but addressing the gradual, less noticeable, changes, may be just as important to coastal communities in the long run," Elphick says.

This research was funded by the National Socio-Environmental Synthesis Center (SESYNC), National Science Foundation, and Fish and Wildlife Service Division of Migratory Birds.

A damaged dock floats in the water during rain and high winds in the Broad Channel section of Queens in New York. (Don Emmert/AFP/Getty Images)

— Adapted from an article from University of Maryland's National Socio-Environmental Synthesis Center

THE ART OF ORGANISMS LIVING IN THE EXTREME

Bernard Goffinet has spent the last 20 years studying the rich diversity of lichens and moss in sub-Antarctic Chile. On October 17, 2019 images of his work were unveiled at that nation's embassy in Washington, D.C.

Goffinet's presentation was part of an announcement about the launch of Chile's Sub-Antarctic Cape Horn Research Center. Set to be inaugurated next October, the center will be the southernmost long-term ecological experiment station in the world. "These organisms are living in the extreme … there is much to be discovered," says Goffinet. The exhibit and panel discussion at the embassy focused on research opportunities in the context of climate change happening in Chile. The United Nations Framework Convention on Climate Change (UNFCCC) was held in Santiago, Chile in December, 2019.

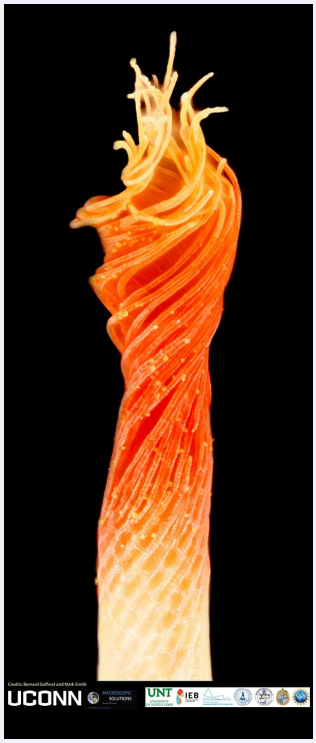
The photo gallery was purposely left without species or size information, Goffinet says, because he wanted the images to stand alone without any details to distract viewers. It emerged out of a desire by Goffinet to stress that there is much to be learned about the diversity within the biosphere of Patagonia. He worked with EEB alumni, **Ricardo Rozzi** (Ph.D. 2001)**,** an advocate for the biosphere reserve, and **Mark Smith** (M.S. 2013) to capture stunning macroscopic photographs of the lichens and mosses in the region.

"Mark has mastered the techniques to capture the beauty and structural complexity of these organisms," says Goffinet. The exhibit, as well as the participation of a UConn delegation at the UN Convention, demonstrate the commitment of the university community in researching and responding to climate change.

This project will serve to promote ecotourism, drawing attention to the region's tremendous and unaccounted for biodiversity. There needs to be a concrete and well-focused effort dedicated to establishing an inventory and a baseline for the interactions between the organisms occurring in the southernmost forests and tundras, says Goffinet.

"In order to assess change, you need to have a baseline and in sub-Antarctic Chile, we do not even have that yet for various groups of organisms," says Goffinet. "If we want a meaningful assessment of what climate change is triggering here, we need to take those steps. This is one of the main points for which I would like to advocate."

Sub-Antarctic lichen/photo by Bernard Goffinet



*Syntrichias/*photo by Mark Smith

TIME-SAVING SOFTWARE IN AN AGE OF EVER-EXPANDING DATA

It is hard to get people excited about software, says **Eliza Grames,** a doctoral candidate in EEB. Yet, the software she has developed is exciting for anyone about to embark on a new research and trying to determine whether it's actually … new.

Put yourself into the shoes of a researcher. Before any new study, a thorough and exhaustive review of existing literature must be done to make sure the project is novel. Or, to determine whether there is existing data that may be used to answer a their new question.

This is a daunting task, especially considering that millions of new research articles are published each year. Where does one even begin to explore all of that data? "Each new study contributes more to what we know about a topic, adding nuance and complexity that helps improve our understanding of the natural world. To make sense of this wealth of evidence and get closer to a complete picture of the world, researchers are increasingly turning to systematic review methods as a way to synthesize this information," says Grames.

