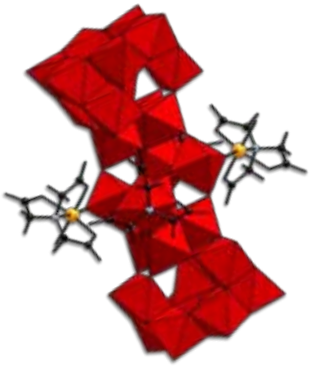
CGRER Center for Global & Regional Environmental Research

iowatch

Fall 2011



Fostering Connections

Complex environmental problems require complex solutions. For two decades, CGRER has fostered interdisciplinary connections between its members in an effort to find those answers. While academia has traditionally rewarded narrow specialization, CGRER encourages its members to work collaboratively. This cross-fertilization of ideas is increasingly vital to environmental research and education, and CGRER has become a national model for how this approach can produce significant results.

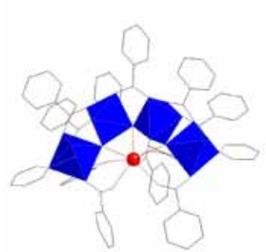
This issue features CGRER members who are drawing rich inspiration from their collaborative and interdisciplinary efforts.

Containing Radioactive Waste

The damage to the Fukushima nuclear reactor in Japan earlier this year brought increased attention to the problem of radioactive materials escaping into the environment. That problem is a major research interest of Tori Forbes, a new faculty member in chemistry who was hired as part of the UI Water Sustainability Initiative, an interdisciplinary effort designed to increase faculty research, education, and outreach efforts relating to water. Forbes' primary area of interest is how contaminants move through groundwater systems. Much of her research focuses on gaining molecular-level understanding of heavy metals and radioactive elements such as plutonium, with the goal of helping to find ways to keep them safely contained. In addition to her work at the UI, Forbes does research at the Argonne National Laboratory in Chicago.

"We don't understand the basic structure of many of these contaminants or how they are transported in the environment," says Forbes. "Nuclear waste is especially problematic because of its long-lived radioactivity and toxicity. The better we understand these compounds at a molecular level, the better chance we have of keeping ▶

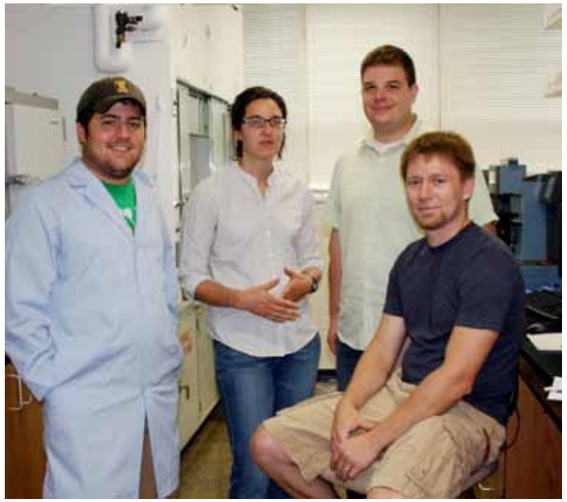
This issue of IoWatch focuses on the interdisciplinary mission of CGRER and the benefits of having its members work collaboratively across disciplines.



them safely contained. That's important for the health of the environment as well as for the sustainability of the nuclear industry."

From the time she first heard of the UI Water Sustainability Initiative, Forbes was intrigued by its goals and philosophy. "My entire career has been very interdisciplinary," she says. "My background is in the traditional discipline of synthetic inorganic chemistry, but in my research I apply that knowledge to environmental systems. That means that my work is done in collaboration with environmental chemists, geologists, hydrologists, and geochemists, among other specialists. Working across disciplines comes naturally to me, and so I'm very pleased to be in a position that encourages that approach and puts me in close contact with other faculty members who have a similar perspective."

