Welcome to
STEM on the Hill™
Congressional Visits Day 2015

Speaker Bios & Materials
for the
Orientation Session at the
Capitol Visitor's Center Auditorium

Tuesday
March 17, 2015
1:30 - 3:45 p.m.
Who I Am | Congressman Mike Honda

Who I Am

Overview

U.S. Congressman Michael Honda represents the 17th Congressional District of California and has served in the U.S. House of Representatives for over twelve years. In Congress, Rep. Honda is a member of the powerful House Appropriations Committee, Chair Emeritus of the Congressional Asian Pacific American Caucus, Co-chair of the Democratic Caucus’ New Media Working Group, and House Democratic Senior Whip.

Mike’s district includes Silicon Valley, the birthplace of technology innovation and now the country’s leading developer of green technology. Mike has dedicated his life to public service and is lauded for his work on education, civil rights, national service, immigration, transportation, the environment, and high-tech issues.

Serving as a California State Assemblymember, Santa Clara County Board Supervisor, San Jose Planning Commissioner, San Jose Unified School Board Member, Peace Corps Volunteer in El Salvador, and with over 30 years in education as a teacher, principal and school board member, Mike’s commitment to serving the people of California’s 17th district is unwavering and unparalleled.
The 2016 Budget: Investing in America’s Future

Kei Koizumi
Assistant Director for Federal R&D,
White House Office of Science & Technology Policy

“Twenty-first century businesses will rely on American science and technology, research and development.”
- President Barack Obama
January 20, 2015
The 2016 Budget:

- Continues our commitment to world-class science and research
- Invests in innovation
- Improves Americans’ health
- Makes America a magnet for jobs
- Invests in homegrown clean energy
- Takes action on climate change
- Prepares students with STEM skills

Continuing our commitment to world-class science and research

- $68.8 billion for non-defense R&D.
- $76.9 billion for defense R&D.
- $66.9 billion for (basic and applied) research.
- $7.7 billion for the National Science Foundation (NSF).
- $5.3 billion for the Department of Energy (DOE) Office of Science.
- $755 million for the National Institute of Standards and Technology (NIST) laboratories.
- $18.5 billion for NASA.
- $550 million for U.S. Department of Agriculture competitive grants, including $450 million for competitively-awarded extramural research grants.
Investing in Innovation for National Security

- $12.3 billion for DOD’s Science & Technology (S&T) program of basic research, applied research, and advanced technology development.
- $3.0 billion for the Defense Advanced Research Projects Agency (DARPA) to maintain DOD’s critical role in fostering breakthrough approaches for discovering promising technologies.
- The Budget invests in defense-related S&T across a diverse portfolio, including advanced manufacturing, energy, cybersecurity, robotics, a safe and secure nuclear arsenal, explosives detection, and biodefense.
- The Budget includes $243 million for civilian R&D to support innovative cybersecurity technologies.
Investing in Innovation for Industries of the Future

“So no one knows for certain which industries will generate the jobs of the future. But we do know we want them here in America. We know that.”

- President Barack Obama
January 20, 2015

- The Budget provides strong support for R&D that is likely to create the foundations for the industries and jobs of the future. Examples include robotics, cyber-physical systems, big data, the Materials Genome Initiative, the National Nanotechnology Initiative, and engineering biology.

- $1.5 billion for the National Nanotechnology Initiative.

- The Budget expands our capabilities in the space industries of the future: $1.2 billion for the Commercial Crew program, $725 million for Space Technology, and $230 million for Advanced Exploration Systems to increase the capabilities of NASA, other government, and commercial space activities.

“I want the country that eliminated polio and mapped the human genome to lead a new era of medicine -- one that delivers the right treatment at the right time. In some patients with cystic fibrosis, this approach has reversed a disease once thought unstoppable. So tonight, I’m launching a new Precision Medicine Initiative to bring us closer to curing diseases like cancer and diabetes, and to give all of us access to the personalized information we need to keep ourselves and our families healthier. We can do this.”

- President Barack Obama
January 20, 2015
Improving Americans’ health through innovation in life sciences, biology, and neuroscience

- The 2016 Budget provides $215 million to launch a Precision Medicine Initiative with funding from HHS agencies.
- The BRAIN Initiative will continue with a Federal commitment of over $300 million from NIH, DARPA, and NSF.
- The 2016 Budget provides over $1.2 billion for a government-wide effort to combat antibiotic-resistant bacteria.
- $31.3 billion for the National Institutes of Health (NIH) to support high-quality, innovative biomedical research.
- The Budget provides $82 million at USGS, EPA, and USDA to address pollinator health, including colony collapse disorder.

“Manufacturing is actually growing faster than the rest of the economy... And the question is, how do we keep that progress going? How do we build on it? That’s why we’re working to grow the jobs of tomorrow through a national network of manufacturing hubs.”

- President Barack Obama
  January 9, 2015
Energy R&D Highlights in the 2016 Budget
Investing in homegrown clean energy

Clean Energy Technology
• The Budget provides $7.4 billion for clean energy technology programs across the Federal government.

Hydraulic Fracturing
• $2.7 billion for DOE, Energy Efficiency and Renewable Energy (EERE) and $325 million for ARPA-E.

Carbon Capture and Storage
• $47 million for DOE, EPA, and USGS for research to reduce health and environmental impacts from hydraulic fracturing.

• Nearly $500 million in cleaner energy from fossil fuels, focused predominantly on development and deployment of carbon capture and storage technologies.

