

POLICY DISCUSSION

Peter Harsha
Director of Government Affairs
Computing Research Association

CCC Council Meeting
April 2, 2021

DISCUSSION TOPICS...

- **FY 2021 Final Update**
- **Infrastructure and Research**
- **NSF and Technology**

FINAL FY 2021 APPROPRIATIONS: OVERALL

- Despite dismal Budget Requests, science sees gains across the board
- AI and Quantum remain priorities
 - Computing enjoys priority
- More details @ cra.org/blog





INFRASTRUCTURE AND RESEARCH

INFRASTRUCTURE, INITIALLY...

- Infrastructure Week!
 - Likelihood of a bipartisan infrastructure bill has increased
 - We argue intelligent infrastructure ought to be a part
 - Not just infrastructure for science (ie, telescopes, clusters, etc)
 - Also the science of infrastructure
- Our approach evolved...

INFRASTRUCTURE, EVOLVING...

- Became clear that this would be a leadership-driven bill (as opposed to committee-driven)
- Using HSS&T as our advocates
- Initial results not promising



DEBATE OVER NSF

PLANS FOR NSF ADVOCACY...

- Advocating for increased federal investments in fundamental computing research
- Biden budget request not likely until May, though a “don’t-call-it-skinny” budget should be out next week
- Congress will begin the appropriations process likely in mid to late April
- With new Congress and Admin, along with some big authorizations already passed, there is hope for further increases for science
- Coalition asks: CNSF wants 18 percent for NSF; ESC wants 9.6 percent for DOE

BACKGROUND: SCHUMER “ENDLESS FRONTIER ACT”

- \$100 billion to NSF over five years
- Includes up to \$35 billion a year for a new Directorate for Technology that would focus on 10 emerging areas

EMERGING TECHNOLOGIES

- Artificial intelligence and machine learning;
- High performance computing, semiconductors, and advanced computer hardware;
- Quantum computing and information systems;
- Robotics, automation, and advanced manufacturing;
- Natural or anthropogenic disaster prevention;
- Advanced communications technology;
- Biotechnology, genomics, and synthetic biology;
- Cybersecurity, data storage, and data management technologies;
- Advanced energy; and
- Materials science, engineering, and exploration relevant to the other key technology focus areas described in this subparagraph.

BACKGROUND: SCHUMER “ENDLESS FRONTIER ACT”

- \$100 billion to NSF over five years
- Includes up to \$35 billion a year for a new Directorate for Technology that would focus on 10 emerging areas
- Also bolsters funding for directorates in R&RA
- Would rename NSF to the National Science and Technology Foundation
- House SS&T Committee not interested in moving it
- Working with the community (including CRA) on their bill

NSF FOR THE FUTURE ACT

- Introduced Friday at ~5 pm
- Bipartisan bill from the House Science, Space and Technology Committee Chair and Ranking Member
- Would grow authorization for NSF from \$8.49 billion to **\$18.33 billion** in five years.
- Funding in FY22 would increase by **35 percent**
- Also includes a new Directorate for Science and Engineering Solutions (SES)

NSF FOR THE FUTURE ACT – SCIENCE AND ENGINEERING SOLUTIONS

- “Accelerating research to address major societal challenges”
- Stays within R&RA
- Focused on:
 - Climate change and environmental sustainability
 - Global competitiveness in critical technologies
 - Cybersecurity
 - National security
 - STEM education and workforce
 - Social and economic inequality

NSF Authorizations for Key Accounts in the National Science Foundation for the Future Act

	FY19 Final	FY20 Final	FY21 Final	FY22 Auth	\$ Change	% Change	FY23 Auth	\$ Change	%Change
NSF Total	\$8.08B	\$8.28B	\$8.49B	\$11.5B	+\$3.01B	+36%	\$12.67B	+\$1.17B	+10%
RRA	\$6.52B	\$6.74B	\$6.91B	\$9.44B	+\$2.53B	+37%	\$10.38B	+\$940M	+10%
Without SES	NA	NA	\$6.91B	\$8.44B	+\$1.53B	+22%	\$8.88B	+\$440M	+5.2%
SES only	NA	NA	NA	\$1B	--	--	\$1.5B	+\$500M	+50%
EHR	\$910M	\$940M	\$968M	\$1.33B	+\$362M	+37%	\$1.39B	+\$60M	+4.5%

