



Strategic Plan (2020 - 2025)

Office of the Senior Vice President for Research

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

## Mission

The mission of the Office of the Senior Vice President for Research (OSVPR) is to define strategic research directions, foster innovative research advances, expand the research impact, and facilitate the conduct of research at Penn State by providing research vision, scientific resources, an informed and responsive administrative infrastructure, and opportunities for commercialization within an environment that espouses cooperation, collaboration, and communication among University campuses, academic units, research institutes, and external stakeholders and by a team of inspired individuals with diverse perspectives and talent. Our mission will continue to advance creativity, knowledge discovery, scholarly developments, and scientific solutions that tackle societies most pressing challenges.

## Vision

Penn State will advance its research worldwide and be known as a leader in research that impacts all aspects of our society, our nation, and the public good. From fundamental discovery to innovative applications, knowledge creation, sustainable implementation, economic development, and national security, our research will, more than ever before, have a transformative impact on the Commonwealth of Pennsylvania, the nation, the world, society as a whole, and the condition of our planet.

## Institutional Values

The above goals are informed and guided by the university's six core values. Our core values are an integral part of who we are and help define our agenda. Our institutional values are:

**INTEGRITY:** We act with integrity and honesty in accordance with the highest academic, professional, and ethical standards.

**RESPECT:** We respect and honor the dignity of each person, embrace civil discourse, and foster a diverse and inclusive community.

**RESPONSIBILITY:** We act responsibly, and we are accountable for our decisions, actions, and their consequences.

**DISCOVERY:** We seek and create new knowledge and understanding, and foster creativity and innovation, for the benefit of our communities, society, and the environment.

**EXCELLENCE:** We strive for excellence in all our endeavors as individuals, an institution, and a leader in higher education.

**COMMUNITY:** We work together for the betterment of our University, the communities we serve, and the world.

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## Goal 1

Advancing Precision Health in Context

### Goal

Penn State Research will advance precision healthcare and health resiliency in populations and individuals by leveraging a uniquely collaborative interdisciplinary research environment and applying expertise in the life sciences, social and behavioral sciences, medicine, engineering, law, and informatics for translation to clinical practice and measurable health impacts.

### 1.1: Build capacity in biomedical and health science research

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#### Objective

Penn State has world-class expertise in biomedical and health science research across the translational spectrum, including basic sciences, preclinical, clinical, implementation, public health, and social sciences. This objective will coalesce and grow an interdisciplinary cadre of faculty charged with developing solutions to health challenges facing society. For the translational components, partnerships with local, regional, and national health care systems will be explored to enable effective translation.

Convergence of the biological, engineering, and physical sciences is leading a third revolution in the life sciences that builds on molecular biology and genomics to deliver novel biotechnology. Through broad interdisciplinary collaborations between institutes, Penn State will be a leader in this revolution with significant convergence activities in biomedical and health sciences.

#### Key Performance Indicator(s)

The University Health Sciences Council will identify health challenges for a Biomedical and Health Sciences initiative via calls for proposals from faculty at Penn State. Such challenges will identify critical health issues. Colleges and institutes will initially seed these challenges to support problem-driven research with the expectation to create a new interdisciplinary research institute.

#### Mapping

Penn State Foundations

- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development

Penn State Thematic Priorities

- EH1 - Advance Discovery In Personalized And Population Health
- EH3 - Build Synergistic Partnerships To Influence Population Health
- EH4 - Facilitate Wellness Within The Penn State Community
- EH5 - Inform Governmental Health Policy

Penn State Supporting Elements

- OP2 - Establish Processes For Continual Institutional Assessment, Improvement, And Innovation, Including More Systematic Review Of Administrative And Academic Organizational Performance And Financial Stewardship
- OP3 - Develop A Culture Of Academic Business Modeling To Support Innovation
- IS1 - Prioritize Investment In Our People.
- IS3 - Drive Innovation And Discovery

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- IS5 - Align Fundraising To Address Specific Needs
- C01 - Focus On Impact Through Partnerships
- C02 - Provide Expanded Access To Penn State Resources
- C04 - Streamline Translation Of Penn State Discoveries
- C05 - Support Economic Development And Community Renewal.

## 1.2: Create an extensive understanding of personalized health through integration of individual biological and behavioral data and use that understanding to positively impact human health.

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### Objective

Penn State expertise spans the domains necessary to address the challenges of the explosion of big (multi-modal, complex, and dynamic) health data, from gene expression to social well-being, encompassing physical environmental exposures and behavioral responses, and to put these data to the most beneficial uses by promoting health, health behaviors, and health care through personalized health and medicine approaches and associated therapeutics.

### Key Performance Indicator(s)

1: Development of a plan to grow this area, based on integration of individual disciplines within a cell-to-society construct.

### Mapping

Penn State Foundations

- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

Penn State Supporting Elements

- IS3 - Drive Innovation And Discovery
- IS5 - Align Fundraising To Address Specific Needs

Penn State Thematic Priorities

- TE3 - Support And Empower Our Outstanding Faculty And Staff
- EH1 - Advance Discovery In Personalized And Population Health
- DI1 - Create digital solutions to new and emerging challenges

## 1.3: Promote and support research aimed at developing programs and policies that measurably reduce adverse effects of environment and lifestyle for sustained positive human health and well-being

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### Objective

Behaviors such as substance misuse and poor nutrition are associated with 40% of premature deaths in the US, including from cancer. We will develop an understanding of bio-psycho-social processes and apply them across the translational spectrum toward development and implementation of effective and sustainable practices aimed at reducing morbidity and mortality from diseases caused through changes in environments and lifestyles.

### Key Performance Indicator(s)

Development of a plan to grow this area, based on data collected from metrics.

### Mapping

Penn State Foundations

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- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

## Penn State Thematic Priorities

- EH1 - Advance Discovery In Personalized And Population Health
- EH2 - Create Innovative Academic Programs In Personalized And Population Health
- EH3 - Build Synergistic Partnerships To Influence Population Health
- EH4 - Facilitate Wellness Within The Penn State Community
- EH5 - Inform Governmental Health Policy

## Penn State Supporting Elements

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically
- IS3 - Drive Innovation And Discovery
- IS5 - Align Fundraising To Address Specific Needs
- C01 - Focus On Impact Through Partnerships
- C02 - Provide Expanded Access To Penn State Resources
- C03 - Promote Contributions Through Strategic Communication
- C04 - Streamline Translation Of Penn State Discoveries
- C05 - Support Economic Development And Community Renewal.

