THE UNIVERSITY OF MICHIGAN
DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY
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Curious child becomes renowned ecologist

Knute Nadelhoffer sampling earthworms as part of former grad student Jasmine Crumsey's project at UMBS.

Almost all ecologists recall catching the "science bug" during their childhood. Professor Knute Nadelhoffer grew up in "a Midwestern oak-hickory savannah sprinkled with glacial lakes and relict forests." The landscape of small farms and towns north of Chicago in the 1950s and 1960s left the boy with a lot of unstructured outdoor time – exploring lakes and rambling through forests. He fished, swam, and collected and identified plants and amphibians.

Nadelhoffer was the first in his family to attend college. He planned a pre-med course of study, but soon altered this trajectory. "I started college in interesting times, 1968, a tumultuous year." He remembers the first Earth Day, in April 1970, when he formed vague ideas about other biological careers. At the University of Wisconsin, Nadelhoffer took courses in ornithology and plant ecology and worked in the herbarium. He realized then it was possible to study the natural world in an organized way.

Knute Nadelhoffer on a blueberry farm (about 4 years old) with his cousin.

Fast forward through two-and-a half years of public school teaching, followed by a Ph.D. at UW and a two-year postdoctoral fellowship at the Ecosystems Center in Woods Hole, Mass. "Two years of a postdoc turned into 20 years as a research scientist." In Woods Hole, Nadelhoffer began studying Arctic tundra, looking at how carbon-rich peat wetlands take up and store atmospheric carbon dioxide (CO_2) and relationships between plant growth and nutrient cycles under cold, wet Arctic conditions. He continued his graduate research on forest nutrient and carbon cycling, expanding his network of research sites across North America and Europe. "I became an ecosystem ecologist during those years at Woods Hole."

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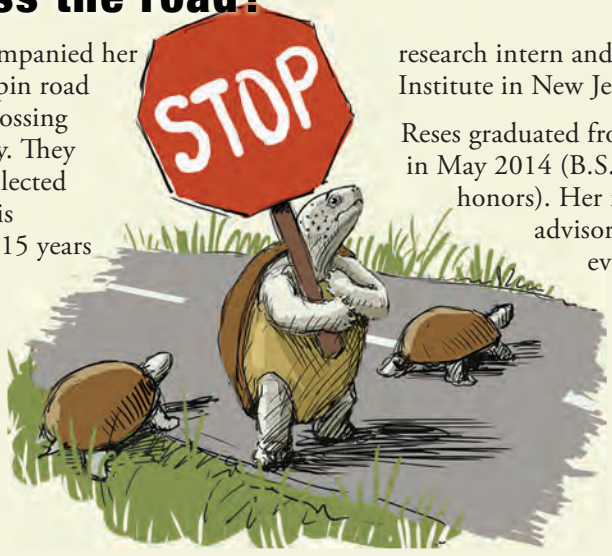
Why did the turtle cross the road?

Once upon a time, a young girl accompanied her grandfather on diamondback terrapin road patrols to ensure the turtles' safe crossing of a causeway in coastal southern New Jersey. They documented terrapin road mortality and collected injured turtles to take to a veterinarian. "This causeway became one of my two study sites 15 years later!" Hannah Reses said.

If road-killed turtles had viable eggs, they were brought back to the Wetlands Institute where the eggs were extracted, incubated, hatched, and released in a head-starting program. Reses was involved in this during her childhood road patrols and it became one of her primary roles as a research intern and research assistant at the Wetlands Institute in New Jersey many years later.



Reses graduated from the University of Michigan in May 2014 (B.S. EEB with distinction and high honors). Her recent thesis research, with her advisor, Dr. Alison Davis Rabosky, evaluated the effectiveness of barrier fences that were installed to reduce road mortality in diamondback terrapins (*Malaclemys terrapin*) seeking nesting habitat along two N.J. causeways.

The natural nesting habitat for terrapins is in sand dunes on

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Chair's note

Photo credit: Dale Austin

Diarmaid Ó Foighil
Chair, Professor of Ecology and Evolutionary Biology
Curator, Museum of Zoology.

Dear Friends,

Fall greetings from Ann Arbor! As I enter my first academic year as the new chair of EEB, I'd like to pay tribute to my predecessors, John Vandermeer, who served as interim chair for the past year, and Deborah Goldberg, our founding and long-time head of department. John has been a faculty member at the U-M since 1970 and he embodies the sense of intellectual drive and enthusiasm that lies at the heart of EEB. Deborah has guided and shaped the department since its very beginning. I simply cannot imagine the EEB department without her input and she deserves the lion's share of credit for the vibrant and inclusive academic community it has become.

