



**IOWA STATE UNIVERSITY**  
Office of the Vice President for Research

**COLLABORATION**  
**BIG IDEAS**

**FOSTERING INNOVATION**

**DISCOVERIES**

**ENTREPRENEURSHIP**





# Applying and sharing knowledge to make the world a better place




**Iowa State University** has been tackling important societal challenges and improving lives since its founding in 1858. By the time the university celebrates its bicentennial in 2058, the challenges associated with a world that will be inhabited by more than 10 billion people will become even more profound. Resources will become more precious and balancing the needs of humankind with the health of our planet will be even more difficult than today.

Meeting these challenges will require the kind of new thinking, big ideas and breakthrough innovation that's only possible through leading-edge research. Whether it's foundational work that contributes the building blocks to greater exploration and understanding, or translational research that directly leads to new products and technologies that benefit society, this is the kind of purposeful discovery that drives the faculty and staff at Iowa State.

The **overarching goal** of the Office for the Vice President for Research (OVPR) is to grow the scale, stature and impact of research at Iowa State. It does so by fostering interdisciplinary research initiatives that target some of society's greatest challenges and by providing researchers throughout the university with the tools and support they need to be successful in their endeavors.

The OVPR is driven by the **vision** that research is critically important to Iowa State's stature as a premier land-grant institution – and as a member of the Association of American Universities (AAU) and a Carnegie Very High Research Activity Institution – and is integral to the university's commitment to improving the lives and livelihoods of Iowans, the citizens of our nation and the people of the world.

The **mission** of the OVPR is to advance research excellence and the creative activity of university faculty, staff and students by:

- Promoting a vibrant and supportive environment for scholarly and artistic endeavors;
  - Fostering ethical conduct in research; and
  - Integrating the research mission with the education, outreach and engagement missions of the university.
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Collaborating with its partners in the colleges on campus, interdisciplinary research centers and institutes and central administration, the OVPR advances the Iowa State research mission by:

- Organizing, facilitating and providing strategic direction to maximize faculty's ability to create new knowledge and translate their discoveries for the benefit of society;
  - Developing advancement initiatives, professional development programs and facilities that maximize faculty members' opportunities to achieve exceptional research careers;
  - Cultivating cross-college research through interdisciplinary research initiatives and centers, and by fostering opportunities to develop new interdisciplinary research thrusts;
  - Encouraging Team Science principles that are designed to address complex challenges through collaboration that brings together individuals with expertise in different fields to address a common goal; and
  - Creating an efficient and effective research enterprise by offering a portfolio of support services that facilitate sponsored funding, responsible conduct of research and research integrity.
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# Interdisciplinary Impact

## STRONG EXTERNAL AND INTERNAL SUPPORT FOR RESEARCH

Competition in today's sponsored funding environment is at an all-time high. The OVPR's emphasis on interdisciplinary research – that encourages big, multi-faceted, multi-disciplinary thinking that targets some of society's greatest challenges – has been critical to Iowa State's success in securing significant awards from federal and non-federal sponsors alike. Over the past five fiscal years (FY16 through FY20), Iowa State received more than \$1.2 billion in external research funding, achieving a record \$260.9 million during the 2019 fiscal year, followed by a new milestone of \$186 million in federal research funding in the 2020 fiscal year.

One of the keys to sustaining and growing outside sponsored funding is for the university itself to invest in high-priority

research programs that align with the university's strengths and reflect national and global priorities. In 2014, Iowa State launched the Presidential Interdisciplinary Research Initiative (PIRI), which is administered by the OVPR. PIRI projects are typically awarded \$250,000 annually for up to three years to create large-scale interdisciplinary teams that are distinguished by intellectual excellence and driven by a clear vision of fundamental advances, new discoveries or technological developments with state, national and global impacts. Teams are expected to seek significant external funding from multiple agencies during their grant period.

