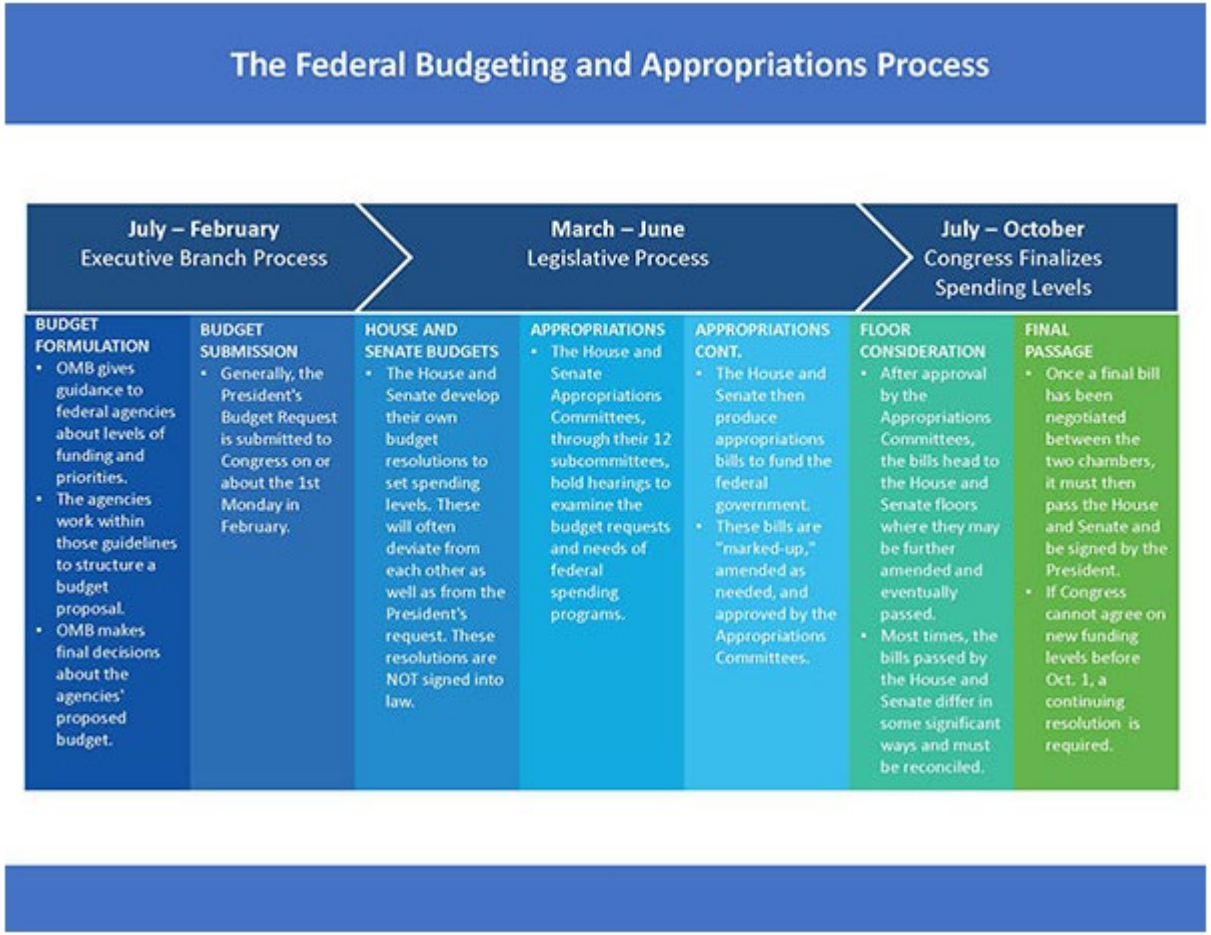
FY22 Federal R&D Priorities

OFFICE OF RESEARCH AND ECONOMIC DEVELOPMENT

SEPTEMBER 2021

The Federal Budget Process



Source: NSF

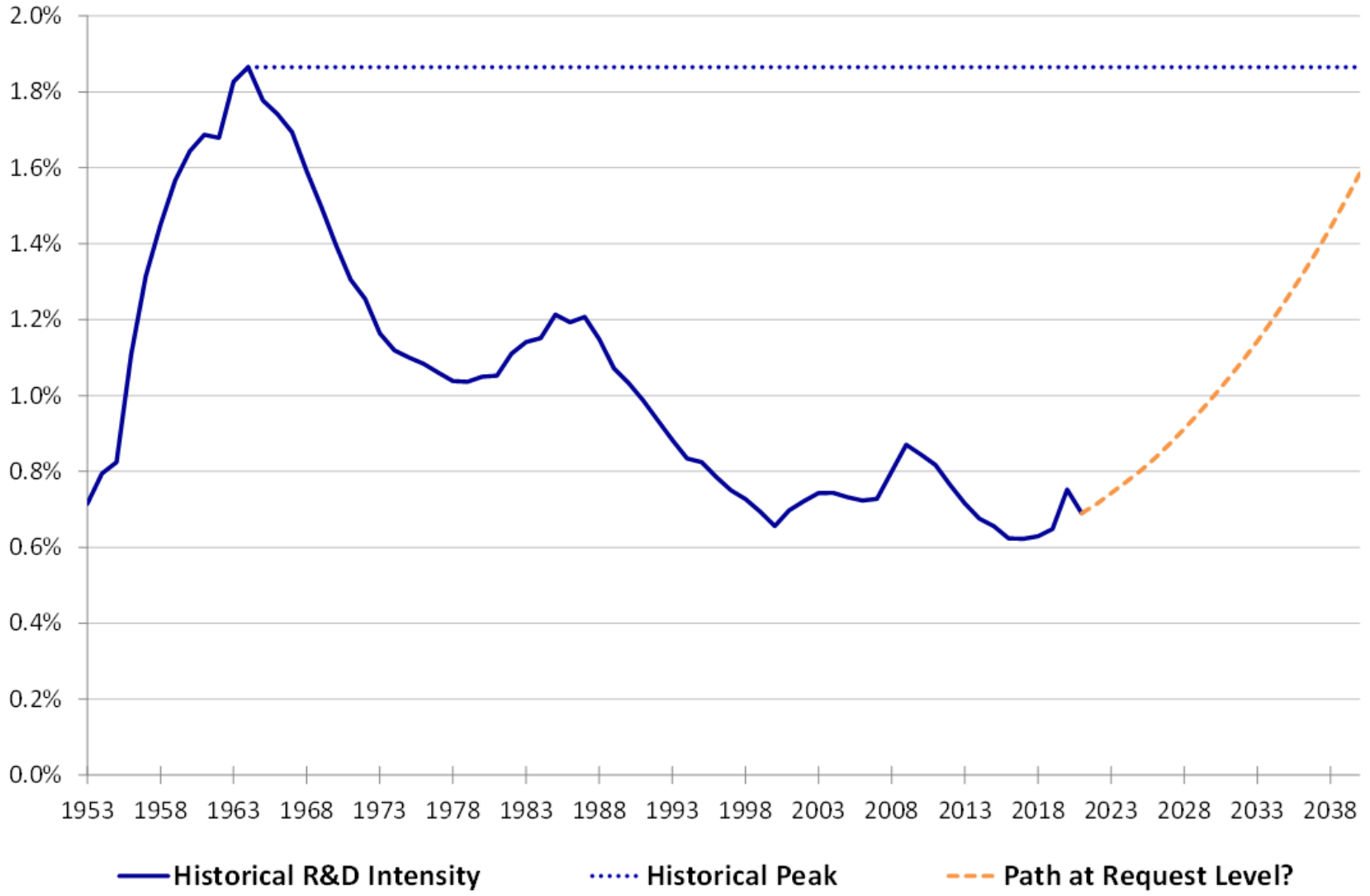
Federal FY22 Budget: R&D Summary

President Biden's budget request for FY2022 includes approximately $171.3 billion for research and development (R&D), $13.5 billion (8.5%) above the FY2021 estimated level of $157.8 billion. In constant FY2022 dollars, the FY2022 R&D request represents an increase of $10.6 billion (6.6%) above the FY2021 estimated level.

Under the President's FY2022 budget request, nearly all federal agencies would see their R&D funding increase relative to FY2021. The only exception is DOD.

Department/Agency	FY2020 Actual	FY2021 Estimate	FY2022 Request	FY2021-FY2022 Dollar Change	FY2021-FY2022 Percent Change
Department of Defense	62,438[a]	63,350[a]	62,800	-550	-0.9%
Dept. of Health and Human Services	44,455	43,494	51,232	7,738	17.8%
Department of Energy	19,476	19,312	21,452	2,140	11.1%
NASA	14,801	13,226	14,565	1,339	10.1%
National Science Foundation	6,800	7,408	8,173	765	10.3%
Department of Agriculture	2,989	2,965	3,609	644	21.7%
Department of Commerce	1,953	2,122	2,743	621	29.3%
Department of Veterans Affairs	1,366	1,420	1,498	78	5.5%
Department of Transportation	1,043	1,024	1,339	315	30.8%
Department of the Interior	1,094	1,033	1,221	188	18.2%
Department of Homeland Security	532	590	627	37	6.3%
Smithsonian Institution	516	524	585	61	11.6%
Environmental Protection Agency	237	445	473	28	6.3%
Department of Education	344	322	346	24	7.5%
Other	582	563	597	34	6.0%
Total	**158,626**	**157,798**	**171,260**	**13,462**	**8.5%**

