THE FEDERAL CASE FOR COMPUTING

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CRA
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John King (University of Michigan)
Margaret Martonosi (Princeton University)
Andrew Moore (Carnegie Mellon University)

CRA GOVERNMENT AFFAIRS
Me
Brian Mosley
Policy Analyst

STRUCTURE OF THIS TALK
- A bit about CRA and where we fit
- The problems we face
- How we deal with them
- Congressional scrutiny

Mission: “to unite industry, government and academia to enhance innovation by strengthening research and advanced education in computing.”

+ 200+ PhD-granting computing depts.
+ 21 industrial and federal research labs
+ Six affiliated professional societies
GOAL

Remain the “organization of record” for computing research policy issues

WE’RE PART OF AN ACTIVE COMPUTING POLICY COMMUNITY

- ACM Ed Policy/USACM
- IEEE-CS/IEEE-USA
- SIAM
- CASC
- AAAI, USENIX
- NCWIT
- Industry Groups

INNOVATION POLICY AND MAINTAINING THE HEALTH OF THE RESEARCH ECOSYSTEM

- Access to Talent
- Impediments to Research
- Research Funding and Priorities

CHALLENGES

# of Lobbyists (FY16)
11,167

Lobbying Expenditures
$3.15 billion

Working “S&T”
366

FY 2017 FEDERAL BUDGET

$4.0 TRILLION
FY 2017 FEDERAL BUDGET

MANDATORY SPENDING $2.54 TRILLION

INTENSITY $306 BILLION

DISCRETIONARY SPENDING $1.21 TRILLION

13

14

FY 2017 FEDERAL BUDGET

DISCRETIONARY SPENDING $1.21 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

15

APPROPRIATIONS IS A ZERO-SUM GAME

Commerce, Justice, Science Bill

- National Science Foundation
- NIST
- NOAA
- NASA
- FBI / Dept. of Justice
- Census

16

NSF, COPS OR SPACESHIPS?

LONG-TERM FISCAL CHALLENGES
ATTITUDES HAVE CHANGED

CONGRESS IS MORE POLARIZED THAN EVER

- Not a single Democratic Senator was more conservative than any GOPer. Not a single GOP Senator is more liberal than any Dem.
- The House is equally polarized, with only five GOPers ranking more liberal than the most conservative Dem, and only four Dems more conservative than the most liberal Republican.

From a 2011 National Journal Study of the 2010 election cycle.

CONGRESS IS MORE POLARIZED THAN EVER

- Of the 98 Democrats who had the most middle-of-the-road voting records in the last Congress, 55 of their seats are now in GOP hands.

From a 2011 National Journal Study of the 2010 election cycle.

Growth in Mandatory Spending vs. Discretionary

Source: Congressional Budget Office projection

AUTOMATIC SPENDING GROWS OVER TIME

Source: CBO

INTEREST VS. OTHER SPENDING
(In 2026 Under Current Law)

Source: CBO

ATTITUDES HAVE CHANGED
Comity and bipartisanship on the committee probably peaked in about 2007-8 with *Gathering Storm* and the America COMPETES Act.

Breakdown started in earnest in 2010, during reauthorization of COMPETES.

GOP tried to kill bill to deny Dems a win in an election year.

- In 2012, Sen. Tom Coburn attacked NSF as wasteful for “silly-sounding” research.
- In 2013, Coburn/McCain and Cantor/L. Smith attacked NSF over political science and social science funding.
- L. Smith attacks Dept. of Energy over Climate Change and Sustainability research.
- L. Smith amends CJS to target SBE.
• FIRST Act of 2014 -> America COMPETES Reauthorization Act of 2015
• NSF “Accountability”
• Modest increases for computing research and other “hard science” accounts
• Specific cuts to SBE, GEO
• Energy R&D Title similarly partisan

“We are also disappointed to note that research at the National Science Foundation in the Social, Behavioral, and Economic (SBE) sciences, along with the Geosciences, would be curtailed under this authorization. As you are aware, research in several key areas of computing – including cyber security and human-computer interaction (HCI) – is significantly informed by work emanating from the SBE directorate.”

• No funding authorizations (boo?)
• NITRD Authorization (yay?)
• Very watered down version of “national interest” language
• Requirement that NSF report researchers who have intentionally misrepresented results
• NRC study on research reproducibility
• Authorized NSF to establish a CS Ed Research program

“NSF must focus research funding on areas most likely to strengthen the economy, national security and other national priorities. NSF has funded too many projects that are at best marginal or at worst frivolous and wasteful.”

“These low-risk, low-priority projects detract from investments in groundbreaking research that crosses biology, physics, computer science and engineering.”
SENATE CONTINUES TO BE A BULWARK FOR SCIENCE

- Sen. Alexander (R-TN), Sen. Thune (R-SD), and Sen. Gardner (R-CO) play key GOP roles in support of basic research investments
- Sen. Alexander wants science in Infrastructure Initiative
- Though, Sen. Jeff Flake (R-AZ), remains focused on silly-sounding science

CHAIR OF HOUSE COMMERCE, JUSTICE, SCIENCE APPROPRIATIONS SUBCOMMITTEE, REP. JOHN CULBERSON (R-TX)

- Culberson remains strongly supportive of NASA and NSF
- “I’m the only one standing between you [NSF] and directorate level funding”
- Not convinced OSTP is all that valuable
  - “I’d be hard-pressed to identify any tangible, specific accomplishments or achievements of the office.”
  - Still believes President needs a Science Advisor

Exodus of experienced GOP staffers
- Things could get worse

SO THE CHALLENGES ARE DAUNTING

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

FORTUNATELY, WE’VE GOT A PRETTY GOOD STORY
Advances in IT are transforming all aspects of our lives.