Such an approach is valuable both in terms of research efforts and in securing grant funding, according to Forbes. "As scientists, we can't just stay within our traditional branches anymore," she says. "Funding agencies are realizing that groundbreaking discoveries are more likely to happen when people are working collaboratively."



Members of the Forbes Lab: Eric Jetter, undergraduate researcher and chemistry major; Tori Forbes; Jacob Ertman, undergraduate researcher and chemistry major; and Daniel Unruh, postdoctoral researcher.

Revitalizing Graduate Education

CGRER members are helping to forge a new model for graduate education, thanks to a grant that will fund students in the UI's program in Geoinformatics for Environmental and Energy Modeling and Prediction (GEEMaP).

The grant is from the Integrative Graduate Education and Research Traineeship (IGERT) program funded by the National Science Foundation (NSF). The program's goal is to strengthen science, technology, engineering and mathematical disciplines in the U.S. by promoting graduate education that produces students with both a deep knowledge of their subjects and an interdisciplinary orientation. The program also aims to increase student ethnic and gender diversity.

The UI received one of the highly competitive IGERT grants in 2010. The bulk of the five-year, $2.6 million grant goes to fund U.S. students admitted to the program as trainees for their first two years of doctoral study. Approximately six new trainees will be admitted each year of the grant and will receive funds for tuition and a stipend. Other applicants, including international students, are admitted as associates, meaning that they will go through the same program as trainees but will not receive NSF funding.

The first GEEMaP cohort – six trainees and two associates – was admitted this fall. Each is pursuing a PhD in one of the GEEMaP constituent departments: biostatistics, civil and environmental engineering, computer science, geography, statistics, and industrial engineering. In addition, all GEEMaP students will earn the graduate certificate in Geoinformatics, which is the science of measuring, storing, organizing, analyzing and visualizing data related to phenomena occurring on the earth and in the earth's atmosphere.

The GEEMaP program emphasizes interdisciplinary research experience and a team-based approach to education throughout a graduate student's career. Thesis research is advised by faculty from two different departments, and students attend a weekly seminar and participate in community-building and outreach activities with their fellow students. They attend an annual geoinformatics symposium and are encouraged to do internships in industry and government and to network with faculty and students in the nationwide IGERT community. The program also includes training in ethical decision-making. Unlike more traditional graduate school education, it follows a rotation system similar to medical school, in which students are exposed to an array of disciplines, techniques and tools.

Kate Cowles and GEEMap student

Eighteen faculty members from nine departments across campus teach in the GEEMaP program. The majority are CGRER members, including Marc Armstrong, David Bennett, Kate Cowles, Keri Hornbuckle, Marc Linderman, George Malanson, Thanos Papanicolaou, Jerry Schnoor, Gerry Rushton and Dale Zimmerman. Kate Cowles serves as principal investigator (PI) for the IGERT grant and David Bennett is co-PI.

"Our goal is to help develop an alternative model of graduate education," says Cowles, an associate professor in the Department of Statistics and Actuarial Science and in the Department of Biostatistics. "The problems facing our world cross disciplinary boundaries, and we need to train a new generation of scientists and engineers who can work cooperatively to solve them. Many of these graduate students will eventually find employment outside academia, and it's important that their training include an emphasis on real-world networking and problem-solving."

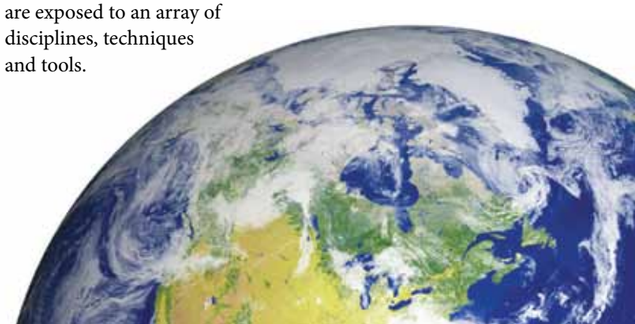
Improving Science Education in Middle Schools

Twenty-one middle school science teachers from throughout Iowa have a deeper knowledge of the science relating to climate, weather and energy, thanks to a five-day workshop led by Charlie Stanier and Morgan Yarker in June. The program was funded by the National Science Foundation and CGRER.

