

Notes from the Field

Fall
2013

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Photo by PJ Perry

Past: Fall 2013 Ecology Seminar Series

By David Watts

The Ecology Program's seminar series for fall 2013 concluded this December with a total of sixteen speakers, including Penn Staters, colleagues from nearby universities, and even visitors from Europe and Africa. These speakers also varied in career stage, as there were postdoctoral scholars, recently hired faculty, established professors, and a private sector researcher. The series gave participants the chance to share their research with other members of the Ecology Program as well as the broader Penn State community. This year had a new format that may pave the way for future changes, as October was Chemical Ecology Month.

With sponsorship from both the Ecology Program and the Center for Chemical Ecology, we were able bring in a top-notch lineup that attracted a wide array of attendees. Topics included plant defense chemistry, chemically mediated tri-trophic interactions, disease-vectoring insect ecology, and plant-fungal interactions, all of which complemented themes covered by other speakers this semester, especially large mammalian herbivore and disease ecology. Throughout the semester, the speakers not only presented their recent, ongoing and future research directions, but they were also able to meet with students, postdocs and faculty. These opportunities both allowed for discussions of career advice and research as well as created potentially useful connections between scholars with similar interests. Overall this seminar series was a positive experience for the planners, speakers and attendees.

Future: Spring 2014 Ecology Seminar Series

By Bradley Carlson, Christen Miller & David Watts

We are proud to announce a [stellar array of speakers](#) for our quite general topic on a diversity of diversities. The actual title of the seminar series is "Diversity in Ecological Systems: Genes, Species, and Beyond," and we believe this is an essential topic in ecology. Understanding the causes and consequences of biological diversity is both a classic theme in our field and also represents the vanguard of modern research. Diversity can be characterized across scales ranging from ecosystems and communities to individuals and genes. This makes it valuable for all ecologists to consider, and substantial strides have recently been made with theoretical questions about origins and patterns of diversity – *Why are there more species in the tropics?* or *Why do individuals differ in behavior?* – as well as issues of applied value – *What is the contribution of species diversity to ecosystem functioning?* or *What are the ecological consequences of declining genetic diversity?*

We will explore what biodiversity has meant for the last 25 years and what the idea's future might be, how to enumerate biodiversity when we know all the constituents as well as explore differentiation when we don't, and the role of biodiversity in the interactions between organisms and ecosystems.

We look forward to hosting these scholars and providing settings for all manner of fruitful discussions.

Embrace Uncertainty in all Languages

By M. Luke McCormack (Ph.D. 2012)

During my in time the Ecology Program I learned a great deal about uncertainty in my data, research process, and analyses. I eventually came to appreciate, even revel in this aspect of science. More recently, I have moved to China to initiate new research with collaborators in Beijing where uncertainty is taking on a slightly new significance like, “How do I conduct science here?” or “How do I buy bread?” Spoiler alert: the take-home message here is to not worry and go wherever you can do your best work.

Before traveling to China I worried that my lack of language skills would be a major impediment to my ability to successfully conduct work there. While it is certainly not a benefit, I have happily found that with the aid of good collaborators it has not been a great hindrance. In China, I have found a host of excellent researchers, motivated students, available resources, and a broad willingness to help me become accustomed to what otherwise is a very foreign system. This is nothing new. During my years in the Ecology Program I watched friends in the program leave to conduct great work in

nearly all corners of the world (Jeff Kerby, Antarctica is calling) and consistently return with similarly positive experiences.

I am now learning a new scientific hierarchy in China and how to network in a foreign country as well as picking up a little Mandarin on the side. Most importantly, I also believe that I am initiating good science with my collaborators in China which would not have been possible if I let my fear of four tones and a few tens of thousands of characters get in the way. So, if you are on the fence but have a potentially great opportunity don't worry too much about language barriers. It is certainly better to know the language, but don't let language be your excuse. In daily life it is truly amazing how much can be communicated through dramatic arm waving and perhaps the aid of a smartphone (though I did not use one for the first 10 months). In science we can communicate with numbers, conceptual models (cartoons), and admittedly... English. Plus, we all speak Latin, right? It'll be fun. *Ad astra per apera.*



Left: Rubber trees that are a part of a plantation in Xishuangbanna, Yunnan Province, China; note the scars used to extract the latex (Photo by M. Luke McCormack). **Top Right:** One of the upsides of traveling through regions where communication can present strong challenges is taking in beautiful and often stunning scenes, such as this Buddhist temple in Kunming, Yunnan Province, China (Photo by M. Luke McCormack). **Bottom Right:** Sloppy welding work and cracked corers are a sure sign of long days in the field in Changbaishan, Jilin Province, China (Photo by M. Luke McCormack).



