

INTERNATIONAL WATER CONFERENCE DRAWS HUNDREDS TO UNC

EXPERTS FROM NEARLY 50 COUNTRIES GATHER IN CHAPEL HILL TO DISCUSS WATER AND HEALTH ISSUES; WATER INSTITUTE AT UNC LAUNCHES

For two days in October, more than 350 scholars, professionals and policymakers from around the world gathered at the University of North Carolina at Chapel Hill for *Water and Health: Where Science Meets Policy*, a symposium focusing on concerns related to water, sanitation and hygiene (WaSH), water quality and climate change impacts on freshwater.

The participants examined WaSH issues in engineering and technology, health, community development, policy and climate change, and learned about international research, education and public outreach initiatives taking place in each of these areas.

The conference, one of the largest environment and health events in the University's history, was presented by the UNC Institute for the Environment (IE) and the new Water Institute at UNC, based in the Gillings School of Global Public Health.

"This conference is part of an ongoing effort to bring UNC's water resources expertise to bear on the growing challenges involved with providing safe water and adequate sanitation to the people of North Carolina, the nation and the world," said IE Director Larry Band, an internationally known expert on watershed hydrology and watershed ecology, who co-chaired the conference. "It went extremely well, and brought a good deal of visibility to UNC and to the State as a center for research, learning and engagement on water and health issues."

Participants registered from nearly 50 countries, and represented diverse organizations such as the Public Authority for Electricity and Water of Oman, Procter & Gamble, the Conrad N. Hilton Foundation, Water for People, AmeriCorps, the Ethiopian Civil Service and the U.S. Environmental Protection Agency.

Speakers included water and sanitation specialists from UNICEF and the World Bank; an expert on human rights obligations related to access to safe drinking water and sanitation for the United Nations; and the chief of the maternal and child health division, bureau for global health, for the U.S. Agency for International Development.

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IE FIELD SITE PROGRAM CELEBRATES A DECADE OF EDUCATION AND SERVICE

LONGEST RUNNING SITES CONTINUE TO SPOTLIGHT UNIQUE ECOSYSTEMS AND ENVIRONMENTAL CONCERNS IN THE MOUNTAINS AND COASTAL REGIONS OF NORTH CAROLINA THROUGH "ENVIRONMENTAL BOOT CAMP" FOR STUDENTS

In 2001, the Carolina Environmental Program, the predecessor to the UNC Institute for the Environment (IE), launched what would become a network of field sites around the State and the world to enable UNC students to spend a semester exploring real-world environmental issues in specific regions or communities through a combination of coursework, field trips, group research projects and internships with local organizations.

The first two North Carolina-based sites were the coastal Albemarle Ecological Field Site in Manteo, and the Highlands Field Site at the Highlands Biological Station in the mountains, both offered each fall. With less than a dozen students each semester, these programs allow for intensive faculty-student interaction.

Originally, IE Associate Director for Education Greg Gangi recalled, the field site curriculum was very broad, with each site offering a wide range of courses. After a few years, program leaders decided to narrow the focus of each site to its unique local issues, and then to extend that understanding to regional and global contexts. Not only does each site use the local environment as a classroom: each also has a unique academic niche. Highlands is focused on ecology, conservation biology and use of geographic information

systems as an ecological and land use planning tool, while Manteo is focused on environmental law and policy and regional planning.

"One of our goals for the field sites is to prepare our students to go on to the next step, whether that's graduate school or a job, by helping them develop their expertise and credentials," Gangi explained. "Students are tracked into each program depending on their intended specialization."

Albemarle Ecological Field Site, Manteo, North Carolina

When this site launched in 2001, founding Director William Stott led a very interdisciplinary program that helped students gain a deep appreciation for the local fishing and oystering communities on the Outer Banks.

Over the years, aided by an active Community Advisory Board that helps shape the program and provides valuable contacts for internships and projects, the site has become much more focused on the policy, planning, management and law elements of coastal environmental studies. As a result, it draws students interested in careers in law, city and regional planning, or public policy.

Site Director Robert Perry teaches a course on resilient coastal communities, while environmental lawyer Lee Leidy teaches coastal law and policy.

