Lessons from NSF

Insights from serving as a rotational Program Officer

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UNCW Research and Innovation

Center for Marine Science, Lunch & Learn
October 28, 2025

Who am I?

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Connect on LinkedIn

A few facts …

- **Systems Ecologist**
- **Professor** @ UNCW since 2007
- **Taught ecology** at BS, MS, and PhD levels
- Editorial Board of **International Journal of Ecological Modelling**
- **Parent** of 2 awesome kids, **married** for 27 yrs
- Began serving as **Senior Research Officer in** 2018
- NSF **Program Officer** 8/2024-8/2025
- Worked in **research leadership & administration** for longer than I was in graduate school

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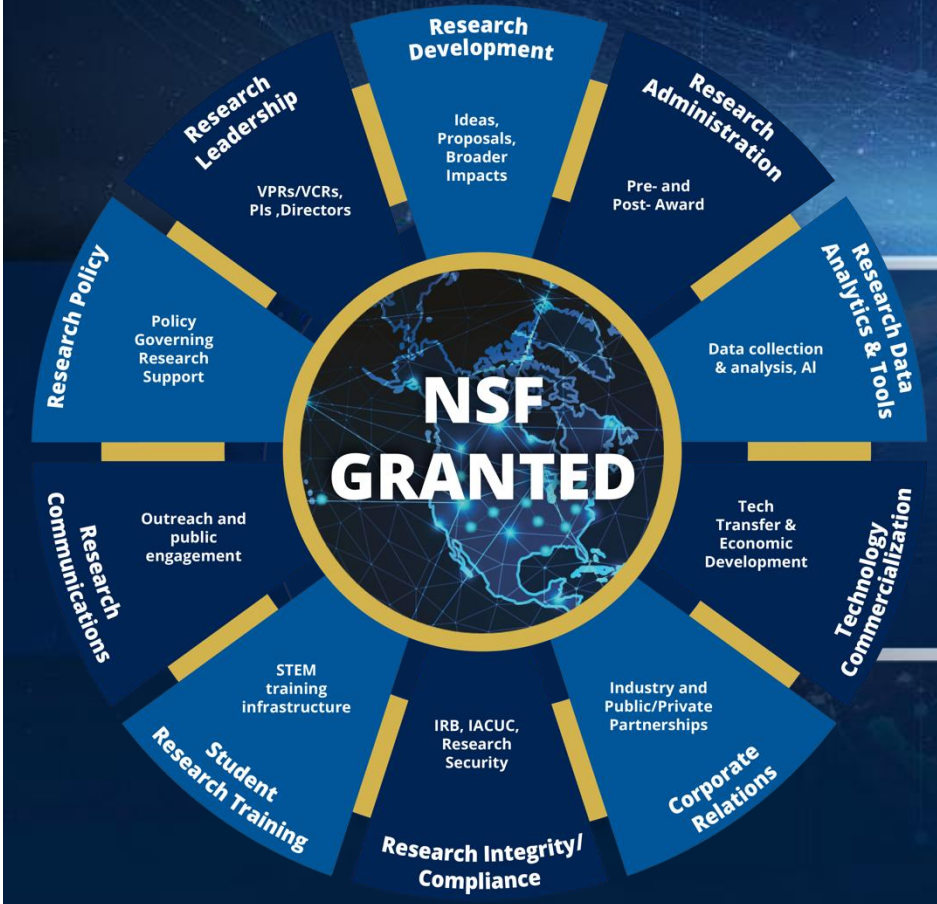


Growing Research Access for Nationally Transformative Economic Development

Transforming the national research enterprise by testing novel models to improve research support and service infrastructure

Trail Map

1. National Science Foundation
2. Competitive Proposals
3. National Research Enterprise

Trail Map

1. **National Science Foundation**
2. **Competitive Proposals**
3. **National Research Enterprise**

Mission

U.S. National Science Foundation

Independent federal agency that supports science and engineering

NSF was established in 1950 by Congress to:

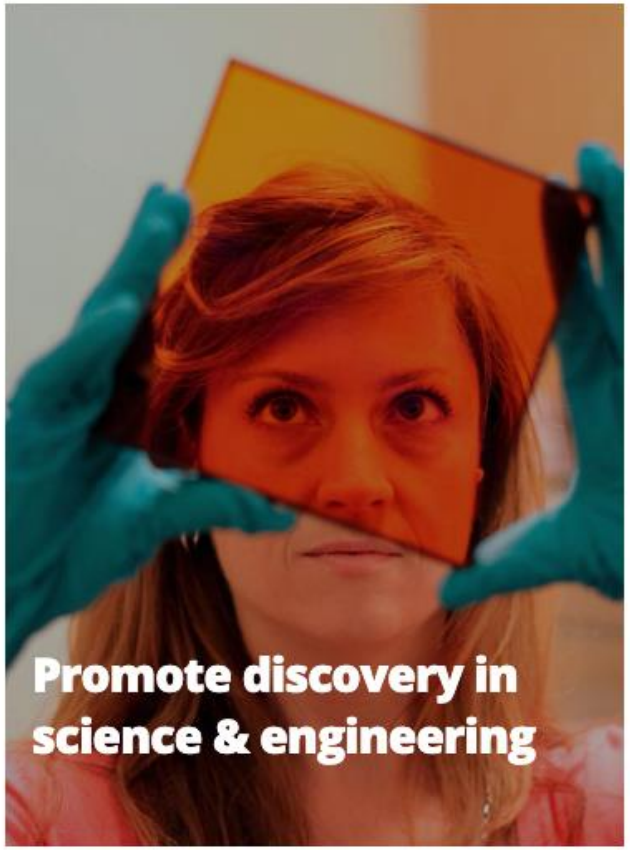
- **Promote** the progress of science
- **Advance** the national health, prosperity, and welfare
- **Secure** the national defense

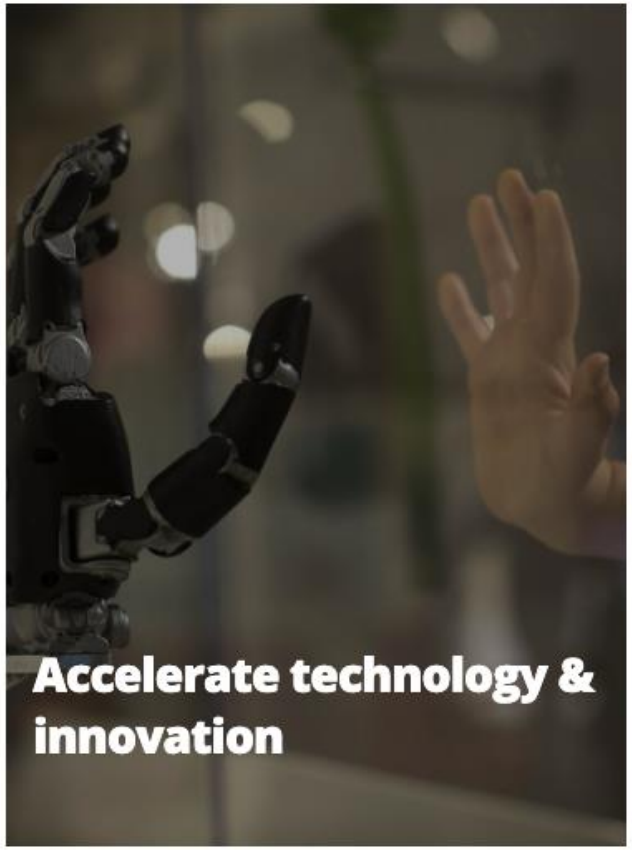
Fulfill mission primarily by **making grants,** guided by merit review

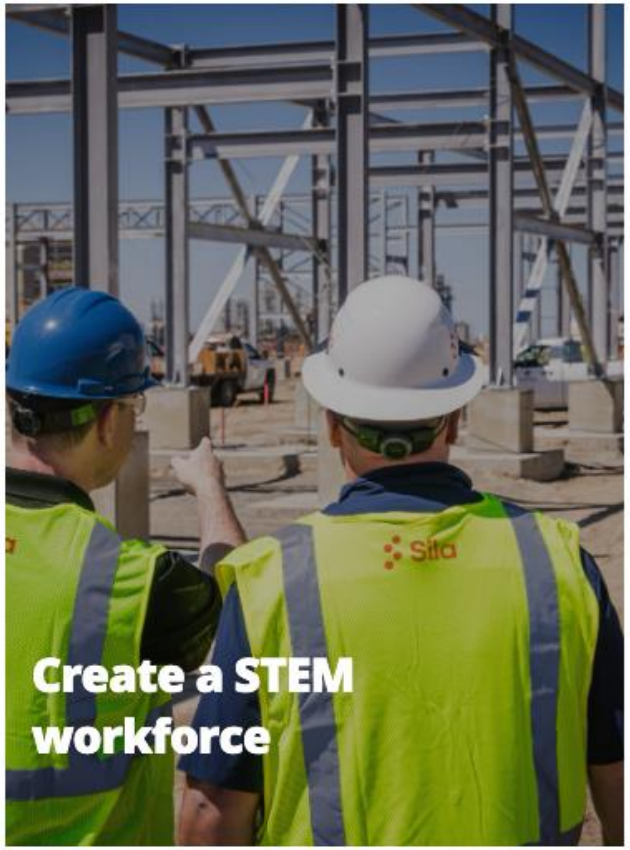
Priorities

U.S. National Science Foundation

Our priorities







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By the Numbers

U.S. National Science Foundation

$9.06B

NSF's Fiscal Year 2024 enacted budget

93%

Percent of budget supporting research, education and related activities

1,900+

Organizations supported by NSF across every state and U.S. territory

350,000+

Researchers, entrepreneurs, students and teachers supported by NSF

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Organization

U.S. National Science Foundation

- **Organized like a University**
- Multiple **Divisions** (e.g., Biology, Computer Science, Geosciences, Mathematical and Physical Sciences, Education)
- Each Division has a portfolio of **programs**, **solicitations**, and support. There are also cross-cutting programs.
- **National Science Board** establishes the polices of NSF and serves as advisor to Congress and the president.