## 1.4: Reduce social disparities in health and healthcare

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### Objective

Interdisciplinary and translational research can inform efforts aimed at remediating widening gaps in health and health care among populations in the Commonwealth, the nation, and internationally in domains including cancer, substance misuse, metabolic syndrome, stress and trauma, aging, and infectious disease. Such disparities disproportionately affect persons of color. Both the co-morbidities among these and other health problems and the connections between health disparities and other disparities (e.g., in education, in access to food, housing, clean water, and other resources) require interdisciplinary and inter-professional collaborations. Ultimately, translational team science in this broad area is necessary to advance social justice by promoting and sustaining the health and well-being of diverse and changing populations in a global society.

### Key Performance Indicator(s)

Development of a plan to grow this area.

### Mapping

#### Penn State Foundations

- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

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## Penn State Thematic Priorities

- TE3 - Support And Empower Our Outstanding Faculty And Staff
- TE4 - Prepare Our Students For Success In Their Careers And In Life
- EH1 - Advance Discovery In Personalized And Population Health
- EH2 - Create Innovative Academic Programs In Personalized And Population Health
- EH3 - Build Synergistic Partnerships To Influence Population Health
- EH4 - Facilitate Wellness Within The Penn State Community
- EH5 - Inform Governmental Health Policy
- AH - Penn State will be a leader in the arts and humanities, utilizing them along with the sciences and other disciplines as agents of change in addressing complex global issues.
- DI - Penn State will prepare students for success in the digital age and use digitally optimized outreach to foster economic prosperity in communities across Pennsylvania and beyond.

## Penn State Supporting Elements

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically
- IS3 - Drive Innovation And Discovery
- IS5 - Align Fundraising To Address Specific Needs
- CO1 - Focus On Impact Through Partnerships
- CO2 - Provide Expanded Access To Penn State Resources
- CO3 - Promote Contributions Through Strategic Communication
- CO4 - Streamline Translation Of Penn State Discoveries
- CO5 - Support Economic Development And Community Renewal.

## 1.5: Build expertise in evolutionary medicine

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### Objective

Evolutionary biology provides insight into diseases and can yield new knowledge for use in medicine. For example, many genetic diseases are from genomes that evolved in environments very different from those they now inhabit. Penn State is uniquely positioned to lead in evolutionary biology to prevent and treat disease. We have substantial scientific expertise, e.g., in infectious disease, cancer, social science, evolutionary biology, ecology, insecticide resistance, and resistance in plant pathogens. We have an institute structure that powers transdisciplinary research teams, forming the foundation for collaboration among diverse groups of scientists and scholars: clinical, life, agricultural, computer, engineering, math, and social scientists. These experts are well-positioned to address critical scientific challenges in evolutionary medicine enable translation to society.

### Key Performance Indicator(s)

Within the next three years, with coordination and support from existing colleges, institutes, and centers, obtain significant external funding focused on evolutionary medicine that demonstrates broad collaboration across research units and where the funding will position us as recognized leaders in this field (e.g., P01, T32 or NRT or multi-PI P30 or P50 grants).

### Mapping

#### Penn State Foundations

- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development

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- F6 - Ensuring A Sustainable Future

## Penn State Thematic Priorities

- TE2 - Foster A Curriculum That Integrates Multiple Modes Of Delivery, While Leveraging Online Capabilities And Enhanced And Emerging Digital Learning Options
- TE5 - Partner More Effectively With Pre-College Educators

## Penn State Supporting Elements

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- IS - Penn State will think creatively and act boldly to ensure that its academic infrastructure aligns with and supports the University's mission and vision.

## 1.6: Advance understanding of the connections between the health of people, animals, plants, and their shared environments.

### Objective

Penn State will build on existing expertise in food science, agricultural systems, plant, and animal, science, and ecology to advance our understanding of key issues at the interface of health, agriculture, and the environment.

### Key Performance Indicator(s)

Expertise to address life systems resilience in the face of climate change and rapid evolution of resistant pests. Within the Commonwealth, we will leverage our extension services and a network of highly engaged alumni to connect this expertise to communities.

### Mapping

#### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

#### Penn State Thematic Priorities

- EH3 - Build Synergistic Partnerships To Influence Population Health
- EH4 - Facilitate Wellness Within The Penn State Community
- EH5 - Inform Governmental Health Policy
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation
- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- DI1 - Create digital solutions to new and emerging challenges
- DI5 - Drive Economic Development

#### Penn State Supporting Elements

- C01 - Focus On Impact Through Partnerships
- C02 - Provide Expanded Access To Penn State Resources
- C03 - Promote Contributions Through Strategic Communication

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- C04 - Streamline Translation Of Penn State Discoveries
- C05 - Support Economic Development And Community Renewal.

## Goal 2

### Stewarding Our Planet's Resources

**Goal**  
Penn State will propel innovation, within the university, our communities, and in policy, related to environmental stewardship with a sharpened focus on the role of climate change in causing and accelerating risks to critical human-environment systems. We will leverage Penn State's interdisciplinary research enterprise to enhance resilience and address challenges across water, food, and energy systems, allowing humans and the environment to thrive.

Informed and effective stewardship of the planet's resources that sustain societies and the environment has never been more critical. Research has shown that processes which regulate the stability and resilience of the Earth system are increasingly at risk. Amidst the many challenges, climate change remains the most critical challenge of our time. It causes, compounds, and accelerates other threats, including land use change and societal inequalities. New collaborations across disciplines and sectors are needed to examine tradeoffs, find commonalities, develop innovations, and scale solutions. Developing integrated advances in climate science, climate solutions, and climate risk (including economic and health risks) is critical to effectively stewarding our planet's resources.

### **2.1: Establish, coordinate, and promote Penn State's leadership in all aspects of climate research to advance and translate convergent innovations that address climate change.**

#### **Objective**

Penn State is world renowned for its research in climate science, climate modeling, renewable energy, agriculture, ecology, health, engineering, social sciences, law and policy, communication, and the humanities and arts. When these resources are harnessed and focused, they can address the monumental challenge of climate change and promote resilience. Our interdisciplinary institutes have convened and facilitated dialogues on climate and identified opportunities for promoting innovations in climate change research, advancing climate education, and creating community resilience. These partnerships are ripe for integration and coordination where establishing a climate consortium can guide local, state, national, and global responses to climate-related threats.

#### **Key Performance Indicator(s)**

Develop and expand convergent research and engagement opportunities related to climate change and community resilience from a local to global scale while working to incorporate diverse perspectives and methods of engagement.

