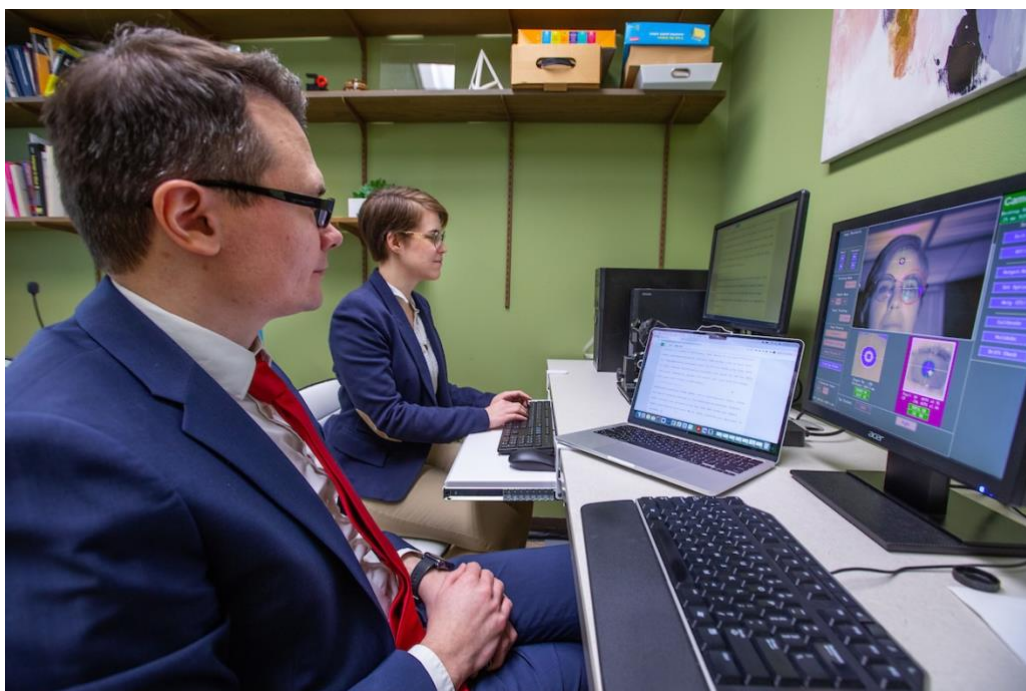


Iowa State University FY24 Federal Research Funding Overview



Associate professor Evgeny Chukharev, left, and Wren Bouwman, Ph.D. student in Applied Linguistics and Technology, use an eye tracking system as part of their development of an intelligent tutoring system. Chukharev received \$850,000 from the National Science Foundation to support a three-year project focused on helping students become better, faster writers. Photo by Christopher Gannon, Iowa State University.

For the second consecutive year, Iowa State established a new benchmark for federal research funding. The \$236.3 million the university received in FY24 surpasses the previous record of \$206.9 million – set in FY23 – by \$29.4 million or 14.2%.

The three agencies that contributed the most to this federal funding record were the Department of Energy (DOE), U.S. Department of Agriculture (USDA), and the National Science Foundation (NSF).

Iowa State and partner Ames National Laboratory – a DOE National Laboratory – received \$111.9 million in funding in FY24, surpassing the previous high over the past five fiscal years of

\$82.8 million in FY23 by \$29.1 million or 35.1%. DOE funding specifically for research at Iowa State in FY24 checked in at \$10.9 million, the largest amount the university has received from the agency over the past five fiscal years. Here is one of the notable projects receiving DOE support in FY24:

- Iowa State is one of six university-based cybersecurity centers selected to conduct innovative cybersecurity research and develop cybersecurity trainings that will meet the needs of the energy workforce in their regions. The [\\$2.5 million two-year project](#) at Iowa State is called CyDERMS – the Center for Cybersecurity and Resiliency of DERs and Microgrids-integrated Distribution Systems. DERs are distributed energy resources such as wind and solar farms or energy storage technologies. Microgrids are local DER grid systems that can be connected to or isolated from the larger grid.

Anson Martson Distinguished Professor in Engineering, Manimaran Govindarasu, said center researchers will protect power grids containing wind and solar farms and microgrids by developing robust computer algorithms and other tools to detect and mitigate cyberattacks and system faults in real time. The researchers will use artificial intelligence and machine learning tools to help detect grid problems and malicious activities. The center brings synergistic collaboration opportunities between academic, industry, and national laboratories via project partnership and an industry advisory board. The partners of the center are University of Illinois Urbana Champaign, University of Minnesota, Michigan Technology University, National Renewable Energy Lab, Argonne National Lab, and GE Vernova.

Iowa State received \$48.9 million in USDA funding in FY24, topping the previous five-year high of \$48.4 million set in FY22. Here are just two notable projects that received USDA funding during the 2024 fiscal year:

- In 2022, USDA Natural Resources Conservation Service (NRCS) launched a new initiative designed to support and increase soil carbon stock monitoring to assess and monitor the effects of climate-smart practices on soil carbon sequestration. In September 2023, NRCS awarded Iowa State just under \$2 million for four years for its project for the Central region of the U.S.: Know Your Carbon Landscape: Data for Consistent Monitoring of Soil Carbon Monitoring. Led by associate professor of Agronomy, Bradley Miller, the project will support a campaign to deliver audience-tailored messaging designed to inform diverse farmer groups on the value of monitoring their farms' soil carbon levels and the information and support they can find through the Iowa State program.
- U.S. dairy goat production has increased 57% over the past ten years, making it the nation's fastest growing commercial livestock segment. This growth has been driven by

increasing demand for goat milk cheese, but the nature of goats themselves – their resilience and ability to remain productive in the face of changing climates – is also a key contributing factor. In April, USDA-NIFA awarded Iowa State \$10 million to support a five-year project focused on promoting and enhancing the sustainability of dairy goat production in the U.S. Achieving this goal would allow for environmentally sustainable intensification of dairy goat production while assuring continued access to value-added markets that support a diverse population of farmers and small rural farming communities. The multi-disciplinary, multi-institutional project is led by Amanda Kreuder, associate professor in Veterinary Microbiology and Preventive Medicine.

