Unearthing insights for a sustainable future
Unearthing Insights for a Sustainable Future in a Rural South Carolina Forest
Dan Richter’s Team Investigates Environmental Effects of Wood Energy

Taking on the Most Vexing Issues of the Third World
Jeffrey Vincent Brings an Economist’s Perspective to the International Impacts of Tropical Forest Logging and ‘Brown Clouds’

It’s Not Theoretical Anymore
Students Put Themselves on the Line to Deliver Products for Real-World Clients

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Thanks to the Nicholas School offices of External Affairs and Career Services for their assistance.
With its post-apocalyptic landscape of rotting stumps, sawed-off tree tops and piles of wood debris teeming with termites, Dan Richter’s research site at the Calhoun Experimental Forest in upstate South Carolina is proof that beauty is in the eye, and inquiring mind, of the beholder.

Richter is professor of soils and forest ecology at the Nicholas School. For nearly two decades, he and his students have come to this 10-acre parcel of dry upland pine forest, growing in a region of heavily eroded former cotton fields, to study the effects of 200 years of changing land use on forest soils and ecosystems.

The beauty of the scarred landscape—half of which was clear cut for experimental purposes in 2007—lies in the rich repository of scientific data and environmental history that investigators from Duke and collaborating institutions are unearthing at the site.

“The Calhoun Experimental Forest has become an ecologically significant experiment, because of what it tells us about how the environment responds to land use,” Richter says. “This is one of only a handful of sites where we have land-use records dating back two centuries and have been able to directly observe changes in the forest ecosystem and soil over time scales of decades.

“What we learn here about the long-term effects of intensive soil management,” he says, “can be applied to the development of sustainable land-use practices worldwide.”

The forest, which has been managed as a research site for 51 years, has long been a fertile field laboratory for studies on forest productivity, soil acidification, carbon sequestration, nitrogen depletion and mineral weathering.

Recently, Richter also has become interested in using it to investigate the environmental effects of wood energy.

Burning wood for fuel is as old as civilization itself, he notes. Until coal and oil became widely available (only about 100 years ago in America), wood was humanity’s primary source of energy, at times leading to overexploitation of forest resources and, in extreme cases, deforestation. It is still the primary source for more than two billion people, chiefly in developing countries.

During the last decade, rising oil prices and escalating concerns about climate change, global carbon cycles and overdependence on foreign fuels have rekindled interest in wood energy in many developed nations, too.

“The use of wood-powered heating, cooling and electricity is definitely gaining momentum. Central European nations, and the Scandinavian countries, in particular, see it as a readily available, renewable and clean energy source that can complement wind and solar power,” Richter says. “In the future, it
seems almost certain that wood will once again become a very significant source of energy in all nations."

Last spring, Richter visited Austria with Duke School of Forestry alumnus John Karakash to tour some of the world’s most advanced wood-fueled power plants to see firsthand “whether modern society can learn to use wood energy more sustainably than we did in the past.”

This fall, he is leading a class of Nicholas School Master of Forestry and Master of Environmental Management students on field trips to wood energy facilities and forest sites in the southeastern United States.

“The public has an image of wood burning as being smoky and not very good for the planet. But Austria’s two-decade experiment with using wood energy demonstrates that advanced wood combustion is a clean technology that can be rapidly implemented,” he says.

Wood-fueled energy systems work in much the same way as conventional systems that burn coal or heating oil. Every month or so, a new supply of pulp, chips or other low-value wood products is delivered to the site and stored until needed. Mechanized augers move the wood into a high-efficiency fire box, where it is burned and efficiently converted into heat and electricity. Steam can be piped underground to the surrounding community. It’s a relatively simple technology, compared to a wind turbine or a photovoltaic panel, Richter says. With retrofitting, many coal plants can co-fire wood.

In Austria, he toured one of the world’s largest wood-energy-fueled power plants, built in downtown Vienna with the backing of the Austrian Green Party. The plant provides heat and electricity for up to 50,000 people.

In the town of Güssing, 100 miles south of Vienna, he toured a medium-scale generator, powered by wood chips and trimmings from local forests and wood industries, that provides heat and electricity to 4,000 people, with enough left over to export energy back into the nation’s power grid. He also toured several small-scale generators called “energy cabins” that are co-powered with solar thermal panels. Entrepreneurs are installing these small power plants in a variety of environments, including isolated stretches of the Austrian countryside, to provide heat and electricity for villages, hotels, highway rest stops, farms and other far-flung locations. Researchers also are developing energy cabins to provide cooling.

Large-scale urban plants like the one in Vienna, though technologically impressive, may be less practical for widespread use, Richter believes, because of the cost and logistical
difficulty of transporting wood products to the plant. The technology likely holds the greatest promise at a smaller, decentralized, community-based scale, where its benefits can be far-reaching.

"Because you're using locally harvested wood products that typically sell for $30 to $50 a ton, transportation and raw material costs are minimized," he says. This can result in lower electricity and heating bills for consumers, while communities themselves may even achieve a positive energy budget by selling surplus energy back to the grid. Managing local forests for wood energy gives landowners and forest-product companies a potential new source of revenue, and reduces the risk that the forests, which are traditionally undervalued, will be permanently cleared and converted for other uses.

"As long as good forest management is practiced, it actually increases the value of the forest," Richter says. "That's always a good thing."

In Güssing, the decision to install a wood-energy power plant, solar thermal panels and other renewable energy technologies has helped turn the once sleepy hamlet into a hotbed of green energy research and development. Since the first wood-fueled facility was built in 1992, more than 50 companies have moved to the town and more than 1,000 new jobs have been created in the renewable energy sector alone. Ecotourism is flourishing, as thousands of curious tourists and researchers flock to the town each year to tour its renewable energy facilities and stay in its wood-powered lodges.

Wood energy offers environmental advantages as well, Richter says. "It is carbon neutral in regard to the wood burned, as compared to coal and other fossil fuels," he says. "Wood energy re-circulates carbon that's already in the biosphere, instead of adding new carbon to it." His research will estimate wood energy's full-carbon budget, including emissions associated with the harvesting, processing and transportation of wood products.

Burning wood gives off little mercury and sulfur, and emissions of carbon monoxide and other pollutants can be minimized before they are discharged in the plant's exhaust. Technological advances in wood combustion systems mean that pollutant-laden flue gases are re-directed back into the plant's burners, "so air pollution is minimized," he says. "The wood is burned to near completion."

"The chief challenge remaining, in terms of air pollution, appears to be fine particulates," Richter says. "Medical researchers are increasingly interested in whether respiratory problems are associated with fine..."
particulates from the combustion of many fuels, including wood."

That question, along with fears about the overexploitation of forest resources, has led some environmentalists and paper companies to resist wood energy’s entry into the green energy mix in the United States.

Rural schools, hospitals, prisons and industrial plants in heavily forested northeastern states like Vermont and Maine have begun burning wood instead of fossil fuels, he says. And a few urban areas, like Akron, Ohio, also are experimenting with it. But for the most part, wood energy remains the red-headed stepchild of U.S. renewable energy.

Richter—who was one of three scientists invited to speak at the National Academy of Sciences this summer in conjunction with the opening of a new Smithsonian Institution exhibit on soil—is working to address these concerns.

His search for answers leads back to the clear-cut plots and forested buffer zones of the Calhoun Experimental Forest.

Over the years, his teams’ research at the site has focused on four core issues: carbon cycling, nutrient cycling, soil-ecosystem acidification, and forest recovery. Their findings, along with results from studies at research plots they maintain at Duke Forest, have resulted in more than 50 peer-reviewed papers in Nature and other scientific journals, a textbook, and dozens of posters, presentations and book chapters.

“One of the main questions we’re trying to answer is how much wood can be removed from a forest that is growing on highly disturbed land,” Richter explains. “As forest nutrition is depleted by harvests, how does that compare with the regenerative effects of forest development?”

Researchers from around the world are eagerly anticipating Richter’s team’s findings.

“With fossil fuel supplies becoming more scarce and expensive, and with the need to replace carbon-intensive fuels with fuels that are closer to carbon neutral, wood energy is an option for the future. However, it is essential that the full environmental impacts of wood fuel and other forms of bioenergy be fully assessed,” says Pete Smith, Royal Society Wolfson Professor of Soils and Global Change at the University of Aberdeen in Scotland.

“Dan’s groundbreaking work on soils at Calhoun Forest is of global importance. It is fitting that he is now examining the environmental impacts of wood fuel use at this well-studied site. I look forward to seeing the outcomes from Dan’s research to make
sure that we proceed sustainably,” Smith says.

To simulate conditions in a forest that has been harvested for wood products, including wood for energy, Richter had half of his 16 research plots at the Calhoun forest “operationally logged” in May 2007. Pulp wood and solid wood products were removed, leaving behind only tree tops and other debris.

As soon as the logging dust settled, he and his team of three PhD students, Jason Jackson, Meg Mobley and Jian Wei Li, and research associate Paul Heine, began the monumental job of estimating how much wood biomass had been left behind.

“Harvesting for wood energy means that managers need to become more and more efficient in removing biomass from forests,” Richter explains. “Conventional harvests of timber take products from the forest every 15 to 30 years and they typically leave low-value wood behind. This material helps resupply forest nutrition. But under intensive management for wood energy, more frequent harvests may be needed, with less material left to resupply forest nutrition.”

Armed with high-tech GPS units and old-fashioned tape measures, Richter’s team canvassed the clear-cut plots, recording the length and diameter of every sizeable branch and stump, as well as measuring and re-measuring the overall area of land cleared. Branches, twigs and debris too small to measure individually were collected from sampling sites throughout the cleared area and sawed up so their biomass could be measured collectively, by volume and weight. Hundreds of samples were taken back to the lab in Durham and ground up, to measure their carbon and nutrient content.

“It’s a lot of work just to get to a number,” says Jackson, “but it’s absolutely critical. We need to know the amount of woody debris left behind because that’s what will impact soil nutrition, feed the decomposers, and affect forest health and recovery in coming years.”

Although they work collaboratively, each has his or her own area of related expertise.

Richter and Li study nutrient cycling in the forest’s O-horizon—the topmost layer of soil, composed of decaying leaves, twigs, pine needles and other organic matter on the forest floor. Their studies, published in Ecology and other peer-reviewed journals, have revealed new insights into how forest re-growth affects the soil’s nutrient balance over time, specifically the availability of micronutrients and iron oxides critical to the biological functioning of the soil.

Mobley focuses on carbon cycling...
and sequestration. By measuring the biomass and carbon content of felled wood in various stages of its decay—from newly downed trees whose bark and needles are still fresh, to logs and stumps in their final stages of decomposition—she can determine how much carbon is sequestered above and below ground in the forest, and at what rate it is released back into the atmosphere.

Jackson is investigating the impacts of intensive management and land-use history on soil biology, particularly on fungi and mushrooms that grow on the forest floor and play a vital role in the regenerative process.

“What we’re finding is that the process of re-growing trees influences the soil a lot more than previously thought,” says Richter. “Soil is much more dynamic and alive than it appears in textbooks.”

Calhoun Experimental Forest is located in a 5,000-acre swath of Sumter National Forest, about 40 minutes south of Spartanburg, S.C. The nearest town, Union, is 15 miles away along a two-lane stretch of asphalt that winds past one-room churches, shooting ranges, a deer-meat processing plant, a former Army bombing range, and the campsite used by Richter and colleagues when working at the Calhoun.

The site originally was covered by a vast hardwood forest that was cleared for cotton in the early 1800s. Decades of intensive farming took its toll. By 1930, erosion had stripped away much of the sandy topsoil, turning many of the once fertile fields into red-clay badlands. The U.S. Forest Service deemed the site to have some of the poorest soil in the Southeast. It bought the land for $3.50 an acre—only slightly more than what plantation owners paid in 1876—and set it aside for long-term experiments on human impacts on forest soils and ecosystems.

Louis Metz, a Forest Service scientist who received his PhD from the Duke School of Forestry, planted pine seedlings in the old fields in 1956-57. Forest Service researcher Carol Wells continued the study until he retired in the 1980s, when the mantle was passed to Richter.

Today, 50-year-old loblolly pines, some planted in soldier-straight rows, others growing wherever their seeds took root, dominate the landscape. Deer, wild turkeys and other game—along with teeming populations of fire ants, termites, chiggers and ticks—inhabit the scattered understory of oaks, red maples and sweet gums.

Gullies and deeply incised streambeds still scar the land, but widespread erosion has been checked, and in some places repaired, by forest regrowth.

Richter can’t imagine a more perfect place for his team to conduct their research.

“The studies we’re able to do here, and the long-term data we have access to, provide unique observations about environmental history, soil change, forest restoration and interactions with the wider environment,” he says. “You could tour a site like this, with its history of abuse, and only see problems. But it holds promise, too. If we can grow trees on this land, there is hope that we can restore and manage ecosystems across a very wide landscape indeed—maybe even for wood energy.”

Tim Lucas is the Nicholas School’s national media relations and marketing specialist.

[for more]

Dan Richter’s bio
nicholas.duke.edu/people/faculty/richter.html

Calhoun Experimental Forest
calhoun.env.duke.edu
The Green Grok, a new blog by Bill Chameides, dean of the Nicholas School, was launched nationally this fall and has been online since May at thegreengrok.com.

