

UNC System Awards \$4.2 Million In Research Grants

By Administrator

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UNC System announced the recipients of research grants distributed from the System Office across the University of North Carolina System. In total, the System Office has awarded 15 grants totaling more than 4.2 million dollars, nested in three different categories. Each of these grant initiatives is specifically designed to support inter-institutional research. “These grants harness the incredible wealth of talent across the UNC System for the benefit of North Carolinians in all 100 counties,” said UNC President Margaret Spellings. “I’m especially grateful for the General Assembly’s continued support of the Research Opportunities Initiative, as it funds game-changing research, this year in manufacturing and cancer treatment.”

This year’s recipients include:

- Novel Mentoring Assessment for Undergraduate Research Opportunities. Principal investigator: Stephanie George, ECU. Partnering institution: FSU. The objective of this research is to gather data that will help evaluate and improve mentoring in undergraduate research situations. This first stage of research will develop a comprehensive mentoring instrument tying program features and participant characteristics to the perceived quality of the relationship and program outcomes.

- Integration of Authentic Research Experiences into Traditional Undergraduate Laboratory Courses Across the UNC System. Principal investigator: Michael E. Taveirne, NCSU. Partnering institutions: FSU, N.C. A&T, NC Central University. This project aims to incorporate inquiry-guided research into undergraduate microbiology laboratory courses across multiple UNC System institutions. In addition to developing a network of CURE courses, this project will develop an assessment instrument to measure skills-based learning outcomes in research courses.

- Empowering Students to Combat Poverty Through Community Action: Undergraduate Research on ‘The Poverty Simulation.’ Callie Schultz, WCU. Partnering institution: Elizabeth City State University. This project will license The Poverty Simulation—a live-action experience where participants navigate the struggles life in poverty—and train facilitators to use this learning tool on campus. Undergraduate students working with the investigators will undertake research projects related to the poverty simulations.

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- Recognizing the Value and Educational Impact of Research Experiences: Identify and Market the Transformative Skill Development in High Impact Learning Opportunities. Principal investigator: Sarah Shoemaker, NC School of Science and Mathematics. Partnering institution: UNC Pembroke. This project will provide a framework for communicating the outcomes of a high impact experience and for assessing the impact or value of these experiences. The focus is on the development and documentation of the transformative (soft) skills that students gain in a research experience. The challenge is that these skills are not easily assessed and more importantly often go unnoticed by students.

The UNC System Research Opportunities Initiative (ROI) is funded by the North Carolina General Assembly to promote innovative and important research projects within the UNC System.

These awards are designed to build capacity in research areas that are strategically important to North Carolina. Priority research areas for the UNC ROI program are pharmacoengineering, advanced manufacturing, energy, data science, marine sciences as well as the military and other security-related issues.

ROI grants fund collaborative research projects with the intent of providing the needed boost to enhance their national or international profile and to provide a competitive edge in pursuit of large scale research funding. This year's grant recipients include:

- North Carolina Consortium for Self-Aware Machining and Metrology. Principal Investigator:

Dr. Tony Schmitz, UNC Charlotte. Partnering institutions: UNC-Chapel Hill, Fayetteville State University. This project will generate new knowledge in the application of artificial intelligence in manufacturing processes for precision parts, enabling machines to understand their current state and surroundings and respond accordingly.

- Pharmacoengineering Approaches to Enhance the Immune Response to Neoantigens. Principal Investigators: Andrew Wang, MD, UNC-Chapel Hill; Jonathan Serody, MD, UNC-Chapel Hill; Zhen Gu, PhD, NC State University. Partnering Institution: UNC Charlotte. Personalized cancer vaccines based on neoantigens (tumor-specific peptides) have the potential to revolutionize

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cancer immunotherapy. But multiple challenges remain before these drugs are ready for clinical adoption, including defining the best approach to inducing immune response to the neoantigens comprising the vaccine. The goal of the research is to use pharmacoengineering approaches to generate a more robust neoantigen vaccine.

UNC System Inter-Institutional Planning Grants

The UNC System Inter-institutional Planning Grant (IPG) initiative is designed to promote collaboration among UNC Institutions (particularly between larger and smaller institutions) and across disciplinary boundaries. IPG incentivizes innovative and productive relationships within the UNC System and increases the System's competitiveness in attracting external funds.

This year's recipients will receive a one-time award to initiate the collaborative effort, with the expectation that the team will use the funding period to position itself to obtain external funding to support continuation of the project:

- Creating an Interdisciplinary Network to Investigate the Drivers of Urban Biodiversity. Principle investigators: Sara Gagné, UNC Charlotte. Partnering institutions: UNC-Chapel Hill, UNC Wilmington. This project will organize seminars to establish a national network of interdisciplinary scholars, a workshop, formal group meetings, and informal social events exploring what drives biodiversity in cities.