- The ability to develop crops and livestock that are more resilient to changing weather conditions and disease is critical to our nation’s ongoing food security. In September 2023, an interdisciplinary research team – led by Patrick Schnable, Baker Professor in Agronomy and Iowa Corn Promotion Board Endowed Chair in Genetics – received a [\\$1.1 million grant](#) from USDA National Institute of Food and Agriculture (NIFA) to probe existing data for previously unseen links between the genetic instructions carried by plants and animals (genomes) and their physiological characteristics (phenomes). The overarching goal of the project is to develop new statistical tools that ultimately result in breeding and developing superior animals and plant cultivars that increase efficiency and productivity while also enhancing agricultural sustainability.

Iowa State established a new five-year high for NSF funding during the 2024 fiscal year. The \$37.3 million received is \$2.2 million or 6.2% more than the previous benchmark of \$35.1 million set in FY23. This total includes [12 NSF CAREER Awards](#), the agency’s most prestigious award supporting early-career faculty. This is the most ISU recipients in any one fiscal year since the university received 15 awards in FY11. Here are two new notable projects, beyond the CAREER awards, receiving funding from NSF in the 2024 fiscal year:

- In October 2023, Evgeny Chukharev, associate professor of English, received an [NSF award of just under \\$850,000](#), for a three-year project focused on helping students become better, faster writers. The project, known as SourceWrite, is designed to provide real-time tutoring. It builds on technology Chukharev and his team previously developed, which tracks a user’s eye movements on a computer screen and keystrokes with millisecond precision. The researchers plan to implement SourceWrite in introductory and intermediate English classes at Iowa State through a phased rollout, starting with the 2024 fall semester. The software will be open source, meaning that others will be able to use it for free in the future.
- Nitrous oxide (N₂O) emitted from nitrogen fertilizer applications is a significant contributor to greenhouse gas emissions in major agricultural states like Iowa and Kansas. Iowa State researchers – led by Wenzhen Li, professor and Herbert L. Stiles

Faculty Fellow in Chemical and Biological Engineering – are partnering with a team at Wichita State University to explore capturing and converting waste nitrogen, along with carbon dioxide (CO₂), to make “green urea” fertilizer. [The NSF project](#) – a \$4 million grant, with each institution receiving \$2 million over four years – is funded through the agency’s Established Program to Stimulate Competitive Research (known as EPSCoR).

In addition to developing a system that efficiently and sustainably produces green fertilizer, the researchers will also: conduct life cycle and economic analyses of green fertilizer use; develop advanced sensors for in-field measurement of nitrogen use by plants; study plant metabolism of nitrous oxide; look at the impacts of policy changes; and work to encourage the use of green fertilizers. Ultimately, the researchers believe a viable nitrous oxide-relieved nitrogen fertilizer could enhance the prosperity of Midwest agriculture while mitigating climate-change issues.

Here are a few additional notable new research projects that received funding in FY24:

- Christian Meissner, professor of Psychology, received an initial award of \$199,502 – with second-year option that could take the total award to just over \$405,000 – from the High-Value Detainee Interrogation Group (HIG) of the Federal Bureau of Investigation (FBI). Meissner and his team are focusing on developing an updated version of the Psychologically Based Credibility Assessment Tool (PBCAT), which he helped develop a decade ago, that will remove much of the ambiguity involved with credibility assessment. Meissner is incorporating principles of statistics-based actuarial tools and heuristics (mental shortcuts that can facilitate problem-solving and probability judgments) to modify the PBCAT to reduce investigator biases and more effectively discern lies and truths across contexts.
- The emergence of three highly pathogenic human coronaviruses in the past two decades highlights the significant and urgent need to study the mechanisms of viral replication and pathogenesis to fight the current and future coronaviruses. Coronavirus exoribonuclease (ExoN) complex is essential for the virus life cycle and represents a promising target for anti-coronavirus therapies. However, many fundamental aspects of this unique enzyme remain uncharacterized. Yang Yang, assistant professor in the Roy J. Carver Department of Biochemistry, Biophysics, and Molecular Biology received an initial award of \$765,000 from the National Institutes of Health (NIH) National Institute of General Medical Sciences (NIGMS) to support a five-year project with total funding estimated at just over \$1.9 million. Yang and his team will use these funds to delineate the structural and molecular basis of multiple key processes mediated by the ExoN complex during SARS-CoV-2 genome replication and transcription, providing valuable

insights in developing new therapeutic strategies to fight both current and future coronaviruses.

- Beena Ajmera, assistant professor in Civil, Construction, and Environmental Engineering received an initial award of \$210,136 – with a second-year option that could take the total award to just over \$425,000 – from the Department of Defense (DOD) Army Corps of Engineers (USACE). Ajmera and her team will explore the merits of using Xanthan Gum – a natural biopolymer produced through fermentation – as a soil stabilizer to improve the performance and strengths of levee materials as well as their resilience in freeze-thaw conditions. Levees are crucial infrastructure that provide essential protection to communities and critical assets in regions susceptible to flooding. Ajmera’s research is structured to evaluate various concentrations of xanthan gum to determine an optimum range at which both freeze-thaw resilience and sheer strength are maximized.