• The Budget proposes a $2 billion carbon capture investment and sequestration tax credit.
“And the best scientists in the world are all telling us that our activities are changing the climate, and if we don’t act forcefully, we’ll continue to see rising oceans, longer, hotter heat waves, dangerous droughts and floods, and massive disruptions that can trigger greater migration and conflict and hunger around the globe. The Pentagon says that climate change poses immediate risks to our national security. We should act like it.”

- President Barack Obama

January 20, 2015
Taking action on climate change in the 2016 Budget

- $2.7 billion for the U.S. Global Change Research Program (USGCRP).
- USGCRP supports research to improve our ability to understand, assess, predict, and respond to global change.
- The 2016 Budget supports an integrated suite of climate change observations, process-based research, modeling, sustained assessment, adaptation science activities, and climate preparedness and resilience strategies.
- USGCRP investments support the President’s Climate Action Plan.
- The President’s Budget provides $20 million to continue expanding and improving enhance and improve the recently-released Climate Resilience Toolkit.

Preparing students with STEM skills

- $3 billion for Federal science, technology, engineering, and mathematics (STEM) education programs in the 2016 Budget.
- Agencies will coordinate to implement the Federal STEM Education 5-Year Strategic Plan.
- $202 million for an expanded Department of Education Math and Science Partnerships program.
- NSF has a $135 million effort to improve retention of undergraduate STEM majors and improve undergraduate teaching and learning in STEM subjects.
- $338 million in NSF for the Graduate Research Fellowship program.
- The Budget establishes a Dept. of Education $125 million competitive program to help communities across America launch Next-Generation High Schools that will be laboratories for cutting-edge STEM teaching and learning.
“Fifteen years into this new century, we have picked ourselves up, dusted ourselves off, and begun again the work of remaking America. We have laid a new foundation. A brighter future is ours to write. Let’s begin this new chapter together -- and let’s start the work right now.”

- President Barack Obama
January 20, 2015

THANK YOU

www.whitehouse.gov/ostp
@whitehouseostp
Kei Koizumi is Assistant Director for Federal Research and Development at the White House Office of Science and Technology Policy (OSTP).

He is known as a leading authority on federal science and technology funding and budget issues, and works on Federal R&D budgets, appropriations, and policies for OSTP.

Before joining OSTP, he served as the Director of the R&D Budget and Policy Program at the American Association for the Advancement of Science (AAAS). While at AAAS, he became a frequent speaker to public groups and to the press. He was the principal budget analyst, editor, and writer for AAAS reports on federal R&D and has addressed the Congressional Visits Day Program on many occasions over the years.

He received his M.A. from the Center for International Science, Technology, and Public Policy program at George Washington University, and received his B.A. in Political Science and Economics from Boston University. He is a Fellow of the American Association for the Advancement of Science.
Bart Gordon
Partner

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Public Policy and Law

Secondary Practices
Energy
Global Government Solutions
Higher Education Institutions
Telecom, Media and Technology

Education
- J.D., University of Tennessee College of Law, 1973
- B.A., Middle Tennessee State University, 1971, (with honors)

Admissions
- Bar of District of Columbia
- Bar of Tennessee

Mr. Gordon joined K&L Gates as partner in the Washington, D.C. office after 26 years representing the state of Tennessee in the United States House of Representatives. Mr. Gordon served as Chairman of the House Committee on Science and Technology from 2007 to 2010. Mr. Gordon was also a senior member of the House Committee on Energy and Commerce, and served on the House Committee on Financial Services and the House Committee on Rules, Transatlantic Parliamentary Dialogue, and NATO Parliamentary Assembly.

Mr. Gordon is a member of the Tennessee bar and the District of Columbia bar.
The FY 2016 R&D Budget: Review and Context

Matt Hourihan
March 17, 2015
for the Science, Engineering, and Technology Congressional Visits Day

AAAS R&D Budget and Policy Program
http://www.aaas.org/spp/rd

Source: AAAS analyses of historical budget and appropriations data. Pre-1994 figures are NSF obligations data from the Federal Funds survey. FY 2015 is the President’s request. R&D includes contract and facilities. © 2015 AAAS
Federal R&D in the Budget and the Economy
Outlays as share of total, 1967 - 2016

R&D as a Share of the Federal Budget (Left Scale)  R&D as a Share of GDP (Right Scale)

Source: Budget of the United States Government, FY 2018 by 2016 is the President's request. © 2015 AAAS

R&D as a Share of GDP by Funder

Source: National Science Foundation, National Patterns of R&D Resources. © 2015 AAAS

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Limits on Discretionary Spending Since FY 2010
billions of constant 2015 dollars

Based on past budget resolutions, the Budget Control Act, and subsequent legislation. Adjusted for inflation using deflators from the FY 16 budget request. © AAAS 2015
### Agency Notes

- **NSF: Total Budget:** +5.2%
  - Highest relative changes: social sciences, engineering; other disciplines and STEM Education programs also boosted
- **Defense S&T flat:** 8.3% cut to basic research
- **Energy:** Large increases, again, for renewable and energy efficiency technology offices, ARPA-E
- **DOE Office of Science:** +5.4%
  - EFRCs, Hubs, advanced computing; Fusion research down

