

MAKING A FEDERAL CASE FOR COMPUTING

Peter Harsha

Senior Director, Government Affairs
Computing Research Association

CRA Conference at Snowbird 2022
July 20, 2022

STRUCTURE OF TALK

- Why CRA does policy
- The challenges we face
- How things are going
- How you can engage

CRA GOVERNMENT AFFAIRS



Peter Harsha
Senior Director,
Government Affairs



Brian Mosley
Senior Policy Analyst



Dalton Hellwege
Eben Tisdale Science Policy
Fellow

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CRA

Computing Research
Association

Mission:

“to catalyze computing research by joining with industry, government, and academia.”

CRA executes this mission by:

- leading the computing research community;
- informing policymakers and the public; and
- championing a diverse, welcoming, equitable, and socially responsible computing research community.



CRA

Computing Research
Association

Goal: To be the “organization of record”
for computing research issues in DC

COMPUTING POLICY COMMUNITY

- ACM USTPC
- IEEE-CS/IEEE-USA
- SIAM
- CASC
- AAAI
- NCWIT
- Industry Groups
- CSET
- code.org
- EFF, EPIC, CDT

“ENSURING THE HEALTH OF THE R&D ECOSYSTEM”

- Access to Talent
- Impediments to Research
- Research Funding and Priorities
- Socially Responsible Computing Research



“REGULAR ORDER” WAS HARD...

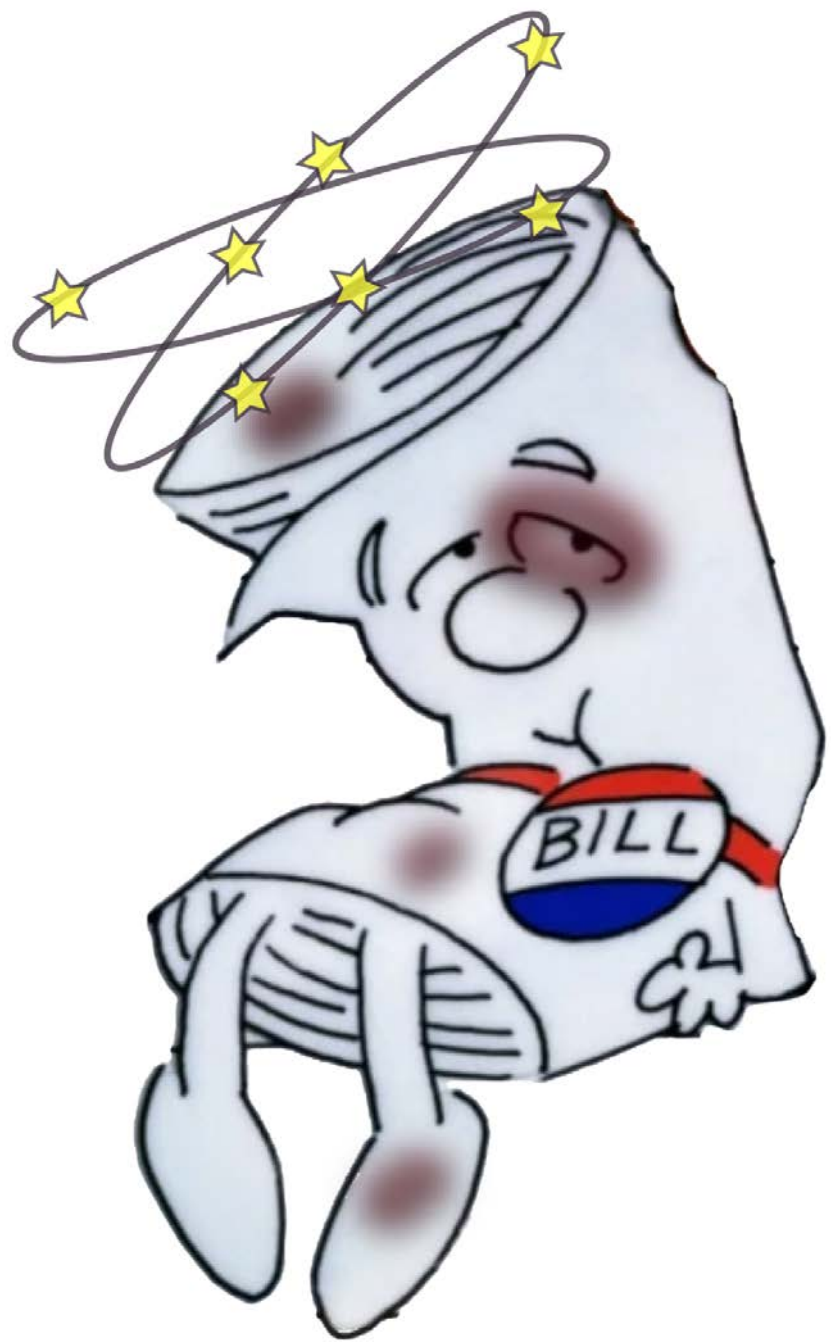


BUT IT'S WORSE THAN THAT NOW



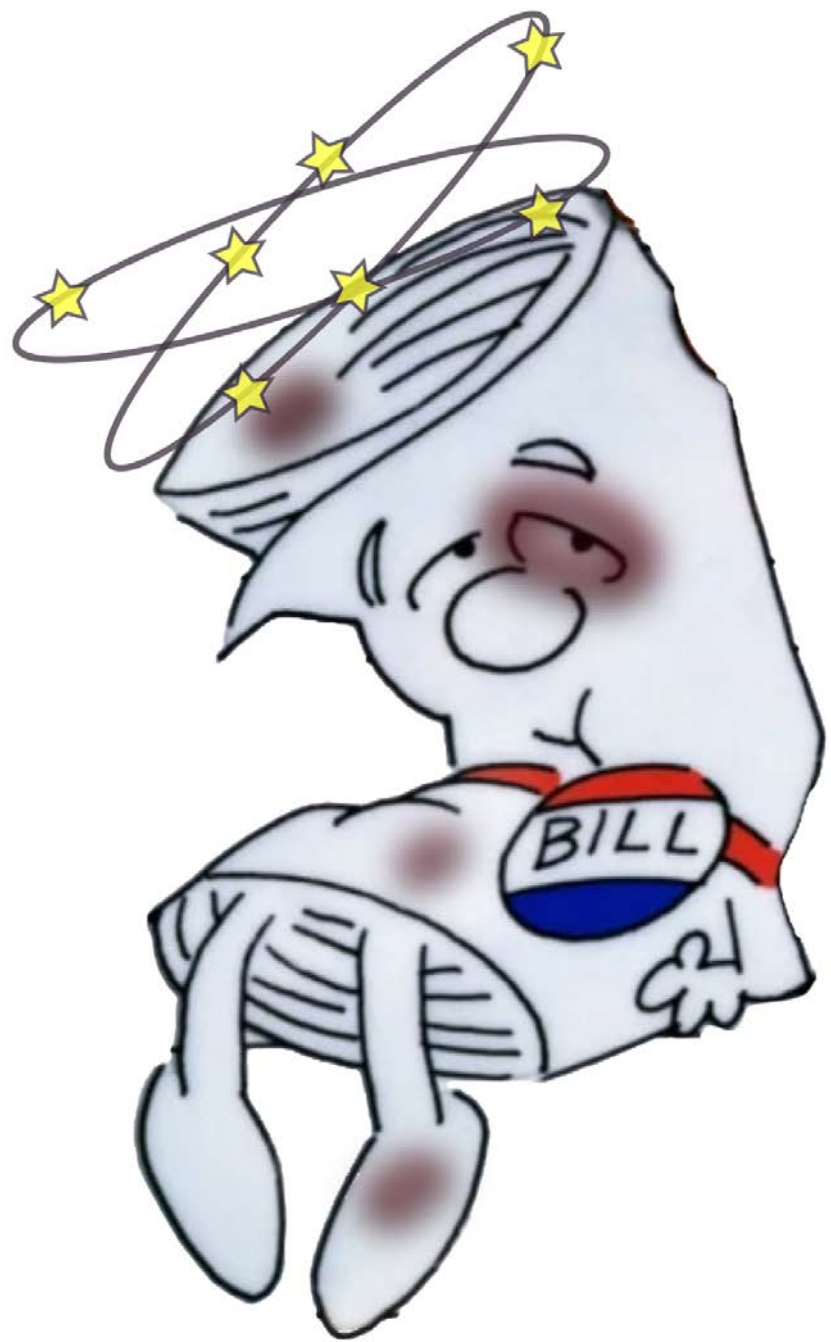
HOW AN APPROPRIATIONS BILL BECOMES A LAW (SCHOOLHOUSE ROCK VERSION)

