

Federal Research Funding Priorities and Opportunities Ahead

Lewis-Burke Associates, LLC
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Today's Presentation

- About Lewis-Burke Associates LLC
- Federal Government overview
- Federal Agency Snapshots
- Agency Engagement
- Q&A

About Lewis-Burke

- Founded in 1992; located in Washington, DC
- Twenty-eight policy experts with range of expertise/backgrounds allow multi-layered issue teams with deep expertise in agencies and scientific/higher education areas
- Support federal relations activities to develop and implement federal strategies to pursue, shape, and create new sources of funding to increase and diversify research portfolio
- Able to engage on multiple levels:
 - Individual faculty (including early career faculty)
 - Teams of faculty
 - Associate Deans for Research
 - Deans and Center Directors
 - University leadership and campus-wide priorities/activities

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Federal Overview

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Federal Outlook – Fall 2020

- Elections will lead to shift in federal focus, agency personnel, and regulatory outlook
 - Likely divided Congress will stall any sweeping legislative changes
 - Biden Administration will reverse many Trump immigration, environment, and health initiatives
 - Busy lame duck congressional period: potential COVID relief/stimulus, FY 2021 appropriations, NDAA
- Research and Innovation in a post-COVID-19 world:
 - New research areas of interest e.g. pandemic response/preparedness
 - Health disparities, education and workforce impacts, effects of pandemic on minority and female researchers
 - Shift to on-line learning and continued uncertainty on modalities
- Global Engagement:
 - Science and Security focus likely to continue
 - Likely increased opportunities for International Collaboration
- Racism in Science and Engineering

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First Priorities Under Biden Administration

- **COVID Relief and Plan (testing, vaccines, global health)**
- **Emphasis on Economic Development/Recovery (infrastructure, small business, economic gaps, public-private investments)**
 - Including workforce / job training
 - Grow industry sectors (clean energy, public health, bioeconomy, etc.)
- **Push for further relief and stimulus but prospects unclear in divided Congress**

