

FOR THE RECORD

News from the Department of Earth and Environmental Systems at Indiana State University • Fall 2009

Blackwell Scholars Excel at ISU and Beyond

Mike Blackwell, a geology alumnus, recently created the Blackwell Scholarship Fund. His generous gift helps one geology student each year with educational expenses, allowing that student to maintain high levels of academic achievement and to pursue research opportunities in the geology program without having to work off campus.

After receiving a B.S. in geology from Indiana State, Blackwell attended graduate school and since has worked in the petroleum industry. He is president and lead scientist for Mississippi Oil Co.



Emily Pugh collects samples at Falmouth Harbor during her summer research experience with the USGS.

photo courtesy of WHOI

The first Blackwell Scholar, Cassie Gray, is currently a geology graduate student at Louisiana State University. While at ISU, Cassie participated in a National Science Foundation Research Experience for Undergraduates (NSF REU). She worked in Dr. Tony Rathburn's paleoceanography laboratory, where she studied the foraminiferal ecology of Venice Lagoon. The 2008 "Outstanding Graduating Senior" participated on an oceanographic research cruise with Scripps Institute of Oceanography and was selected for a prestigious internship opportunity at

NASA's Jet Propulsion Laboratory in Pasadena, Calif.

Emily Pugh was the 2008 Blackwell Scholar. In addition to Emily's success in the classroom, she has excelled in the lab. She is a member of Dr. Jennifer Latimer's geochemistry laboratory studying phosphorus burial and diagenesis during Cretaceous ocean anoxic events. Emily is also a member of the ISU Cross Country and Track teams. In 2008, she was nominated for the Presidential Scholar Athlete Award, and she participated in an NSF REU opportunity at Woods Hole

Oceanographic Institute and the United States Geological Survey, where she studied nitrous oxide fluxes from coastal

sediments in Falmouth Harbor, Mass. Emily also has participated in the Louis Stokes Alliance for Minority Participation (LSAMP) Program and the McNair Achievement Program. She recently received a fellowship award from the Indiana Space Grant Consortium.

The 2008-09 Blackwell Scholar is Tiffany Schoenbachler. She is studying the sediment geochemistry of samples from the Bering Sea over recent glacial/interglacial intervals in Dr. Latimer's geochemistry laboratory. President of the Earth Science Club since 2007, Tiffany is involved in tutoring and supplemental instruction. She is the recipient of the new "Looking to the Future" Scholarship for geology majors, which was established by an anonymous donor. The 2009-10 Blackwell scholar is Joseph Glair. Like his predecessors, we expect great work from Joseph.

Message from the Chair

Greetings everyone! This has been another exciting and productive year for the department. This issue of the newsletter highlights student and faculty activities and accomplishments. As you read on, you'll discover a wide range of research projects that emphasize experiential learning, an important mission of our programs.

This past year we have reorganized and integrated our curriculum so that it has a focus on the environment. Our proposal to create a new Department of Earth and Environmental Systems that reconfigures the Anthropology, Geology, and Geography programs has been approved by the university. Two new majors with concentrations have been designed: Earth & Environmental Sciences and Human & Environmental Systems. Traditional disciplinary curriculums in anthropology, geography, and geology are maintained in concentrations under each major. This new program will be the core environmental curriculum at ISU, allowing us to take the lead in training environmentally-oriented students and conducting research in complex environmental systems.

The Geology master's degree also was revised so that it will have a broader focus and potentially attract a wider range of students interested in the geosciences and Quaternary research. The revised degree is called Earth and Quaternary Sciences and incorporates faculty in Geology and Anthropology, enhancing an already outstanding program.

Please feel free to contact me any time (russell.stafford@indstate.edu), and thank you for your continued support.

Russ Stafford, Chairperson



Meet the Faculty

This feature focuses on the research of a few of our 16 department faculty. Other faculty members will be highlighted in future issues.

Stephen Alrich

Stephen Alrich is our newest faculty member, joining the department this fall. He received his PhD in geography from Michigan State University. His research interests center on geospatial approaches to human environment geography and environmental problems in general. His dissertation research focused on the connection between land conflict and severe deforestation in the Brazilian Amazon. Alrich will be teaching geotechniques (including GIS) and environmental science.



