WASHINGTON UPDATE

Peter Harsha
CRA Director of Government Affairs

CCC Council Meeting
March 24, 2020

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TOPICS

- Fiscal Year 2020 Wrap-up
- The President's Budget for Computing
- Updates on Legislation and Other Stuff

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FY20 APPROPRIATIONS WRAP-UP

WINDING PATH TO COMPLETION

- FY20 (and FY21) under limits of the Budget Control Act

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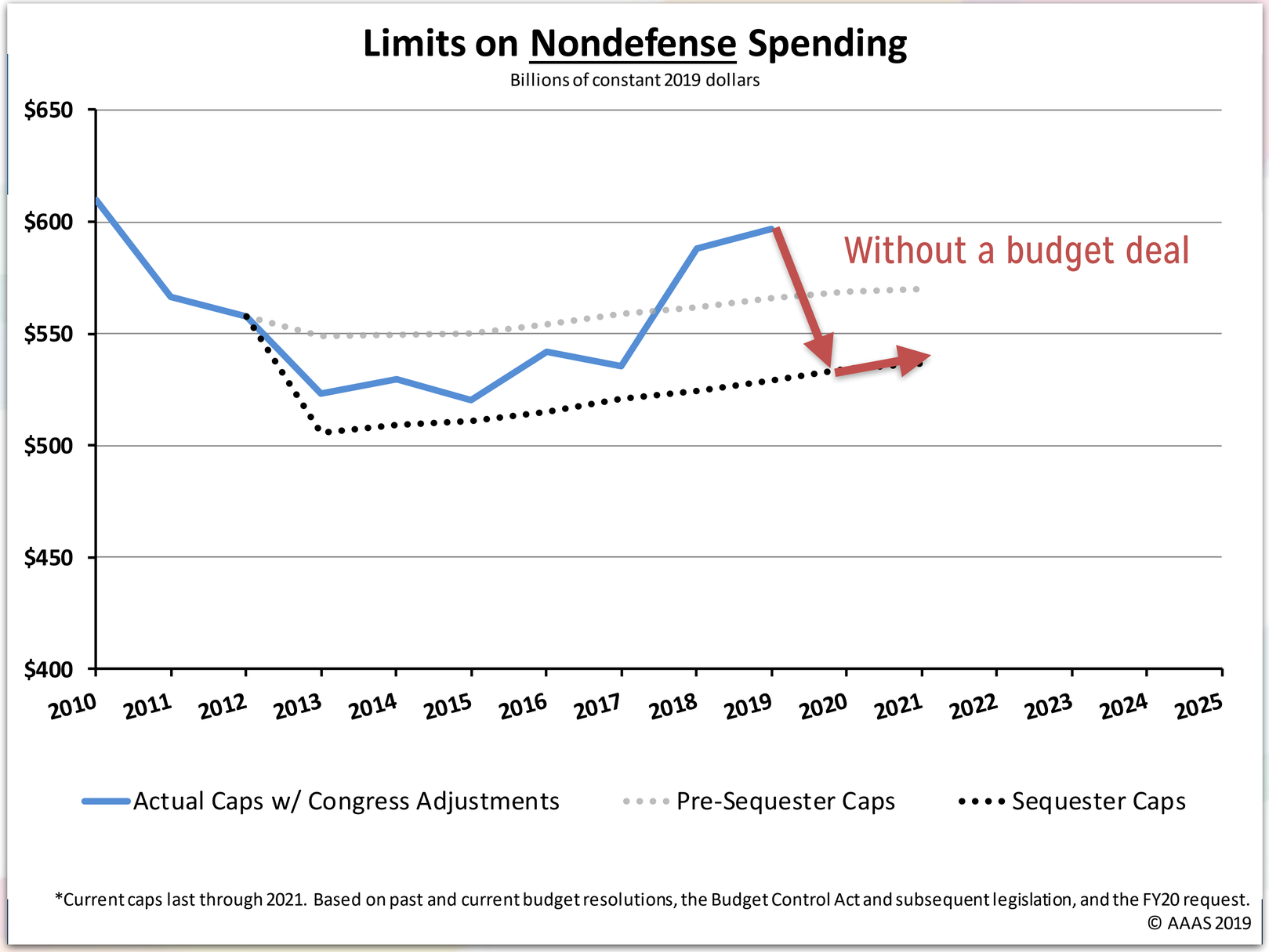