Our program in ecology and evolutionary biology continues to thrive and develop. Twenty-three new graduate students joined us this term. It was a real pleasure to get to know this talented and diverse cohort over a picture-perfect September weekend during our 30th EEB Retreat at the U-M Biological Station. I very much look forward to seeing them develop into accomplished scientists over the coming years. Our fantastic, award-winning EEB faculty members continue to excel. For instance, we cleaned up at the Ecological Society of America this year: 3/12 new ESA Fellows (Mark Hunter, Deborah Goldberg and John Vandermeer) plus the Robert T. MacArthur Award (Mercedes Pascual) were added to our preexisting ESA Early Career Fellow (Meghan Duffy). Most recently, Dan Rabosky won a Packard Fellowship, awarded to the 18 best early-career scientists and engineers in the nation. EEB research is in good hands amongst our very talented faculty and students!

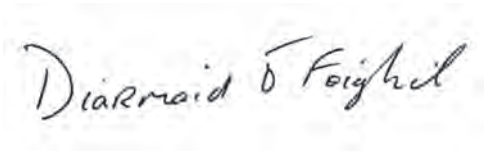
I'm particularly pleased to announce two exciting new faculty hires. Chelsea Wood has just joined us as an assistant professor and Michigan Fellow. She studies the ecology of parasites and pathogens in freshwater and marine ecosystems. Nyeema Harris will join us in the fall of 2015 as an assistant professor. She studies the ecology of mammals and has extraordinary field experience both in North America and throughout Africa. Other faculty transitions this past year include the attainment of emeritus status by three of our long-term faculty: Professors William Fink, Philip Myers, and Earl Werner. As is the case with most of our emeriti, all three remain very much part of our EEB community.

Inside this issue of *Natural Selections*, you'll find an up-close profile of EEB professor and director of the U-M Biological Station, Knute Nadelhoffer. The photo of a 26-year old Knute is not to be missed. His research on forest biogeochemistry is an important part of the climate change puzzle and Knute is also actively involved in public policy and outreach. I think you'll enjoy learning about Hannah Reses, an honors student who just completed her undergraduate degree in biology, majoring in EEB. Her thesis work on terrapin conservation is compelling on a number of levels and is about to be published with her advisor, Alison Davis Rabosky. This issue also features Jingchun Li, a recent Ph.D. graduate. The article outlines her NSF postdoctoral fellowship research at Harvard on the evolution of solar-powered cockles as well as her Ph.D. research on the role of commensalism in a hyper-diverse marine bivalve radiation. And, don't miss our ever-popular photo contest winners, in full color for the first time, on the back cover.

In closing, I'd like to say that I'm profoundly impressed by our talented faculty, graduate students and staff and look forward to working closely with them over the next three years. We have much to do but our future is indeed bright!

I look forward to hearing from you in the coming year. Please take advantage of the many electronic avenues now available to keep in touch with EEB people, news and events, including our website, Facebook, Twitter (#UMichEEB), EEBlog, YouTube channel, RSS newsfeed, and enewsletter.

With my best wishes for a peaceful holiday season and a happy and healthy new year!



Editors: Diarmaid Ó Foighil, Nancy Smith
Writer, editor: Gail Kuhnlein
Design & Illustration: John Megahan

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Answers to Earth's crises may be found in surprising places

Photo credit: John Chapman

Jingchun Li at Hatfield Marine Science Center digging for clams attached to mud shrimps.

Could the humble clam hold the secret within its shell to helping planet Earth with the energy crisis?

Jingchun Li, a recent doctoral student graduate in the Department of Ecology and Evolutionary Biology at the University of Michigan, has begun a National Science Foundation postdoctoral fellowship at Harvard University in the Department of Organismic and Evolutionary Biology. That is one of the many questions her research will explore.

Li is investigating how symbiotic associations affect the evolution of marine bivalves, specifically a group of molluscs called heart cockles.

"They have an interesting photosymbiotic relationship with marine algae," said Li. The cockles host algae inside their tissues, which absorb sunlight and transfer the resulting organic carbon to their cockle hosts, which lounge on ocean floors receiving "a free lunch." In this mutually beneficial relationship, the algae provide food for the host and the host cockles provide shelter for the algae.

