

# Institute faculty, staff relocate following demolition of Miller Hall

**MOVE HIGHLIGHTS NEED FOR PERMANENT HOME WITH STATE-OF-THE-ART FACILITIES**

**M**iller Hall, the aging on-campus building that provided offices for a variety of our faculty and staff since the Carolina Environmental Program (CEP) — the predecessor to the UNC Institute for the Environment (IE) — was founded in 1998, is no more.

In February, the building was demolished as part of a University master plan to repair and update the essential, but antiquated, steam tunnel that is the main utility conduit from the co-generation plant to campus. Miller Hall was directly in the path of that construction, and the University determined that it made more sense to demolish the structure than to work around it. Miller Hall was completed in 1942 by the U.S. Navy for use as housing for the Naval Pre-Flight School, and the Naval ROTC and V-12 Programs during



World War II. The building was named for William Miller, the first UNC alumnus to become Governor of North Carolina, who was also a trustee of the University, and a member of the Legislature, Speaker of the House, Attorney-General, and Charge D'affaires to Guatemala.

In the fall, faculty and staff from the UNC Institute for the Environment left Miller Hall and moved into temporary quarters on and off campus. The closely affiliated Curriculum for the Environment and Ecology also moved, to Coates Hall.

Feelings about the move out of Miller Hall are mixed.

“Miller Hall was built as a temporary building during World War II,” IE

*continued on page 3*

## HIGH SCHOOLERS LEAP AT THE CHANCE TO BECOME CLIMATE LEADERS

**NEW SUMMER SCIENCE ENRICHMENT PROGRAM INSPIRES STUDENTS**

**F**orty-eight high school students from Chapel Hill and Carrboro made the leap last summer into learning the science of climate change and solutions to address it.

As participants in the Climate Leadership and Energy Awareness Program (Climate LEAP), these teenagers took part in a free, five-day summer institute packed with science-rich activities designed to inspire as well as educate.

Climate LEAP was launched by the UNC

Institute for the Environment’s Environmental Resource Program (ERP), in partnership with UNC’s Morehead Planetarium and Science Center, under a three-year grant from the Burroughs Wellcome Fund.

The program featured hands-on science and math activities designed to help students answer questions like: How does a geologist study climate change? A chemist? A physicist? What sustainable solutions exist to address climate change?

What are UNC scientists doing in the field of renewable energy?

Participating students were nominated by teachers or school counselors. The diverse group included a female majority as well as students belonging to ethnic groups underrepresented in science, technology, engineering and math careers. Participants met male and female scientists working in many different areas of academia and industry. Almost 40 UNC faculty, graduate students and

*continued on page 3*

# CEMPD HELPS FAA UNDERSTAND LINKS BETWEEN AIRCRAFT EMISSIONS, AIR QUALITY AND HUMAN HEALTH

“AIRCRAFT EMISSIONS IMPACT AIR QUALITY BY FORMING PRIMARY AIR POLLUTANTS SUCH AS SOOT, AS WELL AS BY FORMING MORE COMPLEX SECONDARY AIR POLLUTANTS SUCH AS OZONE AND FINE PARTICLES THAT HAVE ADVERSE HEALTH EFFECTS. THE CHALLENGE IS TO DISTINGUISH BETWEEN THE TWO, AND ASSESS THE SPATIAL SCALES OF AIR QUALITY IMPACTS, AND WE ARE FORTUNATE TO HAVE A STRONG RESEARCH TEAM AT CEMPD TO TACKLE THIS.”

— SARAV ARUNACHALAM

The number of airline passengers is expected to double or even triple by the year 2025. To understand the impact of this anticipated growth on the magnitude of aircraft emissions and their subsequent impact on air quality and human health, and to develop effective policies to minimize adverse impacts, the Federal Aviation Administration (FAA) has enlisted the help of the IE’s Center for Environmental Modeling and Policy Development (CEMPD).

Under a series of grants from the Partnership for AiR Transportation Noise and Emissions Reduction (PARTNER), which is jointly funded by the FAA, NASA and Transport Canada, Research Associate Professor Sarav Arunachalam and his CEMPD colleagues have been developing and applying cutting-edge emissions and air quality models to help assess the content of emissions from aircraft engines, the contributions of these emissions to air quality, and then to link these to public health impacts in order to develop sound policies for air quality management.

