MAKING A FEDERAL CASE FOR COMPUTING
(DOES SCIENCE POLICY STILL MATTER?)

Peter Harsha
CRA Director of Government Affairs

Early Career Researcher Symposium 2018
STANDARD VERSION OF THIS TALK

• Why does CRA do policy?
• How do we do it?
• What have we done?
• What do things look like now?
WHY DO WE “DO” POLICY?
CRA MISSION

CRA's mission is to enhance innovation by joining with industry, government and academia to strengthen research and advanced education in computing.
COMPUTING POLICY COMMUNITY

- USACM
- Code.org
- IEEE-CS/IEEE-USA
- SIAM
- CASC
- EDUCAUSE
- AAAI
- NCWIT
- Industry Groups
- EFF, EPIC, CDT...
“ENSURING THE HEALTH OF THE R&D ECOSYSTEM”

• Access to Talent
• Impediments to Research
• Research Funding and Priorities
DOES SCIENCE POLICY STILL MATTER?
YES. YES IT DOES.
In the Trump Administration, Science Is Unwelcome. So Is Advice.

As the president prepares for nuclear talks, he lacks a close adviser with nuclear expertise. It’s one example of a marginalization of science in shaping federal policy.
In the Trump Administration, Science Is Unwelcome. So Is Advice.

- First President since 1941 without science advisor
- No Chief Scientist at State Department
- No Chief Scientist at USDA
- Disbanded Climate Science Advisory Committees at Interior and NOAA
- Disbanded Food Advisory Committee at FDA
- Named a climate change skeptic head of NASA
- A whole series of issues with EPA
In 1976, Congress established the White House Office of Science and Technology Policy (OSTP) to provide the President and others within the Executive Office of the President with advice on the scientific, engineering, and technological aspects of the economy, national security, homeland security, health, foreign relations, the environment, and the technological recovery and use of resources, among other topics.
Advise the President on the impacts of S&T on domestic and international affairs;

Lead inter-agency efforts to develop sound S&T policies and budgets;

Work with the private sector to ensure economic prosperity, environmental quality, and national security;

Build strong partnerships between governments and the scientific community;

Evaluate the scale, quality, and effectiveness of Federal S&T;
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Kelvin Droegemeier
ADMINISTRATION “MISSTEPS”

• Travel Ban
• Restrictions on Chinese Graduate Students
• Restrictions on Researchers who have received support from Chinese Companies
• H.R. 1 - House Republican Tax Reform
DOES SCIENCE POLICY STILL MATTER?

YES. YES IT DOES.
“ENSURING THE HEALTH OF THE R&D ECOSYSTEM”

• Access to Talent
• Impediments to Research
• Research Funding and Priorities
CHALLENGES
# of Lobbyists (FY17) $3.37 billion

Working "S&T"

11,529

304
FY 2019 FEDERAL BUDGET

$4.4 TRILLION
FY 2019 FEDERAL BUDGET

MANDATORY SPENDING
$2.79 TRILLION

DISCRETIONARY SPENDING
$1.31 TRILLION

INTEREST
$363 BILLION
FY 2019 FEDERAL BUDGET

DISCRETIONARY SPENDING
$1.31 TRILLION
FY 2019 FEDERAL BUDGET

DISCRETIONARY SPENDING
$1.31 TRILLION

Agriculture
CJS
Defense
Energy and Water
Financial Services
Homeland Security
Interior and Environment
Labor/HHS/Education
Legislative Branch
Military/Veterans
State/Foreign Ops
Transportation/HUD
APPROPRIATIONS IS A ZERO-SUM GAME

Commerce, Justice, and Science Bill

- National Science Foundation
- NIST
- NOAA
- NASA
- FBI / Dept. of Justice
- Census
NSF, COPS OR SPACESHIPS?
LONG-TERM FISCAL CHALLENGES
Growth in Mandatory Spending vs. Discretionary

Source: Congressional Budget Office projection
AUTOMATIC SPENDING GROWS OVER TIME

- Automatic Spending
- All Other Spending

<table>
<thead>
<tr>
<th>Year</th>
<th>Automatic Spending</th>
<th>All Other Spending</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>34%</td>
<td>66%</td>
</tr>
<tr>
<td>2015</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>2026</td>
<td>78%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Source: CBO

Authorized by Chairman Tom Price, M.D., House Budget Committee
ATTITUDES HAVE CHANGED
Democrats and Republicans more ideologically divided than in the past

Distribution of Democrats and Republicans on a 10-item scale of political values

1994

MEDIAN
Democrat

MEDIAN
Republican

Consistently liberal

Consistently conservative

2004

MEDIAN
Democrat

MEDIAN
Republican

Consistently liberal

Consistently conservative

2017

MEDIAN
Democrat

MEDIAN
Republican

Consistently liberal

Consistently conservative

Notes: Ideological consistency based on a scale of 10 political values questions (see methodology). The blue area in this chart represents the ideological distribution of Democrats and Democratic-leaning independents; the red area of Republicans and Republican-leaning independents. The overlap of these two distributions is shaded purple.
Source: Survey conducted June 8-18, 2017.