The professional development workshop was designed to improve the education of middle school students in these important subjects. During the workshop participants heard presentations by experts in the various fields, took field trips, were given sample curricula and access to on-line resources, designed experiments, and had hands-on practice in working with scientific models that support conceptual understandings of climate, weather and energy. The teachers received a stipend as well as room and board, travel expenses and two graduate credits.

The workshop was designed to help teachers meet new standards for science education instruction both nationally and at the state level. The National Science Education Standards (NSES) stress the concepts of energy transfer, energy conservation and issues relating to the environment. The NSES also emphasizes the importance of introducing students to the concept of theoretical, conceptual, and computational models, which are the basis for much scientific research. In Iowa, new educational standards called Iowa Core feature more extensive requirements for middle school science instruction. The workshop will give teachers valuable tools for meeting these standards and improving science education in middle schools.

Stanier is a UI assistant professor of chemical and biochemical engineering and a research engineer in IIHR--Hydroscience and Engineering and Yarker is a CGRER intern who is pursuing a PhD in Science Education. As part of her graduate research, Yarker will follow up during the school year with some of the teachers to see how the workshop's information is being implemented in classrooms.



Collaboration in Action

Scott Spak provides a good example of how a new generation of scientists is changing the way education, research and collaboration can be done.

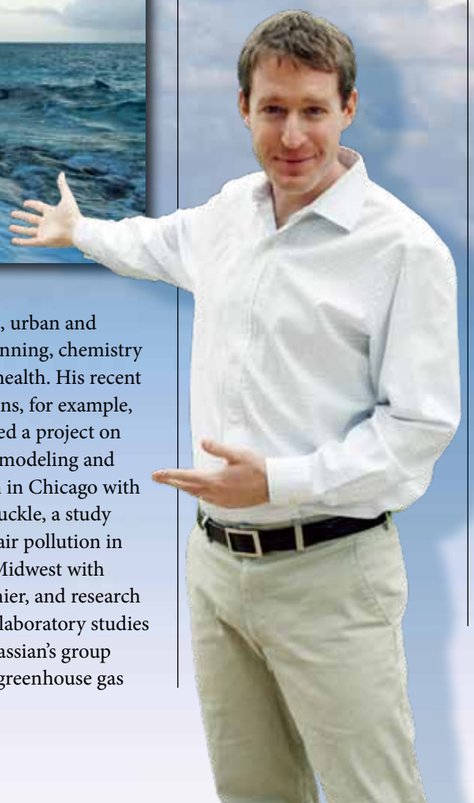
After earning his PhD at the University of Wisconsin-Madison in atmospheric and oceanic sciences, Scott came to the UI in 2008 as a CGRER postdoctoral research scholar. In 2010 he was appointed an assistant research scientist at CGRER and has since worked on a wide variety of research and outreach projects on atmospheric composition and climate spanning multiple disciplines.

"My graduate training and subsequent research have been very interdisciplinary, because I'm looking at questions that can't be answered by a single approach," says Spak. "I've had to design my own education to develop a flexible and broad tool kit. My main area of interest is informing public policy as it relates to air pollution, climate change and sustainability at urban and regional scales. I study how changing some part of a system—for example, a new kind of technology or a change in policy or in housing density—affects the environment, and how that change in the environment in turn affects people."

At CGRER Spak has worked closely with Greg Carmichael and with faculty in environmental engineering, chemical and biochemical engineering, urban and regional planning, chemistry and public health. His recent collaborations, for example, have included a project on urban PCB modeling and assimilation in Chicago with Keri Hornbuckle, a study of episodic air pollution in the Upper Midwest with Charlie Stanier, and research connecting laboratory studies by Vicki Grassian's group to regional greenhouse gas emissions. He also leads development of the Iowa Integrated WRF-Chem Forecast for air quality and renewable energy.