Note that the Trump Administration has asked for a reorganization; plan is not yet public.

Proposals & Awards

NSF Proposal & Award Policies & Procedures Guide (PAPPG)

CURRENT VERSION: NSF 24-1

This is a key reference!

U.S. National Science Foundation

Standard Proposals & Awards for Research

- In response to **PAPPG**, **Program Description**, or specific **Solicitation**
  - Read carefully!
- **Dear Colleague Letters** provide additional guidance
- Standard awards obligate funds for a scope of work and budget (project)
  - University spends on the project and **submits for reimbursement**
  - Award structure (timing, obligation of funds, etc.) can vary
  - Generally, awards cannot exceed **5 years** because the funds appropriated to NSF are typically cancelled after 7 years if not expended.

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Proposals & Awards

U.S. National Science Foundation

NSF Proposal & Award Policies & Procedures Guide (PAPPG)

CURRENT VERSION: NSF 24-1

F. Other Types of Proposals

1. Planning
2. Rapid Response Research (RAPID)
3. EArly-concept Grants for Exploratory Research (EAGER)
4. Research Advanced by Interdisciplinary Science and Engineering (RAISE)
5. Grant Opportunities for Academic Liaison with Industry (GOALI)
6. Ideas Lab
7. Facilitation Awards for Scientists and Engineers with Disabilities (FASED)
8. Conference
9. Equipment
10. Travel
11. Center
12. Research Infrastructure
13. Career Life Balance (CLB) Supplemental Funding Requests
14. Research Opportunity Supplemental Funding Requests for Predominantly Undergraduate Institutions (ROA-PUI)

Ask program officers if the program will accept proposals for these types of projects.

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NSF Merit Review Process

Normally 6-9 months

Proposal Submission & Initial Screening

After the PI submits a proposal, it is checked for *program alignment* and *compliance* with NSF requirements.

If needed, may ask PI for proposal renovation or Return Without Review (RWR).

Merit Review Process

Program Officers (PO) identify domain experts to conduct the NSF merit review process.

Review focuses on two key criteria: **Intellectual Merit** and **Broader Impacts**.

Minimum of two merit reviews are required for each proposal; many receive more. Reviews are advisory to NSF.

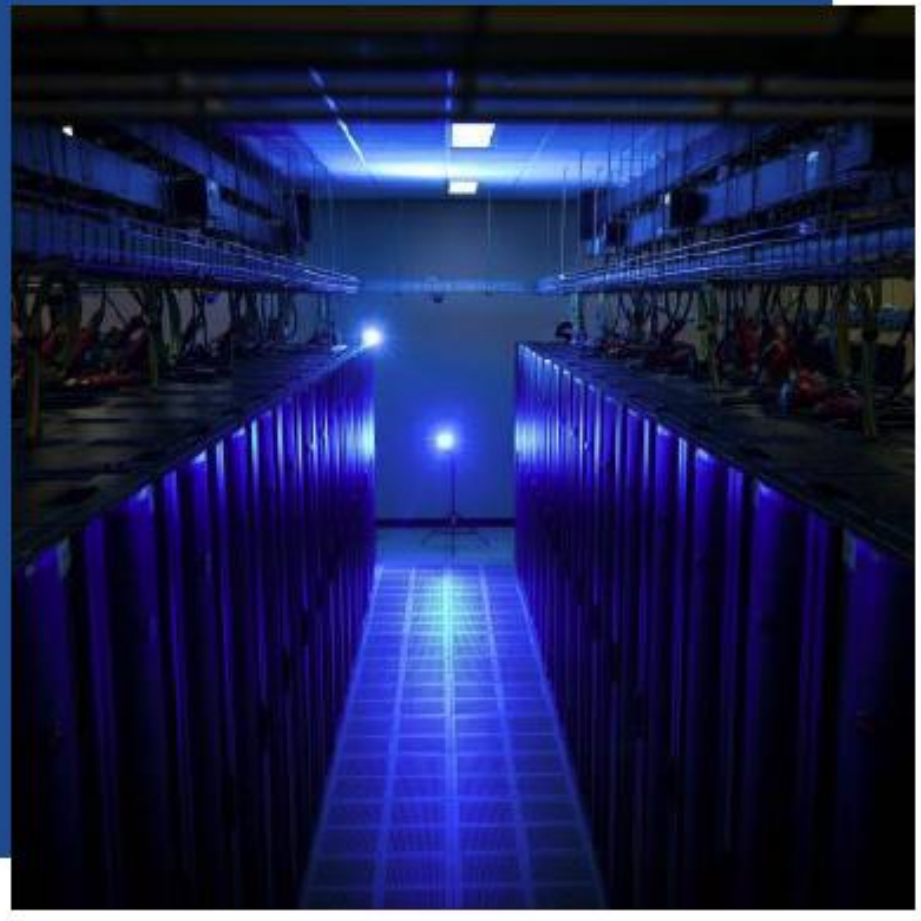
Funding Recommendation & Award

The PO makes a funding recommendation, considering **merit reviews**, **available funding**, and **portfolio balance**.

Before making a recommendation, a PO may ask PIs for additional information. In some cases, a PO may request a change in project scope or budget.

NSF leadership reviews recommendations, and if concurred it moves towards an Award.

Intellectual Merit



Importance of proposed activity:

Should this be done?

- to advance knowledge and understanding
- within the field and across fields
- creative, original, or potentially transformative research
- significance of expected contributions

How well conceived and organized is the proposed activity?

Can this be done?

- Soundness and feasibility of approach, evaluation, research plan
- How qualified is the team to conduct the proposed research
- Data Management Plan
- Mentoring Plan
- Access to necessary resources, equipment, facilities, etc.
- Requested support (budget)

Intellectual Merit

Encompasses the potential to advance knowledge

Considerations

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader Impacts

Accomplished through

- The research itself
- Activities that are directly related to specific research projects, AND/OR
- Activities that are supported by, but complementary to the project.

Considerations

1. What is the potential for the proposed activity to benefit society or advance desired societal outcomes?
2. To what extent do the proposed activities suggest and explore creative, original or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized and based on sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team or institution to conduct the proposed activities?
5. Are there adequate resources available to the principal investigator (either at the home institution or through collaborations) to carry out the proposed activities?

Broader Impacts

These examples should not be considered either comprehensive or prescriptive.

Proposers may include appropriate outcomes not covered by these examples.

The Foundation shall apply a broader impacts review criterion to identify and demonstrate project support of the following goals:

1. Increasing the economic competitiveness of the United States.
2. Advancing of the health and welfare of the American public.
3. Supporting the national defense of the United States.
4. Enhancing partnerships between academia and industry in the United States.
5. Developing an American STEM workforce that is globally competitive through improved pre-kindergarten through grade 12 STEM education and teacher development, and improved undergraduate STEM education and instruction.
6. Improving public scientific literacy and engagement with science and technology in the United States.
7. Expanding participation of women and individuals from underrepresented groups in STEM.

NOTE: Due to recent EOs, #7 BI is disallowed

(P.L. 114-329, "American Innovation and Competitiveness Act of 2017")

Trail Map

1. National Science Foundation
2. Competitive Proposals
3. National Research Enterprise

Proposal Narrative

BLUF – Bottom Line Up Front

- Tell the reader what the proposal is about and why it is important in the first paragraph.

Explicitly state the IM and BI of the proposed project

Diagrams and infographics can be powerful

A proposal is a persuasive essay

- You are selling the importance of your ideas/hypotheses
- You are trying to persuade the reader that your methods/approach will be successful to test your hypothesis, and that they are achievable
- You must convince the reviewer that you/your team can be successful

Budgeting & Budget Narrative

Allowable expenses

- PAPPG (NSF)
- 2 CFR 200 (Uniform Guidance for federal awards)
- University policies and procedures (not checked in NSF review)

ASK SPARC!

ASK Business Team!

Budget

- Considered in merit review only w.r.t. feasibility
  - If awarded, will the project team have the resources necessary to succeed?
- Ultimately negotiable with the Program Officer
- Strategic element

Budget Narrative

- Explain why the requested funds are needed and how expenses were estimated
- *Critical* document for PO, NSF Administration, and for University Administration
- Opportunity to explain rational

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Biosketch and Synergistic Activities

WHY?

Why do you think these proposal elements are required for all Senior/Key Personnel?

Feasibility

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Facilities, Equipment, and Other Resources (FEOR)

Opportunity!

