



# EARS IGERT newsletter

**Volume III  
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## EARS IGERT Newsletter

### IGERT Meeting in Oxford, Ohio February 16—19, 2012

Greetings and KSU /Miami U. meeting in Oxford, OH	1
Meet IGERT trainees from KSU and Miami U.	2
Trainee and Faculty Publications and Presentations	3
Dr. Leff honored, Annual IGERT Survey, and Annual PI Meeting in DC	4
Upcoming Events and announcements	5

Greetings ~  
We hope that you have enjoyed the unseasonably warm temperatures during the past few months!

The KSU and Miami U. IGERTs have been working diligently on collaborative cohort projects and meeting various program requirements.

Recruiting efforts have been completed for the 4th and final cohort, which will begin in fall 2012 and end in summer 2013.

We would like to welcome new trainees from KSU; Thomas Ballinger, Nicholas Bonini, Jonathan Gray, Jakub Kollacz, Fred Minkowski, Alescia Roberto, Ryan Schoeneman and Joseph Taura. There are a few pending applications for KSU.

From Miami U. we welcome Ashley Dunithan, Elizabeth French and Paul Repasky.

We trust that you will enjoy reading about recent IGERT events.

In February, IGERT trainees and faculty from KSU traveled to Oxford, Ohio to meet with trainees and faculty from Miami University. In attendance from KSU were trainees Adrienne Hopson and Patricia Johnston (2nd cohort); Randall Breckon Margaret Gaglione, DeShawn Johnson and David Widner (3rd cohort); and faculty, Drs. Laura Leff, Ferenc de Szalay and Qi-Huo Wei. Trainees from Miami U. included Michael Bishop, Jennie Brentrup and Nicole Hayes (3rd cohort); and faculty Craig Williamson and Jon Scaffidi. Also in attendance were independent program evaluators, Dr. Virginia (Ginny) Anderson from Towson University and Dr. Karen Paulson from National Center for Higher Education Management Systems in Boulder, Colorado.

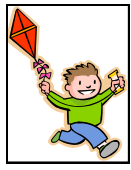
The Miami U. cohort hosted the event. The purpose of the meeting was to discuss cohort projects, plan future events/activities and evaluate progress within the cohorts. The trainees met individually with program evaluators and faculty advisors. Power Point presentations were presented by faculty and trainees to update the group on individual progress. They broke into small groups for a tour of the Miami U. facilities and labs. This was followed by open discussions within working groups about microcystin and buoys. The meeting concluded with each working group writing a progress report which included goals and timelines.

The trainees also enjoyed some social time with their peers while in Oxford. A special thanks to Jennie Brentrup from Miami U. for coordinating activities and for the hospitality she extended to the KSU group!



From left to right: Michael Bishop, Adrienne Hopson, Nicole Hayes, Jennie Brentrup, David Widner, DeShawn Johnson, Margaret Gaglione, Randall Bishop, and Patricia Johnson.

**Happy Spring!**



EARS IGERT is funded by NSF





## Meet KSU and Miami U. Trainees



**David Widner**  
KSU University  
3rd Cohort

David joined the KSU IGERT in fall 2011. He is interested in fresh water remediation and is particularly concerned about stream quality and the promotion and preservation of riparian corridors. His main research interests focus on monitoring the water quality of streams and in educating individuals that impact those streams. He currently is interested in improving the ecology and overall quality of the Sugar Creek Watershed, which is ranked as the second most impaired watershed in Ohio. The primary cause of impairment in the central portion of the watershed is the primitive farming practices of Swartzenruber Amish.

The purpose of his current research is to promote the improvement of the natural environment while simultaneously preserving traditional Swartzenruber culture. The Ohio EPA has a specific protocol for determining stream health and utilizes aquatic environmental sensors to gather data. This data is published in reports designed to educate the public in order to improve the environmental and ecological conditions of particular watersheds. However, the Swartzenruber live primitive lives and attempt to shelter themselves from the education and practices of popular culture. They are unaware of the impacts of farming practices on the watershed, and have no formal environmental education. This leads to the following research questions:

- 1). Can increased environmental awareness within the Swartzenruber community be used to improve the environment and promote culture perpetuation?
- 2). Can environmental sensing systems be developed that will:
  - A. Adequately reflect the local environmental and ecological condition of the Sugar Creek?
  - B. Be convertible to a non-modern system and thus potentially incorporated into Swartzenruber internal education?