Systematic reviews started in the fields of medicine and public health, where keeping current with research can be, quite literally, a question of life or death, says Grames. (Ever wonder how your doctor knows about the latest treatments for your condition?) In those fields, there is an established system with medical subject headers where articles get tagged with keywords associated with the work, but ecology does not have that."

Other fields of research across the scientific spectrum were in the same boat. The project sprang out of need. In her own process of reviewing, Grames noted she would miss articles and key terms and was interested in finding out how to identify those missing terms. So, Grames decided to create a system that researchers in the field of ecology, environment, conservation biology, evolutionary biology and other sciences, could use.

"As we were working on this software, we realized there was a much faster way to do the reviews than how others were doing them," says Grames, "The traditional way was mostly going through papers and pulling out a term and then reading the rest of the article to identify more terms to use."

Even with fairly specific keywords, Grames notes the average systematic review in her field of conservation biology initially yields about 10,000 research papers. While it is important to retrieve relevant information, too much irrelevant information can add unnecessary time.

"Each year, the amount of data just keeps increasing. There are some systematic reviews that if you look at the amount of time they would have taken just three years ago, they would take about 300 days to perform. If the same reviews were done today, they would take about 350 days because the number of publications just keeps going up and up."

Grames says it took about a month or so to hash out ideas for the software, then she spent a summer writing and fixing the code. The result is an open-source software package called **litsearchr.**

How it works, says Grames, is that a user will input a search into a few databases. "The keywords should be fairly relevant entered into the algorithm to extract all of the potential keywords, which are then put into a network. The original keywords are at the center of the network and are the most well-connected."

Grames says the time required to develop a search strategy has been decreased by 90%.

TIME-SAVING SOFTWARE CON'T

Presented with the most relevant articles, researchers then have significantly fewer papers to parse through manually. This review stage is partially automated now, too, adds Grames.

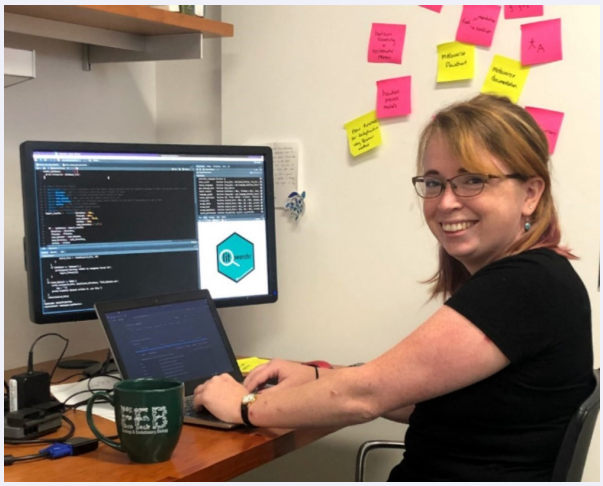
Litsearchr is part of a collaborative effort by researchers, called metaverse, where the goal is to link several software packages together so researchers can perform their research from start to finish in the same coding language.

"Researchers can develop their systematic reviews, import data, and there is even a package that can write up the results section for the systematic review," says Grames.

Grames and her team set up the software so that it could be used by anyone, whether they can code or not, using ready made templates. There is also a detailed step-by-step video to take users through the process.

By keeping the software open source, Grames says debugging and editing is improved because users can point out details that need attention. "Every time I get an email, it is so exciting. It is nice to have it open because people can let me know when there is a typo."

The software is currently being used by researchers in nutritional science and psychology, and for a massive undertaking screening all papers pertaining to insect populations across the globe.



Eliza Grames, doctoral candidate in EEB. (Submitted Photo)

There is no way we could do this project without the level of automation we get using **litsearchr.** I built this out of a need from another project, but this software is making it possible to do even bigger analyses than before."

Grames is funded by a University of Connecticut Outstanding Scholars Fellowship.

In addition to being a software developer, Eliza is an excellent student teacher. She received EEB's 2018-2019 Excellence in Student Teaching Award. The award was presented to her by Eric Schultz at an EEB gathering in September, 2019.

Photo by: Stella S. Ross

BEST WISHES TO DR. JANE O'DONNELL ON HER RETIREMENT

Dr. Jane O'Donnell officially retired from her position as Invertebrate Collections Manager on January 1, 2020. Jane had been at UCONN for 39 years, joining the Department when EEB was the Biological Sciences Group. She completed her undergraduate and graduate degrees at UConn.