Through the blog Chameides, an atmospheric scientist and member of the National Academy of Sciences, examines the key environmental issues of our time, elucidating causes and potential remedies for environmental change and identifying pathways for a more sustainable future.

“The science of environmental change is complex. The goal of The Green Grok is to explain it in ways that everyone can understand and relate to, without oversimplification,” says Chameides, who also has been guest blogging on popular online sites such as the Huffington Post and Gristmill. “Blogs are the perfect platform for fostering this type of real-world discussion, because they take it out of the classroom and lab and bring it into people’s homes and workplaces.”

The term “grok” was coined by novelist Robert Heinlein in his 1961 science fiction classic, Stranger in a Strange Land. To grok means to understand and communicate a topic so thoroughly and intuitively that it becomes part of who you are.

In his first post, “The Fundamentals of a Fundamentalist,” Chameides proudly confessed to being a “climate change fundamentalist,” a moniker coined recently by the editors of The Wall Street Journal to deride scientists and policy experts who acknowledge the serious threat of climate change. Chameides cited Merriam-Webster’s definition of fundamentalism as “a movement or attitude stressing strict and literal adherence to a set of basic principles,” and says that for scientists, this kind of fundamentalism is the only tenable position.

Future posts will examine a wide array of timely issues—many inspired by the day’s headlines—that could range from corporate sustainability and consumer “greenwashing,” to the pros and cons of geologic sequestration or biofuels. Chameides hopes to post two to four blogs a week. Leading scientists and policy experts will be invited to participate as guest bloggers.

In addition to regular blog posts, The Green Grok offers two special weekly features: Keep on top of cutting-edge environmental science news every Monday with the “Pulse of the Planet.” And learn how to “green” your life with the blog’s new “Do It Yourself” series.

The Green Grok is housed on a newly designed interactive Web site, The Nicholas Insider, which serves as the home for all Nicholas School multimedia projects, including student blogs, field trip blogs, alumni videos, and the Nicholas Talks series of recorded lectures and talks.

Erica Rowell, online managing editor for the Nicholas School, serves as editor of The Green Grok. Rowell has more than 15 years of combined experience writing for news outlets and Web sites. She has focused on environmental science since 2003, and spearheaded Environmental Defense’s guide to energy-saving lights, creating what Smithsonian magazine called “the best CFL guide on the Net.”

Research associate Wendy Graber, who holds a Masters in Geology from Duke, is lead researcher for the blog. Prior to joining the Nicholas School this year, Graber worked for 15 years as an environmental consultant, applying science to solve real-world problems.

Stephanie Thirolle, director of Web projects for the Nicholas School and Nicholas Institute, serves as The Green Grok’s lead technician.

Chameides combines more than 30 years in academia as a professor, researcher, teacher, and mentor with a three-year stint as chief scientist at Environmental Defense. He is a member of the National Academy of Sciences, a Fellow of the American Geophysical Union, and a recipient of the American Geophysical Union’s MacElwane Award. He has served on numerous national and international committees and task forces and, in recognition of his “extraordinary service,” was named a National Associate of the National Academies. He has been the dean of the Nicholas School since 2007.
A by-the-numbers look at the impacts humans have on the environment, and the steps we can all take to help forge a sustainable future

Carbon Savings at Home: A Little Goes a Long Way

- **Average Annual CO₂ Emissions of a U.S. Household:** 132,000 lbs.
  - Emissions from energy use: 53,000 lbs.
  - Emissions embedded in household goods and services: 79,000 lbs.

- **9 Easy Steps to Reduce Household CO₂ Emissions 10% (in lbs. per year)**
  - **On the road**
    - Keep the correct air pressure in your tires = 300 lbs.
    - Drive 20 miles less per week = 820 lbs.
    - Drive a car that gets 10 mpg more = 3,000 lbs.
  - **At home**
    - Wash clothes in warm or cold water = 600 lbs.
    - Replace an electric water heater with a gas heater = 1,850 lbs.
    - Replace 20 incandescent light bulbs with compact fluorescent bulbs = 4,500 lbs.
  - **At the dinner table**
    - Ditch red meat and dairy for chicken, fish or veggies 1 day a week = 600 lbs.
    - Eat a plant-based diet 1 day a week = 930 lbs.
    - Eat only local food = 1,400 lbs.
  - **Total CO₂ savings** = 14,000 lbs.

Statistics courtesy of: Dean Bill Chameides’ blog, The Green Grok thegreengrok.com
The International Whaling Commission’s policy of issuing special permits that allow member nations to harvest and kill whales for scientific purposes undermines global conservation efforts and “should end now,” the Nicholas School’s Andrew J. Read told a U.S. House of Representatives subcommittee in June.

“Programs in which whales are harvested under the guise of science” have killed tens of thousands of whales since the late 1980s and added nothing to our understanding of endangered or threatened whale populations that could not be obtained through nonlethal techniques such as genetic markers or tissue samples, said Read, Rachel Carson Associate Professor of Marine Conservation Biology, who is based at the Duke Marine Lab.

“It is not necessary to kill any whale to obtain this information,” he said.

Read was one of three experts who testified at a House Subcommittee on Fisheries, Wildlife and Oceans oversight hearing in advance of the annual International Whaling Commission (IWC) meeting, June 23-27 in Santiago, Chile.

An authority on marine mammals, Read has served on the IWC’s Scientific Committee for more than a decade, including five years as chair of its Subcommittee on Small Cetaceans.

In his congressional testimony, he presented an overview of past depletion of whale populations as a result of overexploitation, along with examples of the IWC’s Special Permit program that...
allows nations to capture and kill whales for research purposes, a practice euphemistically known as scientific whaling.

He urged U.S. delegates at the upcoming IWC meeting to lead efforts to abolish the controversial practice, which is permitted under an IWC provision that was established more than 60 years ago, before the advent of modern non-lethal research techniques. Not only does the provision allow the sale of harvested whales on the commercial market, he noted, but it does not limit how many can be killed.

"Since 1987, the government of Japan has killed almost 10,000 whales in the North Pacific and Antarctic under their special permit program. The governments of Norway and Iceland have engaged in smaller lethal research programs in the North Atlantic," Read said.

Such programs, he said, often "kill an entire whale to describe its last meal," an abuse he described as "overkill of truly leviathan proportions."

In his testimony, Read set forth three critical goals for the U.S. delegation at the 2008 IWC meeting: It must press for an end to special permits for scientific whaling; oppose the creation of any new category of whaling that allows commercialization of whale products; and oppose the resumption of commercial whaling until a fully transparent, third-party monitoring system is put in place to prevent future harvests from exceeding catch limits.

"It is my personal view that it will be extraordinarily difficult, if not impossible, to control whaling should the IWC agree to resume a commercial harvest," he said. "We have only to look at our past failed attempts to control the commercial harvests of other high-value marine resources, such as bluefin tuna, to see the perils in authorizing such ventures."

Despite efforts by the U.S. delegation to address these concerns, no action was taken by the IWC.

"There were no votes on scientific whaling or most other issues," Read reported after the meeting. "The U.S. Commissioners and Chair of the IWC, Bill Hogarth, were trying to work through some of the procedural issues. We don't know the substance of the behind-the-scenes negotiations that are, presumably, under way."

A full text of Andrew Read’s testimony is online at nicholas.duke.edu/whaling

growth and development among local residents and landowners. In year two of the study, they plan to host public workshops to present their findings and gather additional feedback before sharing their report with community leaders.

“The objective isn’t to tell local stakeholders what to do,” Campbell emphasizes, “but to give them tools to determine for themselves how to accommodate development while protecting resources critical to local ecosystems, economies and quality of life.”
Krithi Karanth Receives First Dean’s Award for Outstanding Graduate Student Paper

Dean William L. Chameides awarded the first Dean’s Award for the Outstanding Graduate Student Manuscript to Krithi Karanth at the Nicholas School’s recognition ceremony in May.

Karanth, a PhD student, was honored for a groundbreaking study she wrote examining the controversial use of human resettlement in Indian tiger reserves.

The study, “Making Resettlement Work: The Case of India’s Bhadra Wildlife Sanctuary,” was published in the October 2007 issue of the peer-reviewed journal *Biological Conservation*, as one of the first detailed cases on the factors affecting the success or failure of human resettlements in tiger reserves.

The Dean’s Award is a new initiative developed by Chameides to recognize outstanding student scholarship. The award will be given each year to a student enrolled in the Nicholas School’s PhD programs (Environment and Earth and Ocean Sciences) who has a manuscript accepted or published in a peer-reviewed journal. Manuscripts are judged on disciplinary rigor, originality and likely depth of contribution to the advancement of their field.

Award recipients receive a $3,000 prize and their name is placed on a plaque hung in Hug Commons.

In her winning paper, Karanth found that the controversial practice of relocating people who live in tiger reserves in India to settlements outside the protected areas is a “workable conservation solution” that can benefit both the endangered cats and the resettled humans, provided that key conditions are met.

“Relocation is a viable conservation tool—if it is done with the active consultation of the people being resettled,” she says. “They must be given a voice in the decision-making process. They can’t be forced out or denied fair compensation.” Substantial financial support needs to be available to them for up to a year after the move. And there needs to be long-term involvement by governmental and nongovernmental organizations that are committed to the relocated people’s success.

To research her paper, Karanth examined the experiences of 419 households who voluntarily moved to two villages located outside the Bhadra reserve. She interviewed 61 percent of the households during the relocation in 2002, and interviewed 55 percent of them again in 2006. She also interviewed individuals from governmental and nongovernmental agencies involved in the resettlement effort.

Karanth’s faculty advisors are Norman L. Christensen, professor of ecology and founding dean of the Nicholas School, and Stuart L. Pimm, Doris Duke Professor of Conservation Ecology.

[for more]

To learn more about Karanth’s research winning manuscript visit nicholas.duke.edu/news/ns-krithi.html
Special Awards Recognize 2008 Graduates

Virlis L. Fischer Award  
Goes to the graduating professional degree student with the highest academic achievement. Given by Bernice Fischer in memory of her husband.

**Recipient:**
Emily Chambliss
Hometown: Atlanta, Ga.;
Major: MEM, Global Environmental Change; **Activities at Duke:** GIS (Geographic Information Systems) teaching assistant, Stanback Intern with the Union of Concerned Scientists, Stanback Intern with The Wilderness Society; **Awards/Honors:** Nicholas School of the Environment and Earth Sciences Merit Scholarship; **Post-graduation destination:** PhD study in the Department of Earth and Planetary Science at University of California at Berkeley; **Future goals:** I’ll be moving to Boston in August and most likely work as an environmental consultant; I’m really interested in urban environmental management and promoting sustainable land-use practices. I eventually see myself returning to school to pursue a PhD and working in academia.

Sara LaBoskey Award  
Given in recognition of personal integrity and academic excellence.

**Recipient:**
Waruntorn Kanitpanyacharoen
Hometown: Lampang, Thailand;
Major: BS in Earth and Ocean Sciences; **Activities at Duke:** resident assistant; president, Thai Student Organization, Badminton Club; **Awards/Honors:** Royal Thai Scholarship, undergraduate research support scholarship; **Post-graduation destination:** PhD study in the Department of Earth and Planetary Science at University of California at Berkeley; **Future goals:** professor, research

Thomas V. Laska Memorial Award  
Given by the Earth and Ocean Sciences faculty to the most outstanding senior major.

**Recipient:**
Sarah Marlay
Hometown: Arlington, Va.;
Major: Environmental Science, BS; **Activities at Duke:** member of the Best Buddies Club (supporting adults with mental disabilities) all four years at Duke, member of the WOODS Club (leading youth environmental education programs at local community centers/schools) in Spring 2007, volunteer tutor at a local elementary school, member of Zeta Tau Alpha all four years; **Awards/Honors:** Magna Cum Laude; **Post-graduation destination:** I plan on serving in Peru as a Peace Corps volunteer; **Future goals:** I hope to gain an international perspective on environmental challenges and conservation efforts during my tour in the Peace Corps and apply this perspective to my future career in the environmental field.

*Graduation with Distinction accords special recognition for academic excellence to students who successfully complete a significant independent research project on the environment or earth sciences.*
Researchers from Duke University, the University of Cincinnati (UC) and the Durham Veterans Administration Medical Center are hoping to find a geographical pattern to help explain why 1991 Gulf War veterans contracted the fatal neurological disease amyotrophic lateral sclerosis (ALS) at twice the normal rate during the decade after the conflict.

By layering military records of troop locations onto Gulf-area maps, “we’ve found there were some areas of service where there appears to be an elevated risk,” said Marie Lynn Miranda, an associate professor at Duke’s Nicholas School whose group uses geographic information systems (GIS) to study environmental health problems.

Also known as Lou Gehrig’s Disease because it crippled and ultimately killed that baseball great in 1941, ALS causes cellular degeneration in the central nervous system. Its cause is unknown. “There are no reports on the occurrence of ALS among veterans of other conflicts,” the researchers wrote. “There is only a single report that suggests ALS may arise from environmental exposures associated with military service, per se.” The cases assessed by Miranda and her colleagues occurred within a group of people who are expected to be at low risk for ALS, because they’re mostly under the age of 45.

Miranda is the first author of a report on an initial analysis now published online in the research journal *NeuroToxicology*. The work was funded by the Department of Veterans Affairs Cooperative Studies Program.

The report’s senior author is Ronnie Horner, professor and director of the department of public health at UC, who led research that first documented twice-normal ALS rates among veterans of the first Persian Gulf War in an article published in the September 2003 issue of the journal *Neurology*.

