THE UNIVERSITY OF MICHIGAN
DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY

NATURAL SELECTIONS

VOLUME 11 NUMBER 1 Fall 2013

Five things I learned from Deborah

Nancy Smith, department manager in EEB, began working with Professor Deborah Goldberg on July 1, 2001, the first day that EEB was officially a department. Working together through the years provided Smith a front row seat where she learned many things. Smith shared her David Letterman styled list:

5 It's soil, not dirt! Deborah, that one alone has changed my life!

4 A person can spend their lifetime studying plants in their native environment, yet still manage to kill every houseplant that exists within 10 feet of her. We even had to rescue a silk plant once that she was diligently watering to keep alive.

3 No matter how long Deborah works for the university, I'm still going to have to remind her that one ring means it's an inside call, and two rings means it's an outside call.

2 Never let Deborah drive the department van! I'm just going to leave it at that.

And number 1 She can remember every detail of every decision ever made, what the background or special circumstances were related to the decision and who was involved in the discussion, but she can never remember where she left her cellphone, keys, backpack, wallet, passport, glasses… well, you get the picture. When the staff finds things left in odd places, we know to immediately head to Deborah's office to ask – Did you lose this? Is this yours? It usually is.

Changing of the chairs in EEB

After a long and successful 11 years as chair of ecology and evolutionary biology, Professor Deborah Goldberg officially passed the baton to Professor John Vandermeer for the 2013-2014 academic year. Professor Diarmaid Ó Foighil will follow Vandermeer as chair through the summer of 2017.

John Vandermeer, Deborah Goldberg, Diarmaid Ó Foighil

In May 2013, colleagues and friends gathered to celebrate Goldberg's chairship. Several colleagues paid tribute, presenting talks about Goldberg at the reception, including: Dean of the College of Literature, Science, and the Arts Terry McDonald, Professors Vandermeer, Ó Foighil, Pamela Raymond, Earl Werner and EEB department manager Nancy Smith. Some 100 people attended the event, Celebrating Deborah, on U-M's Ann Arbor campus.

"Deborah has provided leadership to the department throughout its entire history," said Ó Foighil. "From the very beginning, she stepped up to give EEB shape and direction, getting us back on track after an external chair appointment terminated prematurely and directing her formidable energy to all aspects of departmental function and development over the past 11 years. More than any other person, Deborah is responsible for EEB's success."

"As chair for EEB, Deborah has been fantastic, encouraging everyone to do their best, yet critically evaluating their work

see changing chairs, page 3

Malloure's research: not just for the birds

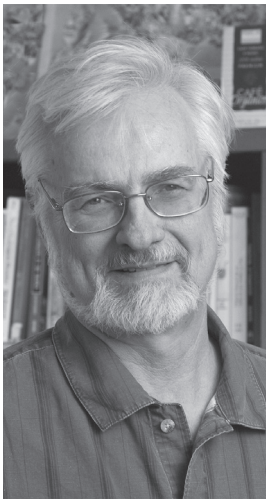
Gliding along the Everglades in an airboat, the racket made by the repurposed airplane engine drowns out the natural sounds of the tropical Florida wetlands. Wind blowing through the sawgrass, the shrill cries and laughing cackles of gallinules, the grunt, grunt, grunt of the pig frogs, the non-stop rattling trill of the marsh wrens, and the unnerving sound of thunder from a storm that is a little too close.

Earlier this year, graduate Brian Malloure (B.S. EEB 2011) monitored the populations of storks, herons and egrets throughout the Everglades with Dr. Peter Fredrick's lab at the University of Florida.

see not just for birds, page 7

Brian Malloure

chair's note



John H. Vandermeer
Chair, Asa Gray Distinguished University Professor of Ecology and Evolutionary Biology
Alfred T. Thurnau Professor

Dear Friends,

I write to you today from a new chair – as chair of the Department of Ecology and Evolutionary Biology – for a period of one year. It is with enthusiasm and trepidation that I take on this role: enthusiasm for helping guide the department in the very positive directions already established by the good Dr. Goldberg, trepidation in that I must live up to the high standards she established for the chair.

In this issue of Natural Selections, you will be introduced to the two newest additions to our faculty, Gina Baucom and Tom Schmidt. Gina was hired as part of the University of Michigan's sustainable food systems cluster hire. As a member of this group, I'm especially happy to have Gina here. We're looking forward to further incorporating her expertise in evolutionary plant genomics and informatics to research and teaching in the department. Tom, our first joint EEB-Medical School appointment, is another superb addition to the department, bringing his expertise and leadership in microbial ecology, and providing a bridge to the Medical School and the growing group in microbial ecology at the Med School and across campus.

