

UNC INSTITUTE FOR THE ENVIRONMENT

• the CAMPAIGN for CAROLINA •



“We challenge ourselves not just to learn what is already known but to create what is not yet known as we stand shoulder to shoulder with thinkers and researchers whose discoveries are changing our world.”

— *Chancellor Carol L. Folt*

Everything we do is driven by a motivation that’s profoundly human. Carolina’s deep roots in public service have grown into a University-wide effort to make more than just a difference, but a better future.

We act because we must. Humanity needs us, and we will show the world the strength in humanity.

The UNC Institute for the Environment will be central to that vision.

For all that’s now, for all that’s new, for all that’s next, we will continue to forge forward, imbued with compassion and compelled by circumstance. With your help, we will maximize our impact, ensuring it is felt across North Carolina and throughout the world.



UNC INSTITUTE
FOR THE
ENVIRONMENT

Our Purpose

The UNC Institute for the Environment is committed to the health and sustainability of the ecosystems on which life depends.

Our collaborations with partners across the UNC campus, North Carolina and beyond uniquely position us to address today's environmental challenges. Together we tackle issues from multiple perspectives to fuel discovery and innovation, turning scientific research into solutions for local and global communities.

Our Promise

As part of a great public university, we are charged with leading environmental research,

education and service to advance the welfare of the planet and its people. We will leverage the skills and talents of Carolina faculty, staff and students to deliver critical environmental solutions for the citizens of North Carolina, the nation and the world.

Our Priorities

Environmental change is inevitable. We intend to shape this change for the better. To do this, we must amplify current efforts and bring together multiple disciplines to work for humanity's collective well-being. Your support will enable us to achieve this in five key areas.

Critical Issues

First and foremost, we must continue to push the boundaries of research in areas that represent our core strengths, such as air quality, water management and environmental health. To do this, we need to create an endowment for term professorships and professors of the practice to recruit and retain faculty within the institute and campus-wide to encourage interdisciplinary collaborations.

We also need to establish an endowment for graduate and postdoctoral fellows to work collaboratively with faculty across Carolina's environmental academic disciplines to tackle complex environmental problems and deliver environmental solutions that benefit populations worldwide.

21st-Century Education

In order to provide first-class, hands-on learning opportunities for our students, we will fund an endowment for an environmental student support fund so our students can participate in education and international enrichment experiences at field sites in Morehead City, Highlands and Manteo, North Carolina; the Galápagos Islands and Thailand. We want these opportunities available to all of our students regardless of their need or major, including support for expanded research experiences and internship opportunities.

Environmental Research Ventures and Programming

Support for multidisciplinary collaboration among top experts is critical to applying groundbreaking, higher-risk research to emerging environmental issues that need early data to establish traction. To achieve this, we need to create an environmental venture fund. The fund will also provide support for an innovation program for emerging needs, tools and ideas that advance our mission across all areas of study, ultimately broadening our impact. In addition, this fund will support programming for the UNC Clean Tech Summit.

Outreach and Public Service

We will support programs to bring current environmental science with an experiential component to educators and community-based organizations statewide, with an emphasis on providing hands-on learning programs, including K-12 and citizen science. In addition, we continue to translate science into action by connecting research with improved public policy and community well-being.

Greatest Need

Gifts to our annual fund support key priorities and give the UNC Institute for the Environment the flexibility to support critical operations and respond to important opportunities that may not have another funding source. Annual-fund donors ensure that our research and outreach areas can respond to the needs of the citizens of North Carolina through programming

and research initiatives. With your support, we will have the resources to tackle and solve today's critical environmental problems to ensure that generations to come will have access to clean air and water, as well as a sustainable environment on a statewide, national and global scale.

The

Breath

& Depth of Solutions

The World Health Organization has identified air pollution as a major threat to human health.

In partnership with the United States Environmental Protection Agency, scientists in our Center for Environmental Modeling for Policy Development have created a Web tool that enables local policymakers to plug various scenarios into Google Maps to predict the impact of transportation emissions on their communities. Examples include the health implications of widening a road or building a school near a major highway.

“We have about 45 million people who live near a major highway in the U.S. We needed a tool to assess exposure risk patterns for people who live next to roadways. Children are more vulnerable to air pollution, and there are two million schoolchildren living within 200 meters of a major highway,” Dr. Sarav Arunachalam said.

In addition to creating tools to inform public policy, we train scientists throughout the world on how to use air quality modeling to study the formation, transport and health effects of air pollution. These models help scientists aid the public in areas such as emissions and storm-surge predictions.