- President submits budget request
- Congress debates request, approves budget resolution
- Using resolution, appropriators get their allocations
- House starts, first in subcom, then full, then to the Floor
- Senate starts, using the same budget resolution
- Both chambers pass related bills, reconcile differences
- Pass conference agreement
- President signs
- Repeat process another 11 times before Sept 30th



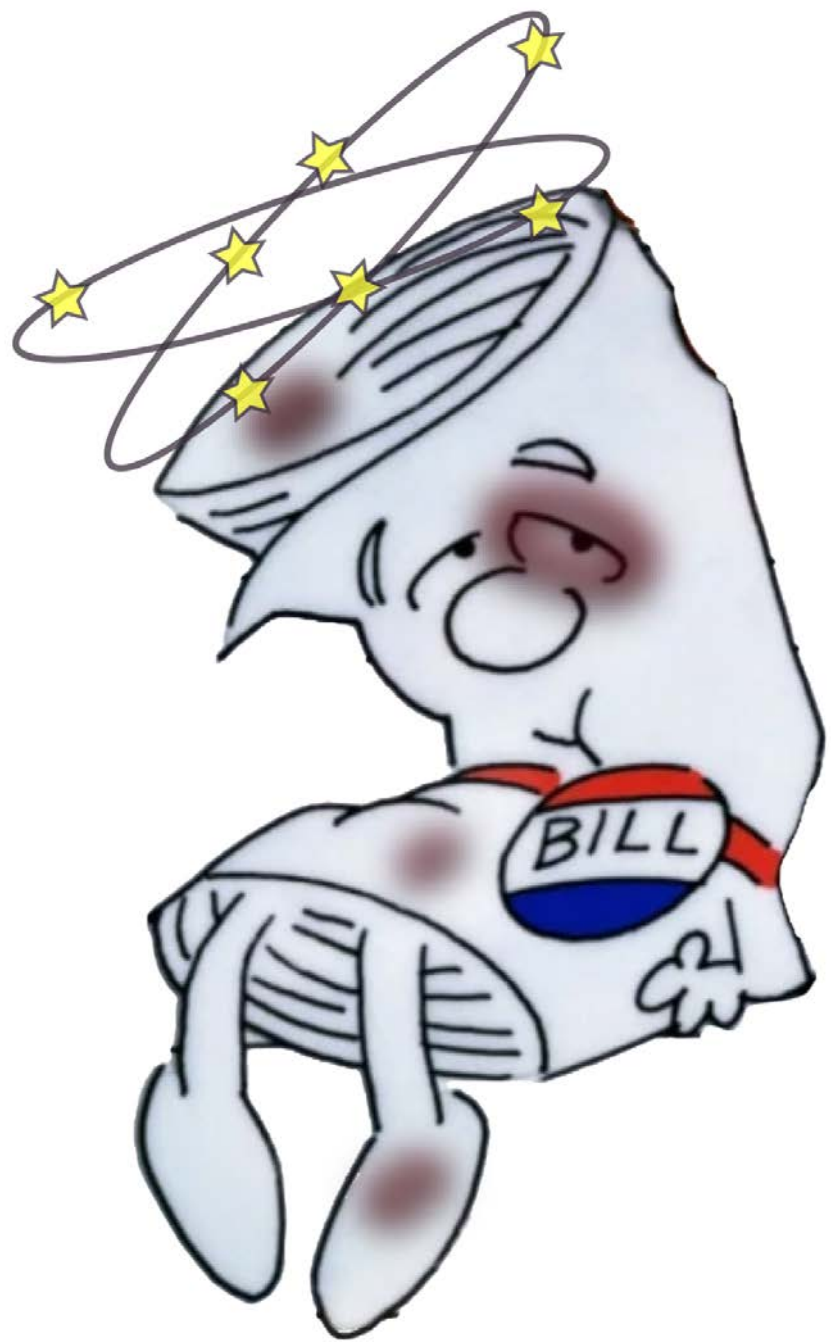
HOW AN APPROPRIATIONS BILL BECOMES A LAW (HOW IT REALLY WORKS)

- President submits budget request
- Congressional budget leaders fail to reach agreement - “Deem” a budget number
- House and Senate Appropriators start work using different numbers and assumptions
- House starts with its bills, going through committee, many make it to the House floor
- Senate bills might make it to committee, probably don’t make it to the floor. Filibuster-proof majorities required



HOW AN APPROPRIATIONS BILL BECOMES A LAW (HOW IT REALLY WORKS - CON'T)

- Congress realizes they'll miss Oct 1st deadline, start passing "continuing resolutions"
- Eventually, bundle all unfinished bills into "omnibus" bill
- Rely on House and Senate leadership to agree on top level budget numbers - tweak all numbers in the bill
- Pass on pain of shutting the government down
- President signs (or doesn't)



HOW AN APPROPRIATIONS BILL BECOMES A LAW (IMPACTS)

- Bills don't get much legitimate policy debate
- Opportunity for much mayhem in Omnibus
- Without much debate and a full amendment process, groups like CRA are at a disadvantage
- Unless you're in that room, you have little impact on the final bill
- There are really only four people in that room

NSF FY 2022 APPROPRIATIONS - FINAL

	FY22 PBR	FY22 House	FY22 Senate	FY22 Final	\$ Change	% Change
NSF Total	+19.8%	+13.4%	+11.8%	\$8.84B	+\$350M	+4.1%
RRA	+17.8%	+11.4%	+11.0%	\$7.20B	+\$290M	+4.2%
EHR	+33%	+31%	+13.6%	\$1.01B	+\$42M	+4.3%

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NOT JUST APPROPRIATIONS BILLS....

