



Ecology

Notes from the Field



Pennsylvania State University

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Best unmanipulated photo ~ Jenn Macalady

“Untitled” This photos shows iron oxides created and inhabited by acid mine drainage microbial communities. Photo taken near Brubaker Run acid mine drainage spring, PA.

Table of Contents

Tracy Langkilde, Mercer Award	1
Switzerland Climate School, Christy Rollinson	2
Ecología internacional, Christy Rollinson	3
Scholar Visits University of Queensland, Laura Russo	4
Andersen Award Reflections Dan Grear & Luke McCormick	5
New Faces in Ecology	6-7
Recent Awards, Publications & Grants	7

Tracy Langkilde Receives 2011 George Mercer Award

Tracy Langkilde was presented with the 2011 Mercer Award at the Ecological Society of America's Annual Meeting in Austin, Texas in August. She received the award for her “outstanding recently-published ecological research paper” that appeared in *Ecology* in 2009: “Invasive fire ants alter behavior and morphology of native lizards.” The Langkilde Lab combined field work and examination of museum specimens to better understand the evolutionary impact of invasive fire ants on native lizard populations. Langkilde joined the Pennsylvania State University in 2006 and has authored over 40 publications on such topics as the ecological and evolutionary consequences of invasive species, the role of stress, and the costs and benefits of various reproductive strategies.

The award is given in honor of George Mercer, a young naturalist and ecologist who was killed in action while serving for the British Army during World War I.



Christy Rollinson Attends Climate Summer School in Switzerland

With the help of travel funds from the Ecology IGDP, I was able to attend the NCCR Climate Summer School in Grindelwald, Switzerland September 4-9. The summer school provided PhD students and post-docs from all over the world to spend a week learning about climate change effects on ecosystems services through lectures by experts in the field, focused group discussions, and participant poster sessions. The poster session where students presented their ongoing research was a great opportunity to learn what research is being done in a variety of disciplines and ecosystems. For my part, explaining the implications of my work to others that work with climate change from a modeling or economic perspective was sometimes challenging, but a valuable learning experience.

I can learn a lot about current climate change research through published peer-reviewed papers, but being able to directly ask questions of leaders in the field and talking with others from across disciplines and nationalities was the main attraction of the Summer School. The discussions that followed each presentation prompted me to think about the implications of my own and other research from a perspective that I might not otherwise have considered. For example, following a presentation on plant ecophysiological responses to warming, there were questions about how this affected global food production and trade or carbon markets. I was also really interested to learn about the effects of climate change on European ecosystems. Since I am more familiar with temperate deciduous forest, it was very interesting to compare findings from my research to those who studied climate change in the Alps or even tropical regions. The NCCR Climate Summer School was a great experience that helps foster both international and cross-disciplinary collaboration in the next generation of scientists, policy makers, and global citizens. This is what made the long journey from the US worthwhile for me and why I am extremely grateful to those who helped make my experience possible.



Best manipulated photo ~ Kristine Averill ~ "Predator Interference" A red fox interferes in a nighttime deer forage preference trial. Combined photos from August 2011 in Pennsylvania and 2008 in an Australian zoo.

International Ecology Research in Spain ~ Christy Robinson



Group Photo, left to right: Mare Kochin (Undergrad, ERM), Laura Davis (Undergrad, ERM, Ag Extension), Claudia Rojas (PhD Candidate, Soil Science), Christy Rollinson (PhD Candidate, Ecology)

This past summer fieldwork was a bit different than normal for me. I spent the month of June in Spain working with a global change ecology lab through an NSF International Research Experience for Students (IRES) grant Margot Kaye and Jason Kaye received to take two grad students and two undergrads abroad to gain international research experience. While I primarily worked with the plant ecology lab of Fernando Valladares at CSIC, I also spent a little bit of time assisting the lab of Fernando Maestre who look at effects of global change on ecosystems from a soil perspective.