Lower Left: A wood frog (*Lithobates sylvaticus*) contemplates its newfound freedom, following a lab experiment on the impacts of traffic noise on the physiological stress response (Photo by Jennifer B. Tennesen). Upper Left: Following her boundless curiosity and willingness to go anywhere in the name of science, Jenny disappears into the center of the Earth beneath Budapest, Hungary; possibly never to be seen or heard from again (Photo by Jennifer B. Tennesen). Above: Already quite beautiful by day, famous monuments like the Heroes' Square come alive with gorgeous glows by night (Photo by Jennifer B. Tennesen).

2013 Andersen Award Reflection

By Jennifer B. Tennesen

I have often wondered how conference organizers identify potential host cities. Is there an equation to describe the selection process? Or are there perhaps a few eloquent members on the committee that have enviable powers of persuasion? Whatever the method, organizers of the 3rd International Conference on the Effects of Noise on Aquatic Wildlife struck gold when they chose Budapest, Hungary, a World Heritage Site, as the location for their August 2013 conference.

The conference was small – approximately 300 participants – yet enormous in its global representation. During a graduate student workshop I realized I was the only American in the room, joined by others from Poland, New Zealand, Canada, Australia, England, Scotland, Belgium, Mexico, the Netherlands and Finland. To be surrounded by such rich international diversity was an intellectually enriching opportunity, and I enjoyed political and academic discussions with my new peers. Because of the small nature of the conference there were no concurrent sessions and participants attended all talks, which encour-

aged attendees to think outside their own disciplines and fostered interdisciplinarity. What a fantastic change of pace from the traditional mega-conference model (particularly enacted by our own ecological society whose name shall remain unmentioned), where attendees dash out of a talk one minute early, sprint a half mile down the labyrinth of corridors in the convention center, only to arrive two minutes late and out of breath at the next talk. Among many fascinating presentations and pages of scribbled notes, some of the most interesting things I learned were that (1) temporary hearing loss can, contrary to existing views, have permanent effects; (2) boat noise impairs marine larvae's abilities to find suitable habitat, and (3) cuttlefish ink in response to being startled by noise. Is this like peeing your pants?

I also had the opportunity to present my research on the physiological consequences of noise. I shared findings from work with a local species of frog – the wood frog (*Lithobates sylvaticus*) – that traffic noise elevates corticosterone, a stress hormone, up to 5 times baseline

levels. These exciting results are the first to document noise-induced stress in amphibians. During subsequent poster sessions, break out discussion groups and workshops, I was able to engage with colleagues in small-group discussions to further explain my research and broaden my perspective about noise impacts on wildlife. I look forward to a portion of my research appearing as a chapter in a book highlighting work presented at the conference, which will be published later this spring.

After the conference I spent a day exploring Budapest. Some highlights included the Castle district, walking along the banks of the Danube, a tour of a secret underground hospital used during World War II, a thermal bath (kind of like an Olympic pool-sized hot tub), and a tour on hands, knees, and often belly, through part of the world's largest thermal water cave network that sits beneath Budapest.

I would like to thank Frank A. Andersen and the Andersen Travel Award Committee for making this wonderful opportunity possible.

New Ecology Student Introductions for 2013

Andrea “Andie” Chan



I am originally from the Los Angeles area, where I received my B.S. in marine biology from UCLA. Currently, I am pursuing a doctoral degree in ecology, working in the lab of Iliana Baums. Broadly, I am interested in the ability of coral reef environments to persist in the coming century with the projected increases in global temperatures and ocean acidification. Outside of work, I enjoy movies, musicals, and going on adventures.