Source: Matt Hourihan, AAAS "The FY 2020 Federal R&D Budget" presentation

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WINDING PATH TO COMPLETION

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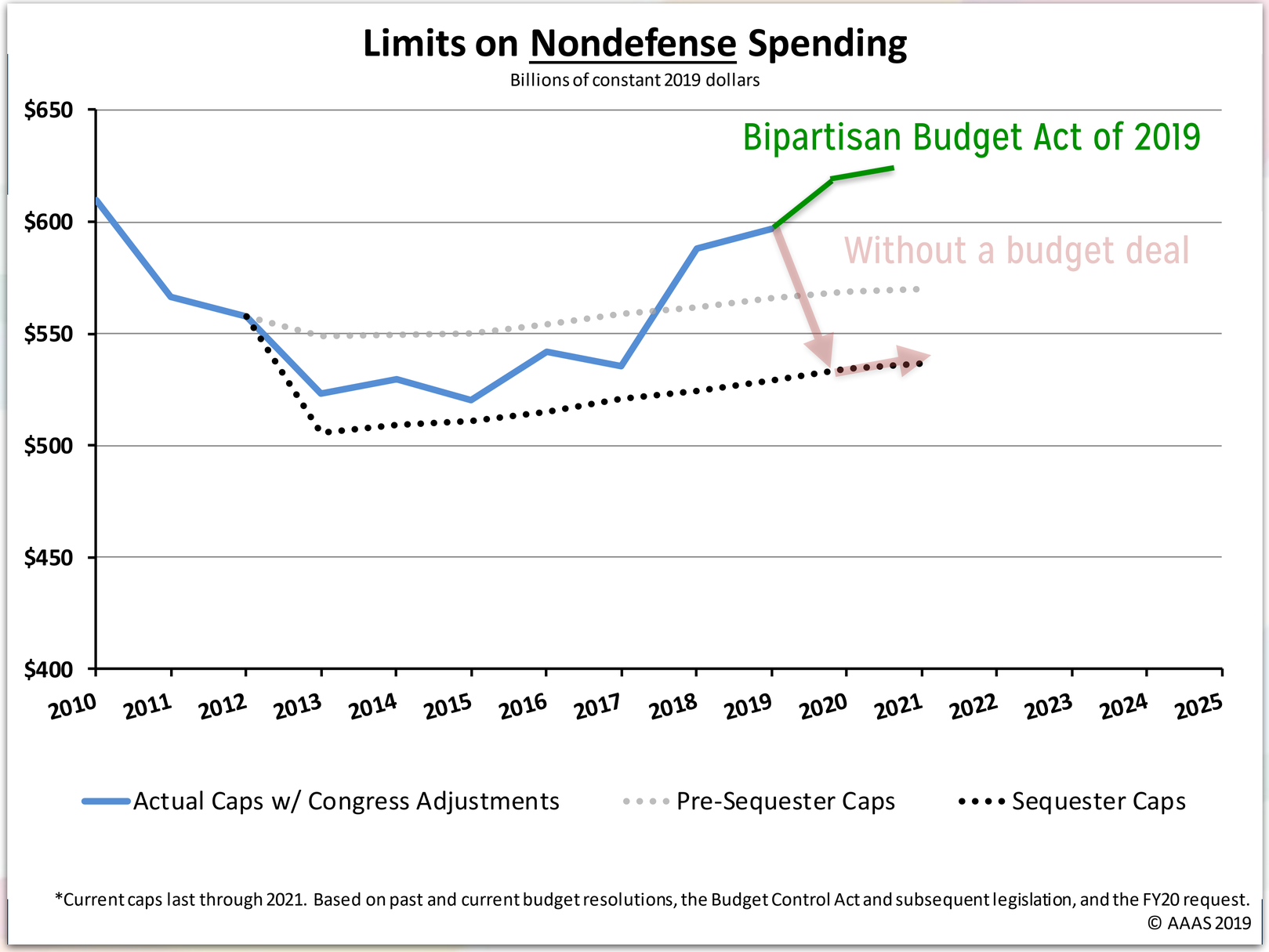
- Congress/President didn't strike budget deal until July