Horner’s group is now assessing possible exposures veterans might have had in the Gulf region that could explain the higher ALS rates its 2003 study found.

Other authors of the new *NeuroToxicology* report include Miranda’s Nicholas School colleagues M. Alicia Overstreet Galeano and Eric Tassone as well as Kelli Allen, a research health scientist at the Durham VA Medical Center and a Duke assistant research professor of medicine.
A study by Duke University researchers finds that minority and low-income communities are more likely to be adversely affected by a 2006 U.S. Environmental Protection Agency ruling that exempts some industries from reporting detailed information about the toxic chemicals they release into the environment.

The study was published in June in the peer-reviewed journal *Environmental Science and Technology*. It was funded by a National Institute of Environmental Health Sciences grant.

Every year, nearly 26,000 industrial facilities across the United States are required to submit detailed information to the EPA about their releases of nearly 650 chemicals to air, land, or water. The facilities also must report the amount of chemicals contained in waste that is disposed of, burned, recycled or treated. The EPA makes this information available to the public through a database known as the Toxics Release Inventory (TRI).

Since 1986, the TRI has been a tool to alert communities, regulators, public health and safety officials, workers, and investors to the presence and use of chemicals by facilities in their communities, said Marie Lynn Miranda, director of the Children’s Environmental Health Initiative (CEHI) at Duke and associate professor at the Nicholas School. Since the database became publicly available in 1986, emissions of toxic chemicals in the United States have declined by 44 percent, she noted.

In December 2006, however, the EPA changed the TRI reporting requirements with the Toxics Release Burden Reduction Rule. The rule exempted thousands of facilities from reporting requirements or allowed them to report much less detailed information about some of the chemicals they released. The purpose of the rule was to reduce the time and cost expended by industry to report releases to the TRI. The EPA estimates that the rule will save eligible facilities about nine hours and about $438 a year for each exempted chemical.

To gain a better understanding of how the ruling might affect minority and low-income communities, Miranda and her team used distance-based geographic information system (GIS) spatial analysis to examine the racial and socioeconomic characteristics of communities within 1-kilometer, 3-kilometer and 5-kilometer buffers around both exempted and non-exempted facilities.

Findings from the study, including EPA Region and state-specific fact sheets can be found at: [nicholas.duke.edu/cehi/about/news/envjustice.htm](nicholas.duke.edu/cehi/about/news/envjustice.htm).

“Oh, we found that communities in proximity to industrial facilities no longer required to report detailed information about their chemical releases, have significantly higher percent minority, minority under age 5, and low-income populations compared to communities where all of the information is still available,” said Miranda. “We also found significant differences in these demographics between regions and at the state level.”

For more information, visit [news.duke.edu/2008/06/TRIMiranda.html](news.duke.edu/2008/06/TRIMiranda.html).
Covering more than 4,300 square miles in Southern Florida, the Everglades are the largest subtropical wilderness in the United States. In recognition of their unique ecological significance, they have been designated an International Biosphere Reserve, a World Heritage Site, a National Park and a Wetland of International Importance.

But over the years, human development, agriculture and urban sprawl in and around the once-remote marshes and peatlands have contributed to radical changes in the Everglades’ water quality and water flow, and have had far-reaching impacts on their animal and plant populations.

A new book by Curtis Richardson, director of the Duke University Wetland Center and professor of resource ecology at the Nicholas School, provides an insider’s view of how scientists have studied these changes and offers practical insights from their research to aid in the restoration of this vast wetland.

Encyclopedic in scope, The Everglades Experiments: Lessons for Ecosystem Restoration, brings together key findings from 14 years of experiments in the Everglades by the Duke Wetland Center and its partners. The 702-page book was published April 18 by Springer Press.

“The findings presented in this book are the result of extensive experimental research from 1989 to 2003 on the effects of water, nutrients and fire on the Everglades communities,” Richardson says. “It’s a synthesis of what we learned and how it can be applied to managing and restoring this irreplaceable resource.”

Nicholas School to Explore Creation of New International Master of Environmental Management Program

The Nicholas School has signed a memorandum of understanding with the Higher Colleges of Technology of the United Arab Emirates and The Energy and Resources Institute (TERI) of New Dehli, India, to explore the creation of a new international Master of Environmental Management (MEM) degree program.

Pending approval by the Duke Board of Trustees, the new MEM program would focus on environmental issues facing the Middle East, the Indian Subcontinent and North Africa, within a global context.

“These regions are home to growing populations, rich natural resources and astounding biodiversity,” says Dean William L. Chameides. “By working together to create this new cross-continental master's program, the Higher Colleges of Technology, TERI and the Nicholas School demonstrate a shared vision of global sustainable development that transcends national boundaries and ideologies.”

“This represents another step forward in the Nicholas School’s continued evolution as a global leader in environmental research and education,” he says.

No start date has been set for the new MEM program or for other joint research and graduate programs that may follow it.

Chameides signed the memorandum of understanding with Dr. Tayeb Komali, vice chancellor of the Higher Colleges of Technology, and Dr. R.K. Pachauri, chancellor of TERI University, who heads the Intergovernmental Panel on Climate Change and shared the 2007 Nobel Peace Prize.

The creation of the new program is part of a broader, university-wide initiative to extend Duke's expertise to campuses in key economic, environmental and cultural centers around the world. Duke's Fuqua School of Business announced this fall an innovative expansion plan to establish a network of campuses in New Delhi; the United Arab Emirates; St. Petersburg, Russia; London; and Shanghai, China, as well as on Duke's campus in Durham.

Partnerships with individuals, municipalities and organizations will facilitate the simultaneous launch of the business school’s campuses in each of these five regions. In addition to establishing the business school in each of these regions, the Fuqua expansion plan includes current or future participation from other parts of Duke University, including the Nicholas School, the Duke Global Health Institute and the Sanford Institute for Public Policy.

The Higher Colleges of Technology was established in 1988 by a federal decree law of the United Arab Emirates to educate and train new generations of technological leaders for the region. It is comprised of 16 colleges located through the United Arab Emirates.

TERI, and its affiliated educational arm, TERI University, were established in 1974 to promote India’s leadership in the fields of energy, the environment, natural resources and sustainable development.


The prestigious Science for Nature Seminar Series is a bimonthly series of talks that brings leading scientists from a variety of fields to Washington, D.C., to present new research advancements of central importance to international conservation.

“Ship strikes, entanglements, fisheries by-catch and sonar interactions are among growing threats facing critical pelagic species today. These threats are spread over wide areas of our oceans and often occur outside of the jurisdiction of established marine protected areas and territorial waters,” Halpin says. “Future efforts to keep marine mammals, sea turtles, seabirds and other large migratory marine species out of harm’s way will necessarily involve a conservation strategy that incorporates greater use of more predictive forecasting, near real-time monitoring and dynamic management.

“In my WWF presentation, I provided examples of marine information systems, forecasting models and new technological applications being developed to address pelagic species protection, and address new directions in marine conservation,” he says. Halpin leads the Nicholas School’s Marine Geospatial Ecology Laboratory and is a founding faculty member of the Duke Center for Marine Conservation.

Now in its second year, the Science for Nature Seminar Series has become a popular forum and networking opportunity for the conservation community. The series is named in honor of Kathryn Fuller, former president and CEO of WWF.

Nicholas School Appoints Associate Dean for International Programs

Prasad Kasibhatla, associate professor of environmental chemistry, has been appointed the Nicholas School’s first Associate Dean for International Programs. Kasibhatla will work with faculty, staff, alumni and the administration to create expanded opportunities abroad for Nicholas School students, as part of a campuswide initiative to increase Duke’s international presence.

Initial efforts will focus on enhancing the placement of Nicholas School students in internships, research projects and jobs abroad, and in launching an international version of the Duke Environmental Leadership (DEL) program. DEL offers an online Master of Environmental Management degree and continuing and executive education courses for professionals in the workforce.

Administrators are considering a number of locales for the initial launch of the international program; India looks to be a prime option, said Dean William L. Chameides, who earlier this year visited with a number of leading environmental programs at Indian universities with Kasibhatla.

“Prasad’s knowledge of international environmental issues, and his commitment to maintaining the highest ethical and professional standards in all that he does will serve the Nicholas School well as we move forward to meet new challenges and pursue new opportunities in the coming years,” Chameides said.

A Nicholas School faculty member since 1997, Kasibhatla is widely cited for his work to develop a fundamental and quantitative understanding of the factors that determine the chemical composition of the atmosphere. He is the author or co-author of more than 50 peer-reviewed papers, has served as co-convener or organizer of numerous international scientific conferences, and was a member of the 2002 National Academy of Sciences Committee in Air Emissions from Animal Feeding Operations.

He received a PhD and Master of Science degree from the University of Kentucky, and a Bachelor of Science in chemical engineering from the University of Bombay.
Norm Christensen and his wife, Portia, were in Haiti this summer with a small group from their church working in a health clinic in Port-au-Prince and an orphanage and school in a rural mountain village, Fondwa. With a few others, Norm visited La Visite and took this hike specifically to get a sense of the challenges to conservation and reforestation in Haiti. He and Portia continue to work with these communities. Norm is hoping to sponsor a field class to Haiti focused on ecological restoration and reforestation. This is his Journal from his hike.

The road, if it can be called such, from Auberge La Visite to the village of Furcy is a brutal and meandering 12 kilometers. Road cuts and dilapidated culverts suggest that, at some time in the past, it must have seen vehicle traffic. But today, it is passable only on foot or donkey.

Parc National La Visite is one of only two remaining intact tracts of primary forest in Haiti. At elevations of 2,000-2,600 meters (6,000-8,800 feet), its limestone soils support about 3,000 hectares of Hispaniola pine, one of many species found only on this island. In my six days traveling in Haiti, this is the only place where I have seen significant numbers of birds besides pigeons.

La Visite is one of the few remaining refuges for Haiti’s once remarkable biodiversity. It also is the only refuge for more than 1,000 desperately poor families, the poorest people I have encountered anywhere on this planet. Naked children with bloated tummies stand next to pine bark lean-tos and wave shyly to me as I walk through the forest. Their parents eke out the meanest existence from small gardens and, if they are fortunate, a few chickens.

The road descends abruptly out of the La Visite forests into a stark and treeless landscape that someone other than an ecologist might call beautiful or stunning (Figure 1). But it is bare red soil and erosion gullies that I see. A few very widely scattered, buttressed trees remind me that evergreen rainforest graced these hillsides less than 50 years ago. Here and there, poorly maintained terraces sprout a few tomatoes, patches of sugar cane and pathetically scrawny banana and mango trees.

I had been warned that this was a tough hike, and I am as prepared as REI and L.L. Bean will allow. My polypropylene shirt and pants effectively wick the sweat away from my body. I trudge along in my $200 Vasque boots, propping myself from time to time against $120 trekking poles.

This is a remote area, but I am by no means alone; people seem to be everywhere. Walking surely and swiftly, wispy little ladies wearing flip flops and carrying 12-liter plastic jugs of water on their heads greet me with a sing-song, “bonjour.” My arthritic feet are aching and my gait is staggered. An old man passing by asks me in broken English, “why you do this?” I am twice passed by groups of 20 or 30 people carrying the casket of a loved one, dancing their way to a cemetery, and singing beautiful hymns and laments a cappella (Figure 2).

There is a haze of smoke from wood- or charcoal-fired stoves in the half-dozen or more one-room, tin-roofed homes in every square kilometer (Figure 3). Goats are everywhere. Nannies are tethered to stakes and their several kids forage nearby. These remarkable herbivorous “machines” turn vegetation—including tree seedlings—otherwise inedible by people into the primary source of dietary protein for the residents of those homes. Haitians’ endless search for fuel wood and their omnipresent goats are major obstacles to nearly all attempts to reforest these hillsides. But, in truth, the challenge is more fundamental. Growing a tree is a profoundly optimistic act driven by a long-term vision. Here, numbing poverty has reduced optimism to thin hope and blinded any vision beyond the
About eight kilometers into my journey, I am joined by a boy, maybe 13 or 14 years old. He’s wearing a second-hand t-shirt, probably donated by one of the many church mission groups that form the backbone of Haiti’s economy. His pants... let’s just say that they will still fit him four or five years from now when he’s nearly a man. His shoes have no laces. I am now exhausted, and I know he could easily pass me by. But he walks at my pace, smiling, not talking, just hoping, I am guessing, that I might offer him a candy bar... something... anything.

I am emotionally exhausted by the ecological nightmare and human misery I have witnessed.

A week or two later, in the comfort of my study, I review the 200-plus photos stored from my Haiti trip in my digital camera. I open photo 148, and there he—let's call him Michael—is, rag-tag clothes, hopeful smile, and dollar bill in hand. Behind him lies a devastated landscape that he had no hand in creating. Before him lies an uncertain future (Figure 4).

The road from La Visite to Furcy is much like the span of global biodiversity conservation challenges—from those few and special places where we strive to conserve ecosystems that still function as they did in eons past, to devastated landscapes where we struggle to restore the most fundamental ecosystem functions and services. People, rich and poor, are everywhere on that road. Like it or not, the fate of that biological diversity is entirely in their hands. And, just as surely, their well-being and that of their children and grandchildren depend on the diversity and functioning of Earth’s ecosystems.