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IE launches Sustainable Triangle Field Site

NEWEST SITE, BASED ON CAMPUS, HELPS STUDENTS EXPLORE, ADDRESS URBAN ENVIRONMENTAL ISSUES



The UNC Institute for the Environment opened its newest field site in January, right in its own backyard. The Sustainable Triangle Field Site (STFS) offers UNC students an urban field experience situated on and near the UNC campus. With its proximity to strong academic departments and pioneering private and nonprofit enterprises, the STFS gives Carolina students the chance to pair academic studies in the environment, urban planning, geography, health and related fields with practical experience delivered through internships and Capstones (senior team research projects).

“Our goal is to provide an urban focus on the environment, in particular related to planning and policy, as well as an opportunity for students who cannot attend one of our remote field sites to have a similar educational experience right in this area,” said Site Director Elizabeth Shay. “By exploring how sustainability is practiced on and near our campus, students incorporate into their UNC experience an understanding of how communities, industries, government and nonprofit organizations can work together toward a sustainable future.”

IE DIRECTOR LEADS WATER SCIENCE FOR STATE, NATION AND WORLD

WATER QUALITY AND QUANTITY, FLASH FLOODING AND DROUGHTS—WATERSHED HYDROLOGIST AND ECOLOGIST LARRY BAND ATTACKS WATER ISSUES FROM EVERY ANGLE

North Carolina has always had an abundant supply of water for our citizens – at least, we thought we did. But the rapid increase in our state’s population has dramatically increased demand for water, and over the past decade, changes in climate have brought us record-setting droughts and floods. As a result, both quantity and quality of water have become major societal issues for North Carolina.



Our state is not alone: increasingly, regions throughout the country and the world are facing significant water-related challenges.

UNC Institute for the Environment Director Larry Band, known internationally for his expertise as a watershed hydrologist and ecologist, is leading the IE’s substantial efforts in research, education and public service in the area of water science and management, both to help policymakers in North Carolina and

beyond. Band is the Voit Gilmore Distinguished Professor of Geography in the College of Arts and Sciences.

RESEARCH ON WATER QUALITY AND QUANTITY

Band’s research team at UNC focuses both on water quantity and quality, which can be threatened by pollutants and stormwater runoff that can change the nutrient content of water.

“Our overarching goal,” Band said, “is to foster understanding of the best ways to develop water sustainability. To do so, we must determine the major challenges to ecosystems and to human communities in terms of both human health and water quality, the hazards from flash flooding and landslides, and the long-term impacts of development on the sustainability of water.”

With major drinking water reservoirs such as Jordan Lake and Falls Lake providing vital drinking water to citizens of the Triangle region, the amount and impact of stormwater runoff flowing into these reservoirs is a major concern. As state legislators work to develop new regulations for urban development and controls of urban stormwater going into those reservoirs (the “Jordan Lake Rules”), Band and his team are helping to develop the fundamental science that policymakers can use to determine the best management options.

Band is also engaged in several projects studying the development and persistence of drought and its effect on both human and environmental health. The Triangle ULTRA (Urban Long-Term Research Area) project teams up researchers at UNC, Duke and N.C. State and the Triangle J Council of Governments to measure and model water quality within the watersheds of Jordan and Falls Lakes. In Baltimore, he is working with researchers from around the country through the Long-Term Ecological Research (LTER) network to study urban ecosystems, stormwater and the interaction of human/residential communities and environment. In another LTER project, he is studying the effect of urbanization on water quality and quantity in the Little Tennessee River Basin south of Franklin, North Carolina.

“We’re looking at similar challenges to water and water sustainability across different levels of development, from the dense, older urban area of Baltimore; to the Triangle’s rapidly expanding, younger urban area; to the less populated, newer exurban development in western North Carolina,” said Band of the three projects, which are all funded by National Science Foundation (NSF).

TEACHING AND PUBLIC SERVICE

Band teaches hydrology and watershed management, water informatics and GIS (geographic information systems), and advanced

watershed modeling to Carolina graduate and undergraduate students, focusing on solving specific water-related concerns.