Courtney Davis



I am originally from upstate New York and I am pursuing a master's degree in Ecology under the guidance of David Miller. I received my bachelor's degree in biological sciences and animal science from Cornell University. I will be using occupancy modeling as a tool to dissect community interactions and population dynamics.

Megan Kepler

As a new ecology graduate student, I am excited to further my education and continue my research in the field of fisheries ecology. I grew up outside playing in streams, fascinated by aquatic insects and everything under the water's surface. I used this to guide my education choices and pursued an undergraduate degree in environmental and cellular biology as well as a master of science degree in wildlife and fisheries science. After completing my M.S. degree, I was compelled to gain a deeper understanding of fisheries ecology, which led me to continue my graduate career. My dissertation research will focus on smallmouth bass disease dynamics and allows me to combine my passion for understanding the natural world with my childhood fascination for aquatic resources. I am excited to learn as much as I can about smallmouth bass in systems with characteristics of disease and am hopeful that my research will provide insight for current and future management strategies. When I am not working on my research, I enjoy spending as much time as possible outside whether hunting, fishing, or with my family and dogs.



Danelle Laflower



I am from Wales, MA. I obtained a bachelor's degree in environmental studies from Mount Holyoke College. I am working in Matt Hurteau's lab modeling forest carbon dynamics in the Pacific Northwest, and pursuing a master's degree in ecology. In addition to forest systems, I am interested in environmental education, invasion ecology, and biodiversity. I like to participate in activities that make a positive difference in the world and I like to be in the woods.

Lauren Johnston



I attended the University of Arizona Honors College as a Flinn Scholar beginning in 2009. During my time as an undergraduate, I worked in the Whiteman Laboratory in the EEB department studying host-parasite co-evolution in Desert Mistletoe. As part of a campaign to increase student involvement in the community, I helped start and run the Alternative Breaks service organization as well as the sustainability volunteer program at the University of Arizona. From 2011-2013, I served as co-founder and co-editor in chief of the *Arizona Journal of Interdisciplinary Studies*. I graduated summa cum laude in 2013 with a B.S. in Ecology and Evolutionary Biology. After graduation, I worked as the Thomas W. Haas Fellow with Clean Air Cool Planet and the University of New Hampshire's Sustainability Institute. As a summer fellow, I worked on evaluating the effects of climate change on agriculture in New England. I have recently joined the Ecology Program at Penn State in the Weed Ecology Laboratory group as a master's student of Dr. Bill Curran and Dr. Heather Karsten.

Shauna-kay Rainford



I was born in Kingston, Jamaica and raised in West Palm Beach, FL. I received my B.S. in natural resources from Cornell University, and I am currently pursuing a Ph.D. in ecology. I am a part of Patrick Drohan's lab, where I am studying plant-soil interactions in wetland environments. In my spare time, I enjoy cooking and reading.



Photo by Bradley Carlsson

Tech Corner: Open Access Software for Ecology and Other Sciences

By Larry York

The glorified ecologist would be that patient naturalist carefully taking notes in the field, perhaps tracking muskoxen in Greenland or exploring the life history parameters affecting the invasiveness of thistles throughout the Americas. But, what happens after leaving the field? Modern ecologists will spend a significant amount of time using a personal computer. Data entry, statistics, writing, literature review, graphic design, communication, and planning are commonly done using specialized software. Both new and experienced ecologists will benefit from being aware of software available to them for free. Free is not something to be afraid of; all the software presented here is of the highest quality and comparable to software costing hundreds of dollars. In this age of open access and free knowledge for all, even the most fundamental tools of science are becoming increasingly available to anybody with a computer and internet connection. This article will provide a short survey of some tools available to us.

Software	Use	Replaces	Platforms
Ubuntu	Operating system	Windows and OS X	
LibreOffice	Word processor, spreadsheets, presentations	Microsoft Office	Linux, OS X, Windows
R and RStudio	Statistics and graphics	SAS, SPSS, etc.	Linux, OS X, Windows
Mendeley Desktop	Reference manager	Endnote	Linux, OS X, Windows
GIMP	Bitmap image manipulation	Photoshop	Linux, OS X, Windows
Inkscape	Vector graphics creation and manipulation	Illustrator	Linux, OS X, Windows
ImageJ	Image measurements		Linux, OS X, Windows
QGIS	Geographic information systems	ArcGIS	Linux, OS X, Windows

The operating system (OS) is the basic environment that connects human to machine and provides much of the experience of using a computer. Most of us are familiar with Windows and Mac OS X, and while we may bicker about which is better, in fact you can do pretty much anything on either. Linux is open source, meaning its code is readily available to

anybody. Over time, a vast number of people have given their time and intellect to craft a very capable, efficient, and secure operating system. However, Linux has a reputation as an operating system only for geeks and of being too hard to learn or use for normal computer users. With the advent of the Ubuntu version of Linux this is no longer true.