2318

U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON
**Science, Space, and
Technology**

2318







Bipartisan Bills Included in the Endless Frontier Act, as reported by the Commerce Committee

1. S. 289, Research Investment to Spark the Economy (RISE) Act (Markey, Tillis, Collins, Peters, Warren, Brown, Stabenow, Coons, Rosen, Van Hollen, Baldwin, Cardin, Kelly) (Section 507)
2. S. 637, Supporting Early-Career Researchers Act (Blumenthal, Merkley, Coons, Brown, Van Hollen, Klobuchar, Hirono) (Section 212)
3. S. 710, Sister City Transparency Act (Blackburn, Hawley, Cramer, Tillis, Rubio, Marshall, Daines)
4. S. 725, Advanced Technological Manufacturing Act (Wicker, Cantwell, Rosen) (Sections 205 and 206)
5. S. 996, Improving Minority Participation and Careers in Telecommunications (IMPACT) Act (Wicker, Sinema, Tim Scott) (Section 509)
6. S. 997, Office of Manufacturing and Industrial Innovation Policy Act (Klobuchar, Wicker, Coons, Portman) (Section 508)
7. S. 1044, National Manufacturing Advisory Council for the 21st Century Act (Peters, Rubio) (Section 404)
8. S. 1106, Shark Fin Sales Elimination Act of 2021 (Booker, Capito, Cantwell, Portman, Blumenthal, Collins, Braun, Duckworth, Schatz, Whitehouse) (Section 518)
9. S. 1161, Quantum Network Infrastructure and Workforce Development Act (Thune, Hassan) (Section 211)
10. S. 1213, National Strategy to Ensure American Leadership (SEAL) Act (Van Hollen, Blunt) (Section 503)
11. S. 1240, Manufacturing USA Expansion Act of 2021 (Brown, Blunt) (Section 402)
12. S. 1257, AI Scholarship for Service Act (Peters, Thune) (Section 208)
13. S. 1374, Rural STEM Education Act (Wicker, Rosen, Cornyn, Hassan) (Section 210)
14. S. 1395, Advancing Precision Agriculture Capabilities Act (Fischer, Klobuchar) (Section 213)
15. S. 1379, Combatting Sexual Harassment in Science (Blumenthal, Smith, Reed, Van Hollen, Klobuchar, Hirono, Shaheen, Sanders, Wyden, Markey, Rosen, Brown, Padilla) (Section 521)
16. S. 1418, Bioeconomy Research and Development Act (Markey, Gillibrand, Rubio, Capito) (Section 217)
17. S. 1563, Telecommunications Supply Chain Diversity Promotion Act (Wicker, Hickenlooper) (Section 520)
18. S. 4827 (116th), Space Preservation And Conjunction Emergency Act (SPACE) Act (Wicker) (Subtitle A of Title VI)
19. S. 2800 (116th), National Aeronautics and Space Administration Act (Cruz, Sinema, Wicker, Cantwell) (Subtitle B of Title VI)
20. S. 3707 (115th), Country of Origin Labeling Online Act (COOL) Online Act (Baldwin, Rick Scott, Murphy, Loeffler)
21. S. 1166 (115th), Internet Exchanges and Submarine Cable Act of 2020 (Blackburn, Baldwin, Duckworth, Blunt)

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AMERICA
COMPETES ACT
of 2022

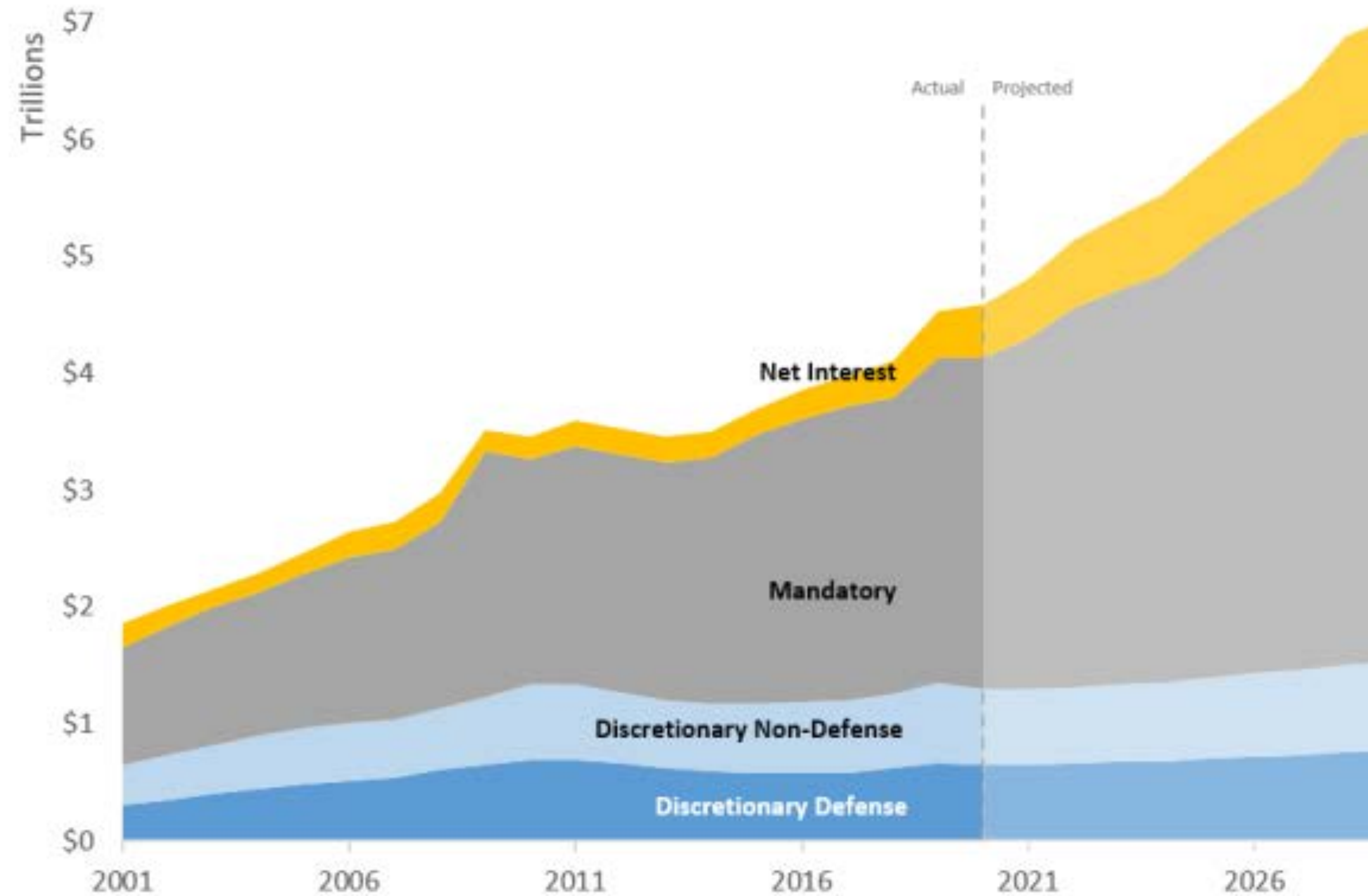
**CONFERENCE
COMMITTEE**
H.R. 4521
Artisan Innovation and
Competition Legislation





FISCAL REALITY

FISCAL REALITIES...







