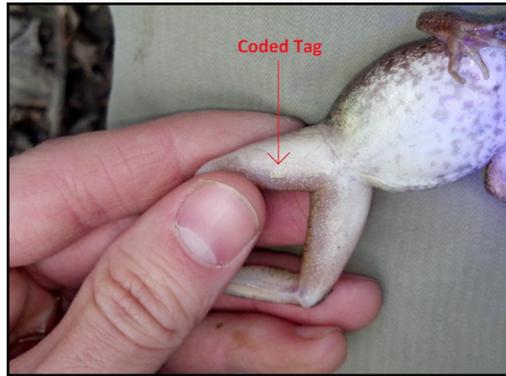


Restoration news bites:

- ◆ ERIE IGERT Trainee **Isabel Porto Hannes** received the Best Poster Award for her presentation “Blurred Lines in Conservation: Freshwater Mussel Gene Flow and Species Boundaries” at the American Museum of Natural History’s Center for Biodiversity and Conservation’s 5th annual Student Conference on Conservation Science.
- ◆ ERIE IGERT trainee **Jonathan Pleban** presented “Evaluation of the Biophysical Limitation of Photosynthesis on Four Varietals of *Brassica rapa*” at the American Geophysical Union Fall meeting
- ◆ ERIE REU student **William Fagan** (SUNY Geneseo) recently presented his research at the American Chemical Society Meeting.
- ◆ ERIE IGERT trainee **Michael Gallisdorfer** along with several co-authors will be presenting “Responses of Experimental River Corridors to Engineered Log Jams” at the World Environmental and Water Resources Congress in May.
- ◆ ERIE IGERT trainee **David Spiering** and ERIE REU student **Scott MacDonald** (University of Missouri) recently presented their research at the Association of American Geographers conference in Chicago.
- ◆ ERIE IGERT trainee **Luke Scannell** was awarded *Engineering Mentor of the Year* at the Future City Competition for his work with Mills Middle School.

ERIE IGERT Trainee Research Spotlight: Spatial Dynamics of Pond-breeding Amphibians



Wood frog with subcutaneous visual alphanumeric tag
Photo: Mike Habberfield

Mike Habberfield is investigating the movements of pond-breeding amphibian at an experimental forest in central NY through collaboration with researchers at SUNY ESF. The site contains several dozen constructed vernal pools organized to test the effects of spatial scale and pool clustering on amphibian dynamics. Vernal pools, small isolated wetlands which dry up each year, are popular restoration targets because they have historically been overlooked by environmental legislation and they serve as key habitat important for reversing the current global decline in amphibians.

To better understand amphibian spatial dynamics and, therefore, inform restoration of vernal pool systems, Mike conducted two related studies. First, he tagged wood frogs (*Lithobates sylvatica*) breeding at pools in early spring and analyzed subsequent recaptures of individuals. Second, he employed experimental translocations of green frogs (*Lithobates clamitans*) breeding at pools throughout the summer. Translocations entail capturing frogs at pools, moving them specific distances and releasing them within a pool cluster. Subsequent frog movements were then tracked using fluorescent dye powder, providing a fine-scale record of the movement path. Path parameters are analyzed to determine how the movement

and habitat selection process varies with translocation scale and the local density of pool clusters.

Mark-recapture models showed that movement of wood frogs between pools both within and between seasons is rare, even where dense pool clusters exist. Spatial clustering of pools may, however, affect breeding season residence time and local population densities. By analyzing the green frog movement pathways, Mike demonstrated that frogs moving between entire clusters exhibit searching behavior instead of goal-oriented movement. Habitat selection models also showed that frogs readily choose neighboring pools only when translocated intermediate distances within a cluster, suggesting that they perceive entire clusters as habitat patches.

Understanding how frog movement behavior and habitat selection change in response to spatial scales improves dispersal modeling, an important tool for predicting colonization and ensuring population viability in restored systems. The culmination of this research can be aligned with the latest movement-based models of resource selection, linking the amphibian modeling field with innovative research on spatial-behavioral ecology. Such a link provides an avenue for effectively predicting organismal response to rapid environmental changes.



Green frog being tracked at night using florescent dye powder under ultraviolet lamp. Photo: Mike Habberfield

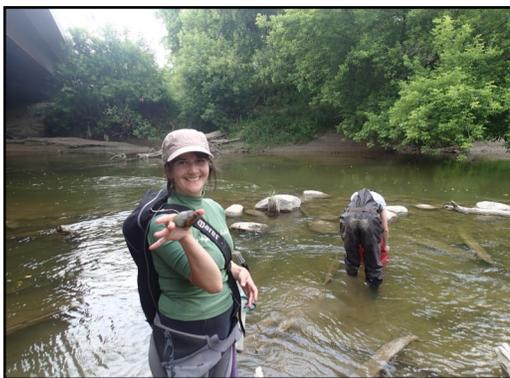
ERIE IGERT Trainee Research Spotlight: Conservation of Native Freshwater Mussels

Native freshwater pearly mussels, also known as unionids, live in the sediments of rivers, streams and lakes and play important roles in the maintenance of these systems. Although this group is highly diverse, it is the most threatened taxon in the United States as a result of human impacts. Correct identification of species is fundamental in developing and implementing measures to conserve and restore unionid species. However, species boundaries and geographic distributions of many unionid species remain unresolved especially in the lower Great Lakes.

