Energy University

Concept and Current Activities

A virtual forum for Penn State faculty, staff, and students

Friday, Dec. 11, 2020  |  9–10:30 a.m.

- Advancing Literacy and Leadership
- Developing Solutions
- Energy Transitions
- Strengthening Communities
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker/Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00-9:25 a.m.</td>
<td><strong>The Energy University</strong></td>
<td>President Eric Barron</td>
</tr>
<tr>
<td>9:25-9:35 a.m.</td>
<td>Q&amp;A President Barron</td>
<td>Facilitated by IEE Director Tom Richard</td>
</tr>
<tr>
<td>9:35-9:40 a.m.</td>
<td><strong>Energy Transitions: Center for Energy Law and Policy</strong></td>
<td>Introduction by Dean Hari Osofsky, Speaker: Seth Blumsack</td>
</tr>
<tr>
<td>9:40-9:45 a.m.</td>
<td><strong>Developing Solutions: Consortium for Integrated Energy Systems</strong></td>
<td>Introduction by Dean Lee Kump, Speaker: Bruce Logan</td>
</tr>
<tr>
<td>9:45-9:50 a.m.</td>
<td><strong>Strengthening Communities: Global Building Network</strong></td>
<td>Introduction by Dean Marie Hardin, Speaker: Esther Obonyo</td>
</tr>
<tr>
<td>9:50-9:55 a.m.</td>
<td><strong>Advancing Literacy and Leadership: Drawdown Scholars</strong></td>
<td>Introduction by Dean Justin Schwartz, Speaker: Rachel Brennan</td>
</tr>
<tr>
<td>9:55 -10:25 a.m.</td>
<td><strong>Moderated Discussion - Big Ideas for Energy University</strong></td>
<td>Led by Senior Vice President for Research Lora Weiss, and IEE Director Tom Richard</td>
</tr>
<tr>
<td>10:25-10:30 a.m.</td>
<td><strong>Engaging with Energy University</strong></td>
<td>IEE Assistant Director Lara Fowler</td>
</tr>
</tbody>
</table>
The Energy University
What it means for faculty, students, staff and alumni

The Energy University Forum
December 11, 2020
Penn State’s Impact the World Imperative

Focus on urgent issues including energy security. Our goal is for energy to be:

• Affordable
• Accessible
• Safe
• Clean
• An Economic Engine

As a land-grant university, we have an expectation and obligation to advance this effort.
Fossil fuels have made up at least 80% of U.S. fuel mix since 1900.

Source: U.S. Energy Information Administration
The Future

• 50% increase in energy requirements by 2040.
• Net CO$_2$ emissions need to decrease.
• Fossil fuels continue to be used so need for carbon capture and sequestration.

IMAGE: KAI WANG
Pennsylvania: The Energy State

- Nation’s second-largest natural gas producer after Texas.
- Ranks second in nation in electricity generation from nuclear power.
- Third-largest coal producing state in the nation; second-largest coal exporter to foreign markets.

Source: [https://www.eia.gov/state/?sid=PA](https://www.eia.gov/state/?sid=PA) (last updated Sept. 17, 2020)
Expected Energy Trends

• Reducing reliance on fossil fuels for the foreseeable future.
• Opportunity for research to end the roadblocks for renewable sources of energy.
• Growing importance for national security and U.S. energy independence.
• Advances in efficiency, effectiveness, and storage.
• Evolution of regulatory environment.
• Greater knowledge about environmental impacts.
Challenges

• Energy is a technical challenge. Addressing it requires good science, innovative engineering solutions, social policies, and law/policy/political action.

• Climate is a political challenge. It is polarizing and highly partisan.

• Climate solutions are an implementation challenge. They need the support of the majority to be effective.
The Opportunity at Penn State

• Broad involvement across ALL colleges, campuses, and schools.
• Connections to industries that can help with transition to renewable energy sources that minimize greenhouse gas emissions.
• Penn State Outreach and Extension translates the science into actionable, practical solutions.
• Innovation and Entrepreneurship Mindset is a source for startups and IP.
• Educational Excellence in energy, policy, law, and disciplines that contribute to climate change understanding and solutions.
Penn State Energy Rankings - USA

- 12 research areas from biofuels to buildings to batteries in the top 10; #6 in Energy overall in the US.
- Highly-cited papers that rank in the top 1% by citations for field and year in the Web of Science.
- Top 10 Elite in energy by American Energy Society.