Scott Spak giving a presentation at a professional development workshop in June.

This fall Spak became assistant director of the new Environmental Science Policy Program at the UI Public Policy Center as well as an assistant professor in Urban and Regional Planning and in Civil and Environmental Engineering. The Environmental Policy Research Program seeks to provide policy makers with the information to help our lives and communities thrive in sustainable ways, by evaluating policy options and providing the scientific, economic, sociological and legal data needed to make informed decisions. The program also includes CGRER members Aaron Strong, assistant professor in Urban and Regional Planning, and Jonathan Carlson, professor of law.



"CGRER provides me with the scientific equivalent of Iowa's fertile soil for farming," says Spak. "I've been astonished at the connections that can be made between very disparate research areas because the people affiliated with CGRER share similar outlooks on the most important environmental research topics, even though they come from different disciplines. I've had many opportunities to collaborate with current members as well as former graduate students. Those of us in the CGRER network have a lot of overlap in the kinds of questions that we're asking, questions that we can only answer if we work together."

University of Iowa student volunteers helped organize a campus tree planting as part of an annual renewal of the university's "Tree Campus USA" designation.

Teaching Sustainability

CGRER members play an important role in the UI's Certificate in Sustainability program, an interdisciplinary initiative that gives students the knowledge and skills to develop sustainable systems in a wide variety of settings.

Sustainability is defined as the implementation of policies, processes and practices that meet the needs of the present without compromising the ability of future generations to meet their own needs. Since it was launched in 2009, the 24-semester-hour certificate has been earned by 16 undergraduate students, with an additional 78 currently taking classes toward it. While the certificate is a natural fit for students majoring in environmental science, its appeal is much broader. Many students from throughout the university are interested in sustainability issues because they know the difficult environmental and economic issues relating to development.

The program is part of the UI's increasing emphasis on sustainability, which features monitoring of the university's use of energy and materials, use of green principles in building design and construction, and new faculty positions. The advisory committee that oversees the certificate program includes CGRER members David Bennett, Ann Budd, Craig Just, and Laura Rigal.

Students pursuing the certificate can choose from 126 classes on topics ranging from Global Perspectives on Environmental Planning to Natural Resource Economics and Wind Power Management. Understanding environmental systems is just one part of students' education. They also learn about sustainability in relation to energy, climate, built environments and human health. The program introduces them to the ethical, economic and public policy issues in the field, as well as to the importance of strong cultural values in promoting sustainability. The goal is to develop a new generation of leaders, thinkers, innovators and entrepreneurs who can find new patterns of development that don't degrade the planet.

How has your work benefited from an interdisciplinary focus?

Dick Baker

Professor Emeritus of Geoscience

University of Iowa

My primary focus is Ice Age paleoecology. I look at fossils to determine which plants have once been in an area and how the vegetation and climate have changed over time.

My research has benefited enormously from discussions and collaborations with people in other departments and institutions, particularly Art Bettis and Jeff Dorale in geoscience, Diana Horton in biology, and researchers in geography, climatology, entomology and archaeology at the UI and elsewhere. Working with others has stimulated ideas I never would have had on my own and helps me come up with a much more complete picture than I would have gotten working individually.

In academia, the pressure is typically to become ever more specialized, which I think is a mistake because it gives too narrow a view of whatever you're working on. That was one of the reasons why I was so pleased to join CGRER when it began twenty years ago. I remember thinking that it was just what we needed as a counter to all the pressure to work exclusively in our own fields. It can be especially tough for young researchers to get support for interdisciplinary efforts, but my own experience has been that working across disciplines is more exciting, more productive and simply more fun.

The world's problems are incredibly complex. If we go by only one approach—if we just focus on the economics, for example, and ignore the environmental issues—then we get a very limited view. Our hope rests on putting together teams that can work on problems from a variety of viewpoints. I think that's important not only for the future of science, but for the future of civilization itself.