### Current Estimates of R&D in the FY16 Budget

<table>
<thead>
<tr>
<th>Agency</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAA</td>
<td>+10.9%</td>
</tr>
<tr>
<td>NIST</td>
<td>+9.8%</td>
</tr>
<tr>
<td>Transportation</td>
<td>+3.9%</td>
</tr>
<tr>
<td>DOE Energy Programs</td>
<td>+10.7%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>+13.0%</td>
</tr>
<tr>
<td>US Geological Survey</td>
<td>+10.7%</td>
</tr>
<tr>
<td>DOD Other</td>
<td>+11.2%</td>
</tr>
<tr>
<td>Veterans Affairs</td>
<td>+8.9%</td>
</tr>
<tr>
<td>National Science Foundation</td>
<td>+6.3%</td>
</tr>
<tr>
<td>DOE Science</td>
<td>+11.5%</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>+9.9%</td>
</tr>
<tr>
<td>Environ Protection Agency</td>
<td>+7.1%</td>
</tr>
<tr>
<td>NASA</td>
<td>+12.5%</td>
</tr>
<tr>
<td>DOE Defense</td>
<td>+10.2%</td>
</tr>
<tr>
<td>DOD S&amp;T</td>
<td>+10.9%</td>
</tr>
<tr>
<td>Homeland Security</td>
<td>+11.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>+10.5%</td>
</tr>
</tbody>
</table>

*Based on AAAS analyses of OMB, OSTP and agency budget data. The above adjusts for inflation, expected at 1.6 percent. AAAS | Feb. 6, 2015*
Agency Notes (Cont.)

- NIH: $1 billion program increase (+3.3%)
  - Priorities: Alzheimer’s research, translational science
  - New priorities: Antibiotic Resistance, Precision Medicine
  - Success rate: 19.3%
- Familiar contours for NASA: gains for technology office, Earth Science, little else
- USDA: extramural research activities, intramural facilities
- Climate research @ USGS, NOAA prioritized
- A trim for DHS science & technology

Looking ahead...

- Size and composition of the discretionary budget? Can R&D stay ahead of the curve?

- Deficits have fallen, but big-picture fiscal challenges remain largely unchanged
  - Debt limit, entitlement growth
  - Reconciliation strategy?
Trends in Federal Spending Since FY 2010

Thanks!

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202-326-6607
http://www.aaas.org/program/rd-budget-and-policy-program
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mhouriha(at)aaas.org
+1 202-326-6607

Matt Hourihan joined AAAS as director of the R&D Budget and Policy Program in December 2011. Prior to joining AAAS, he served as a clean energy policy analyst at the Information Technology & Innovation Foundation (ITIF).

Previously, he served as Jan Schori Fellow at the Business Council for Sustainable Energy, a coalition of energy firms and utilities working to engage policymakers for market-based solutions to sustainable energy development and climate change.

He holds a masters degree in public policy with a focus on science and technology policy from George Mason University, and a B.A. in journalism from Ithaca College.

Contributions

"Dead on Arrival?" - an Analysis of the US FY2014 R&D Budget Request (August 14, 2013)
Sequestration and US Science Budgets (October 11, 2012)
STEM on the Hill™ CVD 2015
Congressional Orientation

Everything you will EVER need to know in 15 minutes
By
Sean Gallagher

Agenda

• 3 P’s
• Why You Are Here
• Your Message
• Q&A
The 3 P’s

- Be Prepared
- Be Punctual
- Be Precise

Scar Says

Be Prepared!

This is the most critical of the 3 P’s
On Being Prepared

- Research your fact sheets
- Go over scripts
- Designate point person(s)
- Prep for 5, 15 or 30 minute meeting
- Know what to expect: Age, location, environment.
- Ask for business card, and FOLLOW UP!

Be Punctual

- This gets its own slide cause it is that important
- Credibility once lost is hard to regain
- Show up early, and know in advance how long it will take you to get from meeting to meeting
Helpful Tips

• The buildings are connected underground

• Allow at least 20 minutes to get between the House and Senate side.

• Capitol Police are very helpful, and located everywhere

• If you have a lot of meetings, wear comfortable shoes

Be Precise

• Less is more when messaging - stick to the issues at hand

• Don’t lecture and don’t monopolize time - you want this to be a two way conversation

• If you don’t know it, don’t fudge it

• No negativity on other members, priorities, etc. - Stay on message
If Legislator is Supportive...

- Thank them and be a resource.

- Encourage them to move from being a supporter to a champion of your cause. Ask them if they will write a guest column, speak at a public event, or any other action that will support your position.

If Legislator is Undecided...

- Seek to understand their reservations and continue to educate them about your side of the issue.

- If they request additional information, provide it to them in a timely manner. Make sure the staff of your organization is aware of any action items.

- Think about their supporters and which ones you could try to mobilize on your behalf.
So Why Hold a CVD?