“Aircraft emissions impact air quality by forming primary air pollutants such as soot, as well as by forming more complex secondary air pollutants such as ozone and fine particles that have adverse health effects,” Arunachalam explained. “The challenge is to distinguish between the two, and assess the spatial scales of air quality impacts, and we are fortunate to have a strong research team at CEMPD to tackle this. We are taking a multi-scale approach in order to understand the broad spectrum of aviation impacts on air quality. We start by looking at the contribution of a single aircraft engine on air quality in the immediate vicinity of that engine; then we expand the scale to the airport level to assess community exposures; then more broadly to an urban and regional level; and ultimately to an entire continent.”

While the current projects are being conducted in the United States, PARTNER is also sharing its findings with the United Nations International Civil Aviation Organization Committee on Aviation Environmental Protection in order to impact international aviation policy through sound science.

To further this work, the CEMPD has been working closely with researchers at the Harvard School of Public Health on health impact-based risk assessment to link air quality to health. For their efforts, Arunachalam and Jonathan Levy, Mark and Catherine Winkler Associate Professor of Environmental Health and Risk Assessment at the Harvard School of Public Health, were named co-recipients of the 2008 FAA Centers of Excellence Faculty of the Year Award.

“Our collaboration has brought together state-of-the-art atmospheric modeling at UNC with knowledge about the health impacts of air pollution, and has allowed us to evaluate the health effects of aviation emissions at individual airports and nationally,” said Levy. “This interdisciplinary collaboration has

been a great learning experience for everyone involved and has allowed us to address problems together that we could not have evaluated independently.”

Two newer partnerships with Aerodyne Research, Inc. and Carnegie Mellon University are also helping the CEMPD validate and enhance its models. The CEMPD is also training UNC and Massachusetts Institute of Technology students to apply some of UNC’s modeling tools to help the FAA and international organizations develop effective policies. Matthew Woody, a graduate student in UNC’s Department of Environmental Sciences and Engineering, won an award from the FAA for his research paper submitted to the PARTNER student paper competition; another UNC student is interning at the FAA.

Twice a year, Arunachalam attends PARTNER-sponsored meetings with other researchers and the PARTNER Advisory Board — comprised of aircraft engine manufacturers, airport operators, aviation professionals and other stakeholders — to share the latest research and update the others on the work taking place at UNC. The IE is hosting the Advisory Board meeting in Chapel Hill this spring. 🌱

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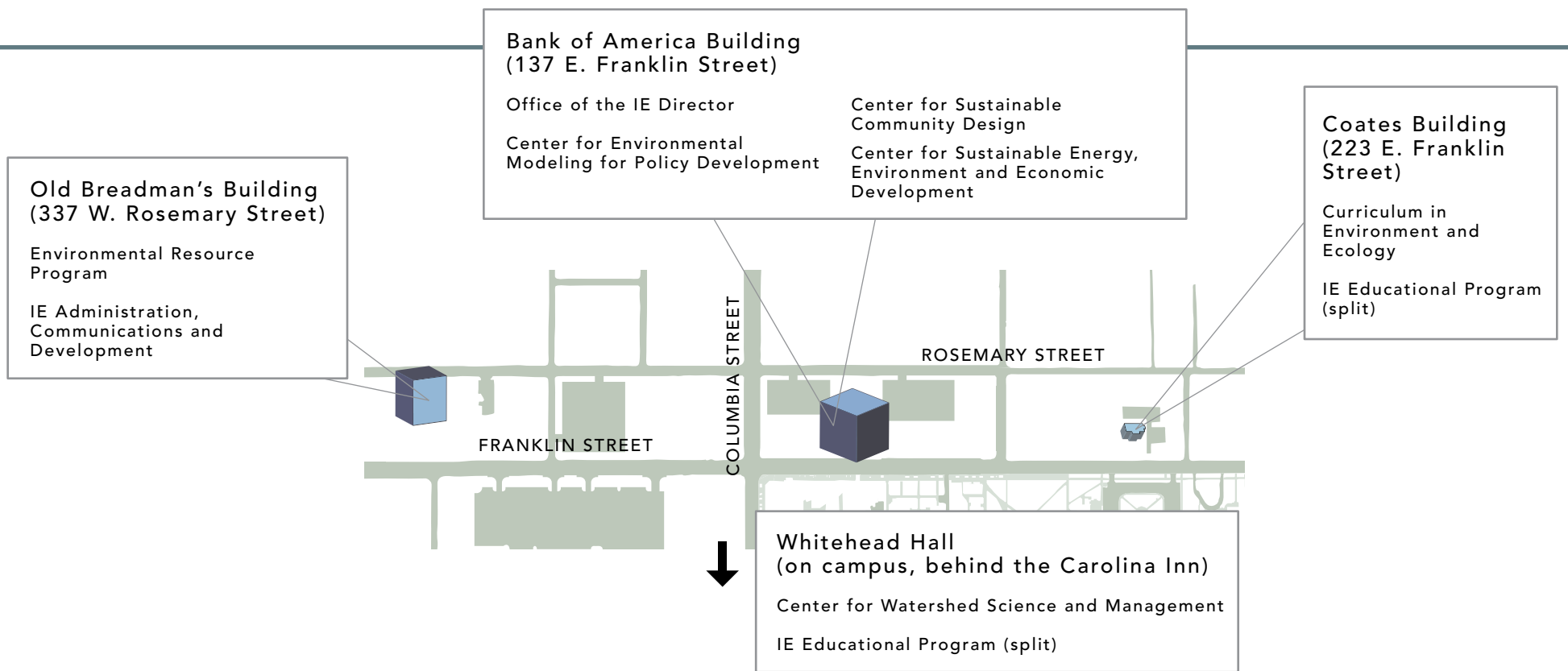
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Miller, continued from page 1