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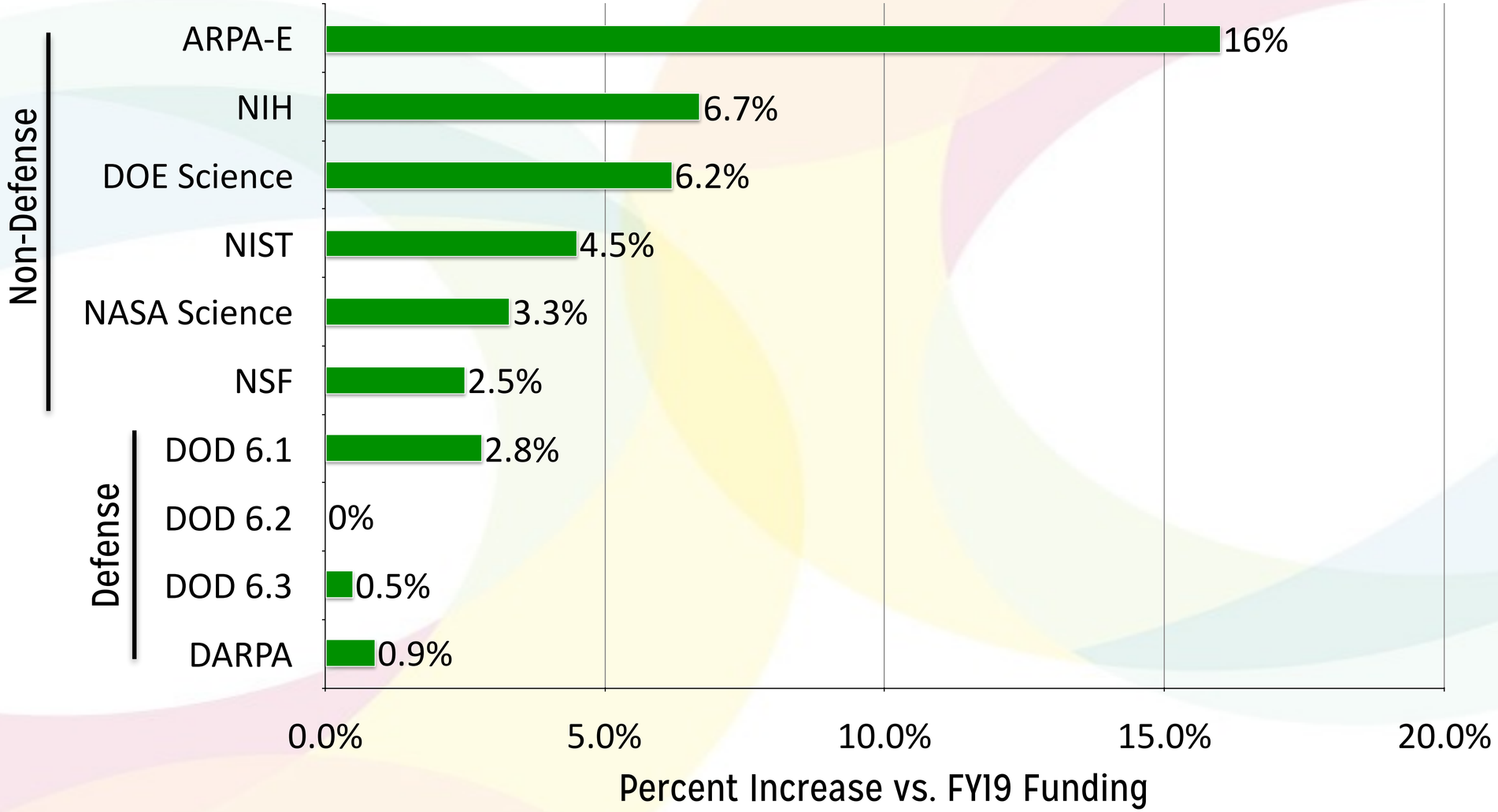
WINDING PATH TO COMPLETION

- FY20 (and FY21) under limits of the Budget Control Act
- Congress/President didn't strike budget deal until July
- Both chambers working from different allocations
- First CR until Thanksgiving, then December 20th
- Finished at deadline as two minibuses

FY20 APPROPRIATIONS LEVELS FOR KEY FEDERAL SCIENCE AGENCIES



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NATIONAL SCIENCE FOUNDATION - FY20 APPROPRIATIONS

- NSF Total = $8.28 billion; $200 million more than FY19 (2.5 percent increase)
  - Research and Related Activities: $6.74 billion; +$220M (3.4 percent increase)
  - EHR: $940 million; +$30M (3.3 percent increase)
- Lower than both House and Senate approved levels (6.9 percent and 3.0 percent, respectively)

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NATIONAL SCIENCE FOUNDATION - FY20 APPROPRIATIONS

- Don’t know the Directorate-by-Directorate allocations yet
- Conference agreement provides “no less than requested amount for Artificial Intelligence” (=~$478 million)
- Both House and Senate commend focus on AI and Quantum

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DOE OFFICE OF SCIENCE – FY20 APPROPRIATIONS

- Office of Science = $7.0 billion; +$415 million over FY19 (6.3 percent increase)
  - Adv. Scientific Computing Research = $980 million; +$44 million (4.8 percent increase)
  - Essentially split the difference between House and Senate funding levels
  - Includes $10 million for CS Grad Fellowships
  - $155 million for Mathematical, Computational and CS Research
- ARPA-e – $425 million; +$59 million (16 percent increase)