#### **Mapping**

##### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

##### Penn State Thematic Priorities

- TE3 - Support And Empower Our Outstanding Faculty And Staff



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- TE4 - Prepare Our Students For Success In Their Careers And In Life
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation
- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- AH1 - Strategically Strengthen The Arts And Humanities Through Investments In Selected Areas
- DI1 - Create digital solutions to new and emerging challenges
- DI4 - Make Online Education And Personalized Learning Central To Our 21st-Century Land-Grant Mission
- DI5 - Drive Economic Development

## Penn State Supporting Elements

- OP1 - Improve The Design, Oversight, Integration, And Effectiveness Of Organizational Processes
- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically
- CO1 - Focus On Impact Through Partnerships
- CO2 - Provide Expanded Access To Penn State Resources
- CO3 - Promote Contributions Through Strategic Communication
- CO4 - Streamline Translation Of Penn State Discoveries
- CO5 - Support Economic Development And Community Renewal.

## 2.2: Establish Penn State research leadership across all energy domains

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### Objective

As society continues to increase its energy consumption needs, improvements in energy sources, efficiency, infrastructure, policy, and management will become increasingly important to the process of stewarding our planet's resources. Penn State is positioned to develop, advance, and disseminate innovative methods for energy production, infrastructure, utilization, carbon sequestration, energy storage and management, related environmental questions, energy efficiency of buildings, transportation, businesses, and other modes of energy use and consumption. At a time of rapid energy system transformation, these components will form the basis of the next generation of integrated energy systems to deliver clean, safe, abundant, affordable, and reliable energy as a foundation for economic and human development. We will drive these concepts with strategic partnerships to accelerate impact and translation.

### Key Performance Indicator(s)

Continued expansion of energy related research and engagement, including a focus on meeting the needs of diverse communities; partnering with industry, NGOs, and government to implement solutions; and further developing an energy outreach and extension program. An increase in numbers of students, including diverse students, seeking interdisciplinary energy research opportunities. Engagement with the arts and humanities is key. Engagement with policymakers and other decisionmakers to translate our research to practice is critical, where engagement occurs at multiple levels from local to international level, including through our Global Engagement Network.

### Mapping

#### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development

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## Penn State Thematic Priorities

- TE4 - Prepare Our Students For Success In Their Careers And In Life
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation
- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- AH3 - Prepare Students With The Skills To Work Together To Develop Ethically And Historically Informed Solutions To Our Most Pressing Problems
- DI1 - Create digital solutions to new and emerging challenges
- DI3 - Develop A More Robust Digital Infrastructure And Culture

## Penn State Supporting Elements

- OP3 - Develop A Culture Of Academic Business Modeling To Support Innovation
- IS2 - Invest In Resources Creatively And Systematically
- CO1 - Focus On Impact Through Partnerships
- CO2 - Provide Expanded Access To Penn State Resources
- CO3 - Promote Contributions Through Strategic Communication
- CO4 - Streamline Translation Of Penn State Discoveries
- CO5 - Support Economic Development And Community Renewal.

## **2.3: Protect and sustain the biodiversity and productivity of living systems through research and education on the regenerative processes and patterns that sustain healthy systems from microbial to global scales.**

### **Objective**

To adapt to the increasing threats caused by climate and human pressures, living systems in land and water need to constantly adapt and evolve; at the same time, human behaviors, choices, and systems need to be adapted to reduce pressure on living systems. While regenerative approaches have been pioneered across many domains including agriculture, engineering, and architecture, they remain research frontiers in environmental stewardship. Research innovation can help understand, support, and promote the regenerative capacity of living systems, which will in turn support human societal resilience. Such understanding will come from research innovations at many levels, from the molecular and cellular levels to the community and landscape levels and to the global level. Penn State has research strengths across all of these areas, many housed in existing centers of excellence, that can harness the potential of living systems, navigate complex changes in Earth systems, and identify research strategies that support the restoration and conservation of existing natural ecosystems.

### **Key Performance Indicator(s)**

Externally sponsored grants, opportunities for transdisciplinary connections with stakeholders, and seminar series. Support integration of research into Penn State's educational, operational, and global engagement activities.

### **Mapping**

#### Penn State Foundations

- F2 - Engaging Our Students
- F6 - Ensuring A Sustainable Future

#### Penn State Thematic Priorities

- TE4 - Prepare Our Students For Success In Their Careers And In Life
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation

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- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- AH3 - Prepare Students With The Skills To Work Together To Develop Ethically And Historically Informed Solutions To Our Most Pressing Problems
- DI1 - Create digital solutions to new and emerging challenges

## Penn State Supporting Elements

- OP3 - Develop A Culture Of Academic Business Modeling To Support Innovation
- IS2 - Invest In Resources Creatively And Systematically
- CO4 - Streamline Translation Of Penn State Discoveries
- CO5 - Support Economic Development And Community Renewal.

## 2.4: Advance global water security through knowledge about water flows and systems

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### Objective

Water is an essential resource for biological, ecological, industrial, and nearly every other system on Earth. The threats to this resource are increasing rapidly, including precipitation extremes such as flooding and drought exacerbated by climate change, nutrients and sediment impacting freshwater and estuaries, aquatic diseases impacting wildlife and humans, and emerging contaminants ranging from pharmaceuticals to radionuclides. Research will advance integration of existing resources to address these real-world impacts in the Commonwealth and beyond.

### Key Performance Indicator(s)

Creation of a Penn State Water Consortium to foster cohesion, host events for faculty and students, help mentor faculty research, and explore the potential development of an interdisciplinary graduate program in water. Build global research connections on critical water challenges and engage partners, including our established partner at Monash University (Australia). Along with Penn State Extension, the Water Consortium would help identify and work with partners to address critical water challenges and seek to find solutions through research, outreach, and engagement

### Mapping

#### Penn State Foundations

- F2 - Engaging Our Students
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

#### Penn State Thematic Priorities

- TE3 - Support And Empower Our Outstanding Faculty And Staff
- TE4 - Prepare Our Students For Success In Their Careers And In Life
- EH3 - Build Synergistic Partnerships To Influence Population Health
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation
- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- AH3 - Prepare Students With The Skills To Work Together To Develop Ethically And Historically Informed Solutions To Our Most Pressing Problems

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- DI1 - Create digital solutions to new and emerging challenges
- DI5 - Drive Economic Development

## Penn State Supporting Elements

- IS2 - Invest In Resources Creatively And Systematically
- IS3 - Drive Innovation And Discovery
- C01 - Focus On Impact Through Partnerships
- C04 - Streamline Translation Of Penn State Discoveries
- C05 - Support Economic Development And Community Renewal.