Li's research project explores the evolution of this photosymbiosis. "I will build phylogenetic trees of these different groups to see where and when photosymbiosis evolved. I'll compare evolutionary patterns between photosymbiotic and non-photosymbiotic groups." She is also looking into the cockles' morphology and rate of evolution.

"They look really weird, really flat," Li said of the heart cockles. "They are normally closed, sitting on the ground. They are almost like a solar panel sitting in the sediment. It's possible they have a lot of unique adaptations to photosymbiosis, such as microstructures in the shell that act as condensing lenses so that when the sun shines on them, they may increase the intensity of sunlight inside their tissues."

If the researchers look closely at the architecture and microstructure of the shells, their findings might provide clues for engineers for improving solar panels.

Li will also look at the genomic composition of the heart cockles that might be related to photosymbiosis. "What changes are involved in hosting algae living inside their tissue? How do they host algae and how do cockles and algae recognize each other? The cockles have special tubular systems in their tissue for hosting algae. In comparing these organisms to sister groups that don't have the algal association, we might be able to identify some interesting genomic structures."

"...their findings might provide clues for engineers for improving solar panels"

Li arrived at U-M knowing she wanted to study marine biodiversity because as a little girl, she journeyed to an imaginary underwater city in the Great Barrier Reef off Australia's eastern coast and ventured to the northernmost reaches of the Arctic.

She had immersed herself within the pages of a series of children's books, Willard Price's "Adventure" series, which formed the foundation of her future studies. "I thought it was real when I was reading it," she recalled.

In a case of serendipity, Li was discussing what she would study for her doctoral program with her advisor, Professor Diarmaid Ó Foighil. Ó Foighil had just received an email about the hyper-diverse marine bivalve superfamily Galeommatoidea from a colleague at the National Museum of Natural History in Paris that he shared with his new student. And that was that.

The last chapter of Li's thesis dissertation is about her work on members of this superfamily that have a commensal relationship with other little marine invertebrates. "I'm interested in how this strange association affects the superfamily's evolution and morphology. It's a global scale project, so I collaborate with museums worldwide." Li and collaborating researchers have gone on biodiversity expeditions and collected hundreds of species of clams. Li extracted their DNA, looked at gene markers, and reconstructed the phylogeny for this group. She compared commensal clams to free-living clams, looking at rates of evolution, morphological change, and their ecology."

Most of these clams grow to two to three millimeters wide, about the size of a pencil tip, and up to one centimeter. Researchers must look at them through dissecting scopes. Li estimates that there are between 400 - 700 species in the superfamily, about half are undescribed.

Most striking is that the free- living clams and the commensal clams show different patterns of evolution. The free-living clams are evolving at a higher rate than commensal clams and

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New chair Ó Foighil takes helm of EEB


Photo credit: Pascal Title

Diarmaid Ó Foighil describes various mussel species from Douglas Lake to Annette Ostling and Yin-Long Qiu.

Professor Diarmaid Ó Foighil is the new chair of the Department of Ecology and Evolutionary Biology, following Professor John Vandermeer, who was interim chair for the 2013-2014 academic year. Ó Foighil became acting chair May 1, 2014 and officially stepped into the new role July 1, 2014.

"Diarmaid will be a great chair," said Vandermeer. "He has already shown great leadership skills as director of the museum, taking the time to seek out everyone's advice on issues concerning them. During these trying times, with the university engaging in some complex and difficult issues such as the famous Administrative Services Transformation (AST) and the department looking at a future in a new building, he is exactly the sort of person we want running the ship. If he were running for president, I would vote for him."

Ó Foighil obtained a B.Sc. (honors) in zoology from the National University of Ireland, Galway, in 1981 and a Ph.D. in biology from the University of Victoria, Canada, in 1987. He was a postdoctoral fellow at the Friday Harbor Laboratories, University of Washington; Simon Fraser University, Vancouver, B.C.; and a research scientist at the University of South Carolina prior to joining the faculty at the University of Michigan in 1995 as a member of the then Department of Biology and the U-M Museum of Zoology. He served as director of the UMMZ from 2011 – 2014.

"If he were running for president, I would vote for him."