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DOD SCIENCE AND TECHNOLOGY - FY20 APPROPRIATIONS

- 6.1 Basic Research - $2.6 billion; +$70 million (2.8 percent)
- 6.2 Applied - $6.07 billion; same as FY19 (0 percent)
- 6.3 Adv. Tech Development - $7.4 billion; +$40M (0.5 percent)
- DARPA - $3.46 billion; +$30 million (0.9 percent)

- Essentially split the difference between House and Senate approved numbers

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FY20 APPROPRIATIONS - FINAL POINTS

- Overall, science budgets did ok, with some exceptions
- Congress completely rejected sharp cuts requested by President Trump
- We'll get a better sense of specifics when Agencies submit their spending plans to Congress
- FY21 likely to be a leaner year for increases

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PRESIDENT'S FY21 BUDGET REQUEST

PRESIDENT'S BUDGET REQUEST FOR FY 2021

- $4.8 trillion - $1.26 trillion discretionary ($37 billion less than FY20)
- $590 billion non-defense discretionary (5 percent cut and well below $627 billion cap)

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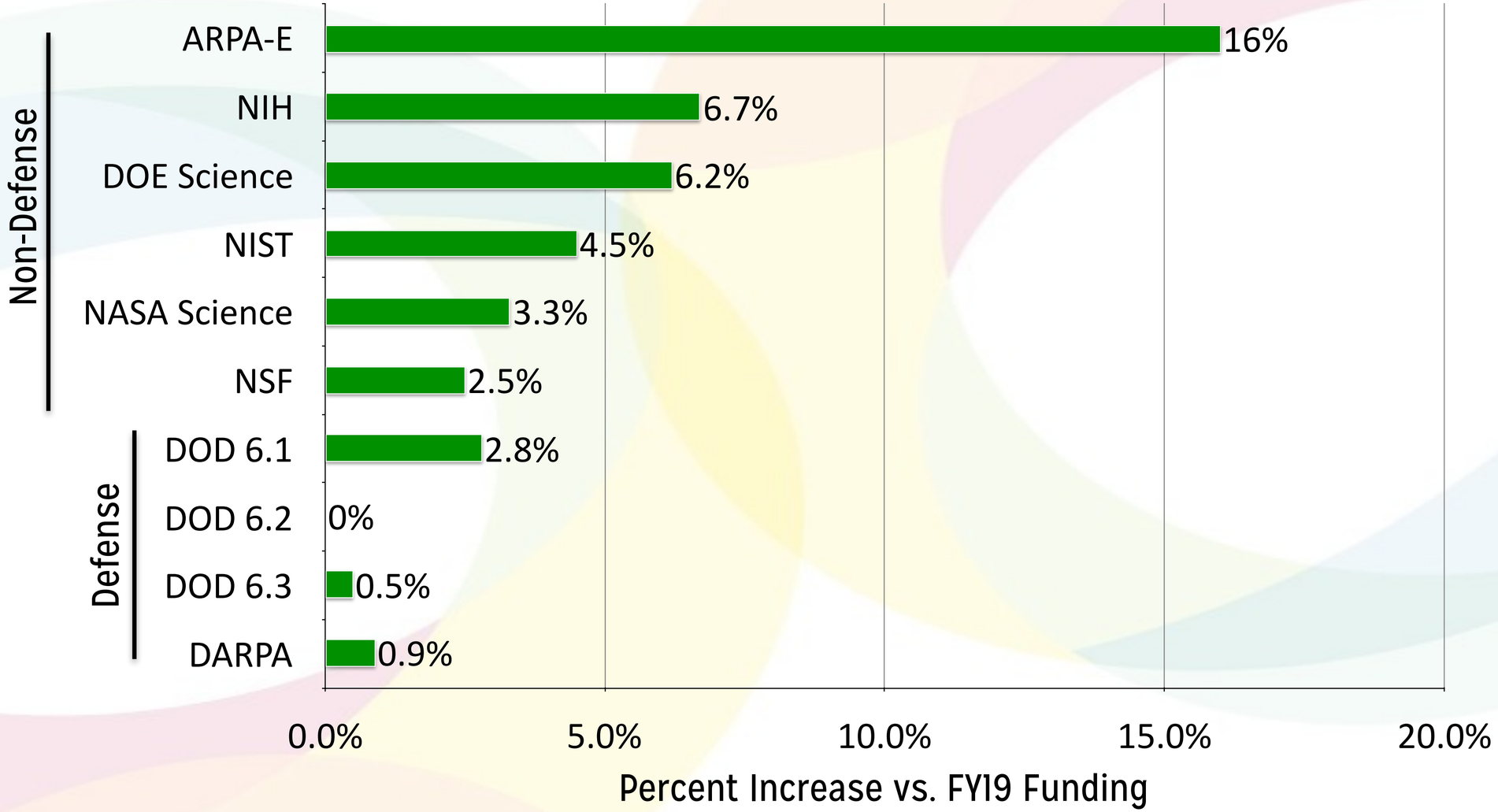