Support your case that the research is feasible with the resources available

Generic institutional templates don't add sig. value*; need to craft to fit your proposal

Only include FEOR directly relevant to your project

Explain partnerships or unfunded collaborations

If a PI does not show effort on the budget, you need to explain why in the FEOR (e.g., the proposed work is withing the scope/expectations of normal job duties of the PI)

* Exception is for standard facility descriptions or core facilities (e.g., Mass Spec, CMS Boats)

Caution!

Reviewers may treat this like the online supplement of a paper, so make sure critical ideas are in the main narrative

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Program Officers

A resource to help potential and active PIs

Provide webinars, guidance documents, and consultation

Ask to review & discuss a 1-page project summary (include IM & BI)

- Consider alignment with program
- Provide guidance on program goals
- Constraints on what they can say to maintain fair competition

Facilitate merit review process, make award recommendations

Busy people, especially now

Significant authority

Trail Map

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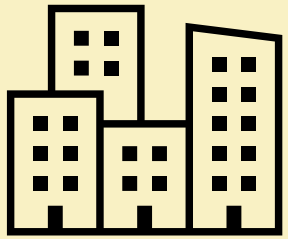
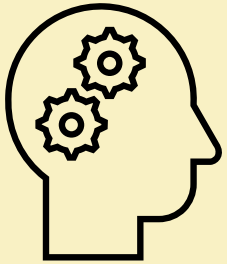
U.S. National Research Enterprise

Institutions and Organizations



- Facilities
- Equipment
- Resources

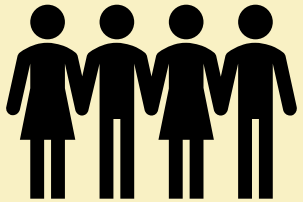
Investigators, Trainees, Teams



- Disciplinary knowledge, networks, expertise
- Discovery, technology & innovation pipeline

Government
Industry/Corporate
National Labs
Non-profits
Institutions of Higher-Ed

Research Support and Service Infrastructure

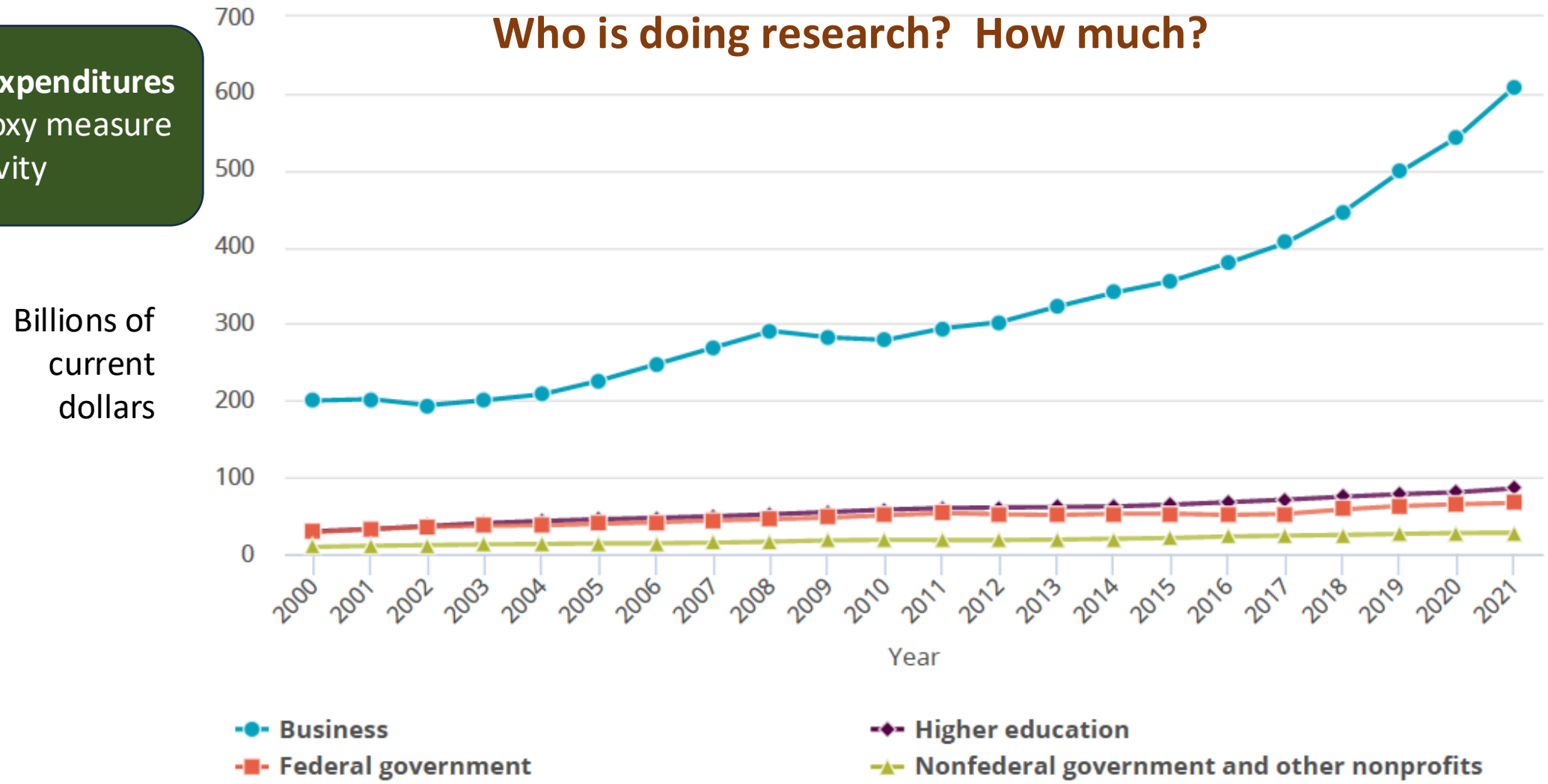


- Staff and administration
- Human capacity and capability
- Policies, practices, and processes
- Partnerships

U.S. R&D Expenditures, by performance sector

Using **expenditures** as a proxy measure for activity

Who is doing research? How much?



Note(s): Some data for 2021 are preliminary and may be revised later.

Source(s): NCSES, National Patterns of R&D Resources (2021–22 edition). *Indicators 2024: R&D*

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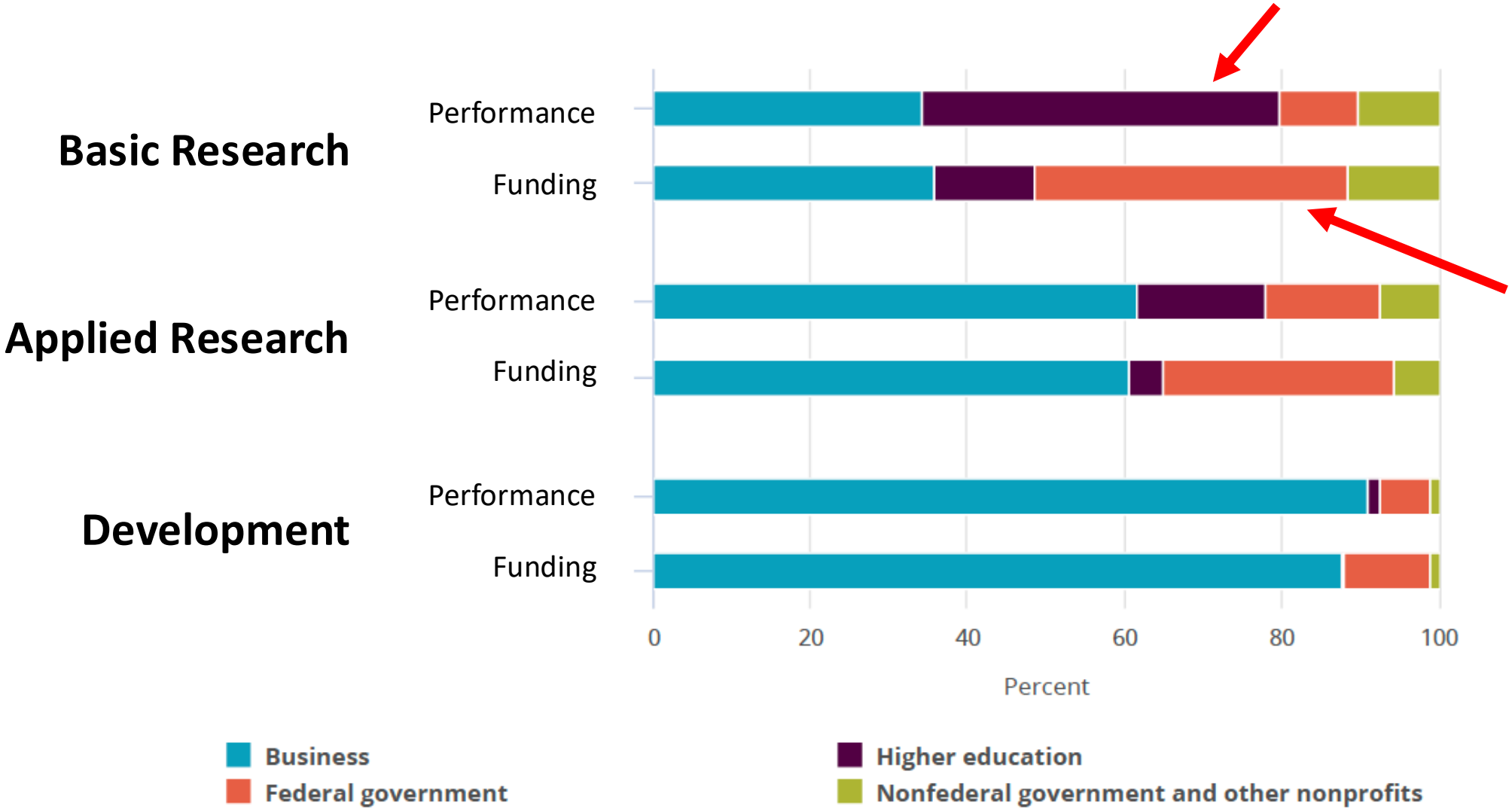
R&D Performance and Funding by Type and Sector: 2021