Ó Foighil's research interests are in invertebrate evolution and systematics, with an emphasis on Mollusca, the second largest animal phylum. They are enormously diverse, have an excellent fossil record, and play central roles in almost all of the Earth's ecosystems. "Outstanding exemplar molluscan taxa can be targeted for most primary questions in the overlapping disciplines of evolution, systematics and biogeography," he said. "Although my background has been in marine systems, since moving to Ann Arbor I have also become very interested in freshwater and terrestrial taxa and presently have research projects on marine, freshwater and terrestrial taxa." These include speciation of open-ocean surface plankton (neuston), the role of commensalism in promoting marine speciation and the conservation biology of highly endangered Pacific island tree snails.

"Diarmaid is an inspiring teacher and an empowering mentor to individual students," said Professor Deborah Goldberg, who was EEB's chair for 11 years. "But, in addition, he has had and continues to have an influence on the biology curriculum that reaches thousands of students, well beyond what any individual instructor can achieve. The College of LSA recognized his extraordinary achievements with an Excellence in Teaching Award in 2008."

Ó Foighil led a three-year process to evaluate and revise the introductory biology sequence and revamp the shared biology concentrations. "He is the single person most responsible for the recent review and revision of the way we teach introductory biology to over 1500 students a year.

"His consistent, calm insistence on thinking about what would be best for the students, combined with his wonderful dry sense of humor, was, I think, the reason it all worked so well in the end.

"Diarmaid's service in other areas of the department is equally stellar. In addition to serving as associate chair and on many regular committees, he was elected a member of the EEB Executive Committee, chair of the EEB Promotion and Merit Committee, chair of a search committee, and much more."

He has published some 80 articles, many in major scientific journals and with students as coauthors.

Jingchun Li, who recently graduated with her Ph.D., said of her advisor, Ó Foighil, "He cares about his students very much, and not just about our academic roles – he cares whether you're happy or not – he's really good at that. He asks what's wrong and sees how he can help."

Li recalls that when she first came to U-M from China, he provided a great deal of assistance and direction. One day when she emailed to say she couldn't make it to the lab because she had hurt her foot, he called to find out what happened, insisted on driving her to the hospital for proper treatment, and found a wheelchair to get her into the building.

"He's really warmhearted. Our lab group is very much like a family to us. A big family." He hosts parties when his students publish their first papers and they celebrate with cakes decorated with a picture of the paper. He recently presented Li a cake with a picture of her diploma on top.

"EEB is lucky to have Diarmaid coming in as the new chair," said Goldberg. "He is completely committed to further increasing EEB's already stellar reputation for outstanding research, continuing to improve our teaching and expand our major, while making it a supportive and balanced place to work. He is highly collaborative and has wonderful people skills and I couldn't be more optimistic about the future of the department."

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Hannah Reses at the Wetlands Institute with two adult female diamondback terrapins.

barrier beach islands, which have largely disappeared due to habitat encroachment. "Development has forced terrapins to seek alternative nesting habitat along the embankments of heavily-trafficked causeways that cross salt marshes."

Over 10,000 roadkills were documented in Reses' study sites from 1989-2011. "Fences have frequently been implemented to combat road mortality, but at the expense of changing patterns of nesting behavior and increasing population fragmentation. My research addresses the ecological tradeoffs associated with fence installation, in order to understand the net effects of fences on population persistence in a species of high conservation concern.

"Determining barrier effectiveness is critical to understanding how barriers impact adult female nesting behavior, ensuring that our conservation efforts and resources are being properly allocated, and identifying opportunities for improvement in barrier design. This was the first study that rigorously assessed the efficacy of ongoing efforts to reduce roadway mortality in diamondback terrapins, in addition to investigating the ecological ramifications of barriers in areas of high urbanization.

"In a world with increasing conflict between humans and other species and limited funding available in conservation management, efficient use of resources is critical."

The constructed barrier fences were highly effective in restricting nest-seeking terrapins to the marsh side of the barriers, and therefore substantially decreased roadway access and subsequent road mortality.

In recent years, nesting terrapins crowded airport runways at John F. Kennedy International Airport, New York. At the request of airport biologists, when Reses was working with the Wetlands Institute in N.J., she wrote a technical report detailing methods for monitoring terrapin barriers.

Reses was the 2014 winner of the Marshall Nirenberg Award in the Life Sciences for her honors thesis, scholarship excellence, and commitment to service in public health. Her thesis was accepted by *The Journal of Herpetological Conservation and Biology,* likely for the December 2014 edition.