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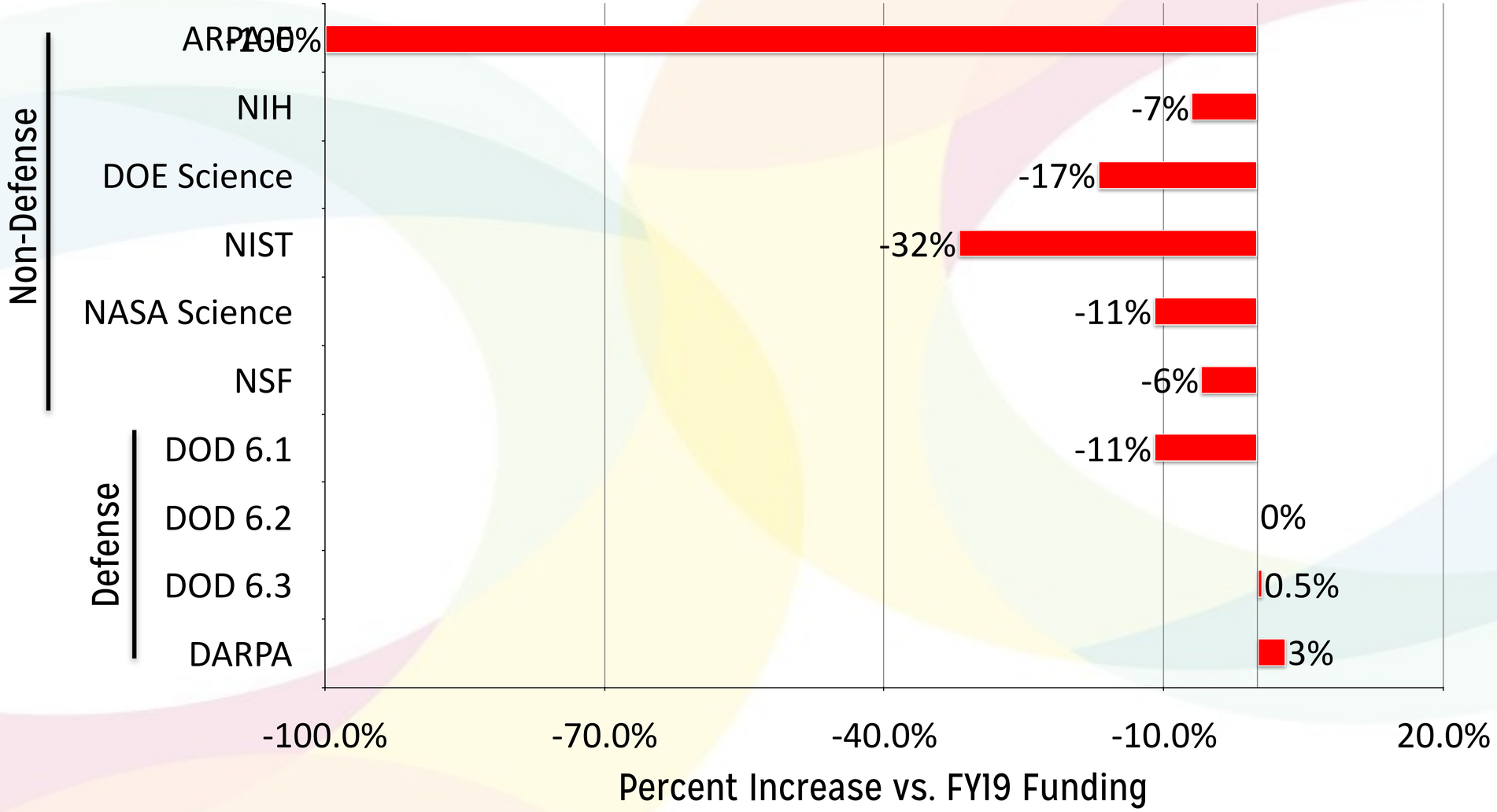
PRESIDENT'S FY21 REQUEST FOR KEY FEDERAL SCIENCE AGENCIES



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FY21 PBR PRIORITY – INDUSTRIES OF THE FUTURE

- Commitment to double Federal investments in AI and Quantum by FY22 (to $2 billion)
- 70 percent increase in AI Research funding at NSF in FY21
- $50 million in AI and QIS workforce development at NSF
- $54 million increase in AI research at DOE Science
- $100 million for Ag and Food Research Initiative through USDA
- $50 million to NIH for using AI on chronic diseases
- DARPA and JAIC both see ~$50 million in increases for AI