Federal Funding: Status and Outlook

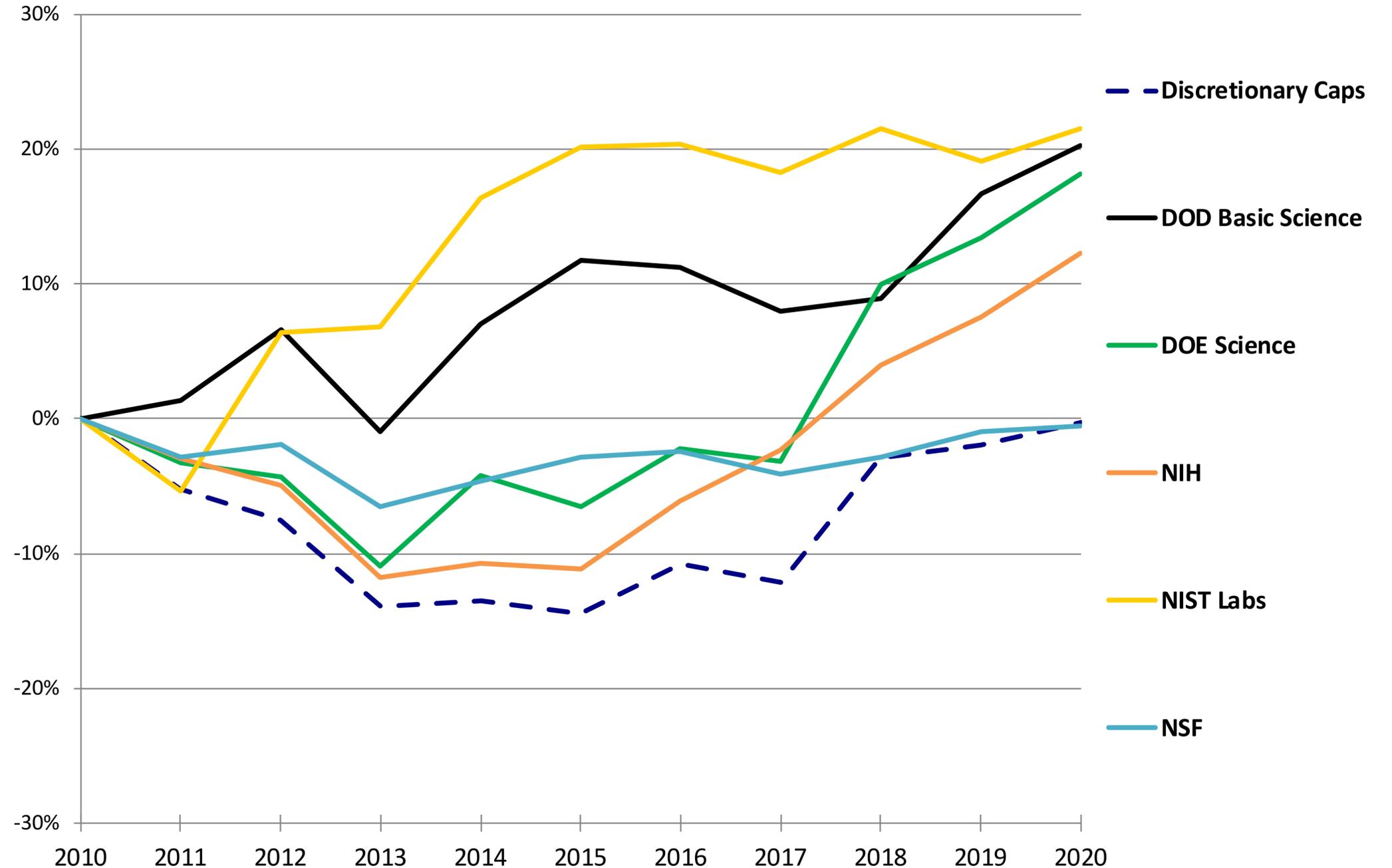
Uncertain Picture Ahead with the End of Sequestration