	FY24 Auth	\$ Change	% Change	FY25 Auth	\$ Change	%Change	FY26 Auth	\$ Change	% Change
NSF Total	\$14.15B	+\$1.48B	+12%	\$16.04B	+\$1.89B	+13%	\$18.33B	+\$2.29B	+14%
RRA	\$11.70B	+\$1.32B	+13%	\$13.44B	+\$1.74B	+15%	\$15.55B	+\$2.11B	+16%
Without SES	\$9.45B	+\$570M	+6.4%	\$10.07B	+\$620M	+6.6%	\$10.49B	+\$420M	+4.2%
SES only	\$2.25B	+\$750M	+50%	\$3.375B	+\$1.13B	+50%	\$5.06B	+\$1.69B	+50%
EHR	\$1.46B	+\$70M	+5.0%	\$1.52B	+\$60M	+4.1%	\$1.60B	+\$80M	+5.3%

	FY21 Final	FY26 Auth	\$ Change	% Change
NSF Total	\$8.49B	\$18.33B	+\$9.84B	+116%
RRA	\$6.91B	\$15.55B	+\$8.64B	+125%
Without SES	\$6.91B	\$10.49B	+\$3.58B	+52%
SES only	NA	\$5.06B	NA	NA
EHR	\$968M	\$1.60B	+\$632M	+65%

Abbreviations:

RRA - Research and Related Activities

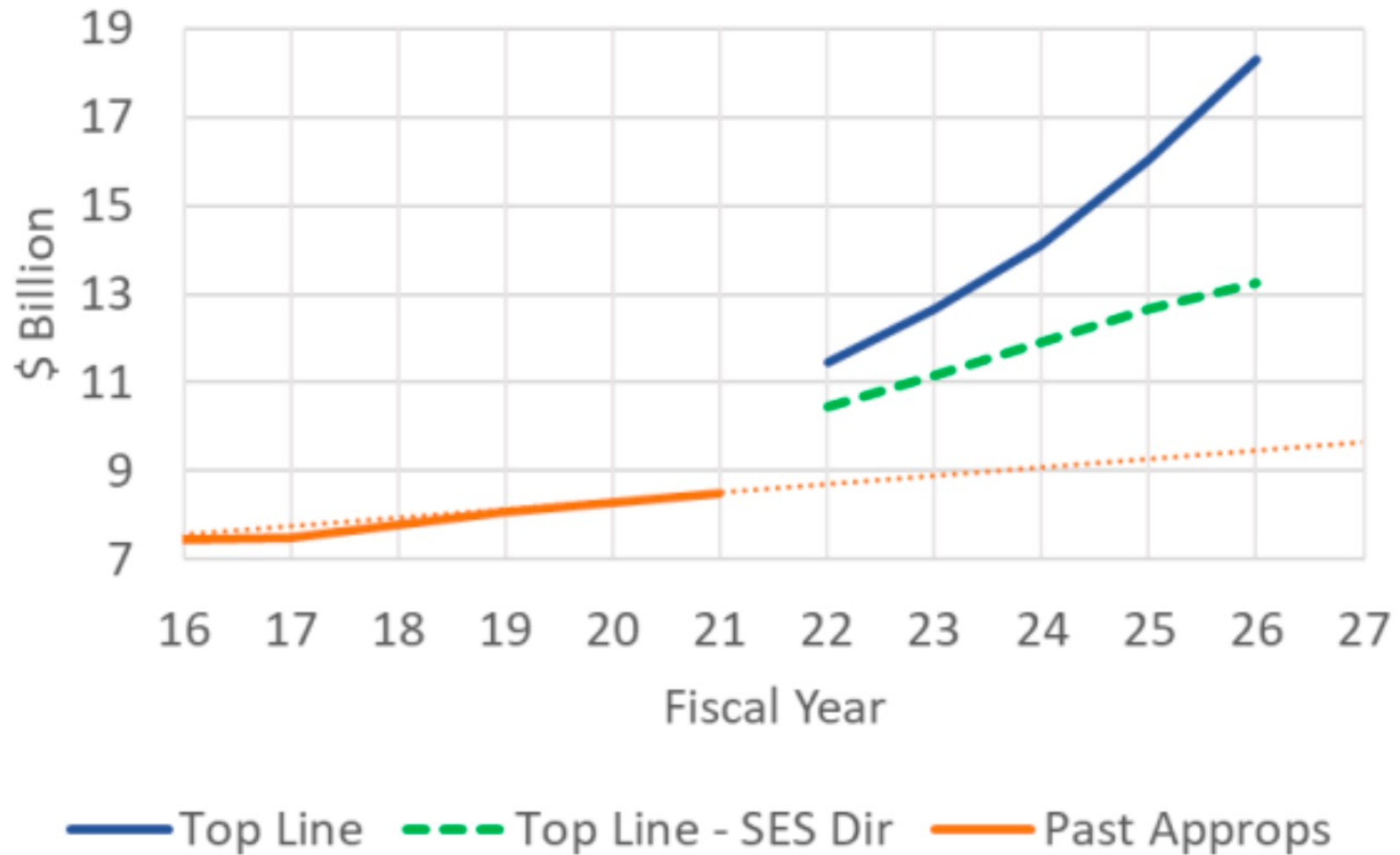
EHR - Education and Human Resources

SES - Directorate for Science and Engineering Solutions

Notes:

\$ and % changes are against the preceding year.