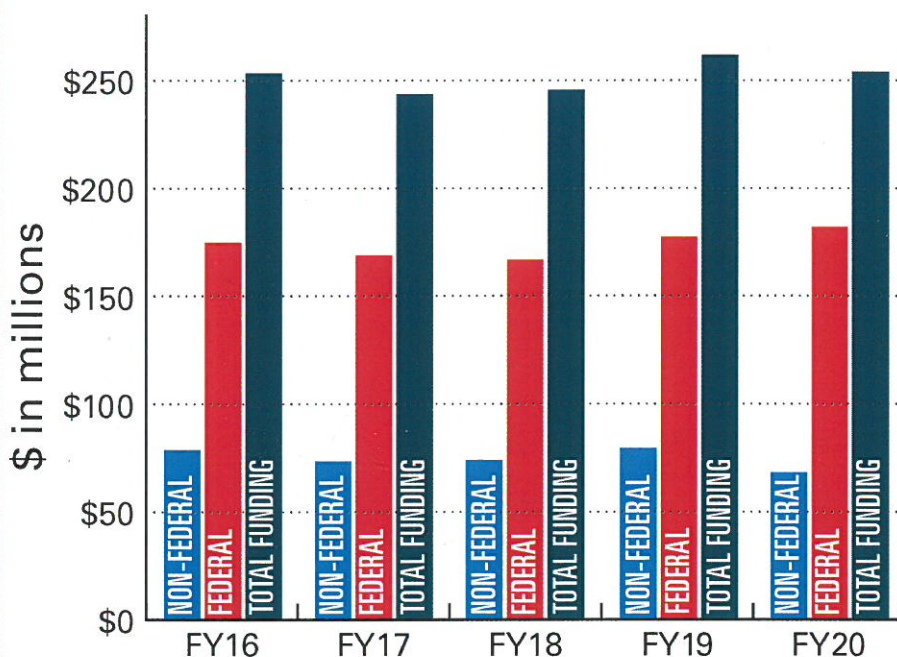
The initial PIRI cohort led to the formation of two significant campus centers, the Nanovaccine Institute and the Crop

Bioengineering Center. Teams from the most recent cohorts – that have led to the formation of the National Institute for Antimicrobial Resistance Research and Education (NIAMRRE) and the Consortium for Cultivating Human and Naturally reGenerative Enterprises (C-CHANGE) – are well on their way to making similar impacts.

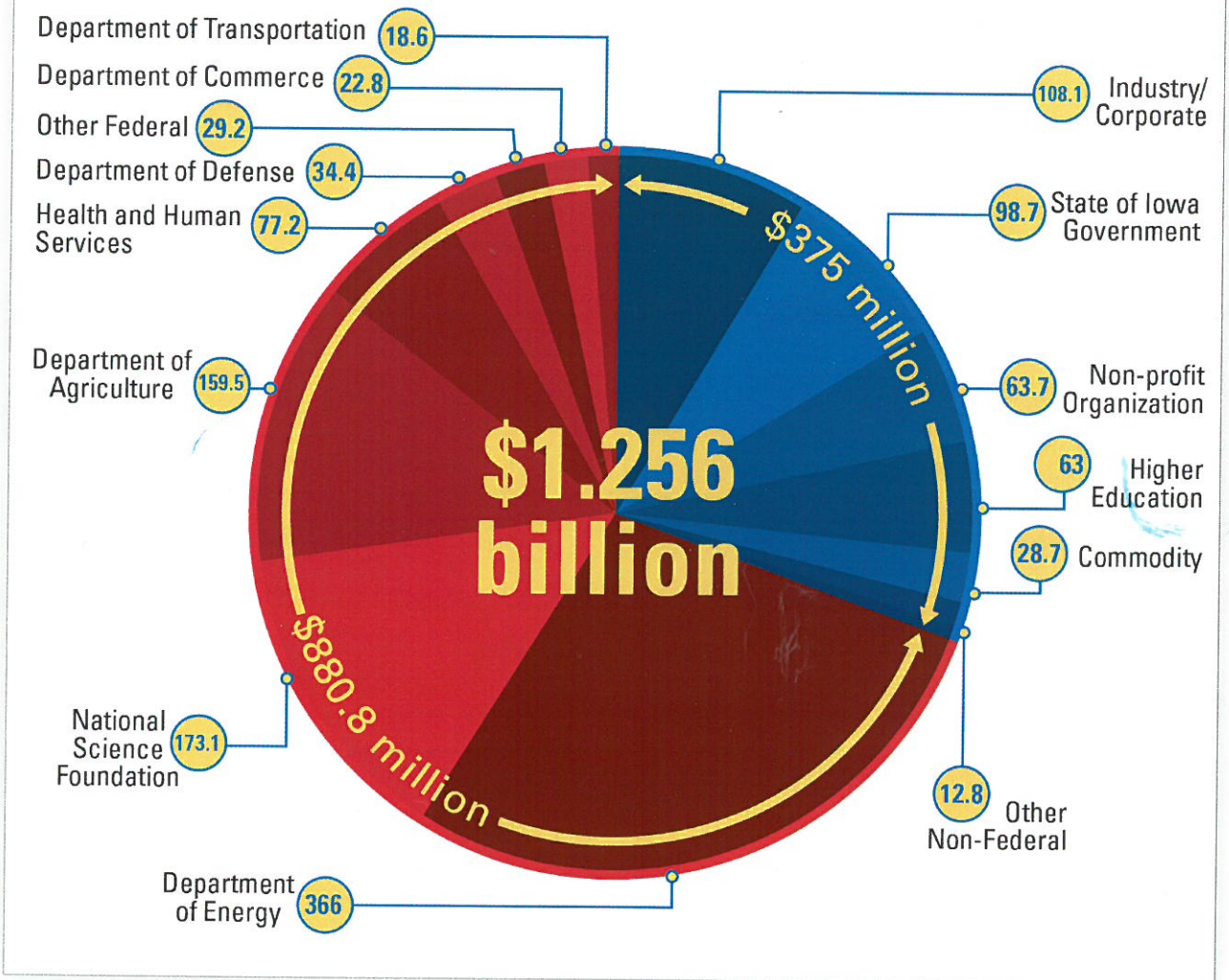
The initial PIRI awards proved so successful that the president's office expanded discretionary research funding in 2016.