- Because of these numbers: 13, 58, and 23
- 13 new senators, 58 new house members, and only 23 total have PhDs
- 20 have no education beyond a high school diploma
- With such little STEM literacy, it is you to make your voices heard

Just for Fun

- 108 Women in Congress
- The average length of service is 8.8 years in House; for Senators, 9.7 years
- 95% of Senate is white while 27% of House are in minority groups, making this most diverse congress ever.
- Average age - House: 57 yrs Senate : 61 yrs
- one physicist, one microbiologist, one chemist, and eight engineers
- 159 Members of the House (36% of the House) and 54 Senators hold law degrees
Message

- Message is to show how important our fields are to the economy and to the lives every single American - placing a direct value on our spending
- We need predictable, sustainable funding for R&D
- Erratic and/or slashed funding will forfeits jobs, America’s leadership, and disrupt the innovation ecosystem

Importance of Congressional Visits

- 3 main factors that influence a member of Congress
- “All politics is local”: Members of Congress are concerned about what their constituents think, and how potential legislation will affect their districts
- The main purpose of Congressional visits is relationship building for you and your professional organization.
- They should not be one-shot meetings.
- Remember, staff members are your friends!
Quick Review

- Be Prepared, Punctual, and Precise.
- Go over message and designate speakers
- Be positive
- Follow up

Inspiration

- "OK, you've convinced me. Now go out and put pressure on me." Franklin D. Roosevelt
- Get excited, get motivated, and get ready!
- Questions?
Sean recently joined AAAS as a Senior Government Relations Officer after spending 7 years on Capitol Hill.

He has been a legislative aide to five Members of Congress, helping represent districts in Pennsylvania, New York, Virginia, California, and most recently was a policy advisor to Representative Rush Holt from central New Jersey. Sean served as Rush’s science and technology advisor, and also has experience in military and veterans affairs as well health care reform.

Sean has a Master’s Degree in Social and Public Policy from Georgetown University but would like to stress that the most important thing is — he went to Villanova University for his undergraduate degree and you should pick them as the winner for the NCAA tournament.
The U.S. population is becoming more diverse each year. By 2050, URMs will represent more than 40 percent of the population, and there will be no majority race. The demand for qualified STEM professionals is high, but the supply of STEM workers to fill these positions is at risk if underrepresented groups are not engaged in these fields. The figures below show that African Americans, Latinos, American Indians, Alaska Natives, and women are underrepresented in all levels of engineering education and in the engineering workforce.

Figure 5: African Americans in Engineering

Figure 6: American Indian/Alaska Natives in Engineering

Figure 7: Latinos in Engineering

Figure 8: Women in Engineering

Endnotes
Increasing the number of Underrepresented Minorities (URMs) in the U.S. STEM workforce would solve many of the skills gaps that confront our economy. Ethnic and gender disparities in STEM academic achievement carry over into lower participation by many URMs in high-paying STEM jobs. Selected data provided by the National Action Council for Minorities in Engineering, Inc. (NACME) help illustrate the challenge. For more information on URMs in engineering education and engineering careers, visit www.nacme.org/research-publications.

**Figure 1:** Changing Demographics of the U.S.  
![Fig 1](image1)

**Figure 2:** Percentage of Public and Private High School Graduates Taking Calculus Courses in High School,  
![Fig 2](image2)

**Figure 3:** Percentage of Students Meeting ACT College Readiness Benchmark Scores, 2014  
![Fig 3](image3)

**Figure 4:** Engineering Bachelor's Degrees Earned, 1977-2013  
![Fig 4](image4)

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**Endnotes**

Christopher Smith currently serves as the Director of Research and Program Evaluation at the National Action Council for Minorities in Engineering, Inc. (NACME), where he reports on trends in engineering education and policy, and measures the impact of NACME programs.

Previously, he worked as the Program Director of Evaluation Services at The After-School Corporation (TASC), where he evaluated after-school programs that were funded through 21st Century Community Learning Center grants, and evaluated TASC-developed program models.

He has previously served as the Newsletter Editor and Membership Director for the American Educational Research Association’s Out-of-School Time Special Interest Group. He is currently a doctoral candidate in Fordham University’s Applied Developmental Psychology program.
### California's STEM Profile 2015 - 2024