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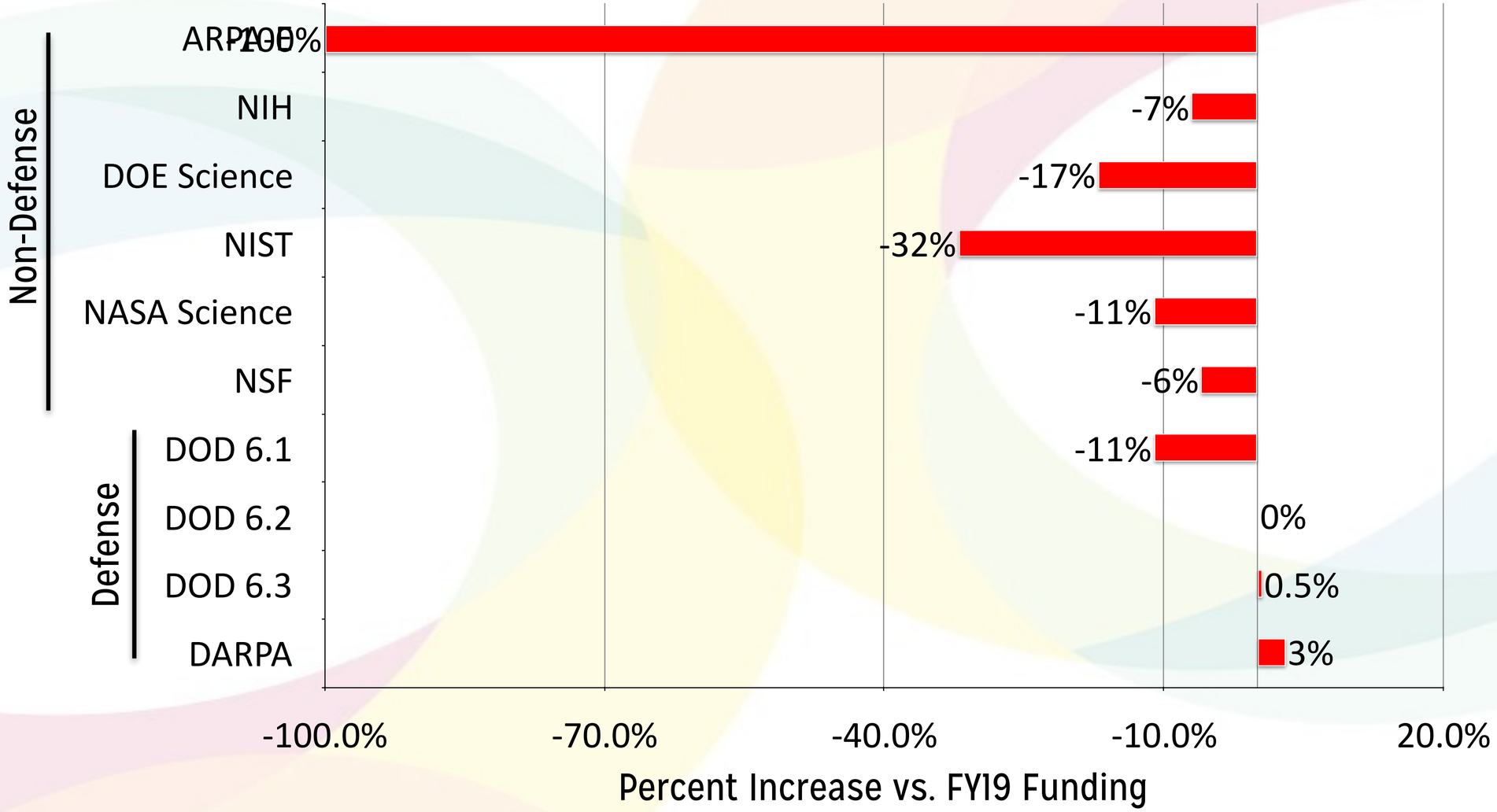

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NSF FY2021 BUDGET REQUEST

NATIONAL SCIENCE FOUNDATION
SUMMARY TABLE
FY 2021 BUDGET REQUEST TO CONGRESS
(Dollars in Millions)