Today, this funding supports the Presidential Interdisciplinary Research Seed Grant Program (PIRS) for establishing new

### ISU EXTERNAL RESEARCH FUNDING: FY16-FY20



## ISU EXTERNAL RESEARCH FUNDING FIVE-YEAR TOTAL (FY16-FY20)



teams to pursue new high-risk/high-reward ideas that have the potential for significant advances. In addition, the Bridging the Divide Seed Funding Program creates new convergence-style research directions by teaming faculty in the arts, humanities and social sciences with scholars in STEM fields. In total, the OVPR has administered more than \$9.2 million in Iowa State presidential discretionary research investments from FY2014 through FY2019.

In sum, these investments in Iowa State research, from both internal and external sponsored sources, deliver a profoundly positive impact on the state's economy. An Iowa Board of Regents economic impact analysis of the state universities

released in Fall 2019 indicated that Iowa State's research expenses had a total gross impact in labor and non-labor income of \$375 million – equivalent to 4,935 jobs – for FY2018.

Equally – if not even more important – is the long-term, downstream impact Iowa State research has on the economy. Discovery that results in the transfer of knowledge to the university's stakeholders and constituencies through Extension, and transfer of technology to the marketplace, begins with research. From FY2016 through FY2020, Iowa State received 686 invention disclosures (excluding 74 datasets in FY20), filed 304 new U.S. patent applications, and produced 314 commercial agreements.



# Supporting research success

Iowa State holds a stellar reputation as one of the nation's leading land-grant research institutions. The OVPR is comprised of eight service units that all play critical roles in maintaining and growing this reputation day-in and day-out by providing faculty with the tools and support they need to be exceptional researchers.