Senior Associate Director Tony Reevy explained (Reevy's IE responsibilities include facilities). "As the only home of the CEP and now the Institute, it holds great memories of the work we've done and the progress we've made in building UNC's environmental education programs, research and outreach.

"On the other hand, Miller Hall was not an appropriate building for an environmental institute, so this is not necessarily the worst thing to happen. There was asbestos, lead paint and mold, as well as major plumbing problems. That was a difficult situation for us in serving students,

faculty, staff and the visiting public. It also had no elevator to the second floor, which presented accessibility issues. Clearly, it was a building that had outlived its usefulness."

For now, IE programs and personnel, as well as the Curriculum for the Environment and Ecology, have been relocated to multiple buildings (see map above).

Long-term, IE Director Larry Band said the goal is to find IE a lasting home within a modern building where all faculty and staff can work under one roof.

"While Miller Hall was definitely a building

whose time had come, it is certainly a challenge to replace it, especially in this economy," Band acknowledged. "And for now, we have the added challenges of paying rent for some of these spaces, and serving students from remote locations.

"Resolving this situation will require working closely with everyone from the Chancellor to our board members. Our goal is to find a facility where the full Institute can be located to efficiently serve students, faculty and our community, followed by the construction of a permanent home in a new state-of-the-art environmental building at Carolina North."

Climate LEAP, continued from page 1



Marshall Lewis, Mahlique Guthrie and Cedric Duquene conduct an experiment to determine the impact of melting land and sea ice on sea level rise.

postdoctoral fellows participated, sharing their expertise as well as their own paths into science as a career.

"We're trying to build a community of young climate leaders," said Dana Haine, K-12 science education manager for the IE and program director for Climate LEAP. The program aims to have an impact beyond

those who directly participate, Haine noted. Each student has been invited to conduct a community outreach project in order to communicate their knowledge with others.

Kristen Powers, a student at Chapel Hill High School, called Climate LEAP "a chance to delve into the world of science and the solutions being worked on to solve the world's biggest challenge. Climate LEAP offered me many amazing connections to scientists, entrepreneurs, professors and many others."

During the academic year, these students will participate in four half-day Saturday Academies, funded by the grant, which also will enable UNC to offer Climate LEAP again this summer and next.

#### Expanded program helps uncover, address at-home risks to children's health

The North Carolina Childhood Lead Poisoning Prevention Program, based at the N.C. Department of Environment and Natural Resources and supported by the ERP, is expanding its services to provide outreach and education that addresses environmental health issues such as asthma, mold, lead, pesticides, fire safety, indoor air quality and other home-based environmental

health risks to children.

ERP Environmental Health Educator Amy MacDonald is leading the transition to the federally funded Healthy Homes Program. "It's exciting because North Carolina environmental health professionals now have a greater opportunity to connect how pollutants and behaviors inside the home can affect a child's health and development."