Ubuntu is truly an OS for the masses. You can try Ubuntu by running it from a USB drive without affecting your primary OS, and if you want to commit a little more you can easily set up a dual boot where you may choose between Ubuntu or your other OS when turning on your computer. To try it is completely risk free, and you may be pleasantly surprised.

LibreOffice is the extant branch of the discontinued OpenOffice that some of you may be familiar with. It has almost all the features of Microsoft Office, including a word processor, a spreadsheet program, and a program for making presentations. It does not, however, have a replacement of OneNote (see Tech Corner in Notes from the Field Volume 10 Issue 1). The only drawback to using LibreOffice is that most people are using the Microsoft products so you may run into formatting issues, and the use of tracking changes and adding comments can conflict between the two products. Convincing your colleagues to also use LibreOffice is one way around that issue.

Most new ecologists are probably acquainted with the R statistical package, though SAS and its companions remain popular. R can be used in conjunction with a vast library of additional packages to perform most statistical tests, as well as other computationally intensive

procedures, such as genome wide association studies (GWAS) and simulation modeling. R is also fabulous for data manipulation by indexing and the creation of custom functions, and R benefits from a vast user community. You can rest assured that if you have a question, you are probably not the first person to ask it, and a simple web search will yield an answer. R can make fantastic graphics, from bar graphs to networks to 3D landscapes.

R itself is a simple command line interface, so it is augmented greatly by RStudio that acts as a sort of wrapper on top of R. RStudio allows the creation of projects within which your code and files (workspace) are automatically saved. RStudio also offers point and click abilities for opening data files and loading packages. Install RStudio after installing R and you will save yourself a lot of pain and frustration. RStudio has been quickly adopted by many ecologists because it makes our lives easier by putting everything we need to do with our stats in one place.

Mendeley is a reference manager and PDF organizer. You can save PDFs for journal articles in a watched folder and Mendeley will automatically try to take information like authors and journal name from information embedded in the PDF itself. It will store this information in your library and you can even open and read PDFs within Mendeley. Mendeley has plugins for both Microsoft Office and LibreOffice that allow you to insert citations from Mendeley, which can then be used to automatically generate the works cited list. Formatting is available for a variety of journals. Mendeley also offers cloud storage of your PDF library which provides a convenient backup. Mendeley has iOS and Android apps that can sync your library to provide on-the-go reading on tablets.

GIMP is an image manipulation program. Basic uses include accurately scaling and cropping photographs. This can be done in batch mode. Images can be

manipulated with regards to brightness, contrast, and colors, as well as through the use of many plugins that may give a desired effect. GIMP can be used to add text to photographs for making diagrams. Use GIMP to make publication ready images for presentations or manuscripts.

Inkscape is used for making vector graphics. Vector graphics are recommended to use when creating a figure or diagram from scratch because vectors can be scaled to any size without loss of quality. Inkscape can generate diagrams like flow charts with ease, or make more advanced graphics depicting experimental setups or results. Visit the online version of this article for some examples.

ImageJ is an image manipulation program with a twist: it was designed by the NIH to be used for taking measurements from images. It can be extended using Java and there are already many plugins available. For example, I use a plugin called ObjectJ to measure angles and diameters from images taken of maize roots. Others use it for measuring bacterial or fungal colonies, or even for measuring canopy cover in crop stands. The possibilities are endless, so it's worth asking yourself if some routine measurement you do could be done from images.

For those of you using geographic information systems, you might find QGIS to be a reasonable alternative to ArcGIS for making maps and extracting information from geographic data.