NSF Authorized Funding



NSF FOR THE FUTURE ACT - OTHER PROVISIONS

- STEM Ed and Workforce Training
 - Research to align undergraduate STEM with training and workforce needs
 - Requirement for grad fellowship proposals to include mentoring plans, individual development plans, supplemental funding for professional development.
- Broadening Participation
 - Codifies the INCLUDES program, requires orgs seeking management awards demonstrate experience in broadening participation
 - Pilot program to require >\$1 million multi-institution proposals to partner with “emerging research institutions”
 - Supports research on diversity, equity and inclusion in the tech sector

NSF FOR THE FUTURE ACT - OTHER PROVISIONS

- Fundamental research
 - Directs assessment of Broader Impacts criterion across Foundation
 - SoC - Reduce administrative burdens
 - Research integrity and security, including appt of Chief of Research Security and development of resources
 - Requires inclusion of ethics statement in award proposals, supports research on ethical and social implications of NSF supported research and risk mitigation
 - Research reproducibility and replicability
 - Climate change research; Violence Research; SBE; Food-Energy-Water; Sustainable Chemistry; Risk and Resilience

NSF FOR THE FUTURE ACT - OTHER PROVISIONS

- Research Infrastructure
 - Including Advanced Computing - directs NSF to collect information and regularly publish a report on the computational needs of NSF-funded projects. Directs NSF to develop and regularly update and advanced computing roadmap
 - Endorses measures identified in the 2016 Academies report entitled “Future Directions for NSF Advanced Computing Infrastructure to Support U.S. Science and Engineering in 2017-2020”

NSF FOR THE FUTURE ACT

- So, comprehensive bill
- Nuanced approach to Technology question
- Still processing, HSS&T has asked for an endorsement
- Then, Wednesday...



THE AMERICAN JOBS PLAN

AMERICAN JOBS PLAN

- \$2 trillion in investments

Infrastructure plan covers manufacturing, caretaking

Estimated spending on the proposed American Jobs Plan

Infrastructure at home \$650 billion

Clean drinking water \$111B	
High-speed broadband \$100B	
Electrical infrastructure \$100B	
Affordable and sustainable housing \$213B	Public schools, early-learning centers and community colleges \$137B
Other \$28B	

Transportation infrastructure \$621 billion

Highways, bridges and roads \$115B	Public transit \$85B	Passenger and freight rail \$80B
Electric vehicles \$174B		
Airports, water transit and ports \$42B		
Transportation inequities \$45B		
Infrastructure resilience \$50B		
Other \$30B		

Research and development \$180B	Manufacturing and small business \$300B
Workforce development \$100B	

Research and development, workforce development and manufacturing \$580 billion

Home and community-based care for elderly and disabled people

Caretaking economy \$400 billion

Note: The White House summarized Infrastructure at Home as \$650 billion; however, the proposed spending in this category adds to \$689 billion.

Source: White House

ALYSSA FOWERS/THE WASHINGTON POST

AMERICAN JOBS PLAN

- \$2 trillion in investments
- \$100 billion in high-speed broadband
- \$180 billion in R&D
 - \$50 billion semiconductor manufacturing
 - \$50 billion to NSF for Schumer
 - \$40 billion for research infrastructure (1/2 to MSIs)
 - \$30 billion for R&D for “innovation and job creation”

Infrastructure plan covers manufacturing, caretaking

Estimated spending on the proposed American Jobs Plan

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AMERICAN JOBS PLAN

- No idea how this plays out...
- Obviously, the details are important
- While infrastructure is a priority for both parties, the Biden plan would roll back many of the tax cuts that the GOP gained under the last Administration
- Not clear yet how the HSS&T committee will react to this
 - Suspect that their late Friday rollout was to get ahead of this
- Biden intends to follow this up with a \$1 trillion plan on healthcare, childcare and education next month

THANKS!

Peter Harsha
harsha@cra.org
cra.org/blog
[@CRATweets](https://twitter.com/CRATweets)