Making a Federal Case for Computing

Peter Harsha
Director of Government Affairs, CRA
Views

IT Policy
Making the Case for Computing

Seeking funding for current and future computing initiatives requires both a strong argument and a broad community of supporters.

When it comes to distributing trillions in U.S. taxpayer dollars, funding for science joins a crowded field of special interests where competition for federal funding is fierce. Policymakers are ultimately stewards of taxpayer dollars and must make judgments about the areas in which government has a legitimate reason to invest. And because tax dollars are not limitless, policymakers must prioritize federal investments, deciding which programs or which agencies have the most compelling need for funding.

Consequently, every special interest—from researchers to roadbuilders, health care professionals to hovercraft manufacturers—has an advocacy group urging policymakers to focus federal investment in their particular area. What ties all of these groups together is the need to have a story—a case to make to Congress, the Administration and the American people—that justifies the expenditure of those tax dollars on the things they care about.

Funding Decisions
The stakes are high. Last year (fiscal year 2009), the U.S. discretionary budget—that is, the amount not automatically committed to federal programs like Social Security or Medicare—was just over $1 trillion. Congress spent that money, as it does every year, by parceling it out to federal agencies and programs in 12 separate pieces of legislation. This is quite literally a zero-sum game. Aggregate spending by Congress is capped, and each of these 12 appropriations bills has its own spending cap. This means that once the spending caps are reached—and they always are—any additional increase in spending for one program must be offset by an equal reduction in another program.

As a result, policymakers find the need to invest in fundamental research in competition with the need to fund agricultural subsidies, or the...
Structure of Talk

- Why CRA does policy
- How CRA does policy
- The situation we face
Why does CRA do policy?
Strengthen research and education in the computing fields.
CRA Government Affairs Committee

Fred Schneider, Cornell - Chair

Ed Lazowska, University of Washington, Co-Chair
Jeff Vitter, Texas A&M, Co-Chair

Sarita Adve, University of Illinois, Urbana-Champaign
Annie Antón, North Carolina State University
Wayne Bennett, ECEDHA
George Cybenko, Dartmouth College
Mary Fernández, AT&T Research
James Foley, Georgia Tech
Jeff Hollingsworth, University of Maryland
Mary Jane Irwin, Penn State University
Bob Kahn, CNRI
Sid Karin, UC San Diego
John King, University of Michigan
Dan Reed, Microsoft Research
Bobby Schnabel, Indiana University
Marc Snir, University of Illinois, Urbana-Champaign
Eugene Spafford, Purdue University
Valerie Taylor, TAMU
David Tennenhouse, New Venture Partners
GAC’s Mission

Develop a deeper understanding of policy issues and their impact, and work for informed policies involving computing research and computing technology in general.

• Influence policy related to computing research by improving public and policy maker understanding of the nature and role of such research.

• Increase the computing community's awareness of and participation in policy issues.
Goal

Become 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
• EDUCAUSE
• AAAI, USENIX
• NCWIT
• Industry Groups
Innovation Policy and Maintaining the Health of the Research Ecosystem

• Research Funding and Priorities
• Access to Talent
• Impediments to Research
Stakes are High
$3.49 billion in lobbying expenditures
FY 2010 Budget Request (in billions)

$3,550

Total Budget
FY 2010 Budget Request (in billions)

- Mandatory: $2,184
- Discretionary: $1,368

- Mandatory
- Discretionary
FY 2010 Budget Request (in billions)
Congressional Budget (in billions)

Agriculture
Commerce, Justice, Science
Defense
Energy & Water
Financial Services
Homeland Security

$1,368
$1,223

Transportation/HUD
State/Foreign Operations
Military/Veterans
Labor/HHS/Education
Legislative Branch
Interior & Environment
Congressional Budget (in billions)

- Agriculture
- Commerce, Justice, Science
- Defense
- Energy & Water
- Financial Services
- Homeland Security
- Legislative Branch
- Military/Veterans
- Labor/HHS/Education
- State/Foreign Operations
- Transportation/HUD

$1,368
$1,223
Some Agencies Within the Commerce, Justice, Science Appropriations Bill

- National Science Foundation
- NIST
- NASA
- NOAA
- Census Dept
- Justice Department
So, we have to make a case compelling enough to compete...