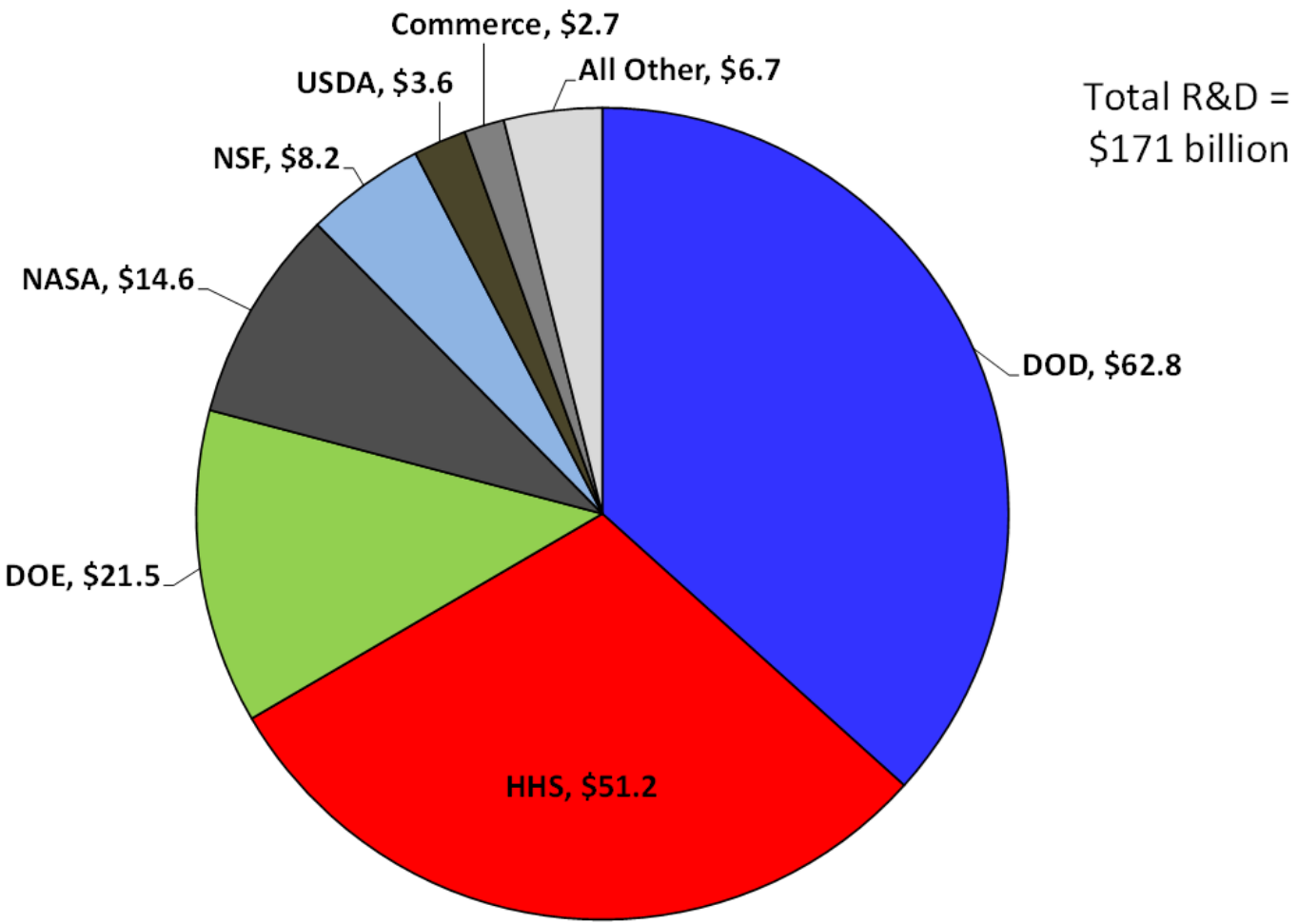
Federal R&D Growth



AAAS analysis based on NCSES, OMB, and CBO data.

Total Requested R&D by Agency, FY 2022

budget authority in billions of dollars



Total R&D = $171 billion

Source: OMB R&D data. R&D includes conduct of R&D and R&D facilities.


resilience
clean
health
National
change
energy
technologies
tax
Health
science
Climate
infrastructure
Agriculture
Education
communities
development
conservation
adaptation
public
ARPA
ARPA-C
underrepresented
underserved
Economic
Atmospheric
carbon
accelerate
farmers
racial
transportation
Earth
monitoring
STEM
Defense
Energy
land
ethnic
equity
pollution
hazardous
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justice
emerging
innovations
Community
families
agriculture
global
adaptation
aviation
Justice
Security
Earthquake
Space
Environmental
Minority-Serving
greenhouse

How can we use this information?

If we understand the climate and priorities of the federal government, we can write responsive proposals (increased likelihood of proposal success)

Targeted hiring of faculty with expertise in priority areas

Planning – facilities, staffing, research infrastructure

Build interdisciplinary teams

National Institutes of Health

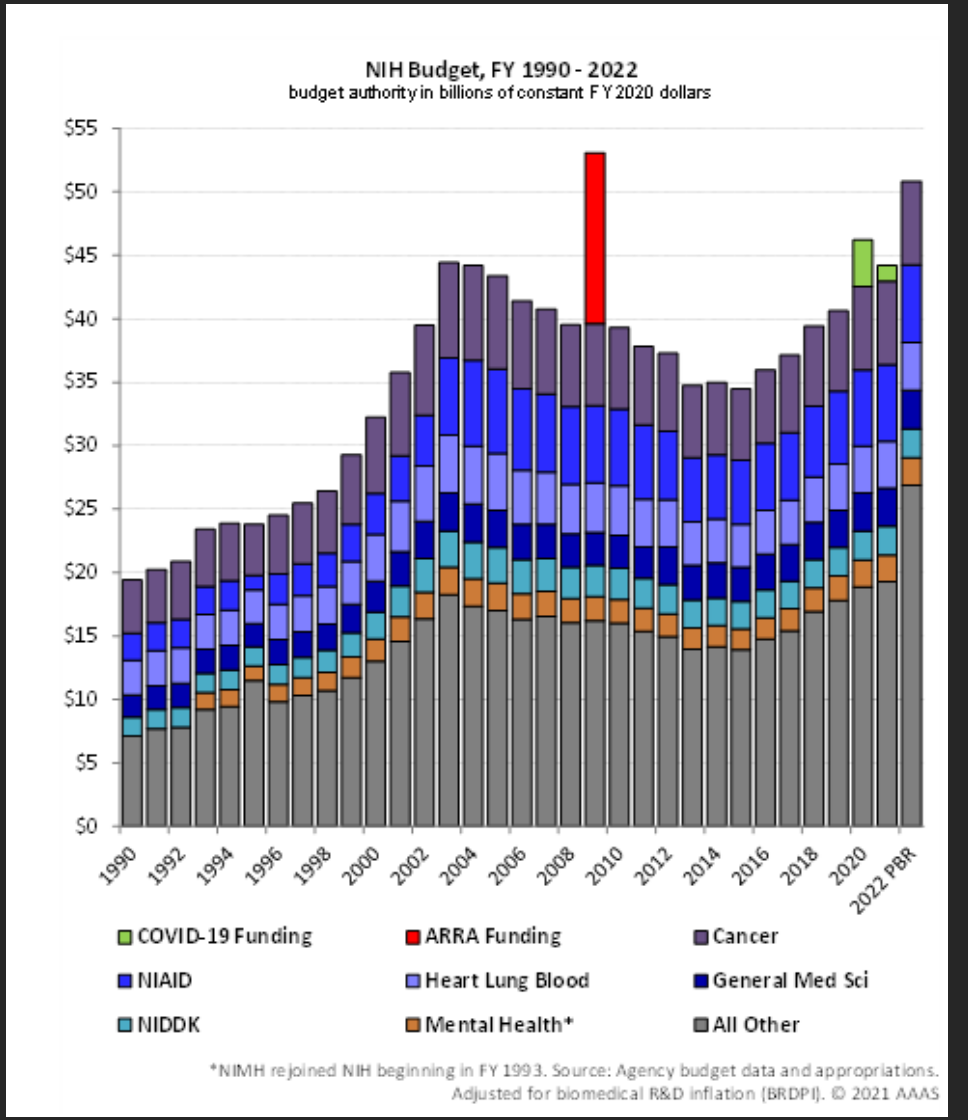
The following tables are in millions of dollars.