Jane distinguished herself through her unconditional commitment to the collection, providing numerous opportunities for undergraduates to acquire experiences in natural history collection management, leading a course on the role and significance of natural history collections (EEB5500) and devoting her career to the preservation, accessibility and growth of the invertebrate collection. Jane has been an inspiration to all who had the chance to work with her. Jane will now focus more of her time on completing some of her outstanding projects on the systematics of the true bugs (i.e., Heteroptera).

"When I arrived at UConn to start my doctoral research, Jane was still an undergraduate. I've long admired her dedication to improving and maintaining the research collection. The transformation from then to now has to be seen to be believed. For the past several years, I've been volunteering in the collection under her direction, mostly updating the beetle specimen database. It's been a joy to work with her... and to share memories from long, long ago," said Stan Malcolm a longtime friend and colleague of Jane's.

COLLECTIONS SPECIMENS REPRESENT 22,000 DIFFERENT SPECIES

Behind locked doors on the first floor of the Biology/Physics Building are massive moveable shelves containing a plethora of preserved flora and fauna — fossilized plants and perfectly intact flowers as well as creatures great and small, from microscopic mites and seed bugs to black bear skulls and a confiscated polar bear skin.

EEB's Biodiversity Research Collections contain hundreds of thousands of specimens representing at least 22,000 different species amassed by faculty, staff, students, and amateur collectors over decades.

"I always tell students, you can go back to the same place, you can look for the same thing, but you can't ever go back in time," Jane O'Donnell, the manager for the Insects, Parasites, and Ant Guests collections, said during a recent tour. "We're a time machine in some sense, but we never get out of date in another sense."

The EEB collections also include birds, fish, fossil plants, herbarium, herpetofauna, and mammals, as well as the living plant collection called the UConn Rainforest. Researchers here and around the world can use the collections in their work, by visiting, having specimens sent to them, or by accessing the digitized collections. Students visit the collections in introductory biology courses and can take courses on maintaining natural history collections.

"These are the organisms that share the planet with us. Natural history collections preserve our natural heritage," O'Donnell says. "I think people relate a little easier to things that preserve our cultural heritage, like art museums and libraries, and this is analogous to that in the broad sense.

"It's our relationship to the natural world, which is becoming more and more tenuous as time goes on," she says.

Artcle adapted from UConn Today article by Julie (Stagis)Bartucca

Biodiversity Research Collections has a vast collection of insect species, including this distinctive dung beetle. (UConn Photo/Sean Flynn)

INSTITUTE OF THE ENVIRONMENT LAUNCHED

Drawing on its strengths as a leader in environmental research, education, and engagement, the University of Connecticut has launched the Institute of the Environment to help chart a course to a greener future.

The new institute will facilitate the University's portfolio of environmental research along with community-wide activities related to sustainability and related efforts, according to **Mike Willig**, executive director of the institute and Board of Trustees Distinguished Professor of Ecology and Evolutionary Biology.

"Sustainability is arguably the biggest challenge we face in the 21st century," says Willig. "Until the establishment of the Institute of the Environment, UConn didn't have a formal organization that facilitated a cross-fertilization of these disciplines across the University, or that created formal bridges between the academic and operations side of the University."

The Institute of the Environment will weave in four organizational units: the Center for Environmental Sciences & Engineering, the Connecticut State Museum of Natural History, the Office of Sustainability, and the Natural Resources Conservation Academy. In addition to many majors that have an environmental component, UConn offers several degrees in this area.

Interdisciplinary collaborations are increasingly important given the rate of transformation in the world, from land use change to climate change, invasive species, and pollution, says Willig. All of the challenges facing the environment require decision-making that weighs costs and benefits from multiple perspectives. This is where an initiative that brings together science, the humanities, and social science is so valuable.

"To understand and foster our relationship to the natural world requires a multidisciplinary approach that involves the entire university and engages the broader community," says John Volin, vice provost for academic affairs and professor of natural resources and the environment.

"Our evolving relationship to the environment is an expression of our competing human values," he says, noting that every aspect of culture – the ways we work, our recreational activities, spiritual and aesthetic lives, political and economic structures, and technological advancement – is shaped by the physical and biological processes happening around us.