The wealthy on this road, those who can afford trekking poles and a comfortable study, must understand the connection between their consumption and the loss of biodiversity, and then act on that understanding. But, more than any other people, Michael and two billion other children like him will determine our success in meeting these biodiversity challenges, which is to say our success in sustaining ourselves. In the end, we will decide to destroy the last wilderness or cut the last tree not because of malice or greed, but because we will have lost hope and become blind to the future. Conservation strategies that do not align with efforts to improve the well-being and restore the vision of the world’s poorest people will be neither successful nor sustainable.

Norman L. Christensen is professor of ecology and founding dean of the Nicholas School.
Faculty and Student Presentations at 2008 ESA Annual Meeting Underscore Nicholas School’s Leadership in Forging a Sustainable Future

More than 45 faculty members, senior staff members and students from the Nicholas School and Nicholas Institute presented findings from new research at the annual meeting of the Ecological Society of America (ESA), the year’s most important ecological science conference, in August in Milwaukee, Wis.

Faculty, staff or students associated with the school and institute were listed as lead authors or co-authors on 22 presentations.

Norman L. Christensen Jr., professor of ecology and founding dean of the Nicholas School, is president of ESA.

“Having a major presence at the ESA conference is a measure of the Nicholas School’s international leadership in forging a sustainable future through strategic, multidisciplinary research, teaching and outreach,” he says. “It underscores our schoolwide commitment to marshalling our resources to help solve the world’s most critical environmental challenges.”

ESA is the world’s largest organization of ecologists, with more than 9,000 members. It is a nonpartisan, nonprofit organization founded in 1915 to promote ecological science by encouraging communication and collaboration among scientists, increasing public awareness of the field’s relevance, and ensuring the use of sound science in environmental decision making by enhancing communication between scientists and policymakers.

Below is a list of the 2008 presentations authored or co-authored by Nicholas School, Nicholas Institute or affiliated Duke University faculty and students:

• “Links Between Soil Microbial Metagenomics and Biogeochemical Functions in Afforested Grasslands in Southern South America,” by Sean T. Berthrong, Christopher W. Schadt and Robert B. Jackson;
• “Effects of the Non-native Invasive Microstegium vimineum on Nitrogen Cycling: Comparing N Cycling Between a Monoculture Invasive and a Diverse Community,” by Julie E. DeMeester and Daniel D. Richter;
• “Dispersal Dynamics and Neutral Theory in Amazonian Tree Communities,” by Kyle G. Dexter, John Terborgh and Cliff Cunningham;
• “Generalist Fungal Pathogens and Seedling Recruitment in a Temperate Mixed Hardwood Forest,” by Michelle H. Hersh, Rytas Vilgalys and James S. Clark;
• “Valuing Ecosystem Services from Wetlands Restoration in the Lower Mississippi Alluvial Valley,” by W. Aaron Jenkins, Brian C. Murray, Randall A. Kramer and Stephen P. Faulkner;
• “Evolution in Plant Populations Can Drive Ecological Changes in the Structure of Associated Arthropod Communities,” by Marc Johnson;
• “Using Transients to Understand the Processes Driving Viral Dynamics,” by Katia Koelle;
• “Four-decade Responses of Soil Trace Elements to an Agrading Old-field Forest: B, MN, ZN, Cu and Fe,” by Jian Wei Li, Daniel D. Richter, Arlene Mendoza and Paul Heine;
• “Simulating Future Forests: Process Uncertainty, Individual Differences and the Importance of Frailty to Predicting Forest Community Dynamics,” by Sean McMahon, James S. Clark, Pankaj K. Agarwal and Hai Yu;
• “Tree Growth Interference When the Point of Measurement Changes: Modeling Around Buttresses in Tropical Forests,” by Jessica E. Metcalf and James S. Clark;
• “Spatial Genetic Structure in Two Populations of Northern Red Oak (Quercus rubra): Implications for Seed and Pollen Movement and Demographic Processes,” by Emily V. Moran, James S. Clark and John Willis;
• “Linking Trace Gas Emissions and Hydrologic Variability in Coastal Plain Wetlands Under Contrasting Land Uses,” by Jennifer L. Morse, Marcelo Ardon and Emily S. Bernhardt;
• “Regulation of Carbon Metabolism in Two Cohorts of Pine Foliage Growing Under Elevated Carbon Dioxide,” by Catarina Moura and Robert B. Jackson;
• “Impact of Physical Disturbance, Grazing and Seasonal Flooding in a Typha-dominated Neotropical Wetland (Palo Verde National Park, Costa Rica),” by Michael J. Osland, Curtis J. Richardson and Eugenio Gonzalez;
• “Soil Type Mediates Soil Respiration Response to a Carbon Dioxide Gradient in Tallgrass Prairie,” by Andrew Proctor, Alexia W. Kelley, Philip A. Fay, Virginia L. Jin, H. Wayne Polley and Robert B. Jackson;
• “Learning in and with the Community: A Review of How Science Educators Connect Classroom and Community Learning,” by Julie A. Reynolds and Jennifer Ahern-Dodson;
• “Effects of Plant Functional Traits on Nitrous Oxide and Methane Emissions from a North Carolina Restored Wetland,” by Eileen Thomas, Ariana Sutton-Grier, Robert B. Jackson and Justin Wright;
• “Limitations of Current Sequence Data in Fungal Taxa Guilds,” by Rytas Vilgalys;
• “Linking Structure and Function: Consistent Shifts in Denitrifying Bacteria Communities in Polluted Urban Streams,” by Si-Yi Wang, Matthew D. Wallenstein, Emily S. Bernhardt and Justin Wright; and
• “Fast Versus Slow Succession in Eastern North America: Why Do Old Fields Persist in the North?” by Justin Wright.
Climate Change Legislation: What’s Next?

The U.S. Senate’s vote on June 6 to move forward with debate on the merits of the Boxer-Lieberman-Warner climate security act fell 12 votes shy of the 60 needed to proceed, but signaled growing support for climate change legislation in the coming year.

“From this vote emerged a clear leadership coalition that is interested in a solution to climate change,” says Nicholas Institute Director Tim Profeta. “Now, we need to roll up our sleeves and get it done in the next Congress.”

The Institute will continue to work with leaders from both sides of the aisle, Profeta says, to help draft legislation that will achieve critical environmental goals while minimizing adverse economic effects on consumers or industry.

The Boxer proposal provides a foundation for future debate, he believes, because it outlines the creation of a greenhouse gas market that would ensure an emissions reduction of nearly 70 percent by 2050, stimulate private investment in low-carbon technologies, and enact measures to assist the U.S. economy. Further work, however, is needed to address concerns about the cost of the legislation, the loss of U.S. competitiveness to China, and the right of state government to retain authority to address global warming.

“The Boxer proposal contains an emergency reserve of allowances that could be released in an economic ‘rainy day.’ That may hold the first glimmer of a solution to cost concerns,” Profeta says. “For other concerns, such as how to seize the advantages of this new paradigm for the manufacturing sector, new approaches must be devised.”

Analysis by the Nicholas Institute can help bridge the gaps, he says. He cites a May 2008 report, “Designing Offsets Policy for the U.S.,” by Lydia Olander, senior associate director for ecosystem services, as an example. The report offers a practical option for designing a nationwide greenhouse gas offsets policy that meets environmental goals without creating a process so onerous it discourages participation.

Author, Author

Two books by Nicholas Institute staff members are making waves in policy circles.

Natural Security: A Darwinian Approach to a Dangerous World, co-edited by Rafe Sagarin, associate director for ocean and coastal policy, applies lessons learned from evolutionary theory to mankind’s toughest security problems, such as global terrorism. The journal Nature called it “a stimulating read.” To learn more, go to ucpress.edu/books/pages/10738.php.

The Carbon Age, by senior associate Eric Roston, explores the pivotal role carbon has played throughout history, both as a building block of life and, now, as one of the greatest threats to it. Time magazine called the book “engaging” and said, “Roston makes clear in the book’s powerful conclusion the dire fate that awaits the Earth if we can’t kick our carbon habit.” To learn more, visit ericroston.com.
Taking on
The Most Vexing Issues of the Third World

Jeffrey Vincent Brings an Economist’s Perspective to the International Impacts of Tropical Forest Logging and ‘Brown Clouds’

By Monte Basgall

Jeffrey Vincent Photos by Les Todd/ Malaysia Photos on Page 22 and 23 Courtesy of Jeffrey Vincent
The scholarship of Jeffrey Vincent, the Nicholas School’s Clarence F. Korstian Professor of Forest Economics and Management, has taken on some of the most vexing issues of the developing world. Those range from his thorough analyses of the international impacts of tropical forest logging to a prize-winning assessment of how mega-polluting “brown clouds” are changing Asia’s climate and agriculture.

While gloom and doom might be the anticipated outcomes, some of his economics-oriented perspectives offer surprising glimmerings of hope. That’s especially the case for Malaysia, a current focus of interest where he finds a vigorous middle class is pushing sustainability and environmental ethics in the face of rapid growth.

The trim, peripatetic Vincent finds himself racking up high frequent-flier credits as he travels again and again to assess on-the-ground situations. “I joke with my students that I live in the U.S. but don’t really work here,” he said in an interview soon after returning from another such trip. “Aside from teaching, my research is abroad,” he added, dressed in tropical shirt and sandals for Durham’s own summer heat.

Relocating to Duke in 2007 after six years at the University of California at San Diego’s Graduate School of International Relations & Pacific Studies, he brings more than two decades of experience in the economics of natural resource management and policy in developing countries, with an emphasis on forests, agriculture and water in Asia.

He has led or participated in projects sponsored by international organizations that include the World Bank, the Asian Development Bank, USAID (United States Agency for International Development), the U.N. Commission for Sustainable Development, the U.N. Development Program and the U.N. Food and Agricultural Organization. Much of that work was done during 11 previous years at a Harvard University contract research organization that sent him to locales ranging from Malaysia to Kazakhstan, Romania and far eastern Russia.

Vincent arrived at Duke after an intellectual odyssey that began in Millbury, Ohio, the very small rural town where he grew up in the 1960s. “I long had an interest in the outdoors and did a lot of camping, hiking and canoeing,” he recalled. “But Ohio was also a state that was famous for pollution. The only business in my town besides farms was a landfill. My family’s own well got contaminated when I was growing up. So I also got interested in the environment.”

Additional interests quickly accumulated during his undergraduate years at Harvard: “developing countries” from his social anthropology major, and “the tropics” from his two-year job after graduation, which included botany field work in Costa Rica for one of his Harvard professors.

A seminar recommended by the same professor provided a life-changing experience for the young Vincent. That session was led by Malcolm Gillis, former dean of Duke’s Graduate School, who “talked about tropical forests and the causes of their problems and possible solutions,” Vincent said. “Gillis put things in an economic context that was very appealing to me,” he added. “My eyes opened up. I’d never thought about studying economics.”

He periodically has collaborated with Gillis during his professional
career, which was molded by his master's degree training at Michigan State University and his PhD research at the Yale School of Forestry & Environmental Studies. He began his stint at Michigan State focusing on forestry, but shifted toward economics. Yale solidified the change with an emphasis on international development.

He also became a visiting scientist at the University of Washington, where he assessed the international trade of forestry products. He joined a group developing a special model to help scholars trace “how forest policies in one country can have ripple effects around the world connected through international trade flows,” he recalled.

After Yale he became an assistant professor back at Michigan State but left there after three years to join Harvard's Institute for International Development, the contract research organization where he stayed for the next 11 years.

At Harvard “I ended up working on a huge range of issues,” he said. “There was water pollution, air pollution, macroeconomics, the environment, how countries measure their national wealth and how they can do that while taking into account environmental degradation and their use of national resources—something called green accounting.”

Interdisciplinary research by Vincent and five others on the economics of HIV and AIDS in southern Africa won the McKinsey Award for the most significant article published in the Harvard Business Review in 2003. “It was the first set of carefully done studies at a company level that looked at what the epidemic implies for companies’ bottom lines,” he said.

“We obtained information on the rates of infections within company work forces, and worked through the impacts on lost work days and additional costs for the companies’ benefits programs. I think that work was quite instrumental in convincing a number of companies in South Africa to start investing in AIDS prevention and treatment programs.”

In 2001 Vincent left his "absolutely crazy lifestyle" of contract work and returned to academe as a full professor at the University of California at San Diego. "I wanted to focus my research a bit more. My opportunities to teach had been pretty limited, and I have a family I like seeing more than I could when I was traveling three to six months of the year," he said.

During his time in California Vincent expanded his interdisciplinary work in Malaysia that had begun with his doctoral research in the 1980s. “I was fascinated by it as a country,” he recalled. “It had tropical timber, oil, soils rich enough to support the world’s biggest plantations of rubber and oil palm, and was the world's biggest producer of tin. It was a country that was growing quite rapidly..."
scientists led by UC-San Diego and funded by the UN. Vincent got involved after he joined UC-San Diego, becoming one of three authors of a report in the Proceedings of the National Academy of Sciences in 2006. That report won the Cozzarelli Prize as the best article in applied biological, agricultural and environmental sciences published in PNAS that year. It combined a statistical model of agricultural production with climate modeling to deduce that brown clouds and greenhouse gases have colluded to reduce rice harvests in India.

