



Risk Management in the Modern Technology Transfer Environment

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Christina Lomasney

Director of Commercialization



PNNL is operated by Battelle for the U.S. Department of Energy

Impact of Federal R&D Investment to the US Economy

“Economists have calculated that approximately 50% of U.S. annual GDP growth is attributed to increases in innovation”

- US Chamber of Commerce

<https://www.uschamberfoundation.org/enterprisingstates/assets/files/Executive-Summary-OL.pdf>

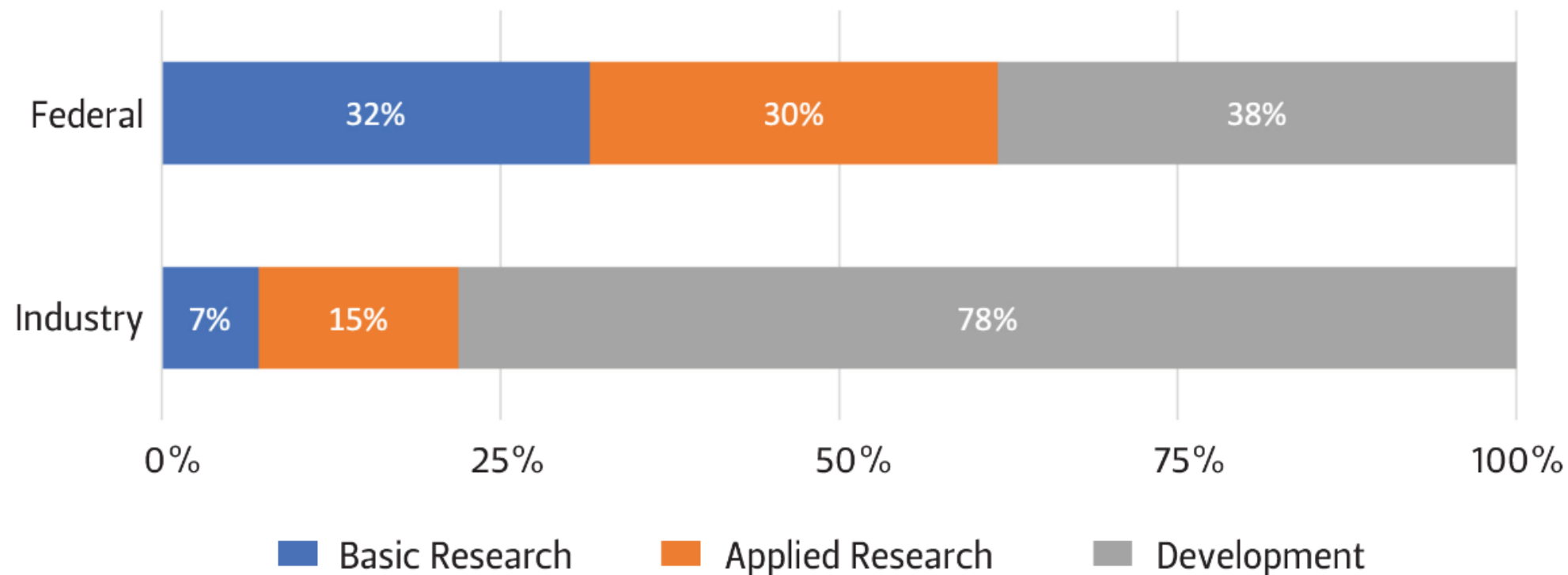
“Government funding for our world-class research institutions produces the new technologies that American entrepreneurs take to market”

- Bill Gates

Reuters, April 18, 2016

While impact is difficult to measure directly, there is no question that Federal R&D in the US produces significant US economic competitiveness and national security returns

The Compliment of US Federal and Industrial Investment in R&D



NSF, National Patterns of R&D Resources: 2018-19 Data Update NSF 21-325

Federal R&D investment provides critical funding in basic and applied research. The US spent an estimated \$176B in 2022. **DOE Office of Science** is the single largest Federal investor in Basic Research for the Physical Sciences



PNNL is **one of the largest** Department of Energy, Office of Science Laboratories in the Nation