With the Valladares lab, I spent a week sampling regeneration of European Beech (*Fagus sylvatica*) along an elevation gradient in northeastern Spain, installed permanent monitoring plots for a new biodiversity & ecosystem function study at another, and measured the ecophysiological responses of different Mediterranean shrub ecotypes to a greenhouse drought treatment. I was also able to spend some time working with the Maestre lab warming and drought experiment focused on biologic soil crusts in a location south of Madrid. Of course we couldn't travel all the way to Spain and do not do a little traveling for fun. Being based in Madrid, we got to know the city fairly well and frequented famous locations such as the Puerta del Sol and the Parque de Buen Retiro. As a group we made a day trip to see intact Roman aqueducts and the four students spent a weekend enjoying the sights in Barcelona. The groups we were working with were very friendly and accommodating, so even trips designated for work ended up having a lot of fun and some sightseeing mixed in.

In addition from benefiting from broadening my horizons by working with a very different ecosystem than I have pervious experienced, it was my first time living in a city, let alone one where the primary language was not English. It was a challenge to be so immersed in a different culture and even a seemingly simple task such as asking for directions or going to the store was a mental exercise. We were fortunate to have a native Spanish speaker in our group (Claudia Rojas, Soil Science PhD) who was extremely helpful in working out some cases of a language barrier, but my Spanish skills were definitely improved by the experience.

This experience was a wonderful way for me to grow both professionally by expanding my research experiences and personally by living and working in another culture. I highly encourage anybody who can to take advantage of opportunities such as these. Even though it can be intimidating (it certainly was for me), it is an experience you will never forget.

Visiting Scholar to the University of Queensland Broadens Her Global Conservation Perspective ~ Laura Russo

I spent this past summer and winter in Brisbane, Australia, as a visiting scholar at the University of Queensland (UQ). In collaboration with Hugh Possingham and Yvonne Buckley, of the Spatial Ecology Lab at UQ, I designed a research project that I expect to be a chapter in my thesis. In addition to a very productive three months of pursuing the questions I put forth in the research proposal, I made a lot of excellent contacts, developed new and unexpected research collaborations, and extended the depth and breadth of my own dissertation research. I attended two workshops and interacted



closely with scientists from universities in Sydney and Melbourne, as well as from CSIRO, the Australian version of the USDA. It was enlightening to see

how different the focus of research is at UQ, where the primary concern is to make a difference in national and global conservation policy, from the standpoint of affecting decision making and optimizing resource allocation. I highly recommend a research exchange experience to any graduate student. It will broaden the horizons of your research and change the way you think about your questions. And you might see some great birds.



Pennsylvania State University Ecology members attend the Ecological Society of America's Annual Meeting in Austin, Texas during August. Penn State Ecology was well represented at the conference, and collectively presented greater than 20 presentations. In addition, Tracy Langkilde received the George Mercer Award for her outstanding ecological research paper by a younger researcher. Photo by Britta Teller.

Luke McCormack ~ Armed with chacos and a memory stick, I, along with thousands of other ecologists from around the world, descended upon Austin, Texas, this past August for the Ecological Society of America annual conference. While I had aimed to “keep it weird” in the streets of Austin I mostly found myself keeping cool in the Convention Center as an oppressive 105° F heat wave rested over much of central Texas. Still, I was inspired by numerous presentations and sessions that took place throughout the week-long conference including several talks given by Penn State students, post-docs, and alumni. Following many of these talks I was proud to hear chatter in the halls of the convention center as ecologists from all over were discussing some of the new research, new ideas, and new paradigms presented by our own.

This year the excitement and inspiration of ESA peaked for me during a session I organized along with David Eissenstat titled “Measuring and modeling roots, the rhizosphere, and microbial processes below-ground.” While I was nervous beforehand, not knowing whether the session would be well received and well attended I was pleased to find the room filled to capacity with standing room only for the duration of the session. The session aimed to bring field ecologists together with ecological modelers and included speakers from across the U.S. as well as China. Across all 10 speakers the session was a great success and sparked meaningful dialogue between and among the presenters and the audience.