Institutes/Centers	2020 /2	2021 /3	2022	2022 +/- 2021
National Cancer Institute	6,440	6,559	6,733	+174
National Heart, Lung, and Blood Institute	3,625	3,665	3,846	+181
National Institute of Dental and Craniofacial Research	478	485	516	+31
National Institute of Diabetes and Digestive and Kidney Diseases	2,265	2,282	2,361	+79
National Institute of Neurological Disorders and Stroke	2,447	2,511	2,783	+272
National Institute of Allergy and Infectious Diseases	5,876	6,067	6,246	+179
National Institute of General Medical Sciences	2,937	2,991	3,096	+105
Eunice K. Shriver National Institute of Child Health and Human Development /4	1,798	1,838	1,942	+104
National Eye Institute	823	836	859	+23
National Institute of Environmental Health Sciences: Labor/HHS Appropriation	803	815	937	+122
National Institute of Environmental Health Sciences: Interior Appropriation	81	82	84	+2
National Institute on Aging	3,546	3,900	4,036	+136
National Institute of Arthritis and Musculoskeletal and Skin Diseases	625	634	680	+46
National Institute on Deafness and Communication Disorders	491	498	512	+14
National Institute of Mental Health	2,043	2,106	2,214	+108
National Institute on Drug Abuse	1,458	1,480	1,853	+372
National Institute on Alcohol Abuse and Alcoholism	547	555	570	+15
National Institute of Nursing Research	172	175	200	+25
National Human Genome Research Institute	604	616	633	+17
National Institute of Biomedical Imaging and Bioengineering	405	411	422	+11
National Institute on Minority Health and Health Disparities	336	392	652	+261
National Center for Complementary and Integrative Health	152	154	184	+30
National Center for Advancing Translational Sciences	833	855	879	+24
Fogarty International Center	81	84	96	+12
National Library of Medicine	457	462	475	+13
Office of the Director /4, 5	2,007	2,175	2,245	+70
21st Century Cures Innovation Accounts /6	157	109	150	+41
Buildings and Facilities	200	200	250	+50
Advanced Research Projects Agency for Health	--	--	6,500	+6,500
Total, Program Level	**41,685**	**42,936**	**51,953**	**+9,017**

NIH

https://www.hhs.gov/sites/default/files/fy-2022-budget-in-brief.pdf

- $52 billion for National Institutes of Health (NIH), which includes $6.5 billion to launch the Advanced Research Projects Agency for Health (ARPA-H) -- an initiative that will have an initial focus on cancer and other diseases such as diabetes and Alzheimer's with the goal of driving transformational innovation in health research and speed application and implementation of health breakthroughs.
- The request includes funds for research on the health impacts of climate change. Most of the money would support extramural research efforts aimed at understanding health-related climate vulnerability and building health resilience, with special attention to the impact on vulnerable health disparities populations.
- Historic investment to end the opioid crisis including $2.2 billion across NIH Institutes and Centers for opioids, stimulant, and pain research, an increase of $627 million above FY 2021 enacted
- Health disparities and inequities research: $330 million—$250 million for NIMHD and $80 million for targeted cardiovascular, nursing, and international health disparities and inequities research at NHLBI, NINR, and the Fogarty International Center, respectively



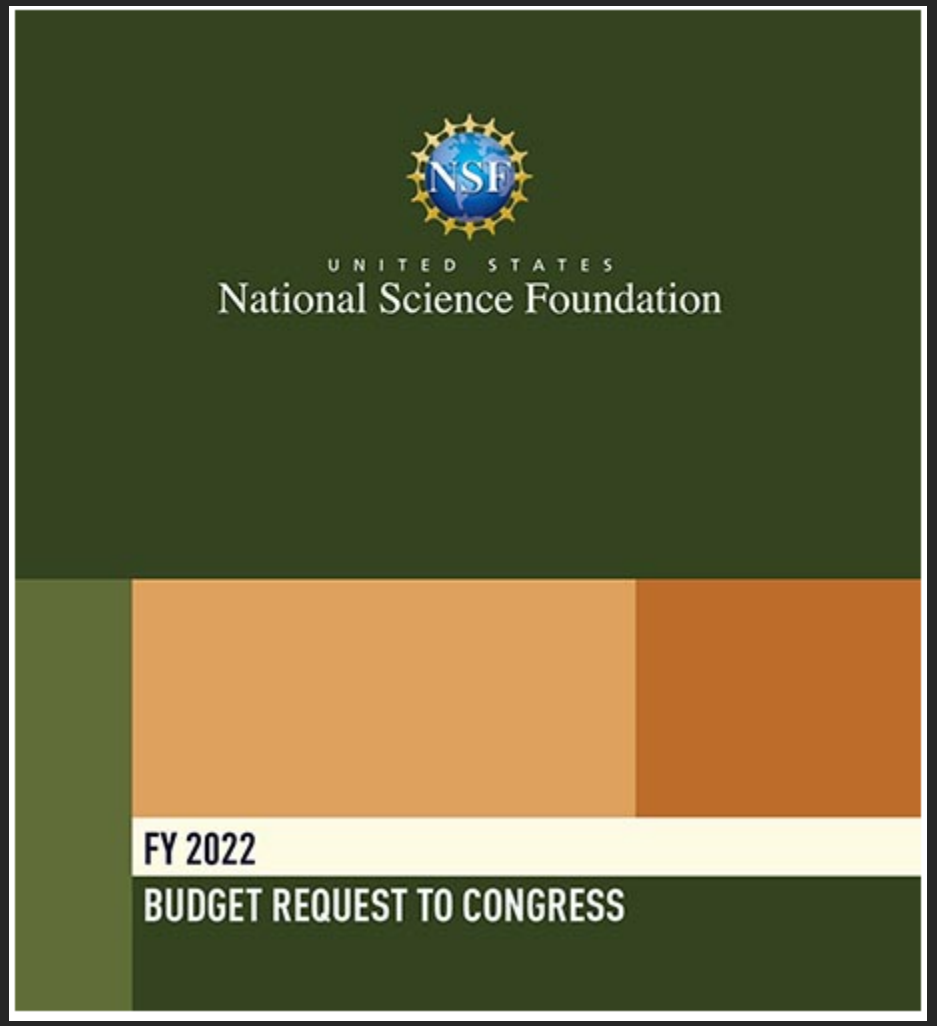
NIH Highlights

- NIH topline: $52 billion ($+9 billion, +21%)
  - Topline LESS ARPA: +$2.5 billion, +6%