UConn is no latecomer to this awareness, with a slew of plaudits and recognition in recent years for the University's sustainability efforts. These include appearing on the Sierra Club's "Cool Schools" list, sending faculty and students to the annual United Nations Climate Change summits, participating in the University Climate Change Coalition (UC3), and committing to the Paris Climate Accord.

"Probably the most important questions we have to answer are, not if a system is sustainable, but if it is desirable," says Willig. "We have many paths we can take in our stewardship, but science doesn't tell us which of those paths to take per se – it's human values that guide us. I don't think that each of us fully understands how we might marshal those perspectives and ways of knowing to the common good."

To learn more about the Institute of the Environment, and their mission, please go to their website: **https://instituteofenvironment.uconn.edu/**

— adapted from an UConn Today article by Elaina Hancock

AWARDS

GRADUATE STUDENTS AND POST DOCS

Rebecca Colby, Ph.D. student in Eric Schultz's lab, was awarded UConn's 100 Years of Women Scholarship Award in 2019. The 100 Years of Women Scholarship Fund was established in 1992 to honor a high school senior planning to enroll in the University of Connecticut, or current UConn students who, as a role model or advocate, has advanced the role and contributions of women in society.

Becca was elected as a Student Director of the UConn Foundation in 2019. She also was awarded a 2020 Doctoral Dissertation Fellowship from the UConn Graduate School.

Samantha Apgar and Eliza Grames, Ph.D. students in Chris Elphick's lab, were awarded 2020 Doctoral Dissertation FellowshipS from the UConn Graduate School.

Eliza also received one of the first grants given from Sysrev which provides funding for projects that use machine learning to improve systematic literature review.

Jessica Gutierrez, M.S. student in Sarah Knutie's lab, received an award from the North American Bluebird Society to study the effect of a gut microbiota disruption on the parasite resistance in Minnesota bluebirds.

Tanner Matson, Ph.D. student in Dave Wagner's lab, was awarded the Audience Favorite and 2nd place award for his "Matson Trap" at the Entomological Society of America Conference in November, 2019.

Chris Nadeau, Ph.D. student in Mark Urban's lab, received a prestigious Smith Conservation Fellowship from the Society for Conservation Biology and the Cedar Tree Foundation.

Jack Phillips, M.S. student in Kurt Schwenk's lab, won the prize for best student paper in the Division of Vertebrate Morphology at the annual meeting of the Society of Integrative and Comparative Biology (SICB). Only eight individuals were chosen to compete—Jack and Amanda Hewes (also a MS student in Kurt's lab) were both selected. In vertebrate morphology this is a very prestigious award and it is exceptionally unusual for a Masters student to win it.

Jack has two papers from his Masters thesis accepted for publication. He also won Best Student Presentation at the Annual Meeting of the Herpetological Association of Africa (HAA) in South Africa and an Honorable Mention for the Seibert Award at the Joint Meetings of Icthyology and Herpetology.

Andrew Stillman, Ph.D. student in Morgan Tingley's lab received a 2019 Graduate Research Innovation (GRIN) Fellowship from the Joint Fire Science Program (DOI, BLM, Forest Service). The Fellowship will provide a stipend for Andrew to pursue his project titled, *"Incorporating pyrodiversity into wildlife habitat assessments for post-fire management and recovery,"* in association with collaborators at the Institute for Bird Populations and the USDA Forest Service.

Dr. Johanna Harvey, post doc in Sarah Knutie's lab, received a American Museum of Natural History Post-doctoral Research Fellowship to work with Dr. Susan Perkins. Dr. Perkins conducts research on the malaria parasites that use vertebrates such as lizards, bat, and birds, as their hosts.

EEB IN THE NEWS

Now Endangered: The Very Act that Protects Wildlife — *Mark Urban* – Kristen Cole *UConn Today*
https://today.uconn.edu/2019/08/now-endangered-act-protects-wildlife/

Why the Amazon is Burning and How World Leaders Want to Stop It – *Robin Chazdon* *NPR On Point*
https://www.wbur.org/onpoint/2019/08/26/amazon-rainforest-fires-brazil-g7-macron

Meet the monkeyflower, a weed that may hold the key to zebra stripes and other biological mysteries —Yaowu Yuan – Elizabeth Pennisi *Science*
https://www.sciencemag.org/news/2019/08/meet-monkeyflower-weed-may-hold-key-zebra-stripes-and-other-biological-mysteries