Substantial growth for S&T spending in the Trump years

Biden supports major growth, but R's will possibly force new deficit controls

Select Federal S&T Spending Since FY 2010

Percent change from FY10 levels, constant dollars



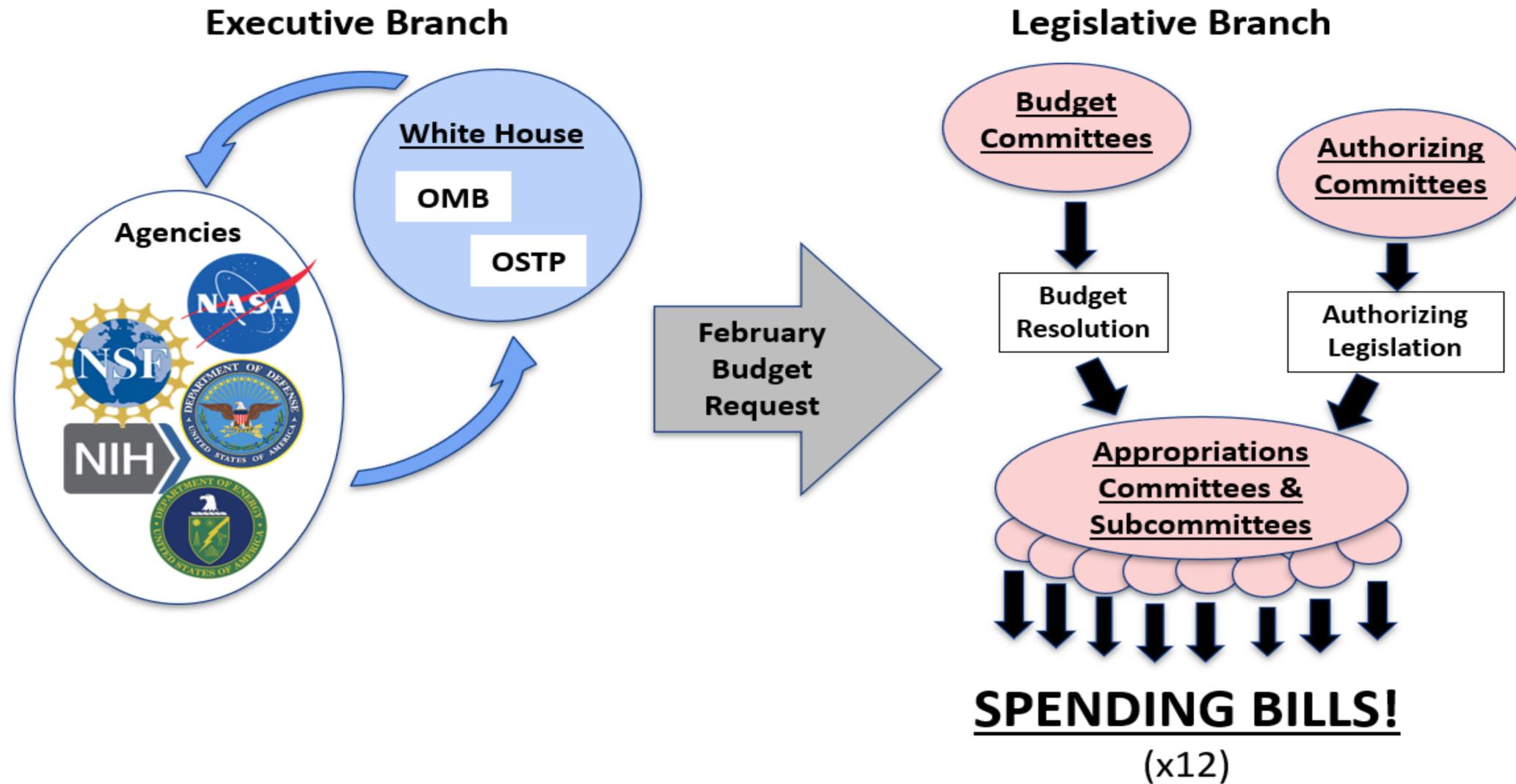
Based on AAAS analyses of historical OMB, agency, and appropriations data. © 2020 AAAS

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Federal Government and Research Enterprise



Source: AAAS Presentation on Federal R&D Appropriations:
<https://www.aaas.org/sites/default/files/2020-12/20201117%20-%20AAAS%20Leadership%20Seminar.pptx>

FY 2022 OSTP/OMB Priority Memo

R&D Priority Areas

– **NEW** Public Health Security and Innovation

- **NEW** Diagnostic, vaccine, and therapeutic R&D
- **NEW** Infectious disease modeling, prediction, and forecasting
- Biomedicine and Biotechnology
- Bioeconomy

– **Industries of the Future**

- AI and QIS
- Future computing ecosystem
- Advanced communications networks, including autonomous and remotely piloted vehicles
- Advanced manufacturing

– **Security**

- Resilience
- Semiconductors
- Advanced military capabilities

– **Energy and Environmental Leadership**

- Energy
- Earth systems predictability and meteorological services
- Oceans
- **NEW** Arctic

– **Space Exploration & Commercialization**

Cross-Cutting Priorities

- Build the S&T workforce of the future
- Optimize research environments
- Multisector partnerships and technology transfer
- Leverage power of data