<table>
<thead>
<tr>
<th>Topics</th>
<th>US Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Deposits; Methane</td>
<td>1</td>
</tr>
<tr>
<td>Fuel Technology</td>
<td>3</td>
</tr>
<tr>
<td>Carbon Capture; Shale; Storage (Materials)</td>
<td>3</td>
</tr>
<tr>
<td>Information Modeling, facilities management</td>
<td>3</td>
</tr>
<tr>
<td>Microbial Fuel Cells; Bioreactors</td>
<td>4</td>
</tr>
<tr>
<td>Energy Engineering; Power Technology</td>
<td>4</td>
</tr>
<tr>
<td>Hydraulic Fracturing</td>
<td>5</td>
</tr>
<tr>
<td>Energy Overall</td>
<td>6</td>
</tr>
<tr>
<td>Energy Policy, Economics, and Law</td>
<td>6</td>
</tr>
<tr>
<td>Buildings; Air Conditioning; Ventilation</td>
<td>6</td>
</tr>
<tr>
<td>Photocatalysis; Solar Cells</td>
<td>8</td>
</tr>
<tr>
<td>Secondary Batteries, Electric Batteries, Lithium Alloys</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: SciVal
Penn State Energy Rankings - Global

- 7 research areas where Penn State stands out globally

<table>
<thead>
<tr>
<th>Topics</th>
<th>Rank by # Publications</th>
<th>Rank by # Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose, Cell Walls</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Hydraulic Fracturing; Water</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Hydrothermal Liquefaction; Bio-Oil</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ferroelectricity</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Anion-exchange Membranes; Alkaline Fuel Cells</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Coalbed Methane; Coal</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Biocathodes; Regenerative Fuel Cells; Bioelectricity</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: SciVal
Energy Education at Penn State

- 30+ undergraduate and graduate degrees with a focus on energy
- 20 undergraduate minor programs
- 10+ programs available through the World Campus
- 35+ Workforce Development and Continuing Education Programs
- K-12 Education in Energy and the Environment
Energy Research Capacity at Penn State

More than 464 individual investigators including:
Engineering (151); EMS (80);
AgSci (50); Eberly (30); Smeal,
Law, School of International
Affairs, IST, Liberal Arts, Arts &
Arch, Comm, HHD, Education,
other campuses (114+)

Source: SciVal and pure.psu.edu
Renewable Energy at Penn State
Energy Action on our Campuses

- Penn State has cut its campus greenhouse emissions by 32% since 2005, with goal of 35% by end of 2020.
- PA goal: Reduce emissions by 80% from 2005 levels by 2050.
Penn State Lightsource bp Partnership

- Partnered on three solar farms that will supply 25% of the University’s state-wide electricity needs and lower Penn State’s greenhouse gas emissions by 57,000 mtCO2e per year.
- Provides opportunities for research for students, faculty and professionals.
- Sites support grazing and are biodiverse enough to attract a wide range of pollinators.
Mining Technology Associate of Science at Penn State Fayette

- Students can choose to focus on Maintenance or Production.
- Prepares students for supervisory roles in the mining industry.
- Accredited by the Engineering Technology Accreditation Commission of ABET Inc.
Breazeale Nuclear Reactor

- Longest-running university nuclear reactor in America.
- Built as part of the “Atoms for Peace” program.
Collaboration Across Borders

• Penn State is one of 37 universities from around the world to join the International Universities Climate Alliance to urge world leaders to protect humankind from climate change.

• Bruce Logan, Evan Pugh University Professor, is leading *Energy 2100*, a multi-year initiative to harness the wide-ranging activity in the area of renewable energy research.

• Smeal College of Business has formed a corporate advisory board consisting of sustainability executives from the world's leading corporations including Alcoa, Caterpillar, Dell, DuPont, Eastman Kodak, Johnson & Johnson, PepsiCo and Xerox.
Sustainability Communication

• The Institutes of Energy and the Environment is co-funding positions in Bellisario College to support a Science Communication Program.