"One obvious thing these big dark clouds of pollution are doing is screening out sunlight and having some impact on temperature," he said. "Something that is less obvious is that this pollution might be having some impact on precipitation too. There's evidence that the monsoon has been weakening since the early 1960s. That led us to speculate that brown clouds have played a role in the slowing of agricultural growth in India that's occurred during the past two decades." The PNAS article concluded they had.

UC-San Diego's School of International Relations & Pacific Studies "was a really good fit for me professionally," Vincent said. "But the number of people working on environmental and natural resources issues at the school was quite small and didn't change in the six years I was there." So he was lured to Duke, where he was offered the Nicholas School's Korstian chair.

"The Nicholas School is very well established and it's a place that keeps growing," he said. "I felt I would have more people to interact with and bounce ideas around with than I had at San Diego. Duke also has created the Nicholas Institute, which is affiliated with the Nicholas School but a separate entity. That appealed to me, having this university-based policy research institute connecting to the real world."

Vincent brings to Duke a reverence for teaching that is equal to his zeal for research. "I particularly enjoy working with students at the masters level, those who intend to go out and try to make a difference," he says. "Whether that's by working in a government agency, for a non-profit, in the private sector or for an international organization, they want to try to make the world a better place."

He teaches masters level courses on environment and development economics, economics of forest resources and economic analysis of environmental policies.

He also is part of a scientific network that helps young economists in South Asia get grants and advice on their own environmental research projects. The network, SANDEE, is directed by Nicholas School PhD Priya Shyamsundar. "SANDEE complements my own teaching and research very well," Vincent said. "It's a way for me to learn directly from individuals who are from these countries and have a depth of understanding of problems I could never gain, not having grown up there."

"These are people who have a great desire to learn and are taking full advantage of the opportunities that the grants and advising provide. They have a tremendous thirst for knowledge and do some very high quality research as well. I hope I can use my position at Duke to help connect the university better to this and other environmental activities in developing countries."

Monte Basgall is senior science writer for Duke University News & Communications.
Getting Beyond Us and Them  By William L. Chameides

Global change is upon us. The global village is shrinking while environmental problems like climate change are growing. Pointing a finger of blame—at ourselves or other countries—won’t solve these problems. To achieve lasting solutions, we need international cooperation and leadership.

In response to this need, I recently have been meeting with university and government officials overseas to establish a Duke international professional masters program in environmental management. This August, I signed a memorandum of understanding with the Higher Colleges of Technology of the United Arab Emirates, and The Energy and Resources Institute in New Delhi, India, to collaborate on the establishment of this program.

What I have seen and learned on my travels convinces me that the time is right to forge this new educational alliance.

Among my recent destinations was China, not exactly your poster child for environmental stewardship. As we all learned from the extensive coverage leading up to the Beijing Olympics, air and water quality there are deplorable. The culprit: rapid economic expansion without adequate environmental controls.

The World Bank has reportedly estimated that some 750,000 people die prematurely in China each year due to air and water pollution. I say “reportedly” because the estimate, intended for a report called “The Cost of Pollution in China,” was, according to media accounts, removed after it was challenged by the Chinese government. Whether or not the number of deaths is as high as 750,000, it is clearly quite large. By comparison, a 2004 report in the Journal of the American Medical Association estimates that the number of pollution-related deaths in the United States is about 55,000. Taking population into account, these estimates suggest that you are three times more likely to die of pollution in China than in the United States.

As it turns out, the Chinese aren’t the only ones bearing the burden of their decidedly non-green economic growth. Observations now link air pollution in the western United States to factories and power plants in China. And China is on the verge of passing the United States for the dubious distinction of being the world’s largest source of greenhouse gas pollution. (The United States still remains the greatest contributor, by far, to the current burden of greenhouse pollution already in the atmosphere, and its emissions per capita are much larger than that of China.)

Defective toys from China also have been in the headlines. In 2007 there were 231 recalls of children’s products in the United States. Most of those products came from China and most of the recalls were because of lead contamination—often from lead paint.

All of this is unacceptable. However, before Americans adopt too much righteous indignation, it might behoove us to look a little deeper.

Have you ever wondered what’s causing China’s pollution? A significant part of it comes from the manufacture of products we consume right here in the United States. By some estimates as much as 25 percent of China’s greenhouse gas emissions arise from the production of exported products, and the United States is by far the top destination for these exports. So, who is ultimately responsible for China’s greenhouse gas pollution? Is it all the responsibility of the Chinese, or should some of it get assigned to the United States? Not so obvious is it?

And what about those contaminated toys from China? Absolutely unacceptable. But there is another side to this story as well. U.S. companies dump 100,000 tons, perhaps more, of electronic waste (e-waste) in China each year. This dumping continues to occur despite the fact that the Chinese government has banned imports of e-waste. Much of the e-waste is disposed of in ways that lead to high levels of toxic metals in the air, water, and soil. In the city of Guiyu in Guangdong Province, where much of the e-waste is “recycled,” up to 80 percent of the children have lead poisoning. Who is responsible for that lead poisoning? The irresponsible processors of the e-waste? Certainly. But what about the U.S. companies that dump the products there in the first place?

My point is not to paint either the United States or China as the bad guys. In a global economy, finger pointing is pointless. All of us—whether we live in the United States, China, India, the United Arab Emirates or any other nation—play a role in environmental problems. And we all need to be a part of the solution.

Lasting solutions start with populating the world with effective and committed environmental managers. This is the stock and trade of the Nicholas School. It is exemplified by the high caliber of graduates—hailing from dozens of countries—we send forth as environmental leaders each year, and by initiatives like our International Marine Conservation Program, which brings nearly 50 international undergraduate and graduate students to the Duke Marine Lab each summer to learn skills and knowledge they take back to their homelands to help solve environmental problems there.

The new Duke international professional masters program in environmental management will build on this foundation. It is another step forward in the Nicholas School’s continued evolution as a global leader in forging a sustainable future.

William L. Chameides is dean of the Nicholas School and professor of the environment.
Like a growing number of Nicholas School students, Gary Morris hopes to capitalize on the recent rise in demand for environmental managers in the corporate world. He's pursuing dual degrees — a Master of Environmental Management (MEM) from the Nicholas School and an MBA from Duke's Fuqua School of Business — to give himself a leg up in the job market when he graduates in 2010.

But he's aware that employers, hard-pressed by rising energy costs and concerns about climate change and sustainability, are looking for managers who bring more to the table than just first-rate academic pedigrees.

"Classroom learning is important," Morris says, "but you need to know how to apply what you've learned to real-life situations."

An intensive, hands-on course offered by the Nicholas School in Spring 2008 gave aspiring environmental managers like Morris an opportunity to hone those practical skills.

Students in the one-credit course, "ENV 301.06: Energy and the Campus," worked in teams to conduct applied energy cost analyses for clients in the local corporate and nonprofit communities. To complete the projects, they had to deal with the same kind of workplace challenges — incomplete data sets, unresponsive contractors, deadlines set in stone — faced by professional environmental managers. And they worked under similar economic and engineering constraints.

At the end of the semester, each team prepared a detailed report to share with the class, and a concise, clearly written two-page executive summary to present to the client.

"If there's one thing students learned in this class, it's how to take an open-ended problem in a limited amount of time with a limited amount of data and turn in a useful analysis," says Joe DeCarolis, an environmental scientist at the U.S. Environmental Protection Agency who has taught the course as an adjunct instructor three times since 2005.

"The idea," DeCarolis says, "was to push them to do things they might never have been called upon to do in class and ultimately help them develop the kind of real-life, problem-solving skills employers are looking for."

In past years, student projects were limited to Duke's campus (hence, the name of the course). But for 2008, DeCarolis expanded the scope by challenging his teams to conduct analyses for high-profile, off-campus clients.

Working for real, off-campus clients added a new sense of urgency and importance to the projects, says Morris, one of 11 MEM students who enrolled in the course.

"Knowing that a client will use what you're doing as a kind of first-line analysis motivates you to do the best work you can," he says. "It's not theoretical. You're producing a finished product for someone who is depending on you."

Student teams selected three projects to work on. Each presented unique challenges.

**New Chillers for a Historic Building**
A student team comprised of Morris, Julie Burlage, Nick Donowitz and Brandon Little chose to perform an engineering-economic analysis of replacement chiller technologies for the 14-story Legacy Tower in Downtown Durham.

The building, still widely known in the community as the NC Mutual Building, houses the home office of the North Carolina Mutual Life Insurance Company, one of the first minority-owned financial institutions in the nation. An architectural icon in the Durham community, the 220,000-square-foot property is managed by Greenfire Development.
Working with Greenfire’s construction manager, Joe Lemanski, the students assessed the pros and cons of four potential replacement chiller technologies for the 43-year-old landmark. They evaluated a basic, code-compliant electric chiller system; a high-efficiency electric chiller system; a geothermal system coupled with water-source heat pumps; and a solar-thermal system coupled with an absorption chiller.

“By analyzing the lifecycle costs, practicality and estimated cost-recovery time of each of the options, we were able to rule out ones that, for a variety of economic and engineering reasons, didn’t meet the client’s objectives,” Morris says. The team’s painstaking analysis showed that although the basic, code-compliant chiller offered the lowest upfront cost, the initial savings it provided would be lost to higher, long-term energy costs. The solar-thermal system could drastically cut energy consumption and costs, but would require a surface area six times larger than the physical footprint of the Legacy Tower building itself. The geothermal heat pump was feasible from an engineering standpoint, but not an economic one: Installing it would cost about $2.9 million and, by the students’ calculations, those high upfront costs would not be recoverable through energy savings in a reasonable time.

“In the end, the clear winner was the high-efficiency electric chiller,” Morris says. “Our analysis showed it offered nearly twice the energy savings as the basic system and was almost as efficient as the geothermal system, but with a payback period of close to one-and-a-half years.”

Lemanski was impressed with the thoroughness of the team’s work.

“I recently installed a geothermal heat pump at another Greenfire property and am interested in using green technologies whenever I can, but they have to make sense from an economic and engineering standpoint, too,” he says. “The students’ analysis showed that for this site, the high-efficiency electric chiller system would be nearly as efficient as at reducing energy costs and carbon emissions, for a much lower cost. They did good work.”

**A Carbon Offsets Catalog**

A second student team, comprised of Tim Chung, Amy Dao, Jill Logeman and Brent Wanner, collaborated with Eben Polk, a research associate at the Nicholas Institute for Environmental Policy Solutions, to develop a carbon offsets catalog for the nonprofit organization Clean Energy Durham. Clean Energy Durham works to promote energy savings and reduce greenhouse gas emissions at the neighborhood level. “One of our challenges,” says executive director Judy Kincaid, “is that many of the households in our community don’t have the income to purchase energy-efficient appliances. We rely on donors to fund purchases on their behalf.”

Kincaid says that the spreadsheet the students produced for her “does much more than I expected. It gives us the exact type of data we need to make our case to donors. It’s a critical tool without which we couldn’t move forward.”

**Indirect Energy Savings**

DeCarolis’ final team of students, David Palange, Denise Grubert and Carl
Chamberlin, chose to conduct an in-depth analysis of indirect energy and emissions savings, as well as cost recovery times, for lighting upgrades at Burt’s Bees, a Durham-based manufacturer of lip balms and other natural personal-care products.

The company recently upgraded to a high-efficiency lighting system at its distribution center in Morrisville, N.C., and it also plans to upgrade the lighting at its bulk manufacturing facility in Durham. Tom Fitz, vice president of sustainable engineering, calculated that switching to the new lights at both locations would save the company nearly $21,000 a year in energy costs.

His challenge for the Nicholas School team was to calculate the indirect savings or hidden costs the lighting would have on heating and cooling loads in the buildings. Lighting systems convert only a fraction of their electrical output into lighting; the rest is dissipated as heat. High-efficiency lighting systems give off less heat and require less cooling—but how this translates into overall energy savings depends on a complex interaction of environmental and engineering factors. Environmental managers typically use commercial building simulation models to predict how all the pluses and minuses will balance out. There was no way, however, that the students could develop and run such a sophisticated model over the course of one semester. So—like environmental managers do every day in the real world—they improvised.

Combing through the scientific literature, they found summarized results from an existing commercial building simulation model that provided them with rule-of-thumb estimates they could use to analyze the indirect energy savings at Burt’s Bees. By plugging the estimates into a cost-analysis spreadsheet, Palange, Grubert and Chamberlin calculated that Burt’s Bees will save an extra 19 percent a year in reduced cooling costs. Even with modest projected increases in winter heating loads, the overall annual indirect savings for the company will total about $3,000.

The team identified other savings as well. The new lighting will reduce the company’s carbon dioxide emissions by nearly 500,000 pounds a year. And its financial reward for installing the lights will come sooner than expected. When indirect energy savings are entered into the equation, Burt’s Bees’ return on investment increases from 24 percent to 27 percent, and its simple payback period decreases by half a year, from 4.2 years to 3.6.

“This was a terrific collaboration,” says Fitz. “It benefitted us as much as I hope it benefitted the students.”

A Big Pay-off

Meeting the demands of their projects frequently meant late nights and long hours for the 11 students, who collectively put nearly 350 hours into the course in addition to carrying a full load of other graduate-level classes. But like the clients they worked for, the students say they expect to see a return on their investment.

“This course teaches you things you couldn’t pick up in a traditional class, like dealing with contractors who aren’t necessarily interested in working with you,” Morriss says. “That’s a big problem in any management situation.”