David Bennett

Professor of Geography

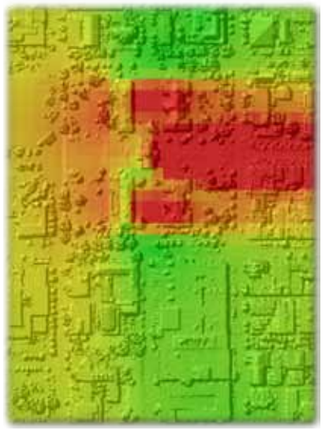
University of Iowa

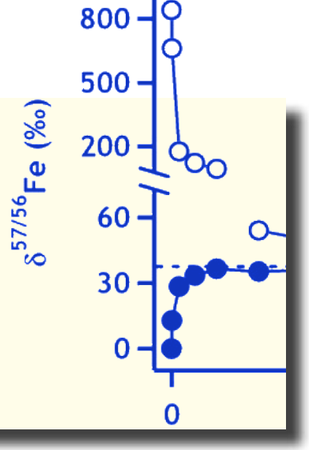
I do research in geographic information science. I'm particularly interested in how we can use computer technology to represent geographical patterns and processes to help us better understand human-environmental interactions and manage environmental resources more wisely.

I firmly believe that many of the most challenging questions that we are trying to address can only be answered in an interdisciplinary fashion. We have to understand economic, social, political, biological and geophysical processes, and for one person to do all of that is impossible. I've worked in an interdisciplinary fashion from the beginning of my career, particularly with hydrologists, resource economists, sociologists and climatologists.

There are challenges to this sort of interdisciplinary approach. We all have our own language and our own set of terms. Sometimes we use the same terms for very different things, and sometimes we use different terms for very similar things.

We need to take the time to learn how to communicate and to build trust among colleagues from other disciplines, in ways that may not come naturally to academics. It often takes a leap of faith when you don't totally understand other people's approaches. In a large university it's easy for us to retract into our own departments and forget that there are other research methods and ways of viewing the world. But we're faced with huge, messy problems, and we can't get too cantankerous or we're never going to be able to make progress.





Michelle Scherer

Professor and Departmental Executive Officer of Civil and Environmental Engineering

University of Iowa

While my research area is environmental engineering, I work very closely with geologists, chemists, microbiologists and physicists. Environmental engineers often end up being a jack of all trades because we tend to work across so many different media (e.g., air, water, soil) and deal with physical, chemical and biological processes all at once.

For myself, there is a personal as well as professional benefit to interdisciplinary work—I'm constantly learning. You're doing the work you normally do, and then you run up against a question you can't answer, and you realize that there are people out there who have the expertise to answer it, and you need to work with them to learn what they know. Sometimes it can feel uncomfortable to be on the edge of what you know, but mostly I like being on a constant learning curve.

As for my students, I think it is important for them to be exposed to a broader world of science and engineering than just one narrow slice of our discipline. For one thing, you get to learn about the ramifications of your efforts. I work with a geologist, for example, who doesn't particularly care about environmental processes, because he's not an environmental engineer. He does research on how the Earth's surface formed several billion years ago, but the data we collect is of great use to him. It's rewarding to see how your work can have implications in an area completely different from what you do.

And to be frank, in these times interdisciplinary collaboration is almost essential, because the funding models increasingly require it. So it's strategic, as well as rewarding, to work in an interdisciplinary way. I think it's important for young researchers to realize this.

Aaron Strong

Assistant Professor of Urban and Regional Planning

University of Iowa

In my work I look at how humans modify ecosystems and how ecosystems modify human behaviors, and also how environmental policies impact not just the environment but also behavioral choices. In other words, I study the feedback loop between the economy and ecosystems. I was hired as part of the Water Sustainability Initiative and I'm the first environmental economist at the university.