- Most institutes rise ~3%. Some outliers:
  - Minority Health +66%
  - Drug Abuse +25%
  - NIEHS: +14%
  - Neuro Disorders: +11%

- RPGs increase by almost 1,500, success rate rises to 22%

- ARPA-Health: “operationally unique…with a distinctive culture and organizational structure”



National Science Foundation

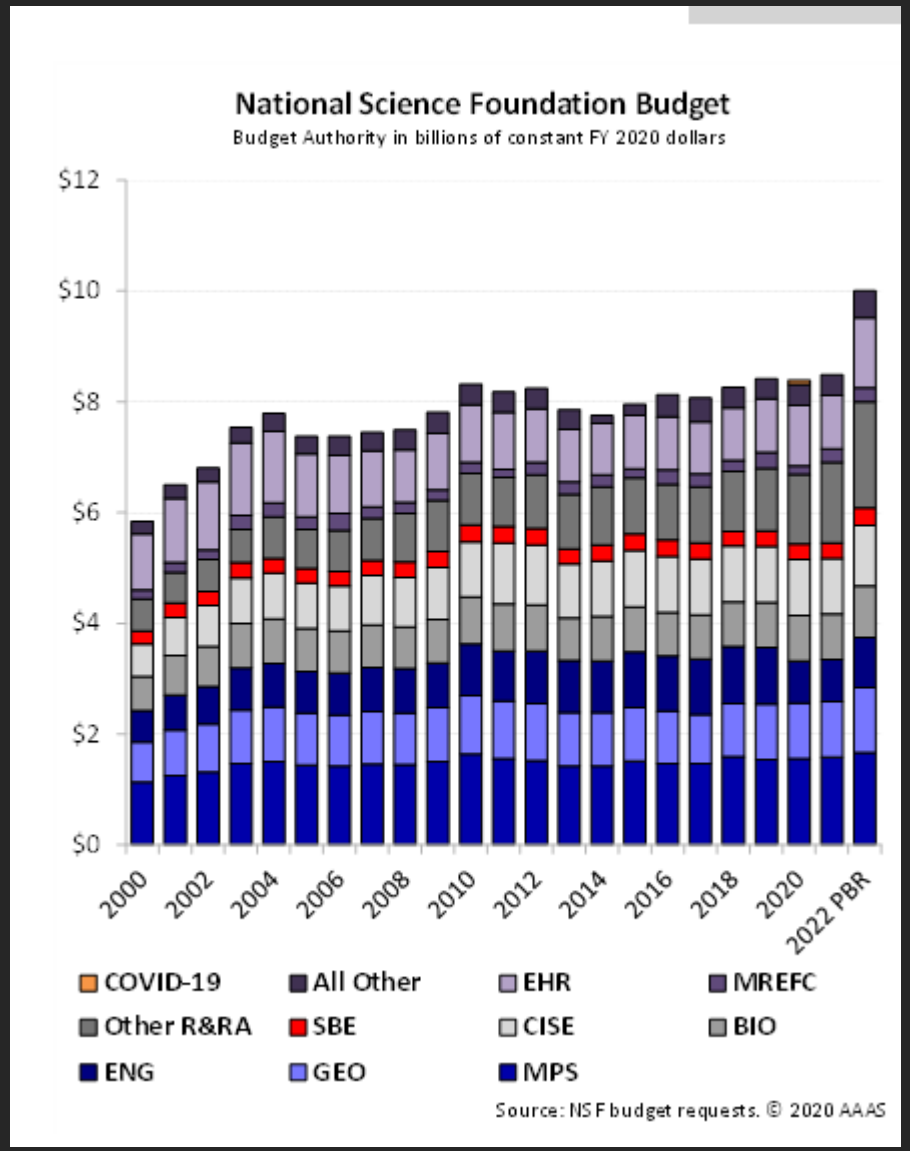
https://www.nsf.gov/about/budget/fy2022/tables.jsp#overview

- $10.2 billion, which is a 19.1% increase over FY 2021 enacted.
  - $1.2 billion for climate and clean energy research, which is $500 millionabove FY 2021 enacted
  - $100 million, which is a $50 million increase over FY 2021 enacted, forfunding for programs that aim to increase participation in science and engineering of individuals from racial and ethnic groups who are traditionally underrepresented in these fields.
  - Proposes the creation of a new Technology Directorate at the agency, focused on funding for emerging technologies areas, such as artificial intelligence, disaster response and resilience, quantum informationsciences, advanced communications and biotechnology.
  - Proposes $8.14 billion for research and related activities, $1.3 billion for education and human resources, and $249 million for major research equipment and facilities construction.
  - Proposes $100 million, roughly a 50 percent increase, in funding for programs that aim to increase participation in science and engineering of individuals from racial and ethnic groups underrepresented in these fields.

NATIONAL SCIENCE FOUNDATION
NSF BIG IDEAS FUNDING
FY 2022 BUDGET REQUEST TO CONGRESS
(Dollars in Millions)