“I want to go into consulting, and this project taught me how you need to juggle between the way you’d like to do a project ideally, and how you have to do it to meet deadlines,” says Wanner.

“Learning to deal with data gaps was useful,” adds Dao. “I’m still uncertain about my career goal but I’m interested in working on ways to calculate carbon footprints. Data gaps are something I’ll have to deal with every day.”

Regardless of whether the students’ career paths take them to a top-floor corporate office or the ground floor of a grassroots organization or entrepreneurial startup, “knowing how to deal with these sorts of issues is going to make them better environmental managers,” DeCarolis says. “Working on a project for a real client, and knowing you’ve applied your expertise to help make a real difference in the local community, drives lessons home better than any textbook can.”

Tim Lucas is the Nicholas School’s national media relations and marketing specialist.
A Bumper Crop of Benefits:
MEM Student Amy Calhoun Offers Fellow Students Healthy Fare and a Chance to Support Internships
by Candice Mitchell

Photos by Jared Lazarus
Master of Environmental Management (MEM) student Amy Calhoun started selling locally grown organic fruits and vegetables in the lobby of Hug Commons in 2007 for two simple reasons. “I wanted to support local agriculture, and give students access to healthier produce on a student’s budget,” she says. “Organic produce is not readily available in Durham, and when it is available it’s expensive.” (Hug Commons is in the Levine Science Research Center at Duke, main home of the Nicholas School.)

Calhoun’s weekly sales of squash, kale, onions, sweet potatoes and other delectable edibles achieved her aims—and more. Proceeds from her makeshift farmer’s market also helped support educational opportunities for her fellow students through the Nicholas School’s Environmental Internship Fund (EIF).

EIF is a student-led initiative that raises money to help support underfunded or unfunded internships. This year, it awarded $8,000 to five MEM students.

“EIF is a wonderful way for students to help other students, while developing their own entrepreneurial and managerial skills,” says Karen Kirchof, assistant dean of career services. Students develop and implement all EIF fundraising activities, from brainstorming the ideas to promoting and staffing them. Few of the ideas have been as fresh, or as fruitful, as Calhoun’s.

“Amy’s produce sales have been well received by students, faculty and staff alike,” Kirchof says. “She’s made it convenient for us to buy local organic produce without having to drive across town to find it.”

Calhoun is pursuing an MEM degree in environmental economics and policy. Opening the produce stand, she says, was a way to meld her entrepreneurial instincts with her passion for organic farming and local agriculture.

“I looked around and saw it wasn’t out there, so I created an opportunity,” she says. “It’s fun to be engaged and know that what you’re doing helps other students as well as supporting the farmer down the road who grew your food.”

Candice Mitchell, a May 2008 graduate of North Carolina Central University, was the Nicholas School’s summer communications intern.
Nicholas School student **Lorna Wright** spent the last two summers crisscrossing the 7,000-acre Duke Forest in search of plants that, frankly, she’d rather not find.

Wright is pursuing dual Master of Environmental Management (MEM) and Master of Forestry (MF) degrees. For her masters project, she’s used global positioning system (GPS) technology to document the location of invasive plants in Duke Forest, and she’s developing a management plan to control them.

“Invasive plants take over and destroy areas native plants need to survive,” she says. With her project, she hopes to “assist the natural ecosystem in persisting.”

Wright worked at Duke Forest as part of a summer internship program coordinated through the Nicholas School’s Office of Career Services. Each summer, dozens of students take advantage of the program to gain hands-on skills and practical experience working at government agencies, corporations, environmental nonprofits and research institutions worldwide. This summer, internships were offered in 14 states, the District of Columbia, Indonesia, India, Mexico, Bolivia, El Salvador, South Africa, Barbados, Tanzania, Burkina Faso, Belize and the United Arab Emirates. Students often use their internships as the basis for their masters projects.

Like many of her classmates, Wright wanted her internships and masters project to be something with practical applications. “I didn’t want to do a project that would sit on the shelf,” she says. “I wanted it to be used to help clients.”

A mass e-mail from Duke Forest Resource Manager **Judson Edeburn**, asking for student volunteers to document the location and spread of invasive plants in the forest, sparked her interest. Although it was a monumental undertaking that would require months of hard work, its potential benefits—to the Duke Forest ecosystem and to her intended future career as an environmental manager in land conservation—were obvious. She eagerly signed on.

“Being able to identify and document the coordinates of plants with the GPS unit is very useful in developing practical experience for writing any management plan,” she says.

The invasive plants Wright has documented in the forest include three of the worst thugs in the Southern landscape: Japanese stiltgrass (**Microstegium vimineum**), Japanese honeysuckle (**Lonicera japonica**), and Chinese privet (**Ligustrum sinense**).

“These plants tend to form dense thickets that push out and exclude native plants,” Wright says. “They tend to invade areas that have been disturbed. An area that has been recently harvested or cleared, for instance, can be quickly taken over by these weeds, inhibiting the natural succession and growth of slower growing, desirable species such as the loblolly pine.”

The project has involved countless hours of tedious, sweaty fieldwork and painstaking analysis in the lab, but the payoff promises to be great.

“I am hoping that the methodology I’ve developed can be used not only by Duke Forest but also by other organizations as they manage their invasive plants,” she says.

Wright received her bachelor of science degree in biology from the University of Rochester in 1999. After spending a year abroad studying ecology and conservation biology in Australia, and doing a volunteer stint with Nature Conservancy in her hometown, Rochester, N.Y., she realized her true passion was developing management plans for nonprofit land trusts.

She’s grateful for the hands-on experience her summer internships at the Duke Forest have given her, especially what she’s learned about the skills needed to develop a management plan from the ground up.

“Internships like this teach you things you wouldn’t learn in the classroom, and instill a greater respect for the challenges of environmental fieldwork,” she says. “It made me aware of the technical and physical skills and knowledge necessary to be successful.”

Candice Mitchell, a May 2008 graduate of North Carolina Central University, was the Nicholas School’s summer communications intern.
In Print
Recent publications by Nicholas School faculty and staff

Richard T. Di Giulio, professor of environmental toxicology

Robert B. Jackson, Nicholas Professor of Global Environmental Change and professor of biology
- "Fine Root Dynamics in a Loblolly Pine Forest are Influenced by Free-Air-CO₂-Enrichment (FACE); a Six Year Minirhizotron Study," Global Change Biology, 2008 (coauthor w/R. Oren et al.)
- "Environmental Justice Implications of Reduced Reporting Requirements of the Toxics Release Inventory Burden Reduction Rule," Environmental Science and Technology, 2008 (lead author w/M. A. O’verstreet Galeano, E. Tassone et al.)
- "Olevi Kull’s Lifetime Contribution to Ecology," Global Change Biology, 2008 (coauthor)

Curtis J. Richardson, professor of resource ecology

Kenneth H. Reckhow, professor of water resources

Ram Oren, professor of ecology
- "Olevi Kull’s Lifetime Contribution to Ecology," Tree Physiology, 2008 (lead author)
- "M icorrhizal and Rhizomorph Dynamics in a Loblolly Pine Forest during Five Years of Free-Air CO₂-enrichment (FACE)," Global Change Biology, 2008 (coauthor)

Lydia Olander, senior associate director, Nicholas Institute for Environmental Policy Solutions

Marie Lynn Miranda, associate professor of environmental sciences & policy

Peter G. McCornick, director of water policy, Nicholas Institute for Environmental Policy Solutions
Raphael D. Sagarin, assistant research professor, Nicholas School, and associate director for ocean coastal policy, Nicholas Institute for Environmental Policy Solutions
- “Remembering the Gulf: Changes to the Marine Ecology of the Sea of Cortez since the Steinbeck and Ricketts expedition of 1940,” Frontiers in Ecology and the Environment Online, 2008 (lead author)
- “Linking PBDEs in House Duct to Consumer Products Using X-Ray Fluorescence (XRF),” Environmental Science & Technology, 2008 (coauthor)
- “Photo Degradation of Decabromodiphenyl Ether (BDE 209) in House Dust by Natural Sunlight,” Environmental Chemistry & Toxicology, 2008 (lead author)
- “Population Structure of Striped Bass,” Environmental Science & Technology, 2008 (coauthor w/A. Ehrlich)

Jonathan B. Wiener, Perkins Professor of Law and professor of environmental policy
- “Climate Change Policy, and Policy Change in China,” UCLA Law Review, July 2008 (author)

M artin D . Smith, associate professor

Jim E. Salzman, Samuel F. Morsecai Professor of Law and Nicholas Institute Professor of Environmental Policy

Heather Stapleton, assistant professor of environmental science
- “Serum PBDE Levels in Occupationally Exposed Individuals in the United States,” Environmental Science & Technology, 2008 (lead author)

Memberships, Appointments and Awards
A associate Professor of Environmental Toxicology Richard T. Di Giulio was appointed associate editor for Environmental Health Perspectives in January. EHP is a monthly journal of peer-reviewed research and news on the impact of the environment on human health and is published by the National Institute of Environmental Health Sciences.

Judson Edeburn was named a Fellow in the Society of American Foresters. SAF honors those members who have provided outstanding contributions to the Society and to the forestry profession with the title of Fellow. SAF is the national scientific and educational organization representing the forestry profession in the United States. Edeburn has been active as a member since 1972 and has managed the Duke Forest for 30 years. He was honored with a plaque during a ceremony at the N.C. Division meeting held in June.

Bill Holman, director of state policy in the Nicholas Institute for Environmental Policy Solutions has been appointed by N.C. Senator Marc Basnight to the State Water Infrastructure Commission (SWIC). Members of the SWIC elected him to a one-year term as chairman. In May, the Raleigh City Council established a Water Conservation Advisory Council and appointed Holman.

Martin D. Smith, associate professor, was appointed to a two-year term on the Science and Statistical Committee of the Mid-Atlantic Fishery Management Council. MAFMC is one of eight regional fishery management councils that were established to serve as planning units to carry out provisions of the Magnuson-Stevens Fishery Conservation and Management Act of 1976.

Jonathan B. Wiener, Perkins Professor of Law and professor of environmental policy, was elected in December 2006 to serve as 2008 president of the Society for Risk Analysis (SRA). When his term ends in December, he will remain as past-president for 2009. SRA is a multidisciplinary, interdisciplinary, scholarly, international society that provides an open forum for all those who are interested in risk analysis.

Grants
Grants of $100,000 or more awarded to faculty in the past six months

Joseph Bonaventura, research professor of cell biology, VaxDesign Corp., $358,974, “SNO on the Go: Rapid Altitude Acclimation through Aids to Oxygen Delivery to Tissues.”


James S. Clark, H.L. Blomquist, Professor of Environment, Woods Hole Research Center, $654,845, “Effects of Warming on Tree Species Recruitment in Deciduous Forests of the Eastern United States.”

Duke Environmental Leadership Program (DEL), Nuclear Regulatory Commission, $800,000, “Customized National Environmental Policy Act Training.”


Lydia Olander, senior associate director, Nicholas Institute for Environmental Policy Solutions, Linden Trust Conservation, $502,503, “Mitigation Beyond the Cap.”

Timothy H. Profeta, Director, Nicholas Institute for Environmental Policy Solutions, State of Utah, $305,000, Utah Climate Change Project.


Curtis J. Richardson, professor of resource ecology, National Science Foundation, $930,000, “Exploration of the Mechanistic Basis and Biogeochemical Implications of Differential Nutrient Limitation Among Trophic Levels”; Environmental Protection Agency, $598,100, “Ecological Impacts from the Interactions of Climate Change, Land Use Change and Invasive Species.”

Daniel Rittschof, professor of zoology, Office of Naval Research, $301,157, “Use of Genetic Lines of Barnacles and Foul Release Polymer Coatings, Components and Catalysts to Study Properties and Polymerization Chemistry of Barnacle Bioadhesive.”

Thomas F. Schultz, director, Marine Conservation Molecular Facility, NC Biotechnology Center, $236,800, “Core Facility for Genetic and Genomic Approaches to Marine Conservation.”

Heather Stapleton, assistant professor of environmental science, NIEHS, $2,188,531, “Children’s Exposure to Brominated Flame Retardants: Effects on Thyroid Hormone Regulation”; NIH, $260,000, “Human Exposure to PBDEs.”

John W. Terborgh, National Science Foundation, $400,000, “From Fruit to Sapling: Constructing a Long-term, Basin-wide, Community-level, Ontogenetically and Phenomenologically Integrated Picture of Tree Recruitment in Western Amazonian Lowland Rainforests.”

—Compiled by Donna Sell, Nicholas School communications assistant.
Mandy Schmitt, MEM’05, has her work cut out for her. She is the sustainability director for the City of Atlanta, the poster child for runaway sprawl. Just how does someone go about greening a city that has grown outward and into one of the country’s smoggiest cities with the worst commutes? In short, by starting small, aiming big and focusing on the center of government.

“A lot of things that the city does impacts how people get around—transportation, housing,” says Schmitt. “But my focus is not that. My focus is about building the foundation so the city gets its house in order first. Then we can go out and support initiatives in the community.”

The first item on Schmitt’s greening agenda frequently tops any sustainability to-do list: grabbing the low-hanging fruit of efficiency. Schmitt says Atlanta’s best opportunities to tackle inefficiencies lie in the city’s 300 buildings.

“Many of those buildings are quite old,” says Schmitt. “So we’re looking at projects to improve the insulation in the buildings, to make sure all the systems are working properly and are upgraded, to replace the windows, to ensure that all of our lighting is as efficient as it can possibly be … to retrofit plumbing and piping to decrease energy use.”