Trump Administration Science and Technology Priorities

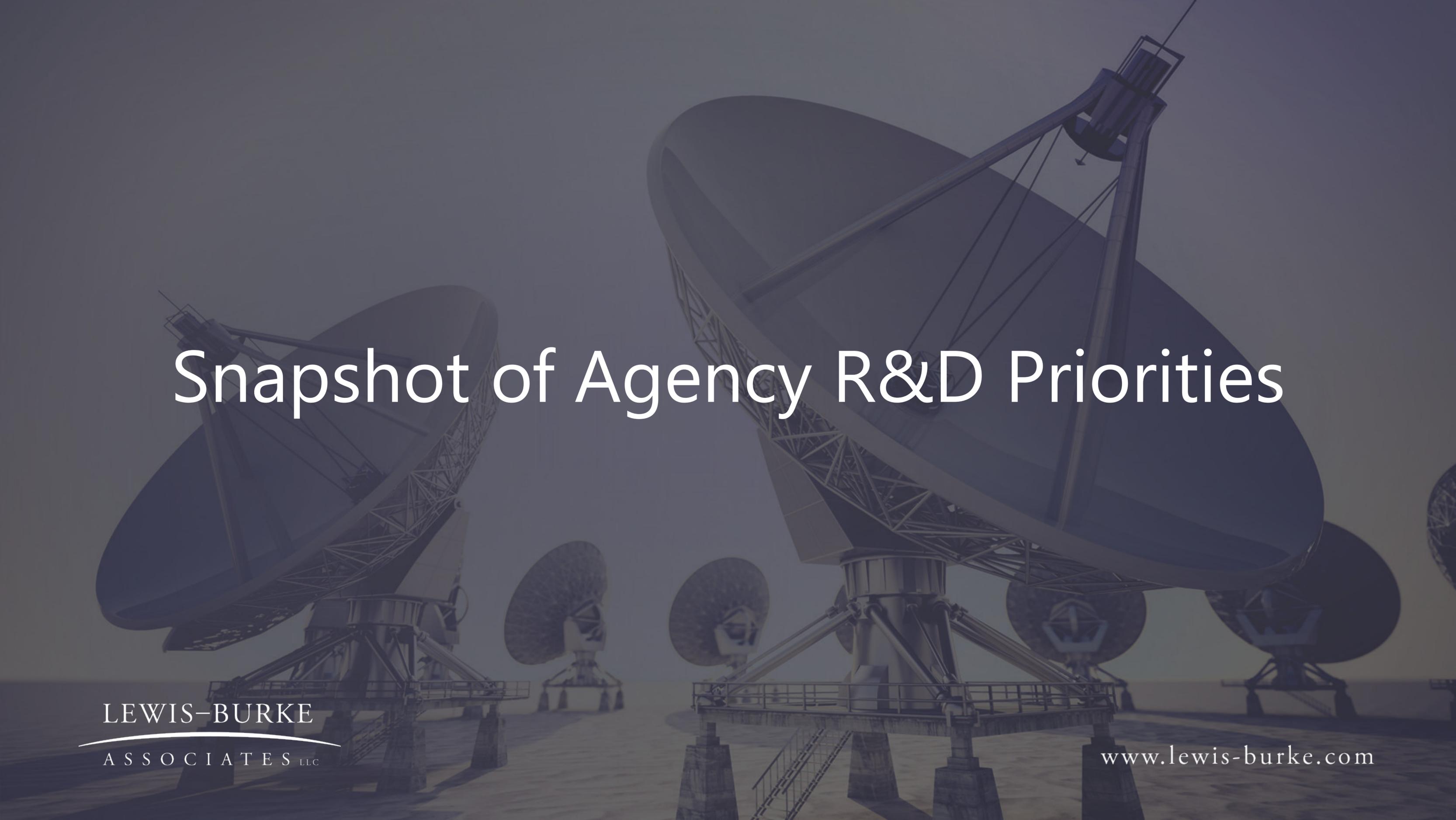
Although President Trump's budget requests have consistently proposed significant cuts to science and technology programs across the federal government, increased investments are proposed for Industries of the Future, including:

quantum information science,
artificial intelligence and machine learning,
strategic computing,
5G/advanced communications,
advanced manufacturing,
biotechnology,
next-generation microelectronics, and
space exploration.

