Welcome to Research @ Penn State!

Lora G. Weiss, Ph.D.
Senior Vice President for Research

August 20, 2020

Visualization of the powder/liquid interface at atomistic scale during the evaporation in Cold Sintering Process. Credit: van Duin Group / Penn State
More than **5,300** researchers collaborating globally

- **11** members
  National Academy of Sciences

- **11** members
  American Academy of Arts and Sciences

- **11** senior members and fellows
  National Academy of Inventors

- **5** members
  National Academy of Engineering

- **3** members
  National Academy of Medicine

- **14** researchers named “Highly Cited Researchers” by Clarivate Analytics
Research Expenditures FY 2019

Total Expenditures: $968 million

Federal: $593 Million
Industry and Other: $101 Million
Commonwealth of Pennsylvania: $73 Million
University: $201 Million

Federal Expenditures: $593 million

- Dept. of the Interior: $1.5 M
- Dept. of Commerce: $2.6 M
- Dept. of Transportation: $5.2 M
- Dept. of Education: $5.4 M
- NASA: $15.0 M
- Dept. of Agriculture: $22.6 M
- Dept. of Energy: $27.3 M
- Other Federal Funds: $54.0 M
- NSF: $68.1 M
- Dept. of HHS (NIH): $132.8 M
- Dept. of Defense: $258.6 M

Millions of Dollars
Penn State has 18 research fields ranked in the top 10
This is more than any other university
Testament to our
- Excellence
- Breadth
- Depth

Research expenditures rankings
#21 All universities
#12 All public universities

Federal agencies rankings
#3 DOD
#11 USDA
#17 NSF
#20 NASA

Source: NSF Higher Ed R&D Survey FY2018, released Nov 2019
<table>
<thead>
<tr>
<th>Top 25 universities by key fields</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Johns Hopkins</strong></td>
</tr>
<tr>
<td><strong>Michigan</strong></td>
</tr>
<tr>
<td><strong>UC San Francisco</strong></td>
</tr>
<tr>
<td><strong>U. Pennsylvania</strong></td>
</tr>
<tr>
<td><strong>U. Washington</strong></td>
</tr>
<tr>
<td><strong>UCLA</strong></td>
</tr>
<tr>
<td><strong>UC San Diego</strong></td>
</tr>
<tr>
<td><strong>Wisconsin</strong></td>
</tr>
<tr>
<td><strong>Harvard</strong></td>
</tr>
<tr>
<td><strong>Duke</strong></td>
</tr>
<tr>
<td><strong>Stanford</strong></td>
</tr>
<tr>
<td><strong>UNC</strong></td>
</tr>
<tr>
<td><strong>Cornell</strong></td>
</tr>
<tr>
<td><strong>Pittsburgh</strong></td>
</tr>
<tr>
<td><strong>Yale</strong></td>
</tr>
<tr>
<td><strong>MIT</strong></td>
</tr>
<tr>
<td><strong>Minnesota</strong></td>
</tr>
<tr>
<td><strong>Columbia</strong></td>
</tr>
<tr>
<td><strong>UT MD Anderson</strong></td>
</tr>
<tr>
<td><strong>Texas A&amp;M University</strong></td>
</tr>
<tr>
<td><strong>Penn State</strong></td>
</tr>
<tr>
<td><strong>Georgia Tech</strong></td>
</tr>
<tr>
<td><strong>USC</strong></td>
</tr>
<tr>
<td><strong>NYU</strong></td>
</tr>
<tr>
<td><strong>Ohio State</strong></td>
</tr>
</tbody>
</table>

Source: NSF Higher Ed R&D Survey FY2018, released No. 2019
Matching Funds Policy

- Equipment (if required by sponsor):
  - Match of 15% from central on minimum annual equipment cost of $100,000
  - College/department must match at a minimum of 7.5%
    policy.psu.edu/policies/rag51

- Graduate Assistantships/Traineeships (GA):
  - Match equal to 50% of F&A generated on GA costs or 10% of total GA costs
  - Minimum annual match of $10,000
    policy.psu.edu/policies/rag52
OSVPR Organization

- Sponsored Programs
- Research Protections
- Animal Resource Program
- ORIS
- Strategic Initiatives
  - SIRO
  - Limited Submissions
  - Postdoctoral Affairs
- UARC
- Research Commercialization
  - Industrial Partnerships
  - Technology Management
- Invent Penn State
- Ben Franklin
- Research Institutes (7)
- URC/UHSC
Co-Hires (Currently Active)