The list goes on. The idea is to implement projects that cross all departments and address key issues of water, energy, and air. This foundation will enable the city to go after cooler, more innovative projects that cities like Portland, Boston and New York are already implementing.

“But until we get our buildings to be efficient, it makes no sense to put a solar panel on our roof,” says Schmitt.

Schmitt’s Sustainability Roots Trace Back to Duke

Efficiency and innovation were two hallmarks of Schmitt’s time at Duke. She was a force in creating both the Master of Environmental Management Energy and Environment concentration and the Duke University Greening Initiative (DUGI). DUGI, the brainchild of Michael Vitarelli, Justin Siegel, and Schmitt launched with a doozie of an idea: persuading the university to ensure all new buildings would be “green.” Spurred by the mentorship of former Nicholas School Board of Visitors’ Chairman Simon Rich, the students took their brainstorm to Duke’s Executive Vice President Tallman Trask. “He said yes without blinking an eye,” says Schmitt. “And he challenged us to take a more aggressive look.”

A quick survey of the Duke campus shows DUGI’s enduring influence: recycling, bike racks, low-flow showerheads and LEED-certified buildings, to name just a few. In fact, the university’s commitment to sustainability earned it the #5 spot on Sierra Club’s November 2007 rankings of the “greenest schools.”

Another lasting effect of DUGI’s founders is a sustainability coordinator. The group suggested the university add the position. In 2004 Duke hired its first coordinator to helm its efforts, much like Schmitt does today for Atlanta.

Creating the Energy Needed

In 2002 the Nicholas School introduced
a new short course: “Energy and the Environment” taught by Simon Rich, former CEO of Louis Dreyfus Natural Gas. For Schmitt, this class filled a knowledge gap and marked what might be described as the beginning of a partnership with Rich and a small group of students who pushed for broadening the energy offerings in the school.

Working with Schmitt and Lena Hansen MEM ’04, Rich organized a global conference convening the world’s major energy players to discuss the new paradigm. This effort would lead to the group pushing for the school to find more funding for energy studies and for the evolution of a full-fledged master’s program.

The school first initiated an energy certificate program lead by Lincoln Pratson, associate professor of sedimentary geology, which was funded through the generosity of a $2.15 million gift in 2005 from Jeffrey and Martha Gendell of Greenwich, Conn. The Gendells’ gift, which totaled $2.9 million when matching funds were included, supported an expanded curriculum in energy studies at the Nicholas School, and endowed two new full-time faculty positions in the school’s Energy and Environment program. Along with an energy research fund, the money also paid for a speakers’ series, a visiting executives program and a general fund to support energy innovation.

“The Gendell’s endowment was the cornerstone for creating a sustainable EM concentration,” says Schmitt. Her introduction to energy at Duke has paid off for Schmitt, providing essential knowledge needed for her career. “Energy more than any other resource issue, including water, underpins today’s major public policy issues,” says Schmitt.

Greening the South From Durham to Atlanta
Schmitt, a Georgia native, worked on a number of greening initiatives in Atlanta before joining city government. In fact it was her first big greening opportunity that lured her back to the Peach State. While still at Duke, Schmitt took on a project with developer Ray Weeks to develop a macrotrends analysis of the Atlanta metro area to help determine what initiatives could improve it.

That work led to a consulting position on the Atlanta Beltline, a 25-year, $3-billion greening project that aims, among other things, to transform the city’s transportation system and spur economic development.

Tina Arbes, the Beltline’s Chief Operating Officer, credits Schmitt with helping lay a solid foundation for the nation’s largest redevelopment project. “She created a healthy and credible relationship with some key funders early on,” says Arbes. “She recognized the importance of public awareness … and was creative in how to build interest. … The staff positions she recruited are among the strongest we have today.”

From the Beltline, Schmitt joined Atlanta Mayor Shirley Franklin’s team tasked with putting Atlanta on a more sustainable path. Looking at what made 40 of the greenest cities in North America sustainable, Schmitt and seven other consultants created a master plan for the city.
Schmitt on Recycling

“Recycling seems like one of those things that we started to do in 1970 that should just be part of common business practice now. But it’s not, because recycling is highly based on the local market and what it demands.

We in the South haven’t had the price pressure that other places have had, so recycling rates in the South have always been very low.

In Georgia, for instance, we have so much land that using landfills has been inexpensive, until recently. Now that landfills are getting more expensive, recycling is looking like an attractive option.

Plus, there’s a growing need for recycled materials. Major corporations such as Coca Cola and Interface and other carpet companies up in Dalton need plastic bottles to make their carpets and Coke bottles. That incentive has been helpful to increase our recycling rates.

We here at the city also are working with a local company named Pratt, which is helping us improve our recycling. They take paper and make it into 100 percent post-consumer recycled paper. They’re providing us with the resources to do the recycling, and then they take it and turn it back into the product, so it’s a real win-win.”

Guiding Atlanta Into the Vanguard of Sustainability

Schmitt is helping Atlanta sync up with its motto “resurgens” (Latin for “rise again”). As in 1887 when the city rebuilt from the ashes of General Sherman’s fiery march, the Southeast’s largest city is resurging, reaching for the brass ring of green stature.

In February of 2008, Mayor Franklin acted on one of her green team’s recommendations: hiring someone to helm the city’s sustainability efforts. Green is now prominently on the radar.

“I think we’re seeing the commitment from Mayor Shirley Franklin and her administration to reach out to developers to try to develop a more sustainable community here in Atlanta,” says Jim Jacoby whose group, Jacoby Development Inc., transformed an old steel mill into Atlantic Station, the country’s largest green corporate campus.

There’s a lot of work to be done between now and 2010 when Schmitt’s tenure as the sustainability director is up—not the least of which is to rack up enough savings to fund a full-time position. (Schmitt is currently a loaned executive.) But if the past is any indication, Schmitt will cover a great deal of green ground—which will provide the other kind of green to fund it.

Stacked up against green cities like Portland, Boston, and Chicago, Atlanta gets about a “C,” Schmitt says.

“The first tier of activities that we’re going after will get Atlanta to a strong ‘B,’” says Schmitt, “but getting to where the Portlands and Seattles of the world are is going to take a lot of effort. They’ve been at this game for at least 10 years, much longer than we have, and it’s also a different ethic out there.”

But Atlanta is headed in the right direction.

Greening its building will address some 60 percent of greenhouse gas pollution, air pollution, storm runoff, water use, and energy use. Installing green roofs like the demonstration one on City Hall can help reduce the heat-island effect, prevent storm-water runoff and provide a good working space for employees. Boosting its recycling efforts will reduce waste (see sidebar).

Working in partnership with the Beltline will help address transportation issues.

“It’s a good time to be working on this,” says Schmitt. “2008 is very different from even what 2007 was. We’ve got a lot of low-hanging fruit, which is good because we’ll make a lot of progress quickly and I think we’ll be catching up.”

Erica Rowell is the Nicholas School’s online managing editor and is responsible for Dean Chameides’s blog, TheGreenGrok.com. She is based in New York City.
The Nicholas School Alumni Association has recognized two alumni with 2008 awards for exceptional achievement.

**Judson Edeburn**, a 1972 School of Forestry graduate, received the 2008 Ralston Distinguished Alumni Award, the highest honor given by the Alumni Association. The award is presented to alumni who have distinguished themselves through contributions made in their own fields of work, in service to the Nicholas School or toward the betterment of humanity.

Edeburn has guided the stewardship of the Duke Forest for three decades. He became the forest’s resource manager in 1978, and still holds that position today.

In managing the Duke Forest as an outdoor teaching and research laboratory for faculty and students, Edeburn enjoys the many responsibilities that are part of tending this diverse ecosystem. “We maintain the forest, from upkeep of the roads and trails, to managing timber and keeping maps and records. We help researchers locate and prepare sites for their projects, and guide students to places for laboratory exercises and research. And because the forest is open to the public for recreation, we manage that use as well. The variety of activities in my work is especially refreshing: One morning I might be working in the forest, and in the afternoon attend a meeting in the vice president’s office.”

Edeburn says the most rewarding part of his job has been the people he has worked with over the years—especially the students. As a field course teacher, research facilitator, and faculty representative for the student chapter of the Society of American Foresters (SAF) for 25 years, Edeburn has gotten to know hundreds of students—and he still keeps in touch with many. He is the revered barbecue pit master for the Nicholas School’s annual spring Field Day, where he leads forestry games such as cross-cut sawing.

In addition to managing the forest, Edeburn is active in the SAF and has served as an officer in a number of capacities. This year, he was named a Fellow in the SAF. He also serves on advisory committees and working groups for several local community organizations that share conservation interests with the Duke Forest.

Edeburn, who came to Duke after his undergraduate days at Marshall University, says “Duke taught me to think, and where to go to find answers for myself. It taught me not to hesitate to ask questions to learn what I need to do my job.”

Edeburn says it was “quite an honor” to be recognized with the Ralston Distinguished Alumni Award, particularly because it was co-presented by a former student, Brian McDonald, now an International Paper executive. “There are so many alumni who have contributed substantially to making the world a better place, so to be singled out among the thousands of alumni of the school is very flattering.”

**Joseph E. Aldy** received the 2008 Rising Star Alumni Award, which recognizes exceptional achievement by young alumni who have distinguished themselves through contributions in their own fields of work, in service to the Nicholas School or toward the betterment of humanity.

Aldy, a 1995 graduate, is a fellow at Resources for the Future (RFF), a nonpartisan think tank in Washington, D.C. His research focuses on climate policy, mortality risk valuation, and energy policy.

As part of his work at RFF, Aldy co-directs the Harvard Project on International Climate Agreements, which brings together scholars from around the world to evaluate questions raised in the discussion of international climate policy and to help inform the design of the successor to the Kyoto Protocol.
Recent Nicholas School graduate Michael Stringer DEL-M EM '08 is using a new Web site he created, velocommuter.org, to help fight global warming by encouraging people to leave their cars at home and bike to work—if only for a day.

“Biking benefits everyone,” says Stringer, who bikes to and from his workplace in Ashland, Ore., each day. “It’s a win-win proposition. Even if we all only did it once, it would make a difference. And if everyone did it one day a week, it could remove hundreds of thousands of pounds of carbon dioxide from our atmosphere annually, and help us shed excess pounds of body fat, too.”

Stop-and-go urban commuting, typical of what’s found in most metropolitan areas nationwide, is a major source of greenhouse gas emissions. Stringer’s goal is for Americans to keep one million pounds of carbon dioxide out of the atmosphere by biking to work instead. Currently, he estimates that people who have taken part in his Web-based initiative have reduced their collective carbon output by 176,807 pounds.

Stringer received a Duke Environmental Leadership Master of Environmental Management (DEL-M EM) degree from the Nicholas School this May. The DEL-M EM is a two-year, 30-credit program that emphasizes interdisciplinary and global themes, strategic approaches to environmental management, communication and effective leadership. Coursework is completed through a combination of weeklong place-based sessions and online learning.

Stringer says his experience as a DEL student helped inspire him to launch the Velocommuter Web site.

“I was already interested in social marketing and Web design, and the DEL coursework helped me refine the idea, define the mission statement, and identify the target audiences and most effective messages for a Web site promoting bicycling as a viable commuting alternative,” he says.

“Velo” is the French word for bicycle. Stringer coined the term “velocommuter” because he thought it sounded cooler than “bike commuter” and would appeal to his 18- to 22-year-old target audience.

“Biking,” he says, “is a viable source of transportation. It’s not only clean and green, but also sexy and cool. I wanted a term that reflected that.”

On the Velocommuter Web site, people can pledge to bike to work every day, some days, or only once. An online calculator provides immediate positive feedback by telling them how many pounds of carbon dioxide they will keep out of the atmosphere, based on the distance they commute.
Are you IN yet?

by Jeremy Schreifels MEM’99

Did you know that the Nicholas School of the Environment has our own group on LinkedIn— a popular and free professional networking site? The group was established as a way for alumni, faculty, and staff to connect and stay in touch with one another, discover new contacts within the group and beyond, and aid in exploring career opportunities.

During my time at the Nicholas School I learned the value of a strong alumni network—my internship came through an alumnus. That network, however, is only helpful if you know who is an alumnus, where they are (and where they’ve been), and how to reach them. That’s one of the reasons I am grateful that Career Services has done much of the data collection and organization work for the Alumni Career Network. Now if only I could remember that username and password!*

LinkedIn expands our opportunity to access the vast network of people, e.g. faculty and staff, connected to the Nicholas School. After a little pressure from some colleagues to join LinkedIn, I put up my profile and invited some friends to “join my network.” It wasn’t long before long-lost friends and former colleagues found me and we reconnected (on- and off-line). I even received some amazing job offers as a result. Quickly recognizing the value of LinkedIn, I established our group making it easier for us all to link up with other members of the Nicholas School community and the thousands of professional contacts available through their extended networks.

If that’s not incentive enough, when you join the group you receive a small badge on your profile (you can hide it to non-members if you prefer) identifying you as a proud member of the Nicholas School group. Thinking of a career change or just curious about the environmental job market? As a member you can elect to receive exclusive job notifications seeking experienced environmental professionals from Karen Kirchof, assistant dean for career services and LinkedIn NSOE group manager. Whether you already use LinkedIn or not, you can join the NSOE group (see note at the bottom of this page). I hope to see you in the group.