RESEARCH SECURITY

RESEARCH SECURITY

- Improper foreign influence in federally funded research:
 - Researchers' failure to disclose foreign affiliations
 - Conflicts of Interest and Conflicts of Commitment
 - Intellectual Property theft
 - Economic and academic espionage
 - Disclosure/diversion of confidential grant application information
 - Grant fraud
- Legislative proposals, Justice department efforts, Exec Branch NSPM-33
- Agencies developing guidance for how to quantify and mitigate risks

Senior/Key Personnel Foreign Influence Risk Rubric					
Rating	Broad Qualitative Metric	Identified Specific Actions of the Senior/Key Personnel			
		Foreign Talent Program	Denied Entities	Funding	Foreign Institutions
<u>VERY HIGH</u>	Key personnel have <i>direct foreign ties, some of which are with strategic competitors (i.e, Russia, China) or other countries with a history of targeting U.S. technologies (CWHTUST) for unauthorized transfer.</i>	Indicators of active (ongoing) participation in a strategic competitor or CWHTUST Foreign Talent Program.	Indicators of an active (ongoing) <u>affiliation</u> with an entity on the US Govt identified denied entity or person list or EO 13959 or subsequent similar issuances.	Indicators of active (ongoing) direct funding from a strategic competitor or CWHTUST.	Indicators of active (ongoing) <u>affiliation</u> with a high risk foreign institution.
<u>HIGH</u>	Key personnel have some foreign ties, <i>some of which are with strategic competitors (i.e., Russia, China) or other countries with a history of targeting U.S. technologies for unauthorized transfer. No Indicators of a <u>direct foreign affiliation or tie.</u></i>	Indicators of past participation in a strategic competitor or CWHTUST Foreign Talent Program.	Indicators of past <u>affiliation or present association</u> with an entity on the US Govt identified denied entity or person list or EO 13959 or subsequent similar issuances.	Indicators of history/pattern of direct funding from a strategic competitor/CWHTUST.	Indicators of active (ongoing), direct <u>association</u> with a high risk foreign institution.
<u>MODERATE</u>	Key personnel have some foreign ties (family, friends, professional, financial) but <i>none</i> are with strategic competitors (Russia, China) or other countries with a history of targeting U.S. technologies for unauthorized transfer.	Indicators of active (ongoing) Participation in a Foreign Talent Program of a U.S. ally who has a relationship with a CWHTUST.	Indicators of past <u>association</u> with an entity identified in the U.S Govt denied entity list or EO 13959 or subsequent similar issuances.	Indicators of a history of non-consecutive, funding from a strategic competitors/CWHTUST.	Indicators of a history/pattern of direct association with a high risk foreign institution.
<u>LOW</u>	Key personnel have little or no foreign associations (family, friends, professional, financial) and no foreign affiliations.	No Participation in a Foreign Talent Program.	No Indicators of past or current association or affiliation with an entity on the US Govt identified denied entity or person list or EO 13959 or subsequent similar issuances...	Current or past funding from a foreign ally, country with no history of targeting US technology, or no foreign funding at all.	No indicators of an association or affiliation with a high risk foreign institution.

- **Affiliation** is defined as academic, professional, or institutional appointments or positions with a foreign government-connected entity, whether full-time, part-time, or voluntary (including adjunct, visiting, or honorary), where direct monetary or non-monetary reward is involved. Affiliation is NOT considered co-authorship of publications with researchers at a foreign entity.
- **Association** is defined as academic, professional, or institutional appointments or positions with a foreign government-connected entity, whether full-time, part-time, or voluntary (including adjunct, visiting, or honorary), where no direct monetary or non-monetary reward is involved. Association is NOT considered co-authorship of publications with researchers at a foreign entity.
- **Risk** may be amplified if the DARPA technology being pursued is similar to the technology/research of the Senior/Key Personnel’s indicators.

Risk-Based Measures to Assess Potential Undue Foreign Influence Conflicts of Interest ⁵ or Conflicts of Commitment ⁶				
Rating	Factors for Assessing Senior/Key Personnel Disclosures			
	Factor 1: Foreign Talent Program	Factor 2: Denied Entity Lists	Factor 3: Funding Sources	Factor 4: Foreign Institutions or Entities
<u>VERY HIGH</u>	Indicators of active (ongoing) participation in a Foreign Talent Program run by the government of a strategic competitor or country with a history of targeting U.S. technologies (CWHTUST) for unauthorized transfer.	Indicators of an active (ongoing) affiliation ³ with an entity on the US Govt identified denied entity or person list or EO 13959 or subsequent similar issuances.	Indicators of active (ongoing) direct funding from a foreign government or a foreign government-connected entity of a strategic competitor or CWHTUST.	Indicators of active (ongoing) affiliation ³ with a high-risk foreign government, or foreign government-connected, institution or entity.
<u>HIGH</u>	Indicators of past participation in a Foreign Talent Program run by the government of a strategic competitor or CWHTUST but with indications that a professional association with the program has continued.	Indicators of past affiliation ³ or multiple recent associations ⁴ (within the last four years) with an entity on the US Govt identified denied entity or person list or EO 13959 or subsequent similar issuances.	Indicators of history/pattern of direct funding from a foreign government or from a foreign government-connected entity of a strategic competitor or CWHTUST.	Indicators of multiple active (ongoing) direct associations ⁴ with a high risk foreign government, or foreign government-connected, institution or entity.
<u>MODERATE</u>	Indicators of active (ongoing) participation in a Foreign Talent Program run by the government of a U.S. ally who has technology sharing agreement with a CWHTUST.	Indicators of multiple past associations ⁴ with an entity identified in the U.S Govt denied entity list or EO 13959 or subsequent similar issuances.	Indicators of past non-consecutive, sporadic funding from a foreign government or foreign government-connected entity of a strategic competitor or CWHTUST.	Indicators of multiple past direct associations ⁴ with a high risk foreign government, or foreign government-connected, institution or entity.
<u>LOW</u>	No Participation in a Foreign Talent Program.	No Indicators of past or current association ⁴ or affiliation ³ with an entity on the US Govt identified denied entity or person list or EO 13959 or subsequent similar issuances...	No indicators of past funding from a foreign government or foreign government-connected entity of a strategic competitor or CWHTUST.	No indicators of an association ⁴ or affiliation ³ with a high-risk foreign government, or foreign government connected, institution or entity.

Note 1: The existence of disclosures involving any of the four factors in this rubric is not automatically disqualifying.

Note 2: Co-authorship by itself is not a consideration of this rubric.

Note 3: Affiliation is defined as academic, professional, or institutional appointments or positions with a foreign government or government-connected entity, whether full-time, part-time, or voluntary (including adjunct, visiting, or honorary), where direct monetary or non-monetary reward is involved.

Note 4: Association is defined as academic, professional, or institutional appointments or positions with a foreign government or government-connected entity, whether full-time, part-time, or voluntary (including adjunct, visiting, or honorary), where no direct monetary or non-monetary reward is involved.