His research looks at the relationship between environmental perception and environmental responsibility. His study will also attempt to determine if environmental responsibility will limit interference in the religious decisions of traditional culture by popular culture, and satisfy the environmental standards of mainstream society.

He plans to pursue a career in academia and will continue to research interactions between culture and the natural environment. He will also look at the interactions between various land uses and ecosystems. He is interested in researching surface water in general, but my primary focus will be centered on riparian environments.

Family is very important to him and he enjoys a date night with his granddaughters every Friday! He enjoys walking and has spent a great deal of time doing this in both Urban and rural environments. He is an animal lover and has rescued many (domestic and wild). He currently has four cats.

Over spring break, he had the opportunity of traveling to Costa Rica with the Geography Department during Spring Break. This trip had an ecological focus. He had the privilege of visiting a Cloud Forest and two unique rainforests. These ecosystems are amazingly diverse and their preservation is immensely important. He thoroughly enjoyed this experience which caused him to realize the urgency of environmental responsibility.



**Nicole Hayes**  
Miami University  
3rd Cohort

Nicole joined the Miami University IGERT in fall 2011. She is a fourth-year PhD student in Mike Vanni's lab at Miami University. Her research examines the influence of human-induced land use change on aquatic ecosystems. She is particularly interested in the role that agriculture and urbanization play in determining phytoplankton community composition, cyanobacterial dominance, cyanotoxin production, and nutrient limitation within the phytoplankton community.

She is addressing these questions by examining patterns in nutrient limitation and phytoplankton community across spatial (40 reservoirs across Ohio) and temporal (one reservoir over nearly two decades) scales. She is also manipulating the nutrients available to phytoplankton in a mesocosm experiment to determine if the nutrient supply or nitrogen to phosphorus ratio is more important in determining cyanobacterial dominance.

She has incorporated sensors into many aspects of her research including buoy-based sensors to correlate phytoplankton community to reservoir mixing depth, light penetration, and chlorophyll concentrations and a fluoroprobe to assess the phytoplankton community at a higher frequency than is possible with traditional microscopy methods. She plans on completing her doctorate within the next two years and would like to find a post-doc that incorporates molecular methods into understanding aquatic biogeochemical cycles.



This spring she is presenting the third cohort's research project entitled "Sensing Climate Change: Using Sensors to Identify Drivers of Climate Change in Aquatic Ecosystems" at the IGERT PI-meeting in Washington DC.

Before coming to Miami, she completed an undergraduate degree at the University of Wisconsin-Madison, where she did research on the interactions between native and invasive crayfish (*O. rusticus*). After graduating, she taught environmental education, with a focus on invasive species management at the MacKenzie Environmental Education Center in Poynette, Wisconsin.

In her spare-time she enjoys camping and canoeing with her husband and their dog.



# IGERT Trainee and Faculty Publications and Presentations June 2011 - May 2012

Throughout the past year, KSU and Miami U. IGERT trainees and faculty contributed to scientific publications, writings and conferences presentations. Following are the contributions made by Dr. Laura Leff (PI, KSU) and Dr. Craig Williamson (Co-PI, Miami U.; Sarah Hicks and Kevin Rose (1st cohort, KSU); Patricia Johnston (2nd cohort, KSU); Jennie Brentrup (3rd cohort, Miami U.) and David Widner (3rd cohort, KSU).

## Journal Articles – Refereed Publications

S. E. Hicks\*, S. P. Hurley, R. S. Zola, and D. -K. Yang, (2011) Polymer Stabilized VA Mode Liquid Crystal Display. *Journal of Display Technology*, 7, 619-623.

Fischer, J., M. Olson, C. Williamson, J. Everhart, J. Mack, K. Rose\*, R. Vinebrooke, J. Saros, and J. Stone (2011) *Daphnia mendorfiana* as a sentinel of climate change in alpine lakes: evidence from spatial distribution, long-term dynamics, and experiments. *Hydrobiologia*, 676: 263-277.