• Michael Mann (atmospheric sciences) received the Schneider Award for Outstanding Science Communication and the 2020 World Sustainability Award.

• Penn State News has sites dedicated to Earth and Environment, and Science and Technology.
Other Major Initiatives

• The Center for Energy Law and Policy: Interdisciplinary focus and leadership on energy law and policy issues where science intersects technology.

• The Consortium for Integrated Energy Systems: Focused on renewable energy, non-renewable and hybrid systems, smart systems and optimal-impact generation and distribution.


• Advancing Literacy and Leadership: A positive, solutions-oriented path to advocate for and research a wide variety of strategies to reverse global warming.
The Vision: *Becoming The Energy University*

Stepping forward as the higher education leader in:

- **Research**: Generating the knowledge and technology that will drive the next energy revolution.
- **Education**: Preparing a workforce that is both highly trained and highly adaptable, ready for global careers and collaboration.
- **Service**: Partnering with industry to address urgent, real-world needs for energy production and policy.
The Challenges

• Competition with well-funded peers (e.g. MIT, Stanford, UC Berkeley) for top faculty and students.
• Misconception that PA isn’t prepared for real energy industry leadership.
• Limited institutional resources, despite strong institutional interest and will.

Le Shi and Bruce Logan examine their newly-designed sea water electrolyzer.
Next Steps

• Identify investments that will create even greater excellence in faculty leadership, industry expertise, state-of-the-art infrastructure, and the next energy leaders.
• Engage partners across Penn State and beyond.
• Commit university resources.
• Partner with lead donors.
• Publicize work through Strategic Communications and college and campus communications professionals.
Discussion.
Questions?
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
</table>
| 9:00-9:25 a.m. | **The Energy University**  
President Eric Barron                                                                 |                                                                         |
| 9:25-9:35 a.m. | **Q&A**  
President Barron  
Facilitated by IEE Director Tom Richard                                                  |                                                                         |
| 9:35-9:40 a.m. | **Energy Transitions: Center for Energy Law and Policy**  
Introduction by Dean Hari Osofsky  
Speaker: Seth Blumsack                                                  |                                                                         |
| 9:40-9:45 a.m. | **Developing Solutions: Consortium for Integrated Energy Systems**  
Introduction by Dean Lee Kump  
Speaker: Bruce Logan                                                      |                                                                         |
| 9:45-9:50 a.m. | **Strengthening Communities: Global Building Network**  
Introduction by Dean Marie Hardin  
Speaker: Esther Obonyo                                                      |                                                                         |
| 9:50-9:55 a.m. | **Advancing Literacy and Leadership: Drawdown Scholars**  
Introduction by Dean Justin Schwartz  
Speaker: Rachel Brennan                                                    |                                                                         |
| 9:55-10:25 a.m. | **Moderated Discussion - Big Ideas for Energy University**  
Led by Senior Vice President for Research Lora Weiss  
and IEE Director Tom Richard                                                |                                                                         |
| 10:25-10:30 a.m. | **Engaging with Energy University**  
IEE Assistant Director Lara Fowler                                          |                                                                         |
The Center for Energy Law and Policy

Seth Blumsack
Director of the Center for Energy Law and Policy
sab51@psu.edu
Bringing Penn State’s Expertise to The Energy Transition

Founding Units and Governance Board
- College of Earth and Mineral Sciences
- College of Engineering
- College of Health and Human Development
- Institutes for Energy and Environment
- Penn State Harrisburg
- Penn State Law and School of International Affairs
- Office of the Provost

- Leverage breadth and depth of expertise across Penn State, and our collaborative culture
- Support deep interdisciplinary collaborations
- Get involved – projects, workshops, webinars
Engaged Research: Methane Emissions from Oil & Gas

- PSU expertise from law, atmospheric science, engineering, economics
- Multiple stakeholder workshops
- Interdisciplinary White Paper (celp.psu.edu/methane)
Engaged Research: A Low-Carbon Power Grid For Pennsylvania

- Expertise from law, public affairs, environmental modeling, economics, health
- Fall webinar series and stakeholder discussions
- An independent voice addressing a major energy issue in Pennsylvania

REGIONAL GREENHOUSE GAS INITIATIVE (RGGI)

- A market-based initiative of 10 New England and Mid-Atlantic states to reduce greenhouse gas emissions from the power sector while generating economic growth.
- In October 2019, Governor Wolf signed an executive order that directed DEP to begin a rulemaking process that will allow Pennsylvania to participate.