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Snapshot of Agency R&D Priorities

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Biden Administration Research Priorities

- Several new priorities with some continuing
 - Top priority to contain and reverse **COVID-19 pandemic** – new approaches to testing and public health
 - Much greater emphasis on **climate change, renewable energy, and environment**
 - Big focus on **manufacturing and economic development**
 - Continued focus on **Industries of the Future** given **competition with China** (AI, quantum, wireless, biotech)
 - Major priority on **racial equity** and reversal of Trump policies
- New and returning approaches to harnessing innovation
 - President-elect Biden loves **moonshots** and framing research as big challenges (e.g. cancer moonshot)
 - Attempt to create **new ARPAs** for Health (HARPA) and Climate (ARPA-C)
 - Emphasis on vehicles that promote public-private partnerships, prize competitions – **technology hubs**
 - Building research capacity at **MSIs** and promoting collaboration with R1s
- New personnel
 - New leadership coming to many agencies: DOD, DOE, ED, USDA, NEH, NASA, NOAA, EPA
 - Interest in diversity, push for more science-oriented leadership, choices likely constrained by divided Congress
 - Continued leadership at NSF, possible change at NIH

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National Science Foundation



Funding Outlook: In FY 2020, NSF was funded at \$8.3 billion, a 2.5% increase over FY 2019

House and Senate both propose small 2-3 % increases for FY 2021



New Director, Panch Priorities and

- Advancing the frontiers of research into the future
- Ensuring accessibility and inclusivity
- Securing Global leadership (through partnership)
- *All include innovation and Partnership*

Emerging Areas - NSF historically is in strong alignment with White House Priorities/Office of Science and Technology Policy

- Increased emphasis on public-private **partnerships**, translational research
- New approaches to **climate, renewable energy, and environment**
- Addressing racial disparities and **increasing equity** – internal task force formed AND focus on building MSI research capacity
- Continued emphasis on Industries of the Future e.g. **AI** and increased focus on **engineering biology**/biotechnology
- Emerging focus on resilience in wake of COVID-19 pandemic

Waning Focus on 10 Big Ideas for Future Investment

- Some areas will start winding down over next couple of years, but many programs will continue (e.g. mid-scale, C-Accel)

New Directions Ahead

- Lots of Directorates in flux or preparing major changes (new MPS AD Sean Jones, ENG AD search launched)
- Congressional reauthorization underway – potential for new technology or convergence directorate

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National Institutes of Health



National Institutes
of Health

Funding Outlook: NIH funded at \$41.7 billion in FY 2020, strong bipartisan support ensured a fifth consecutive increase; *Senate would provide \$43.7 billion in FY 2021*



Areas of trans-agency focus:

- COVID-19 (*\$3.6 B and counting*)
- Precision Medicine ("*All of Us*")
- Aging and Alzheimer's Disease
- Opioids, addiction, pain management
- BRAIN Initiative
- Artificial intelligence and data science
- Health disparities
- Ending sexual harassment in science
- Combating foreign influence
- Diversity, equity, and inclusion (DEI)

Priorities under Biden Administration:

- Pivoting on pandemic response
 - Public health infrastructure; more testing; contact tracing; treatment; research
- Biomedical research
 - Big ideas to address grand challenges (e.g. Cancer Moonshot)
 - ARPA for health/biomedicine ("*HARPA*") focused on delivering more cures for more diseases
 - Translational medicine
 - Cancer; Alzheimer's Disease and aging; heart disease; diabetes
 - Big data and computation (data sharing)
 - Infectious disease and pandemic preparedness
- *Possible new NIH director later in 2021*

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Department of Energy



Funding Outlook: In FY 2020, DOE was funded at \$38.6 billion, an 8% increase over FY 2019
FY 2021 Budget Request at \$35.4 billion (8% decrease), House bill provides \$40.9 billion



Major cross-cutting priority research areas

- Next-generation energy storage (\$367 million)
- Quantum Information Science (\$237 million)
- Artificial Intelligence/scientific machine learning (\$125 million)
- Rare earths/separation science (\$56 million)
- Next-generation microelectronics (\$45 million)
- Polymer upcycling (\$14 million)
- Engineering biology (\$9 million)