I'm very interested in doing interdisciplinary work because it allows me to ask bigger questions than I could answer just working by myself. Right now, I'm collaborating with ecologists, geographers and urban planners on a variety of projects. I'm seeing a different set of problems here in Iowa than I've dealt with in my previous work, which was primarily on rangeland in the western U.S. and on household decision-making regarding water use.

I think it's very valuable to get alternative perspectives. My own discipline of environmental economics began by relying heavily on economics, and we're only just now starting to branch out to get perspectives from other disciplines to see how they view the same problems. Much of the interesting work that is being done in environmental economics today relies heavily on geography and ecology.

I think throughout academia there's an increasing emphasis on the value of collaboration, though that tends to be more operative at the institutional level than at the discipline level. I hope that as things change we can modify our concept of what constitutes tenure, so that scholars aren't penalized for doing interdisciplinary work. Iowa is trying to make that shift, because it's becoming increasingly clear that collaboration can yield significant results.

seeds

In 2011, CGRER funded five new seed grants for the coming fiscal year, for a total of $149,879.


PhD student Jiayu Wu measures stream flow rate.

Watershed Responses to Climate Change

Quantifying Urban Headwater Stream Flow and Water Quality Dynamics to Develop Predictions for Urbanization and Climate Change Scenarios in Central Iowa; Janette R. Thompson (ISU Dept. of Natural Resource Ecology and Management) with Timothy W. Stewart (ISU Dept. of Natural Resource Ecology and Management) and Kristie Franz (ISU Dept. of Geology and Atmospheric Sciences); $29,897


Michael Collazo, an intern from California, conducts instream measurements of pH.

Streams in urban areas are vulnerable to many environmental stresses, including increasing numbers of extreme precipitation events caused by climate change. This grant project will study 20 watersheds in the Des Moines metropolitan area, looking at their land cover characteristics, stream flow and pollutant loading. Researchers will use water sampling and flow rate monitors to create descriptions of the response patterns of these streams. The data will also be used to develop a model that will predict possible stream responses to changes in precipitation inputs in the future. The findings will be shared with local municipal officials and residents to help them better understand stream responses to increased precipitation inputs, and to plan for future development that will mitigate impacts to streams and the residents who live near them.

Reducing Environmental Damage in China

Nitrogen Load Reduction Evaluation for the Huai River: Balance Pressures from Agricultural Intensification, Industrialization and Climate Change; You-Kuan Zhang (UI Dept. of Geoscience) and Keith Schilling (Iowa Geological Survey); $30,000

The Huai River basin is one of China's most productive agricultural regions, yielding 16.5% of China's total grain on only 3% of its total land. The Chinese government has set a goal of significantly increasing grain production in the basin by 2020, which will result in even greater strain on its environmental systems from excessive application of manures and fertilizers. This grant funds an on-site study of the Huai River, its surrounding landscape and its current contaminant loads. The data will be used to create a model that will assess the environmental impact of the proposed changes, the potential impact of alternative agricultural practices that may reduce damage, and the effects that a range of possible climate change scenarios may have on the region. A report will be given to the Chinese government to help guide future management of land and water resources in the Huai River basin.

You-Kuan Zhang working with a student at a field site.


Iowa Air Monitoring Site at the University of Iowa

Improving Measurements of Atmospheric Aerosols

Development of Quantification Standards and Methods to Evaluate Agriculturally Derived Organic Aerosol; Elizabeth Stone and David Wiemer (UI Dept. of Chemistry); $30,000

Atmospheric aerosols—which are very small particles in the air—affect global climate and human health. A key question concerns secondary organic aerosols (SOA), which form because of the atmospheric oxidation of other compounds. This study will analyze air samples taken near Iowa City to develop standards and methods for improving SOA quantification. It will also determine whether the sampled SOA is from agricultural or other plant sources. The project will help assess the relative importance of natural, agricultural and anthropogenic precursors to organic aerosols. The long-term goal is to advance our understanding of the human influences on climate by improving the measurements of atmospheric aerosols and their sources.