He is helping North Carolina legislators through his service on the Nutrient Sensitive Waters Scientific Advisory Commission, advising lawmakers on appropriate stormwater management to improve water quality in the State’s drinking water supplies. He has also worked with the Orange Water and Sewer Authority (OWASA) and the N.C. Urban Water Consortium on drought issues and watershed management.

Nationally, Band is past chair of the Board of Directors for the Consortium of Universities for the Advancement of Hydrologic Science Incorporated (CUAHSI), a nonprofit comprised of more than 120 universities, nongovernmental organizations, research institutes and government agencies. CUAHSI, which is largely funded by the NSF, aims to help determine community priorities in water science, develop facilities and infrastructure to accelerate discovery, and translate scientific advances into practice.

Internationally, Band spent six months in Australia as a visiting scientist working on their major drought response activity. He also co-chaired UNC’s successful international water conference this past fall. (See article on page 1.)

“There is a strong need to bring to bear advanced informatics, measurements and modeling to both understand and to more sustainably manage our water resources. That requires people from multiple disciplines, using multiple tools,” he stated. “Most importantly, we must interface with community members, because we’re all consumers and users of water. That is the focus, both in my work and in the water science and management community at large.”

Fourteen UNC undergraduates are currently enrolled at the STFS, which will be offered each spring semester. They take classes on principles of sustainability, reimagining the American landscape, and community design and green architecture, and participate in internships where they are paired with mentors who are leaders in local businesses, nonprofit organizations and governmental entities.

Students also complete a Capstone, where they apply their skills and interests to a team research project that produces tangible products for an on- or off-campus client. This semester, one group is conducting a greenhouse gas emissions baseline inventory for the Town of Carrboro; the other is working with the Orange County Department of Solid Waste to increase both the quantity and quality of recycling in multifamily housing and apartment complexes.

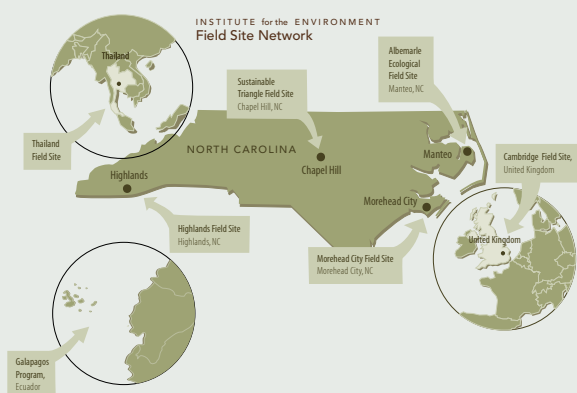
The STFS offers Carolina students an opportunity to earn a Minor in Sustainability in a single semester. Classes are taught by Shay, a transportation and land use researcher, and IE Associate Director for Education Greg Gangi, an ecologist.

The Sustainable Triangle Field Site is part of a network of IE field sites that includes locations in Highlands, Manteo and Morehead City, North Carolina, as well as Ecuador, Thailand and the United Kingdom. These sites are conducted in partnership with the Curriculum in Environment and Ecology; most are also in partnership with the College of Arts & Sciences Study Abroad Office.

Jonathan Howes, former secretary of Environment, Health and Natural Resources for North Carolina and former Chapel Hill mayor, chairs the STFS's Community Advisory Board. 🌿

"THIS FIELD SITE PROVIDES STUDENTS WITH A WONDERFUL OPPORTUNITY TO STUDY SUSTAINABILITY ACTIVITIES IN ACTION IN THE GREATER TRIANGLE AREA...MEMBERS OF THE COMMUNITY ADVISORY BOARD SERVE AS LINKS BETWEEN OUR STUDENTS AND SUSTAINABILITY BEST PRACTICES. SINCE OUR OWN STUDENTS ARE LEADERS IN SEEKING SUSTAINABLE SOLUTIONS, THIS IS A CHANCE FOR THEM TO LEARN AND TEACH AT THE SAME TIME."

