

MOVING FORWARD

NC State is excited that the faculty excellence program continues to grow. Here are eight new clusters and their respective goals.

- **Carbon Electronics:** to develop international prominence in carbon-based, renewable energy through cost-effective, next-generation technology and computation platforms.

- **Emerging Plant Disease and Global Food Security:** to better understand emerging infectious plant diseases caused by pathogens and pests, and to build tools to enable rapid responses to contain and limit potential damage.

- **Global Water, Sanitation and Hygiene:** to position NC State as the leader in research and interdisciplinary education on issues in the emerging field known as Global WaSH.

- **Leadership in Public Science:** to transform the way we look at and understand science by making it attainable to the public through messaging and participation.

- **Microbiomes and Complex Microbial Communities:** to focus on research concerning communities associated with crop plants, farm animals, insect pests and the environment.

- **Modeling the Living Embryo:** to better understand growth and diversification of plants and animals, and to train new scientists to explain the complexity of embryonic development.

- **Sustainable Energy Systems and Policy:** to catalyze a campus-wide initiative linking technical energy research with education and outreach programs to change the way we look at energy solutions.

- **Visual Narrative:** to push the shared frontiers of humanistic and engineering research to set a new agenda for advanced multimodal scholarship.



ABOVE: Creative storytelling abounds at the MicroTiles wall in the iPearl Immersion Theater in the Hunt Library.

THE NC STATE CHANCELLOR'S FACULTY EXCELLENCE PROGRAM

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NC STATE UNIVERSITY

WORK THAT MATTERS

SOLUTION-DRIVEN RESEARCH AND INNOVATION

Society's biggest problems don't fit neatly into traditional academic boundaries. To answer ongoing and emerging questions, the world's top universities are exploring innovative ways to enhance interdisciplinary collaboration.

NC State is a global leader in this exciting and challenging effort.

The Chancellor's Faculty Excellence Program, launched in 2011, is recruiting some of the best and brightest minds to join NC State's community of world-leading faculty at the forefront of this initiative.

Guided by a strong strategic plan and an aggressive vision, new thematic clusters are adding 76 new faculty members in 20 select fields to enhance the breadth and depth of NC State's solution-driven research and innovation.

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BUILDING A WIDE SPECTRUM

A dozen new interdisciplinary clusters are off the ground, actively engaging faculty and students across NC State and partners around the globe.

Bioinformatics

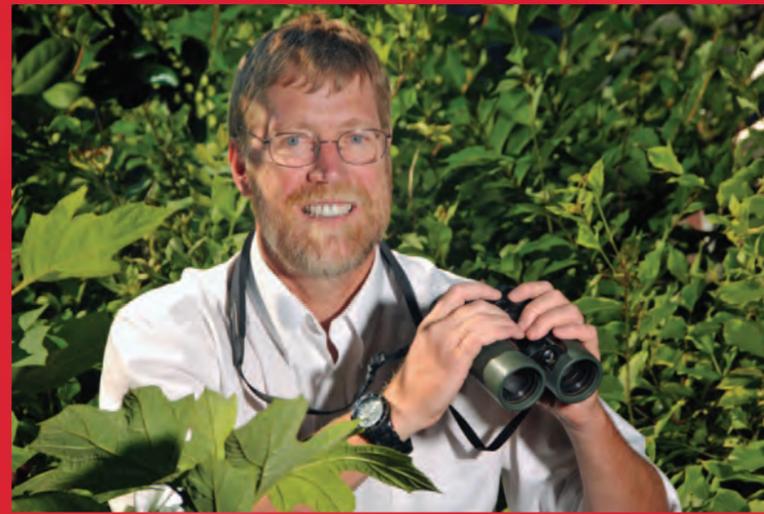
Bioinformatics gives researchers new tools to help make sense of the vast, complex and diverse datasets generated by studies in biological and medical science. Drawing on statistics, genetics, computer science and biology, researchers in bioinformatics delve deep into the genetic code, seeking to understand how variations in an organism's DNA may make it vulnerable to a parasite or disease.