The ERP conducts healthy home workshops for parents, professionals

#### MOST PEOPLE SPEND 90% OF THEIR TIME INDOORS. A HOLISTIC APPROACH TO ASSESSING THE SAFETY OF A HOME CAN PREVENT CHILDHOOD DISEASE AND INJURY.

in state and local health and housing agencies, and other organizations that provide services for children and teaches how hidden hazards in the home can negatively affect health. The ERP has produced a short video on Healthy Homes (<http://www.vimeo.com/7647887>), funded by the UNC Institute for the Environment and the Center for Environmental Health and Susceptibility, and is developing a website ([www.nchealthyhomes.com](http://www.nchealthyhomes.com)) in partnership with the Guilford County Health Department. For more information, contact Amy MacDonald at [amyjmac@email.unc.edu](mailto:amyjmac@email.unc.edu).



Kholiswa Tsotetsi, Roisin Bermingham, Hannah Rice, and Lily Tidwell use a photovoltaic panel to investigate solar energy.

# IE receives vital gifts, grants in support of research, outreach

THE UNC INSTITUTE FOR THE ENVIRONMENT IS GRATEFUL FOR SEVERAL RECENT GIFTS AND GRANTS THAT ENABLE OUR FACULTY, STAFF AND STUDENTS TO CONTINUE TO PURSUE IMPORTANT RESEARCH AND OUTREACH EFFORTS, PARTICULARLY DURING THESE DIFFICULT ECONOMIC TIMES.

The UNC Institute for the Environment is beginning a collaborative project with Duke University, N.C. State and the Triangle J Council of Governments on urban ecosystem sustainability. The project is co-funded by the National Science Foundation and the U.S. Forest Service under a new program known as the Urban Long-Term Research Area (ULTRA) initiative. ULTRA is designed to understand the interaction between people and ecosystems in urban areas. The Triangle ULTRA grant is one of 12 awarded out of 70 proposals from cities around the country.

ULTRA projects use the concept of “ecosystem services” — the goods and services provided by nature — to measure environmental quality and equity in urban areas. These goods and services include fresh air, freshwater availability, carbon sequestration, the regulation of floods, wildlife habitat, as well as recreational and aesthetic resources.

The initial focus of the Triangle ULTRA will be on freshwater resources, which have received increased attention due to recent drought and increased stormwater impact on drinking water reservoirs, including Jordan Lake, Falls Lake and other regional water bodies. Water quantity and quality have become major issues in the Triangle due to our rapid population growth and sprawling form of urbanization, the finite water resources provided by our local watersheds especially in times of drought, and the water intensive nature of our historic development. With multiple cities and towns located within the same watersheds, questions of regional cooperation and equity are paramount, and require novel approaches to water resource management. These new approaches must also address the impact of any new water resource management on multiple ecosystem services.

IE Director Larry Band and Deputy Director Phil Berke are heading the UNC portion of the project, which will include faculty, graduate and undergraduate students from all three universities, state and local government agency personnel, as well as community groups.

The IE’s Center for Environmental Modeling for Policy Development (CEMPD) has received a three-year, \$1 million grant from NASA’s Applied Sciences Program for a project to improve air quality decision-making by integrating satellite data with air quality modeling and monitoring data collected from the ground level.

“By using NASA satellite data to complement existing ground-based observational databases, model outputs and analytical capabilities of a widely used, web-based data system, this project will improve air quality decision-making by local, regional and national planners,” explained CEMPD Research Associate Uma Shankar, principal investigator of the project.

CEMPD is partnering with the Cooperative Institute for Research on the Atmosphere at Colorado State University, the Joint Center for Earth Systems Technology at the University of Maryland-Baltimore County, and the UNC Renaissance Computing Institute (RENCI) on this project. The

system enhancements will be beta tested by an end-user group that includes prominent air quality planning organizations and agencies around the country. Training on the enhancements is being provided through the Community Modeling and Analysis System (CMAS) Center, which is based at CEMPD.

“We are pleased to be on the leading edge in the application of satellite data to air quality modeling,” said Shankar. “This will be a publicly available system, and we are building a lot of tools that weren’t in use previously, so we are excited to be contributing to the environmental modeling community in a very meaningful way.”

The IE CEMPD has also received a gift from Microsoft in support of a partnership between Microsoft Research, UNC, Indiana University and the University of Oklahoma to develop the next generation of Linked Environments for Atmospheric Discovery (LEAD), an integrated, web-based system that dynamically integrates meteorological analysis tools, forecast models and data repositories. The initial development of LEAD was funded by the National Science Foundation, which also provided supplemental funding to CEMPD Research Associate Craig Mattocks to create linkages between LEAD and other weather forecasting models and databases at the National Oceanic and Atmospheric Administration and other agencies, and to make the LEAD portal simple for the beginning user while also incorporating features demanded by advanced weather researchers.