I would like say thank you to the Andersen Travel Award Committee as well as the memory of Frank A. Andersen for helping to make this opportunity a reality. I was inspired by many of the talks and encouraged by many of the discussions I had with other researchers at the conference. I am looking forward to turning back now to my own research with renewed energy and a more focused research lens.

Dan Grear ~ In the early summer I traveled to Santa Barbara, California to attend the 9th annual Ecology and Evolution of Infectious Disease conference. This conference attracts some of the top disease ecologists and evolutionary biologists from around the world with an astoundingly wide range of topics; ranging from studies of disease emergence in multi-host populations, to gene-for-gene coevolution of hosts and parasites. We were generously hosted by colleagues at the University of California-Santa Barbara and were treated to an incredible conference venue (campus is on the beach) where the suggested attire included flip-flop sandals.

I presented a chapter of my dissertation describing how novel methods for sampling the contact rates of wildlife can explain the prevalence of individual parasites and patterns of parasite communities infecting the same host. Some of the most intriguing research was presented by our UCSB hosts about the many roles that parasites play in complex aquatic food-webs: accounting for a significant share of energy flow and biomass compared to macro-invertebrates and vertebrates. One of the neatest features of this conference was being able to step outside the conference hall, walk for 5 minutes and see the coastal estuaries where this research was performed.

The highlight of this conference is always a hike on the final afternoon that gives everyone the chance to interact and see the local flora and fauna. Because this conference was on the coast of southern California, the ‘hike’ was completed mostly in bare feet. In between walking along with the ocean surf and spotting some unique California megafauna (sea lions, otters, and surfers), I had a chance to meet many new people and discuss the science of the previous days. I am grateful for the support of the Andersen travel award to help pay my way to California.



Xin Peng ~ I am from Xinjiang province in China, the geographical center of Eurasia, and I am a big ping-pong fan. I completed both my B.S. and M.S. degrees at Nanjing University. I currently am studying the fate of photosynthetic microorganisms applied to soils: impacts on carbon cycling and soil microbial community succession. Advisor: Mary Ann Bruns. Home Department: Crop and Soils



Lauren Smith ~ I majored in Environmental Science at Wheaton College, MA and graduated with a BA. As an undergraduate I researched orb-weaver spider behavior, water hyacinth vegetative and sexual reproduction in the presence of a biocontrol in Costa Rica and coyote movement along a barrier beach based on potential prey on

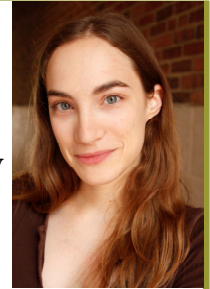
Cape Cod. I then took a year to work for Arizona Game and Fish, removing invasive trout species and building fish barriers in the streams of the White Mountains. Most recently, I worked at a Sea Turtle Rehabilitation Center in Texas, assisting in triage to injured gulf species and also contributing to the Kemp's Ridley Conservation Project by relocating and incubating nests. At Penn State, I am looking forward to enjoying the outdoors and conducting research at The Shale Hill's critical zone observatory, looking at carbon pool fluxes in response to climate change! Advisor: Margot Kaye. Home Department: Forestry



Melanie Kammerer ~ I graduated in May 2011 from Penn State with a B.S. degree in Agroecology, and decided to stick around to pursue a M.S. in Ecology. Most of the coursework I took during my undergraduate years focused on agronomic cropping systems, but I look forward to switching

gears to start a project on native pollinators in apple orchards. Given the decline of honeybee populations due to Colony Collapse Disorder, there is increasing interest in supporting native pollinator populations to ensure pollination of horticultural crops. My research will be investigating the effect of plant diversity in and around orchards on native pollinator abundance and diversity. What, if any, is the value for pollinators of non-cropped, semi-natural habitat surrounding orchards? When not working I enjoy gardening, baking, and ballroom dancing. Advisor: Dave Mortensen. Home Department: Crop and Soils