#### Top 40 STEM Jobs in California

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<tbody>
<tr>
<td>1</td>
<td>13-2011</td>
<td>Accountants and Auditors</td>
<td>217,235</td>
<td>328,585</td>
<td>1,05,350</td>
<td>49%</td>
<td>$33.65</td>
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<td>2</td>
<td>11-9199</td>
<td>Managers, All Other</td>
<td>207,938</td>
<td>235,014</td>
<td>27,076</td>
<td>13%</td>
<td>$25.47</td>
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<td>3</td>
<td>25-1099</td>
<td>Postsecondary Teachers</td>
<td>155,727</td>
<td>181,961</td>
<td>26,234</td>
<td>17%</td>
<td>$37.51</td>
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<td>4</td>
<td>13-1199</td>
<td>Business Operations Specialists, All Other</td>
<td>147,204</td>
<td>161,900</td>
<td>14,696</td>
<td>10%</td>
<td>$37.72</td>
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<td>5</td>
<td>35-1012</td>
<td>First-Line Supervisors of Food Prep. &amp; Serving Workers</td>
<td>130,172</td>
<td>154,409</td>
<td>24,237</td>
<td>19%</td>
<td>$14.98</td>
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<tr>
<td>6</td>
<td>49-3023</td>
<td>Automotive Service Technicians and Mechanics</td>
<td>87,755</td>
<td>103,243</td>
<td>15,488</td>
<td>18%</td>
<td>$37.79</td>
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<td>7</td>
<td>27-1024</td>
<td>Graphic Designers</td>
<td>71,410</td>
<td>75,540</td>
<td>4,130</td>
<td>6%</td>
<td>$21.88</td>
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<td>8</td>
<td>11-3021</td>
<td>Computer and Information Systems Managers</td>
<td>59,962</td>
<td>62,913</td>
<td>2,951</td>
<td>5%</td>
<td>$71.00</td>
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<tr>
<td>9</td>
<td>19-3031</td>
<td>Clinical, Counseling, and School Psychologists</td>
<td>53,650</td>
<td>60,604</td>
<td>6,954</td>
<td>13%</td>
<td>$34.04</td>
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<td>10</td>
<td>11-9021</td>
<td>Construction Managers</td>
<td>52,538</td>
<td>52,639</td>
<td>101</td>
<td>0%</td>
<td>$33.15</td>
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<td>11</td>
<td>17-2051</td>
<td>Civil Engineers</td>
<td>45,500</td>
<td>56,014</td>
<td>10,514</td>
<td>23%</td>
<td>$34.09</td>
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<td>12</td>
<td>35-2012</td>
<td>Cooks, Institution and Cafeteria</td>
<td>36,904</td>
<td>41,450</td>
<td>4,546</td>
<td>12%</td>
<td>$14.98</td>
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<td>13</td>
<td>17-2072</td>
<td>Electronics Engineers, Except Computer</td>
<td>34,322</td>
<td>36,474</td>
<td>2,152</td>
<td>6%</td>
<td>$52.59</td>
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<td>14</td>
<td>11-9041</td>
<td>Architectural and Engineering Managers</td>
<td>32,890</td>
<td>36,126</td>
<td>3,236</td>
<td>10%</td>
<td>$77.92</td>
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<td>15</td>
<td>13-2099</td>
<td>Financial Specialists, All Other</td>
<td>30,827</td>
<td>35,485</td>
<td>4,658</td>
<td>15%</td>
<td>$29.88</td>
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<td>16</td>
<td>13-1051</td>
<td>Cost Estimators</td>
<td>29,035</td>
<td>34,757</td>
<td>5,722</td>
<td>20%</td>
<td>$32.10</td>
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<td>17</td>
<td>13-1041</td>
<td>Compliance Officers</td>
<td>30,715</td>
<td>34,623</td>
<td>3,908</td>
<td>13%</td>
<td>$36.24</td>
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<td>18</td>
<td>19-1042</td>
<td>Medical Scientists, Except Epidemiologists</td>
<td>28,032</td>
<td>31,263</td>
<td>3,231</td>
<td>12%</td>
<td>$48.41</td>
</tr>
<tr>
<td>19</td>
<td>17-2141</td>
<td>Mechanical Engineers</td>
<td>26,455</td>
<td>29,215</td>
<td>2,760</td>
<td>10%</td>
<td>$46.04</td>
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<td>20</td>
<td>17-2061</td>
<td>Computer Hardware Engineers</td>
<td>24,831</td>
<td>27,588</td>
<td>2,757</td>
<td>11%</td>
<td>$54.80</td>
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<td>21</td>
<td>17-2071</td>
<td>Electrical Engineers</td>
<td>24,680</td>
<td>27,142</td>
<td>2,462</td>
<td>10%</td>
<td>$53.18</td>
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<td>22</td>
<td>17-2112</td>
<td>Industrial Engineers</td>
<td>24,621</td>
<td>27,127</td>
<td>2,506</td>
<td>10%</td>
<td>$49.01</td>
</tr>
<tr>
<td>23</td>
<td>17-2199</td>
<td>Engineers, All Other</td>
<td>23,946</td>
<td>25,797</td>
<td>1,851</td>
<td>8%</td>
<td>$43.33</td>
</tr>
<tr>
<td>24</td>
<td>17-3023</td>
<td>Electrical and Electronics Engineering Technicians</td>
<td>21,976</td>
<td>23,891</td>
<td>1,915</td>
<td>9%</td>
<td>$30.17</td>
</tr>
<tr>
<td>25</td>
<td>17-1011</td>
<td>Architects, Except Landscape and Naval</td>
<td>22,233</td>
<td>23,785</td>
<td>1,552</td>
<td>7%</td>
<td>$32.86</td>
</tr>
<tr>
<td>26</td>
<td>11-3051</td>
<td>Industrial Production Managers</td>
<td>19,970</td>
<td>21,083</td>
<td>1,113</td>
<td>6%</td>
<td>$49.74</td>
</tr>
<tr>
<td>27</td>
<td>17-2041</td>
<td>Environmental Scientists &amp; Specialists, Including Health</td>
<td>17,200</td>
<td>19,675</td>
<td>2,475</td>
<td>14%</td>
<td>$39.18</td>
</tr>
<tr>
<td>28</td>
<td>17-2011</td>
<td>Aerospace Engineers</td>
<td>16,113</td>
<td>17,631</td>
<td>1,518</td>
<td>9%</td>
<td>$53.60</td>
</tr>
<tr>
<td>29</td>
<td>19-2031</td>
<td>Chemists</td>
<td>13,928</td>
<td>15,655</td>
<td>1,727</td>
<td>13%</td>
<td>$38.47</td>
</tr>
<tr>
<td>30</td>
<td>49-3011</td>
<td>Aircraft Mechanics and Service Technicians</td>
<td>14,085</td>
<td>15,273</td>
<td>1,188</td>
<td>8%</td>
<td>$29.40</td>
</tr>
<tr>
<td>31</td>
<td>17-3011</td>
<td>Architectural and Civil Drafters</td>
<td>13,061</td>
<td>15,038</td>
<td>2,977</td>
<td>20%</td>
<td>$26.69</td>
</tr>
<tr>
<td>32</td>
<td>51-3092</td>
<td>Food Batchmakers</td>
<td>13,271</td>
<td>14,244</td>
<td>973</td>
<td>7%</td>
<td>$13.26</td>
</tr>
<tr>
<td>33</td>
<td>29-1031</td>
<td>Dietitians and Nutritionists</td>
<td>11,818</td>
<td>13,521</td>
<td>1,703</td>
<td>15%</td>
<td>$33.21</td>
</tr>
<tr>
<td>34</td>
<td>19-4021</td>
<td>Biological Technicians</td>
<td>11,630</td>
<td>13,361</td>
<td>1,731</td>
<td>15%</td>
<td>$21.70</td>
</tr>
<tr>
<td>35</td>
<td>11-9011</td>
<td>Natural Sciences Managers</td>
<td>9,705</td>
<td>10,697</td>
<td>992</td>
<td>10%</td>
<td>$79.01</td>
</tr>
<tr>
<td>36</td>
<td>15-2031</td>
<td>Operations Research Analysts</td>
<td>8,416</td>
<td>10,530</td>
<td>2,114</td>
<td>25%</td>
<td>$44.69</td>
</tr>
<tr>
<td>37</td>
<td>19-4099</td>
<td>Life, Physical, and Social Science Technicians, All Other</td>
<td>8,957</td>
<td>10,146</td>
<td>1,189</td>
<td>13%</td>
<td>$24.58</td>
</tr>
<tr>
<td>38</td>
<td>17-3029</td>
<td>Engineering Technicians, Except Drafters, All Other</td>
<td>9,485</td>
<td>10,450</td>
<td>965</td>
<td>10%</td>
<td>$30.78</td>
</tr>
<tr>
<td>39</td>
<td>19-3039</td>
<td>Psychologists, All Other</td>
<td>8,156</td>
<td>9,259</td>
<td>1,103</td>
<td>14%</td>
<td>$38.55</td>
</tr>
<tr>
<td>40</td>
<td>17-2081</td>
<td>Environmental Engineers</td>
<td>7,810</td>
<td>9,095</td>
<td>1,285</td>
<td>16%</td>
<td>$46.48</td>
</tr>
</tbody>
</table>