## 2.5: Urban Systems

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### Objective

Anthropogenic and environmental changes are having a profound impact on the health and sustainability of humans and the environment. A trend toward urbanization across the globe is driving resource needs and impacts water, food, and energy. A research focus on urban systems that incorporate affordable materials, social behavior, human health, and big data has the potential to have a profound impact.

### Key Performance Indicator(s)

Support a seminar series, provide seed grants, and mentor researchers on external grant opportunities. Expand opportunities for translational research; better incorporate the participation of and investment in arts and the humanities.

### Mapping

#### Penn State Foundations

- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

#### Penn State Thematic Priorities

- TE2 - Foster A Curriculum That Integrates Multiple Modes Of Delivery, While Leveraging Online Capabilities And Enhanced And Emerging Digital Learning Options
- EH3 - Build Synergistic Partnerships To Influence Population Health
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation
- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- AH3 - Prepare Students With The Skills To Work Together To Develop Ethically And Historically Informed Solutions To Our Most Pressing Problems
- DI1 - Create digital solutions to new and emerging challenges
- DI2 - Living with digital innovation
- DI5 - Drive Economic Development

#### Penn State Supporting Elements

- IS3 - Drive Innovation And Discovery
- IS4 - Build And Manage State-Of-The-Art Information Technology

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- C01 - Focus On Impact Through Partnerships
- C02 - Provide Expanded Access To Penn State Resources
- C05 - Support Economic Development And Community Renewal.

## 2.6: Promote sustainability research and creative accomplishments that simultaneously support social well-being, economic prosperity, and ecological health in the implementation of Sustainable Development Goals (SDGs) of the UN Agenda 2030.

### Objective

Anthropogenic and environmental changes are having a profound impact on the health and sustainability of humans, agriculture, and natural ecosystems. Finding ways to meet the SDGs to protect the environment is critical. Transdisciplinary research and creative accomplishments are needed to address complex sustainability problems, including engagement with external sponsors and stakeholders and other disciplines such as the arts and humanities.

### Key Performance Indicator(s)

Support of interdisciplinary research to comprehensively integrate sustainability into the University's research, operations, student life, teaching, and outreach to prepare students, faculty, staff, and members of the wider community to be sustainability leaders across all facets of their lives. New research directions will be developed to move it beyond operations and outreach, including increasing the participation of and investment in arts and humanities faculty, and students.

### Mapping

Penn State Foundations

- F2 - Engaging Our Students
- F4 - Enhancing Global Engagement
- F6 - Ensuring A Sustainable Future

Penn State Thematic Priorities

- TE4 - Prepare Our Students For Success In Their Careers And In Life
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation
- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- AH3 - Prepare Students With The Skills To Work Together To Develop Ethically And Historically Informed Solutions To Our Most Pressing Problems
- DI1 - Create digital solutions to new and emerging challenges

Penn State Supporting Elements

- IS3 - Drive Innovation And Discovery
- C01 - Focus On Impact Through Partnerships

## Goal 3

Transforming Education and Enhancing Access

### Goal

The Penn State OSVPR will transform education through research-based opportunities for engaged scholarship and learning.

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Penn State has identified six imperatives for successful institutions of higher education: excellence, student engagement, demographics and diversity, student career success and economic development, accessibility, and technology. Research provides essential and integral contributions to meeting these imperatives. It helps us discover how to better achieve these goals, and it is a best practice for education through the engaged research scholarship of students and learners of all types.

## 3.1: Promote engaged scholarship through research-related experiences involving advanced instrumentation and technologies, and inclusive of minorities, veterans, and students at all campuses

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### Objective

Engaged scholarship encompasses a wide variety of out-of-classroom academic learning experiences to complement in-classroom learning to reach a broad spectrum of learners. Robust engaged research will focus on the inclusion of undergraduates, veterans, and disadvantaged populations in activities supporting academic and career development. Research experiences for undergraduates is a major component of this learning.

### Key Performance Indicator(s)

Core facilities continue to provide unique training for research and practical laboratory educational experiences.

### Mapping

Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity

Penn State Thematic Priorities

- TE1 - Advance The Frontiers Of Knowledge

Penn State Supporting Elements

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- IS - Penn State will think creatively and act boldly to ensure that its academic infrastructure aligns with and supports the University's mission and vision.
- CO - Penn State will partner directly and effectively with our constituencies in sharing consequential research, creative works, and scholarship worldwide.

## 3.2: Educate faculty, students, and staff to actively support technology transfer, research commercialization, and work with private sponsors

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### Objective

The competitive global economy is changing the culture of higher education. The need for a highly skilled workforce to support commercialization is now recognized well beyond the business and industry sectors.

### Key Performance Indicator(s)

Creation and distribution of training modules for research translation. New content will be developed on a variety of relevant subjects and will be distributed on-line and via in person training sessions.

### Mapping

Penn State Foundations

- F1 - Enabling Access To Education
- F5 - Driving Economic Development

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## Penn State Thematic Priorities

- No Associated Thematic Priority Connection

## Penn State Supporting Elements

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- CO - Penn State will partner directly and effectively with our constituencies in sharing consequential research, creative works, and scholarship worldwide.

### 3.3: Maintain an exceptional environment for postdoctoral training and postdoctoral professional development

#### Objective

Postdoctoral scholars are an important element of research. We will maintain and advance our robust career and professional development curriculum for them. Training is offered throughout the year for postdoctoral scholars, fellows, and assistant research professors to transition to careers in academia as tenure track, non-tenure track, or teaching faculty, or to transition to careers in industry, foundations, management, administration, and other non-academic careers.

#### Key Performance Indicator(s)

Progress on this objective will be measured by the number of attendees at workshops/events related to academic and nonacademic career tracks and their subsequent career placement. Engagement with postdoc alumni in various career tracks and evaluations from postdocs about the impact and learning outcomes from the workshops and webinars will be collected.

#### Mapping

##### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity

##### Penn State Thematic Priorities

- TE1 - Advance The Frontiers Of Knowledge
- TE4 - Prepare Our Students For Success In Their Careers And In Life
- TE - Penn State will be a leader in the transformation of education, including enhancing access to it, as it fulfills its land-grant mission in a 21st-century context and continues to drive discovery-focused research across disciplines.