These units support researchers by providing direction and counsel on issues relating to funding and technology transfer:

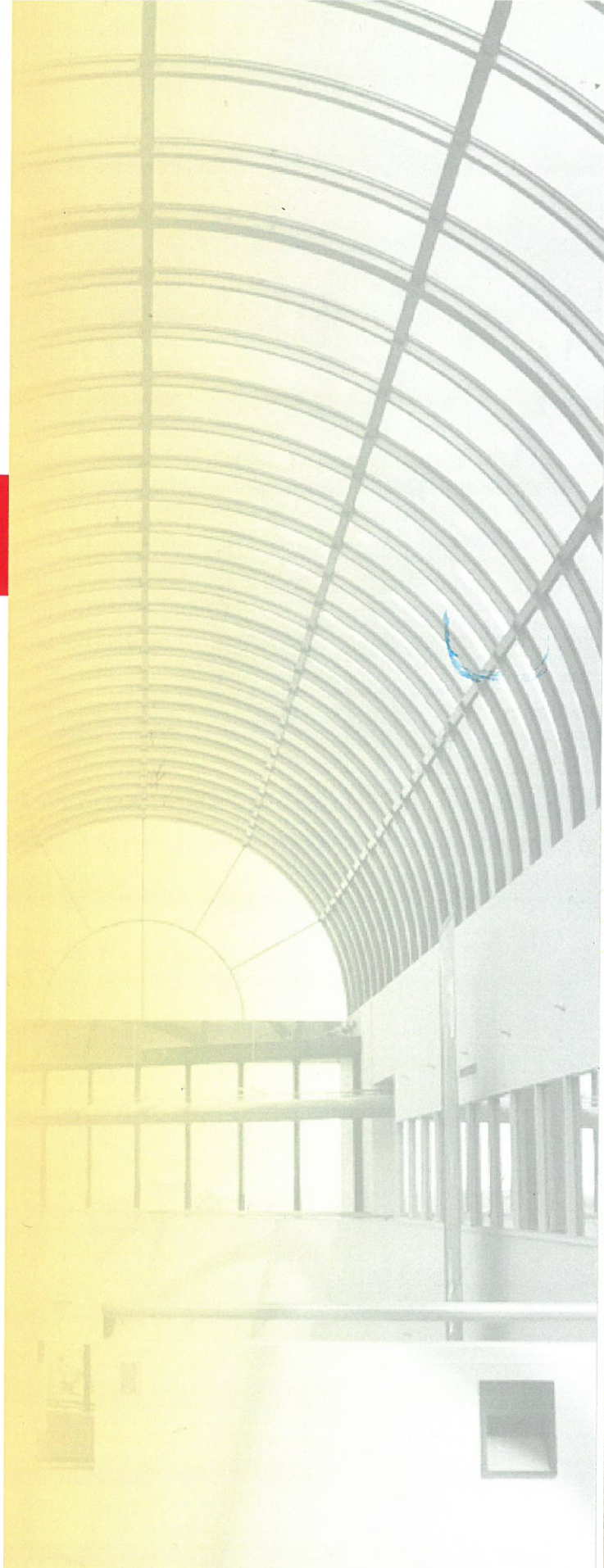
- **GRANTS HUB** helps researchers identify funding opportunities and new potential avenues for their work, provides assistance preparing proposals, offers consultation on large, team-based research and support on how to manage projects.
- **OFFICE OF SPONSORED PROGRAMS AND ADMINISTRATION** helps researchers with their proposal submissions to sponsors, negotiates and establishes award agreements and then helps with post-award approval requirements.

These units play critical roles in ensuring the integrity and success of research conducted at Iowa State:

- **OFFICE OF RESEARCH ETHICS** serves as a single source of contact for assistance in the various ethics and security aspects involved in successfully executing research at Iowa State, including:
  - Human-subjects research – Institutional Review Board (IRB);
  - Research involving animal subjects – Institutional Animal Care and Use Committee (IACUC);
  - Biohazards – Institutional Biosafety Committee (IBC);
  - Radiation – Radiation Safety Committee (RSC);
  - Conflicts of Interest and Commitment;
  - International Collaborations;
  - Research Integrity and Other Resources; and
  - Unmanned Aircraft Systems.
- **RESEARCH INTEGRITY OFFICER** addresses issues of possible research misconduct.
- **OFFICE OF BIOTECHNOLOGY** provides researchers with a broad range of biotech services and instrumentation, and connects them with faculty who have similar or complementary interests.
- **ATTENDING VETERINARIAN** helps researchers design their studies to assure best care is provided every animal involved in a project.
- **LABORATORY ANIMAL RESOURCES** works with researchers to provide care and housing for animals used in projects.