Unionids dispersed into the lower Great Lakes after the last glaciation approximately 18,000 years ago. Closely related species that were isolated in the past came into contact when their geographic range overlapped and it has been suggested that they can hybridize. There is a total of six pairs of closely related species which have come into contact, two of these species; the Fatmucket, *Lampsilis siliquoidea*



Lampsilis siliquoidea with an attached juvenile of an unknown species. Photo: Lyuba Burlakova



Isabel collecting mussels at the Nottawassaga River, Canada. Photo: Lyuba Burlakova

and the Eastern lampmussel, *L. radiata*, are the focus of ERIE IGERT trainee **Isabel Porto Hannes'** research. The research goals are to determine the phylogenetic relationship and levels of intermixing between these two species. The project is a joint effort between UB and Buffalo State College. Furthermore, due to the wide distribution range of these two species, covering territories from USA and Canada, Isabel has collaborated with universities, museums, and State and federal agencies in both countries.

A motivation to study unionids is that in spite of its ecological significance and conservation status it is an understudied group and much of the life history and evolution of many unionid species are not well known. Furthermore, the use of molecular genetics has increased in ecological conservation and restoration projects. When appropriately applied, population genetics can provide answers to questions at evolutionary and ecological scales.

Registration is Open for the Summer Ecosystem Restoration Workshops

This first workshop is **Fundamentals of Stream Channel Design** (June 1-2). This workshop will cover stream restoration design approaches, various modeling tools for stream restoration design, case studies, and more. The workshop will be taught by Sean Bennett, Ph.D. (UB Geography) and Alan Rabideau, Ph.D., P.E. (UB Civil, Structural, & Environmental Engineering).

The second workshop is **Watershed Management Planning, Assessment, & Monitoring** (June 3-5). This workshop will cover project and watershed planning, the Stream Visual Assessment Protocol, biomonitoring methods, macroinvertebrate sampling and identification, and more. The workshop will be taught by Kelly Frothingham, Ph.D. (Buffalo State Geography & Planning), Wayne Gall, Ph.D. (NYS Dept. of Health), and Alan Rabideau, Ph.D., P.E.

The third workshop is **Principles of Habitat Assessment for Non-ecologists** (June 9). This workshop will introduce participants to the basics of habitat assessment at restoration sites in the lower Great Lakes region. Topics include pollinator friendly practices, promoting eastern blue bird habitat and other song birds, monitoring pollinators, reptile and amphibian surveys, and more. This workshop will be taught by Jeff Popp (Wildlife Habitat Council).

We are offering a repeat of last year's workshop **Pumping Test Design & Analysis** (May 29). Details forthcoming.

For more information and to register, please visit our [workshop webpage](#) today!

ERIE Trainee Robert Earle Graduates

One of the ERIE IGERT Program's first trainees, **Robert Earle**, has successfully defended his dissertation in Philosophy: "Deep Intentional Environmental Value: Toward A Relational Theory." In his work, a relational account of environmental value is proposed and outlined based upon the phenomenological concept of "intentionality." The proposed relational account is contrasted with the intrinsic, holistic, and anthropocentric accounts, which have been dominant since environmental philosophy emerged as an autonomous subfield in the early 1970s. Dr. Earle has a publication titled *Is Natural Beauty the Given?* forthcoming in the journal *Environmental Ethics*.

Alan Rabideau Earns Philosophy Degree

ERIE Principal Investigator **Alan Rabideau** received his M.A. in Philosophy on February 1, 2015, 29 years after his first (engineering) Master's degree was conferred. He began his program of study in 2008 with the very first ERIE class: "Perspectives in Ecological Restoration" taught by Ken Shockley & Don Grinde. He received a Fellowship from the National Science Foundation to continue his studies with philosopher Andrew Light in Washington DC (2009-10), completing his UB coursework over the next four years under the direction of ERIE philosopher Ken Shockley. "UB has a superb Philosophy Department" said Rabideau, "but I'm ready for another 30-year break from graduate work".

Please consider donating to the **Ecosystem Restoration Scholarship Fund**. Your tax-deductible gift will support summer undergraduate student research in ecosystem restoration in the Great Lakes & western New York Region. **Your support is greatly appreciated!**

Donations are accepted [online](#). Thank you!

ERIE IGERT Program Highlights and Major Accomplishments

We hope you enjoyed this final issue of the ERIE Program Newsletter. As the ERIE IGERT Program comes to a close, we would like to share some of the highlights and accomplishments of the program over the past several years.

- ◆ To date, five ERIE IGERT trainees have earned their doctorate with several more poised to graduate in 2015. ERIE IGERT trainees have majored in Biology, Environmental Engineering, Geology, Geography, American Studies, Philosophy, Chemistry, and the Evolution, Ecology, and Behavior Program.
- ◆ ERIE IGERT trainees have authored or co-authored 19 papers in scientific journals with several more in review or in preparation as more trainees complete their dissertation research. In addition, they have authored or co-authored 3 book chapters and over 70 conference presentations with more expected over the next year.
- ◆ ERIE IGERT trainees have assisted in hands-on restoration projects within the WNY community through cohort Practicum projects with Buffalo Niagara Riverkeeper, Motorola, Inc., Tuscarora Environment Program, and Tiff Nature Preserve/Buffalo Museum of Science. In addition, several trainees have continued to volunteer their time and expertise with these projects and others such as Buffalo Audubon Society's Joseph Davis State Park avian habitat restoration project and Buffalo Niagara Riverkeeper's Buffalo River restoration.
- ◆ The ERIE Research Experience for Undergraduates (REU) program, also supported by the National Science Foundation, has supported approximately 60 undergraduate students over a six-year period, including students from over 40 colleges and universities across the U.S. The majority of REU the students are now enrolled or will enroll in science and engineering graduate programs.
- ◆ The popular ERIE summer workshops in Ecosystem/Environmental Restoration continue to attract professional and academic participants and are expected to continue for the foreseeable future with a streamlined scope and focus.
- ◆ Selected ERIE programs will continue through the UB-RENEW initiative (Research and Education in eNergy, Environment, and Water), which was recently launched with an initial \$15M investment and 20 anticipated faculty hires.