The Microsoft project will translate the LEAD technologies to the MS Windows environment, to enable users of all experience levels to configure and run weather forecast models directly from their desktops. An early concept was successfully demonstrated at Supercomputing 2009 in Portland, Oregon, and has attracted the attention of the Federal Aviation Administration.

“Craig’s work makes use of the most advanced weather forecasting models,” noted IE Director Larry Band. “We are thrilled that Microsoft, which is interested in improving computational technology for science and education, has seen the value of Craig’s work and is investing in his contributions to science. This is a wonderful partnership of private and public institutions that will push both computational technology and science forward.”

More information on LEAD is available at <https://portal.leadproject.org/gridsphere/gridsphere>.

The Progress Energy Foundation has renewed funding for the Progress Energy Program in the IE’s Center for Sustainable Energy, Environment and Economic Development (C-SEED). The latest grant will enable C-SEED to continue to lead public lectures around the state to expand North Carolinians’ knowledge and understanding of energy science and alternative sources of energy. It also continues to fund professional development workshops for K–12 teachers to increase their knowledge and understanding of energy and introduce them to hands-on activities they can use to share this knowledge with their students. In addition, the grant helps fund research by Progress Energy Faculty Fellows David McNelis and Richard “Pete” Andrews as well as up to five Progress Energy Graduate Fellows at UNC.

Progress Energy’s support will also be used to develop an Energy Challenges Symposium that will bring together academic and industrial researchers and technologists from throughout the state to exchange information and findings relevant to North Carolina. A major focus of this initiative is to highlight the interdependency of energy and water resources, and to identify research needs unique to North Carolina.

C-SEED Director David McNelis, who leads the project, said “this grant helps us in expanding our research efforts in new and emerging technologies and in efforts to increase energy literacy in North Carolina’s population and in K–12 students via our outreach program with their teachers.”



## NEW FACES AT THE INSTITUTE

Three new research associates have joined the Center for Environmental Modeling for Policy Development (CEMPD). **Liz Adams** earned her master's degree in environmental science and engineering at UNC. At CEMPD, she will apply air quality and global climate models to analyze issues related to regional air quality and climate change. **Darin Del Vecchio** has a bachelor's degree in civil engineering from Virginia Tech. He will design and develop three-tiered enterprise Java software in support of environmental models and related data. **Kevin Talgo**, who has a master's degree in meteorology from North Carolina State University, has been with the CEMPD since the fall. He applies and uses meteorological models for air quality and global climate modeling applications.

**Lindsay Dubbs** is a lecturer in the UNC Curriculum in Environment and Ecology teaching at the IE's Albemarle Ecological Field Site in Manteo, N.C. Dubbs was a doctoral candidate in UNC's Department of Environmental Sciences and Engineering when she was hired, and received her PhD degree in August 2009. She teaches a course on estuarine ecology at the field site.

**Josh Meyer** is the Institute's new public communications specialist. He brings a strong background in public relations and journalism, including a master's degree from the UNC School of Journalism and Mass Communication, editorial experience at the *Roanoke Times* and *The News & Observer*, and leadership roles in communications and public relations at Action for Children North Carolina and the NC Jaycee Burn Center. Meyer is responsible for the content of the IE newsletter and website, as well as media relations, events, publications, and communication with the greater University.

**J.R. Rigby** is a post doctoral research associate concentrating on the IE's Carolina Environmental Synthesis Program. With a doctorate from Duke University in civil and environmental engineering, he brings specific expertise in the mathematics and science of hydrology. Rigby is working on a major stormwater project to study and manage nitrogen discharge in Triangle watersheds into our major drinking water reservoirs such as Jordan Lake and Falls Lake.

**Robert Weaver** is the IE's new accounting technician. He previously held a similar post at the UNC Gillings School of Global Public Health. At the Institute, Weaver will focus mainly on research accounting support for the CEMPD, working with research faculty and associates on projects and providing administrative support for the Center. ✿

## IE trains Chinese delegation in environmental modeling

Several employees of China's Jinan Environmental Protection Bureau and the Jinan Environmental Protection Monitoring Station, including the chief engineer, spent three weeks at UNC in December training with the staff at the IE's Center for Environmental Modeling for Policy Development (CEMPD). Jinan is the capital city of China's Shandong Province.