You'll also read about one of our exceptional undergraduate alumni in this issue, Brian Malloure, who is engaged in conservation field work with birds in the Canadian Arctic and the Florida Everglades. It's so gratifying to see the exciting careers that lie ahead for our students. We are faced with many daunting challenges in the world today, but our students give us renewed hope for a better future.

We have several upcoming retirements to announce. Professors Earl Werner and Phil Myers retire in December of this year. Bill Fink retires in May 2014. Earl leaves a legacy of major breakthroughs in community ecology, focused on his extensive work with the amphibians of the E. S. George Reserve, continuing with our long tradition of field ecology coupled with advancing theory. Phil continues with his important work on the effects of climate change on the distribution of mammals in Michigan, providing the world with yet further examples of the disturbing consequences of global warming. His long-standing work in building and maintaining the Animal Diversity Web will remain an essential tool for teaching animal biodiversity for many years to come. Bill's expert guidance as director of the Museum of Zoology was essential during some difficult years, and the current strong position of the museum and its collections reflect his persistent defense of the unit in the face of sometimes conflicting pressures from many quarters.

I look forward to hearing from you in the year ahead. Wishing you a peaceful holiday season and a productive, happy and sustainable new year in 2014!

Cheers,

Editors: John Vandermeer, Nancy Smith
Writer, editor: Gail Kuhnlein
Production, illustration: John Megahan
Photographers: Dale Austin, Mark O'Brien

faculty profile

changing of chairs from page 1

when called for," said Vandermeer. "She was everything anyone could have wanted in a leader. As the one taking on the reins now, I shudder to think of the shoes with the golden soles that I now have to try and fit into."

Smith provided comic relief with her Letterman style list of what she learned from Goldberg over the years. (See box on cover.) Smith concluded on a serious note. "It's been an honor to serve with you, and I know we will continue to grow and benefit from your wisdom in the days and years ahead."

"I think that largely due to Deborah's aplomb as a leader, she united faculty, provided a vision and sense of direction, and importantly, was unfailingly open, honest and fair. She always seemed to be the conscience of groups and committees," said Werner.

"As everyone here knows, Deborah is a dynamo," said Raymond. "She is one of the most energetic people I know, always thinking of new ideas and devising ways to accomplish her challenging goals, indicative of her prodigious ability to do so many things at once and all of them well. She has maintained an active research program during her 11 years as chair. She has taken on important leadership roles in her professional community. She has raised a wonderful son, Benjamin, who is here with us today to honor his mother.

"Deborah is deeply committed to diversity and access. One of her lasting accomplishments that has impact beyond the department is the creation of the M-Bio Scholars Program, which has now expanded into the newly constituted M-STEM Academies. The goal of these NSF-funded programs is to increase the representation of women and minorities in the sciences by encouraging and supporting excellent but underprepared students who want to major in biology or other science disciplines."

When Goldberg steps down as chair, she will take on her next big challenge to build and lead the M-STEM Academies, expanding from just biology to all of the natural sciences in LSA.

"Under her guidance, EEB has also taken a leadership role in promoting diversity and access at the graduate level, with the very successful Frontiers Master's Program," Raymond continued. "Also laudatory are the many outreach efforts sponsored by the department, such as the recent survey of biodiversity on Belle Isle."

Raymond proclaimed that Goldberg is in all respects the Mother Earth, the Gaia, of EEB. "There never can and never will be another one like her," she said. She crowned Goldberg with a wreath of leaves, flowers and ribbon as Gaia of Ecology, Evolution, and Biodiversity at the University of Michigan. A fitting honor, indeed, for our illustrious chair.

Goldberg said, "I enjoyed my time as chair tremendously and it is a bit strange to have stepped down after 11 years in the role. Seeing the department grow and change has been fascinating and even better has been working with our amazing faculty, students, and staff."

"It is with enthusiasm and trepidation that I enter the role of chair: enthusiasm for helping guide the department in the very positive directions already established by the good Dr. Goldberg, trepidation in that I must live up to the high standards she established for the chair," said Vandermeer.