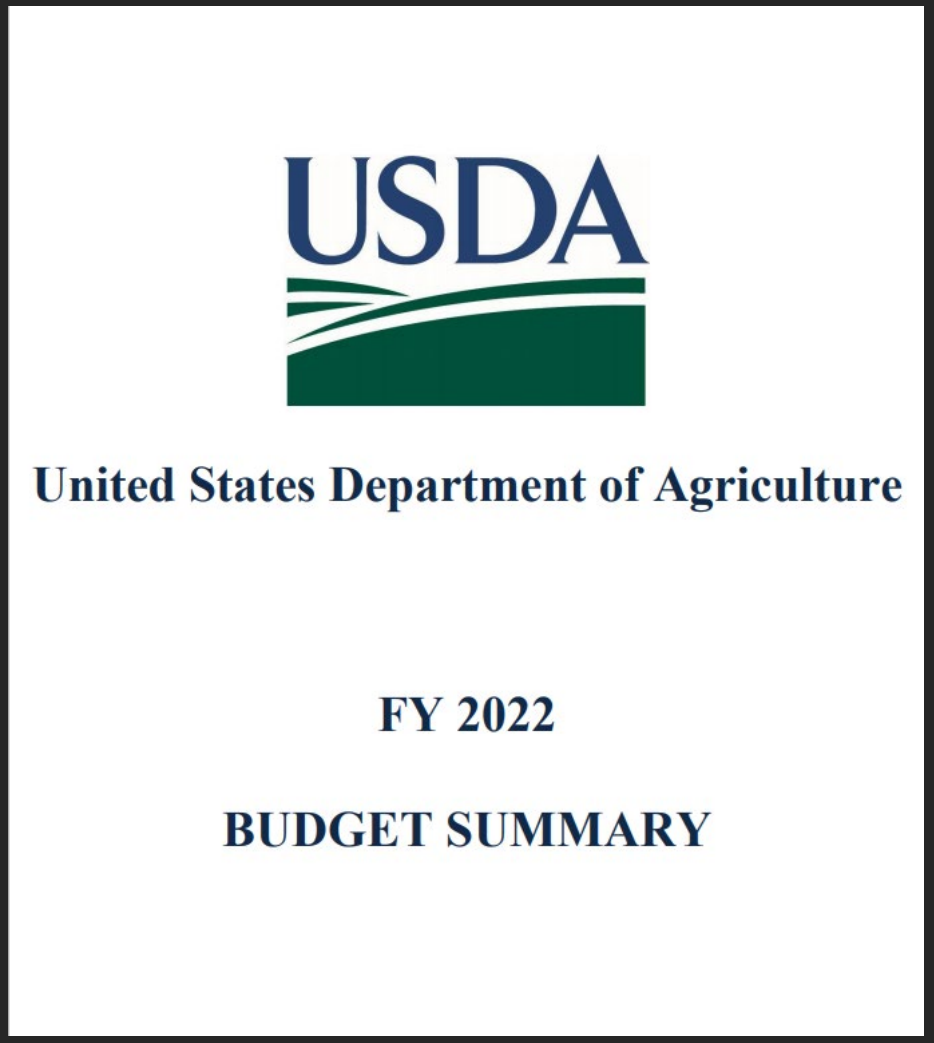
NSF Big Ideas	FY 2020 Actual	FY 2021 Estimate	FY 2022 Request
Research Ideas	**$177.15**	**$150.00**	**$150.00**
Harnessing the Data Revolution for 21st Century Science and Engineering (HDR)	30.00	30.00	30.00
The Future of Work at the Human-Technology Frontier (FW-HTF)	30.00	30.00	30.00
Navigating the New Arctic (NNA)	27.20	30.00	30.00
The Quantum Leap (QL)[1]	30.00	-	-
Understanding the Rules of Life (URoL)	29.95	30.00	30.00
Windows on the Universe (WoU)	30.00	30.00	30.00
Enabling Big Ideas	**$73.43**	**$144.92**	**$196.92**
Growing Convergence Research (GCR)	15.90	16.00	24.17
Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (NSF INCLUDES)	20.75	20.00	46.50
Mid-scale Research Infrastructure	30.37	108.92	126.25
Mid-scale RI Track 1	*30.37*	*32.67*	*50.00*
Mid-scale RI Track 2	-	*76.25*	*76.25*
NSF 2026[1]	6.42	-	-
Total	**$250.59**	**$294.92**	**$346.92**

[1] Starting in FY 2021, all Quantum Leap stewardship activities are managed with the broader Quantum Information Science (QIS) portfolio. See the NSF-Wide Investments chapter for detail on QIS.



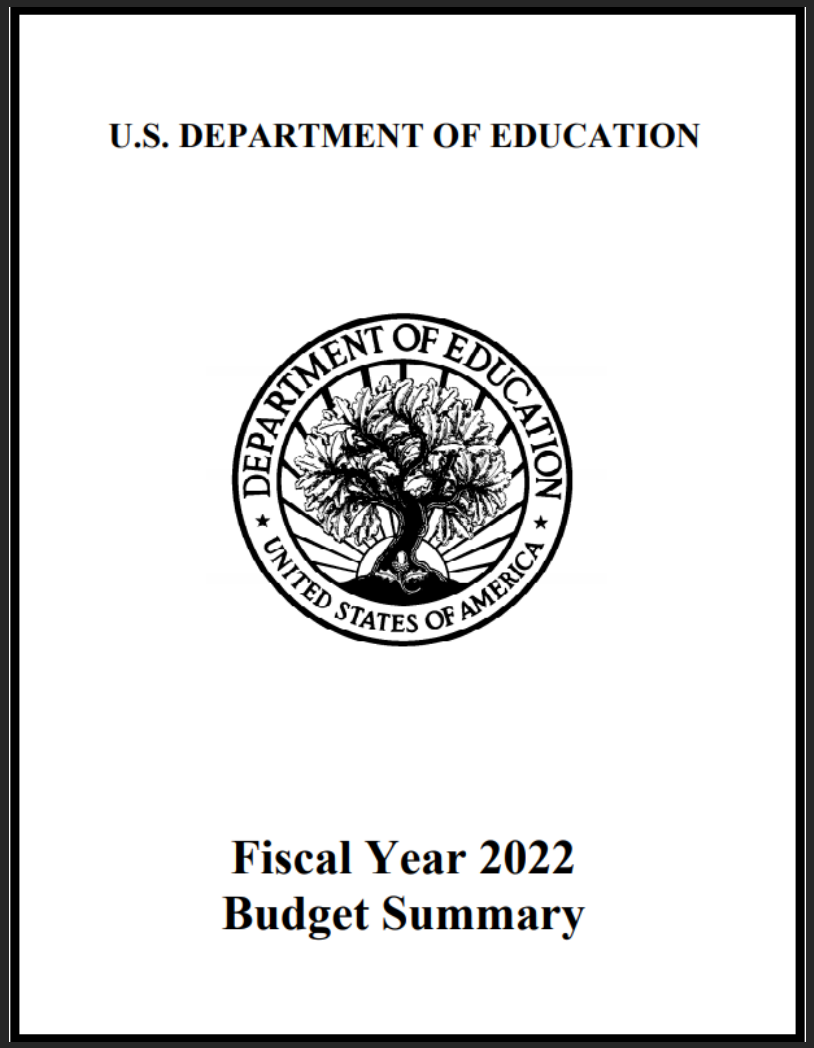
NSF Highlights

- NSF topline: $10 billion ($+1.7 billion, +20%)
  - Topline LESS Technology, Innovation, and Partnership Directorate (TIP): +$1.2 billion, +14%
- Largest increases for Geosciences (GEO) and Engineering (ENG), smallest for Math and Physical Sciences
  - Relatively larger increases for Advanced Industries (AI, quantum, biotech, etc)
- Research grants up 1,800, success rate: 28%
  - Also ~$22,000 increase in median annualized award size
- Education and Human Resources (EHR): +16% or +$177 million, mostly for STEM diversity
- Research Infrastructure up 5%; larger focus on midscale infrastructure and instrumentation