At the UNC Institute for the Environment, we are working to improve air quality across the world. We invite you to join us as we continue to make progress on a global scale.

FROM THE OUTSIDE IN

Pollution has dire consequences for human health. A new campus collaboration funded by the National Institutes of Health is bringing together data science, environmental science and precision medicine to revolutionize how doctors treat patients with conditions that can be aggravated by environmental factors. For our part, the UNC Institute for the Environment scientists have developed modeling software that gives researchers access to 50 environmental pollution measures while incorporating key variables such as season, time of day, wind direction and atmospheric stability. One of the goals of the research is to determine if these tools will reduce the readmission rates of high-risk patients, thereby lowering health-care costs.

“It is incumbent upon us in academe to demonstrate and prove the hypothesis that clean energy and sustainability and improved health is not just economically viable, it is economically necessary,” said Dr. David B. Peden, interim director of the institute. “It will be a revenue-driver. At the end of the day, we have to solve problems that are meaningful. Environmental impact on health is an extraordinarily meaningful problem.”

Dr. Peden’s colleagues at the UNC Institute for the Environment, Dr. Adel Hanna and Dr. Sarav Arunachalam, also are lending their expertise to the project, which, in addition to Dr. Peden, is co-led by Dr. Stanley Ahalt, director of UNC’s Renaissance Computing Institute (RENCI).

Dr. David B. Peden

A WORLD WITHOUT WATER IS AN UNLIVABLE WORLD

Water is scarce in many places around the world, and even primary water sources in the U.S. are becoming insufficient. Less water equals less food, less energy and less sanitation — a frightening scenario that Carolina is working to prevent. The UNC Institute for the Environment is leading the way in watershed science, a field that specializes in the production of clean water to alleviate this challenge for society.

A pan-University team led by Dr. Greg Characklis, who directs the newly formed Center on Financial Risk in Environmental Systems, co-funded by the institute and the UNC Gillings School of Global Public Health, examines the interdependence of the systems that supply food, energy and water, particularly in times of scarcity. Dr. Characklis is conducting the National Science Foundation - funded study in California, a state that, despite widespread droughts, continues to lead the nation in agricultural production. The data gathered in the study will ultimately benefit states and regions that suffer from drought.

Dr. Characklis is globally recognized as a leader in the development of innovative water management strategies that integrate consideration of economics and engineering.



“The human and natural systems that provide society with food, energy and water are tightly linked, so a disruption in one invariably impacts the others,” Dr. Characklis said. “This research will provide us an opportunity to develop an improved understanding of these systems and ultimately develop innovative management strategies using tools from science, engineering and economics.”

BRINGING SCIENCE TO THE

people

Developing policy solutions for today’s environmental challenges.

The institute’s Policy Initiative is building bridges between world-class UNC researchers and policymakers to create solutions for North Carolina’s most pressing environmental challenges. Much of the environmental research at Carolina is focused right here in the state. Whether studying the quality of the Triangle’s drinking-water supplies, leading hurricane response-and-recovery efforts in the eastern part of the

state, identifying ways to mitigate wildfires in the mountains, or evaluating methods to reduce air pollution in the state’s urban regions, the University’s faculty and staff are at the forefront of addressing critical environmental issues. The institute’s Policy Initiative highlights Carolina’s environmental research by strengthening connections with environmental decision-makers and increasing visibility in the media. As such, this project is educating the public on the latest scientific findings and enhancing Carolina’s ability to put environmental research findings into action.

ONE DROP AT A TIME



X Dr. Tamlin Pavelsky, associate professor of global hydrology in the Department of Geological Sciences, has built a career on measuring rivers and lakes. With support from NASA, he is teaming up with our Environmental Resource Program to combine his data with citizen-scientists to gain a more accurate picture of water-storage in lakes across North Carolina. He hopes to create a prototype citizen-science program, enlisting North Carolinians to help collect height measurements on 15 lakes in the eastern part of the state. These measurements will help discern regional water-storage variations and illustrate how water moves through the Earth’s systems. If the prototype succeeds, NASA will fund worldwide implementation.

“By tapping into people’s interest in science all over the world, we get a lot more data that can validate assumptions,” said Kathleen Gray, director of the Environmental Resource Program. “The beauty of the citizen-science model is you have many more data collectors. We are no longer limited by one researcher and what his or her team can do.”

Our best chance is their

opportunity



Sites Set on Education

The UNC Institute for the Environment has joined the UNC Curriculum in Environment and Ecology to establish a network of field sites in North Carolina, such as Highlands, Morehead City and the Outer Banks, as well as in Ecuador and Thailand. Undergraduate students participate in semester-long programs, choosing from six diverse locations that offer a rich variety of research and community-outreach opportunities.