...but with a much more limited tool box.
Our success is based on the strength of our story.

Fortunately, we have a pretty good story.
Advances in computing have changed all aspects of our lives...
Conduct commerce...
...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.
There’s a compelling economic case

• 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.
And advances in computing continue unabated...
The history is compelling, but the future opportunities are 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
So why is this a concern for federal policymakers?
Federal research is at the heart of the IT R&D 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
“Tire Tracks” circa 1995

FIGURE 1.2 Government-sponsored computing research and development stimulates creation of innovative ideas and industries. Dates apply to horizontal bars, but not to arrows showing transfer of ideas and people. Table 1.1 is a companion to this figure.
The topics are ordered roughly by increasing date of $1 B industry.

Source: From [6], reprinted with permission from the National Academy of Sciences, courtesy of the National Academies Press, Washington D.C. © 2003.
Essentially every aspect of IT on which we rely today bears the stamp of federal support.
So, we have a pretty compelling story. How do we use it?
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
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, AHPDM
  • We leverage our interactions with the press
We're opportunistic...

- We leverage new media (or try to)

http://cra.org/blog

On Facebook

On Twitter

@CRATweets
We’re opportunistic...

• Try to use events like Snowbird to reach out to our own community and to policymakers
And we’ve had reasonable success.
Where do we stand now?
Good news first...
Science agencies fared OK in FY10 Approps
FY 2010 Funding for Some Key Science Agencies (in millions)

<table>
<thead>
<tr>
<th>Agency</th>
<th>FY 09 Estimate</th>
<th>FY 10 Request</th>
<th>FY 10 Conference</th>
<th>$ change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSF</td>
<td>$4,833</td>
<td>$5,290</td>
<td>$5,188</td>
<td>$356</td>
<td>7.4%</td>
</tr>
<tr>
<td>DOE Sci</td>
<td>$4,326</td>
<td>$4,468</td>
<td>$4,431</td>
<td>$105</td>
<td>2.4%</td>
</tr>
<tr>
<td>Defense</td>
<td>$14,537</td>
<td>$12,263</td>
<td>$14,801</td>
<td>$264</td>
<td>1.8%</td>
</tr>
<tr>
<td>NIST</td>
<td>$550</td>
<td>$637</td>
<td>$603</td>
<td>$53</td>
<td>9.6%</td>
</tr>
<tr>
<td>NIH</td>
<td>$29,747</td>
<td>$30,184</td>
<td>$30,427</td>
<td>$680</td>
<td>2.3%</td>
</tr>
</tbody>
</table>
## FY 2010 Computing Research Accounts at NSF
(in millions)

<table>
<thead>
<tr>
<th></th>
<th>FY 09 Estimate</th>
<th>FY 10 Request</th>
<th>FY 10 Conference</th>
<th>$ change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSF CISE</strong></td>
<td>$574</td>
<td>$633</td>
<td>$620</td>
<td>$47</td>
<td>8.1%</td>
</tr>
<tr>
<td><strong>NSF OCI</strong></td>
<td>$199</td>
<td>$219</td>
<td>$215</td>
<td>$15</td>
<td>7.7%</td>
</tr>
</tbody>
</table>
FY 2010 Computing Research Accounts at DOE Sci (in millions)

<table>
<thead>
<tr>
<th></th>
<th>FY 09 Estimate</th>
<th>FY 10 Request</th>
<th>FY 10 Conference</th>
<th>$ change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOE ASCR</td>
<td>$369</td>
<td>$409</td>
<td>$394</td>
<td>$25</td>
<td>6.8%</td>
</tr>
</tbody>
</table>
## FY 11 Request - Total Research (basic and applied) by agency, in millions