Vandermeer is the Asa Gray Distinguished University Professor of Ecology and Evolutionary Biology and an Arthur T. Thurnau Professor. In addition to EEB, he is formally affiliated with the Center for the Study of Complex Systems, Michigan Center for Theoretical Physics, School of Natural Resources and Environment, Latin American and Caribbean Studies, and American Studies.

Vandermeer is widely recognized for his outstanding accomplishments in teaching, mentoring, research, writing, and diversity outreach. He was awarded the Harold R. Johnson Diversity Service Award from the U-M Office of the Provost in 2013. The recipients were selected for their dedication to developing cultural and ethnic diversity at U-M. Vandermeer always has a full contingent of interested students working in his lab and his research interests cross many boundaries including forest ecology, tropical agroecology, and theoretical ecology. His most recent project is unraveling the complex interactions associated with the production of coffee in southern Mexico. Vandermeer is the author or co-author of 15 books and over 200 scientific papers.

Goldberg said, "The department is in terrific hands with John for this year and then Diarmaid starting after that and I look forward to seeing how it develops in new and exciting directions."

Deborah Goldberg
Elzada U. Clover Collegiate Professor

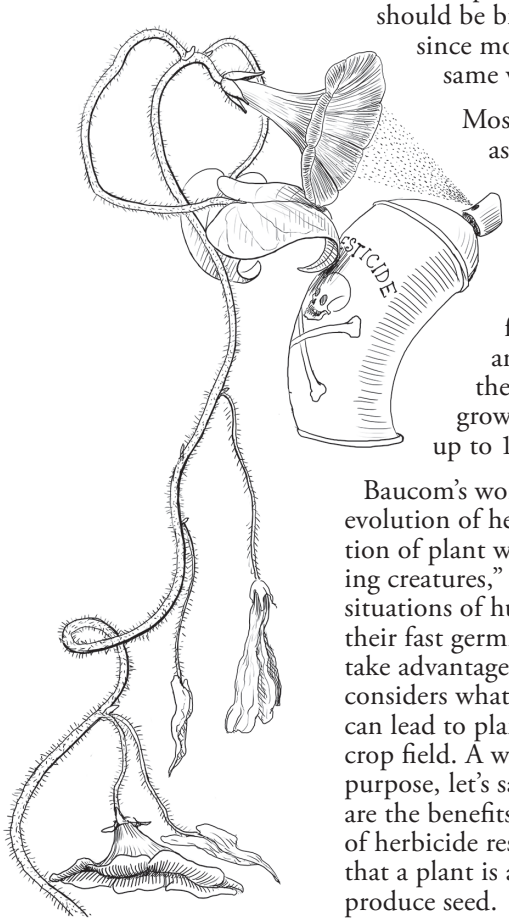
Research growing like a weed

Gina Baucom

Against an increasing onslaught of herbicides, weeds are fighting back to the tune of a $27 billion annual economic decline in food production and supply in the U.S. In addition, some $4 billion is spent each year trying to control weeds with herbicides nationally.

The lab of Gina Baucom, a new assistant professor in ecology and evolutionary biology, is exploring what traits in the Common Morning Glory might strengthen its ability to compete with crops from an evolutionary ecology standpoint and by looking into the genetic underpinnings of the weeds. Her lab combines quantitative genetics, principles of ecology, and bioinformatic techniques to look at particular parts of the genome. Baucom was hired as part of a new sustainable food systems cluster at the University of Michigan.

Morning glories are consistently in the top 10 worst weeds in southeastern agriculture, and are also significant pests in mid-western crops. The work should be broadly applicable to other weeds since morning glory exhibits many of the same weediness traits as other weeds.



Most people think of morning glories as harmless and beautiful purple flowering vines – but they live a double life. They can cause great disturbance in crop fields when seeds escape the garden. A morning glory seed can lie dormant for 20 years deep underground and once it gets stirred up closer to the surface and sprouts, the vine can grow up to a foot a day and produce up to 10,000 seeds per plant.

Baucom's work falls under the umbrella of the evolution of herbicide resistance and the evolution of plant weediness. "Weeds are interesting creatures," she said. They adapt rapidly to situations of human-mediated disturbance, their fast germination and growth is poised to take advantage in an agricultural field. Baucom considers what particular traits and scenarios can lead to plants being fierce competitors in a crop field. A weed evolves a trait for a particular purpose, let's say to be herbicide resistant. What are the benefits and costs, or ecological tradeoffs, of herbicide resistance? An obvious benefit is that a plant is able to survive being sprayed and produce seed.