**-JONATHAN HOWES
FORMER SECRETARY OF ENVIRONMENT
CHAIR, STFS COMMUNITY ADVISORY BOARD**



IE Field Site Program, continued from page 1

Postdoctoral candidate Lindsay Dubbs teaches students how ecological systems on the coast work, emphasizing management of these systems.

Students at the Albemarle Ecological Field Site take part in local internships and work together on Capstone research projects such as compiling recommendations for how the Town of Manteo could improve its stormwater management in order to reduce pollution to nearby Shallowbag Bay, and an analysis of historical value systems in Nags Head and how those values could be brought back to help the town to become more sustainable.

"In addition to providing a valuable educational experience for our students, we want to help local communities understand how to become more sustainable," Perry noted.

Highlands Field Site, Highlands Biological Station, Highlands, North Carolina

Originally this field site, first directed by Robert Wyatt, focused on cultural history and the way people have interacted with the land in a mountainous region through the centuries.

When current Director Jim Costa came to Highlands in 2005, he and his colleagues at the Carolina Environmental Program agreed to step up the science content of the program. Students now take courses in biodiversity, ecology, conservation and land use, drawing many interested in careers in conservation. Because understanding the interaction between humans and the landscape is so critical to understanding the current biodiversity crisis in this mountainous ecosystem, the site continues to offer an excursion-based course that traces the ecological and cultural history of the southern Appalachians.

The local community has really embraced the program, Costa said. With their help, students have interned at organizations such as the Highlands

Nature Center, Coweeta Hydrologic Laboratory, the Highlands-Cashiers Land Trust and the Jackson County Green Energy Park. Capstone projects have ranged from a study of the effects of hemlock loss in one of the last old-growth hemlock forests on the Highlands Plateau, to a scientific analysis of the health of a stream that was heavily damaged by stormwater runoff when a nearby road was re-graded. (Data generated helped spark remediation efforts for the stream.)

"The Highlands Biological Station is an especially appropriate field site for Carolina environmental students because it sits in a region that is tremendously biodiverse and extremely interesting ecologically," Costa noted. "Outwardly, it looks like a very healthy and functioning ecosystem. But in fact, development and other impacts have begun to unravel its integrity.

"At all of the IE's remote field sites, students literally live the subject for a semester, getting an on-the-ground view of how this ecosystem ticks, what's happening to it and how you study it, and then raising the question: What might be done about it? Away from other distractions, the students focus like a laser on their subject. It can be a very formative experience."

Gangi agreed. Almost to a student, those who have attended a field site call it the best experience of their college career.

Today, the IE's network of field sites in North Carolina includes sites in Manteo, Highlands, Morehead City and the Research Triangle (see top of page 2), making the IE one of the only units at UNC-Chapel Hill to have programs in all three areas of the state (mountains, coast, piedmont). The network also includes international sites in Thailand, Cambridge (UK) and, starting this summer, the Galapagos Islands of Ecuador. 🌿

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IE BRINGS FUNDING TO NORTH CAROLINA

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.

David McNelis, director of the IE's Center for Sustainable Energy, Environment and Economic Development (C-SEED), has been awarded a \$150,000 grant from Progress Energy to further enhance an existing partnership between the IE and Progress Energy to create an integrated program of faculty and student research, public and K-12 educational outreach, and an incubator for interdisciplinary collaboration across the UNC campus.

The Wallace Genetic Foundation has provided a \$75,000 grant to support an integrated water quality initiative, based in Chapel Hill and extending across the Neuse River Basin. *Promoting Environmental Literacy through Water Quality Outreach and Investigation* incorporates education materials from a previously supported stormwater pollution prevention training project with river basin-focused scientific inquiry and hands-on outreach activities that will engage area educators in protecting North Carolina's water quality. Kathleen Gray, IE associate director for outreach and public service, is principal investigator on the project. Dr. Brent McKee, Mary and Watts Hill, Jr. Distinguished Professor and Department Chair of Marine Sciences, will oversee the scientific investigation and sampling along the Neuse River.

