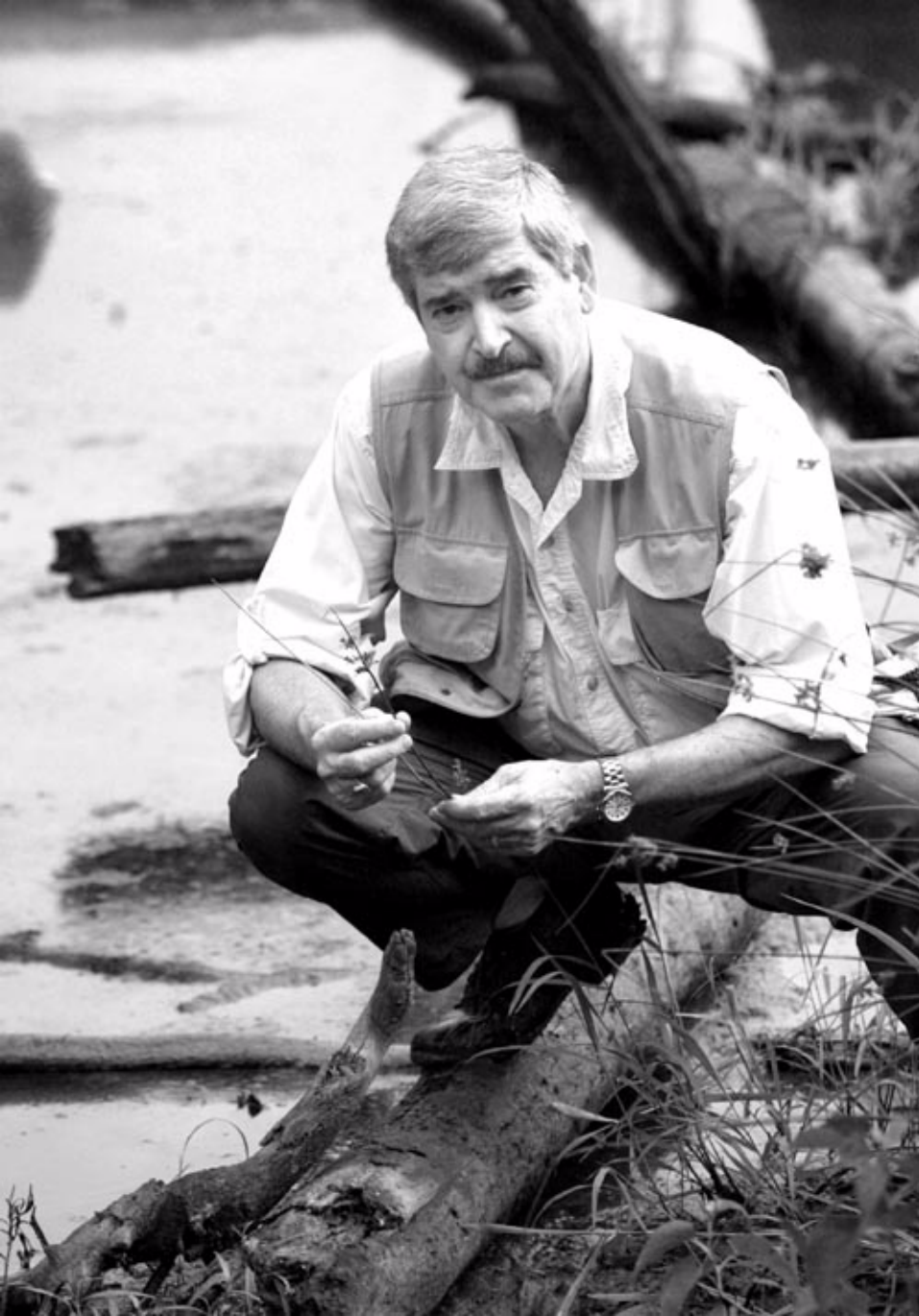

Research Centers



Research centers in the Nicholas School of the Environment and Earth Sciences are by design and intent flexible, multidisciplinary units. A major aim is to bring together specialized groups of scholars and professionals from many disciplines to focus their attention on current natural resource and environmental problems. The centers are headed by a director and staffed by an interdisciplinary faculty from Duke, neighboring universities and a variety of public and private research organizations. Depending upon the level of funding, the centers may also employ research assistants and other support staff. The centers do not offer courses or degrees; rather, they offer students, scientists and other professionals an opportunity to participate in research through collaboration with affiliated faculty.