PNNL is DOE's **most diverse National Laboratory**



\$1.24B Spending



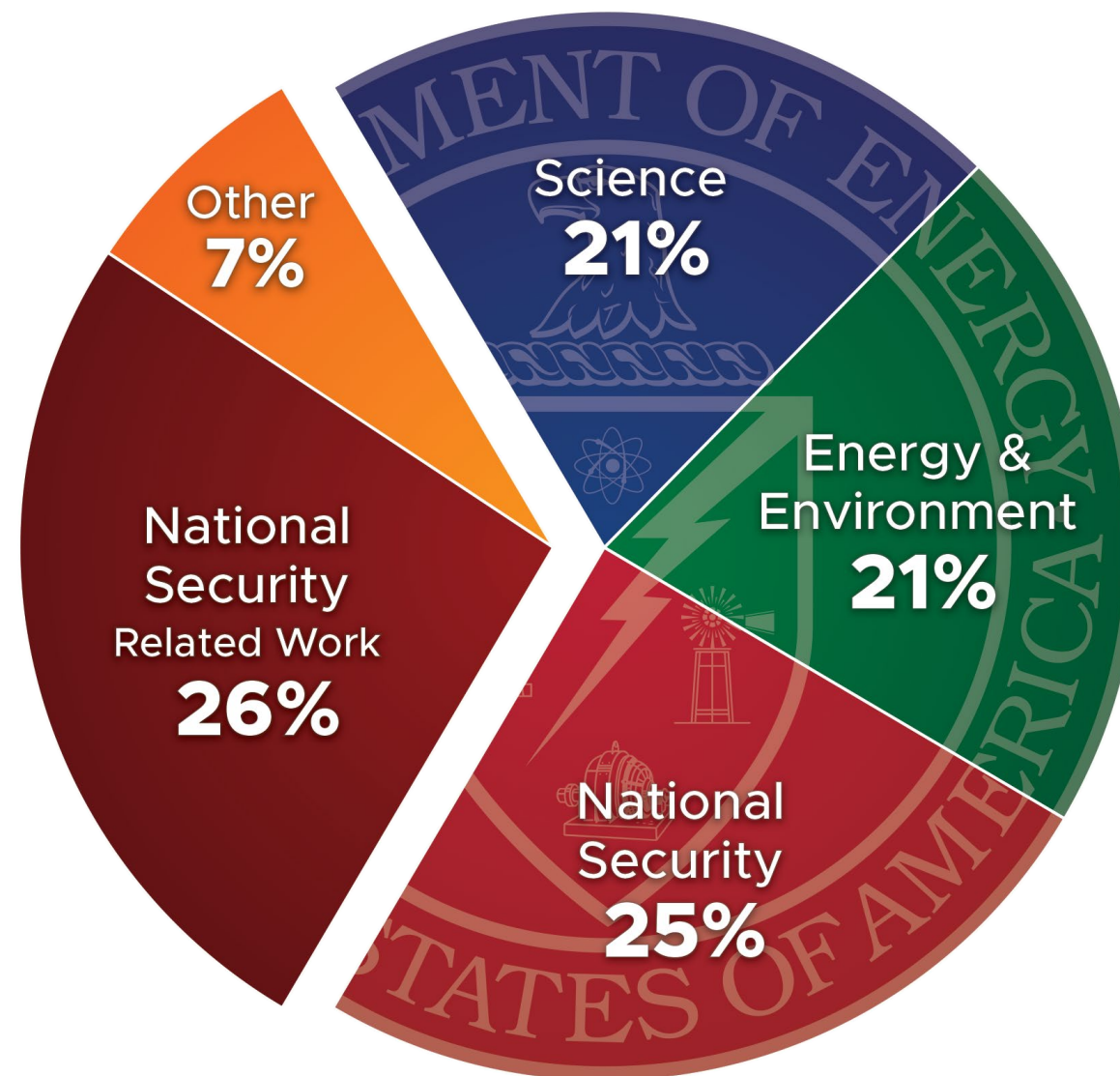
5,300 Staff



1,755 Peer-reviewed
Publications



247 Invention
Disclosures



FY 2021 Spending

What is “Technology Transfer”?

- **Advance** the economic, energy, and national security interests of the United States
- **Achieve** maximum public return and impact
- **Ensure** streamlined and compliant technology transition

The Technology Transfer Mission of our National Labs enables *industrial* partnership with goal of providing benefit from Federal research to **U.S. economic competitiveness**

“China’s theft of US Technology – be it through circumventing export controls, commercial deals with US companies to access intellectual property, or espionage – costs the united states \$300-600 billion per year”

– FBI representative, CSIS China Initiative Conference,
February 6, 2020

Threats to US taxpayer-funded innovation & industrialization

Critical Emerging & Sensitive Technologies

What are they?