"But, think about a year when the farmer doesn't spray herbicide – he decides to grow organically or rotates the crops and sprays a different herbicide. If there's a fitness cost to being resistant, resistant individuals are going to be at a disadvantage. Do plants put their carbon into being fit or toward being resistant?"

In a recent experiment investigating this very question, Baucom and members of her lab artificially selected for high and low resistance, and maintained controls without selection. They planted the third generation of this selection into the field into two plots, one that was sprayed with herbicide and one that was not.

"So there is a benefit of herbicide resistance – if farmers were to spray the same herbicide year after year, they could potentially select for increased resistance, which is not a good thing"

In science as in life, our expectations are not always realized – or at least not initially. Baucom has been analyzing the findings of this experiment looking for a fitness cost associated with resistance but she has found no evidence to support her theory. "That's still a result – maybe not the one I was expecting," she said.

"After three generations of selection, we have changed the pattern of who's resistant and who's susceptible in the original population. The lines we selected for high resistance show higher resistance than the control lines and the susceptible lines. We've taken a base population and within three generations, we've moved it."

"So there is a benefit of herbicide resistance – if farmers were to spray the same herbicide year after year, they could potentially select for increased resistance, which is not a good thing."

In contrast, if a farmer rotates crops and uses a different herbicide or lets a crop field go fallow, it won't affect the resistant plants since they are not at a fitness disadvantage, in fact, they have the same fitness as the susceptible ones.

"We don't find a cost of resistance (to the weeds). We definitely find benefits. Fourteen percent of resistant plants were able to set seed. Less than one percent of the susceptible plants were able to set seed. The object of an herbicide is to kill the plant so that it doesn't set seed and maintain a population. In the environment without herbicides, there was not a cost. The resistant weeds were not at a fitness disadvantage compared to the susceptible or control populations.

One of Baucom's students compared the gene expression levels of all of the genes of the Common Morning Glory after being sprayed with herbicide between the resistant plants and the susceptible ones. "He found a panel of about 19 genes that were differentially expressed, which is nice because

see research growing, page 6

faculty profile

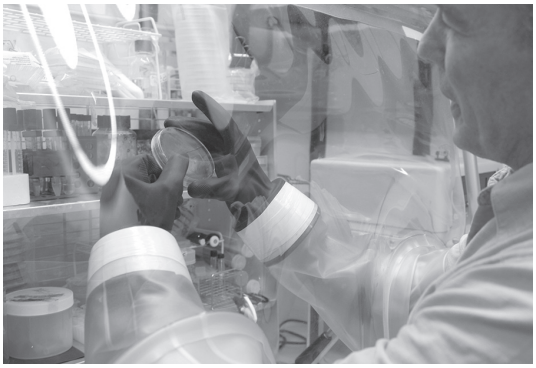
Take a shallow breath: exploring microbes in low oxygen environments

Professor Thomas Schmidt is knocking down literal and figurative walls in his lab and beyond.

Schmidt joined the University of Michigan in January 2013 as a professor with a shared appointment between the Departments of Ecology and Evolutionary Biology, Internal Medicine, and Microbiology and Immunology – a first at U-M.

"I think these groups recognize the value and power in bringing these fields together," Schmidt said. "I'm helping develop a university-wide center for microbial sciences. U-M has remarkable strength in the area, from engineering, public health, eeb, cell and molecular biology, natural resources, immunology and other areas of the Medical School. Michigan may not be at the top of everyone's list as a Mecca for microbiology, but it should be. The idea is that discoveries we make with complex microbial communities in humans would apply to a bioreactor in engineering or deep sea vents, for example. Principles of the structure and function of the microbial community would cross environments, and we would all benefit from discoveries being made in different studies."

As part of the remodel of the office and lab space for Schmidt and his colleagues in the Medical Science Research Building at U-M, walls have been torn down. A recent tour of the lab reveals remains of walls that once stood separating what are now large, open labs. "We wanted to create opportunities for people to interact. A more open environment makes it easier to strike up conversations and work together," said Schmidt.



Ten researchers from Michigan State University joined Schmidt at U-M. "We were an instant lab," said Schmidt. The Schmidt lab contains anaerobic and microoxic chambers (contained in large plastic "bags") that scrub out atmospheric oxygen so researchers can create environments to work with microbes that can't survive with oxygen or those that grow under oxygen levels that vary from the 20 percent that humans live in.