Prof. Wei Peng, October 2020
Our Scope is Local to Global

- **Pennsylvania Energy Policy**
  - Clean Energy Program Planning for DEP; PA Climate Impacts Assessment and Climate Action Plan; PA Solar Policy

- **Sub-National Climate Policy**
  - Working with Alaska, New Mexico, New York, Pennsylvania on sustainability, resilience, innovative energy transition

- **Critical Infrastructure Protection Workshop, Feb. 2**
  - Joint with the Center for Security Research and Education

- **Climate, Health and the Built Environment**
  - Joint with the Global Buildings Network

- **Energy Governance Reform**
  - Revisiting how energy system decisions are made in the US, Europe, Australia
Our Mission is Research for Impact and Engagement

Over 100 stakeholders engaged through projects on methane, RGGI, infrastructure and energy governance

Public webinars, seminars, papers and (virtual) face time with policy-makers

We count on stakeholders to inform our research!

Prof. Daniel Walters, November 2020
More Information About the Center for Energy Law and Policy

• Check out our project web sites:
  Methane mitigation: https://celp.psu.edu/methane
  Regional Greenhouse Gas Initiative: https://celp.psu.edu/rggi

• Contact Seth Blumsack, Center Director: sab51@psu.edu
Consortium for Integrated Energy Systems

Bruce Logan
Director of the Consortium for Integrated Energy Systems
bel3@psu.edu
CIES: Consortium for Integrated Energy Systems

**Mission:** Facilitate interdisciplinary, solutions-focused research and the development of innovative programs aimed at producing the next-generation energy workforce.

**Energy Systems**
- Form a network of faculty, researchers and centers with expertise in three future-oriented areas in energy and systems:
  - **Renewable energy**, integrated with non-renewables, using hybrid systems
  - **Smart energy** systems, including modeling and big data
  - **System optimization** and impact mitigation

**Integration**
- Integrate energy activities across various Institutes, Consortia, and Centers working in areas related to the Energy University
- Fulfill Penn State strategic goals through special activities:
  - **Energy 2100**: Special initiative focusing on evaluating and stimulating renewable energy research and education at Penn State (2019–2021)
Energy transitions: Making electricity greener

- Coal has \( \sim 1.8 \) times more CO\(_2\) than natural gas
- Coal to electricity only \( \sim 33\% \) efficient

- Natural gas to electricity can reach 63% energy efficiency (about twice that of coal)
- Complete coal to natural gas at high efficiency could cut US CO\(_2\) emissions by 56%

Penn State Center for Gas Turbine Research, Education and Outreach

Integrated solutions:
- Green H\(_2\) from water electrolysis
- Energy storage in H\(_2\)
Climate solutions + Energy production

- **Current**: Produce biofuels with existing technologies
- **Future**: Improved biofuels production

Capture carbon in trees and soils

Pasture land

Capture carbon in soils and switchgrass used for biofuel production

CIES: Consortium for Integrated Energy Systems

IMPACT

– Create teams that solve complex problems and provide energy & climate solutions
– Translate our energy-focused analyses and systems into solutions that benefit a global society

Plans going Forward

• Identify and prioritize research areas
• Form “Clusters” of researchers on important topics, such as
  – Carbon Capture and Sequestration
  – Water electrolyzers for green H₂ production
  – Heavy duty vehicle alternative fuels
  – Valorization of CO₂: Using electrons to make chemicals

Volunteer to form a cluster on a CIES topic!
Email: blogan@psu.edu
The Global Building Network

Esther Obonyo
Director of the Global Building Network
eao4@psu.edu

- July 2020 tied with July 2016 as the second-hottest month ever recorded.
- Human induced - buildings responsible for > one-third of global final energy consumption and ~ 40% of total direct and indirect CO2 emissions.
- Building-related consequences for communities: more energy inefficiency; energy burden & poor health outcomes.