NSF by Account	FY 2019 Actual	FY 2020 Enacted[1]	FY 2021 Request	FY 2021 Request change over: FY 2019 Actual Amount	FY 2019 Actual Percent	FY 2020 Enacted Amount	FY 2020 Enacted Percent
BIO	$783.75	-	$704.95	-$78.80	-10.1%	N/A	N/A
CISE	985.12	-	1,062.40	77.28	7.8%	N/A	N/A
ENG	991.15	-	909.78	-81.37	-8.2%	N/A	N/A
Eng Programs	*779.50*	-	*700.53*	*-78.97*	*-10.1%*	*N/A*	*N/A*
SBIR/STTR, including Operations	*211.65*	-	*209.25*	*-2.40*	*-1.1%*	*N/A*	*N/A*
GEO	969.88	-	836.61	-133.27	-13.7%	N/A	N/A
MPS	1,490.61	-	1,448.32	-42.29	-2.8%	N/A	N/A
SBE	271.17	-	246.84	-24.33	-9.0%	N/A	N/A
OISE	49.00	-	44.01	-4.99	-10.2%	N/A	N/A
OPP	488.68	-	419.78	-68.90	-14.1%	N/A	N/A
IA	547.31	-	538.73	-8.58	-1.6%	N/A	N/A
U.S. Arctic Research Commission	1.48	-	1.60	0.13	8.5%	N/A	N/A
Research & Related Activities	**$6,578.14**	**$6,737.20**	**$6,213.02**	**-$365.12**	**-5.6%**	**-$524.18**	**-7.8%**

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CRA STATEMENT ON FY21 PBR

"The United States has maintained its scientific, economic and military leadership in part because of its broad support for research across disciplines; recognizing that the interplay among scientific fields has provided extraordinary benefits; and understanding that perfect knowledge of where the next great breakthrough will arise is impossible. While we agree that areas such as AI and Quantum Science are ripe for priority, any additional investment should not come at the cost of progress in all other fields."

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February 4, 2020

Statement of the Computing Research Association
on
The President's FY 2021 Budget Request

CRA commends the Administration for recognizing the importance of Artificial Intelligence and Quantum Information Science to the Nation's security and competitiveness, and for addressing that with significant new investments in the President's Budget Request for FY2021. However, we take issue with the proposed cuts to a large number of other areas of science.

Failing to adequately fund a broad portfolio of research puts the nation at risk of missing key breakthroughs and the leadership position to capitalize on them. It also threatens to constrain progress in the same critical fields the President has chosen to highlight. For example, the social sciences will be crucial to developing appropriate ethical guidance for the development of AI systems, economic scientists will help us understand the impact of AI and quantum computing on our workforce, and breakthroughs in materials science will be required for advanced manufacturing and quantum science progress.

A broad Federal research investment portfolio also builds the science and technical workforce that is vital to support design, building, operation, and extending technologies fundamental to industry and defense. Cutting research funds will have a long-term, negative effect on the growth and training of that crucial community. Additionally, our technical workforce has consistently benefitted from adding personnel who are well-educated in the liberal and fine arts. Their perspective in human-centric design, aesthetics, cultural norms, psychology, history, and other aspects outside the STEM disciplines has resulted in a more robust and global set of solutions within the STEM space. Furthermore, those individuals bring new problem-solving insights and paradigms to bear on technological problems, giving us a distinct, innovative advantage over countries that consistently devalue non-STEM disciplines.

The United States has maintained its scientific, economic and military leadership in part because of its broad support for research across disciplines; recognizing that the interplay among scientific fields has provided extraordinary benefits; and understanding that perfect knowledge of where the next great breakthrough will arise is impossible. While we agree that areas such as AI and Quantum Science are ripe for priority, any additional investment should not come at the cost of progress in all other fields.

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PRESIDENT'S FY 2021 BUDGET REQUEST

- Funding requests likely to be largely ignored
- Believe AI and Quantum will see "priority"
  - But not at cost of all other areas of science
- Pro: President didn't spend to the caps in his budget
- Con: Caps provide barely any headroom for growth
- Expect there will be winners and losers in a flat-ish budget

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LEGISLATIVE UPDATES AND OTHER STUFF

LEGISLATION CRA IS TRACKING/PROVIDING INPUT/ENDORSED

- Election Technology Research Act of 2020 - Endorsed
- Harvesting American Cybersecurity Knowledge through Education (HACKED) Act (S. 2775) - Endorsed
- Cybersecurity Competitions to Yield Better Efforts to Research the Latest Exceptionally Advanced Problems (Cybersecurity CYBERLEAP) Act of 2020 - Input
- NSF Reauthorization - Input

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LEGISLATION CRA IS TRACKING/PROVIDING INPUT/ENDORSED

- Science Authorizations
  - Senate *Industries of the Future Act of 2020*
    - Calls for a study on how to double baseline budgets for AI, Quantum, 5g, Adv. Manufacturing and Synthetic Biology by FY22
    - Then fund at $10 billion by FY2025
  - *Securing America's Leadership in S&T Act of 2020* (SALSTA) - Rep. Frank Lucas (R-OK) and other GOP
    - Doubles authorizations for NSF, NIST, and DOE Science over ten years