Note 5: Conflict of interest, as defined in NSPM-33, is a situation in which an individual, or the individual's spouse or dependent children, has a financial interest or financial relationship that could directly and significantly affect the design, conduct, reporting, or funding of research.

Note 6: Conflict of commitment, as defined in NSPM-33, is a situation in which an individual accepts or incurs conflicting obligations between or among multiple employers or other entities.

Note 7: More information on DARPA's policy and Frequently Asked Questions can be found at the following link: <https://www.darpa.mil/work-with-us/for-universities>.

RESEARCH SECURITY

- What we tell our community:
 - Issue is gaining attention and concern; not going away
 - Threat from malign foreign governments is real
 - Research agencies under pressure from policymakers to take action
 - Several provisions in current legislation touch on this subject
 - Also: DOJ's China Initiative
- What we and the community need to do:
 - Balance vigilance against overzealous government actions versus actions of bad foreign actors
 - Work with allies in the research policy community (ie: university and high-tech industry groups)
 - Monitor research agencies for release of individual plans
 - Delicate balance: confronting real threat while not closing or harming the country's open research ecosystem
 - Focus is on a policy's likelihood of achieving stated goal

SO THE CHALLENGES ARE DAUNTING

AND WE HAVE A MUCH MORE LIMITED TOOL BOX...



FORTUNATELY IT'S A PRETTY GOOD STORY

TALKING POINTS



INFORMATION TECHNOLOGY R&D AND U.S. INNOVATION

- **Advances in information technology are transforming all aspects of our lives:** commerce, education, employment, health care, manufacturing, government, national security, communications, entertainment, science, and engineering.

- **Advances in information technology also drive our economy** – both directly (the growth of the IT sector itself) and in productivity gains across the economy. Advances in computing are enabling innovation in all fields.

- **The history of innovation in computing is impressive, but the future opportunities are even more compelling:** the future of networking, revolutionizing transportation, personalized education, powering the smart grid, empowering the developing world, improving health care, enabling advanced manufacturing, driving advances in all fields of science and engineering.

It's impossible to imagine a field with greater opportunity to change the world.

- **The IT R&D ecosystem is crucial to continued innovation in IT, and federal support is at the heart of that ecosystem.** Essentially every aspect of IT upon which we rely today bears the stamp of federal support.

"In order to sustain and improve our quality of life, it is crucial that the United States continue to innovate more rapidly and more creatively than other countries in important areas of IT. Only by continuing to invest in core IT science and technology will we continue to reap such enormous societal benefits in the decades to come."

– President's Council of Advisors for Science and Technology
(in Designing a Digital Future, December 2010)

Computing Research Association – 1828 L St. NW, Washington, DC 20036 – 202.234.2111 – www.cra.org



Advances in Information Technologies (IT)
are transforming all aspects of our lives.



Commerce



Education



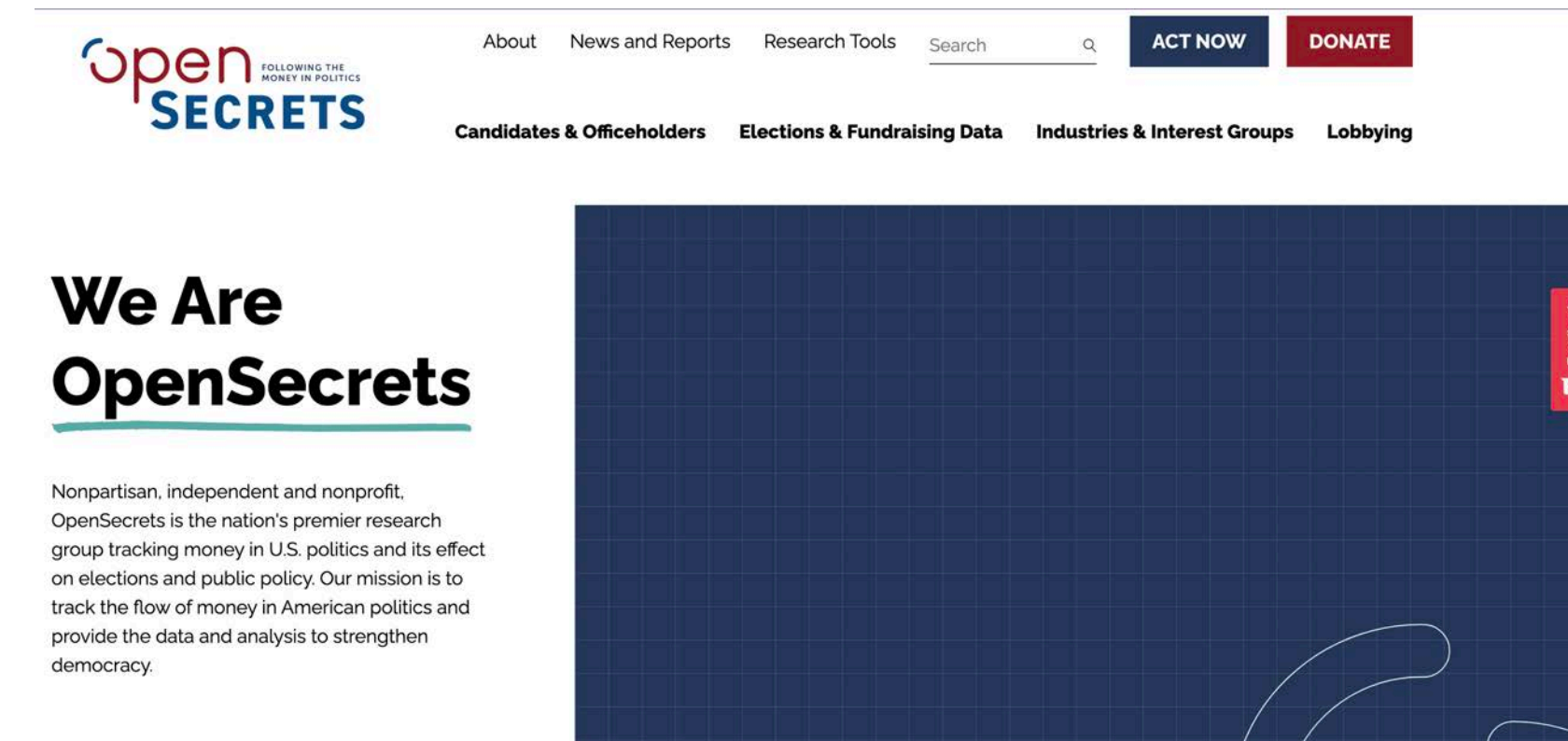
Employment



Health Care



Manufacturing



Government



National Defense



Entertainment

Advances in IT also drive our economy.

- Computing drives our economy, not just through the growth of the IT industry, but also through productivity gains across the entire economy
- The Digital Economy accounts for 10.2 percent of U.S. GDP or \$2.1 trillion in 2020.¹
- The sector grew at a rate of 6.5 percent from 2012 to 2020, adjusted for inflation.²
- IT enables productivity growth, enables the economy to run at full capacity, enables goods to be allocated more efficiently and the production of higher quality goods and services³

1. Bureau of Economic Analysis, <http://bea.gov/data/special-topics/digital-economy>

2. *Ibid*

3. Atkinson, Robert D., Andrew S. McKay. Digital Prosperity: Understanding the Economic Benefits of the Information Technology Revolution. Information Technology and Innovation Foundation. 2007.