##### Penn State Supporting Elements

- CO - Penn State will partner directly and effectively with our constituencies in sharing consequential research, creative works, and scholarship worldwide.

### 3.4: Innovate excellent, diverse, and student-centered interdisciplinary graduate training programs

#### Objective

Graduate students are a primary engine of research productivity at Penn State. We must continue to innovate to deliver excellence in interdisciplinary graduate training supported by the acquisition of new training grants. This will be essential to provide innovative, inclusive, and student-centered environments to train the next generation of scientists for a rapidly evolving job market. Furthermore, graduate students play a key role in delivering experiential/hands-on learning and research training to our undergraduate students. We must continue to support innovation in training programs to support graduate student instructional training.



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## Key Performance Indicator(s)

Training grants and other external funding for interdisciplinary graduate degree programs and that are broadly supported by Deans and Unit Leaders including goals for graduate student excellence, achievement, diversity and inclusion, and student success after graduation.

## Mapping

### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity

### Penn State Thematic Priorities

- TE1 - Advance The Frontiers Of Knowledge
- TE2 - Foster A Curriculum That Integrates Multiple Modes Of Delivery, While Leveraging Online Capabilities And Enhanced And Emerging Digital Learning Options
- TE3 - Support And Empower Our Outstanding Faculty And Staff
- TE4 - Prepare Our Students For Success In Their Careers And In Life

### Penn State Supporting Elements

- OP1 - Improve The Design, Oversight, Integration, And Effectiveness Of Organizational Processes
- OP2 - Establish Processes For Continual Institutional Assessment, Improvement, And Innovation, Including More Systematic Review Of Administrative And Academic Organizational Performance And Financial Stewardship
- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically
- IS3 - Drive Innovation And Discovery

## Goal 4

### Empowering Science and Society Through Digital Innovation

#### Goal

As computation and data science become increasingly vital modes of scientific inquiry, Penn State will lead in interdisciplinary research through the development and application of innovative digital methods to tackle problems of scientific and societal importance.

Quantification and characterization of our complex world provides an ever-increasing wealth of data which, when coupled with scientifically rigorous approaches to data-intensive and computation-intensive modeling, provides a singular opportunity to address critical societal and scientific challenges. Penn State scholars and supporting infrastructure are driving advances for innovation, economic prosperity, and societal well-being. A critical component will be to advance artificial intelligence (AI), from the science of AI through to numerous applications, including 5G, additive manufacturing, biotechnology, national security, quantum, and health.

#### **4.1: Build the ecosystem of people, interdisciplinary initiatives, and infrastructure to establish Penn State as a global leader in computation and data science.**

#### Objective

In particular, build the ecosystem to make great strides in advancing the industries of the future: artificial intelligence (AI), quantum, 5G, biotechnology, and additive manufacturing, all of which have critical and novel data science needs.



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Penn State is expanding expertise, infrastructure, and collaborative research initiatives, establishing the university as a leader in digital discovery. The Institute for Computational and Data Sciences (ICDS) is the Penn State hub for interdisciplinary advanced computation and data intensive research. ICDS will continue to be a cornerstone for building Penn State leadership in computation for science and society, expanding Penn State capacity in computational and data science and artificial intelligence methodologies. ICDS will increase investments in a diverse cohort of ICDS co-hires between ICDS and one or more departments, a wider community of scholars, collaborations across Penn State, interdisciplinary research initiatives, and the expansion of the ICDS Roar, formerly ICDS-ACI, ecosystem of professionals, infrastructure, and resources, to provide a cohesive framework for interdisciplinary research.

## Key Performance Indicator(s)

- 1: Expansion of an interdisciplinary research community enabled by computation and data sciences.
- 2: Ensure that the Penn State research community has access to an advanced data and high-performance computing (HPC) ecosystem.
- 3: Creation of interdisciplinary centers and initiatives to enhance the visibility of Penn State research and application of artificial intelligence and other areas of critical national and international priority, and possibly coordinated under a consortium-like structure.

## Mapping

### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

### Penn State Thematic Priorities

- TE1 - Advance The Frontiers Of Knowledge
- TE2 - Foster A Curriculum That Integrates Multiple Modes Of Delivery, While Leveraging Online Capabilities And Enhanced And Emerging Digital Learning Options
- EH1 - Advance Discovery In Personalized And Population Health
- EH3 - Build Synergistic Partnerships To Influence Population Health
- EH - Penn State will be a leader in promoting quality of life through comprehensive approaches to enhancing personalized and population health, achieved through a commitment to and investment in relevant research, education, clinical practice, and outreach.
- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation
- SP3 - Improve Modeling Capability
- SP4 - Fully Engage Our Research Infrastructure
- SP5 - Forge Broad And Relevant Partnerships
- AH2 - Invest In Penn State As A Cultural Destination And Enhance Personal Engagement In The Arts
- DI1 - Create digital solutions to new and emerging challenges
- DI3 - Develop A More Robust Digital Infrastructure And Culture
- DI5 - Drive Economic Development

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

## Penn State Supporting Elements

- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically
- IS3 - Drive Innovation And Discovery
- IS4 - Build And Manage State-Of-The-Art Information Technology
- IS5 - Align Fundraising To Address Specific Needs
- CO1 - Focus On Impact Through Partnerships
- CO2 - Provide Expanded Access To Penn State Resources
- CO4 - Streamline Translation Of Penn State Discoveries
- CO5 - Support Economic Development And Community Renewal.

## **4.2: Establish Penn State as Pennsylvania s leader for advanced computation and complex data methodologies through outreach, training, and translational research for economic development, technology transfer, entrepreneurship, and societal impact more broadly.**

### **Objective**

Penn State is the Pennsylvania land-grant university founded with a mission of teaching, research, service, and extension in support of Pennsylvania s industries. As advanced computation and complex data are becoming increasingly central to every area of daily life, we will provide access to advanced computing and data infrastructure and professionals, advanced training, and research expertise. This will serve to invigorate use-inspired research, product design and prototyping, technology transfer, and economic development.

### **Key Performance Indicator(s)**

1: Engage more broadly across Penn State’s campuses and others in the Commonwealth to support development of HPC-related research capacity.

2: Expand access and partnerships to cyberinfrastructure resources to Penn State’s Innovation Hub companies and industry partners.