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Source(s): NCSES, National Patterns of R&D Resources (2021–22 edition). *Indicators 2024: R&D*

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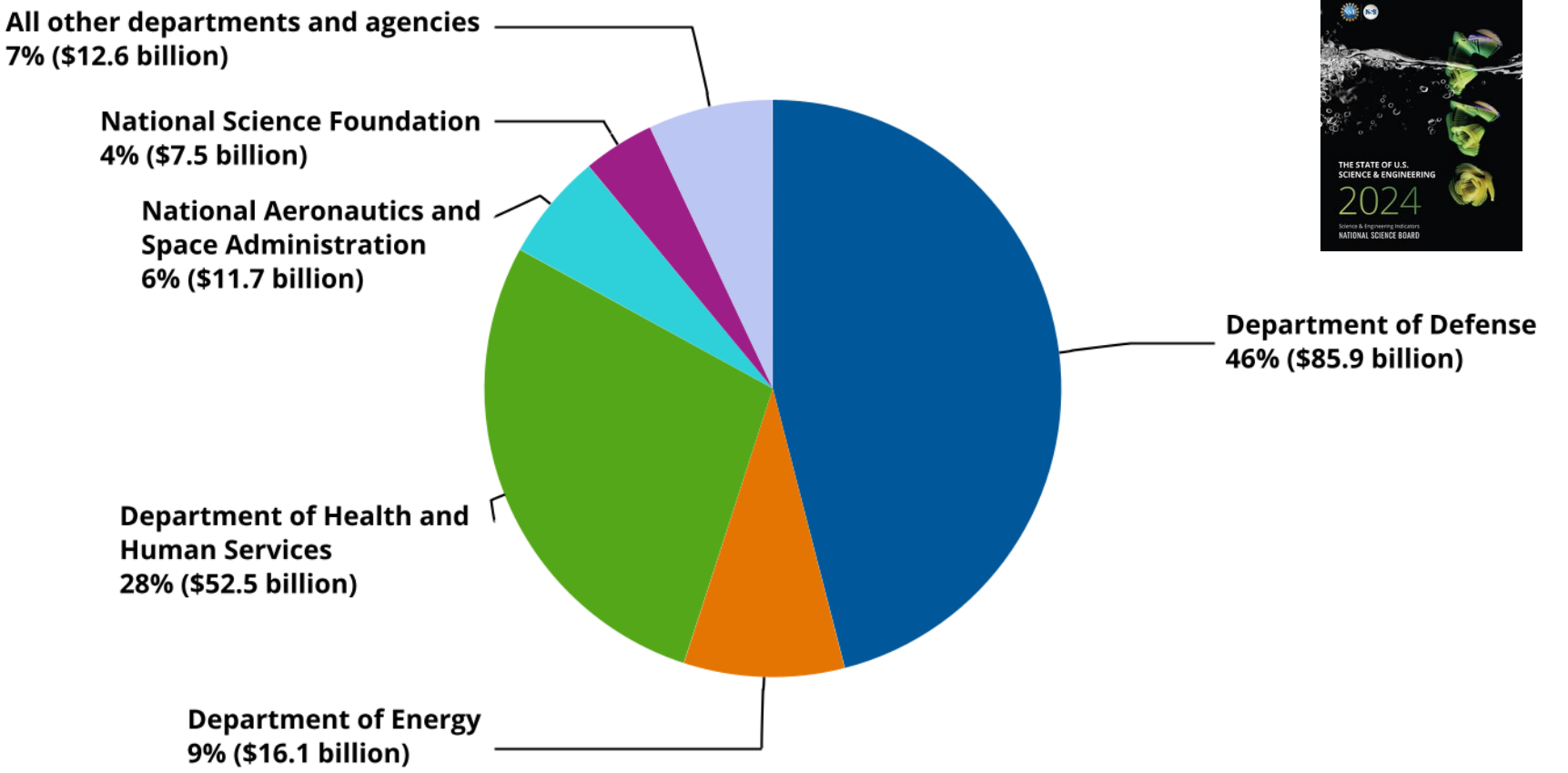
Federal obligations for R&D by agency, FY2023



NATIONAL ENDOWMENT FOR THE HUMANITIES

$207 million

NATIONAL ENDOWMENT for the ARTS
arts.gov

$207 million

Note(s):
Because of rounding, detail may not add to total.

Source(s):
National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development, FYs 2023–24.

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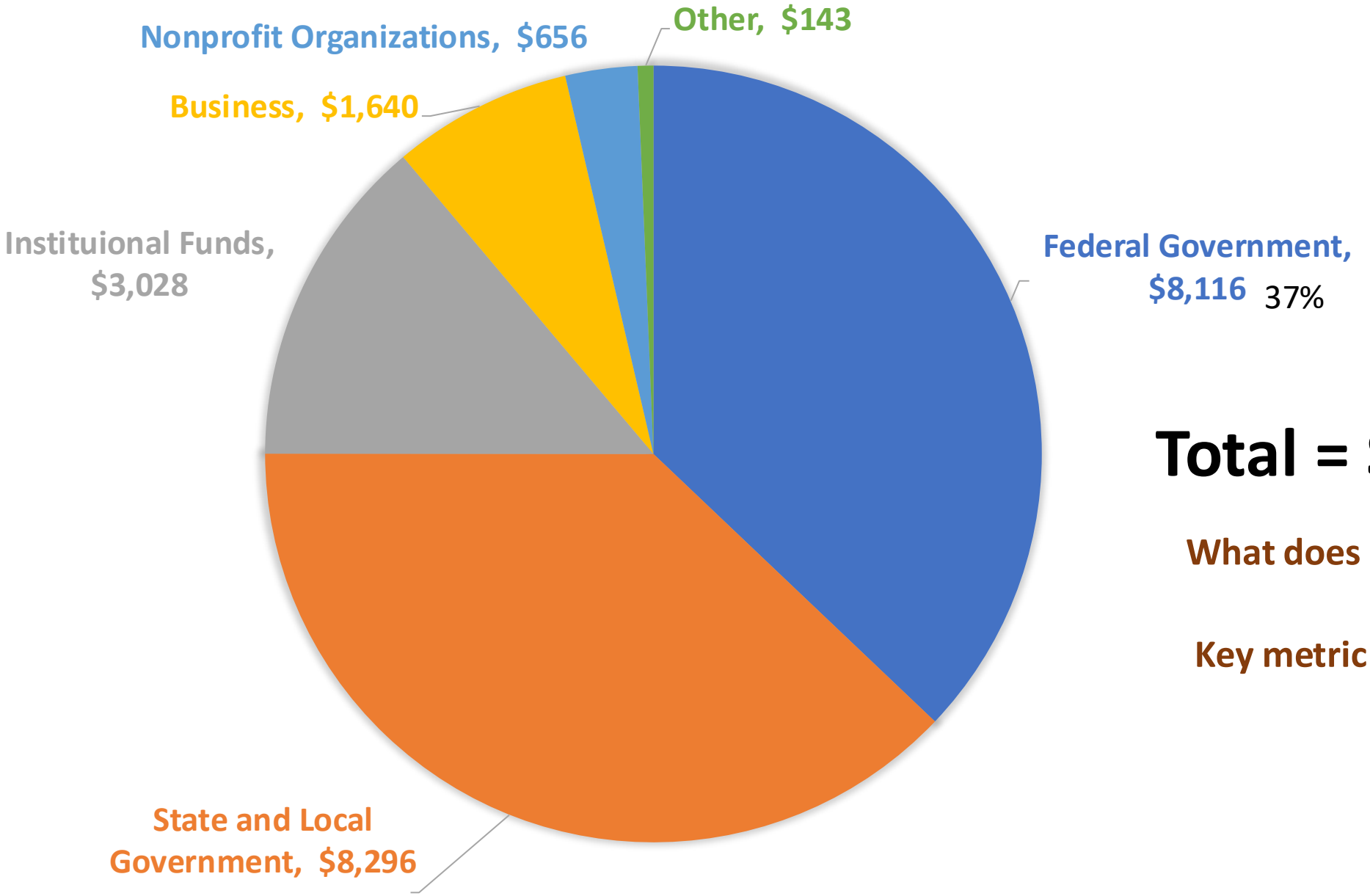
FY23 Research Expenditures, by source (in $1000s)



Total = $21.9 million

What does this include/exclude?