The Wallace Genetic Foundation has also awarded David Salvesen, deputy director for the IE's Center for Sustainable Community Design (CSCD), a \$40,000 grant for a pilot project in Cedar Point, North Carolina to demonstrate the benefits and feasibility of intergovernmental coordination and implementation of plans for land use, watersheds, wetlands and other areas in the State's coastal counties. The project is a collaborative effort between CSCD, the North Carolina Coastal Federation and the Eastern Carolina Council of Governments.

Nikhil Kaza, assistant professor of city and regional planning, received a \$175,102 award from the U.S. Department of Defense to help the U.S. Navy comply with a recent Department of Defense mandate to reduce operational energy consumption across various installations. Kaza is helping the Navy develop its Energy Investment Program to enable cost-effective choices at its Joint Region Marianas installation.

Saravanan Arunachalam, research associate professor at the Center for Environmental Modeling for Policy Development (CEMPD), whose previous work through the Partnership for Air Transportation Noise and Emissions Reduction (PARTNER)'s Center of Excellence showed that a gap existed in linking aviation emissions with local/regional air quality impacts and health effects, received a \$225,000 continuation grant. Through this grant, he and the team of researchers at CEMPD and UNC students will address this critical gap by expanding on previously developed methodologies, explicitly looking at the effects of aviation growth and change in climate on future air quality, and using multi-scale modeling approaches.

IE Director Larry Band has been awarded a \$60,000 grant from the USDA Forest Service to study ecohydrological controls and prediction of landslide risk in forest watersheds of the Southern Appalachians. Band also received a grant from the University of Georgia (with underlying funding from the National Science Foundation) to study the consequences to the Southern Appalachian socio-ecological system of the interaction between changing climate and land use.

Jennifer Horney, deputy director for the N.C. Preparedness and Emergency Response Research Center at the UNC Center for Public Health Preparedness and research assistant professor of epidemiology, received a \$379,649 grant from the U.S. Department of Agriculture to study the vulnerability of rural communities to natural hazards and the quality of local hazard mitigation plans adopted to reduce vulnerability in eight southeastern states, including North Carolina.

Uma Shankar, a research associate at the CEMPD, received a \$1,035,025 grant in collaboration with the Cooperative Institute for Research in the Atmosphere, the University of Maryland Baltimore County, and RENCI, for a three-year project to improve an air quality decision support system currently used by many federal land managers, regional planning organizations, and state, tribal and local agencies. The project enhances this system through the integration of NASA satellite data with ground-based, modeled, and emissions data, and advanced analysis tools to examine their correlations.

The IE also received a generous gift from George Russell, Jr. through the Russell Family Foundation for studies on the nuclear fuel cycle, principally focused on transmutation, reprocessing technologies and nuclear non-proliferation. Jun Li of C-SEED leads these efforts, supported by David N. McNelis and faculty and students in the Department of Nuclear Engineering at North Carolina State University.

Water Conference, continued from page 1

The 2010 symposium also marked the formal launch of the new Water Institute at UNC, led by Jamie Bartram, professor of environmental sciences and engineering, the other co-chair of this conference. Before coming to UNC, Bartram coordinated the World Health Organization's water, sanitation, hygiene and health unit. The Water Institute's mission is to bring together individuals and institutions from diverse disciplines and sectors and, through academic leadership, empower them to work together to solve the most critical global issues in water and health.

"The cooperation between the long-established Institute for the Environment and the new Water Institute at UNC proved to be a real asset and confirmed the complementary nature of the two, enabling us to draw environmental issues with health and social concerns on an area of fundamental importance for development," Bartram stated. "The feedback we received from participants was outstanding. The linking of science with policy and practice was seen by many as real added-value and something that is not available anywhere else."

In addition to the UNC sponsors, the 2010 event was co-sponsored by the American Water Works Association, Gannett Fleming, the International Association of Plumbing and Mechanical Officials, NSF International and P&G Children's Safe Drinking Water. The next Water and Health: Where Science Meets Policy Conference is scheduled for October 3-7, 2011 in Chapel Hill. 🌱



N.C. COMMUNITIES, TEACHERS TRAINED IN ASSESSING HOMES FOR ENVIRONMENTAL HEALTH CONCERNS, CLIMATE CHANGE SCIENCE

The IE's Environmental Resource Program (ERP) continues to help North Carolina communities expand their capacity to identify and remedy environmental health hazards in homes such as mold, lead, pesticides and poor indoor air quality. In fall 2010, ERP staff partnered with the Kinston Community Health Center in Lenoir County to train its professional staff to conduct assessments in vulnerable communities in the area. Kinston has a large population of migrant farm workers living in conditions that may present environmental hazards in the home.