"Oxygen is a double-edged sword," said Schmidt. "For instance, it works well for our respiration, but it is also toxic, so a healthy diet has lots of antioxidants to mop up the problematic aspects. We have to have mechanisms to deal with the toxic forms of oxygen." The same circumstances exist in the world of microbes.

The alternative atmospheres in the Schmidt lab permit researchers to incorporate other common gasses such as nitrogen (80 percent of what you're breathing now), carbon dioxide, hydrogen and low levels of oxygen to create atmospheres similar to what's common in the human gut, soils, and even aquatic environments. The researchers are cultivating individual microbes grown under low oxygen. Schmidt's foot is in two camps: host-associated microbiology and terrestrial microbiology.

"We're helping pioneer research that is between 20 and 0 percent oxygen. Microbiologists traditionally work with aerobes or anaerobes. Like most things, it's not black and white, there's a whole range in-between. We're working at low levels of oxygen, with organisms that we call microaerobes."

An example of microorganisms that live in low oxygen are those in the human gut right next to host tissue. Oxygen diffuses into the gut from the human cells, providing an environment with low levels of oxygen. "If we want to study bacteria that are physically in close proximity to the host, we've got to go under low oxygen."

Schmidt and a colleague published a paper "Shallow breathing: microbial life at low 0_2," in the February 2013 journal *Nature Microbiology Reviews*. Until now, it's an area that's been largely overlooked.

Schmidt's lab is one of many nationwide involved in the Human Microbiome Project funded by the NIH. The initiative, launched in 2008, has the ultimate goal of testing how changes in the human microbiome are associated with human health or disease. The microbiome is the collection of microbes associated with the human body. The Schmidt lab's role in the HMP is their work with microbes closely associated with host tissue in the gastrointestinal tract and the role of oxygen impacting the structure and function of the microbial community.

Did you know that there are 10 times more microbes than human cells in a human body? "All animals, including humans, and plants evolved

see shallow breath, page 6

Thomas Schmidt

Did you know?

Microbes are single-cell organisms so tiny that millions can fit into the eye of a needle. The oldest form of life on Earth, microbe fossils date back more than 3.5 billion years to a time when the Earth was covered with oceans that regularly reached the boiling point, hundreds of millions of years before dinosaurs roamed the Earth. Without microbes, we couldn't eat or breathe. Without us, they'd probably be just fine. Understanding microbes is vital to understanding the past and the future of ourselves and our planet. Microbes are everywhere. There are more of them on a person's hand than there are people on the entire planet! From microbeworld.org.

research growing from page 4

we have 20,000-25,000 genes that could be involved in resistance at any given time. We hope to hone in on the genetic architecture that controls resistance. We're not there yet, but we have some nice candidates, including some detoxification genes."

Baucom has a grant from the United States Department of Agriculture that provides funding for her research into the impact of mating systems in the morning glory and the evolution of herbicide resistance.

Additionally, Baucom considers the microbial community's impact on the evolution of weediness traits. Some species of morning glory are widespread while others have very limited distribution. "We are transitioning our questions about ranges and weediness to think about the microbial community as the selective agent," Baucom said. "When they think about plant adaptation, most scientists think about what's above ground such as climate, herbivores, parasites, but they don't necessarily consider what's going on below ground with the bacteria and fungi. At least a third of the plant is interacting with what's below ground."

Baucom will co-teach undergraduate genetics and Introduction to Bioinformatics (the first time the course will be taught at U-M) in winter 2014. She appreciates "the ability to do something interesting and novel on a daily basis – to have little problems that you have to solve that no one has solved before, but you have to figure out a mechanism of solving them or a workaround. That's pretty exciting to me."

On a personal note, Baucom lives in Dexter in a renovated farmhouse initially built in 1908 and has been exploring for weeds in the surrounding areas.

shallow breath from page 5

within a sea of microbes – of course they've impacted the evolution of their host. It's hard to study an organism without including its microbiome. Obesity, heart disease, autism – there are suggested relationships between lots of diseases and the microbiome."

The other piece of Schmidt's research delves underground to explore terrestrial microbes and the flux of greenhouse gasses. He initiated this work at MSU, where he was a professor for 20 years before joining U-M "The subset of organisms we're working with in soil produce or consume greenhouse gasses."