- Foundational Technology Fields
- Critical Emerging Technology Fields
- Dual Use Technologies
- Critical Datasets (i.e. for AI training)

Known threat vectors:

- Foreign adversary talent recruitment programs
- Targeted theft of data
- Protected IP (patent/copyright) violations

Critical Emerging & Foundational Industries

What are they?

- Entrepreneurial Ventures
- Venture/PE-backed Companies
- Critical Material & Technology Supply Chains
- Key Real Estate (i.e. Ports, Energy Corridors)

Known threat vectors:

- Foreign adversary talent recruitment programs
- Targeted venture investments/influence
- Targeted venture contracting/influence

“Improperly design controls could inadvertently restrict the export of significant numbers of commercial products and cause **substantial harm to the US technology industry...**”

- US National Security Commission on AI, Chapter 14: Technology Protection

“I will use those ... regimens which will benefit my patients according to my greatest ability and judgement, and I will **do no harm ...**”

- Hippocratic Oath, c. 275AD

Elements of Threat Mitigation

REGULATORY

Export Control Reform Act
Section 1758

Foreign Investment Risk Review
Modernization Act of 2018

DOE 485.1A: Foreign
Engagements with DOE National
Laboratories

IMPLEMENTATION STANDARDS

**Common set of principles and
rules for technology transfer