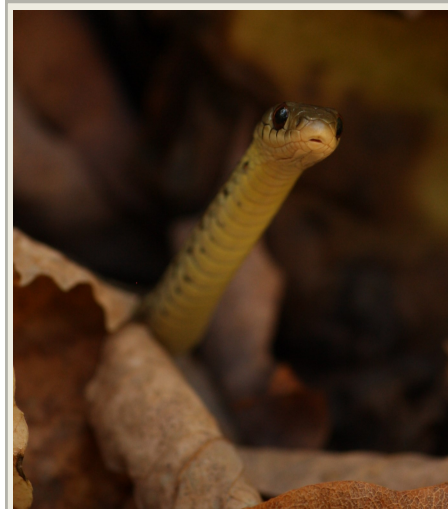
This article has outlined the use of several popular programs that are freely available. For most students, this software would be enough to complete a Ph.D. Free software embodies the spirit of an equitable sharing of knowledge. Open software leads to open science that can benefit the lives of us all.

For more information, visit <http://plantscience.psu.edu/research/labs/roots/methods/computer/opensoftware/>.



Recent Publications

- Carbera, A. R., Shirk, P. D., Duehl, A. J., Donohue, K. V., **Grozinger, C. M.**, Evans, J. D. & P. E. A. Teal. 2013. Genomic organization and reproductive regulation of a large lipid transfer protein in the varroa mite, *Varroa destructor* (Anderson & Trueman). *Insect Molecular Biology* 22: 505-522.
- Carlson, B. E. & **Langkilde, T.** 2013. No evidence of selection by predators on tadpole boldness. *Behaviour*. *In press*.
- Chaby, L. E., Cavigelli, S. A., White, A., Wang, K. & **Braithwaite, V. A.** 2013. Long-term cognitive changes as a result of chronic mild stress during adolescence. *Frontiers in Human Neuroscience*, 7, 328-338.
- Chen, W., Zeng, H., Eissenstat, D. M. & Guo, D. 2013. Variation of first-order root traits across climatic gradients and evolutionary trends in geological time. *Global Ecology and Biogeography* DOI: 10.1111/geb.12048
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- Post, E.** 2013. Erosion of community diversity and stability by herbivore removal under warming. *Proceedings of the Royal Society, Series B*. 280: 20122722.
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Above: A garter snake keeping an eye out for new publications (Photo by Laura Russo).

What's in a Name?

By Lindsey Swierk

Recently, my Ph.D. adviser Dr. Tracy Langkilde and I experienced a whirlwind of media attention for a paper we published in *Biology Letters*. Our paper told a simple story about the downsides of ornamentation in female lizards. Some female fence lizards inexplicably have male-typical blue spots on their chins and bellies, and we found that these females are less “sexy” to males and less reproductively fit than their drab counterparts. Around the lab, we referred to these unfortunate, masculinized female lizards as “bearded ladies.” With fingers crossed, we decided to use this nickname in our manuscript—it was just so darn descriptive, it was hard *not* to use! In fact, “Bearded ladies” was the opening clause of our manuscript’s title.

Our paper was published under the title “Bearded ladies: females suffer fitness consequences when bearing male traits.” And, well, it turned out that the press loved this terminology. With the help of the media offices at Penn State and *Biology Letters*, a total of 9 independently authored popular media articles were written about our paper, including by *National Geographic*, *Scientific American*, and the

Los Angeles Times. All prominently featured the phrase “bearded ladies” in their coverage of our work. Talk about flabbergasted. The overflow of press left me, as one article stated (out of context), “scratching [my] beardless chin.”

I’m confident that it was our catchy title that gave this paper the extra media push. (In fact, one of the writers who contacted us for an interview also inadvertently forwarded the email dialogue between himself and his head editor—lobbying to write about our research because “what makes it fun is the ‘bearded ladies.’”) This made us think, since in another paper we recently published, we had to fight tooth-and-nail with the reviewers to keep the “catchy” but informative first clause of our title (“Sizing-up the competition”). So, what should be in a title?