USDA: https://www.usda.gov/sites/default/files/documents/2022-budget-summary.pdf

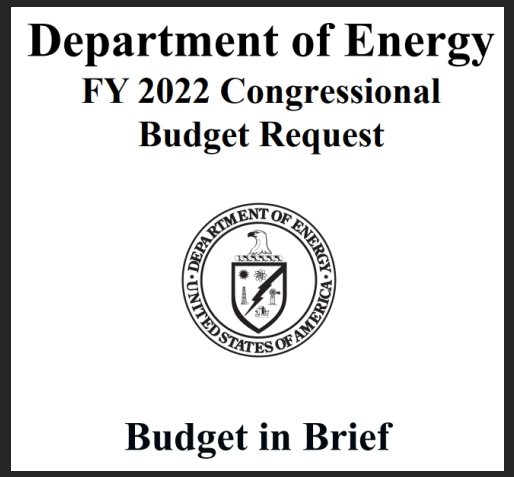
- Budget includes $4 billion to support research to advance the competitiveness of U.S. agriculture, promote food security and increase climate change research.
  - Investments are prioritized for research that advances innovation and science-based approaches to put technologies into the hands of farmers.
  - Address threats from wildfires, including funding to address issues related to hazardous fuels and forest resilience projects
  - Increase in funding for climate smart agriculture, climate resilience, and clean energy.
  - Expand broadband access in rural areas; to provide safe drinking water and waste-water infrastructure in rural communities; to improve voluntary public and private land conservation efforts; to help rural communities to use clean energy; to help with rural economic development issues; and to advance equity.



US Department of Education

https://www2.ed.gov/about/overview/budget/budget22/summary/22summary.pdf

- Boost in support for Children with Disabilities: $17.5 billion for special education programs, with $15.5 billion for IDEA, a $2.6 billion increase over FY 21 and the largest increase to the program in two decades
- Expanding Access to Broadband: $100 billion over 10 years to bring high-quality, reliable broadband to all American families which will close the homework gap
- Increases the funding level for programming intended to support historically underserved students in science and engineering fields by $100 million (approximately 50 percent).
- Increases to federal student aid programs (Pell, SEOG, Work Study)



Department of Energy:

https://www.energy.gov/sites/default/files/2021-06/doe-fy2022-budget-in-brief-v4.pdf

$46.1 billion, which is a 10.2% increase over FY 2021 enacted.

- Proposes $200 million for the creation of an ARPA-Climate (ARPA-C) to invest in high-risk, high-reward research to address the climate crisis.
- Proposes $4.7 billion for the Energy Efficiency and Renewable Energy (EERE) office, which is a $1.8 billion increase over FY 2021 enacted.
- Proposes $501 million for ARPA-E, which is 17% increase over FY 2021 enacted.

NASA:

https://www.nasa.gov/sites/default/files/atoms/files/fy2022_budget_summary.pdf

$24.7 billion, which is a 6.3% increase over FY 2021 enacted.

- $20 million for the Office of STEM Engagement to expand initiatives to attract and retain underserved and underrepresented students in engineering and other STEM fields, in partnership with minority serving institutions and other higher education institutions.
- Provides a $30 million increase to accelerate transformative science at the frontiers of biological and physical sciences research in space.
- $57 million for the Space Grant College and Fellowship Program ($6 million increase over FY21) and $48 million for the Minority University Research and Education Project ($10 million increase over FY 2021 enacted).

Department of Commerce

https://www.commerce.gov/sites/default/files/2021-06/BiB-Final-622-Noon.pdf

- $11.4 billion, which is a 27.7% increase above FY2021 enacted.
  - Economic Development Administration:
    - $10 million, an increase of $6 million, for STEM Apprenticeship Pilot program.
    - $10 million (new) for Regional Innovation Hubs
  - NOAA: $6.9 billion, an increase of more than $1.4 billion over the 2021 enacted level, for the National Oceanic and Atmospheric Administration.
    - $722 million for Office of Oceanic and Atmospheric Research (OAR), which is a 27% increase over FY21 enacted.
    - $40 million allocation for proposed Advanced Research Projects Agency-Climate (ARPA-C).
    - $2 billion, an approximately $500 million increase over the 2021 enacted level, for the next generation of satellites.
  - $1.497 billion for National Institute of Standards and Technology (NIST), which is a 45% increase over FY21 enacted.
    - $916 million, an increase of $128 million over the 2021 enacted level, to expand scientific and technological research at NIST.
    - $150 million in new funding to establish two additional Manufacturing USA Institutes.

Other Agencies

Department of Homeland Security

- $52 billion, which is a 0.2% increase over FY 2021 enacted.
  - Proposes $599 million for research and development with new investments in climate resilience, cybersecurity data analytics and transportation security technologies.
  - Proposes $45.8 million for university centers of excellence, which is a 13% increase over FY 2021 enacted.

EPA

- $936 million is provided for a new Accelerating Environmental and Economic Justice initiative to support environmental justice issues for low- income and marginalized communities, including for community air quality monitoring and other areas.
- Additional funding is provided related to protecting communities from hazardous waste and environmental damage, including for cleaning up environmentally damaged areas.
- $1.8 billion is provided to tackle climate change with urgency. Funding would support programs that would help to address climate change, including for greenhouse gas emissions, environmental justice, and other areas.