Gail McCormick ~ I am originally from the Detroit area and recently graduated from the University of Michigan with a BS in Ecology & Evolutionary Biology and a BTA in Theatre Arts. I am glad to be joining the Langkilde Lab where I am currently studying stress and immune responses of eastern fence lizards to invasive fire ants. Other interests include communicating science to the public, theatre, jigsaw puzzles, and paper art. Advisor: Tracy Langkilde. Home Department: Biology



Chris Thawley ~ I recently graduated with an MS from the University of Alabama where I studied physiology, genetics, and modeling of two invasive anurans in the southeastern U.S. At PSU, my PhD research focuses on how native fence lizard populations undergo rapid adaptation in the presence of invasive fire ants. Specifically, I look at how fire ants impose selection on lizards across life history and how this pressure alters behavior and morphology. In my spare time, I play frisbee, bake, and run around in the woods looking for herps. Advisor: Tracy Langkilde. Home Department: Biology



Christy Miller ~ Advisor: Jennifer Macalady. Home Department: Geosciences

NEW FACES IN ECOLOGY & HONORS & PUBLICATIONS



Kris Hennig ~ Mycorrhizal fungi form mutualistic associations with greater than 80% of the world's plant species. These organisms form diverse and functionally variable assemblages upon plant roots which act to influence individual plant fitness, competition, community composition, and may then act to influence ecosystem function and properties at various scales. My interests revolve around this functional variation between mycorrhizal taxa. In understanding this functional variation and how it acts to influence plant individuals and communities, I hope to gain a greater understanding of how and to what degree mycorrhizal fungi, in concert with other soil components, may aid in tightening N cycling, sequester carbon, and add to the resilience of ecosystems. Advisor: Roger Koide. Home Department: Horticulture



Alison Grantham ~ Originally from Los Angeles, I graduated from Mt. Holyoke College in central Massachusetts and have been working in organic and sustainable ag research, education and policy at the Rodale Institute and at Penn State Extension in southeastern PA. I'm excited to join Jason Kaye's lab as a PhD student on a new organic pastures project in collaboration with the USDA-ARS Pasture Lab. I will be studying the greenhouse gas and nitrogen cycling implications of agricultural management decisions across a gradient of dairy systems. In my spare time I enjoy hanging out with my husband and cats as well as gardening, cooking, and eating all kinds of fruits and vegetables. Advisor: Jason Kaye. Home Department: Crop and Soils

Recent Awards, Honors & Publications by Penn State Ecologists

Trish Miller, Ph.D. Candidate in Ecology, received the William C. Andersen Memorial Award for the best student oral presentation at the 2011 Annual Meeting of the Raptor Research Foundation in Duluth, MN. The title of her paper, presented on October 8, was - Striking a balance: Modeling Golden Eagle (*Aquila chrysaetos*) migration through wind energy developments in the central Appalachian Mountains, USA. Trish is co-advised by Robert P. Brooks (Penn State) and Todd Katzner (West Virginia University).

Fernandez, C.W. and R.T. Koide. (*In press*). The role of chitin in the decomposition of ectomycorrhizal fungal litter. *Ecology*. DOI: 10.1890/11-1346.1

Hill, J.M., and C.L. Elphick. (*In press*). Are grasslands passerines especially susceptible to negative transmitter impacts? *Wildlife Society Bulletin*. DOI: 10.1002/wsb.84

Tracy Langkilde received the 2011 Mercer Award from the Ecological Society of America.

PI **Jason Kaye** along with nine co-PIs received a \$2.3 million USDA Organic Agriculture Research and Extension Initiative Grant for their work: "Multifunctional cover crop cocktails for organic systems"

Watts, D.A. and G.W. Moore. 2011. Water-Use Dynamics of an Invasive Reed, *Arundo donax*, from Leaf to Stand. *Wetlands* 31:725-734.



Photo lower right; "ArcticFox" (*Vulpes lagopus*) on the Greenland tundra. By Jeff Kerby.