

IOWA STATE UNIVERSITY GRAND CHALLENGE RESEARCH THEMES

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The White House Office of Science and Technology Policy defines grand challenges as *“ambitious but achievable goals that harness science, technology and innovation to solve important national or global problems and that have the potential to capture the public’s imagination.”*

ISU’s research strengths and commitment to the land grant mission place it firmly at the nexus of the current multi-pronged, transdisciplinary revolution to meet the growing challenges confronting humanity in the 21st century. To support the strategic goal of growing the scale and impact of ISU research, VPR and Colleges have identified a set grand challenge research themes that represent:

- Complex challenges connected to global problems, and potentially relate to state and local concerns,
- Emerging next-generation areas of research that connect to ISU strengths,
- Excellent opportunities for expanding sponsored funding and advancing key research metrics,
- Strong integration across institutional missions (research, education, engagement) and a commitment to promoting and evaluating societal impacts, and
- A clear case for faculty involvement from multiple colleges.

Using these criteria, the following strongly interconnected ***ISU Grand Challenges Research Themes*** have evolved:

1. *Enabling Healthy Lives*

The healthy lives research theme seeks to position ISU as one of the best universities in the world that provides transformative science-based solutions to pursuing a healthy lifestyle by recognizing the interdependencies of human, animal and plant health, in an environment persistently confronted with water issues, diseases both old and new, and an aging population.

2. *Building Sustainable Human and Natural Ecosystems*

Echoed in many agencies, the sustainability theme addresses the challenge of balancing current societal needs with the well-being of future generations by developing the scientific and societal underpinnings of sustainability in its broadest sense – from deciphering the food-energy-water nexus to creating vibrant and engaged communities with supportive cultural, social, economic and environmental conditions.

3. *Designing Next Generation Materials and Manufacturing Technologies*

As one of the top priorities of federal agencies and industry sponsors, the advanced materials and manufacturing research theme speaks to ISU's excellent foundations to create new materials and transformative manufacturing technologies by leveraging shared infrastructure facilities between federal and university laboratories and building strong public-private partnerships.

4. *Creating Data Driven Science and Information Systems for Societal Challenges*

The data and information systems research theme leverages ISU's strengths with increasingly powerful and interconnected data-driven systems to improve the lives and security of citizens, communities and organizations through new approaches to harnessing complex and dynamic data sources arising from nearly any context – from science and engineering, to business and policy making, to creative and humanistic endeavors.

5. *Developing Global Citizens and Our Workforce*

To fulfill ISU's vision of building the capacity to address grand challenges, the education and workforce research theme focuses on investigating the most effective ways of preparing our next generation of global leaders, problem solvers and lifelong learners through education and engagement that transforms and enriches not only pre-K, K-12, community college and university classrooms, but also their communities.