Time-Saving Software in an Age of Ever-Expanding— *Eliza Grames*— Elaina Hancock *UConn Today*
https://today.uconn.edu/2019/09/time-saving-software-age-ever-expanding-data/

Why is Earth so Biologically Diverse? Mountains Hold the Answer — *Rob Colwell* – Combined Reports *UConn*)
https://today.uconn.edu/2019/09/earth-biologically-diverse-mountains-hold-answer/?utm_source=listserv&utm_medium=email&utm_campaign=weekly&utm_content=uconn-today

Hurricanes May Kill Some Birds, but Humans are the Real Threat — Chris Elphick— James Gorman *NY Times*
https://www.nytimes.com/2019/09/17/science/hurricanes-birds-threat.html

We've Lost 3 billion birds since 1970 in North America — Morgan Tingley— Jonathan Lambert *ScienceNews*
https://www.sciencenews.org/article/3-billion-birds-lost-since-1970-north-america

Where have the wild birds gone? 3 billion fewer than 1970 — Margaret Rubega — Seth Borenstein and Christina Larson *AP News* ***https://magazine.uconn.edu/2019/06/14/uconn-talks-summer-19/***

How to Get a Species Named after You — Janine Caira — Alison Koontz *Scientific American*
https://blogs.scientificamerican.com/observations/how-to-get-a-species-named-after-you/?utm_source=listserv&utm_medium=email&utm_campaign=daily&utm_content=uconn-today

The Art of Organisms Living in the Extreme — Bernard Goffinet -- Elaina Hancock *UConn Today*
https://today.uconn.edu/2019/10/art-organisms-living-extreme/?utm_source=listserv&utm_medium=email&utm_campaign=daily&utm_content=uconn-today

Fake chimneys for birds that need vertical hollows to rest — Margaret Rubega — Janet McConnaughey and Jay Reeves AP News
https://apnews.com/f52138468e5042b9b84b8ed37674b75c?utm_source=listserv&utm_medium=email&utm_campaign=daily&utm_content=uconn-today

Florida woman hospitalized after getting stung by venomous puss caterpillar — Dave Wagner — Ricky Pinella Orlando Sentinel
https://www.orlandosentinel.com/news/florida/os-ne-florida-woman-hospitalized-after-puss-caterpillar-sting-20191021-xbav3pw4mzbshf4crh7ksfvriu-story.html?utm_source=listserv&utm_medium=email&utm_campaign=daily&utm_content=uconn-today

EEB IN THE NEWS

UConn rainforest acquires major collection of ginger relatives — EurekAlert (AAAS)
https://www.eurekalert.org/pub_releases/2019-10/uoc-ura103019.php

Treehoppers' Bizarre, Wondrous Helmets Use Wing Gene to Grow — Cera Fisher, Jill Wegrzyn, Elizabeth Jockusch – Katherine J. Wu *Smithsonian Magazine*
https://www.smithsonianmag.com/science-nature/treehoppers-bizarre-wondrous-helmets-use-wing-genes-grow-180973713/#mZC3GKHqrwBhRFlr.99

A Bug Life— Jane O'Donnell— Julie (Stagis) Bartucca *UConn Today*
https://today.uconn.edu/2019/12/a-bug-life/?utm_source=listserv&utm_medium=email&utm_campaign=daily&utm_content=uconn-today

Stressed? Be Stoic — *Massimo Pigliucci* – Steve Neumann *UConn Magazine*
https://today.uconn.edu/2020/01/uconn-magazine-stressed-stoic/?utm_source=faculty-staff-daily-digest&utm_medium=email&utm_campaign=daily

New England Power Line Corridors Harbor Rare Bees and Other Wild Things — Dave Wagner and Henry Frye *UConn Today*
https://today.uconn.edu/2019/10/new-england-power-line-corridors-harbor-rare-bees-wild-things/

Introducing the 2020 David H. Smith Conservation Research Fellows — *https://conbio.org/publications/scb-news-blog/introducing-the-2020-david-h.-smith-conservation-research-fellows*

NEWS FROM OUR ALUMNI

Dr. **Kaitlin Gallagher** (Ph.D. 2019) has accepted an assistant professor position in biology at Christian Brothers University in Memphis, TN. She will begin her position n August, 2020.