Carey, C.C., P.C. Hanson, D.A. Bruesewitz, G.W. Holtgrieve, E.L. Kara, K.C. Rose\*, R.L. Smyth, and K.C. Weathers (2012) Organized Oral Session 43. Novel Applications of High-frequency Sensor Data in Aquatic Ecosystems: Discoveries from GLEON, the Global Lakes Ecological Observatory Network. *Bulletin of the Ecological Society of America*, 100-105.

Kara, E.L., P. Hanson, D. Hamilton, M.R. Hipsey, K.D. McMahon, J.S. Read, L. Winslow, J. Dedrick, K.C. Rose\*, C.C. Carey, S. Bertilsson, D da Motta Marques, L. Beversdorf, T. Miller, C. Wu, Y.-F. Hsieh, E. Gaiser, and T. Kratz (2012) Time-scale dependence in numerical simulations: Assessment of physical, chemical, and biological predictions in a stratified lake at temporal from scales of hours to months. *Environmental Modelling & Software*, doi: 10.1016/j.envsoft.2012.02.014.

Read, J.S., D.P. Hamilton, A.R. Desai, K.C. Rose\*, S. MacIntyre, J.D. Lenters, R.L. Smyth, P.C. Hanson, J.J. Cole, P.A. Staehr, J.A. Rusak, D.C. Pierson, J.D. Brookes, A. Laas, and C.H. Wu (In Press) Lake-size dependency of wind shear and convection as controls on gas exchange. *Geophysical Research Letters*. (currently in press, publication date may be before May 31).

## Book Chapter

Leff, L.G. *Freshwater Habitats*, (2012) In: *Topics in Ecological and Environmental Microbiology*, Tom Schmidt and Moselio Schaechter (editors), Elsevier.

## Conference Publications-

Williamson, C.E., K.C. Rose\*, A.J. Tucker, J.S. Mack, E.P. Overholt, J.E. Saros, J.M. Fischer, and J. C. Everhart (2011) Water Transparency to UV Radiation as a Sentinel Response to Climate and Land-use Change: Implications for Aquatic Food Webs and Invasive Species. *Conference Proceedings of the October, 2010, 10th Biennial Scientific Conference on the Greater Yellowstone Ecosystem*.

## Conference Presentations

Brentrup, J.A.\* , Rose, K.C.\* , Leach, T.H., Williamson, C.E., Fischer, J.M., Saros, J.E., Hargreaves, B.R., Moeller, R.E. Sentinel Responses to Extreme Precipitation Events in Lakes: Changes in UV Transparency. Poster Presentation. *Global Lake Ecological Observatory Network Conference*, October, 2011, Sunapee, NH.

Hargreaves, B.R., Brentrup\*, J.A., Rose, K.C.\* , Strock, K., Knoll, L.B., Saros, J.E., Williamson, C.E. Lakes as Sentinels of Change: DOC Signals from Terrestrial Watersheds. Poster presentation. *Northeastern US Environmental Sensor Network Workshop*, October, 2011, Hubbard Brook Experimental Forest, NH.

## Conference Presentations, continued

Hicks, S.E.\* *Imprinting Microstructures on Liquid Crystal Polymer Composite Materials*, Oral presentation given at the *International Liquid Crystal Elastomer Conference*, September, 2011, Lisbon, Portugal.

Hicks, S. E.\* , Hurley, S.P., Zola, R., and Yang, D.-K. *Light Scattering Studies on Polymer Stabilized VA Mode Liquid Crystal Displays*, Poster Presentation given at the *Liquid Crystals Gordon Research Conference*, Mount Holyoke College, June, 2011, South Hadley, MA.

Leff, L. G. Bade, D. Williamson C, and Woolverton C. 2011. *Environmental Aquatic Resource Sensing (EARS): Basic Science, Business Education And Outreach*. Invited talk. *Universities Council on Water Resources Conference*, July, 2011, Boulder, CO.

Johnston, G.P.\* , Farnham, L., Simeonsson, J., Johnston, C.G., Lineman, D. *Biogeochemical characterization of PAH contaminated river sediments: Harnessing microbes for remediation*. Poster presentation at *Ecological Society of America General Meeting*, August, 2011, Austin, TX.