CEMPD Research Associate Professors Aijun Xiu and Sarav Arunachalam and Research Associate B.H. Baek trained the scientists on the WRF weather forecasting model, the CMAQ air quality model and the SMOKE emission model — “the three most important components of air quality modeling,” said Xiu, who served as the visit's coordinator and principal investigator.

The CEMPD, through the CMAS (Community Modeling and Analysis System) Center, routinely provides training to scientists and policymakers from all over the world. The group from Jinan contacted CEMPD directly and requested training. “China is struggling with air quality problems,” Xiu explained. ✿



## IE WELCOMES NEW MEMBERS TO BOARD OF VISITORS

Greg Wetstone is vice president for government affairs at Terra-Gen Power, one of the nation's leading renewable energy companies and the only company with utility scale electricity production from all three major renewable sources (wind, solar and geothermal). Wetstone came to Terra-Gen from the American Wind Energy Association (AWEA), where he was director of public and government affairs. Prior to joining AWEA, he served as director of advocacy at the Natural Resources Defense Council (NRDC). Wetstone was chief environment counsel for the House Energy and Commerce Committee's Health and Environment Subcommittee for 12 years, where he played a key role in negotiating and drafting a number of important environmental laws, including the Clean Air Act Amendments of 1990, the Safe Drinking Water Act Amendments of 1986, the Resources Conservation and Recovery Act, and the Superfund Amendments and Reauthorization Act. Prior to joining the Committee staff, Wetstone directed the Air and Water Pollution Program at the Environmental Law Institute, where he co-authored a desk reference on pollution law and a groundbreaking book on acid rain. Wetstone earned a BS in biology at Florida State University and a JD at the Duke University School of Law.



Dr. Bill Easterling is dean of the College of Earth and Mineral Sciences at Pennsylvania State University. He has been dean since 2007, and has been at Penn State for over a decade, serving as the director of the Penn State Institute of Energy and the Environment from 2001 to 2007. Easterling is an internationally recognized expert on how global warming may affect the Earth's food supply, and was one of the lead authors of the United Nations Intergovernmental Panel on Climate Change report on the effects of climate change. The Intergovernmental Panel was the co-winner (with Al Gore) of the 2007 Nobel Peace Prize. Easterling has authored more than 70 refereed scientific publications in the areas of food and climate, testified before the House Committee on Science and Technology on climate change, and chaired the National Research Council's Panel on the Human Dimensions of Seasonal-to-Interannual Climate Variability. Recently, he was named fellow of the American Association for the Advancement of Science. Easterling earned his bachelor's, master's and doctoral degrees in geography at UNC-Chapel Hill. ✿



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UNC environment

## UPCOMING INSTITUTE EVENTS

### Spring 2010 Commencement

**Sunday, May 9, 2010, 1:00 p.m.**

North Carolina Botanical Garden

### 9th Annual CMAS (Community Modeling and Analysis System) Conference

**October 11–13, 2010**

William and Ida Friday Center for  
Continuing Education

Hosted by the Institute's Center for  
Environmental Modeling and Policy  
Development

See [www.cmascenter.org](http://www.cmascenter.org) for information and  
call for paper



### Water and Health: Where Science Meets Policy

**October 25–26, 2010**

Annual Conference, Networking and Learning  
Week, and launch of the Water Institute at UNC

William and Ida Friday Center for  
Continuing Education

## WATER AND HEALTH: WHERE SCIENCE MEETS POLICY

**Water and Health: Where Science Meets Policy** will bring together experts from academia, industry, government, non-governmental organizations and foundations to provide an interdisciplinary perspective spanning science, policy, practice and economics. The Conference will consider drinking water supply, sanitation, hygiene and water resources in both the developing and developed worlds with a strong public health emphasis.

*Jointly hosted by the UNC Institute for the Environment and the Water Institute at the Gillings School of Public Health*

**Call for Papers:** The Conference includes plenary sessions, paper presentations and workshops, including special sessions dealing with topical issues such as the Millennium Development Goals. Presenters may electronically submit a 300-500 word abstract for a proposed paper by May 15 through the symposium's website. See site for details.

**For registration and more information, please visit [www.ie.unc.edu/content/news\\_events/symposia/2010](http://www.ie.unc.edu/content/news_events/symposia/2010)**

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