Eugene S. Takle and Shannon L. Rabideau with a model of building designs of the future

Building Structures Suited to a Changing Climate

Exploring Alternatives to the "Typical Meteorological Year" for Incorporating Climate Change into Building Design; Eugene S. Takle (director of ISU Climate Science Program) and Shannon L. Rabideau (ISU graduate student in Dept. of Meteorology); $30,000

To function efficiently, buildings need to be well-suited to the climate in which they're constructed. Architects and engineers typically use meteorological data averaged over the past 30 years to create designs, but changing weather patterns may make those averages obsolete. This grant will use computer modeling to develop new, more reliable climate forecasts for the building industry. Researchers will collaborate with the National Renewable Energy Laboratory as well as key people in the design and construction fields to produce scenarios of future typical and extreme meteorological years through 2070. The project will begin by developing models for Iowa cities and then expand into other regions of the U.S. The goal is to help architects and builders construct energy-efficient structures that are suited to a changing climate.

Monitoring the Health of Wild Bee Populations

Are Solitary Bee Communities Collapsing? An Empirical Test for Declines and the Search for Colony Collapse Viruses in Solitary Bees; Stephen Hendrix (UI Dept. of Biology) and Harsha Doddapaneni (UI Carver Center for Genomics); $29,982

While considerable attention has been focused on the decline in honey bees worldwide, wild, solitary bees are also threatened. More than 20,000 species of wild bees provide valuable pollination of crops, and these species become even more important as managed honey bee populations decline. This study samples the diversity of bee communities at seven Iowa state prairie preserves and will compare the new measurements to those made at these same sites a decade ago. In addition, it will look at changes in landscape characteristics to determine if habitat fragmentation is having an effect on diversity. Researchers will also examine the bees for viruses that have been implicated in Colony Collapse Disorder. The study will provide valuable information on possible declines in solitary bees and baseline information on their susceptibility to diseases.


Stephen Hendrix and Caitlin Digman collect wild bee samples.

CGRER New Members

Margaret Beck came to the UI in 2007 and holds a BA in English and MA in anthropology from the University of Kansas and a PhD in anthropology from the University of Arizona. As an assistant professor of anthropology, she studies food habits, cooking practices and culinary equipment in the U.S. Southwest and Great Plains, with an emphasis on Native American ceramics. She's interested in how pots and other ceramic vessels reflect the culture of those who created them and the environment in which they lived. Her current research includes a project in southwestern Arizona studying the relationships between village residents and neighboring mobile groups between A.D. 700-1100, and another project on food preparation and traditions at a pueblo dated to about A.D. 1700 in western Kansas. Beck is pleased to be part of CGRER because of her broad environmental interests and is eager to learn about other people's research in a range of disciplines.

Richard Cruse, a professor of agronomy and director of the Iowa Water Center, has been on the Iowa State University faculty since 1979. He earned his BS in agronomy from ISU and his MS in soil science and PhD in soil physics from the University of Minnesota. Cruse does field and laboratory research on the management of soil and water resources, with much of his work focusing on soil erosion, soil carbon and soil quality. In addition to his extensive research in the Midwest, he also serves as an adjunct professor at schools in Hungary and China, where he has mentored scholars, taught classes on sustainable agricultural practices and conducted research projects. Cruse joined CGRER because he believes that the best way to advance science is to work collaboratively. He appreciates the way CGRER builds bridges between individuals and disciplines.

Tori Forbes came to the UI in 2010 through the Water Sustainability Initiative. A graduate of Beloit College, she earned a PhD in geology from the University of Notre Dame and completed a post-doctorate at the University of California-Davis in the thermodynamics of carbon dioxide sequestration. As an assistant professor in the Department of Chemistry, Forbes studies soluble inorganic nanoclusters, which are among the most reactive and toxic components in the environment. She tries to gain a molecular-level understanding of these compounds with the goal of keeping them out of aqueous systems. She joined CGRER because its members are doing exciting research in a variety of environmental fields. She appreciates the opportunity to interact with people with similar interests and welcomes possible collaborations with researchers in other disciplines.