8. Source: ASTRA’s Global STEM & Innovation Data Project and EMSI occupation employment data are based on final EMSI industry data and final EMSI staffing patterns 2/01/15.

Highest Number of Nuclear Medicine Technologists

- 2014 jobs: 20,456
- 2013 average annual earnings: $34.66
Regions with Skills Gaps in Nuclear Medicine Technology
Doug Heckman is a senior account manager at EMSI, where he oversees client support for EMSI customers in the US and Canada. He also acts as the subject matter expert for higher education within EMSI.

Prior to EMSI, Mr. Heckman spent 15 years in the high-tech industry in product development and communications. A graduate of the Air Force Academy and the University of Washington, Mr. Heckman has taught at several universities including Creighton University and the University of Idaho. He lives with his family in Moscow, Idaho.
National R&D Investment as a percentage of GDP

The United States is Falling to Keep Pace with Competitors’ Investments in R&D

As China’s R&D intensity (black) rapidly grows by an average of 8 percent per year in pursuit of the goal of R&D investment equal to 3 percent of GDP, U.S. investments (red) have pulled back. At this pace, China will surpass the United States in R&D intensity in about eight years.


The U.S. has Fallen to 10th place in R&D Investment

U.S. ranking among OECD nations by national R&D investment as a percentage of GDP

From Restoring the Foundation: The Vital Role of Research in Preserving the American Dream (American Academy of Arts & Sciences, 2014)
Federal Basic Research Investment as a Share of GDP

Getting U.S. Basic Research Back on Track

Should federal obligations for basic research (blue) falter relative to economic growth, the United States will be left with a research shortfall (cross-hatch). Under the historical competitive trend (orange) established during the period of 1975 to 1992, this committee recommends that the nation return to this historical competitive growth rate (green), with the ultimate goal of fully closing the basic research shortfall (purple) as the economy improves.

Note: Orange trend line is a best-fit (least-square regression) of federal obligations for basic research (percentage of GDP) between 1972 and 1992.

Refer to Appendix C to view this graph in constant dollars.


Research Investment as a percentage of GDP

From Restoring the Foundations: The Vital Role of Research in Preserving the American Dream
(AMERICAN ACADEMY OF ARTS & SCIENCES, 2014)
Federal Basic Research Investment
in billions of constant FY 2014 dollars

Getting U.S. Basic Research Back on Track

Should federal obligations for basic research (blue) flatline relative to economic growth, the United States will by 2032 have accumulated a $639 billion shortfall (cross-hatch) in federal support of basic research relative to the 4.4 percent average annual real growth trend (orange) established during the period of 1975 to 1992. This committee recommends that the nation return to this historical competitive growth rate (green), with the ultimate goal of fully closing the basic research shortfall (purple) as the economy improves.

Note: Orange trend line is a best fit (least squares regression) of federal obligations for basic research (constant 2014 dollars) between 1975 and 1992.