### **Mapping**

#### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development

#### Penn State Thematic Priorities

- TE2 - Foster A Curriculum That Integrates Multiple Modes Of Delivery, While Leveraging Online Capabilities And Enhanced And Emerging Digital Learning Options
- TE4 - Prepare Our Students For Success In Their Careers And In Life
- EH - Penn State will be a leader in promoting quality of life through comprehensive approaches to enhancing personalized and population health, achieved through a commitment to and investment in relevant research, education, clinical practice, and outreach.
- SP3 - Improve Modeling Capability
- SP5 - Forge Broad And Relevant Partnerships
- DI1 - Create digital solutions to new and emerging challenges
- DI3 - Develop A More Robust Digital Infrastructure And Culture
- DI4 - Make Online Education And Personalized Learning Central To Our 21st-Century Land-Grant Mission

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

- DI5 - Drive Economic Development

## Penn State Supporting Elements

- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically
- IS3 - Drive Innovation And Discovery
- IS4 - Build And Manage State-Of-The-Art Information Technology
- IS5 - Align Fundraising To Address Specific Needs
- IS - Penn State will think creatively and act boldly to ensure that its academic infrastructure aligns with and supports the University's mission and vision.

### **4.3: Establish Penn State as a leader in the advanced computing cyber-ecosystem of hardware, software, methodologies, and experts to empower transformative research by building partnerships from the institutional level to the international scale.**

#### **Objective**

Penn State will lead computational and data science research and cyber-ecosystem partnerships supporting institutes and colleges in computational and data sciences in regional, national, and international collaborative initiatives. We will coalesce the distinct and complementary expertise and capabilities of Penn State, building on several existing partnerships and develop new collaborations.

#### **Key Performance Indicator(s)**

Forge and expand high-impact national and international partnerships and projects around computation and data science research.

#### **Mapping**

##### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

##### Penn State Thematic Priorities

- TE3 - Support And Empower Our Outstanding Faculty And Staff
- SP5 - Forge Broad And Relevant Partnerships
- DI1 - Create digital solutions to new and emerging challenges
- DI2 - Living with digital innovation
- DI3 - Develop A More Robust Digital Infrastructure And Culture
- DI4 - Make Online Education And Personalized Learning Central To Our 21st-Century Land-Grant Mission
- DI5 - Drive Economic Development
- DI - Penn State will prepare students for success in the digital age and use digitally optimized outreach to foster economic prosperity in communities across Pennsylvania and beyond.

##### Penn State Supporting Elements

- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically
- IS3 - Drive Innovation And Discovery
- IS4 - Build And Manage State-Of-The-Art Information Technology

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

- IS5 - Align Fundraising To Address Specific Needs
- IS - Penn State will think creatively and act boldly to ensure that its academic infrastructure aligns with and supports the University's mission and vision.

## 4.4: Establish Penn State as a global hub for interactive, collaborative, and participatory research, learning, and outreach by developing scientific software, tools, and data repositories.

### Objective

Data are collected at a faster rate than we can analyze. Multi-institutional and multi-disciplinary investigations often rely upon complex data, models, and analysis tools. Collaborations between disciplinary experts and computational scientists are needed to transform data to knowledge using secure, fast, and reliable data portals. To firmly establish Penn State's academic pre-eminence in the digital age, we will build locally hosted or multi-institutional digital hubs supporting collaborative exploration of complex data and models, or digital laboratories. This will build upon the cyber-ecosystem, emphasizing data sharing and interoperability, data standards, metadata, privacy and security, cloud and edge computing, and federated data access.

### Key Performance Indicator(s)

Establish and support strategic multi-institutional and international digital laboratories for computational and data-intensive research.

### Mapping

#### Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement
- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

#### Penn State Thematic Priorities

- EH - Penn State will be a leader in promoting quality of life through comprehensive approaches to enhancing personalized and population health, achieved through a commitment to and investment in relevant research, education, clinical practice, and outreach.
- SP - Penn State will be a leader in creating comprehensive solutions to mitigate the dangers of climate change and address the challenges of providing safe and abundant water, clean and renewable energy sources, and plentiful and nutritious food.
- DI1 - Create digital solutions to new and emerging challenges
- DI2 - Living with digital innovation
- DI3 - Develop A More Robust Digital Infrastructure And Culture
- DI4 - Make Online Education And Personalized Learning Central To Our 21st-Century Land-Grant Mission
- DI5 - Drive Economic Development
- DI - Penn State will prepare students for success in the digital age and use digitally optimized outreach to foster economic prosperity in communities across Pennsylvania and beyond.

#### Penn State Supporting Elements

- IS1 - Prioritize Investment In Our People.
- IS2 - Invest In Resources Creatively And Systematically

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

- IS3 - Drive Innovation And Discovery
- IS4 - Build And Manage State-Of-The-Art Information Technology
- IS5 - Align Fundraising To Address Specific Needs
- IS - Penn State will think creatively and act boldly to ensure that its academic infrastructure aligns with and supports the University's mission and vision.
- C01 - Focus On Impact Through Partnerships
- C02 - Provide Expanded Access To Penn State Resources
- C04 - Streamline Translation Of Penn State Discoveries
- C05 - Support Economic Development And Community Renewal.

## Goal 5

Advancing the Arts and Humanities

### Goal

We will build stronger inter-disciplinary communications and collaborations to foster and disseminate outcomes of research undertaken to enhance understanding and valuation of diverse cultures.

Penn State is a leader in the fields of anthropology, sociology, and psychology where researchers are looking at how individuals have come together to form modern societies with diverse cultural beliefs and practices. Engineers and architects design much of the physical and cyber infrastructure supporting our cultures. Faculty in the humanities study the history, variety, and significance of human expression since the invention of writing. Faculty in communications and the arts study, develop, and practice forms of human expression used in the Pyramids to the internet. International research and collaborations advance the understanding of diverse cultures. Given the complexities of human beings, researchers have a clear role in valuing and exploring and finding solutions that benefit our cultures.

### 5.1: Become the institution known for championing research that advances scholarly research in the arts and humanities and that improves the human condition to develop solutions for societal challenges worldwide

#### Objective

Penn State connects with every continent on the globe through an expansive international research network and student base. These connections remind us of our societal obligation to consider not only the value of specific research productivity for the US and other countries, but also to strive to reduce disparities in health, education, and access to resources and improve the human condition among economically disadvantaged and more remote societies. Initiatives will stimulate a cross-fertilization of scholarly expertise to enable new discoveries, new solutions and joint translational efforts embracing institutional strengths, diversity, and investments through the arts and the humanities.

#### Key Performance Indicator(s)

Developing scholarly activities and partnerships across the university that expand our global footprint in areas associated with societal obligation.