Farnham, L., Johnston, C.G., Johnston, G.P.\* , Simeonsson, J. *QUEST: A forum for student scholarship poster presentation: Development and Application of a Sequential Extraction Procedure for Characterization and Analysis of Elemental Pollutants in Contaminated River Sediments and Soils*, April, 2011, Youngstown State University, Youngstown, OH.

Williamson, C.E., J.E. Saros, and K. C Rose\*. 2012. *Lake ecosystem responses to deglaciation in subarctic and alpine environments*. *NASA Workshop on Ice, Life, and Energy: Microbial Ecosystem Responses to Deglaciation*. *NASA Ames Research Center*, March 26-27, 2012.

Rose, K.C.\* , Neale, P.J., and M. Tzortziou. *Modeling attenuation across the UV-PAR spectrum in the Rhode River sub-estuary*. 2012. *Chesapeake Bay Modeling Symposium*, May 2012, Annapolis, MD. Oral Presentation.

Rose, K.C.\* , Read, J.S., McBride, C., C.E. Williamson, and D. Hamilton. *Deep Chlorophyll Maxima: Where do they form and what implications do they have for ecosystem structure and metabolism estimates?* 2011. *Global Lake Ecological Observatory Network (GLEON) 13 Meeting*, October 2011, Sunapee, New Hampshire. Invited Oral Presentation.

Rose, K.C.\* 2011. *Introduction to GLEON and a Broad Overview of Advanced Aquatic Sensors*. *Advanced Aquatic Sensors Workshop*, University of Michigan Biological Station, September 2011, Pellston, Michigan. Invited Oral Presentation.

Rose, K.C.\* , Williamson C.E., Saros J.E., and C.E.H. Kissman. 2011. *Understanding Allochthony: New Techniques and Tools*. *Ecological Society of America (ESA) meeting*, Austin Texas. August 2011. Invited Oral Presentation

Widner, D\*. *Bridging the Gap Between Traditional and Popular Culture: Developing an Environmental Education and Stream Health Monitoring Plan to Promote the Improvement of the Sugar Creek Watershed and the Preservation of Swartzentruber Amish Culture*. Presented at the *National Meeting of the Association of American Geographers* in New York, New York. February 25th 2012.

### Dr. Laura Leff Honored at KSU Ceremony

Dr. Laura Leff, KSU IGERT PI, was one of six Kent State University faculty members across several disciplines who received the "Outstanding Research and Scholar Award." The recipients were recognized during an awards ceremony on March 28th for their quality contributions to the university and to society.

She has been a professor in KSU Biological Sciences since 1994 and has published approximately 100 peer-reviewed papers in scientific journals. She has been invited to lecture numerous times at national and international meetings and has served as editor for several scientific journals in her field. In addition, she has brought approximately \$5 million in funding for scholarships and training to KSU.

The event was held in Cartwright Hall at the KSU campus. Following the ceremony and reception, a public lecture was presented by John W. Harris, a Physics professor from Yale U. The lecture was entitled, "Through Our Universe: From the Big Bang and Unknown Dark Forces to Unseen Dimensions in the Universe."



### Annual IGERT Survey for 2012

It's time again for the Annual IGERT Survey. Dr. Leff is required to submit this report each May for the duration of the IGERT grant. Trainees and faculty have been very busy providing data. Trainees who are funded from June 1, 2011 to May 31, 2012 are required to complete individual surveys within the main survey.

The survey is a tool to collect important data for the activities related the IGERT grant. The information being collected from trainees and faculty includes publications, presentations, books, book chapters, patents, research achievements, educational achievements, trainee achievements, and international travel.

Thanks to all for assisting with this important project!

### Annual IGERT PI Meeting in Washington, DC



The Annual IGERT PI meeting is scheduled from May 30 to June, 2012 at the Capital Hilton in Washington, DC. Invitees from each IGERT include a principal investigator, trainee and program coordinator. Persons planning to attend from the KSU/Miami U. IGERT are Dr. Jon Scaffidi, Nicole Hayes and Margaret Nagella.