Office of Science

- 40% of annual research funding (~\$1 billion) for research universities
- Basic Research Needs workshop reports drive future research priorities and investments

ARPA-E

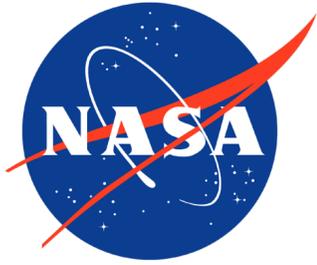
Future topics under consideration:

- Ultra high-temperature materials for power generation applications
- Microgrids with control co-design
- Preventing or abating anthropogenic methane emissions

DOE Under the Biden Administration

- Goal of net zero power sector emissions by 2035
- \$400 billion over ten years on clean energy research and development to develop new technological breakthroughs to reach net zero goals
- “All of the above” energy strategy, including carbon capture, storage and utilization, advanced nuclear energy, renewables, and energy efficiency
- \$300 billion over four years across federal research agencies for Industries of the Future, including new DOE investments to fund grants at research universities
- New technology hubs in diverse communities across every region of the country that bring together research and development investments with workforce training and education and small and medium-sized businesses

National Aeronautics and Space Administration



Funding Outlook: In FY 2020, NASA was funded at \$22.63 billion, a 5.3% increase over FY 2019. FY 2021 Budget Request at \$25.2 billion (11.9% increase), House would fund at \$22.63 billion (flat)



Overview

- Mission: advance human exploration and understanding of the Earth and space
- Most of NASA's budget devoted to human exploration missions and operations
- Budget: \$22.6 billion in FY 2020 (and under the FY 2021 CR)
 - \$6.017 billion for exploration
 - \$7.1 billion for the science
 - \$1.1 billion for technology
- Responsive to community consensus priorities
- **Highly political**

NASA Under the Biden Administration

- The agency won't receive the same level of prioritization as witnessed under the Trump Administration
- **Integrated within the Administration's climate agenda**
 - Expected emphasis and support for expanding Earth Science Division (ESD) resources
 - May translate to stronger budget requests aligned with Earth Science Decadal recommendations
 - Unknown how resource shifts favoring ESD will impact other science divisions' research budgets and competed or flagship mission programs
- Biden pick for NASA Administrator unlikely to be announced until well past the inauguration
- **Expected shift away from timeline and goals of Artemis**
 - Progress on Artemis to-date suggests the mission architecture will continue
 - May push to abandon or delay 2024 landing and 2028 sustained presence goals – Congress may block changes
 - Continuation of "Humans to Mars" possible given similar efforts under the Obama Administration

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Department of Defense



FY 2021 Funding Outlook: Continuing resolution at 2020 levels - \$16.1 billion for S&T across Services (basic, applied, adv tech); Basic Research increased 3% in FY 2020 (\$73 million across the Services). Future budgets expected to remain flat or decrease.



- Focus on National Defense Strategy to counter great powers (China, Russian, N. Korea), innovate, and work with allies
- Prioritization of later stage development and prototyping (Research, Development, Test, and Evaluation (RDT&E))
- Newly established Space Force funded \$40 million
- Under Secretary of Defense for Research and Engineering (USD(R&E)) top technology focus areas:
 - 5G
 - Hypersonics/Missile Defense
 - Microelectronics
 - Artificial Intelligence/Machine Learning
 - Biotechnology
 - Space
 - Quantum
 - Autonomy
 - Directed Energy
 - Network C3/Joint All Domain C2
 - Cybersecurity
 - Infectious Diseases (new)
 - Manufacturing/Supply Chain resilience (new)

Key RDT&E priorities across the Department support the need to stay ahead of China, Russia, N. Korea:

- Conventional Capabilities: **Hypersonics, Directed Energy, Missile Defense**
- Technology Enablers and Force Multipliers: **Artificial Intelligence, Autonomy**
- Counter-adversary: **Space, Counter-Autonomy**
- New Emphasis: **Biodefense, Information Warfare (Disinformation, Cyber, and EW)**
- Supply Chain Resilience: **Cybersecurity**