- 284 individual faculty members
- 11 faculty members co-funded by 2 institutes
Interdisciplinary Collaboration & Co-Hires

“There are exceptions to this rule. One university in our sample stood out...”
Dec 3, 2019

Differentiators
- Genuine partnership between deans & directors
  - Shared vision, shared expectations
- Institute directors are top scholars
  - Exceptionally attractive to junior hires
- Professional staffing of shared resources
  - Dedicated staff maintain and operate core facilities
- Seed grants
  - High risk-high payoff collaborations, bold forays into new research directions, and creation of new partnerships.
  - Gathering performance metrics
  - ~41% receive external funding
Mission of the Interdisciplinary Research Institutes

- Community of Colleagues
- Seminars & Workshops
- Team Building for Research Initiatives
- Co-Funded Appointments
- Core Facilities
- Seed Funds for Scholarship/Research
Research Instrumentation

The 7 interdisciplinary research institutes operate core shared facilities available to internal and external users.

- Includes more than 300 instruments and services.

[link to capabilities.psu.edu]

*Micro CT Scanner at the Center for Quantitative Imaging.*
Social Science Research Institute (SSRI)

SSRI 2015-2020 Strategic Aims

Smart and Connected Health

The Human System

Social Disparities

Data ↔ Knowledge ↔ Impact

• Innovative Methods
• Dissemination and Implementation Science

Example program: Child Maltreatment Solutions Network.

In 2017, the Network was awarded the first-ever Capstone Center Grant from NIH for child maltreatment prevention research.
The mission of IEE is to **foster and facilitate interdisciplinary scholarship and collaboration** to positively impact important energy and environmental challenges.

Example program: **Project Drawdown**

More than 500 collaborating faculty
Institute for Computational and Data Sciences

ICDS supports researchers in applying big data and big simulation methods across the research landscape.

- ICDS maintains the ICDS Advanced Cyber Infrastructure (ICDS-ACI), Penn State’s primary HPC system for researchers.

- ICDS offers
  - 36,500 computing cores
  - 25 PB of storage
  - A dynamic software stack of broadly used research applications
  - ~890 gigaflops of total peak theoretical performance

ICDS-powered study using data from the Human Connectome Project to better understand the correlations between brain features
Materials Research Institute

State of the art shared core facilities supporting multidisciplinary research, education, and industry.

Example Project: The 2D Crystal Consortium (2DCC) is an NSF Materials Innovation Platform (MIP) national user facility focused on advancing the synthesis of 2D chalcogenides for next generation electronics.

One of only 2 NSF Materials Innovation Platforms in the U.S

Angle-resolved photoemission spectrometer
Huck Institutes of the Life Sciences

Promoting excellence in research and graduate training in the life sciences.

The Huck Institutes include:
- 30 research institutes and centers of excellence
- 11 shared core instrumentation facilities
- 7 advanced graduate programs

Recent project: In March 2020, Huck launched a rapid-response RFP for Penn State researchers seeding proposals to address the emerging COVID-19 outbreak.
Penn State Cancer Institute

• A premier academic oncology center that encompasses clinical care, research, education, and outreach.

• Example Research:
  ■ Deborah Kelly, Cancer Institute, Huck, Engineering
  ■ Developed new field of structural oncology, studying the protein players of cancer at the atomic scale, utilizing Huck’s Cryo-electron microscope
Clinical and Translational Science Institute

• Accelerating discoveries to benefit human health.
• Featured Resource: Center for Big Data Analytics and Discovery Informatics
  ▪ Headed by Vasant Honavar, CTSI, IST
  ▪ Research interests around AI:
    ➢ Predictive modeling from big data
    ➢ Predicting protein-RNA, protein-protein interfaces and complexes

discovery-informatics.ist.psu.edu
Applied Research Laboratory

- University Affiliated Research Center (UARC)
  - Was approved by the Navy to execute up to $2.1 billion in research over 10 years aimed at improving U.S. national security.
  - Has supported nation’s security efforts for more than 75 years with basic and applied research.
    - www.arl.psu.edu

- Electro Optics Center
  - Navy’s Technical Agent for Electro Optics
    - www.eoc.psu.edu
Research Compliance
Disclosing International Activities

- While most international collaborations are acceptable and encouraged, we urge researchers to err on the side of transparency.
- It protects everyone’s interests – the Federal government, Penn State, individual PIs, and their international collaborators – to have international relationships disclosed and vetted to determine if there are any potential conflict of commitments, duplications of research, and/or diversion of intellectual property in the performance of federally funded research.