Source: National Oceanic and Atmospheric Administration; International Energy Agency

www.theguardian.com/environment/2020/feb/26/lead-poisoning-minorities-poor-americans
We know how to solve these problems

Where do we need to go?

The IEA’s Sustainable Development Scenario (SDS) offers a pathway for the global energy system to reach three strategic goals: the Paris Agreement’s well below 2°C climate goal, universal energy access and substantially reducing air pollution.

But based on existing and announced policies – as shown in the IEA’s Stated Policies Scenario (STEPS) – we are far from on track.

How do we get there?

The IEA’s Tracking Clean Energy Progress (TCEP) reports assess the status of 46 critical energy technologies and sectors and provides recommendations on how they can get ‘on track’ with the SDS.

Need: Increase renovation of buildings for energy efficiency from < 2% to > 5% annually

Source: International Energy Agency (IEA)
Local, Regional and Global Synergies

- Adapt to climate change-related spikes in heating and cooling loads (Pennsylvania Housing Research Center, Pennsylvania Technical Assistance Program, Energy Innovation Center, Engineering Design & Learning Factory)
- Address widespread use of less-efficient technologies (Living Lab - Office of Physical Plant, Architectural Engineering, Engineering, Architecture)
- Increase No. of bankable projects (the Navy Yard, Penn State Beaver Campus, New Kensington, Harrisburg, Global Programs)
- Increase investment in sustainable buildings (BRE Trust)
Impact

Research, education & outreach that strengthens communities through enhanced Building Performance Plus

- Environmental and Human Health
- Resilience to extreme weather events
- Wealth (jobs & economic development; entrepreneurship)
- Social justice and racial harmony
Thank you - email Esther at eao4@psu.edu to join the Global Building Network

https://globalbuildingnetwork.psu.edu/
Drawdown Scholars: Advancing Literacy & Leadership

Rachel Brennan
Director of the Drawdown Scholars Program
rab44@psu.edu
Student engagement at Energy University can be facilitated through Drawdown
What is Drawdown?

“Drawdown is the point at which levels of greenhouse gases in the atmosphere stop climbing and then steadily decline, ultimately reversing global warming.”

https://www.drawdown.org/
Drawdown solutions (technical, ecological, and social) are organized into nine sectors:

- **Reducing Sources**
  - Buildings
  - Electricity
  - Food, agriculture, and land use
  - Industry
  - Transportation

- **Supporting Sinks**
  - Coastal & ocean sinks
  - Engineered sinks
  - Land sinks

- **Social Equality**
  - Health and Education
Drawdown Scholars REU Program

Mission: to develop a diverse cohort of students who are informed agents of change for addressing complex global climate issues at local and regional scales

• Competitive 10 week summer Research Experiences for Undergraduates (REU) program open to all majors and institutions
• Immersive contextual systems research and professional development programs:
  – Leadership training
  – Science communication
  – Environmental justice, ethics, law & policy
  – Professional networking and graduate school opportunities

HTTPS://WWW.ENGR.PSU.EDU/DRAWDOWN/
Drawdown Scholars Topics at Penn State in 2019 & 2020:

- Biomass energy
- Building automation
- Carbon sequestration
- Health & education
- Electric vehicles
- Energy storage
- Green roofs
- Mass transit
- Methane digesters

- Net zero buildings
- Nutrient management
- Plant-rich diets
- Reducing food waste
- Refrigerant management
- Rooftop solar
- Smart materials
- Sustainable agriculture
- Wind energy

https://news.psu.edu/story/577025/2019/06/06/research/inaugural-drawdown-scholars-class-arrives-penn-state
Colleges and Institutes that have supported the Drawdown Scholars REU to date

- PennState Institutes of Energy and the Environment
- PennState College of Engineering
- PennState College of Earth and Mineral Sciences
- PennState Eberly College of Science
- PennState College of Arts and Architecture
- PennState Sustainability Institute
- PennState College of Agricultural Sciences
- PennState Physical Plant

HTTPS://WWW.ENGR.PSU.EDU/DRAWDOWN/
Interested in learning more?