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DOD Medical Research Priorities

- **General mission** – Support the Service Members, Veterans, and their families to aid and promote national security and defense
- **Infectious Disease** – COVID-19 response; other prevention, diagnostics, therapeutics; surveillance; warfighter v. civilian health
- **Hemorrhage** – blood products (storage, transportation, in theater transfusions); extend blood platelet shelf life; improved pre-hospital treatments for critical patients; alternatives to using anti-biotics for post wound care
- **Combat casualty care** – surgical systems and procedures, surgical en-route care, neurotrauma, minimizing blast-related injury
- **Traumatic Brain Injury (TBI)** – classification of TBIs that can inform future technology and treatment strategies; biomarkers to replace CAT scans (affordability); development of chronic traumatic encephalopathy (CTE)
- **Mental Health** – PTSD, suicide prevention; substance abuse, rural healthcare/telemedicine
- **Pain Management** – Burn care, opioid use/misuse
- **Health IT** – electronic health records, mobile health technology, telemedicine (in theater and at home)
- **Chemical, Biological, Radiological, and Nuclear (CBRN) Threats** – surveillance, prevention, detection, and treatment
- **Human Performance Optimization** – readiness, rehabilitation, fatigue/sleep, nutrition

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U.S. Department of Agriculture



Funding Outlook: NIFA received a \$1.532 billion in FY 2020; FY 2021 House bill for NIFA is \$1.575 billion; NIFA Senate FY 2021 \$1.538 billion



Ongoing Challenges

- NIFA continuing to staff up post relocation to Kansas City, as of October 2020 65% staffed
- NBAF Transition from DHS to ARS
- Uncertain impacts of COVID on ag research community

Agriculture and Food Research Initiative

- NIFA's extramural, solicited research. Receives very small increases
- Major focus on AI, machine learning, and predictive science, likely to continue under Biden
 - Foundational and Applied Sciences
 - Education and Workforce Development
 - Sustainable Agricultural Systems: combining FY 2020 & FY 2021 competitions, expected to have around 15 awards

USDA and COVID-19

- USDA NIFA leadership working to engage with community through the pandemic
 - Recognizes the impact on USDA research, especially those impacted by missing growing seasons
 - Real concern over keeping research personnel, grad students, etc. on board
 - Working to provide extensions as necessary

Biden Priorities

Established in last farm bill:

- Plant Health and Production and Plant Products; Animal Health and Production and Animal Products; Agricultural Systems and Technology; Agricultural Economics and Rural Communities; Sustainable Energy; Childhood Obesity; Food Safety
- Climate and agriculture will be top of mind
- Nutrition and equitable food access

Strategic Planning: USDA released two strategic planning documents in February 2020, the *USDA Science Blueprint* and the *Agriculture Innovation Agenda*.

- *USDA Science Blueprint*, a framework for coordinating USDA's science initiatives across the Department, in addition to five sustainability and innovation focus themes, the *Blueprint* outlined crosscutting "movements of science" including: open data, big data, artificial intelligence, gene editing, microbiome sciences, and technology, automation, and remote sensing
- *Agriculture Innovation Agenda* to develop future research objectives and innovation strategies to increase production and resilience while decreasing the environmental footprint of agriculture
 - In April, USDA released a RFI focusing on four innovation clusters: advanced sensing, data science, gene editing, and microbiome sciences, responses were due August 1

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Institute of Education Sciences (IES)



Funding Outlook: IES received a small 1.3 percent increase in FY 2020, up to \$623 million

Agency Priorities

- Focus is measurable improvement of learning outcomes
- Director Mark Schneider pushing new directions and changes to IES research, with greater emphasis on usability among practitioners
 - Significant changes to application process over last year, including topics and project types

Emerging Priorities

- IES has had greater emphasize on career and technical education, workforce development, and post-collegiate outcomes
- Planning forthcoming efforts related to assessment and research & development of digital learning platforms given pandemic