The event will feature six technical sessions covering interdisciplinary research themes. The program agenda includes:

1. Keynotes: Dan Mote, University of Maryland and Griffin Weber, CTO, Harvard University
2. Emerging Science and Engineering: Findings from IGERT - Technical Sessions
3. Post Session and announcement of 2012 Video and Poster Competition Winners

Nicole will present the third cohort's research project entitled, "Sensing Climate Change: Using Sensors to Identify Drivers of Climate Change in Aquatic Ecosystems."

As the lowest point in the landscape, lakes integrate the signals of climate change. The cohort is using a novel optical index that integrates the effects of precipitation on optical properties in the water column and allows them to compare the effects of climate change across aquatic ecosystems. Preliminary results suggest that the optical index is a function of the quality of dissolved organic matter and may help us to distinguish its source. They have also found that the optical properties of lakes from non-human influenced watersheds and reservoirs from heavily modified watersheds both respond in the same direction, albeit at a different magnitude, following precipitation events or drought periods. Their goals are: first, to determine if the index works in diverse aquatic ecosystems and second, to identify the factors driving these changes in optical properties using high frequency data from automated sensors. Each water body will have sensors that measure algal, sediment, and dissolved organic matter concentrations and they will collect water samples to estimate the optical index. With their results they will determine if their index works across all aquatic ecosystems and identify the relative importance of the three drivers (algae, sediment, and dissolved organic matter) across ecosystem type.



# EARS IGERT

Want more information? Contact us at the address, phone number or e-mail below. You can also go to the web page to get contact information for our faculty participants and find links to our participating

EARS IGERT  
Department of Biological Sciences  
Kent State University  
Kent, OH 44242

Phone: 330-672-7828  
Fax: 330-672-3713  
leff@kent.edu



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[http://  
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## Upcoming events—2012

~ Chitra Rajagopal - Summer course at KSU - see details below

~ Lacawac Sanctuary field experience in PA  
September 6-9



## Info about Lacawac workshop—2012

IGERT trainees (3rd and 4th cohorts) are required to enroll for the first EARS IGERT event for 2012-2013, which will be held at the Lacawac Field Station in Pennsylvania. The event will start on the evening of September 6 and end the morning of September 9. Trainees will receive one credit for a ST course in biology for this event. Transportation, lodging and food will be provided. Additional details about the event will be sent to IGERT trainees and faculty within the next the next few months—**so save the date**—and stay tuned!



**Congratulations to Valerie Finnemeyer (KSU 2nd cohort) and her family on the arrival of Zedrian Mattias Finnemeyer. "Zed" was born on February 15, 2012. Valerie and Zed visited the KSU campus recently. His "big" sister is enjoying her new sibling. The family is overjoyed with this precious new addition.**

Earth and sky, woods and fields, lakes and rivers, the mountain and the sea, are excellent schoolmasters, and teach some of us more than we can ever learn from books.

~John Lubbock



**Special topic: BSCI-50195/40195/70195: by Chitra Rajagopal**

**Course Description:** Two credit hour course. Environmental Sensor Technology.

Lecture –Lab: partially in-person and partially web-based) offered summer intercession, May 14—June 1, 2012

The course structure focuses on providing students with an interesting and stimulating learning experience in the field of Environmental wireless sensor technology and performing both isolated and collaborative tasks. Hands-on experience is made possible by the use of necessary firmware and other existing applications in the crossbow kit which enables students to implement WSN using sensors by integrating hardware and software components to easily develop and build prototype sensor networks individually or in group. Students in this course will study cutting-edge research papers that deal with various aspects of wireless sensor networks applied to Environmental sensing.

For Undergraduate or Graduate students

Please feel free to share information about IGERT with your colleagues and friends.

Copies of the newsletter can be downloaded from our web page at <http://bioweb.kent.edu/igert/>.

Ask us about marketing materials, too!



As always, we appreciate the participation of the **EARS INTERNAL COMMITTEE!** We've got one representative in each of the participating departments from **KSU and Miami U.**



### MIAMI U.

Chemistry, J. Scaffidi  
Geography, W. Renwick  
Geology, H. Dong  
Microbiology, R. Morgan-Kiss  
Zoology, C. Williamson

### KSU

Biology, A. Leff  
Chemical Physics, Q. Wei  
Chemistry, R. Twieg  
Geology, A. Smith  
Geography, M. Munro-Stasiuk