*(Can’t remember the password for the Alumni Career Network? Contact Thelma Jernigan at tejernig@duke.edu.)

Jeremy Schreifels is Senior Policy Analyst (Climate and Air Policy), U.S. EPA

Ready to join? For instructions go to: nicholas.duke.edu/career/alumni

Candice Mitchell, a May 2008 graduate of North Carolina Central University, was the Nicholas School’s summer communications intern.

The Web site— which uses the motto, “Cure your commute, ride a bike”— also includes sections on the health, environmental and economic benefits of biking; guides for biking safety and bike maintenance; information on how to pick the perfect bike for you; and inspirational news nuggets to keep you biking once you’ve started.

“Whether you already love to bike, or are just curious and want to learn more, the Web site is designed to be very welcoming and informative,” Stringer says.

Stringer currently provides all monetary support for the Web site. In the future, he says, he plans to work with other social-minded organizations and individuals to co-brand Velocommuter and help defray the costs of its operation.

For more information about the DEL program, go to www.nicholas.duke.edu/del, or contact the program administrators at (919) 613-8082 or del@nicholas.duke.edu.
Peter Etnoyer T’88, MEM’01 received the prestigious National Oceanic and Atmospheric Administration (NOAA) David S. Johnson Award, which recognizes young scientists for their innovative use of environmental satellite data. He is a graduate research associate at the Harte Research Institute for Gulf of Mexico Studies, part of Texas A&M University- Corpus Christi. Pete was cited for his use of Earth observation satellite applications to characterize and identify important pelagic (open ocean) habitats for endangered marine species in the North Pacific. He used two instruments aboard polar orbiting satellites to track blue whales and sea turtles, and found prolonged residence times along subtle temperature gradients, or fronts, far offshore. Go to www.harteresearchinstitute.org.

Susan McCarthy Herz MEM’95 and Raphael Herz MEM’96 live in Natick, Mass., with their boys—Jacob (active swimmer, diver, and all-around four-year-old athlete who can hold his breath underwater for 20 seconds!) and Tobias (16 months and practicing running). Raphael, after a 10-year stint with Massachusetts’ renewable energy agency, now manages renewable energy development activities in the Northeast states for Johnson Controls Inc. Susan works at ESS Group Inc. nearly full-time, managing environmental assessments and regulatory permitting for several underwater electric cable and offshore wind energy projects. Check in with them if your travels bring you near Boston!

Michael Dunn, MEM’97, and his wife, Theresa, of Indianapolis, welcomed their second daughter, Anna Theresa Dunn, on June 13. Anna joins big sister, Mary Michael Dunn.

Anish A. Joshi, Esq., MEM/MBA’97 received the 2007 General Practitioner of the Year Award from the New Jersey State Bar Association of Lawyers. Anish has operated his solo law practice in New Brunswick, N.J., for the past five years.

Cynthia F. Van Der Wiele, Ph.D., MEM/MF’98 Senior environmental scientist at KCI Associates of North Carolina, P.A., has been appointed as chair of the Research Committee of the American Orchid Society Inc. The American Orchid Society established a Research Committee in 1951 to assist and stimulate research on orchids. Since then nearly 200 grants and fellowships totaling more than $1.1 million have been provided to worthy students and scientists.


Will Forney MEM’99 accepted a new job as an environmental geographer at U.S. Geological Survey in Menlo Park, Calif. Anyone wishing to catch up with him can e-mail wforney@usgs.gov.

Staying on Top of Your Field
The Duke Environmental Leadership (DEL) Program serves as the continuing education arm of the Nicholas School, providing unique opportunities for environmental professionals to hone their environmental management skills and stay on top of new developments in the field. Professional development opportunities are available through both our Continuing and Executive Education Program and the DEL-Master of Environmental Management (MEM) Degree Program.

The DEL-MEM Program offers a first-of-its kind degree program for professionals with a minimum of five years environmental experience. The DEL-MEM Program is an online Master’s Program integrated with space-based sessions, leadership development, and interdisciplinary and global themes.

Upcoming Executive Education Short Courses*
(nicholas.duke.edu/del/continuinged/)
Nov. 12-14
Current and Emerging Issues in NEPA**

Jan. 28-30
Considering Greenhouse Gas Emissions and Climate Change Under NEPA**
Valeria Orozco MEM’03 received her MBA from the University of Chapel Hill Kenan-Flagler Business School in May 2008 during which she completed an academic exchange at the Indian School of Business in Hyderabad, India. Since graduation, she has joined Kinetix LLC, a sustainability management consulting firm based in New York City, as a corporate strategist. In her role, she will work on business development for the firm and with its corporate clients to improve their environmental, social and financial performance.

Cara Forster MEM’04 is working as a program manager-Double Bottom Line at Accion International in Washington, D.C. Accion provides microloans, business training and other financial services to poor men and women who start their own businesses. For more, go to www.accion.org/NETCOMMUNITY/

Shannon Lyons Green MEM’04 and her husband, Walter Green, of College Park, Md., announce the birth of their daughter, Kimsey Noelle, on Sunday, March 23. The new family is doing great!

Lia Protopapadakis MEM’06 finished her Knauss Sea Grant Fellowship as a legislative assistant for Congressman Sam Farr (D-Calif.-Monterey Bay) in Washington, D.C., and left on a 32-day research cruise to Antarctica as a scientist with NOAA’s Antarctic Marine Life Research Survey. She is now living in Southern California and working as the science and policy analyst for the Santa Monica Bay Restoration Commission. She’s happy to be near family and surfing in the “South Bay” once again.

Word comes from Seattle, Wash., that Dean Lorenz MEM’07 has moved to the Cascade Land Conservancy as a Geographic Information System analyst. Dean’s responsibilities include designing high-quality maps for internal and public communication, developing and maintaining spatial data, and providing spatial analyses. For information on Cascade Land Conservancy, go to cascadeland.org

Deaths
Richard Chapman Allen MF’61, March 22
Charles O. Baird Jr. PhD’63, (Forestry), April 4
Harry W. Thorne MF’50, May 2
James E. West MF’54, May 26
Steven J. Fritz PhD (University of North Carolina), MA’71 (Geology), June 21
Don F. Gross MF’54, July 9

What’s your news?
New job? New baby? Professional honor? Recent wedding? Your classmates want to know! Send your news (and photos) to:
Carol Dahm, Development Research Coordinator
Nicholas School of the Environment
Duke University • Box 90328 • Durham, NC 27708-0328
919-613-8001 • E-mail: cdahm@duke.edu

Jan. 13-Feb. 22
Environmental Communication for Behavior Change (online)

Feb. 18-20
Socioeconomic Impact Analysis under NEPA**

April 1-3
Scoping, Public Involvement and Environmental Justice**

May 18-22
Preparing and Documenting Environmental Impact Analyses**

* Nicholas School alumni receive a 10 percent discount on all Executive Education Short Courses.
** Courses followed by two asterisks are included in the National Environmental Policy Act Certificate Program.
***Courses followed by three asterisks are included in the NEW Certificate Program in Land Management for Conservation.

For information on the DEL-MEM Program, upcoming short courses, our NEPA Certificate Program, our Custom Course Program, and other new and exciting programs, visit our Web site at nicholas.duke.edu/del, e-mail del@nicholas.duke.edu, or call 919-613-8082.
The Nicholas School has received a $1 million gift from Sandra Taylor Kaupe of Palm Beach, Fla., to create the new Arthur P. Kaupe Assistant Professorship of Molecular Biology at the Duke Marine Lab in Beaufort, N.C.

The gift was announced by Duke President Richard H. Brodhead and Nicholas School Dean William L. Chameides earlier this year.

"The Arthur P. Kaupe Chair will bring research and classroom education at the Marine Lab to a whole new level—the molecular level," Chameides said. "Our students and faculty will enjoy new opportunities to answer questions about marine ecosystems using molecular tools."

"As an avid outdoorswoman with a lifelong love of the marine environment, Sandy Kaupe appreciates the challenges facing conservationists and resource managers today," Chameides added. "She understands the critical role modern molecular technologies can play in studies of the biology of marine organisms and in developing sound strategies for the management and protection of our marine resources."

Kaupe is a member of the Nicholas School's Board of Visitors. She also serves on the board of the National Coalition for Marine Conservation, and was appointed by Gov. Jeb Bush to serve a five-year term, from 2002 to 2007, on the Florida Fish and Wildlife Conservation Commission. The Coastal Conservation Association of Florida named her Conservationist of the Year for 2007.

The newly endowed assistant professorship honors her late husband, Arthur P. Kaupe, and underscores her commitment to helping educate future generations of environmental leaders.

Creating a faculty position in molecular biology at the Beaufort campus has been a top priority of Marine Lab Director Cindy L. Van Dover since she assumed leadership of the lab in 2006.

"Molecular-level research techniques are yielding new insights into how populations interact and how organisms respond to changing environmental conditions," Van Dover explained. "Sandy Kaupe's generous gift represents a major step toward realizing our goal of establishing world-class expertise in marine conservation molecular biology at the Marine Lab. It will help enable the Nicholas School to be a leader in this emerging field. Our students and faculty members will benefit from Sandy's vision for years to come."

Nicholas School Names MEM Chris Wachholz Director of Development

Chris Wachholz M BA’88, M EM ’93 of Efland, N.C., has joined the Nicholas School External Affairs Office as director of development.

Wachholz will assist Associate Dean Chandra Christian and the External Affairs staff in building school affinity among alumni as well as new constituencies to support Dean William Chameides' vision of creating "the next generation of dynamic environmentalists."

He last worked with Divers Alert Network (DAN), an international NGO for diver health and safety with more than 300,000 members worldwide. He joined DAN in 1983 as the first manager when the organization was part of the Duke Medical Center.

While employed at Duke, Wachholz earned an M BA at Fuqua School of Business in 1988 and an M EM (Economics/Public Policy) in 1993. Following his Nicholas School graduation, he fulfilled his environment interests by serving on various nonprofit boards such as Coral Reef Alliance, Building Materials Reuse Association and North Carolina Sustainable Energy Association.

Wachholz began his career in health care as a registered nurse, graduating from Marquette University in his hometown of Milwaukee, Wis., in 1980. During and prior to college, he worked in factories and nursing homes and as a scuba dive instructor.

Wachholz says, "I really enjoyed my time as an M EM student. I've always considered myself an environmentalist, but the faculty and students here opened my mind to the issues in a balanced, pragmatic way while not compromising on 'the big idea'—it's great to be back!"
Mark your calendar for the following dates and monitor our Web site at nicholas.duke.edu for additional events.

**december 15**

**American Geophysical Union Alumni Reception**
2008 AGU National Convention
Contact: Kylie Snyder
919-613-8035 or kylie.snyder@duke.edu

**march 27-28**

**Admitted Students Visitation Weekend**
Duke Campus, Levine Science Research Center
Contact: Erika Lovelace
919-613-7459 or admissions@nicholas.duke.edu

**april 17**

**Nicholas School Alumni Council Meeting**
Levine Science Research Center, Durham
Contact: Kylie Snyder
919-613-8035 or kylie.snyder@duke.edu

**january 9**

**Prospective Student Visitation Day**
Bryan Center, 8 a.m.-3 p.m.
Contact: Erika Lovelace
919-613-7459 or admissions@nicholas.duke.edu

**april 2-3**

**Masters Project Symposium**
MEM and MF candidates masters project presentations
Von Canon Rooms, Bryan Center
Contact: Erika Lovelace
919-613-8070 or admissions@nicholas.duke.edu

**april 18**

**Nicholas School Field Day**
Couch Farm Site, Duke Forest, Durham
Contact: Michele Robinson
919-613-8039 or michele.robinson@duke.edu

**february 6**

**14th Annual Duke/Yale Environmental Recruiting Fair**
Kellogg Conference Center
Gallaudet University
Washington, D.C.
Contact: Thelma Jernigan
919-613-8102 or tejernig@duke.edu

**april 3-4**

**Nicholas School Board of Visitors Meeting**
Washington Duke Inn & Golf Club, Durham
Contact: Michele Robinson
919-613-8039 or michele.robinson@duke.edu

**april 23-24**

**Masters Project Symposium in Beaufort**
MEM candidates, Coastal Environmental Management program presentations
Duke University Marine Lab
Contact: Sarah Eminhizer
252-504-7531 or sle7@duke.edu

**february 20**

**Stanback Conservation Internship Interview Day**
Bryan Center, Von Canon Rooms, Duke Campus
Contact: Glenda S. Lee
919-613-8079 or gslee@duke.edu

**april 3**

**Spring Banquet and Silent Auction**
Durham Hilton, 7 -10 p.m.
Contact: Nancy Kelly
919-613-8090 or nkelly@duke.edu

**a greener magazine**

dukenvironment is printed on Utopia 2XG paper; this paper is manufactured with electricity in the form of renewable energy (wind, hydro, and biogas), virgin pulp from certified sources, and a minimum of 30% post-consumer recovered fiber. Please recycle this magazine.
Check out our newly designed interactive Web site, The Nicholas Insider, which serves as the home for all Nicholas School multimedia projects, including the dean’s blog, The Green Grok; student blogs; field trip blogs; our new alumni video series (under My Nicholas); and the “Nicholas Talks” series of recorded lectures and talks.

nicholas.duke.edu/insider