Connie Mutel is well-known to many in CGRER for her wide range of writing projects on ecological and scientific issues. After earning a BS in biology and music from Oberlin College, Mutel received an MS in plant ecology from the University of Colorado-Boulder. She came to the UI in 1976 and joined IIHR--Hydroscience & Engineering in 1990, where she works as a writer, historian and archivist. For nearly two decades Mutel served as editor of CGRER publications, and she is also the author or editor of books that include *A Watershed Year: Anatomy of the Iowa Floods of 2008; The Emerald Horizon: The History of Nature in Iowa; The Tallgrass Restoration Handbook for Prairies, Savannas, and Woodlands*, and *Fragile Giants: A Natural History of the Loess Hills*. Her passion since childhood has been to try to understand and explain to others the ecological intricacies that hold the natural world together. She joined CGRER with hopes of continuing to be part of efforts that integrate and creatively transmit information on environmental research, preservation and education.

Aaron Strong is an assistant professor with joint appointments in Urban and Regional Planning and in the Environmental Policy Program at the UI Public Policy Center. He came to the UI in 2010 through the Water Sustainability Initiative. Strong holds a BA from Luther College and an MA in economics, MS in applied mathematics and PhD in economics from the University of Colorado-Boulder. As an environmental economist, he studies issues that include how municipalities price water and how their policies affect residential demand, as well as rangeland management in the West and growth management in urban areas, particularly how government policies in one municipality affect other nearby areas. Strong joined CGRER in hopes of building a network of relationships with people of related research interests.

A native of England, **David Peate** is an associate professor of geochemistry. He earned his undergraduate degree in natural sciences at Cambridge University and his PhD in geochemistry from the Open University in the United Kingdom. After holding post-doctorate and research positions at the University of Durham, California Institute of Technology, Danish Lithosphere Centre and University of Heidelberg, Peate came to the UI in 2004. His research focuses on the composition of volcanic rocks and how magmas are formed, including the processes through which their compositions are modified as they move through the earth's crust. He joined CGRER because many of the tools he uses in his research have potential applications in other disciplines (particularly the ICP-MS instrument that detects trace amounts of inorganic substances in a variety of solid and liquid media). He invites inquiries from CGRER members and other researchers about how his trace element analysis laboratory equipment might be of use to them.

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The Center for Global and Regional Environmental Research

The Center for Global and Regional Environmental Research (CGRER) at the University of Iowa promotes interdisciplinary efforts that focus on the multiple aspects of global environmental change, including its regional effects on natural ecosystems, environments, and resources, and on human health, culture, and social systems. CGRER currently is composed of 82 members from 27 departments at seven institutions.

Center goals are promoted by encouraging interdisciplinary research and dialogue among individuals whose disciplines touch upon any of the multifaceted aspects of global change. More specifically, the Center awards seed grants, fosters interdisciplinary courses, provides state-of-the-art research facilities and equipment, and holds seminars and symposia. The Center encourages students to broaden their studies and research through considering the multi-disciplinary aspects of global and regional environmental problems. Through such activities, the Center attempts to assist Iowa's agencies, industries, and citizens as they prepare for accelerated environmental change that may accompany modern technologies.

Housed in the Iowa Advanced Technology Laboratories at the University of Iowa, the Center was established by the State Board of Regents in 1990 and receives funding from a public utility trust fund, as mandated by the State of Iowa's Energy Efficiency Act.

Staying Connected to CGRER

For the latest updates on CGRER, visit our website at www.cgrer.uiowa.edu. The site features information on the research being done by our members, links to information on climate change, educational resources for teachers and Iowa Environmental Focus, a source for Iowa-related news, analysis and commentary on the environment. The site also includes audio clips and transcripts of the weekly radio segments produced by CGRER on environmental topics.

The University of Iowa

IoWatch is published each fall. Comments, questions, and requests for additional copies should be directed to:

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