Center for the Analysis and Prediction of River Basin Environmental Systems (CARES)

Director: Kenneth H. Reckhow, Professor of Water Resources, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences

The mission of the Center is to facilitate river basin scale science through research, education, knowledge transfer and policy analysis. River basins are of central importance to human activity and provide for the maintenance of terrestrial and aquatic ecosystems. Failure to preserve the quality and quantity of water in river basins risks significant impacts on human well-being and potentially irreversible effects on ecosystems. Panels convened recently by the National Science Foundation, the National Academy of Sciences and the National Research Council have recognized the complexity of human-climate-landscape-ecological interactions. Accordingly, the Center for the Analysis and Prediction of River Basin Environmental Systems (CARES) seeks to be a forum for leading scientists to develop science, technology and training programs to ultimately improve policy, planning and decision-making.

Research undertaken by the Center emphasizes the understanding of processes that are important on a basin scale; selected river basins reflecting river-estuary systems, highly urbanized environments, and mountain watersheds provide “natural laboratories” for a common scientific framework. The research program has physical, chemical, biological and social science dimensions, with the goal of relating collaborative, community decision processes to conceptual representations of interlinked global scale, landscape scale and river channel processes that are informative even given limited onsite data and uncertainty as to future conditions. Internet: <http://www.nicholas.duke.edu/cares>.

Center for Environmental Genomics

Principal Investigator: David A. Schwartz, M.D., M.P.H., Professor of Medicine and Genetics Chief, Pulmonary and Critical Care Medicine, Duke University Medical School

Despite the tremendous inter-individual variability in the response to environmental toxins, we simply do not understand why certain people develop disease when challenged with environmental agents and others remain healthy. Yet, there is emerging consensus that many of the complex (and prevalent) diseases that humans develop occur as a result of multiple biologically unique gene-gene and gene-environment interactions. The recent advances in human and molecular genetics have provided an unparalleled opportunity to understand how genes and genetic changes interact with environmental stimuli either to preserve health or cause disease.

The goal of the Center for Environmental Genomics is to use gene expression

profiling to understand the effects of environmental stresses on human health. The overall hypothesis unifying the Center's research program is that gene expression profiling will identify genes and pathogenic processes that are critical to environmental health and disease. Internet: <http://www.envgenomics.duke.edu>.

Center for Environmental Solutions

Faculty Director: Jonathan B. Wiener, Professor of Law and Environmental Policy, School of Law, Terry Sanford Institute of Public Policy and Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences

Executive Director: Kathryn Saterson, Research Scientist, Nicholas School of the Environment and Earth Sciences

The Center for Environmental Solutions is a university-wide initiative seeking creative solutions to complex environmental challenges through multidisciplinary research and analysis. Environmental problems are multifaceted and complex. Problems do not arise segmented into the discrete disciplines that are typically found in university departments. Solutions to complex environmental problems require insights that draw on numerous disciplines and that link intellectual depth to real-world relevance.

Drawing on environmental policy, law, social sciences, sciences and related fields, the Center for Environmental Solutions mobilizes multidisciplinary thinking and institutional analysis, bridging and strengthening the schools and departments of the university to help generate creative solutions for the most important and complex environmental challenges. Internet: <http://www.nicholas.duke.edu/solutions>.

Center on Global Change

Faculty Director: Robert B. Jackson, Professor of Environmental Sciences and Biology

Executive Director: Barbara Braatz, Research Scientist, Nicholas School of the Environment and Earth Sciences

Duke University established the Center on Global Change in 2001 as a university-wide initiative to facilitate innovative, interdisciplinary research and graduate education in the area of global change science. The goals of the Center are to advance scientific understanding, provide new educational opportunities, attract additional funding from public and private entities and enhance Duke's reputation as a leader in global change research and education.