The ongoing, NSF-funded research seeks to understand how land management affects the complex microbial community and in turn, how changes in the community affect the production of nitrous oxide, a greenhouse gas. "Something like half of nitrous oxide in the atmosphere is being produced by microbes in agricultural soils." So these terrestrial microorganisms are having a global impact on Earth's atmosphere. The ultimate goal would be to learn how to manage the microbial community to help mitigate N_20 production.

Schmidt was raised in Elyria, Ohio, where many of his relatives and neighbors worked at the nearby steel mill. It wasn't until he was an undergraduate at U-M that a world of opportunity outside the traditional careers became apparent. When he decided he wanted to study the natural world, he became a biology major. However, it wasn't until graduate school when he looked inside a cell during his first microbiology course that the field of biology became unified for him. "I think people find different levels of complexity at which they are comfortable – for me it was a single cell. Life at that level is fascinating."

Schmidt said the best part of his profession is the discovery process. "I spend a lot of my day talking individually with people in the lab, trying to solve problems, interpret data, figure out what's next. That's what gets me going." He likes teaching as well and will teach introductory microbiology in the spring.

His wife, Susan, is a full-time educator with Lansing schools, specializing in children with learning disabilities. She spent five years working in the Michigan Legislature as chief of staff for a state representative. Their two sons are U-M graduates. Alex, a math major, is the Schmidt lab manager. Erik, a political science and environmental science major, is currently a math and computer technology assistant.

Schmidt ran cross-country and track as an undergraduate at U-M. He still runs although "not quite as fast." He plans to stay active at his new treadmill desk. To top it off, Schmidt is a drummer looking for a rock and roll band. So, if you're in a band looking for a drummer, you know who to call.

undergrad profile

not just for birds from page 1

The Everglades research concentrates on the population health and ecology of wading birds, which have been hunted for their feather plumes, and have experienced habitat destruction and degradation in the last 100 years. "Only recently have there been real efforts to restore the ecosystem – this project is part of that effort," Malloure said.

The noise feels invasive as they head out on airboats at sunrise but it scares the parent birds away long enough for Malloure and his fellow researchers to check the chicks and eggs in the nest. When they get out of the boat, he said they do "the most ridiculous walking, like walking on floating mats of vegetation you're constantly breaking through, and bouncing on tree roots, with lots of gators everywhere."

To monitor the birds nesting in about 60 large colonies within a large conservation area, the researchers perform monthly aerial surveys from a fixed wing aircraft, on the ground nest surveys of about four colonies a day by airboating and trudging through the swamp, and annual ground surveys buzzing to the islands in airboats to record all birds seen.

The seasonal nature of the Florida research allowed Malloure to spend the summers of 2012 and 2013 happily isolated in the pristine and majestic Queen Maud Migratory Bird Sanctuary in the Canadian Arctic working with waterfowl colonies.

"It was absolutely amazing," he said. The young scientist's passion for behavioral ecology, ornithology, and the outdoors was a perfect fit for this "first true field research experience" working in the remote research camp, where he was blissfully disconnected from the rest of the world without phone and internet.

He spent the first summer collecting nesting data on breeding Snow and Ross's geese, performing necropsies (an autopsy performed on an animal), mist netting and banding King Eiders, and collecting blood samples from live geese. Malloure estimates that he corralled and handled over 13,000 geese. Most days were spent walking 20 kilometers and more across the tundra, monitoring nests and all the while staying vigilant for wildlife: caribou, arctic foxes, muskox, wolves, wolverines and grizzly bears. One grizzly destroyed the sleeping bag out of his tent! "Carrying out tasks was at times very trying, the weather was unpredictable, the mosquitoes were predictably horrendous, and the terrain was rugged."

Malloure returned to the Canadian Arctic for summer 2013 to continue the shorebird research – this time for pay, he happily reported. He worked as a shorebird technician and for a few weeks as the field supervisor. The research is attempting to assess the affect the estimated two to three million geese within the colony have on shorebird populations.