In January 2011, the ERP conducted a "Healthy Homes" workshop for residents in Chapel Hill's Rogers-Eubanks Neighborhood – a lower income, predominantly African-American neighborhood comprised of older, at-risk homes – and is working with the Neighborhood Association to help them address indoor environmental health concerns. The ERP will also train a community member and UNC intern to conduct Healthy Homes assessments in the community to look for asthma triggers, lead hazards, pest problems and other home safety concerns. These programs are supported by the N.C. Department of Environment and Natural Resources (DENR) and the UNC Center for Environmental Health and Susceptibility, which is funded through the National Institute for Environmental Health Sciences.

"By conducting Healthy Homes assessments in vulnerable communities," said ERP Environmental Health Educator Amy MacDonald, "we can identify environmental health issues in the home, work with the family to improve their indoor environment, and ultimately, we hope, improve children's health."

With a \$318,000 Global Climate Change Award from NASA, the ERP has launched NC CLIMATE Fellows, a professional development program that will support 24 North Carolina high school science teachers annually. The program combines classroom-focused, hands-on climate change science investigations with experiential learning in fragile ecosystem environments.

"Our goal is to increase North Carolina teachers' knowledge about current climate change science with an emphasis on how scientists use NASA data and models in their research, so they will feel more confident utilizing these resources with their students," explained Dana Haine, ERP K-12 science education manager.

In June, selected fellows from around the State will come to UNC for an intensive three-day institute to learn about global climate change science and the latest work of IE and other UNC researchers in this important area. Many of these research projects incorporate data and models from NASA.

This fall, the fellows will attend a weekend retreat at the IE's Highlands Field Site to learn how climate change is impacting the Southern Appalachian mountain ecosystem, and in spring 2012 they will attend another retreat at the Albemarle Ecological Field Site in Manteo to learn about climate change impacts along the North Carolina coast. They will extend this knowledge about local ecosystems to global systems as well.

The fellows will also take part in an online community that includes webinars, blogs and an e-newsletter to share resources and ideas. Each teacher will develop a lesson that incorporates one or more NASA resources to address a climate change topic. These lessons will be shared within the community of teachers, as well as with teachers around the State.

NASA has provided funding to support this program for three years, engaging 72 educators. This program, conducted in partnership with N.C. DENR's Office of Environmental Education and Public Affairs, also receives support from DENR and the Institute for the Environment.

"We were pleased to be able to diversify ERP's funding base while also building the capacity of North Carolina educators to incorporate current environmental science into their teaching," said Kathleen Gray, IE associate director for outreach and public service and principal investigator on the project. ♣



At the UNC Science Expo – part of the statewide NC Science Festival held throughout September 2010 – ERP staff and students introduced thousands of people to water quality issues and related IE programs.



PEOPLE NEWS

This winter, IE Director **Larry Band** visited the National University of Singapore (NUS) to discuss extending the current joint degree program between NUS and UNC-Chapel Hill to include the new environmental majors that the Singapore school is currently developing. Band helped develop a joint NUS-UNC degree program in geography several years ago; this new joint program could enable environmental students at each university to spend one or two years at the other school. UNC currently has a study abroad program at NUS; Band and his colleagues are exploring ways to tighten that integration through a joint degree or exchange program.

Band also visited Brunei to meet with a group that is forming an international consortium on biodiversity. The International Consortium of Universities for the Study of Biodiversity and Environment (ICUBE) will bring together researchers from UNC, the Universiti Brunei Darussalam (UBD), Monash University in Australia, Korea University in Seoul, Kings College London, the University of Bonn, National University of Singapore and the University of Auckland. The consortium, which will focus first on tropical rain forests, will facilitate the development of student and faculty exchanges and joint research programs. This spring, faculty from Brunei will visit UNC.