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AI RESEARCH AUTHORIZATIONS

- Significant interest in moving something to demonstrate a commitment to keep US the world-leader in AI
- Community-led CCC 20-year AI Research Roadmap
- Additional focus by DOD, including NSCAI and the DIB
- White House priority – OSTP/OMB Memo, several summits, National AI Initiative
- Proposals emerging

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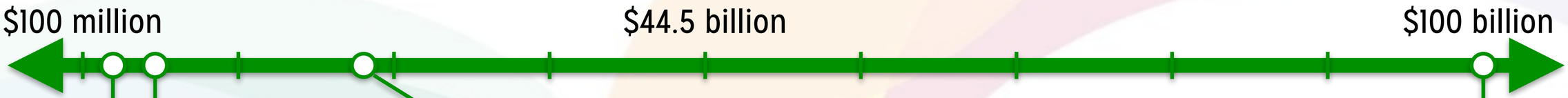
AI RESEARCH FUNDING PROPOSAL LANDSCAPE



New NSF Joint Solicitation
~$120 million over 5 years
Up to 6 research centers + Planning Grants

AI Research Roadmap Recommendation
~$20 billion over 10 years
$1 billion/year over 10 years for 5 National AI Research Centers
$1 billion/year over 10 years for 5 Mission Driven AI Labs

Schumer Proposal
~$100 billion over 5 years
Research "fund"/subsidiary agency for AI/Quantum/?

Artificial Intelligence Initiative Act
$2 billion over 5 years
($500 million over 5 years for 5 NSF Centers
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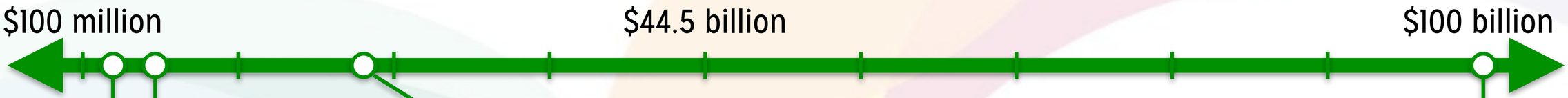

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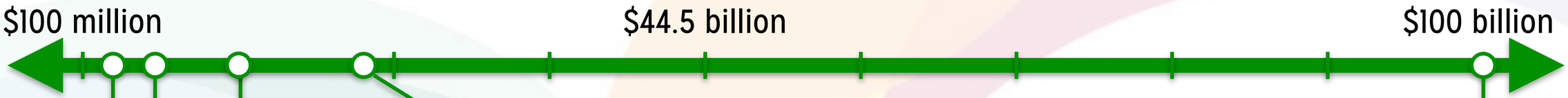

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Draft AI R&D Bill - House SS&T Committee
$4.7 billion over 5 years
National AI Research Institutes (mission-focused and tech-focused). Triples NSF funding. 5x NIST funding. Increases DOE funding.

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HOUSE SS&T DRAFT AI R&D BILL

- Bipartisan bill
- Includes
  - $3.7 billion in funding authorizations for NSF through FY25
  - $526 million for DOE*
  - $488 million for NIST
  - National AI Research Institutes
    - Multi-disciplinary, tech and mission focuses, compute resources, software/hardware engineering support
    - DOE must support AI research community with compute resources and data

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HOUSE SS&T DRAFT AI R&D BILL

- Ethics and Fairness are points of emphasis
  - NSF and DOE requirements for “Statement of Ethics” for all PIs, similar to Broader Impacts
- NIST will work on metrics, curated data sets, development of international standards in AI
  - Also, risk assessment frameworks for trustworthiness
  - Best practices for data sharing
- NITRD for AI; NITRD NCO for AI; PITAC for AI (PCAST?)
- Studies on impact on workforce and economy

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PROGNOSTICATING

- Schedule for all of these bills is tight
- Election year…things will stop moving by June-ish
- Lots of momentum behind AI, Senate also getting up to speed
- AI likely to move
- Appropriators have been supportive of authorizing language prioritizing Quantum Information Science and AI.
- Or, the world is ending, none of this matters.

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OTHER STUFF

- OSTP has issued two Request for Comments
  - RFC fo *Information on the American Research Environment*
    - Four areas: Research Rigor and Integrity, Coordinating Administrative Requirements for Research, Research Security, and Safe and Inclusive Research Environments
    - CRA joined with IEEE-USA in submitting comments; got help from ACM's US Tech Policy Committee
  - *Desirable Characteristics of Repositories for Managing and Sharing Data Resulting from Federally Funded Research*
    - CCC helping write a response

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QUESTIONS?

THANKS!

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