Dr. Jim Speer (right) and students traveled to Wyoming where they studied the Bridger Antelope Trap.

Greg Bierly

Greg Bierly joined ISU in fall 1995. He is a climatologist interested in the influence of atmospheric factors on natural and human phenomenon. His research is focused on the dynamics and spatial characteristics of atmospheric circulation features, specifically the mid-latitude westerlies and extra-tropical cyclones. He has been funded by the National Science Foundation to examine the climatology of low level jet streams and their relationship to southwest U.S. cyclone patterns. Bierly also explores the influence of upper atmospheric circulation regimes and teleconnections on the parenting success of white-throated sparrows. He also is the director of the ISU Honors Program.

Sandra Brake

Sandra Brake joined ISU in fall 1995, replacing Dr. John Cleveland as the program's hard rock geologist. Prior to joining ISU, Brake worked for several international precious metal exploration companies in the western U.S. and for an environmental engineering firm in Wisconsin. At ISU, she has been teaching courses in mineralogy, petrology, ground-water hydrology, economic geology, and volcanology. She has combined her expertise in the mining and environmental industries to develop a research program that evaluates contamination associated with coal mines in Indiana. Her current research focuses on eukaryotic microbial biofilms living under the extreme conditions of acid mine drainage.

Kathleen M. Heath

As a bio-cultural anthropologist, Kathleen Heath focuses on evolution and ecology. She is interested in life history strategies and multi-generational interactions. To this end, she continually expands two

large databases—a historical demographic database with data ranging from 950 ACE to the present from groups around the world ($n > 100,000$) and a database representing life histories and oral histories from three generations of contemporary peoples from different ethnic, cultural, and socio-economic lifeways. These data are used to address how the physical and cultural environment affect health and lifestyle behaviors; fertility, mortality, and migration patterns; mating and parenting strategies; and the role of family in life history events.

Learn more about the ESS faculty at www.indstate.edu/ees

Jennifer C. Latimer

Jennifer Latimer received her PhD from Indiana University in 2004 and focuses her research on the biogeochemistry of nutrients and metals in the environment. In particular, she studies the relationships between phosphorus geochemistry and metal fluxes in the world's ocean to try to understand the interactions between nutrient burial, detrital fluxes, paleoproductivity, and past climate change. Latimer also examines the impacts of acid mine drainage on soil, sediment, and water chemistry and the relationships between heavy metals in the environment and human health.

Shawn M. Phillips

Shawn Phillips' research focuses on health and disease patterns in past populations. In particular, he investigates how we can interpret health patterns as outcomes of human behavior and environmental interactions. In the past few years, he has worked with students on projects such as the variable health risks soldiers faced during the War of 1812, with a special emphasis on the Indiana Frontier. Among Phillips' ongoing projects is a study of a Kentucky family that includes data from before the Revolutionary War through the 21st century. In another project, he is examining how health and disease patterns changed in a Caribbean population over the past century.

Tony Rathburn

Tony Rathburn's research typically involves fieldwork in marine environments all over the world. Students in his lab are involved in four exciting international projects. One project focuses on trace metal pollution in the Venice Lagoon, Italy. Another involves examining seafloor methane seep biogeochemistry, and a third project includes seafloor seasonality off Antarctica. The most recent project will examine newly discovered carbonate ecosystems using the manned submersible, *Alvin* (most

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Rathburn continued

famous for its discoveries of the *Titanic* and hydrothermal vents) off Costa Rica and Oregon. For more details, including student interviews and videos of the trips, see the paleontology lab website: www.indstate.edu/ees/paleontology/paleontology.html.