Key metric for R2 classification

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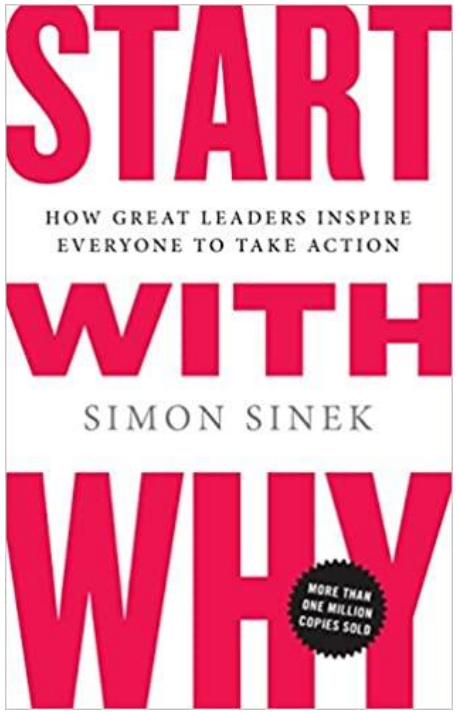
Consider



Why are US taxpayers investing in R&D?

Why does the federal government partner with universities for R&D?

Why does the agency support R&D?

How do your research goals & objectives align with these "whys"?

Answer these questions when you communicate about your research

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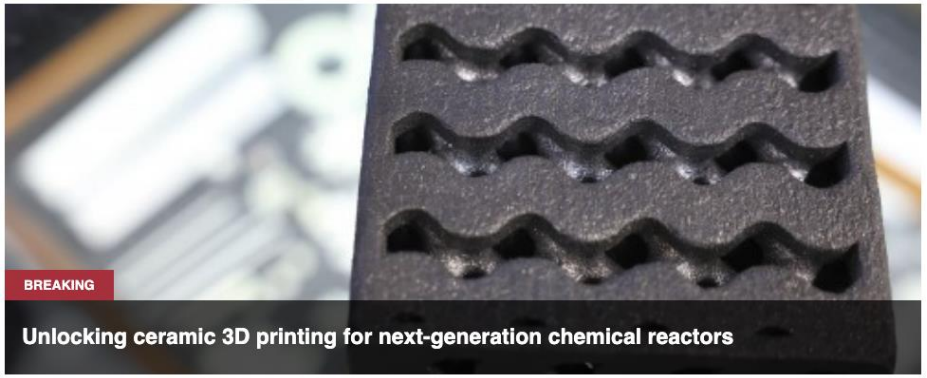
R&D Outcomes: Recent Headlines



New research explores improving coastal high tide flooding outlooks

Increasing lead times will help communities mobilize flood responses.

Treating opioid addiction in jails improves treatment engagement, reduces overdose deaths and reincarceration

September 10, 2025 — NIH-funded study demonstrates life-saving potential of providing medications for opioid use disorder in carceral settings.

PPPL PRINCETON PLASMA PHYSICS LABORATORY

16-Sep-2025 8:30 EDT

A New Way to Produce Ammonia More Efficiently

Princeton Plasma Physics Laboratory

A new approach for making the chemical ammonia using plasma — the fourth state of matter — could revolutionize how hydrogen is stored and transported and drive down the price of various manufacturing processes.

Repeated head impacts cause early neuron loss and inflammation in young athletes

September 17, 2025 — NIH-funded study reveals brain changes long before chronic traumatic encephalopathy (CTE) develops.

NEH in the News

WSU professor's app will help visually impaired read 'rich visual content'

February 25, 2025

Latest News

ARS researchers and their partners discovered a tomato line that is resistant to tomato brown rugose fruit virus. **More ...**

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New AI model could revolutionize U.S manufacturing

Artificial intelligence has transformed fields like medicine and finance, but it hasn't gained much traction in manufacturing. Factories present a different challenge for AI: They are structured, fast...

July 17, 2025

USDA and DOI Announce Bold Federal Reforms to Improve Nation's Wildfire Response System

September 15, 2025

(Washington, D.C., September 15, 2025) – U.S. Secretary of Agriculture Brooke L. Rollins today issued a new memorandum to modernize and strengthen America's wildfire prevention and response system. This policy direction enacts common-sense reforms that modernize and streamline federal wildfire...

New axolotl study gives researchers a leg up in work towards limb regeneration

Researchers supported by the U.S. National Science Foundation have discovered that it is not how much of a key molecule that allows axolotls to regenerate limbs properly, it is how little. This new...

July 18, 2025

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R&D Outcomes: IT

"Tire Track Plot"

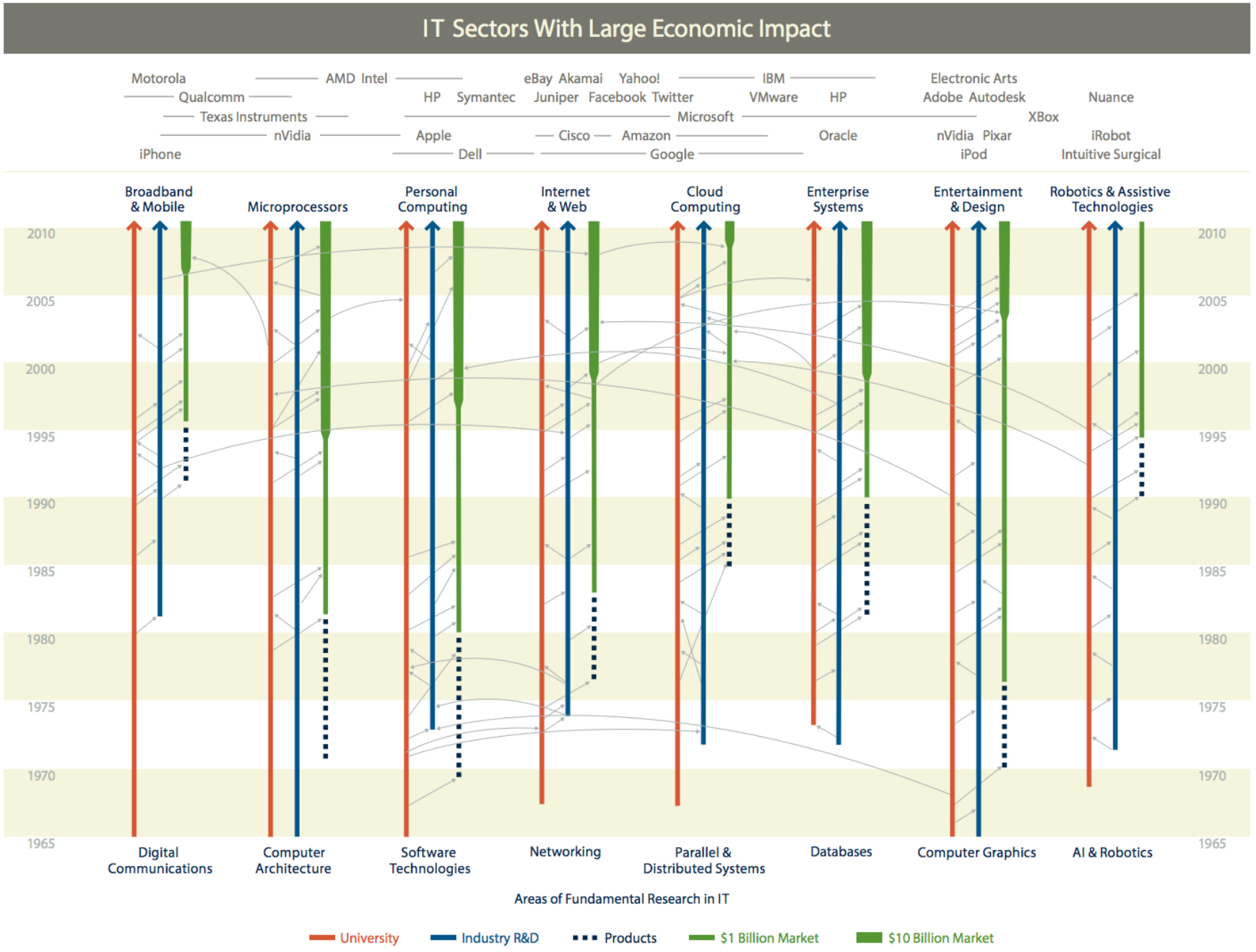

FIGURE I.1 Examples of the contributions of federally supported fundamental research to the creation of IT sectors, firms, and products with large economic impact. SOURCE: Reprinted from National Research Council, 2012, *Continuing Innovation in Information Technology,* The National Academies Press, Washington, D.C.

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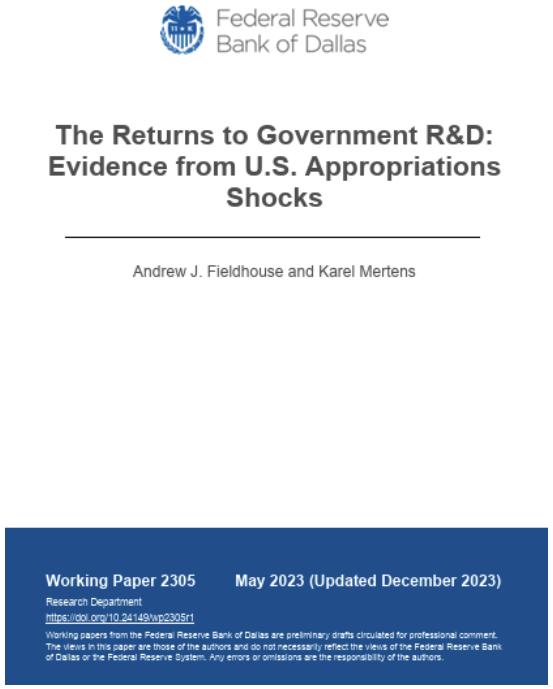
R&D Outcomes: Economic Prosperity



25%

of business sector economic growth (TFP)

since WWII

is due government funded non-defense R&D

…workforce development too!