Data-Driven Science

Big data, the huge and rapidly growing volume of information available for analysis, creates enormous challenges for decision makers in health care, national security, energy and other sectors. Researchers in data-driven science use modeling, data management and analytics to understand and interpret the data generated by nearly ubiquitous sensing arrays such as websites, satellites and even smartphones.

Digital Transformation of Education

The use of technology in the classroom promises to bring dramatic changes to the nation's education system as teachers prepare students for the life in the increasingly digitized world. Researchers in this cluster leverage intelligent tutoring systems, virtual games and research on cognition and human factors within technology-enabled learning environments to drive the digital transformation of education.



TOP: Scott Mills is looking at human stressors on wildlife. **MIDDLE:** NC State forensics experts train state and federal officials. **BOTTOM:** Marie Davidian coordinates a cluster looking at personalized medicine.

Environmental Health Science

There is growing appreciation that human health is strongly influenced by environmental factors, often through complex interactions at the genetic level. Researchers in environmental health science address the population-level effects of environmental factors on health as well as the links between toxic exposure and disease.

Forensic Sciences

Adding four new faculty members in forensic sciences enables an existing interdisciplinary team to increase capabilities in research, academics, professional training and outreach in forensic aspects of chemistry, evidence analysis, disaster preparedness, human DNA and statistics. The team already serves the mid-Atlantic region with research, training, education and investigative assistance to state and federal agencies.



TOP: Geospatial modeling has many real-world uses. **MIDDLE:** Ross Sozzani is studying stem cells in plants and animals. **BOTTOM:** Binil Starly directs the Laboratory for Engineering Biological Tissue Systems.

Genetic Engineering and Society

Faculty members with expertise in the social sciences and humanities examine cultural, policy and economic aspects of genetically modified organisms, including development and use of transgenic pests to suppress diseases, protect crops and conserve biodiversity. NC State hopes to broaden the program to consider other transgenic approaches, such as synthetic biology and genetic engineering of livestock.

Geospatial Analytics

A unique interdisciplinary research and Ph.D. program in geospatial analytics addresses extensive research needs in geospatial sciences and corresponding computer science and mathematical modeling

disciplines. New faculty members allow NC State to significantly expand its research initiatives in spatial analytics and algorithmic development and computation, mobile GIS, spatial data mining and remote sensing.

Global Environmental Change and Human Well-Being

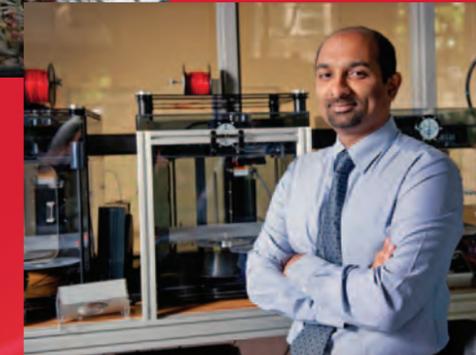
Human health and well-being are threatened in the coming decades by global environmental changes in climate, urbanization, water availability and the loss of biological diversity. New faculty members with expertise in quantitative disease ecology, aquatic biodiversity and evolutionary ecology are working to improve the understanding and management of these changes.

Innovation and Design

Students participating within this cluster have unique opportunities to explore new forms of business innovation and design practice, and then develop skills to bring new products and services to local and global markets. Key lessons focus on the skills to navigate the complex process of innovation — from concept to product to market.

Personalized Medicine

Faculty in the personalized medicine cluster are developing quantitative methods that will lead to optimal treatment decisions for individual patients based on their physiology, genetic makeup, demographics and other clinical factors. The cluster brings together researchers in quantitative, clinical and biological sciences.



Synthetic and Systems Biology

Integrating synthetic and systems biology offers opportunities to solve key challenges, such as eradicating disease and addressing the increasing demands for food and energy in a sustainable

environment. The researchers are creating new biological factories to produce materials important in varied applications, including food and feedstocks, industrial chemicals, fuels and therapeutic agents.

Translational Regenerative Medicine

What is the reality of printing new organs? Faculty members within the translational regenerative medicine cluster are advancing manufacturing and other aspects of this emerging field. They link basic and applied research at NC State and similar institutions with clinical needs and expertise at nearby hospitals.