The scope of the Center is intentionally broad to encourage creativity and to leverage Duke's strengths across a range of disciplines, including ecology, biology, earth sciences, ocean sciences, statistics, engineering, computer sciences and math. Rather than focus on a single, specific scientific problem, the Center is designed to support multiple efforts by faculty and students to create new collaborations, both internal and external to the University, across traditional disciplines and on a range of topics of relevance to global change.

The Center on Global Change supports four types of activities: interdisciplinary working groups of Duke and non-Duke scientists; a visiting speaker seminar series; symposia and workshops held in collaboration with other units at Duke; and the provision of space and support for visiting scholars in residence. Internet: <http://www.nicholas.duke.edu/cgc>.

Center for Hydrologic Science

Co-directors: Dr. Gabriel Katul, Professor Of Hydrology, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences; Dr. Miguel Medina, Professor of Civil Engineering, Pratt School of Engineering

From global climate change to flooding to hazardous waste storage, the science of hydrology plays a key role in many problems facing society. Rivers, lakes, plants, soils, rocks and snow and ice provide storage for water on land. Hydrologists are concerned with the magnitude and chemistry of this storage over time and space and the rate of transfer of water from one storage area to another. Studies of these storage and transfer processes allow us to examine a variety of environmental problems and devise solutions for them.

Hydrologists have their roots in and depend upon a variety of associated disciplines including civil engineering, ecology, environmental engineering, geology, geophysics, mathematics, meteorology and soil science. The Center for Hydrologic Science serves as an integrating center for hydrology research and graduate level hydrology education at Duke University. The Center offers fellowships for graduate study in hydrology and organizes a lecture series that attracts speakers of international stature. Monthly colloquia are organized for student and faculty presentations from Duke as well as the nearby University of North Carolina at Chapel Hill and North Carolina State University. For students engaged in Ph.D. research the Center offers a Certificate in Hydrology that is granted in addition to the Ph.D. degree in their host department. Internet: <http://www.nicholas.duke.edu/chs>.

Center for Tropical Conservation

Co-directors: John Terborgh, James B. Duke Professor of Environmental Science, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences; Carel van Schaik, Professor, Departments of Biological Anthropology and Anatomy and Biology

The Center for Tropical Conservation (CTC) was established to focus the activities of Duke faculty and students who share a common concern for tropical biodiversity. The goal of the Center is to unite biological and scientific inquiry with sound political economic analysis and conservation advocacy. The CTC serves to gather and disseminate pertinent information and to promote and coordinate research relevant to biodiversity and the sustainable development of natural resources.

The research and training agenda of the Center focuses on the integration of environmental science and environmental policy and the processes by which policies can be adapted to reflect new scientific findings. Development of methods for managing natural resources is coupled with economic analysis to suggest policy reforms that promote the sustainable use of natural resources such as land, water, forests and biodiversity.

Dr. John Terborgh, co-director of the CTC, operates Cocha Cashu Biological Station in Manu Biosphere Reserve, Peru. Located in the remote Peruvian Amazon, Cocha Cashu has hosted researchers from all over the world in a variety of fields. Investigators from a variety of disciplines have produced an impressive body of work, resulting in over 300 publications. Internet: <http://www.duke.edu/web/ctc>.

Children's Environmental Health Initiative

Director: Marie Lynn Miranda, Gabel Associate Professor of Environmental Ethics and Sustainable Environmental Management, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences

The Children's Environmental Health Initiative (CEHI), a research and community outreach program established by the Nicholas School, is designed to focus attention on environmental threats facing children today. Because of their behavior, metabolism and developmental status, children are especially vulnerable to environmental hazards. Yet policy makers, public health officials, and child advocates currently lack the appropriate

infrastructure to evaluate children's risk and potential exposure across a broad range of risks. Unable to identify where the highest risk of exposure occurs and how various environmental health hazards act in the aggregate, children's environmental health programs remain mitigative instead of preventive. Thus, children must first become sick before they can be protected.