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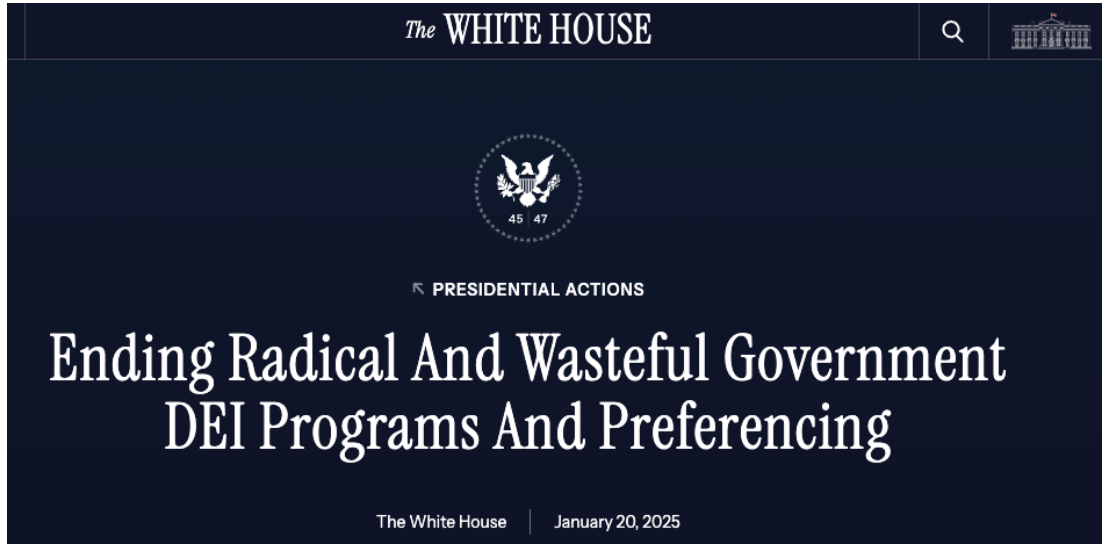
Contemporary Shifts

Contemporary Shifts: Presidential Executive Orders



These and others required federal agencies sponsoring research to change their practices

NSF

- New Guidelines
- Terminated awards that were not compliant
- Asked PIs to renovate active awards
- Eliminated programs
- Revising program descriptions
- Broader Impacts

1,752 Awards
$1.4 B

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- ~7 awards terminated (of ~250)
- Others may still be impacted
- Slow NCX
- Slow new fed. awards

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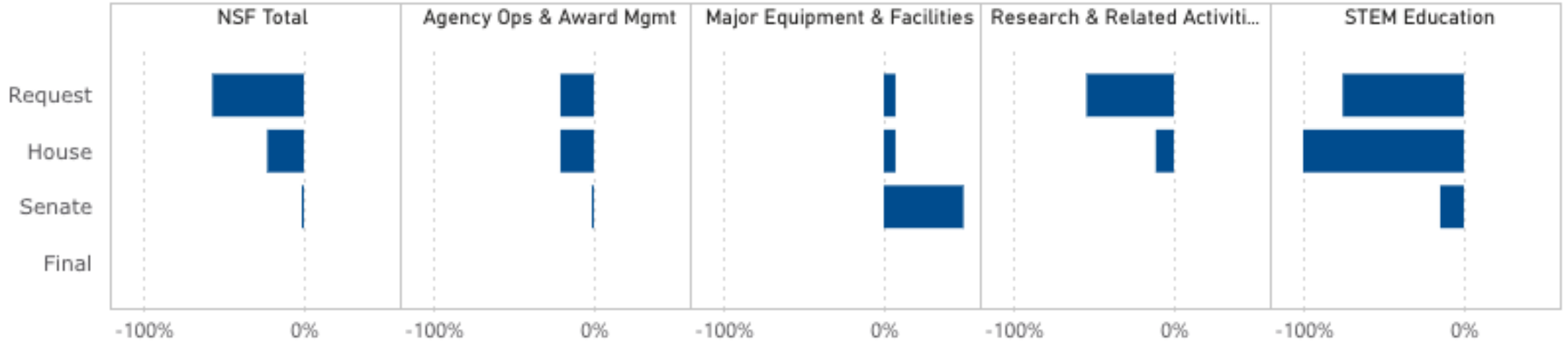
Contemporary Shifts: FY26 Federal Budget – not done yet

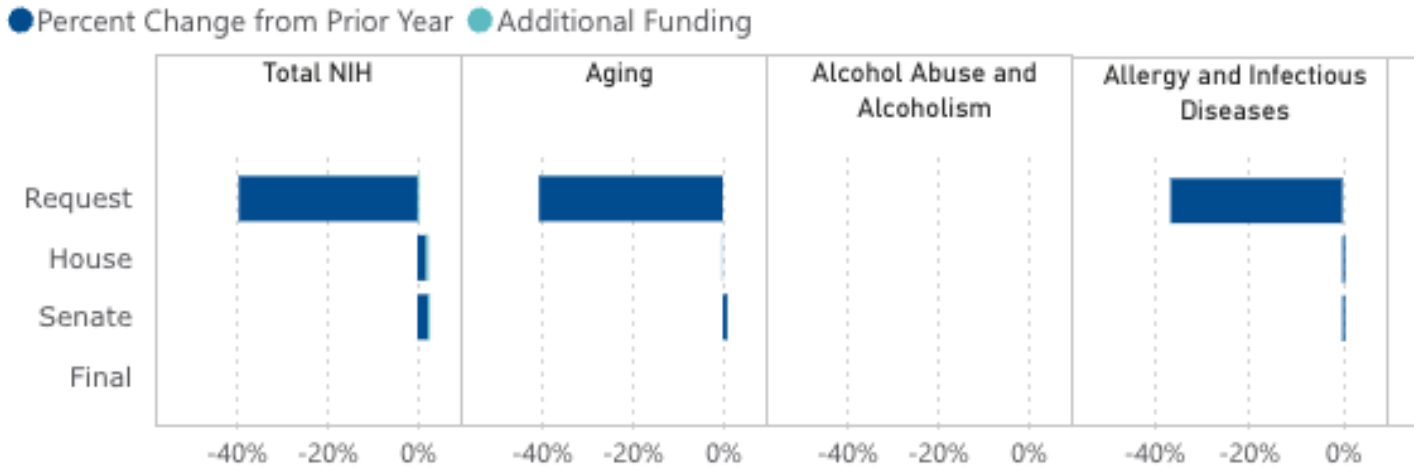
National Science Foundation



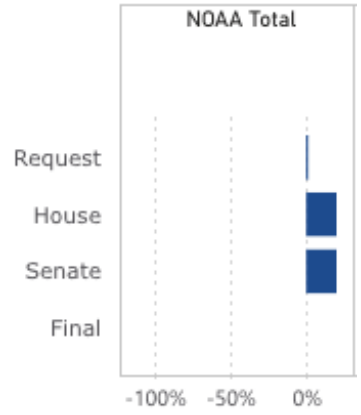
Aaas.org

Percent different from previous fiscal year

NIH



NOAA



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Contemporary Shifts: Other Items

- Changing federal workforce
  - Reduction of force
  - “Fork” approach
- Changing rules for federally sponsored research
  - 2 CFR 200 update expected soon
  - Recover of facilities and administration costs
  - Award Terms and Conditions

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Things Come Apart, Todd McLellan

Assemble the key pieces

Take Home Lessons from a Program Officer:
Keep submitting proposals

- **Writing a proposal** is never wasted time & effort. It is a creative act that advances a researcher's ideas and insights.
- **Merit Review**: constructive reviews further improve research.
- When the funding arrived, I could only **recommend awards** to proposals that were in hand and reviewed.
- A **drop in proposal submissions** could be used as evidence that continuing funding of the agency/sponsor is unnecessary.
- **Patience. Federal agencies must comply** with executive orders and new legislation, and it takes time to do this.

Recall Your Research Motivation

WHY

Do you conduct research?

Discovery

What is one of your research discoveries that still excites you or makes you proud?

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Thank you!

Q&A

U.S. National Science Foundation

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Q: What is the #1 reason for a No Cost Extension request?

Connect with Research and Innovation Service Team (RIST)!

Signup for R&I News & Funding Opportunities email

Opt in!

Join SPARC Virtual Office Hours

https://uncw.edu/myuncw/research/toolbox/news-updates

Tuesday & Thursdays
1-2 pm

Join RIO Virtual Office Hours

Virtual Office Hours

IRB: T, 11-12:30 pm
TH, 2-3:30 pm

IACUC: F, 11 – noon

Export Controls: TH, 10-11:30 am

Contact Us!