Reses worked as a research assistant in Professor Deborah Goldberg's plant ecology lab throughout her undergraduate years, where she processed samples and studied environmental constraints on the germination of native and invasive cattails.

"As an EEB major, I was fascinated by interactions among humans, animals, and the environment. When I took a course on the ecology and evolution of infectious diseases, I realized that I found the field of study that encompassed all of my interests and fulfilled my desire to apply EEB concepts to tangible problems affecting human populations."

"In a world with increasing conflict between humans and other species and limited funding available in conservation management, efficient use of resources is critical."

Reses is a first-year graduate student at Emory University's Rollins School of Public Health, pursuing a Master of Public Health degree in epidemiology. "I plan on researching the ecology and evolution of infectious diseases and the environmental determinants of disease emergence, particularly in underserved populations worldwide," she said.

She's been hired by the Rabies Team at the Centers for Disease Control (CDC), where she will study the ecological, environmental, and climatic influences on animal rabies transmission dynamics. She will assist in the development of an animal rabies surveillance program in Haiti.

After earning an MPH, she plans to pursue her Ph.D. in infectious disease epidemiology, and hopes eventually to work as an epidemiologist for the CDC.

So, just why did the turtle cross the road? Fortunately, due to the work of Reses and others, we don't have to ask this question nearly as often.

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Knute Nadelhoffer, 26, working for the Youth Conservation Corp.

Nadelhoffer moved to the University of Michigan in 2003 to become director of the U-M Biological Station (UMBS) and a professor in the Department of Ecology and Evolutionary Biology. One of the largest field stations in the country, UMBS comprises 10,000 acres of forests, wetlands, rivers and lakeshore. It provides access to a wide range of habitats across northern Michigan, which enables a diverse, interdisciplinary field research program. UMBS was founded in 1909 following region-wide logging and burning at the turn of the last century. As a result, most forests surrounding the station and across the northern Great Lakes region are less than 100 years old.

"We have an obligation to effectively and dispassionately convey what we know to people who will realize its value and use it to make good policy."

"Researchers at UMBS seek to understand processes affecting our planet, principle among them is the carbon cycle. Most UMBS forests, like many across North America, Europe and Asia are growing back after massive harvesting and are removing more carbon dioxide from the atmosphere than they're returning. These forests, in aggregate, are offsetting about one-quarter of all human-derived CO_2 emissions," explained Nadelhoffer. "Conventional ecological wisdom is that forests remove CO_2 most rapidly at about 40 to 80 years after disturbance. However, new research suggests forests might continue taking up and storing carbon for a century or more following the restart of growth after being cut or burned."

Fortunately, about 300 acres of forests at UMBS have not been cut or burned for over 150 years. These rare "old growth" forests provide opportunities to test this conventional wisdom. According to Nadelhoffer, "These forests are helping to slow the rate of warming. If we cut forests every 30 years, they're probably releasing as much CO_2 as they're taking up. If we manage forests for long-term growth, we're helping mitigate some of the greenhouse gasses to the atmosphere."

"UMBS students now have opportunities to look back and see what northern Michigan looked like 100 years ago, 50, 25, 10 years ago, and to compare historic information with their data to predict what the environment might look like in a decade or decades into the future."

The 110-foot-tall UMBS AmeriFlux tower was built in 1998 with U.S. Department of Energy (DoE) support to track the carbon and energy balances of a naturally aging forest, which is gradually shifting from dominance by aspen and birch trees to domination by oaks, maples and pines. Instruments on this "eddy-covariance" tower continuously measure factors such as CO_2 concentration, wind direction, wind speed, solar energy input and heat balance. The 15-year AmeriFlux tower record, together with measurements of tree biomass and soils, shows that UMBS forests are removing one-half to one ton of carbon per acre from the atmosphere each year.

UMBS forests, however, are in transition from being dominated by tree species, such as aspen and birch, which recolonized after logging and fires a century ago, to more shade tolerant species such as red oak, maples and white pine. An important question is whether forests dominated by these "late succession" species will continue taking up atmospheric carbon at the same rates as the aspen-dominated forests. To answer this question, a large team of UMBS-based AmeriFlux researchers established the Forest Accelerated Succession ExperimenT/Forests in Transition (FASET/FIT). This collaborative project, involves modifying the species composition forest by killing over 6,700 aspen and birch trees in an 80-acre plot within which a second eddy covariance tower was erected in 2007, the year before aspen and birch trees were killed by removing bark from around their stems. The FASET experiment accelerates the natural transition to old-growth forests and researchers are seeking answers related to patterns of forest carbon uptake, such as: Does the rate of carbon uptake depend on tree species composition? Will future forests store atmospheric CO_2 at the same rate as today's forests?