Jim Speer

Jim Speer joined ISU in fall 2001. He is a dendrochronologist who uses tree rings to reconstruct environmental factors such as fire, insect outbreaks, and climate. He has received funding from the National Science Foundation to examine the effect of periodical cicadas on tree growth in the eastern deciduous forest and to determine how this root parasite may affect succession in these forests. Speer has developed the first annually dated tree-ring chronology from the tropical island of Espanola in the Dominican Republic for the purpose of climate reconstruction. He is recognized internationally for his work organizing the North American Dendroecological Fieldweek over the past six years and is the president of the Tree Ring Society.

The Ocean Leadership Program has named Assistant Professor Jennifer Latimer a distinguished lecturer. She will speak next spring at seven universities around the country about her research in the area of scientific ocean drilling and iron fertilization in the ocean.

Geography Students Take Learning Outdoors

Indiana State University geography students spent part of their summer measuring and mapping alongside Kennesaw State University students in north central West Virginia and southwestern Pennsylvania. The field trip was led by Dr. Jay Gatrell, dean of the ISU College of Graduate and Professional Studies and associate professor of geography, and Dr. Nancy Hoalst-Pullen, assistant professor of geography at Kennesaw State.

Students surveyed and collected data regarding physical and human landscapes. They used soil and water test kits, as well as global positioning systems. They also

took walking tours of Appalachian communities and coal camps to learn about cultural landscapes and settlement patterns. ISU and KSU students formed research groups to develop projects ranging from "Geology of West Virginia," "Red Maple Regeneration and Oak Decline," and "Hydrology of a Reach Along Decker's Creek" to "Demographics, Politics and Bumper Stickers," "Neighborhood Architecture of Morgantown, W.Va.," and "Coal Camps and the Human Landscape."

Excerpted from a story by Jennifer Sicking, ISU Media Relations



Involving students in every aspect of research is a primary goal of the Earth and Environmental Systems program.

Anthropology Students Put Training to Work



Anthropology students Jenny Hildebrand, Shawn Richey, Ben Orcutt, Jason Dear, and Jason Giberson all participated in the archaeological field school project at the Northwood site just north of Terre Haute during summer 2007. At the 1,500 year-old Allison-LeMotte village, they gained valuable training in archaeological excavation techniques and methods that they are now putting to good use after graduating last year.

Before pursuing graduate school they decided to acquire additional experience (and make a little money) by hitting the CRM circuit, which involves archaeo-

logical studies conducted as a result of federal historic preservation regulations. They have been gainfully employed and working in Nevada and other western States since graduation.

Jenny, Shawn, Ben, and Jason Dear are working for a private firm on a historic mining site in Nevada. They love what they're doing and can't believe that they're getting paid to do it. This is an example of experiential learning that pays off.

Learn more about student research at www.indstate.edu/ees



Geology Research Examines Organisms Living on the Seafloor

Dr. Tony Rathburn recently took three students (Darrin Lang and Ron Taylor, both undergraduate students majoring in geology, and Jason Waggoner, a geology M.S. student) on oceanographic research cruises to Antarctica. Rathburn and the students traveled to Chile, where they boarded the *Lawrence M. Gould* research vessel that sailed through the Straits of Magellan and the Drake Passage. The purpose of the trip was to look at how organisms living on the seafloor are responding to seasonal variations in food supply.

Even though the samples were collected from a depth of 1,300 meters, the responses of organisms living on the seafloor are directly related to the availability and production of food in the surface ocean. By studying how foraminifera, single-celled amoeba-like organisms, respond to environmental variations today provides clues to understanding the variability seen in fossil foraminiferal records.

You can make a difference too. Consider a gift to support EES faculty and student research.



Dr. Tony Rathburn (second from right) and geology students on an oceanographic research cruise in Antarctica.

Dendrochronology & Archaeology Research in Wyoming

Drs. Jim Speer and Karla Hansen-Speer took several ISU students to Wyoming to collect preliminary samples from the Bridger Antelope Trap. The trap was designed to corral antelope so that hunters could easily kill their prey. The project was funded partially by the U.S. Department of Interior and a private donation.

The Department of Interior wanted to date (using dendrochronology techniques) when the trap, built from juniper stems, was constructed. Funding from the Department of Interior supported the research efforts, but without the generous donation from a private donor, students would have had to incur significant expenses for this research experience.