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Institution Fact Sheet: UNCW

U.S. National Science Foundation
WHERE DISCOVERIES BEGIN

Accessibility
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Select Institution Name
University Of North Carolina At Wilmington

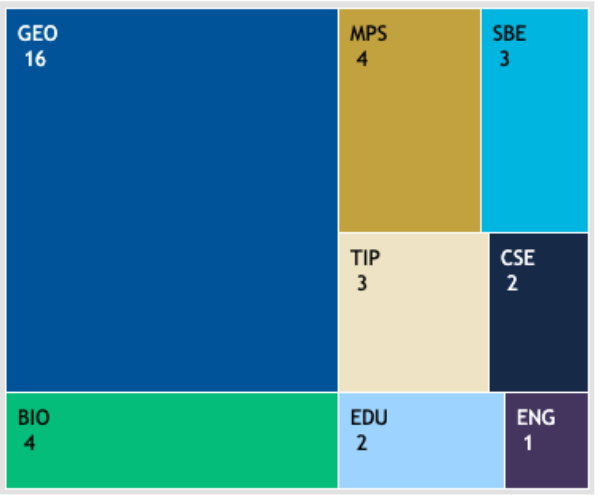
University Of North Carolina At Wilmington

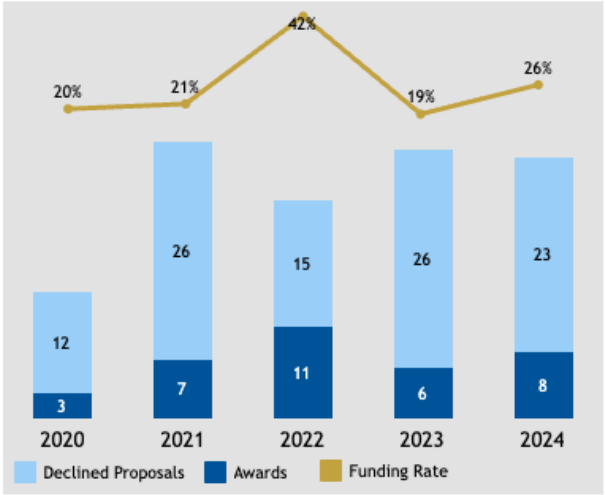
Wilmington, North Carolina
MSI : Non-MSI
ERI : Emerging Research Institution
Current EPSCoR State : NO
As of Date: September 26, 2025

FY 2020-2024 - Fast Facts

137 Proposals Evaluated	35 New Awards Funded	26% Funding Rate NSF 2024 avg. 27%	$13 M Award Obligation	48 PIs and Co-PIs on Awards

FY 2020-2024 - Awards by Managing Directorate and Trends





Note: When there are fewer than 10 proposals in aggregate, the funding rate and count of declined proposals are not displayed.

Largest Active Awards

All Active Awards

Award ID	Award Title	Award Date	Directorate	Total Intended Award Amount
2306135	NSF Engines Development Award: Advancing climate technologies in Eastern North Carolina (NC)	05/09/2023	TIP	$995,337
2218863	The role of sponges in altering seawater DOM on Caribbean reefs	08/08/2022	GEO	$946,705
2018803	MRI Consortium: Development of CCPflex - A multi-function, modular platform for next-generation Conductivity Concentratio	07/17/2020	GEO	$924,974
2215839	MRI: Acquisition of a novel multi sensor-equipped unmanned aerial system (UAS) observatory for coastal mapping	08/17/2022	SBE	$850,863
2225144	Collaborative Research: Have Transantarctic Dispersal Corridors Impacted Antarctic Marine Biodiversity?	06/25/2022	GEO	$667,605

Most Recent Active Awards

Award ID	Award Title	Award Date	Directorate	Total Intended Award Amount
2409465	EMBRACE-OCE-Growth: The dynamics and drivers of fish-mediate ecosystem functions in Large Marine Ecosystems	08/29/2024	GEO	$393,925
2412800	Probes of Fundamental QCD Symmetries and BSM Physics Via the Neutral pion, eta and eta' Decays	08/21/2024	MPS	$383,366
2426530	Collaborative Research: Rising seas, failing infrastructure: Characterizing microbial risks from exposure to tidal floods	08/13/2024	ENG	$79,998
2439855	Graduate Research Fellowship Program (GRFP)	08/02/2024	EDU	$106,000
2421363	Collaborative Research: Characterizing the physiological and environmental cycling of abundant osmolytes	07/18/2024	GEO	$519,767

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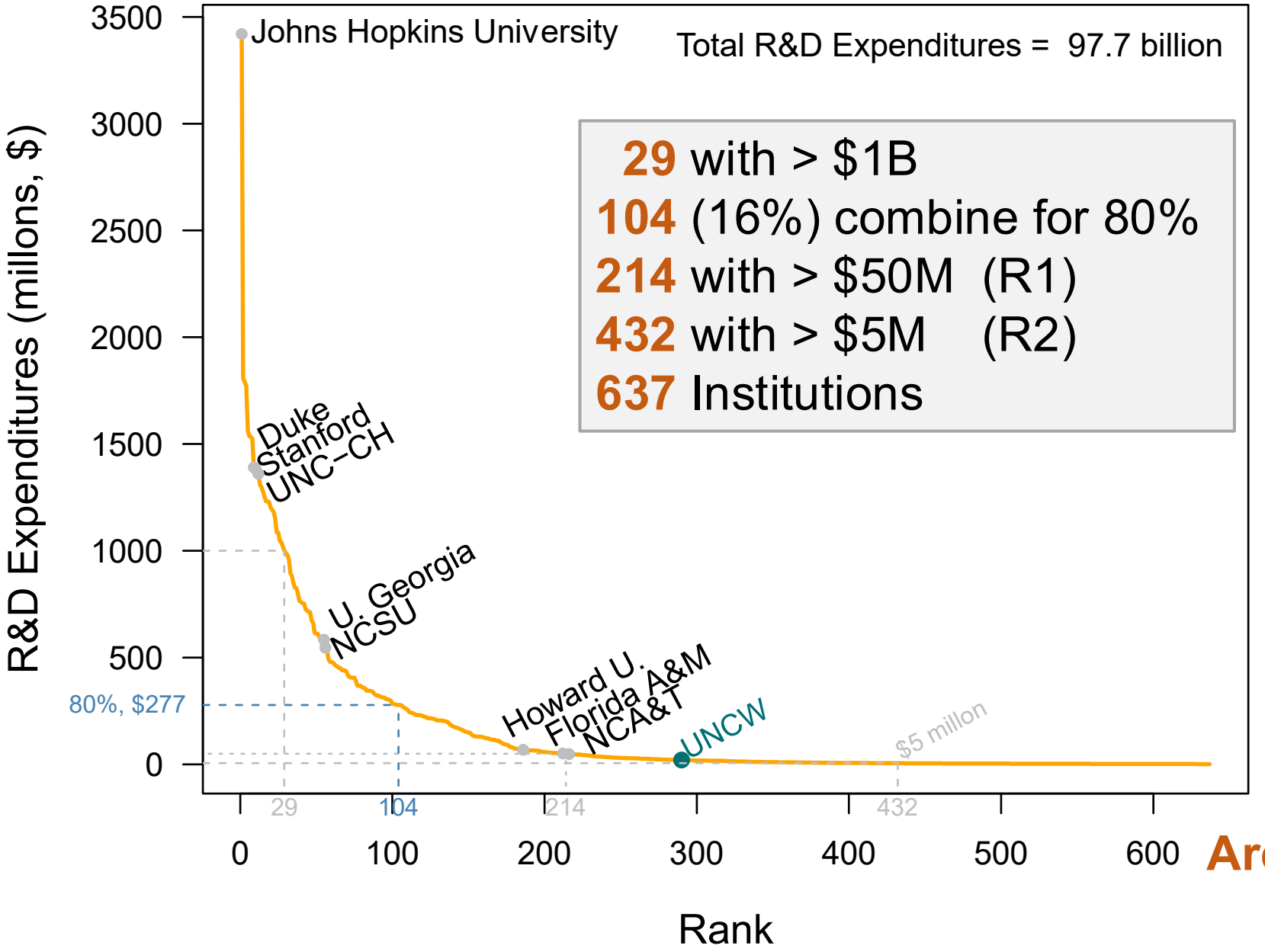
NSF HERD 2022 Research Expenditures



637 of ~ 4,000
Colleges and Universities

Variability in institution research activity, type, expertise population served, geographic location

Shannon Equitability Index
$(1 - E_h) = 0.20$
→ Not Diverse
→ Centralized

Are we getting all we can from the IHE R&D ecosystem?

Suggested Responses

, ?

Acknowledge & Grace

Discere Aude

Continue **research**, **scholarship**, and **creative work** with the resources we have at UNCW.

Your research matters!

Seek emergent opportunities

Federal priorities seem to be:

- Emerging technology: **Artificial Intelligence**, **Quantum Computing**
- **Biotechnology** and biosecurity
- **Advanced manufacturing**
- **Nuclear energy**

Consider other partnerships

- State & local government
- Foundations
- Corporate & Industry
- Other universities

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Research and Innovation Service Team (RIST)

- **Here to support you!** Please let us know when you have a question, concern, or suggestion.
- Actively **monitoring the changing research support and regulatory landscape**, and we will actively share with you what we know (and don't).
- Happy to meet individually or visit **department or committee meetings.**

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Contemporary Shifts: Federal R&D Strategy

To what degree should the US Federal Government …

A Invest in R&D?