Dr. **Nasim Rahmatpour** (Ph.D. 2019) accepted a post-doc position with Fay-Wei Li at the Boyce Thompson Institute at Cornell University.

Dr. **Anna Sjodin** (Ph.D. 2019) received the 2019 E.C. Pielou Award from the Statistical Ecology section of the Ecological Society of America. The E.C. Pielou Award is a competitive award made annually to a graduate student or recent Ph.D. graduate based on overall quality of the student's scientific contribution to statistical ecology as evidenced by his/her oral presentation at the Society's Annual meeting.

FACULTY GRANTS

Dan Bolnick is CO-PI with Misha Matz, Mike Ryan and Manfred Schartl, on PI Mark Kirkpatrick's NIH-NIGMS grant entitled *"Sexually antagonistic selection in the genome."*

Sarah Knutie received a 2019 National Geographic Society Research and Exploration Grant for her proposal entitled "*Costs and benefits of urban living for Darwin's finches in the Galapagos Islands"*

Mike Willig received a NSF grant for his proposal entitled: "OPUS: CRS -- A Cross-Scale Synthesis in a Disturbance-Mediated System: Integrating Population, Community, and Metacommunity Perspectives,"

Breaking News: Jill Wegrzyn recently received the news that her NSF CAREER proposal, "*Advancing evolutionary genomics and eukaryotic biodiversity research through accurate, scalable, and flexible frameworks for structural genome annotation"* will be funded.

2019 PUBLICATIONS

Anderson, R. M., N. M. Dallar, N. L. Pirtel, C. J. Connors, **J. G. Mickley**, **R. Bagchi** & M. S. Singer. 2019. Bottom -up and top-down effects of forest fragmentation differ between dietary generalist and specialist caterpillars. *Front. Ecol. Evol*. 9:452. DOI: 10.3389/fevo.2019.00452

Barton, P., M. Westgate, C. Foster, K. Cuddington, A. Hastings, L. O'Loughlin, C. Sato, **M. R. Willig**, and D. Lindenmayer. 2020. Using ecological niche theory to avoid uninformative biodiversity surrogates. *Ecological Indicators* 108:105692. *In Press.*

Beausoleil, M.-O., L.O. Frishkoff, L.K. M'Gonigle, J.A.M. Raeymaekers, **S.A. Knutie**, L.F. de León, S.K. Huber, J.A. Chaves, D.H. Clayton, J.A.H. Koop, J. Podos, D. Sharpe, A.P. Hendry, R.D.H. Barrett. 2019. Temporally varying disruptive selection in the medium ground finch (*Geospiza fortis*). *Proceedings for the Royal Society of London B* 286: 20192290. doi: 10.1098/rspb.2019.2290

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Che-Castaldo, J., O. R. Jones, B. E. Kendall, J. H. Burns, D. Z. Childs, T. H. Ezard, H. Hernandez-Yanez, D. J. Hodgson, E. Jongejans, **C. Merow**, S. Ramula, I. Stott, Y. Vindenes, H.Yokomizo, R. Salguero-Gómez. 2020. Comments to "Persistent problems in the construction of matrix population models". *Ecological Modeling***.** 416: 108913.

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Dong S., C. Zhao, S. Zhang, L. Zhang, H. Wu, R. Zhu, Y. Jia, **B. Goffinet** & **Y. Liu**. 2020. Mitochondrial genomes of the early land plant lineage liverworts (Marchantiophyta): conserved genome structure, and ongoing low frequency recombination. *BMC Genomics* 20: 953. https://doi.org/10.1186/s12864-019-6365-y

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Grames, E. M., **G. A. Montgomery**, N. R. Haddaway, L. Dicks, **C. S. Elphick**, **T. A. Matson**, S. Nakagawa, M. E. Saunders, **M. W. Tingley**, T. E. White, P. Woodcock, and **D. L. Wagner.** 2019. Trends in global insect abundance and biodiversity: A community-driven systematic map draft protocol.

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Ling, F., **D.I. Bolnick***, N.C. Steinel, J. Weber, L. Ma, C. Smith, D. Correa, B. Zhu, G. Wang. In press. The gut microbiome response to helminth infection depends on host sex and genotype. *ISME J *Co-first author. BioRxiv preprint: doi: https://doi.org/10.1101/608638*

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