CEHI focuses on incorporating innovative spatial analysis into children's environmental health research. Throughout its projects, CEHI is committed to issues of environmental justice and children's environmental health. All CEHI projects include Spanish/English bilingual community outreach and dissemination efforts. Internet: <http://www.nicholas.duke.edu/cehi>.

Duke University Wetland Center

Director: Curtis J. Richardson, Professor of Resource Ecology, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences

The goal of the Duke University Wetland Center is to provide sound scientific knowledge that will lead to sustainable wetland management and values for the nation and the world. The Center works toward this goal by conducting, sponsoring and coordinating research and teaching on critical wetland issues, especially wetland ecosystem function.

Perhaps no single environmental issue has so polarized public opinion as the protection of wetlands. Part land, part water, wetlands are ecosystems in which water level and low oxygen support a unique ecological habitat conducive to the development of specific plant and animal species. Wetlands improve water quality; provide flood control; supply habitat for fish, waterfowl, and wading birds and supply a vital link between surface water and groundwater. However, these properties of wetlands are often poorly understood by the people expected to comply with wetland regulations.

By bringing together scientists and professionals, the Duke University Wetland Center is able to focus attention on these and other wetland issues of regional, national and international scale. Core researchers for the Center are the director, faculty, visiting scholars and graduate students. As part of a professional school within a private university, the Duke Wetland Center works independently on wetland issues without the political pressures often brought to bear upon public institutions. Internet: <http://www.nicholas.duke.edu/wetland>.

Program for the Study of Developed Shorelines

Director: Orrin Pilkey, James B. Duke Professor Emeritus of Earth Sciences, Division of Earth and Ocean Sciences, Nicholas School of the Environment and Earth Sciences

The Duke University Program for the Study of Developed Shorelines takes a worldwide view of modern coastal processes and geologic hazards. A wide variety of research projects are directed under the auspices of this program, whose ultimate goal is the examination of the geologic basis for managing developed shorelines in a time of rising sea level. These projects include a study of the bases for prediction of beach replenishment success, hurricane property damage mitigation on barrier islands and an evaluation of numerical models used to predict sand movement.

Research assistantships and other forms of support for graduate students are available through the program. Internet: <http://www.nicholas.duke.edu/psds>.

Southern Center for Sustainable Forestry

Director: Daniel D. Richter Jr., Professor of Soils and Forest Ecology, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences

The Southern Center for Sustainable Forestry provides innovative research and practical applications for enhancing sustainable forest management on industrial and nonindustrial private forest land in the South. The Center provides an umbrella for research activities ranging from sustainable production of wood fiber to extensive management of nonindustrial private forestland to the broad management of forested landscapes for non-market values.

The Center is a cooperative organization with three participant institutions: North Carolina State University, Department of Forestry; Duke University, Nicholas School of the Environment and Earth Sciences; and the Division of Forest Resources of the North Carolina Department of Environment and Natural Resources. Internet: <http://www.nicholas.duke.edu/scsf>.

Superfund Basic Research Program

Co-directors: Richard Di Giulio, Professor of Environmental Toxicology, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences; Theodore Slotkin, Professor of Pharmacology and Cancer Biology, Duke University Medical Center

It is increasingly recognized that early life stages of humans and other organisms are particularly sensitive to environmental stressors such as pollutants. The Superfund Basic Research Center unites researchers from the Nicholas School of the Environment and Earth Sciences, the Pratt School of Engineering, and the Duke University Medical Center in examining the developmental effects of chemicals found at Superfund sites.

The goal of the Center is to study the mechanisms of exposure and toxicity in humans and ecosystems to specific Superfund chemicals that are selected based upon their potential importance as developmental toxicants. In addition to conducting research on chemicals emanating from Superfund sites in North Carolina, the Center's role includes communicating this information to health professionals, community leaders and the public.

The Center capitalizes on the close ties that exist between biomedical and environmental scientists at Duke University and its Medical Center and with other institutions in the Research Triangle including the National Institute of Environmental Health Sciences, the Environmental Protection Agency, the Chemical Industries Institute of Toxicology and the toxicology and environmental science programs at North Carolina State University and the University of North Carolina at Chapel Hill. Internet: <http://www.duke.edu/web/superfund>.