Advances in computing are enabling innovation in all other
scientific & engineering fields...

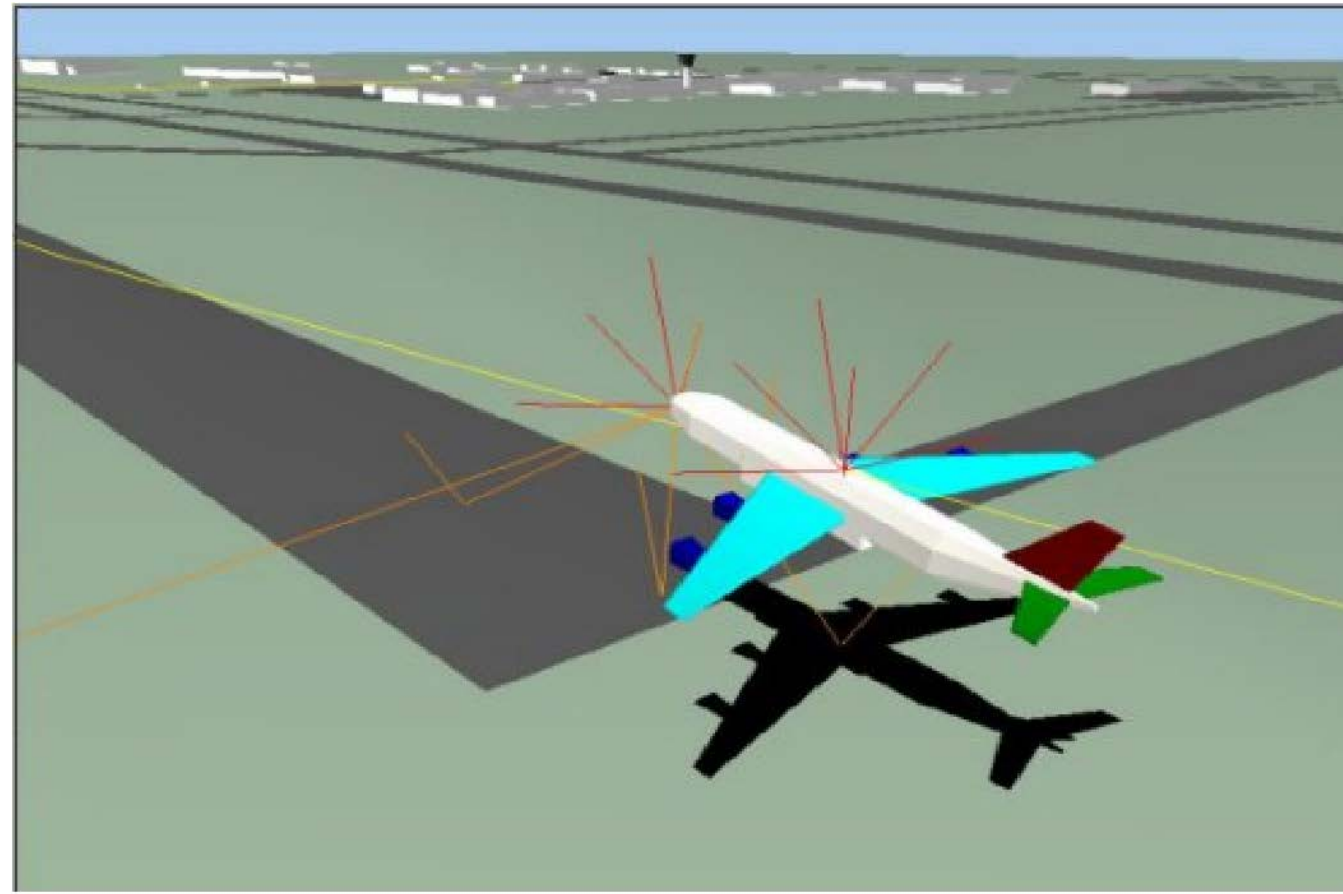
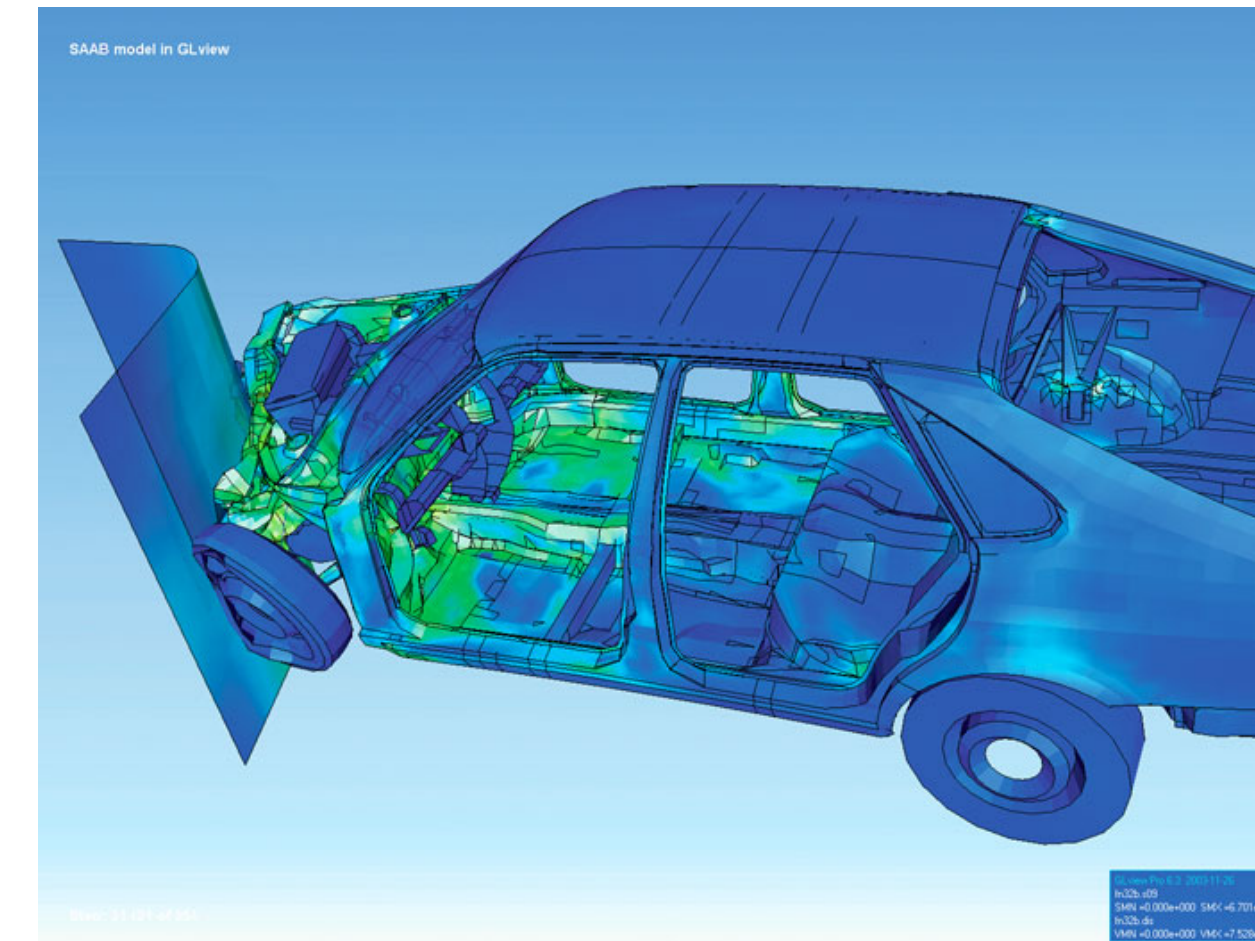


Fig. 2: Visualization of an aircraft [9]



Computer modeling, visualization, and data analysis have joined observation, theory, and experiment as the drivers of scientific discovery.