Department of Transportation

- $88 billion is requested for FY 2022.
  - The budget incorporates language suggesting that the President is committed to making a “once-in-a-lifetime” generational investment to significantly improve America’s transportation infrastructure.
  - $2.5 billion is provided for the Capital Investment Grant Program to assist with transit projects.
  - $250 million is provided to assist transit agencies with procuring low and no emission buses.
  - $1 billion is provided for the Better Utilizing Investments to Leverage Development (BUILD) grant program, which funds surface transportation infrastructure projects.
  - $88.5 million for clean climate research activities to reduce the impact of aviation on climate change and air quality.

National Endowment for the Humanities (NEH) /National Endowment for the Arts (NEA)

- The President’s budget request provides a funding level for the NEH at $177.5 million, a 6% increase over FY 2021.
- The NEA was funded at $201 million.

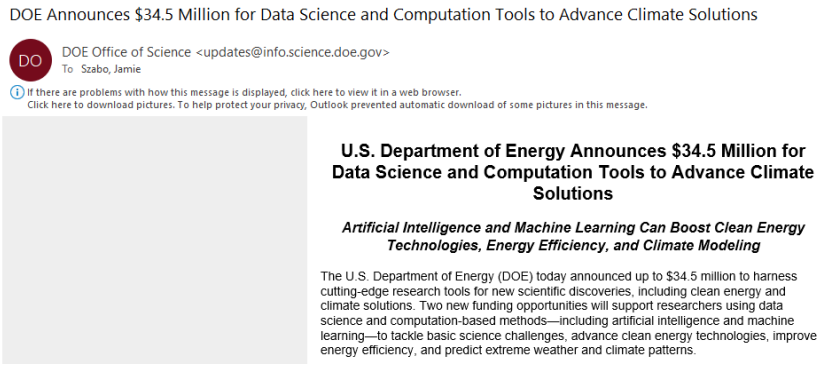
Stay informed!

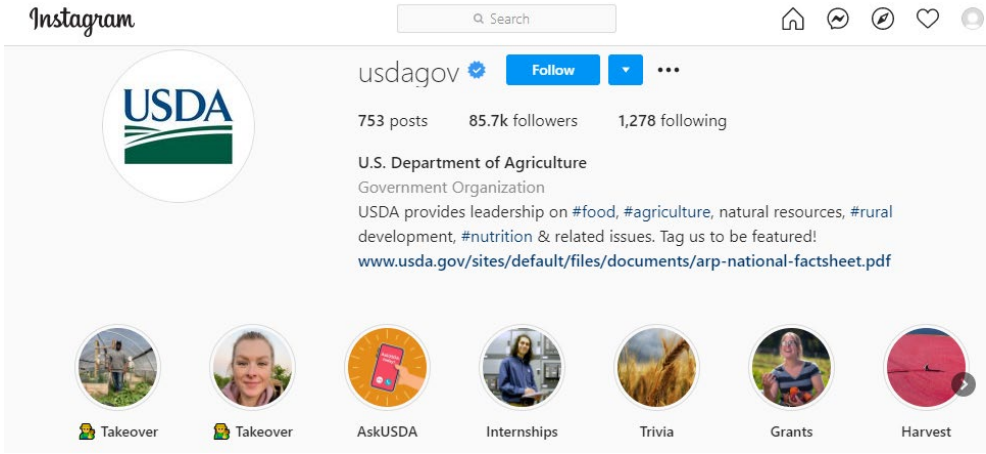
Listservs; Newsletters

- Subscribe to agency communications because funding opportunities and other announcements can offer insight into priorities
- Free webinars

Social Media Outlets

- Many agencies have accounts on multiple platforms—their posts and tweets inform followers as to their priorities and what has been





How can we use this information?

President's Budget – Key areas, common themes, proposed dollars allocated

Agency Budgets – Priority areas by office, institute, etc.

Institutional alignment – Faculty Insights, Research Interest Groups

Funding Opportunities – Pivot, Grants.gov, Faculty Insights, Others (October Session)

Ideas Labs, Form Teams, develop a proposal that is responsive to the federal priority/priorities

Resources

American Association for The Advancement of Science (AAAS)

- Historical Data
- Explanation of Budgeting Process
- Federal R&D Dashboard

https://www.aaas.org/programs/r-d-budget-and-policy/federal-rd-budget-dashboard

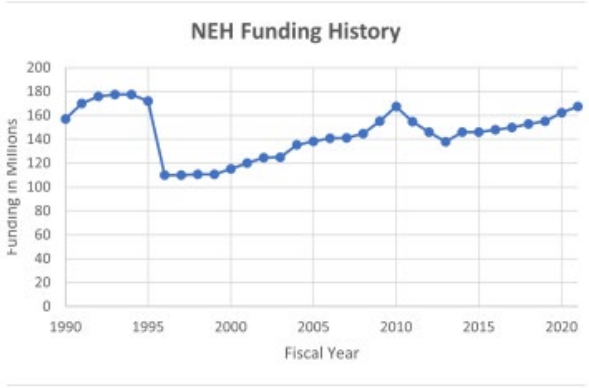
American Institute of Physics (AIP)

- Up to date information on appropriations/budget tracker

https://www.aip.org/fyi/federal-science-budget-tracker

Arts and Humanities

- NEH Appropriations History: https://www.neh.gov/neh-appropriations-history
- NEA Appropriations History: https://www.arts.gov/about/appropriations-history



Questions?

More from the Office of Research

Funding Your Research
Friday, October 22, 2021, Noon to 1 p.m. via Zoom
Register Online
Learn about the resources on campus that can help you find funding opportunities that match your research agenda. We will share the basics of using Pivot, the research analytics services available on campus, and learn about strategies that will help give your proposal a competitive edge.

Broader Impacts & Beyond
Friday, November 12, Noon to 1 p.m. via Zoom
Register Online
Join Dr. Sara Vassmer, Director of The Connector to learn about the resources and partners at Mizzou that can help you develop successful broader impacts activities and productive collaborations.

More events and opportunities at:
https://research.missouri.edu/researchfrst/