#### Mapping

Penn State Foundations

- F1 - Enabling Access To Education
- F2 - Engaging Our Students
- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

- F5 - Driving Economic Development
- F6 - Ensuring A Sustainable Future

## Penn State Thematic Priorities

- TE1 - Advance The Frontiers Of Knowledge
- TE2 - Foster A Curriculum That Integrates Multiple Modes Of Delivery, While Leveraging Online Capabilities And Enhanced And Emerging Digital Learning Options
- TE3 - Support And Empower Our Outstanding Faculty And Staff
- TE4 - Prepare Our Students For Success In Their Careers And In Life
- TE5 - Partner More Effectively With Pre-College Educators
- TE - Penn State will be a leader in the transformation of education, including enhancing access to it, as it fulfills its land-grant mission in a 21st-century context and continues to drive discovery-focused research across disciplines.

## Penn State Supporting Elements

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- IS - Penn State will think creatively and act boldly to ensure that its academic infrastructure aligns with and supports the University's mission and vision.
- CO - Penn State will partner directly and effectively with our constituencies in sharing consequential research, creative works, and scholarship worldwide.

## 5.2: Continue to foster opportunities for collaborative endeavors at the nexus of science and the arts

### Objective

Both science and art have the capacity to stimulate curiosity, shape impressions, and inspire wonder. Penn State can build on its emerging success as an institution that fosters and reinforces collaboration between scholars in science and the arts to facilitate understanding, appreciation, and integration of these complimentary disciplines. Using these ideas not just to represent complex data to scientists, but also to communicate the beauty and power of science to a broad community and art to the scientific community.

### Key Performance Indicator(s)

New collaborative initiatives, activities (e.g., symposia, workshops), and accomplishments integrating the arts in planning, launching, and execution.

### Mapping

#### Penn State Foundations

- F3 - Advancing Inclusion, Equity, and Diversity
- F4 - Enhancing Global Engagement

#### Penn State Thematic Priorities

- AH1 - Strategically Strengthen The Arts And Humanities Through Investments In Selected Areas
- AH3 - Prepare Students With The Skills To Work Together To Develop Ethically And Historically Informed Solutions To Our Most Pressing Problems

#### Penn State Supporting Elements

- IS2 - Invest In Resources Creatively And Systematically
- CO1 - Focus On Impact Through Partnerships
- CO3 - Promote Contributions Through Strategic Communication

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

## Goal 6

Invigorating Entrepreneurship, Technology Transfer, and Economic Development

### Goal

Penn State will continue to translate its scientific research and leverage its resources to invigorate entrepreneurship, technology transfer, and economic development in Pennsylvania, the United States, and the world.

### 6.1 Increase Penn State's collaboration with the private sector by providing more opportunities for faculty and students to engage in technology transfer and economic development

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#### Objective

The University will expand relationships with existing private sector partners to include more Penn State faculty or units while also establishing new relationships with industry. The key to building more fruitful relationships will be to work collaboratively across the university to establish and grow multi-sector, deep, and long-lasting relationships with our corporate partners.

#### Key Performance Indicator(s)

An overall increase in successful engagements with industry which would result in an increase in sponsored research awards, an increase in philanthropic support, and an increase in the number companies engaging with Penn State and the Corporate Engagement Center.

#### Mapping

Penn State Foundations

- F5 - Driving Economic Development

Penn State Thematic Priorities

- TE - Penn State will be a leader in the transformation of education, including enhancing access to it, as it fulfills its land-grant mission in a 21st-century context and continues to drive discovery-focused research across disciplines.
- EH - Penn State will be a leader in promoting quality of life through comprehensive approaches to enhancing personalized and population health, achieved through a commitment to and investment in relevant research, education, clinical practice, and outreach.
- SP - Penn State will be a leader in creating comprehensive solutions to mitigate the dangers of climate change and address the challenges of providing safe and abundant water, clean and renewable energy sources, and plentiful and nutritious food.
- AH - Penn State will be a leader in the arts and humanities, utilizing them along with the sciences and other disciplines as agents of change in addressing complex global issues.
- DI - Penn State will prepare students for success in the digital age and use digitally optimized outreach to foster economic prosperity in communities across Pennsylvania and beyond.

Penn State Supporting Elements

- C01 - Focus On Impact Through Partnerships
- C02 - Provide Expanded Access To Penn State Resources
- C03 - Promote Contributions Through Strategic Communication
- C04 - Streamline Translation Of Penn State Discoveries
- C05 - Support Economic Development And Community Renewal.



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**6.2: Enhance Penn State's growing culture of entrepreneurship, technology transfer, and economic development, including a focus on the national industries of the future: AI, 5G, quantum, biotechnology, and additive manufacturing.**

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### Objective

During the past five years, Penn State has made significant strides in establishing a culture that values entrepreneurship, technology transfer, and economic development. Building on momentum created by the Invent Penn State initiative, we will expand the culture of entrepreneurship. This includes marketing existing resources and opportunities with the Fund for Innovation, the Office of Technology Management, the Office of Entrepreneurship & Commercialization, the Office of Industrial Partnerships, Ben Franklin Technology Partners of Central and Northern Pennsylvania, and Innovation Park. We will also continue to leverage alumni relationships to drive research commercialization and economic development. Specific focus will address the national industries of the future: AI, 5G, quantum, biotechnology, and additive manufacturing.

### Key Performance Indicator(s)

Increase in companies assisted, program participants, and positive trends in tech transfer metrics.

### Mapping

Penn State Foundations

- F2 - Engaging Our Students
- F5 - Driving Economic Development

Penn State Thematic Priorities

- No Associated Thematic Priority Connection

Penn State Supporting Elements

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- CO - Penn State will partner directly and effectively with our constituencies in sharing consequential research, creative works, and scholarship worldwide.

**6.3: Improve, streamline, and clarify processes to accelerate the pace at which technologies move from discovery to implementation**

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### Objective

We will continue to review our processes for tech transfer, from disclosure through policy for intellectual property licensing and identify improvements to reduce barriers. We will continue to build and implement a culture of continuous improvement as it relates to processes and tools involved with technology transfer, industry partnerships, and startup activities.

### Key Performance Indicator(s)

The impact of successful process improvements will ultimately support an increase in the rate of intellectual property disclosures, in the number of license agreements executed, an increase in royalties, and in an increase in industry sponsored research activity.

