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The National Science Foundation (NSF) today announced it will invest nearly \$16 million in three research projects led or supported by The University of New Mexico. The grants are part of a \$77.8 million NSF investment in projects that will build climate resilience capacity as part of the Established Program to Stimulate Competitive Research (EPSCoR). The \$4.67 million in funding coming to UNM will enable The University to work collaboratively with other institutions to understand the impacts of indoor farming, integrate Indigenous knowledge with Western science, and convert waste into construction materials.

"This is not only an investment in University of New Mexico-led research, but in research that will positively impact the entire State of New Mexico as well as our neighboring states and regional tribal communities," said Ellen Fisher, UNM vice president for research. "These three projects show the breadth of interdisciplinary work that happens every day on our campuses where our student and faculty researchers seek to tackle today's challenges to enhance tomorrow's future."

Exploring the impacts of indoor farming

Changing climates and increasing frequency of extreme environmental disasters will make farming and food security more difficult, particularly in disadvantaged communities. The NSF will invest \$6 million in the UNM-led project, titled "Harnessing Controlled Environment Agriculture to Secure Sustainability and Economic Growth," which will investigate indoor farming, also known as controlled environment agriculture, as a possible solution to the problems climate change poses for agriculture. UNM will receive nearly \$2.2 million of the funding over four years.

Working in partnership with the University of Wyoming (UW), the University of South Dakota, New Mexico State University, and Santa Fe Community College, the team will study the foundational science of indoor farming and its impact on socioeconomics, nutrition, and crop yield. The research team will also develop training to empower tribal communities to retain highly skilled, climate-smart controlled environment agriculture experts.

Jingjing Wang, associate professor in the Department of Economics and associate director of the Water Resources Program, is the project's primary investigator. UNM's David Hanson, professor in the Department of Biology and assistant vice president for research, and Yolanda Lin, assistant professor in the Department of Geography and Environmental Studies, are co-primary investigators on the project.

"Our collaborating EPSCoR jurisdictions of New Mexico, South Dakota, and Wyoming are home to 36 federal reservations, making for some of the most disadvantaged regions in the nation. Using a convergent approach, we will leverage the biological and socio-economic knowledge we gain about controlled environment agriculture to identify best management strategies for controlled environment agriculture, develop novel curricula to prepare a highly skilled workforce, and support tribal activities to achieve climate resilience," Wang said. "The project will provide exciting opportunities for learning among universities, community colleges, industry, and tribal communities to allow for the development of tailored controlled environment agriculture systems and a climate-smart and community-based workforce."

UNM will lead the project's core socio-economic work, investigating the drivers and impacts of controlled environment agriculture on tribal communities. UW, which will receive nearly \$2.08 million, will lead the project's core science components, characterizing how the environment, plants and microbes interact in hydroponic systems and impact crop yield. Carmela Rosaria Guadagno, director of the UW Plant Growth and Phenotyping Facility, will act as UW's lead primary investigator.

"The State of Wyoming continues to invest in Controlled Environment Agriculture (CEA) as a strategic approach to foster food safety and economic sustainability within the region. By partnering with other states facing similar challenges, we aim to harness the scientific knowledge necessary to ensure food security for all while driving innovation in CEA technologies," Guadagno said.

The team will work closely with tribal communities throughout the process and will host community meetings with tribes to learn what elements of the project are most relevant to individual communities. The project will emphasize training opportunities, including an 8-week summer research experience in engineered agriculture to be offered in person at UNM with a hybrid option for those interested in other locations and workshops at the New Mexico State University Agricultural Science Center at Farmington.

The partnership with Santa Fe Community College (SFCC) will also be critical for establishing a pathway for students to transition from a two-year program in controlled environment agriculture to a related STEM bachelor's program at a university. Initial agreements will be established between SFCC and UNM, the University of Wyoming and the University of South Dakota. Faculty and students will be able to utilize SFCC's commercial-scale controlled environment agriculture facilities. Students will also be critical to the research and each of the involved institutions will hire undergraduate and graduate students to collaborate on the project.

Wang was empowered to apply for the grant by UNM's FRESSH program, initiated by the Office of the Vice President for Research and provides faculty in the humanities with resources and training in the development of grant proposals for major entities like the NSF.

UNM will also receive NSF funding for its involvement with two other EPSCoR projects.

Integrating Indigenous knowledge and Western science

The NSF will invest nearly \$4 million in a collaborative project with the University of Oklahoma titled, "Enhancing Indigenous Community Resilience to Climate Change Impacts through Partnerships and Co-Development of Adaptation Planning." The project aims to create sustainable research and educational partnerships that integrate Indigenous knowledge with Western science to enhance the resilience of Indigenous communities against climate change. UNM will receive about \$1.47 million to conduct the work.

UNM's lead primary investigator is Lani Tsinnajinnie, an assistant professor in the Community and Regional Planning Department in the School of Architecture. Other Community and Regional Planning faculty involved include Assistant Professor Elspeth Iralu and Distinguished and Regents' Professor Ted Jojola. Assistant Professor Leola Paquin in the Department of Native American Studies is also on the research team. The UNM team is comprised of all Indigenous faculty who will lead the project's engagement and programming with Indigenous partners and students.

"Together, we will be working on furthering partnerships we have with Indigenous communities and organizations in New Mexico to support undergraduate and graduate research projects that will be co-designed with our partners to develop strategies for climate change adaptation around impacts on land, air, and water," Tsinnajinnie said.

Turning waste into construction materials

UNM is also involved with a project led by the University of Alabama that will receive \$5.99 million in NSF funding. UNM will receive \$1 million in funding for its role in the project. Titled "Transforming Wastes Into Economic Assets for Sustainability, Resilience, and Prosperity by a Novel Negative Emission Technology," the project will use negative emission technology to convert hazardous industrial wastes into environmentally friendly construction materials. The University of Idaho and Alabama A&M University will also collaborate on the project, which aims to transform biomass and hazardous industrial wastes into inexpensive, green construction materials using Negative Emission Technology. Communities of color are disproportionately impacted by hazardous industrial waste and climate change and the goal of this project is to promote environmental justice by reducing hazardous waste for better public health and safer housing options while creating economic opportunities and infrastructure enhancement.

UNM's primary investigator on the research is Maryam Hojati, assistant professor in the Gerald May Department of Civil, Construction, and Environmental Engineering. UNM's team also includes Interim Chair and Professor Susan Bogus Halter and Assistant Professor Madura Pathirage from the department, as well as Assistant Professor Sungjin Kim from the Chemical and Biological Engineering Department.

To learn more about the ESPCoR program, visit nsf.gov (<http://nsf.gov/>).

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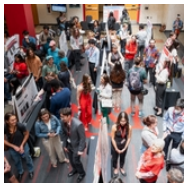
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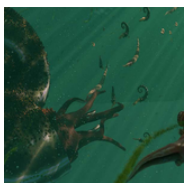
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