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)
...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 IT.

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 services.

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.


stem job projections by stem %

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

We’re opportunistic...

- Congressional testimony
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
November 6-7
Washington, DC
WE'RE OPPORTUNISTIC…

- Part of a broader science advocacy community that’s looking for good stories to tell
- Join coalitions around our interests
  - CNSF, CNSR, TFAI, ESC, Code.org
- We leverage our interactions with the press

We leverage social media (or try to…)

http://cra.org/blog
On Facebook
@CRATweets

AND WE'VE HAD SOME SUCCESS...

“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.”

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

TRUTHY — WHAT HAPPENED?

- Studied the political domain in the run-up to the 2010 election
- Looked at a range of hashtags and memes across the political spectrum
- Noted that the GOP appeared to use astroturfing
- Published work in 2012 describing their findings
- Twitter shuts down ‘bot accounts
- Since then, they’ve studied OWS, societal unrest in Turkey, polarization of online political discourse, stock market movements, and geo trends of trending topics
The government wants to study 'social pollution' on Twitter

By Ajit Pai, Oct 17, 2014

Smith: NSF Has No Business Using Taxpayer Dollars to Study Political Messages on Twitter

By Ajit Pai, Oct 25, 2014

National Science Foundation
WHERE DISCOVERIES BEGIN

Award Abstract #1201743
ICES: Large: Meme Diffusion Through Mass Social Media

ABSTRACT

The project is aimed at modeling the diffusion of information online and empirically
determining among models mechanisms driving the spread of memes. We explore
why some ideas cause viral explosions while others are quickly forgotten. Our analysis
goes beyond the traditional approach of applied epidemics diffusion processes and focuses
on cascade size distributions and popularity time series in order to model the agenda and
processes driving the online diffusion of information, including: users and their topical
interests, competition for user attention, and the chronological age of information.
Completion of our project will result in a better understanding of information flow
and could assist in elucidating the complex mechanisms that underlie a variety of human
dynamics and organizations. The analysis will involve studying meme diffusion in large-
scale social media by collecting and analyzing massive streams of public micro-blogging
data.

The project stands to benefit both the research community and the public significantly. Our
data will be made available via APIs and include information on meme propagation
networks, statistical data, and relevant user and content features. The open-source
platform we develop will be made publicly available and will be extensible to ever more
research areas as a greater preponderance of human activities are replicated online.
Additionally, we will create a web service open to the public for monitoring trends, virals,
and suspicious memes. This service could mitigate the diffusion of false and misleading
ideas, detect hate speech and subversive propaganda, and assist in the preservation of
open debate.

“Truthy’s entire premise is false. In the United States, the government has no business entering the
marketplace of ideas to establish an arch of what is false, misleading or a political smear. Nor should
the government be the long arm of Big Brother in the Orwellian sense of the word. Let me
squash what is deemed to be ‘subversive propaganda.’

Instead, the merits of a viewpoint should be determined by the public through robust debate. I had
thought we had learned these lessons long ago.”

“While the Science Committee has recently looked into a number of other questionable NSF grants, this one appears to be worse than a simple misuse of public funds. The NSF is out of touch and out of control. The Science Committee is investigating how this grant came to be awarded taxpayer dollars. The NSF must be held accountable for its funding decisions.”
Government funding of this project is not only a waste during a time of budgetary constraints, it is also a danger to free society better suited for a George Orwell book than a country founded on the idea of liberty.

We do not believe this work represents a threat to free speech or a suppression of any type of speech over the internet. The tools developed in the course of this research are capable of making no political judgements, no prognostications, and no editorial comments, nor do they provide any capability for exerting any control over the Twitter stream they analyze. The work is not a database tracking hate speech, or even defining it. It simply visualizes the patterns of flow of publicly available information in the Twitter stream.

We ask that as you exercise your oversight responsibilities over the National Science Foundation, which funded much of this research, you call on subject-matter experts to help guide your investigation and not let media mischaracterizations of the work color your effort.
REACTION

While some have argued that Truthy could be used to better understand things like disaster communication or to assist law enforcement, instead it appears Truthy focused on examples of ‘false and misleading ideas, hate speech, and subversive propaganda’ communicated by conservative groups.

Letter to NSF Director France Cordova - November 10, 2014
Rep. Lamar Smith (R-TX), Chairman
House Committee on Science, Space and Technology

NOT MUCH HAPPENED

• No hearings or further requests for info
• No requests for subject-matter expertise
• Smith requested info on 13 additional grants (up to ~70 now), including 1 CISE funded grant on malware detection

THINGS TO KEEP IN MIND WHEN COMMUNICATING ABOUT RESEARCH

• Congress has a legitimate oversight responsibility and Members take seriously their stewardship of tax dollars spent on research.
• Attention is heightened because the pressure to cut discretionary spending is so high.
• Members of Congress are acutely aware of zero-sum nature of Federal appropriations.
• There is a serious lack of subject-matter expertise on some key committees.

SO WHAT DO YOU DO IF YOU HAVE RESEARCH IN THOSE AREAS?

• Don’t be cute. Try not to trivialize your work. Emphasize the problem you’re investigating and the new knowledge to be gained.
• Explain why the topic area you’re exploring is the most appropriate one for the problem you’re trying to solve.
• Remember, you’re not spending Federal money — you’re spending taxpayer money. You need to be able to explain your work to your neighbors as if you just took 30 percent of their paychecks to pay for it.
THANKS!

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