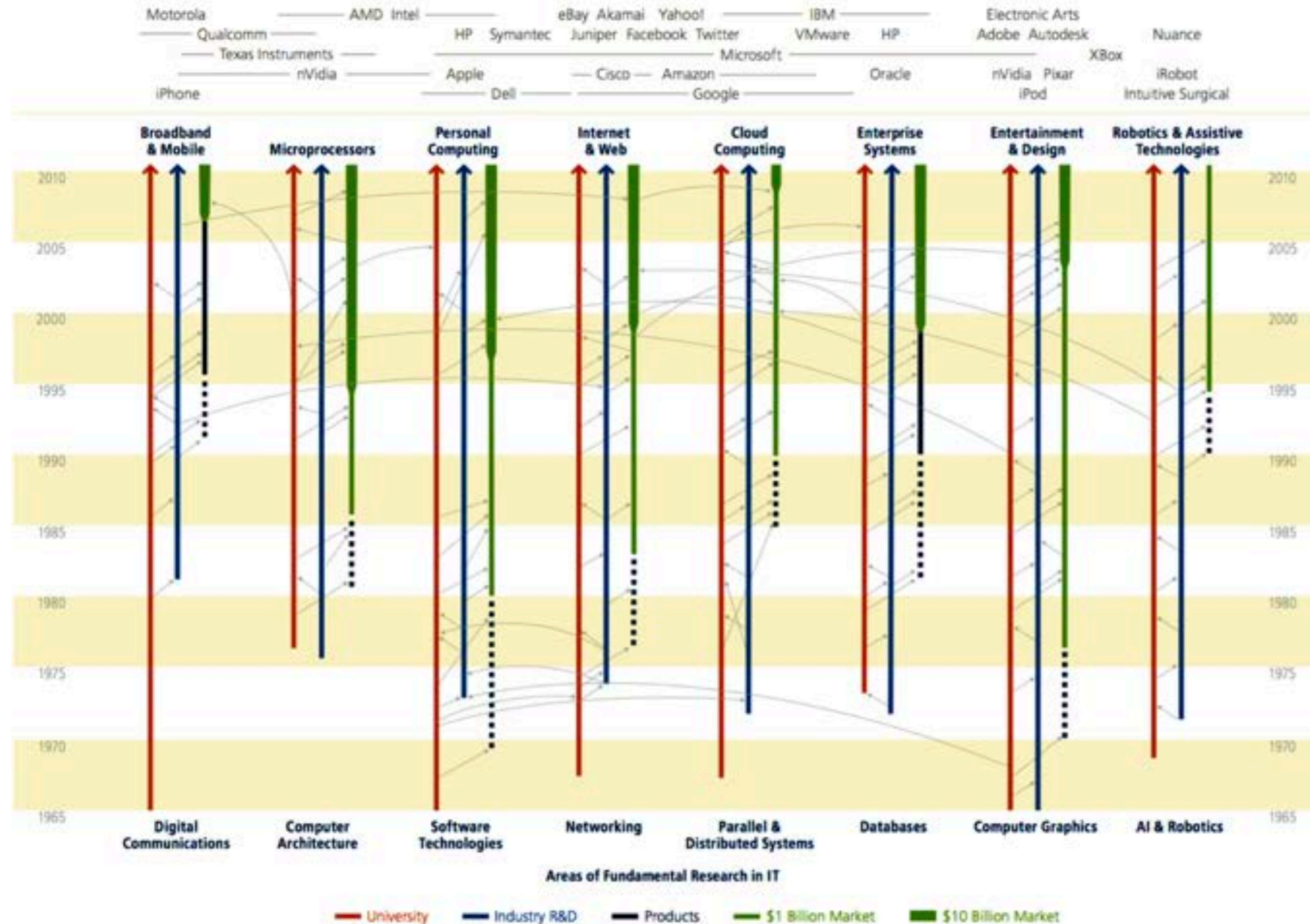
The history is impressive.
But the future is even more compelling...

- The future of networking
- Revolutionizing transportation
- Delivering personalized education
- Enabling the smart grid
- Artificial Intelligence
- Robotics
- Quantum Computing
- Improving health care
- Driving advances in **all** fields of S&E

It's impossible to imagine a field with greater opportunity
to change the world.

The R&D ecosystem is **crucial** to innovation in IT, and federal support is **at the heart** of that ecosystem.

IT Sectors With Large Economic Impact



Essentially every aspect of information technology on which we rely today bears the stamp of federal support.



HOW DO WE TELL THIS STORY?

CONGRESSIONAL TESTIMONY



House Committee on Science,
Space, and Technology

Subcommittee on Research and
Science Education

Hearing on the NITRD Program

HOST OUR OWN EVENTS & PART OF BROAD POLICY COMMUNITY




CRA Intelligence Infrastructure Hill Briefing
January 2018



Congressional Robotics Caucus Event:

Marking 5 Years of the
National Robotics Initiative
June 2016








HOST OUR OWN EVENTS & PART OF BROAD POLICY COMMUNITY



Task Force
on American
Innovation

Deconstructing The iPad

How Federally Supported Research Leads to
Game-Changing Innovation





BUILD A GOOD BRAND & ENGAGE OUR COMMUNITY IN POLICYMAKING



Coalition for National Science Funding (CNSF)



CRA LiSPI Workshop



Congressional Visit Day



WE'VE HAD SOME SUCCESSES...

“This is our generation’s Sputnik moment. Two years ago, I said that we needed to reach a level of research and development we haven’t seen since the height of the Space Race. In a few weeks, I will be sending a budget to Congress that helps us meet that goal. We’ll invest in **biomedical research, information technology**, and especially **clean energy technology** – an investment that will strengthen our security, protect our planet, and create countless new jobs for our people.”