PEW RESEARCH CENTER
Less overlap in the political values of Republicans and Democrats than in the past

Distribution of Republicans and Democrats on a 10-item scale of political values

1994

1994

2004

2004

2017

2017

Notes: Ideological consistency based on a scale of 10 political values questions (see methodology). Republicans include Republican-leaning independents; Democrats include Democratic-leaning independents.
Source: Survey conducted June 8-18, 2017.
PEW RESEARCH CENTER
THIS POLARIZATION HAS CHANGED ATTITUDES ABOUT SCIENCE
SO THE CHALLENGES ARE DAUNTING
AND WE HAVE A MUCH MORE LIMITED TOOL BOX...
FORTUNATELY, WE’VE GOT A PRETTY GOOD STORY
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)
Advances in IT are transforming all aspects of our lives
Conduct commerce...

Venmo

Ebay

Amazon
...how we learn...
...our employment...
...our health care...
...how we manufacture...
...how government functions...
...how we preserve our national security...
...how we communicate...
...and how we’re entertained.
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

• Remarkable economic growth between '95 and '02 was spurred by productivity growth enabled almost completely by factors related to IT¹

• 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 services²

Advances in computing are enabling innovation in all other fields...
In Science and Engineering...

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
• Empowering the developing world
• 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 IT R&D ecosystem is crucial to innovation in IT, and federal support is at the heart of that ecosystem.
“[An] extraordinarily productive interplay of federally funded university research, federally and privately funded industrial research, and entrepreneurial companies founded and staffed by people who moved back and forth between universities and industry.”

-NRC on the federal IT R&D Program
Essentially every aspect of information technology on which we rely today bears the stamp of federal support.
U.S. BUREAU OF LABOR STATISTICS JOB PROJECTIONS: 2014-2024
STEM JOB PROJECTIONS BY STEM %

% of Newly Created Jobs

- Engineering: 11%
- Mathematics: 7%
- Natural Sciences: 6%
- Computing: 76%

% of Total Jobs

- Engineering: 27%
- Mathematics: 4%
- Natural Sciences: 11%
- Computing: 58%

Source: US BLS Employment Projections (www.bls.gov/emp/ep_table_102.htm)
WE’RE OPPORTUNISTIC...

- Congressional testimony
House Committee on Science, Space and Technology
Subcommittee on Research and Science Education
Hearing on the NITRD Program
October 28, 2015
WE’RE OPPORTUNISTIC...

• Congressional testimony
• We host our own events and partner with others
Deconstructing Precision Agriculture

Think Moon landing.
Think Internet.
Think iPhone and Google.
This is bigger.
This is about feeding the world.

Come hear from U.S. farmers, leading agriculture technology companies, and scientists on how they work together to solve this global challenge.

Save the Date
3/4/2015
Reception 4:30 to 5:30 pm
House Agriculture Committee Room
1500 Longworth House Office Building
Washington, DC
Invitation to follow

In partnership with
The Task Force on American Innovation
Texas A&M Coalition for the Advancement of Precision Agriculture
Publisher Solutions, LLC
The Association of Equipment Manufacturers (AEM)
WinField Solutions, LLC
Trimble

Deconstructing The iPad
How Federally Supported Research Leads to Game-Changing Innovation
WE’RE OPPORTUNISTIC...

• Congressional testimony
• We host our own events and partner with others
• We’ve developed a good “brand”
• We strive to engage the community in policymaking – LiSPI
LiSPI 2017
CRA/CCC Leadership in Science Policy Institute

“Science policy boot camp”
Next in 2019!
Next Fly-in: September 12-13, 2018!
WE’RE OPPORTUNISTIC...

• Part of a broader science advocacy community that’s looking for good stories to tell
  • CNSF, CNSR, TFAI, ESC, Code.org
• Join coalitions around our interests
• We leverage our interactions with the press
We leverage social media (or try to)...
AND WE’VE HAD SOME SUCCESS...
If we want America to stay on the cutting edge, we need young Americans to master the tools and technology that will change the way we do just about everything.

- President Obama in a video on behalf of the Hour of Code
“A key priority of my Administration is to better equip America’s young people with the relevant knowledge and skills that will enable them to secure high-paying, stable jobs throughout their careers. With the growing role of technology in driving the American economy, many jobs increasingly require skills in science, technology, engineering, and mathematics (STEM) -- including, in particular, Computer Science. These skills open the door to jobs, strengthening the backbone of American ingenuity, driving solutions to complex problems across industries, and improving lives around the world. As part of my Administration’s commitment to supporting American workers and increasing economic growth and prosperity, it is critical that we educate and train our future workforce to compete and excel in lucrative and important STEM fields.” — President Donald Trump, 9/25/17
Big spender
Trump plans to invest big in computer science education
NSF “10 BIG IDEAS”

**RESEARCH IDEAS**

- Harnessing Data for 21st Century Science and Engineering
- Work at the Human-Technology Frontier: Shaping the Future
- Windows on the Universe: Multi-messenger Astrophysics
- Quantum Leap: Leading the Next Quantum Revolution
- Navigating the New Arctic
- Understanding the Rules of Life: Predicting Phenotype

**PROCESS IDEAS**

- Mid-scale Research Infrastructure
- Growing Convergence Research at NSF
- NSF 2026
- NSF INCLUDES: Enhancing STEM through Diversity and Inclusion
POSITIVE TRENDS FOR COMPUTING RESEARCH FUNDING

- NSF up 5 percent in FY18; 4-5 percent in FY19
- ASCR up 25 percent in FY18; 12-21 percent in FY19
- Exascale up 25 percent in FY18; 10-13 percent in FY19
- New “AI and Big Data Initiative” at DOE in FY19
- New activities at OSTP focused on AI and Machine Learning; Quantum Information Science; and HPC
- House and Senate bills to create new Quantum Science Initiative and authorize funding for new NSF and DOE centers
ENGAGEMENT
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

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!