From Restoring the Foundation: The Vital Role of Research in Preserving the American Dream
(American Academy of Arts & Sciences, 2014)
Federal Basic Research Investment
in billions of constant FY 2014 dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>Federal Basic Research (actual)</th>
<th>Historical Competitive Track (mean growth 1975–1992)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>$5</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>$10</td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>$15</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>$20</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>$25</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>$30</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>$35</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>$40</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>$45</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>$13.7B</td>
<td></td>
</tr>
</tbody>
</table>

The Federal Investment in Basic Research, 1975 - 2012

Federal obligations in basic research (blue) experienced competitive, sustainable growth (orange) from 1975 to 1992, averaging an annual inflation-adjusted growth rate of 4.4 percent. Since then, federal funding of basic research has become increasingly unpredictable, deviating from the sustainable funding path and resulting in a $13.7 billion basic research shortfall in 2012 (red).

Note: Orange trend line is a best fit (least squares regression) of federal obligations for basic research (constant 2014 dollars) between 1975 and 1992.


From Restoring the Foundation: The Vital Role of Research in Preserving the American Dream (American Academy of Arts & Sciences, 2014)
John Randell is the Program Director for Science, Technology, and Global Security at the American Academy of Arts and Sciences in Cambridge, Massachusetts, one of the nation’s oldest learned societies and independent policy research centers.

He joined the Academy in 2009 as a Hellman Fellow in Science and Technology Policy, following several years as a postdoctoral fellow in biology at the Massachusetts Institute of Technology.

In 2001 he was a visiting associate professor of microbiology during the inaugural year of the Kathmandu University School of Medical Sciences in Nepal.

Randell has served as the staff director for a wide range of Academy studies in science and technology policy, including the recent Academy report *Restoring the Foundation: The Vital Role of Research in Preserving the American Dream*.

Released in September 2014, *Restoring the Foundation* emphasizes the importance of establishing sustainable federal funding for science and engineering research, particularly basic research, and new mechanisms to promote long-range planning within the research system.

Other recent projects have explored how health care providers communicate with parents about childhood vaccinations, how Internet users can contribute to online privacy and security, and how clean energy and energy efficiency programs can be improved by applying knowledge from the social and behavioral sciences. Randell holds a Ph.D. in virology from Harvard University and undergraduate degrees in mathematics and microbiology from the University of Iowa.
The Charts* on this page represent an in-depth nationwide look at the “STEM Interests” of more than 6 million high school students in the MyCollegeOptions® program in 2015 — and comparisons with past years. Students' college major/career aspirations were used to determine their interest in STEM-related fields. Nearly 30% — more than 1.6 million students — say they would like to pursue STEM in their futures. Keeping such students from dropping out of the STEM Talent Pipeline is essential in meeting U.S. STEM workforce demands for the future. Do our schools and teachers have the capacities to do this?

7. Source: MyCollegeOptions.org® — for more information e-mail shapingthefuture@mycollegeoptions.org

STEM Interest by Graduation Year...

<table>
<thead>
<tr>
<th>Grad. Year</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>41.2%</td>
</tr>
<tr>
<td>2008</td>
<td>40.1%</td>
</tr>
<tr>
<td>2009</td>
<td>39.3%</td>
</tr>
<tr>
<td>2010</td>
<td>39.0%</td>
</tr>
<tr>
<td>2011</td>
<td>40.4%</td>
</tr>
<tr>
<td>2012</td>
<td>42.7%</td>
</tr>
<tr>
<td>2013</td>
<td>42.0%</td>
</tr>
<tr>
<td>2014</td>
<td>43.2%</td>
</tr>
<tr>
<td>2015</td>
<td>44.9%</td>
</tr>
</tbody>
</table>

STEM Interest by Gender...

<table>
<thead>
<tr>
<th>Grad. Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>41.2%</td>
<td>16.1%</td>
</tr>
<tr>
<td>2008</td>
<td>40.1%</td>
<td>15.7%</td>
</tr>
<tr>
<td>2009</td>
<td>39.3%</td>
<td>15.9%</td>
</tr>
<tr>
<td>2010</td>
<td>39.0%</td>
<td>15.6%</td>
</tr>
<tr>
<td>2011</td>
<td>40.4%</td>
<td>15.7%</td>
</tr>
<tr>
<td>2012</td>
<td>42.7%</td>
<td>16.3%</td>
</tr>
<tr>
<td>2013</td>
<td>42.0%</td>
<td>15.6%</td>
</tr>
<tr>
<td>2014</td>
<td>43.2%</td>
<td>13.6%</td>
</tr>
<tr>
<td>2015</td>
<td>44.9%</td>
<td>13.4%</td>
</tr>
</tbody>
</table>

STEM Interest by Self-Identified Ethnicity...

<table>
<thead>
<tr>
<th>Grad. Year</th>
<th>American Indian</th>
<th>Asian American</th>
<th>African American</th>
<th>Hispanic</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>30.1%</td>
<td>36.2%</td>
<td>28.8%</td>
<td>28.0%</td>
<td>29.6%</td>
</tr>
<tr>
<td>2008</td>
<td>31.1%</td>
<td>33.6%</td>
<td>27.4%</td>
<td>30.2%</td>
<td>28.1%</td>
</tr>
<tr>
<td>2009</td>
<td>30.3%</td>
<td>31.8%</td>
<td>28.1%</td>
<td>28.7%</td>
<td>27.9%</td>
</tr>
<tr>
<td>2010</td>
<td>29.2%</td>
<td>33.8%</td>
<td>27.1%</td>
<td>27.0%</td>
<td>27.5%</td>
</tr>
<tr>
<td>2011</td>
<td>29.4%</td>
<td>32.2%</td>
<td>26.4%</td>
<td>26.2%</td>
<td>28.2%</td>
</tr>
<tr>
<td>2012</td>
<td>32.1%</td>
<td>33.6%</td>
<td>27.3%</td>
<td>28.3%</td>
<td>29.6%</td>
</tr>
<tr>
<td>2013</td>
<td>32.0%</td>
<td>35.2%</td>
<td>27.7%</td>
<td>30.3%</td>
<td>29.5%</td>
</tr>
<tr>
<td>2014</td>
<td>30.3%</td>
<td>33.7%</td>
<td>24.2%</td>
<td>27.0%</td>
<td>29.0%</td>
</tr>
<tr>
<td>2015</td>
<td>31.7%</td>
<td>34.6%</td>
<td>25.1%</td>
<td>29.3%</td>
<td>30.0%</td>
</tr>
</tbody>
</table>