2011 State of the Union Address



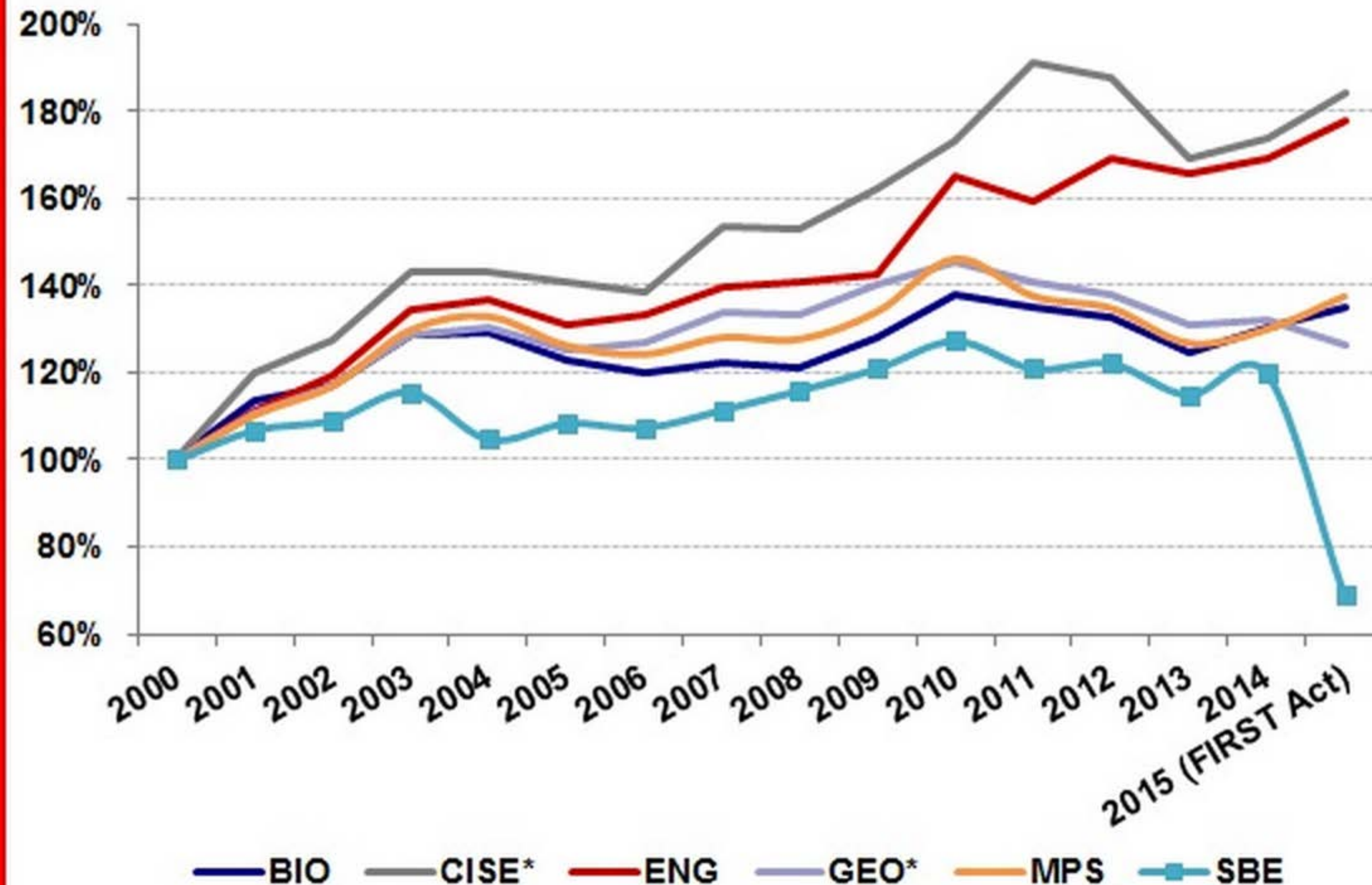
“We will help give our American children a pathway to success in the workforce of tomorrow.”

– Remarks made as he signed an executive order directing the Department of Education to spend up to **\$200 million** in grants towards **STEM and CS education**.



NSF Directorate Budgets and the FIRST Act

Percent change from FY 2000 funding levels, constant dollars



*Adjusted for comparability. Based on historical agency data and proposed authorizations in the FIRST Act. © 2014 AAAS

- Key Technology Focus Areas:

- (A) Artificial intelligence, machine learning, autonomy, and related advances.
- (B) High performance computing, semiconductors, and advanced computer hardware and software.
- (C) Quantum information science and technology.
- (D) Robotics, automation, and advanced manufacturing.
- (E) Natural and anthropogenic disaster prevention or mitigation.
- (F) Advanced communications technology and immersive technology.
- (G) Biotechnology, medical technology, genomics, and synthetic biology.
- (H) Data storage, data management, distributed ledger technologies, and cybersecurity, including biometrics.
- (I) Advanced energy and industrial efficiency technologies, such as batteries and advanced nuclear technologies, including but not limited to for the purposes of electric generation....
- (J) Advanced materials science, including composites and 2D materials.

Limited to 10, can be reviewed and changed each year (was 3 years)

- 2017 Travel Ban - CRA rallied our professional society members and released a statement opposing it.
- 2017 Grad Student Tax - Professional society members signed joint statement opposing provision in HR 1, which would have taxed graduate student tuition waivers.
- 2020-2022 – Senate’s Endless Frontier Act and House’s NSF for the Future Act, which would reorganize NSF to make it the lead Federal research agency to keep the nation competitive in key research areas.
- FY 2022 President’s Budget Request for NSF: **+20%**

SOCIALLY RESPONSIBLE COMPUTING RESEARCH

“WHILE ESTABLISHING ITSELF AS A:

Leader in promoting socially responsible computing research”

- Advocating for policies to improve diversity and inclusion in STEM and in computing research in particular
- Advocating for research that informs justice, equity, diversity, and inclusiveness goals:
 - Voting Technologies R&D Act
 - Countering Human Trafficking R&D Act
- Evolving charge for the Gov’t Affairs Committee and CRA overall



HOW TO ENGAGE!

WAYS TO GET INVOLVED WITH CRA ADVOCACY!

- Participate in a “Congressional Visits Day”

WAYS TO GET INVOLVED WITH CRA ADVOCACY!

- Participate in a “Congressional Visits Day”
- Send yourself or your colleagues to LiSPI
- Participate in CRA briefings/hearings if asked
- Run for the CRA Board, serve on CRA committees

WAYS TO GET INVOLVED AS A SCHOOL/DEPARTMENT CHAIR

- Send the message that policy engagement is valuable and valued by your school and nation
- Provide recognition for public service
 - Highlight policy work by faculty/students to university leadership and the general public
- Value policy-related service during promotion

Credit: Peter Swire, “A Policy Wonk’s Plea for More and Better Policy Research and Engagement from Computer Scientists,” CRA Snowbird Conference 2014

WAYS TO GET INVOLVED AS AN INDIVIDUAL

- Make the case to your state and local representatives
- Make the case to your industry partners
- Join the policy conversation:
 - Serve on advisory committees
 - Serve at an agency – science or non-science
 - Do a tech fellowship/internship with Congress
 - Submit comments on regulation

WAYS TO GET INVOLVED AS AN INDIVIDUAL

- Join other advocacy organizations
 - Serve on their boards and committees
- Engage in your local community
 - Talk to your neighbors about what you do and why it's important
 - Talk to your local Rotary or Kiwanis clubs
 - Write OpEds and Letters to the Editor in your local papers (and let us know!)

WAYS TO GET INVOLVED AS AN INDIVIDUAL

- Help your local schools, be a mentor
- Run for office.



JUST GET INVOLVED!

Thanks!

Peter Harsha
Director of Government Affairs

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