<table>
<thead>
<tr>
<th>Agency</th>
<th>FY 10 Estimate</th>
<th>FY 11 Request</th>
<th>$ change</th>
<th>%change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSF</td>
<td>$4,673</td>
<td>$5,104</td>
<td>$430</td>
<td>9.2%</td>
</tr>
<tr>
<td>DOE</td>
<td>$6,993</td>
<td>$7,731</td>
<td>$738</td>
<td>10.6%</td>
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<tr>
<td>Defense</td>
<td>$6,330</td>
<td>$6,477</td>
<td>$147</td>
<td>2.3%</td>
</tr>
<tr>
<td>NIST</td>
<td>$439</td>
<td>$513</td>
<td>$74</td>
<td>16.9%</td>
</tr>
<tr>
<td>NIH</td>
<td>$30,334</td>
<td>$31,265</td>
<td>$931</td>
<td>3.1%</td>
</tr>
<tr>
<td>Agency</td>
<td>FY 10 Estimate</td>
<td>FY 11 Request</td>
<td>$ change</td>
<td>% change</td>
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<td>----------</td>
</tr>
<tr>
<td>NSF</td>
<td>$1,091</td>
<td>$1,171</td>
<td>$80</td>
<td>7%</td>
</tr>
<tr>
<td>Defense</td>
<td>$1,278</td>
<td>$1,107</td>
<td>-$171</td>
<td>-13%</td>
</tr>
<tr>
<td>HHS</td>
<td>$986</td>
<td>$1,019</td>
<td>$33</td>
<td>3%</td>
</tr>
<tr>
<td>Energy</td>
<td>$495</td>
<td>$524</td>
<td>$29</td>
<td>6%</td>
</tr>
<tr>
<td>Commerce</td>
<td>$104</td>
<td>$119</td>
<td>$15</td>
<td>14%</td>
</tr>
<tr>
<td>NASA</td>
<td>$82</td>
<td>$82</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>EPA</td>
<td>$6</td>
<td>$6</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>NARA</td>
<td>$5</td>
<td>$5</td>
<td>--</td>
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</table>
## Computing Research Accounts at NSF
### FY 11 Request, in millions

<table>
<thead>
<tr>
<th></th>
<th>FY 10 Estimate</th>
<th>FY 11 Request</th>
<th>$ change</th>
<th>%change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSF CISE</td>
<td>$619</td>
<td>$685</td>
<td>$66</td>
<td>10.6%</td>
</tr>
<tr>
<td>NSF OCI</td>
<td>$214</td>
<td>$228</td>
<td>$14</td>
<td>6.4%</td>
</tr>
</tbody>
</table>
### NSF Funding by Directorate
**FY 11 Request, in millions**

<table>
<thead>
<tr>
<th>Directorate</th>
<th>FY 10 Estimate</th>
<th>FY 11 Request</th>
<th>$ change</th>
<th>%change</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO</td>
<td>$715</td>
<td>$768</td>
<td>$53</td>
<td>7.5%</td>
</tr>
<tr>
<td>CISE</td>
<td>$619</td>
<td>$685</td>
<td>$66</td>
<td>10.6%</td>
</tr>
<tr>
<td>ENG (-SBIR/STTR)</td>
<td>$618</td>
<td>$683</td>
<td>$65</td>
<td>10.5%</td>
</tr>
<tr>
<td>GEO</td>
<td>$890</td>
<td>$955</td>
<td>$66</td>
<td>7.4%</td>
</tr>
<tr>
<td>MPS</td>
<td>$1,352</td>
<td>$1,410</td>
<td>$58</td>
<td>4.3%</td>
</tr>
<tr>
<td>SBE</td>
<td>$255</td>
<td>$269</td>
<td>$14</td>
<td>5.3%</td>
</tr>
</tbody>
</table>
• Science, Engineering and Education for Sustainability (SEES) – $29.3 million in CISE; $765 million Foundation-wide

• Cyberlearning for Transforming Education (CTE) – $15 million in CISE; $41 million Foundation-wide

• Also, continued participation in CDI ($50 M) and SEBML ($15 M)