Explore the 2020 Drawdown REU projects:
https://sites.psu.edu/climatedrawdown2020/

Applications for 2021 open in early Spring:
https://www.engr.psu.edu/drawdown/

Questions?
Contact Rachel Brennan, rab44@psu.edu
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
</table>
| 9:00-9:25 a.m. | **The Energy University**  
**President Eric Barron** |
| 9:25-9:35 a.m. | **Q&A President Barron**  
Facilitated by IEE Director Tom Richard |
| 9:35-9:40 a.m. | **Energy Transitions: Center for Energy Law and Policy**  
Introduction by Dean Hari Osofsky  
Speaker: Seth Blumsack |
| 9:40-9:45 a.m. | **Developing Solutions: Consortium for Integrated Energy Systems**  
Introduction by Dean Lee Kump  
Speaker: Bruce Logan |
| 9:45-9:50 a.m. | **Strengthening Communities: Global Building Network**  
Introduction by Dean Marie Hardin  
Speaker: Esther Obonyo |
| 9:50-9:55 a.m. | **Advancing Literacy and Leadership: Drawdown Scholars**  
Introduction by Dean Justin Schwartz  
Speaker: Rachel Brennan |
| 9:55 -10:25 a.m. | **Moderated Discussion - Big Ideas for Energy University**  
Led by Senior Vice President for Research Lora Weiss  
and IEE Director Tom Richard |
| 10:25-10:30 a.m. | **Engaging with Energy University**  
IEE Assistant Director Lara Fowler |
Opportunities for funding, outreach, & engagement

Lara Fowler
Assistant Director for Outreach & Engagement
Institutes of Energy and the Environment
lbf10@psu.edu
# Potential internal seed grant opportunities

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Type of funding</th>
<th>Due date (if known)</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center for Security Research &amp; Education (CSRE)</td>
<td>4 grants ranging from $1k outreach to $30k impact grants; water security = potential. Emphasis on critical infrastructure topics</td>
<td>11/2/20 (past)</td>
<td><a href="https://csre.psu.edu/grant-program/">https://csre.psu.edu/grant-program/</a></td>
</tr>
<tr>
<td>Penn State Institute of Computational &amp; Data Sciences (ICDS)</td>
<td>Grants for interdisciplinary work that involves computational sciences (can address energy/environmental issues)</td>
<td>TBD</td>
<td><a href="https://www.icds.psu.edu/resources-for-researchers/icds-funding-opportunities/">https://www.icds.psu.edu/resources-for-researchers/icds-funding-opportunities/</a></td>
</tr>
<tr>
<td>Material Research Institute</td>
<td>Various funding types, focus. See website. <a href="https://www.mri.psu.edu/mri-seed-grant#limc2">Living Multifunctional Materials Collaborative Research</a></td>
<td>12/18/20 (1/21/21)</td>
<td><a href="https://psu.infoready4.com/#competitionDetail/1828873">https://psu.infoready4.com/#competitionDetail/1828873</a></td>
</tr>
<tr>
<td>Penn State Social Science Research Institute</td>
<td>Various funding mechanisms (including faculty buyouts) to support social science research. Specific call for “Reducing social disparities” out now- due Jan. 18, 2021</td>
<td>On-going (1/18/21)</td>
<td><a href="https://ssri.psu.edu/funding1">https://ssri.psu.edu/funding1</a></td>
</tr>
<tr>
<td>Penn State Institutes of Energy &amp; the Environment (IEE)</td>
<td>Grants for interdisciplinary work</td>
<td>Feb. 12, 2021</td>
<td><a href="https://iee.psu.edu/seedgrant">https://iee.psu.edu/seedgrant</a></td>
</tr>
<tr>
<td>Huck Life Sciences: Huck Innovative &amp; Transformational Seed Fund (HITS)</td>
<td>Grants for high risk/high reward projects linked to life sciences that are “bold, have high impact, and would transform our understanding or provide a solution to a pressing issue.”</td>
<td>On-going; Nov. 15; May 15</td>
<td><a href="https://www.huck.psu.edu/about/huck-ventures/huck-innovative-and-transformational-seed-fund/about-the-hits-fund">https://www.huck.psu.edu/about/huck-ventures/huck-innovative-and-transformational-seed-fund/about-the-hits-fund</a></td>
</tr>
<tr>
<td>Multicultural Faculty Development Support Funds</td>
<td>Funding to support new/established tenure-track or tenured faculty members who identify as historically underrepresented racial/ethnic minorities</td>
<td>On-going</td>
<td><a href="http://equity.psu.edu/faculty-pathway-sfm">http://equity.psu.edu/faculty-pathway-sfm</a></td>
</tr>
</tbody>
</table>
Funding sources for energy-related research: Federal grants & partnerships