Jun Li, who was previously appointed as research assistant professor in the Department of Environmental Sciences and Engineering at the Gillings School of Global Public Health, has also been named a research assistant professor in the Institute for the Environment.

After five years with the Environmental Research Program (ERP), Research Associate **Brennan Bouma** is headed back to school. He started a master's degree program in the UNC-Chapel Hill Department of City and Regional Planning in fall 2010 and became a full-time student in January.

Josh Meyer, public communications specialist for the IE, has left to return to his hometown of Roanoke, Virginia, where he is managing communications at a community college. ♣

NEW HIRES

Michele Drostin, who has extensive experience developing environmental education curricula, has joined the IE's Environmental Resource Program to coordinate a stormwater project, in partnership with the Town of Chapel Hill, to educate local restaurant workers on preventing stormwater pollution.

Lindsay Dubbs has been named a postdoctoral candidate at the UNC Institute of Marine Sciences. In addition to her work on the 2011 Albemarle Pamlico National Estuary Program Ecosystem Assessment, she teaches coastal and estuarine ecology and energy and the environment for students at the IE's Albemarle Ecological Field Site in Manteo, and assigns internships for field site students.

The IE has added two new fellows in the Center for Environmental Modeling for Policy Development: **Jason Ching** as a senior research fellow and **Alan Huber** as a research fellow. Both bring extensive experience in meteorological and air quality modeling from their work at the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration (NOAA). **Mohammed Omary** also has joined the CEMPD as a research associate focusing on air quality and emissions modeling.

Jonathan Howes has been named a senior public service fellow of the Institute for the Environment.

Katie Hall has joined the IE as public communications specialist. She was formerly an environmental policy analyst for North Carolina Senator Marc Basnight, where she researched energy and environmental policy issues and advised Senate members in the development of legislation. She holds a master of environmental management degree from Duke University, as well as bachelor's degrees in both meteorology and marine science from N.C. State. ♣


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UNC environment

IE WELCOMES NEW BOARD MEMBERS

Jeff Garwood is a consultant, adviser and financier of several growth companies in the clean-tech arena, helping firms map their strategic plans, develop targeted action plans and execute on delivering value to customers as part of a global ecosystem. Garwood is past president and CEO of GE Water & Process Technologies, and held several other leadership positions at GE. He began his career as a process engineer with DuPont, with responsibilities for water treatment, powerhouse and boiler management, air compression and nitric acid production. He also worked at McKinsey & Co., a consulting firm, where he focused on business development, change management and strategic business modeling. Garwood and his family live in Charlotte. He is a summa cum laude graduate of N.C. State University, where he earned a BSc in chemical engineering. He also graduated first in his MBA class at the University of North Carolina. ■

David Ruffin is a partner in Credit Risk Management, LLC in Raleigh. He was formerly vice president and senior credit officer for the eastern region for First Union National Bank of North Carolina. A graduate of UNC-Chapel Hill (BA 1971) and East Carolina University (MS 1978), Ruffin also worked as a credit officer at Planter's National Bank in North Carolina and as regional associate and group officer at Robert Morris Associates. He has served as a volunteer leader and board member of the Triangle Land Conservancy and the Friends of the Mountains-to-the-Sea Trail. ■



CALENDAR OF UPCOMING EVENTS

Water and Health: Where Science Meets Policy, 2011 Conference

This second annual international water conference, jointly organized by the Institute for the Environment and the Water Institute at UNC, will consider drinking water supply, sanitation, hygiene and water resources in both the developing and developed worlds with a strong public health emphasis.

- October 3–7, 2011
- UNC Campus and William and Ida Friday Center for Continuing Education
- Visit whconference.unc.edu for more information.

10th Annual CMAS Conference

The IE's Center for Environmental Modeling for Policy Development hosts this annual conference to help connect members of the atmospheric modeling and model research communities and address the pertinent issues of the day.

- October 24–27, 2011
- William and Ida Friday Center for Continuing Education
- Visit www.cmascenter.org for more information.