"Our focus is to understand processes responsible for taking up atmospheric carbon and storing it in soils and biomass. This will allow for better predicting of how forests function as they age and as climate continues to change," Nadelhoffer said. His research investigates how the forest nitrogen cycle is changing and affecting the carbon cycle. Nadelhoffer collaborates with Luke Nave, a UMBS-EEB assistant research scientist, and colleagues from The Ohio State University and Virginia Commonwealth University on the AmeriFlux-FASET project, which, as of this year, is funded on a long-term basis as one of ten DoE AmeriFlux core sites. Nadelhoffer and Nave recently completed an NSF-funded project focused on how soil nitrogen cycles were affected by the FASET treatment. This research serves as a platform for workshops involving foresters and land managers that inform forest management decisions as well as for site visits by tribal groups and K-12 teachers.

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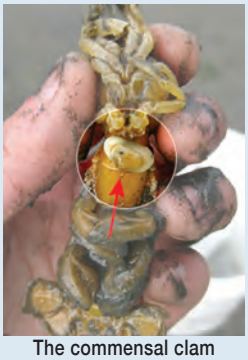
do not have a strange morphology. The commensal clams, however, are evolving more slowly and have rapid morphological evolution.

"It's interesting because people think the rate of evolution and morphological change would be related but, in this case, it's the opposite."

Her hypothesis is akin to the Red Queen's race from Alice in Wonderland, whereby Alice had to keep running to stay in place. In this case, she believed that the host and symbiont have to keep evolving to keep up with each other and that the organisms react to their changing environment just to survive.



The commensal clam *Neaeromya rugifera* attached to a mud shrimp *Upogebia pugettensis*.

Some of the stranger morphologies in the commensal clams include tinted tentacles, an excess of soft tissue that encloses the shell, and flat shells. Some of the bizarre commensalisms are clams living in a sea cucumber esophagus, on a shrimp's belly, or in crab gills.

Li thought the commensal clam morphology was so varied because they have so many different host associations, but then she discovered that the free-living clams are more diversified. "It looks like it's because they're occupying a biologically complex coral reef system – a biodiversity hot spot. We don't really know." That's the question that got her interested and there is further work to be done, as is so often the case in science.

Li was awarded a prestigious Doctoral Dissertation Improvement Grant from the National Science Foundation, which supported her thesis research. Her dream job is to have a research or faculty position at a university, research institution or museum.

Li met her husband, Paul Shearer, who is now a postdoc and applied mathematician, at a U-M graduate student speed dating event. The first person she met, he took out his notebook and began explaining his project and calculations and asked about her project. He was fascinated about someone working with the "real world." After the event, he found Li to finish explaining his project. Needless to say, they were a match made in academia.

curious child from page 6

Nadelhoffer and Nave were awarded a five-year NSF Long-Term Research in Environmental Biology (LTREB) grant last May. This project, the "Forest Burn Chronosequence Experiment," uses existing long-term plots to investigate the drivers of forest nitrogen cycling and carbon storage in forests ranging in age from 15 to over 150 years old. "A lot of science is luck," Nadelhoffer said. "And luckily for us, Professor Frank Gates was teaching plant ecology at UMBS in 1936 and started a series of experimental burn plots that mimicked the cutting and burning of the early 1900s. Other experimental burns followed, and we now have a series of six plots cut and burned to study how forests recover from major disturbances such as fire."

Another five-year NSF award funds the Black Carbon project, a collaboration with City University of New York and Purdue investigators that uses UMBS for field experiments to link the chemical structure of black carbon or "biochar" to nutrient cycling and soil invertebrate and microbial community dynamics in forest soils. Prior to U-M, Nadelhoffer was among the first ecologists to perform large-scale stable isotope biogeochemistry, which is integral to this project.