✕ **ECUADOR/GALÁPAGOS**

✕ **HIGHLANDS**

✕ **MOREHEAD CITY**

✕ **OUTER BANKS**

✕ **SUSTAINABLE TRIANGLE**

✕ **THAILAND**

Students explore real-world issues

through coursework, field trips, group research projects and internships with local organizations. Host communities help shape the curriculum at each site, and our faculty and students share their research results with community partners.

These field sites provide a valuable complement to on-campus education and fulfill UNC's experiential-education requirement for graduation. We need support to increase student access by offering scholarships to offset expenses not covered by student fees and to enhance programmatic operations.

OUR CRITICAL FUTURE LEADERS

In recent years, the number of high school seniors interested in pursuing careers in science, technology, engineering and mathematics (STEM) has dropped substantially, along with the share of students graduating with STEM undergraduate degrees. Two signature UNC Institute for the Environment initiatives aim to reverse those trends.

Increasing Diversity and Enhancing Academia (IDEA) enrolls motivated and talented undergraduate students to work with Carolina faculty on cutting-edge science and participate in graduate school preparation seminars in fields such as geography and environmental sciences. A high school component works with students interested in earth, atmospheric or marine sciences, inspiring them to turn their interests into studies or even a career.



Building on IDEA, other offerings for youth, such as Energy LEAP (the Energy Literacy, Engagement and Action Program), engage high school students in learning about climate and energy as well as solutions to move us toward a low-carbon future. Students get hands-on experiences in UNC facilities and through field trips that are intended to provide new and innovative ways to ignite a lifelong passion for environmental stewardship.



The UNC Institute for the Environment is preparing elementary school teachers to develop creative and engaging methods of teaching children about science through an outreach program called ExPLORE NC (Experiencing Place-based Learning Outdoors in Rivers and Ecosystems of North Carolina). Following a rigorous selection process, fourth- and fifth-grade teachers participate in field retreats and webinars throughout the school

year, all aimed at increasing teachers' abilities and confidence in teaching science outdoors. This opportunity to apply knowledge and skills in new settings, with a supportive peer network, is a large part of what makes ExPLORE NC such a robust and helpful program. Experiential learning, for both the teachers and their students, is the most straightforward way to build relationships between people and nature.

LVX Teachers ExPLORE NC

LIBERTAS



Innovation

For a Sustainable Future



Many economic benefits come to regions and countries that address environmental challenges in sustainable ways. One way the UNC Institute for the Environment is helping our state's economy in this arena is through the UNC Clean Tech Summit.

The UNC Institute for the Environment partnered with UNC Kenan-Flagler Business School's Center for Sustainable Enterprise, Strata Solar and the Research Triangle Cleantech Cluster to launch the first summit in 2014. Today, the annual summit attracts more than 1,000 people from industry, academia and state government to discuss North Carolina's clean tech industry. The summit ignites innovation and collaboration across the state and extends our mission to solve critical environmental issues.

The collaborations fostered during the UNC Clean Tech Summit are remarkable. We have developed mutually beneficial relationships between universities, industry, government and others to strengthen the clean technology industry in North Carolina and green the global economy.

North Carolina's solar industry attests to clean technology's potential. The state ranks second in the nation for cumulative solar electric capacity (2016), according to the Solar Energy Industries Association, with nearly 250 solar companies in the state. The technology is here and together we can generate new ways of tackling our most pressing environmental issues.

"When we think about the future, we have to think about clean technology. Right now it's over a trillion dollars worldwide, more than \$200 billion in our country alone, and the Research Triangle Park has been a place where new ideas for new industries have always been born."

— **Chancellor Carol L. Folt**



ONE
TAR
HEEL

STATE
OF
MIND

FOR ALL

FOR ALL

FOR ALL



The University of North Carolina at Chapel Hill is a place like no other.

It's a place built from a public mission, propelled by a shared desire and unafraid to fight for a better future. We come together to make the world a better place for all.

The UNC Institute for the Environment epitomizes that mission. With you, we will have what humankind needs. The world is listening. What will you say next?

For all that's now, for all that's new, for all that's next. For everyone today and in the future, join us in the next step for all kind.

To learn more about how you can support the UNC Institute for the Environment and the Campaign for Carolina, visit ie.unc.edu or campaign.unc.edu.





THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

FOR
ALL
KIND

the
CAMPAIGN
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