• $70 million bump to Trusted Computing research
## Defense R&D

### FY11 Request, in millions

<table>
<thead>
<tr>
<th></th>
<th>FY 10 Estimate</th>
<th>FY 11 Request</th>
<th>$ change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOD 6.1</td>
<td>$1,830</td>
<td>$1,998</td>
<td>$168</td>
<td>9.2%</td>
</tr>
<tr>
<td>DOD 6.2</td>
<td>$4,500</td>
<td>$4,479</td>
<td>-$21</td>
<td>-0.5%</td>
</tr>
<tr>
<td>DARPA</td>
<td>$2,991</td>
<td>$3,103</td>
<td>$112</td>
<td>3.7%</td>
</tr>
<tr>
<td>Key Accounts at DARPA</td>
<td>FY 11, in millions</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>FY 10 Estimate</td>
<td>FY 11 Request</td>
<td>$ change</td>
<td>%change</td>
</tr>
<tr>
<td>Defense Research Sciences</td>
<td>$206</td>
<td>$328</td>
<td>$122</td>
<td>59.2%</td>
</tr>
<tr>
<td>Math and CS Sciences</td>
<td>$46</td>
<td>$73</td>
<td>$27</td>
<td>58.7%</td>
</tr>
<tr>
<td>Transformative Sciences</td>
<td>--</td>
<td>$53</td>
<td>$53</td>
<td>--</td>
</tr>
<tr>
<td>ICT</td>
<td>$272</td>
<td>$281</td>
<td>$9</td>
<td>3.3%</td>
</tr>
<tr>
<td>Cog Comp</td>
<td>$144</td>
<td>$90</td>
<td>-$54</td>
<td>-37.5%</td>
</tr>
<tr>
<td>Machine Intelligence</td>
<td>--</td>
<td>$44</td>
<td>$44</td>
<td>--</td>
</tr>
</tbody>
</table>
## DOE Office of Science
### Advanced Scientific Computing Research
#### FY 11 request, in millions

<table>
<thead>
<tr>
<th></th>
<th>FY 10 Estimate</th>
<th>FY 11 Request</th>
<th>$ change</th>
<th>%change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCR</td>
<td>$394</td>
<td>$426</td>
<td>$32</td>
<td>8.1%</td>
</tr>
<tr>
<td>ARPA-E</td>
<td>--</td>
<td>$300</td>
<td>$300</td>
<td>--</td>
</tr>
</tbody>
</table>

## DOE NNSA
### FY 11 request, in millions

<table>
<thead>
<tr>
<th></th>
<th>FY 10 Estimate</th>
<th>FY 11 Request</th>
<th>$ change</th>
<th>%change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adv. Sim and Computing</td>
<td>$568</td>
<td>$616</td>
<td>$48</td>
<td>8.5%</td>
</tr>
</tbody>
</table>
Congress seems inclined to continue “doubling” trajectory

House Commerce, Justice, Science markup provided NSF with its requested increase (with a little change)

House Energy & Water mark also looks good (but a long way to go)
But there are some looming clouds
House and Senate Defense Authorization
Election-year politics is making a mess of the calculus
President Obama's Job Approval
Congressional Approval

Congressional Approval
(Gallup Tracking Poll)

![Graph showing congressional approval over time, with a line for approval and a line for disapproval. The graph illustrates fluctuations in approval and disapproval rates from January 2009 to February 2010.](image-url)
Generic House Ballot

2010 National Congressional Ballot
Latest Poll: 07/14/2010

Republican (43.9%)  Democrat (42.7%)
GOP smells blood.

Votes that should be slam dunks, aren’t.
AN ACT

To invest in innovation through research and development, to improve the competitiveness of the United States, and for other purposes.

1. Be it enacted by the Senate and House of Representa-
2. tives of the United States of America in Congress assembled,
Reauthorization goes a bit beyond the original bill:

- Authorization increases from 3 to 5 years
- Includes NITRD and NNI bills
- Includes new programs to bolster Industrial Innovation
- Rate of increase “steeper”
“I remain committed to the underlying goals of the America COMPETES Act and believe that we should continue to prioritize investments in basic research and science, technology, engineering, and mathematics (STEM) education. However, this bill spends too much money and goes far beyond the original intent and scope of the COMPETES legislation.”

-Rep. Ralph Hall (R-TX), Ranking Member, House S&T Committee
January 2009

Porn among National Science Foundation Researchers

By Jordan Lite

Investigative report by The Washington Post reveals porn surfing by employees has been rampant at the National Science Foundation, a government agency that received $2.1 billion in taxpayer funding in 2008.

Documents into employee misconduct, which involved workers looking at x-rated government computers, grew sixfold last year.

Misconduct cases at the NSF, at least 22 in the past year, involved employees viewing online porn, naked pictures, and violent images.

The scandal at the foundation was found at least 331 days looking at porn for naked or scantily-clad women.