Within the scientific community, the acceptability of using “catchy” titles can be extremely polarizing: some researchers use them heavily; others eschew them as distracting or unprofessional. I can see both sides of the coin. A clever title is *never* enough to carry a manuscript, and inappropriate use of catchy phrases—those that obscure the mean-

ing of the research, that make the title awkwardly long, or that don’t actually contribute additional relevant information—are just plain irritating. That said, it’s becoming increasingly obvious that it’s not enough just to publish good research—you also have to market yourself and your lab. Never having taken a marketing course in college, there’s little I can officially say on the topic. What I can, unofficially, contribute here is from my own experience as an avid reader of popular science articles, and as a writer of scientific papers. I am more likely to notice and read articles with (good) “catchy” titles; the ones with clunky titles, I’m much less jazzed by and less likely to invest time to read. Just some food for thought—perhaps the art of crafting a title should be given more attention in the information age, when new manuscripts are so rapidly disseminated they inundate our inboxes and overwhelm our web searches. Being able to lure someone to choose to read your paper, attend your talk, etc., is hugely important—what’s the point of publishing, if your paper is rarely read?



Photo by Jeff Kerby

Fellowships, Awards, and Achievements

Bradley Carlson received a National Science Foundation Doctoral Dissertation Improvement Grant.

Spencer Carran received a National Science Foundation travel grant for a mathematical biology workshop at the Memorial University of Newfoundland conducted by the Atlantic Association for Research in the Mathematical Sciences.

Jacquelyn Harth and **Chad Nihrenz** each received a scholarship from the J. Ben and Helen D. Hill Memorial Fund.

Anjel Helms won the President's Prize for Best Talk at the Entomological Society of America Annual Meeting in Austin.

Lauren Chaby participated in the annual Animal Behavior Society Outreach Fair at the University of Colorado's Museum of Natural History. She also spoke to the Community Services Group in Lancaster, Pennsylvania. Her research has been [featured on](#) the Huck Institutes' website.

Wren Patton was selected as the 2013 recipient of the Latham Award, which is given to an outstanding graduate student in the Department of Ecosystem Science and Management.

Sean Cahoon and **Laura Radville** were [featured on](#) PBS News-Hour's online video magazine Science Nation.

Jeff Kerby was invited to speak in the Global Environment Speaker Series at the University of Richmond. His research also was [featured in](#) Conservation Magazine, among other

Photo by Jeff Kerby



media. This summer, he finished fourth in the 2013 Running of the Moskus half-marathon with a time of 1:39:40.

Consuelo De Moraes recently received the 2013 Silverstein-Simeone Award from the International Society of Chemical Ecology in recognition of her research. She was also elected a Fellow of the Entomological Society of America.

Duane Diefenbach received the 2013 Caesar Kleberg Award for Excellence in Applied Wildlife Research from The Wildlife Society. His research was recently [featured on](#) the Penn State News website.

Eric Post became Director of the Polar Center at Penn State, which opened on April 6, 2013.

Photo by Luke McCormack



Photo by PJ Perry



Photo by Bradley Carlson

Grants

Christina Grozinger received a grant from the Synthesis Centre of Biodiversity Science entitled "Synthesizing transcriptome data to explore interspecies bee-pathogen molecular interactions that many underpin pollinator decline." co-PI: R. Paxton. €23,544.

Etya Amsalem, in collaboration with her postdoctoral adviser **Christina Grozinger**, received a BARD Postdoctoral Fellowship to work on "Genomic, physiological and behavioral analysis of life history traits underpinning performance and productivity in bumblebees."

George Perry received a NSF Physical Anthropology grant entitled "Comparative and population genomic studies of Madagascar's extinct subfossil lemurs." \$292,833.

Katriona Shea received a grant from the NSF's Division of Mathematical Sciences entitled "Dynamics and stability of plant-pollinator mutualistic networks in response to ecological perturbations." co-PI: Réka Albert. \$300,000.

Recent Program Graduates

Warm congratulations to each and every one of the summer and fall semester graduates!

Summer 2013:

Kelly Brossman (M.S.)

Lauren Smith (M.S.)

Fall 2013:

Rachel Glenn (Master's in Ecology)

Melanie Kammerer (M.S.)

Laura Russo (Ph.D.)

This publication is available in alternative media upon request. Penn State is committed to affirmative action, equal opportunity, and the diversity of its workforce.

U.Ed. # GRD 14-11.