Nadelhoffer values UMBS projects with which he is not directly involved. One example is a three-decade piping plover restoration program focused on the Great Lakes population of this federally protected shorebird. Overall, scores of scientists from around the world work at UMBS on diverse projects focused on organisms (e.g. mammals, algae, mollusks, insects, fungi, etc.), aquatic systems, atmospheric chemistry, environmental sensors, and forests. "As a scientist, it's wonderful to be able to talk with and learn from others who are at the top of their scientific games," he said.

Nadelhoffer spends time talking to alumni, community and school groups explaining the importance of environmental and ecological sciences. These presentations led to him (and his students) getting involved in public policy about climate change in the Great Lakes region, and occasionally meeting with the Michigan legislative staff and members of the U.S. Congress.

"In my core, I think we have an obligation," he said of his outreach. "We're privileged to have information that few others have. As ecologists or evolutionary biologists, things we think are simple and obvious are not known by most people, including educated people and those who make decisions about resources and make laws. We have an obligation to effectively and dispassionately convey what we know to people who will realize its value and use it to make good policy."

He advocates spending time on things for which we have little talent. "It keeps us on the edge of learning, and gives teachers insights into their students' struggles with new ideas and ways of thinking." As such, he is a self-described, struggling guitar player. "When my scientific thinking gets bogged down, I steal away and play the blues or riff on a rock tune. It feeds my creativity and reenergizes my neural networks."

Nadelhoffer is involved in several other ongoing research projects. Read more on his lab website: ***sites.lsa.umich.edu/nadelhoffer-lab/***

To read more about UMBS visit: ***http://www.lsa.umich.edu/umbs/***

The University of Michigan
Department of Ecology and Evolutionary Biology
Kraus Natural Science Building
830 North University
Ann Arbor, MI 48109-1048
USA

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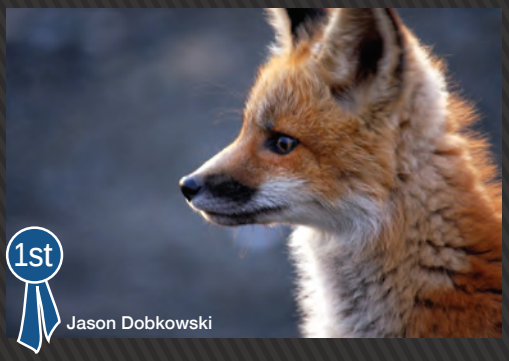
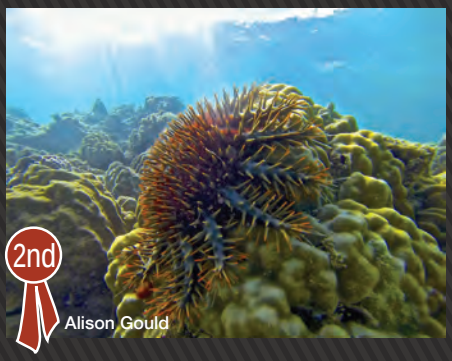
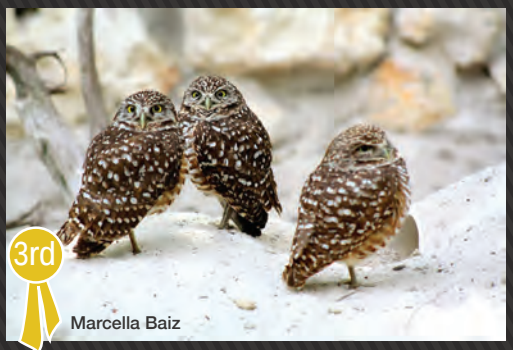
STUNNING SNAPS: EEB PHOTO CONTEST WINNERS







First: Jason Dobkowski, Fox kit, North Slope of Alaska

Second: Alison Gould, Coral killer, underwater off the shore of Okinawa

Third: Marcella Baiz, Burrowing owls, Springs Wildlife State Park, Tallahassee, Fla.

Honorable mentions

Honorable mentions:

Cody Thompson, "DeSoto Marecage," DeSoto National Wildlife Refuge, Iowa

Marcelo Sturaro, "Tree frog (*Hypsiboas geographicus*)," Amazon Rainforest

Anat Belasen, "Birds nest fungus," U-M Biological Station

Isabella Oleksy, "*Daphnia dentifera* and *Daphnia magna*," Professor Meghan Duffy's lab

The photo contest is in memory of David Bay, "photographer at large" for EEB and its predecessor departments for 34 years. See all photos from the 2013 contest here: http://bit.ly/um-eeb-photos13 (the 2014 contest is underway).