- Establishing a State-wide Public Health Entomology Research Consortium: Addressing National Entomological Surveillance Needs by Developing Novel Diagnostic Methods Through Transdisciplinary Collaborations. Principal investigator: Brian D. Byrd, Western Carolina University. Partnering institutions: NC State University, East Carolina University. This planning project will bring together investigators from three UNC System universities to begin establishing a research consortium focused on streamlining mosquito identification and addressing insecticide resistance. The long-term goal is to enhance public health responses to outbreaks and reduce endemic threats posed by mosquito-borne diseases.

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Envisioning HeArt. Principal investigator: Carolyn Berry, Winston-Salem State University. Partnering institutions: UNC Asheville, UNC School of the Arts. This project will establish a design studio housed within the Center for Design Innovation that will focus on the intersection of health and art, addressing biases in health care and improving health outcomes.

- Conceptualization of Data Science in Exploring Business Ecosystems: Big Data and Networks Analytics Challenge. Principal investigator: Kayvan Miri Lavassani, North Carolina Central University. Partnering institutions: N.C. A&T, UNC-Chapel Hill. This project will establish an inter-institutional and cross-disciplinary research team and plan a new center at NCCU's school of business dedicated to the study of the business ecosystems. The long-term objective is to establish a regional hub of research on business ecosystems that conduct regional, nation-wide, and global research.

- New Focus on a Regional Problem in Eastern NC: What are the Impacts of Increased Salinity on Mercury, Parasite Prevalence in Fish, Fishing Behaviors, and Perceptions of Human Health Risk?

Principal investigators: Martin Tsui, UNC Greensboro; Marcelo Ardón-Sayao, NC State; April Blakeslee, ECU; Cynthia Grace-McCaskey, ECU. This project will establish an interdisciplinary team to tackle the issue of the increased mercury levels in fish resulting from sea level rise.

- Exploring the Viability of Small-Scale Forest Carbon Offsets. Principal investigator: Tatyana Ruseva, Appalachian State University. Partnering institutions: NC State, UNC Asheville. The Appalachian Carbon Research Group will expand its multidisciplinary work through an inter-institutional collaboration to develop an innovative accounting protocol for forest carbon offset projects. The goal is to identify and evaluate alternative forest inventory methodologies that could make small-scale forest carbon offset projects viable, and to pursue external funding for testing and refinement.

- Exploiting Tardigrade Stress Resistance to Develop Novel Therapeutic Delivery Strategies. Principal investigators: Brooke E. Christian, App State; Gary J. Pielak, UNC-Chapel Hill. Protein-based drugs, such as Herceptin for treating breast cancer and insulin for diabetes, are inherently unstable at room temperature and require refrigerated transport and storage. This project will test a novel stabilization strategy for these drugs that exploits the natural

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stress-resistance abilities of tardigrades.

- Synchronous Mapping of Coastal Habitat Change Using Multiple Unmanned Aerial Vehicles. Principal investigators: Narcisa Pricope, UNCW; Srinivas Akella, UNC Charlotte. This project will develop new strategies for using drone and satellite imagery to develop models for predicting how invasive species will spread into native wetlands. This research will be useful in habitat monitoring across the US and worldwide.

- Design of Bio-Inorganic Hydrogels with Nanostructured Components. Principal investigator: Yaroslava G. Yingling, NC State. Partnering institutions: UNC Charlotte, UNC Greensboro. This project will establish a strong, collaborative, inter-institutional, and interdisciplinary team to address fundamental design aspects of responsive biocompatible gels that could revolutionize many applications in health sciences and pharmacoengineering. It further plans to design a pilot training program for science communication.

The UNC System Undergraduate Research Program

The University of North Carolina Undergraduate Research Program Award is a grant mechanism to provide funding to universities or consortia of universities within the UNC System to support undergraduate research.

Undergraduate research provides students with intensive, high impact learning opportunities and supports the University's teaching mission to pursue multiple approaches to student learning while allowing students and faculty to undertake scholarly activities of the highest intellectual caliber.

This year's grants were awarded to projects related to one or more of the following areas essential to developing, enhancing, and promoting undergraduate research:

- **Assessment:** Development or expansion of novel or innovative methods to assess UR outcomes.

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- CUREs: Development or expansion of novel or innovative curricula that substantively include UR, recognizing that the goal of CUREs is to enhance research skills and to expand access to UR opportunities.
- Inclusive Excellence: Development or expansion of novel and/or innovative strategies/methods to expand awareness, access, and participation in UR opportunities to all students, especially students from underrepresented groups.
- Digital Learning: Development or expansion of novel or innovative methods that include digital learning tools in support of undergraduate research in distance learning environments.