- Federal granting agencies
  - US Department of Energy
  - US Department of Agriculture
  - National Oceanic Atmospheric Administration
  - NASA
  - US Department of Transportation
  - Department of Defense
  - And more

- Cooperative Ecosystem Studies Units (CESU)
  - MOU w/ 9 federal agencies
  - http://www.cesu.psu.edu/unit_portals/CHWA_portal.htm

- Penn State Strategic Integrated Research Office (SIRO) https://www.research.psu.edu/siro
Funding sources for energy-related research: Corporations, Foundations & Private Support

- Fundraising strategic initiative in support of Energy University activities with:
  - Alumni & Friends in partnership with Colleges
  - Corporate Engagement Center
  - Office of Foundation Relations

Eric Reinhard
Director of Strategic Initiatives
University Development
emr124@psu.edu
Opportunities for finding others & engaging

• Internal newsletters/programs:
  – Institutes of Energy & the Environment: https://iee.psu.edu/newsletter
  – Sustainability Institute: http://sustainability.psu.edu/mainstream
    • Penn State Communities Collaborative: https://sustainability.psu.edu/live/staff/sustainable-communities-collaborative
    • Green Gov & Sustainability Institute speaker series: https://sustainability.psu.edu/greengov-and-sustainability-institutes-sustainability-series
    • City Semester: Philly, Pittsburgh: https://www.citysemesterphiladelphia.psu.edu/

• Penn State “PURE”
  – Searchable database of Penn State researchers: https://pennstate.pure.elsevier.com/
Opportunities for finding others & engaging

Example listservs/groups/centers (not an exhaustive list!)

- Battery & Energy Storage Technology (BEST): Chris Rahn (cdrahn@psu.edu)
- Climate Consortium (in development); Carbon Capture & Sequestration: Erica Smithwick (eus17@psu.edu)
- Center for Biorenewables/Carbon Neutral Penn State: Charlie Anderson (cta3@psu.edu)
- Center for Climate Risk Management: Klaus Keller (Klaus@psu.edu)
- Center for Energy Law & Policy: Seth Blumsack (sab51@psu.edu)
- Consortium for Integrated Energy Systems: Bruce Logan (bel3@psu.edu)
- Drawdown Research Experience for Undergrads: Rachel Brennan (rab44@psu.edu)
- Energy & Environmental Economics: Karen Fisher Vanden (kaf26@psu.edu) & Seth Blumsack (sab51@psu.edu)
- Energy Institute: Bruce Miller (interim) (bgm3@psu.edu)
- Facilities Engineering Institute: Mark Bodenschatz (mab163@psu.edu)
- Global Building Network: Esther Obonyo (eao4@psu.edu)
- Larson Transportation Institute: Eric Donnell (etd104@psu.edu)
- Penn State Wind: Susan Stewart (sstewart@psu.edu)
Stay tuned for next year:

• Institutes of Energy & the Environment seed grant call

• Additional forums on energy:
  – Forum on Education
  – Forum on Extension

• Colloquium on the Environment speaker:
  Dr. Robert Bullard, April 1, 2021

• Ideas from you! Contact us: iee@psu.edu
Energy University
Concept and Current Activities
A virtual forum for Penn State faculty, staff, and students
Friday, Dec. 11, 2020  |  9–10:30 a.m.

- Advancing Literacy and Leadership
- Developing Solutions
- Energy Transitions
- Strengthening Communities