Biden Administration

- Director Schneider is in midst of a six-year term so may continue forward into Administration
- Likely to continue with new area of interest in digital learning platforms
- Could envision greater shift toward education disparities work
- IES would likely receive Administration support, either stable or increases, in budget requests

117th Congress

- New Republican leadership for Senate education committee could bring shift in IES approach
- Reauthorization of IES, via Education Sciences Reform Act, is overdue but not political priority
- New assessments and research on digital learning likely to be supported regardless
- Democratic control may result in increased funding for education research

Arts and Humanities



NATIONAL
ENDOWMENT
FOR THE
HUMANITIES

NATIONAL
ENDOWMENT
for the **ARTS**
arts.gov

Funding Outlook: Congress continues to provide minor funding increases the last few fiscal years, NEH received a 4.7 percent increase in FY 2020, up to \$162.3 million

National Endowment for the Humanities

- Launched the “A More Perfect Union” initiative commemorating the 250th anniversary of American independence
 - Emphasis on American history and civic education integrated into new and existing grant programs
- NEH has been investing in humanities infrastructure and capacity-building activities
 - Matching funding for capital projects (construction, equipment, renovation, etc.) and digital infrastructure

National Endowment for the Arts

- Interest in veterans’ arts programs and public access to arts
- NEA Research office continuing signature opportunities
 - Research Grants in the Arts (previously Research: Art Works – research on value and impact of arts)
 - NEA Research Labs – transdisciplinary research of arts + health/wellness/cognition/learning/innovation

Biden Administration

- NEH Chair Jon Parrish Peede and NEA Chair Mary Anne Carter will likely leave posts
 - Carter came in with Trump campaign background
 - Deputy Chair at NEH came directly from White House so also likely out
- While NEH may still push for support in ramp up to 250th anniversary of nation, the tone surrounding agency interests may change to be more inclusive, increased focus on diversity, racial history of U.S.
- President’s budget requests would not push for eliminations of both Endowments and likely support level or increased funding

117th Congress

- Loss of Senate arts/humanities champion and lead Democratic appropriator for agencies, Sen. Tom Udall (D-NM)
- Under full Democratic control, Endowments would likely be on more secure footing for appropriations



Agency Engagement

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Benefits of Meeting with Federal Agencies

- Relationship-building opportunity
- Receive first-hand information about research funding opportunities
 - Be on both “send” and “receive”
- Learn of non-funding ways to engage with the agency, such as serving on review panels or advisory councils
- Lewis-Burke can help identify specific meeting targets based on research and objectives

How to Prepare

- Review the programs of the officials with whom you will be meeting and other relevant funding opportunities at their agencies
 - As you review program descriptions and past solicitations, note places of potential fit to your areas of interest so you can ask specific questions
- Prepare a one-page description of your research that may be shared with the program staff
 - Including your contact information
 - Research descriptions should be consistent with areas of interest of the targeted agency program staff
- Send introductory email, including your one-pager requesting a call with the PO
- Speak to more senior investigators who are funded by the federal agencies at which you will be meeting about their experiences and insight into the agencies and programs
- Prepare questions to ask in the meetings

Examples of Early Career Programs

- National Science Foundation (NSF):
 - Faculty Early Career Development Program (CAREER)
 - Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII)
- Department of Energy (DOE):
 - Early Career Faculty program
- Department of Defense (DOD):
 - Young Investigator Program (YIP) for ONR, AFOSR, ARO
 - DARPA Young Faculty Award (YFA)
- National Institutes of Health (NIH):
 - Career Development Awards – K series
 - Common Fund Programs—New Innovator Award (DP2); Pioneer Award (DP1); Early Independence Award (DP5) (all focused on “high-risk, high-reward” research)
 - *NEW* : Stephen I. Katz Early Stage Investigator Research Project Grants – no preliminary data

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Thank you for your time!

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And the Lewis-Burke Team!

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