When confronted, he tried a charitable act:

The ranking member of the Senate Finance Committee launched an inquiry Tuesday into reports that National Science Foundation officials are using government computers to view pornographic Web sites during working hours.

In a letter sent to the NSF's inspector general Tuesday, Chuck Grassley requested access to all documents related to the "numerous reports," and seven investigations into "Abuse of NSF IT Resources" - which are referenced in the agency's 96-page semi-annual report.

In one instance, the report cites an NSF "senior official" who allegedly spent 20 percent of his work hours viewing sexually explicit Web sites - amounting to a potential loss of $58,000 in employee compensation.

Grassley has asked the NSF to disclose all "specific reports of investigations, audit reports, evaluations and information supporting the examination of the NSF network drive" by Thursday to "ensure that NSF
Hall crafts “Motion to Recommit With Instructions”

• Eliminates “duplicative” programs
• Reduces authorization to 3 years
• Freezes agency budgets unless “budget is balanced”
• Adds some veterans benefit language
• Prohibits agencies from paying the salaries of any federal workers disciplined for viewing pornography on federal computers
Do you believe a few days suspension is “good enough” for federal workers who waste taxpayer dollars looking at pornography on the job?

Congressman Cole does.

Vote John Doe in November!

House Vote 993, on HR 5116
“Every body raise your hand that’s for pornography. Come on, raise your hand. Nobody? Nobody is for pornography? Well, I’m shocked. So I guess we need this little bitty provision that means nothing. That’s going to gut the entire bill. This is an embarrassment, and if you vote for this, you should be embarrassed.”

-Rep. Bart Gordon (D-TN), Chair of the House Science and Technology Committee and sponsor of H.R. 5116
Gordon’s Revenge

• Reintroduces COMPETES a few days later with minor changes (including anti-porn language), calls it a “Jobs Bill”
• Wants to force Republicans to be “anti-Jobs”
• Uses “Suspension of the Rules,” loses vote (expectedly)
• Berates Republicans for killing U.S. jobs
Gordon’s Revenge

- Reintroduces the original COMPETES Reauthorization
- Brings up the Motion to Recommit
- Asks the Chair to “Divide the Question”
- Dems defeat all the controversial measures, pass the anti-porn language
- COMPETES Reauthorization finally passes
On to the Senate for COMPETES
What happens next?

• Appropriations won’t get done in regular order
• Headed for a Continuing Resolution
• Likely resolved with an Omnibus – When?
Turnover among some key Members

Vern Ehlers (R-MI)
Bart Gordon (D-TN)
David Obey (D-WI)
Brian Baird (D-WA)
Bob Inglis (R-SC)
Alan Mollohan (D-WV)
Long term forecast
Nation Demands Tax Dollars Only Be Wasted On Stuff That's Awesome

WASHINGTON — Acknowledging that the outrageous misappropriation of public funds is inevitable, an estimated 500,000 Americans gathered in the nation's capital Sunday to demand their misused tax dollars at least be squandered on something really awesome that everyone can enjoy.

Protestors from every state in the union voiced concerns that the federal government is misusing its wasteful spending on special interests, bloated no-bid contracts, and other
Growth in Mandatory Spending vs. Discretionary

- Discretionary
- Mandatory
- Net Interest


Discretionary Spending
Mandatory Spending
Net Interest
The situation was competitive when deficits were in the billions...
Without a strong case and support from a broad community—industry, higher education, scientific societies—research funding and the innovations it enables will face a chilly reception among policymakers.
What else are we looking to do?

• Improve opportunities at other mission agencies
• Improve the pathway to funded initiatives
• Make sure the community is represented on advisory boards and in national initiatives
• Continue to support our partners
We’re looking for your help, too.

(you knew that was coming)
Join the Computing Research Advocacy Network (CRAN)

http://www.cra.org/govaffairs/advocacy/cran/

Get “Action Alerts” and updates from CRA staff so you don’t miss important opportunities to speak out on behalf of computing research
A Proposal:

Congressional Visits Day Fly-in
Computer Science
EDUCATION WEEK
csedweek.org
With your help, we'll continue to make the case for computing research wherever we can.
Thanks!

email: harsha@cra.org
twitter: @peterharsha
facebook: http://facebook.com/peter.harsha
blog: http://cra.org/blog
CRA Twitter: @CRATweets

phone: 202.556.4335