### Mapping

Penn State Foundations

- F5 - Driving Economic Development

Penn State Thematic Priorities

- No Associated Thematic Priority Connection

Penn State Supporting Elements



# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

- OP - Penn State will lead nationally in the design, development, and deployment of effective and agile organizational processes that support the University's mission.
- C01 - Focus On Impact Through Partnerships
- C02 - Provide Expanded Access To Penn State Resources
- C04 - Streamline Translation Of Penn State Discoveries
- C05 - Support Economic Development And Community Renewal.

## Goal 7

Innovating for National Security Asymmetry

### Goal

Our nation's technological preeminence on the global stage will continue to be challenged in the foreseeable future; we exist in an increasingly complex security environment that is defined by rapid technological and environmental change. As the nature of global security evolves, challenges must be anticipated to the extent that they impact our core competencies and highlight our inherent agility and ability to adapt in everything that we do. Maintaining relevance to our sponsor base and delivering critical research and engineering to advance our nation's technological edge is paramount. Supporting national security with a balanced approach as a Department of Defense University Affiliated Research Center (UARC) through education, scientific discovery, technology demonstration, and transition to application will drive innovation for national security asymmetry.

### 7.1 Advance Penn State's position in areas of national security

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#### Objective

Advance Penn State's position in areas of national security by maintaining our core competencies, developing the next generation of national security professionals, and initiating additional areas of exploration and innovation

#### Key Performance Indicator(s)

- 1: Maintaining traditional sponsor-base for UARC-related research
- 2: Expanding sponsor-base for additional innovations in national security

#### Mapping

Penn State Foundations

- F2 - Engaging Our Students
- F5 - Driving Economic Development

Penn State Thematic Priorities

- SP1 - Drive Fundamental Science Relevant To Critical Problems
- SP2 - Develop Technologies For Implementation

Penn State Supporting Elements

- IS3 - Drive Innovation And Discovery

### 7.2 Serve as a catalyst for collaboration

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#### Objective

Serve as a catalyst for collaboration across Penn State in research that supports national security including addressing the national imperatives of AI, 5G, quantum, biotechnology, and additive manufacturing, in addition to electronic infrastructure, food and water supplies, public health, and the natural environment

#### Key Performance Indicator(s)

Increase collaborative activity between the Applied Research Lab and other units across Penn State

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

## Mapping

Penn State Foundations

- F2 - Engaging Our Students
- F6 - Ensuring A Sustainable Future

Penn State Thematic Priorities

- SP5 - Forge Broad And Relevant Partnerships

Penn State Supporting Elements

- IS3 - Drive Innovation And Discovery
- C01 - Focus On Impact Through Partnerships

## 7.3: Expand our capability to understand, detect, and mitigate biosecurity health threats (e.g., zoonotic, biowarfare, pandemics) on a global scale.

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### Objective

Leverage our strengths in biomedical health to evolve our activities into a coordinated approach to health security. This includes detection, characterization, tracking, mitigation, and avoidance of zoonotic diseases.

### Key Performance Indicator(s)

Development of advanced methodologies in one or more areas of: zoonotic detection, characterization, tracking, mitigation, or avoidance of zoonotic disease, biowarfare, and pathogens of future pandemics.

### Mapping

Penn State Foundations

- F0- No Foundation Connection

Penn State Thematic Priorities

- No Associated Thematic Priority Connection

Penn State Supporting Elements

- No Associated Supporting Element Connection

## Goal 8

Maintaining and Nurturing an Exceptional Workforce

### Goal

Our employees are our greatest asset and our success as an organization in achieving our goals is based on having a team of inspired individuals with unique perspectives, an array of skills, and providing them with an engaging environment with opportunities for growth.

Underpinning all of our goals is the realization that without effective and efficient operational support, our research enterprise cannot thrive. Without a diverse workforce, our research enterprise cannot thrive. Without opportunities for professional growth, our research enterprise cannot thrive. The creation of a partnership between all individuals within our enterprise that encompasses researchers, administrators, and staff undoubtedly results in a robust, informed, and responsive administrative infrastructure, which then advances the growth of research.

# Strategic Plan (2020 - 2025) - Office of the Vice President for Research

## 8.2: Provide professional development and opportunities for career advancement

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### Objective

Provide professional development and opportunities for career advancement to enable our employees to grow personally and professionally as individuals and collaborators

### Key Performance Indicator(s)

Employees seeking and participating in professional development opportunities

### Mapping

Penn State Foundations

- F0- No Foundation Connection

Penn State Thematic Priorities

- No Associated Thematic Priority Connection

Penn State Supporting Elements

- No Associated Supporting Element Connection

## 8.1: Ensure diversity, equity, and inclusion is in the forefront of workforce expansion

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### Objective

Ensure diversity, equity, and inclusion is in the forefront of workforce expansion, increasing the breadth and depth of diversity within our organization

### Key Performance Indicator(s)

Committees, groups, team leaders, and new hires should be diverse in many ways. Assignment of responsibilities, providing opportunities, chairing committees, and committee participants should be reflective of this diversity, including adequate support to engage in these activities. Different individuals should be offered opportunities and provided support for their participation. Hiring committees should be broadly diverse and should work with human resources to attract diverse applicants.

### Mapping

Penn State Foundations

- F0- No Foundation Connection

Penn State Thematic Priorities

- No Associated Thematic Priority Connection

Penn State Supporting Elements

- No Associated Supporting Element Connection

## 8.3: Productive work environment

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### Objective

Provide a work environment that positions individuals to do their best work, including opportunities for individuals to excel, teams to be creative, and units to inspire, while also being provided the necessary software, tools, and equipment to attain this excellence.

### Key Performance Indicator(s)

Employees having sufficient supplies and equipment to do their jobs well. Employees having sufficient flexibility in their schedules to feel independent and inspired. Employees offered opportunities to contribute to innovations in their work environment.

### Mapping

Penn State Foundations

## Strategic Plan (2020 - 2025) - Office of the Vice President for Research

- F0- No Foundation Connection

Penn State Thematic Priorities

- No Associated Thematic Priority Connection

Penn State Supporting Elements

- No Associated Supporting Element Connection

## **Strategic Plan (2020 - 2025) - Office of the Vice President for Research**

The University is committed to equal access to programs, facilities, admission, and employment for all persons. It is the policy of the University to maintain an environment free of harassment and free of discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information, or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the University's educational mission, and will not be tolerated. Direct all inquiries regarding nondiscrimination policy to the Affirmative Action Office, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901; Email: [aao@psu.edu](mailto:aao@psu.edu); Tel: 814-863-0471.

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