The OVPR also partners with these on-campus departments that play critical roles in helping Iowa State research faculty achieve success:

- **OFFICE OF INTELLECTUAL PROPERTY AND TECHNOLOGY TRANSFER** and **ISU ECONOMIC DEVELOPMENT AND INDUSTRY RELATIONS**, play critical roles in helping identify industry sponsorship opportunities, building entrepreneurial skill sets among those in the research community and – when the time is right – assistance in commercializing the product of a researcher's work.
- **IMPROVED SERVICE DELIVERY** will help researchers manage the finances of their funded project through the grants finance specialists on staff.
- **DEPARTMENT OF ENVIRONMENTAL HEALTH AND SAFETY** offers an array of services to help ensure the safety of a researcher's project and lab, as well as that of the campus community.





# Interdisciplinary centers & institutes fuel research & scholarly success

**The Office of the Vice President for Research's** strategic emphasis on interdisciplinary research creates research initiatives that, with enough momentum and far-reaching support, evolve into centers – and, ultimately, institutes – of scholarly and disciplinary excellence.

These centers and institutes serve as platforms that help facilitate cutting-edge research that: A) contributes to the success of faculty and staff; B) enhances the university's competitiveness in attracting extramural sponsored funding; and C) benefits the greater good. Prime examples of the latter can be found in the key roles the Center for Biorenewable Chemicals (CBiRC) and Nanovaccine Institute are playing in advancing Iowa's biosciences-based economic development initiatives in the areas of Biorenewable Products and Vaccines and Immunotherapeutics, respectively, and the leadership role the National Institute of Antimicrobial Resistance Research and Education (NIAMRRE) is playing in identifying global strategies for combating antimicrobial resistance.



***Centers and institutes serve as platforms that help facilitate cutting-edge research.***



## The OVPR is currently responsible for oversight for these eleven centers and institutes at Iowa State:

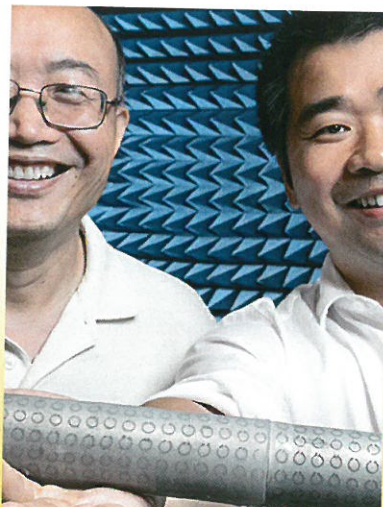
- **BIOECONOMY INSTITUTE (BEI)** seeks to advance the use of biorenewable resources for the production of fuels, energy, chemicals and materials. BEI assures Iowa's prominence in the revolution that is changing the way society obtains essential sources of energy and carbon.
- **CENTER FOR BIORENEWABLE CHEMICALS (CBIRC)** – a one-time National Science Foundation Engineering Research Center – focuses on exploring technologies and solutions that will help the chemical industry transform from a carbon and petroleum base to a stronger renewables base.
- **CROP BIOENGINEERING CENTER (CBC)** is committed to exploring and developing more efficient crop breeding techniques, using transformative genome engineering technologies, to provide the world's growing population with sufficient food, feed, biofuels and biorenewable chemicals.
- **CENTER FOR EXCELLENCE IN THE ARTS AND HUMANITIES (CEAH)** promotes excellence in research and creative scholarship by Iowa State's arts and humanities faculty. The center's core mission is to provide internal grant support and create programs that strengthen the richness, productivity, national and international visibility and continuing impact of faculty research.
- **CENTER FOR METABOLIC BIOLOGY (CMB)** focuses on improving the fundamental understanding of metabolism as the basis for designing novel biological pathways for biochemical components that improve the nutritional quality of agricultural products and generate novel biorenewable sources of industrial feedstocks.
- **CENTER FOR STATISTICS AND APPLICATIONS IN FORENSIC EVIDENCE (CSAFE)** works to build a statistically sound and scientifically solid foundation for analyzing and interpreting forensic evidence to grow competence in forensic sciences and legal communities. The center is also committed to bringing together forensic practitioners and other stakeholders through educational and training opportunities.
- **IOWA WATER CENTER (IWC)** – one of 54 federally funded Water Resources Research Institutes – uses diverse expertise from researchers, communicators and policymakers to address locally significant water-related issues.
- **INSTITUTE FOR TRANSPORTATION (INTRANS)** is dedicated to developing and implementing innovative methods, materials and technologies for improving transportation efficiency, safety and reliability, while improving the learning environment of students, faculty and staff in transportation-related fields.
- **NANOVACCINE INSTITUTE** – led by Iowa State – is a consortium of dozens of researchers at 20 universities, research institutes, national laboratories and companies focused on the development of nanovaccines and nanotherapeutics that will revolutionize how diseases are prevented and treated.
- **NATIONAL INSTITUTE OF ANTIMICROBIAL RESISTANCE RESEARCH AND EDUCATION (NIAMRRE)** drives cross-sector engagement and coordinated action to combat the global threat of antimicrobial resistance across humans, animals and the environment through research, education, collaboration and advocacy.
- **PLANT SCIENCES INSTITUTE (PSI)** research is focused on predictive phenomics – gaining a better understanding of the effects of genotype and environment on phenotype in order to more accurately predict the performance of a given crop genotype in a given environment.