B Partner with IHE for R&D?

C What R&D to prioritize?

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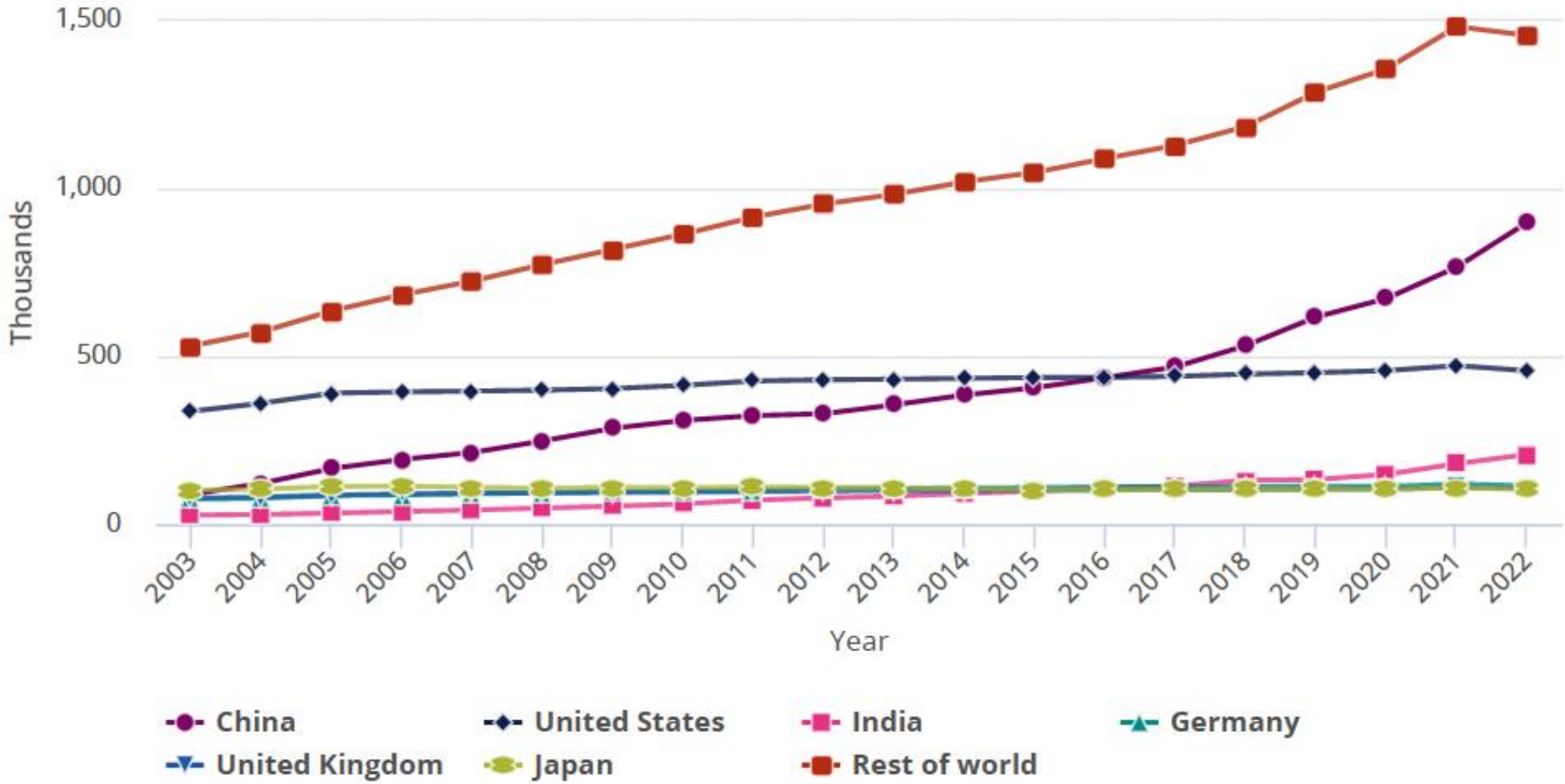
International Context: S&E Articles, 2003-22



Note(s): Articles are fractionally counted and classified by publication year and assigned to a region, country, or economy by author's institutional address.

Source(s): NCSES, special tabulations (2023) by Science-Metrix of Elsevier's Scopus abstract and citation database. *Indicators 2024: Publications Output*

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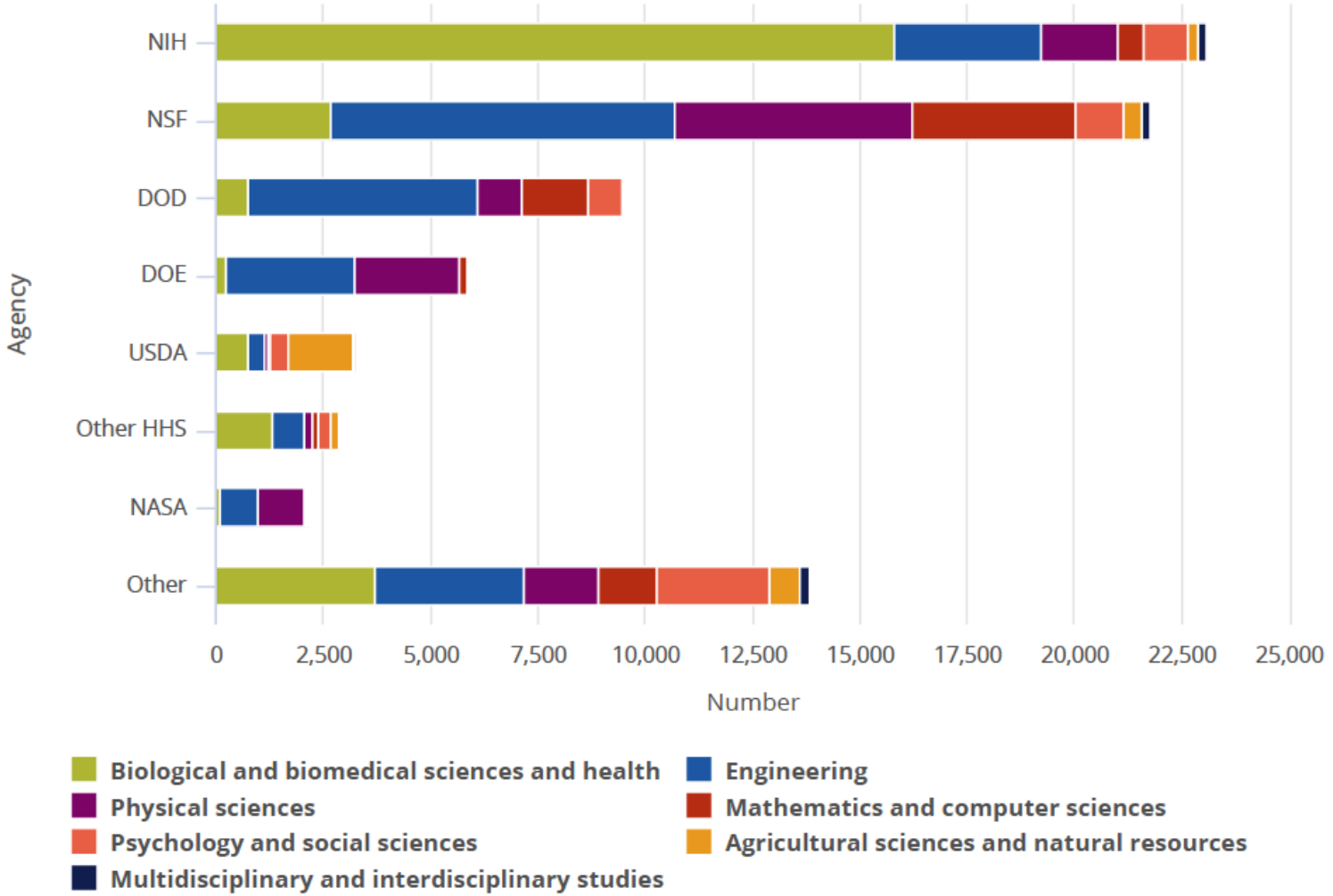
Support for Graduate Students



Note(s): DOD is Department of Defense. DOE is Department of Energy. HHS is Department of Health and Human Services, excluding NIH. NASA is National Aeronautics and Space Administration. NIH is National Institutes of Health. NSF is National Science Foundation. USDA is Department of Agriculture. S&E includes health fields. Physical sciences includes geosciences, atmospheric sciences, and ocean sciences. Agricultural sciences includes veterinary sciences; natural resources includes conservation. Mathematics includes statistics; computer sciences includes information sciences.

Source(s): NCSES, GSS, 2021. *Indicators 2024: Academic R&D*

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Definition of R&D

Research and experimental development (R&D) comprise **creative and systematic work** undertaken in order to **increase the stock of knowledge** – including knowledge of humankind, culture and society – and to **devise new applications** of available knowledge.

p.44

Organization for **E**conomic **C**ooperation and **D**evelopment