Our website details the steps you can take to protect yourself and your research. New guidance and clarifications are being issued on a rolling basis; agency-specific updates are sent to research administrators, those with active grants and are posted here: research.psu.edu/international_affiliations
Outside Professional Commitments

- Outside business activities cannot exceed 40 hours per month.
- Special care should be exercised in executing private consulting contracts or arrangements.
  - Contracts should be examined to ensure that the assignment of rights to intellectual property evolving from consulting activities does not conflict with the patent agreement signed by all faculty; and
  - Any associated compensation will likely require a financial disclosure by the faculty involved.

- AC80 - Outside Business Activities and Private Consulting
  [policy.psu.edu/policies/ac80](policy.psu.edu/policies/ac80)

- AD77 - Engaging in Outside Professional Activities (Conflict of Commitment)
  [policy.psu.edu/policies/ad77](policy.psu.edu/policies/ad77)

- RP06 - Disclosure and Management of Significant Financial Interests
  [policy.psu.edu/policies/rp06](policy.psu.edu/policies/rp06)
Significant Financial Interests ("SFI")

- Investigators are required to disclose personal financial interests that are related to his/her institutional responsibilities. You must disclose when:
  - You are hired*
  - At least annually
  - Within 30 days of discovering or acquiring a new SFI
  - Prior to submission of research proposals related to the SFI

- If the COI Committee determines a potential or perceived conflict between the disclosed SFI and Penn State research, it will work with the investigator to reduce or eliminate the conflict.

- See RP06: guru.psu.edu/policies/RP06.html

*New faculty will receive an email to complete a disclosure this fall
Data Management and Integrity

Researchers are responsible for:

• Ensuring the integrity of their data
  RP02 policy.psu.edu/policies/rp02

• Ensuring that the data from published papers are publicly accessible
  datacommons.psu.edu

• Properly archiving data
  AD22 – Health Insurance Portability and Accountability Act (HIPAA)
  AD35 – University Archives and Records Management
  AD53 – Privacy Policy
  AD95 – Information Assurance and IT Security
  AD96 – Acceptable Use of University Information Resources
Research Administration and Support
Office of Research Protections (ORP)

- Leadership: Candice Yekel, Associate Vice President for Research and Director, ORP
  
  research.psu.edu/orp

- Human Research Protection Program (IRB)
- Animal, Biosafety, and Isotope Research Protection Program (IACUC, IBC, UIC)
- Dual Use Research of Concern
- Scientific Diving Program
- Unmanned Aircraft Program
- Human Embryonic Stem Cells
- Conflict of Interest Program
- Education & Quality Management
- Research Misconduct Inquiries & Investigations

Remember: You are a role model for your students
ORP Training for Investigators

• Required Training: research.psu.edu/education

• Scholarship and Research Integrity (SARI@PSU) = training in the responsible conduct of research
  ▪ Required for faculty: Any CITI online training OR 2 hours of discussion-based activities, plus 1 hour continuing education every 3 years: citi.psu.edu

• ORP’s education arm is a central resource for:
  ▪ IRB training (human subjects research)
  ▪ IACUC training (research activities involving vertebrate animals)
  ▪ Biosafety training (research activities involving biohazardous materials and/or bloodborne pathogens)
  ▪ Trainings on UIC, IBC, UAS, GCP, GLP, DURC (based on your research)
  ▪ Compliance system training (IRB, IACUC)
Animal Resource Program

• Leadership: Todd Jackson

• Veterinary Services
• Education & Training
• Purchase & Transportation
• Experimental Guidelines
• Husbandry/ Breeding

Research.psu.edu/arp
Office of Sponsored Programs (OSP)

- Leadership: John Hanold, Associate Vice President for Research and Director, OSP
- Processes proposals and negotiates grants and NDAs
- Coordinates with research administrators across Penn State to ensure that all sponsored funds are administered in accordance with the agreed upon terms and conditions.

research.psu.edu/osp
Office of Research Information Systems (ORIS)

- Leadership: Jim Taylor, Director, OSP
- ORIS administers research administration software systems
- **My Research Portal** – centralized management of financial information, agreement requests (NDAs), proposal administration steps, conflict of Interest disclosures and more.
  - Provides investigators an integrated view of sponsored portfolio data
  - Simple tools to support the PI
  - Current and Pending report
  - Export financial data to Excel
  - [MyResearch.psu.edu](http://MyResearch.psu.edu)
  - [New SIMBA portal](http://New SIMBA portal)
Strategic Initiative Submissions