National Student Interest in STEM Careers Increasing:

California’s STEM Profile 2015 - 2024™

Shaping the Future: California Students’ Interest in STEM Jobs 2015

California High School Students’ Interest in STEM Careers: Class of 2016 by Gender & Ethnicity

Keeping STEM students from dropping out of the STEM Talent Pipeline is essential in meeting U.S. STEM Job demands for the future. The Charts’ on this page represent California’s portion of an in-depth nationwide look at more than 6 million high school students in the MyCollegeOptions® program in 2015. Overall, U.S. students’ college major/career aspirations were used to determine their interest in STEM-related fields. The survey reveals that nationwide, nearly 30% — more than 1.6 million students — would like to pursue STEM careers in their futures. See how California compares below.

<table>
<thead>
<tr>
<th>Grad Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>35.0%</td>
<td>14.9%</td>
</tr>
<tr>
<td>2008</td>
<td>34.5%</td>
<td>14.9%</td>
</tr>
<tr>
<td>2009</td>
<td>33.9%</td>
<td>15.8%</td>
</tr>
<tr>
<td>2010</td>
<td>34.4%</td>
<td>16.8%</td>
</tr>
<tr>
<td>2011</td>
<td>35.5%</td>
<td>16.9%</td>
</tr>
<tr>
<td>2012</td>
<td>36.1%</td>
<td>16.3%</td>
</tr>
<tr>
<td>2013</td>
<td>37.0%</td>
<td>16.3%</td>
</tr>
<tr>
<td>2014</td>
<td>39.8%</td>
<td>17.2%</td>
</tr>
<tr>
<td>2015</td>
<td>41.9%</td>
<td>16.8%</td>
</tr>
<tr>
<td>2016</td>
<td>44.7%</td>
<td>16.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grad Year</th>
<th>American Indian</th>
<th>Asian American</th>
<th>African American</th>
<th>Hispanic</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>25.1%</td>
<td>34.1%</td>
<td>20.9%</td>
<td>24.2%</td>
<td>26.5%</td>
</tr>
<tr>
<td>2008</td>
<td>24.2%</td>
<td>30.7%</td>
<td>19.9%</td>
<td>22.8%</td>
<td>24.8%</td>
</tr>
<tr>
<td>2009</td>
<td>24.2%</td>
<td>29.8%</td>
<td>19.3%</td>
<td>22.9%</td>
<td>25.0%</td>
</tr>
<tr>
<td>2010</td>
<td>26.2%</td>
<td>30.4%</td>
<td>20.9%</td>
<td>24.1%</td>
<td>25.5%</td>
</tr>
<tr>
<td>2011</td>
<td>24.8%</td>
<td>29.6%</td>
<td>20.5%</td>
<td>24.2%</td>
<td>26.2%</td>
</tr>
<tr>
<td>2012</td>
<td>25.9%</td>
<td>30.4%</td>
<td>20.0%</td>
<td>23.9%</td>
<td>26.2%</td>
</tr>
<tr>
<td>2013</td>
<td>26.2%</td>
<td>31.8%</td>
<td>20.7%</td>
<td>24.7%</td>
<td>27.0%</td>
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<tr>
<td>2014</td>
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<td>33.3%</td>
<td>21.3%</td>
<td>25.8%</td>
<td>28.6%</td>
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<tr>
<td>2015</td>
<td>29.2%</td>
<td>34.0%</td>
<td>22.7%</td>
<td>27.0%</td>
<td>29.7%</td>
</tr>
<tr>
<td>2016</td>
<td>28.9%</td>
<td>35.5%</td>
<td>22.8%</td>
<td>28.0%</td>
<td>31.0%</td>
</tr>
</tbody>
</table>
Ryan Munce
Vice President

Ryan Munce joined the MyCollegeOptions® Executive Team in 2006, and as Vice President is responsible for cultivating business development opportunities and managing the NRCCUA and My College Options® cooperative research program through partnerships with educational, professional, governmental and community organizations.

Prior to joining NRCCUA, Ryan was an Enrollment Services Coordinator at the University of Missouri - Kansas City.

Ryan received his Bachelor’s Degree in Corporate Communications from Creighton University in Omaha, NE and is earning his Master’s Degree in Higher Education Administration from the University of Missouri - Kansas City.
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(Members are in Red Exhibitors are in Blue, Member-Exhibitors are in Red):

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American Chemical Society (ACS)
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American Physical Society (APS)
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American Society for Microbiology USA (ASMUSA)
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Association of University Research Parks (AURP)
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Biophysical Society
EMSI, Inc.
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IEEE-USA
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