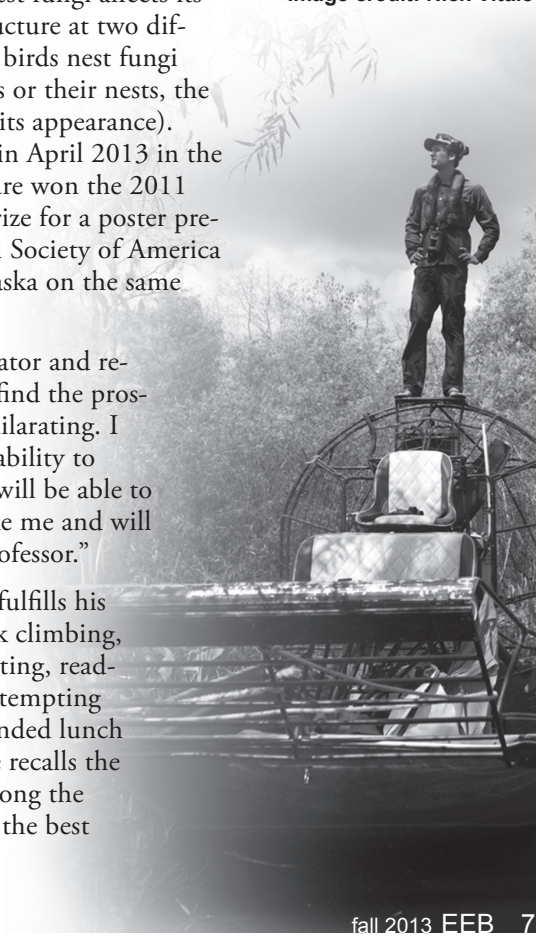
"It was the pilot year for the project so we got to work out all of the details, like how to record the data, what to collect and generally what is doable for next year," Malloure said. "It was great to once again be surrounded by wilderness and I really enjoyed getting to try out a leadership role." Malloure will undertake several more field positions before a return to graduate school where he plans to study behavioral ecology and/or conservation.

Malloure's first semester as an EEB major at U-M confirmed his newfound belief that he was meant to be a biologist. He was captivated by the experiments and lab time that were part of a mycology course. "I seized the opportunity to work with the class professor, Dr. Tim James, and spent my final four semesters working on a project examining how the animal-mediated dispersal strategy of bird's nest fungi affects its population genetics and structure at two different spatial scales." (Note: birds nest fungi has nothing to do with birds or their nests, the fungus is named because of its appearance). The research was published in April 2013 in the journal *Heredity* and Malloure won the 2011 graduate student research prize for a poster presentation at the Mycological Society of America conference in Fairbanks, Alaska on the same topic.

"I aspire to become an educator and researcher," Malloure said. "I find the prospect of educating others exhilarating. I feel my enthusiasm has the ability to inspire others. Hopefully, I will be able to awaken students who are like me and will benefit from a passionate professor."

Aside from work, Malloure fulfills his taste for adventure with rock climbing, snowboarding, running, writing, reading, and listening to and "attempting to play" music. During extended lunch breaks on the Everglades, he recalls the peace of floating silently among the grass and lily pads as one of the best parts of every day.

Brian Malloure
Image credit: Nick Vitale



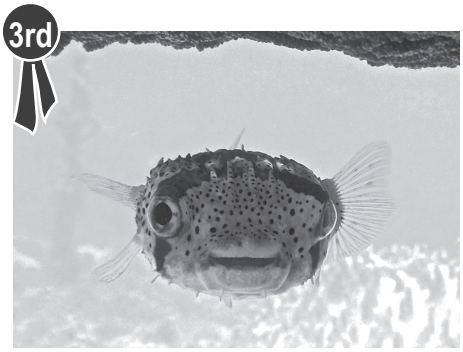
The University of Michigan
Department of Ecology and Evolutionary Biology
Kraus Natural Science Building
830 North University
Ann Arbor, MI 48109-1048
USA

LSA

NONPROFIT
ORGANIZATION
U.S. POSTAGE
PAID
ANN ARBOR, MI
PERMIT NO. 144

Congratulations to Honorary Photographer at Large, Sara Fortin, who won first place with “Bold Ridge Summit,” Eklutna Lake, Alaska.

Second: Mark O’Brien, “Dragon hunter,” U-M Biological Station, Pellston, Mich.



Third: Alison Gould, “Puffer,” Okinawa, Japan.

Honorable mentions: Jingchun Li, “A different kind of flower,” Hong Kong. Jason Dobkowski, “Springtime reflections,” North Slope, Alaska. Alex Wenner, “Spider web revealed,” Pinckney, Mich.

Shutterbug showcase

The photo contest is held in memory of David Bay, “photographer at large” for EEB and its predecessor departments for 34 years.

See color photos here:
http://bit.ly/lsa-eeb-photos