- **Leadership:** Shashank Priya, Associate Vice President for Research and Director of Strategic Initiatives

- **Strategic Interdisciplinary Research Office (SIRO)** – Grant development and administration support for large, interdisciplinary projects
  - Service request form available at research.psu.edu/siro

- **Limited Submissions:** research.psu.edu/limitedsubs

- **Penn State at the Navy Yard:** NavyYard.psu.edu
Office of Postdoctoral Affairs (OPA)

• Leadership: Pallavi Eswara, Director, OPA

• OPA manages all aspects of the unique and valuable relationship Penn State has with its postdoctoral scholars. This includes:
  • Travel
  • Benefits
  • Moving/residency
  • Collaboration and networking events

Research.psu.edu/opa
Office of Technology Management (OTM)

- Leadership: Harl Tolbert, Assistant Vice President for Research and Director of OTM

- Works with PIs to protect intellectual property, support researchers in the patent process, and work with corporate partners in licensing Penn State technology
  - Technology disclosure form and invention disclosure portal available at: research.psu.edu/otm
Office of Industrial Partnerships (OIP)

Works with PIs and external partners to support research collaborations with industry

- **Corporate Engagement Center** supports PIs developing industry-funded research relationships, corporate visits to campus, and more: CorporateEngagement.psu.edu

- **Innovation Gateway** provides opportunities for industrial research projects: InnovationGateway.psu.edu

- PennTap

- Innovation Park

Snap-Shot of Companies
- 23 Incubator Tenants
- 7 Incubator Graduates
- 11 from Local Area
- 7 from PSU relationship
- 1 coupled with research
- 3 in process
- 8 showing interest
Office of Entrepreneurship and Commercialization (OEC)

- Leadership: James Delattre, Associate Vice President for Research and Director of OEC
- Invent Penn State: Invent.psu.edu
  - Innovation Hubs
  - Startup Week
  - NSF I-Corps Program
  - Fund for Innovation
  - Venture & IP Conference and more
Ben Franklin Technology Partners of Central and Northern PA

- Leadership: Steve Brawley, President and CEO
- Invests in tech-based startups in 32 counties in PA

[cnp.benfranklin.org](cnp.benfranklin.org)
More Resources

Find Research

• A searchable database of PSU researchers and papers:
  Pure.psu.edu

Find Computing/Data Resources

• Find networking services, tools, data sources and more.
  ResearchData.psu.edu

Find Funding

• Links to internal and external funding resources
  Funding.psu.edu

Find Instrumentation

• Penn State’s shared core facilities
  Capabilities.psu.edu
COVID-19 and Research Activity

• Your dean or institute director is your primary source for guidance on conducting research amid COVID-19:
  ▪ Each unit has research ramp-up and ramp-down plans that take into account unique and current circumstances for each unit, lab or campus location.

• The Research.psu.edu website will have a link on its homepage directing you to information about COVID-19 and research activities.
Rapid Response to COVID-19

• February 18: Penn State became the first U.S. university signatory on the Wellcome Trust statement for providing immediate open access to research findings related to COVID-19.

• March 3: Huck Institutes of the Life Sciences and Huck Family Endowment launch seed funding for COVID-19 research proposals.
Seed Grants: $2.25 million Awarded to 47 teams

Example Seed Grant
Paul Cremer, Professor of Chemistry

*Developing sensors to detect coronavirus in enclosed spaces.*

- Inexpensive, real-time sensors that continuously monitor for SARS-CoV-2 in enclosed spaces, such as a large conference room,
- Identify the presence of an infection before it spreads.
Grassroots Faculty Engagement: MASC

- Manufacturing And Sterilization for COVID-19 (MASC)

- Donors, community members, and researchers can get involved at:

  [www.masc.psu.edu](http://www.masc.psu.edu)
Penn State for PA

Penn State donated 10K pieces of personal protective equipment (PPE)
On the Front Lines

• Penn State Health hospitals now using plasma from recovered patients as possible treatment for COVID-19

• Hershey Medical Center joins clinical trial evaluating antiviral drug remdesivir
Interdisciplinarity: Our Strength

• Colleges of Arts & Architecture and Engineering teamed up to design a glove-box nursing booth.

• Huck’s Center for Infectious Disease Dynamics (CIDD) launched a video outreach series to answer the public’s basic questions about the pandemic.

www.AskCIDD.psu.edu
We are here to support your Research!

Research.psu.edu

@PSUResearch