(GAAP example)**

**Framework for FFRDC
technology classification**

**Framework for entity vetting
and data collection**

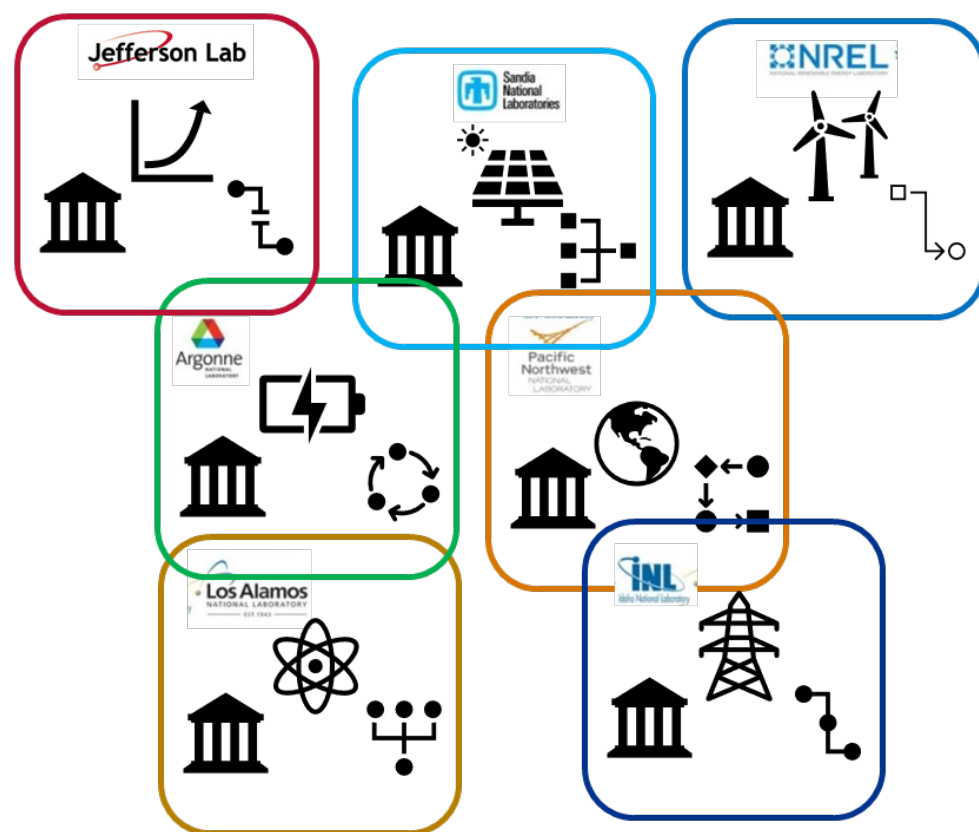
RISK MITIGATION PRACTICES

Domain Specific practices

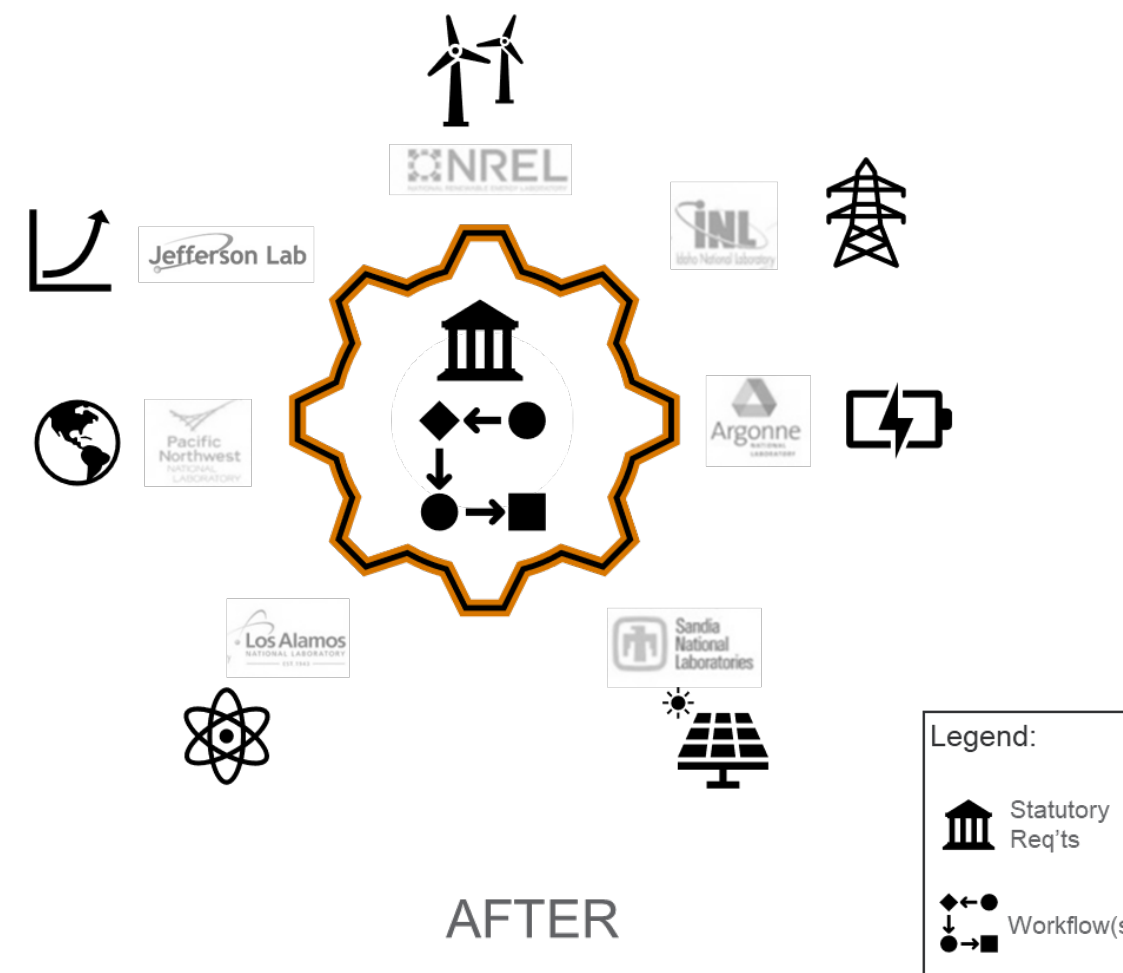
Export Control “choke
points”

Individual entity, project
and contract level
implementation

Building the GATT Implementation Architecture & Systems across the National Lab System



BEFORE



AFTER

DOE OTT has funded PNNL, National Lab Partners and Salesforce to lead an effort to build compliant lab-to-market tools and processes across partner DOE national labs.

Closing

Continued innovation
is the best way
to beat the competition

- Thomas Edison

Key References

- [Protecting U.S. Technological Advantage | The National Academies Press](#)
- [China Initiative Conference | CSIS Events \(200206 Wray transcript.pdf \(csis-website-prod.s3.amazonaws.com\)\)](#)
- [Improved Export Controls Enforcement Technology Needed for U.S. National Security \(csis.org\)](#)
- [2021 Final Report – NSCAI](#)
- [The Social Value of Science and Innovation Investments and Sources of Breakthroughs | NBER](#)
- [The State of U.S. Science and Engineering 2022 | NSF - National Science Foundation](#)
- [Historical Trends in Federal R&D | American Association for the Advancement of Science \(AAAS\)](#)