# Purposeful research focused on societal challenges

During the development of the Iowa State strategic plan in 2016, the campus research community identified five grand societal challenges that reflect the university's interdisciplinary research strengths and priorities. Many projects within the institution are shaped and framed to address at least one of these challenge themes:

- Promoting healthy lives;
- Building sustainable human and natural ecosystems;
- Creating next-generation materials and manufacturing technologies;
- Advancing data-driven discovery and secure cyber systems; and
- Developing global citizens and vibrant societies.

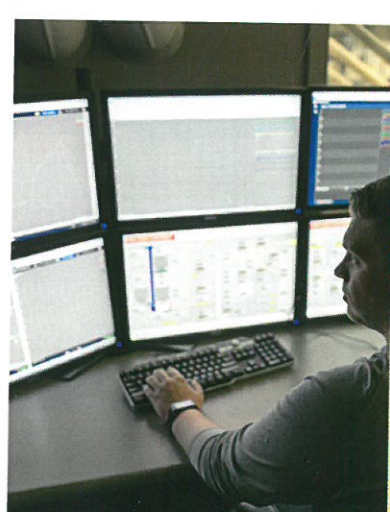
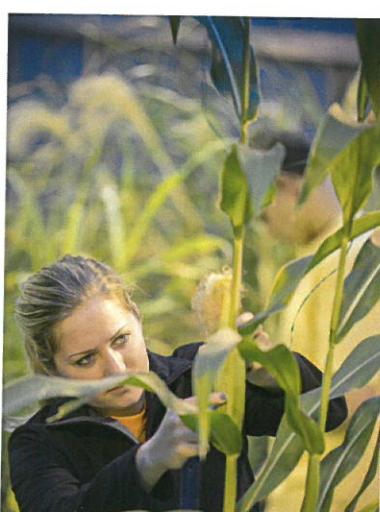




Undergirding these interdisciplinary themes – and critically important in their own right – are foundational, basic research pursuits across all disciplines, as well as creative and scholarly works in the arts and humanities. In addition, the translation of discoveries through undergraduate, graduate and postdoctoral fellow development, extension and outreach and commercialization of new ideas and technologies are critical to demonstrating the excellence and impact of Iowa State research and creative activities.

With each passing year, the world becomes a little smaller. Yet, out of necessity, Iowa State University's mission – Create, share and apply knowledge to make Iowa and the world a better place – continues to expand. This is a critical mission girded by **the Office of the Vice President for Research** by promoting the excellence of more than 700 principal investigators and 4,000 university research staff, and supporting well over 1,000 funded research projects and initiatives every year.

Through strong leadership, the OVPR will continue to play a vital role in growing the scale, stature and impact of Iowa State research for the betterment of the local, state and global communities the university serves, just as it has done for more than 160 years.







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