

## Science, Technology, & Innovation Strategy in the Obama Administration

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US-European Summit on  
**Science, Technology, Innovation,  
and Sustainable Economic Growth**

Washington, DC • 28 September 2010



*"Science is more essential for our  
prosperity, our security, our health,  
our environment, and our quality  
of life than it has ever been before."*

President Obama, National Academy of Sciences, April 27, 2009

### **Challenges linked to ST&I: Domestic**

- economic recovery & growth: S&T as drivers (infotech, biotech, nanotech, greentech...?)
- health care: better outcomes for all at lower cost
- energy & climate : cleaner, safer energy supply (incl reduced oil imports & GHG emissions)
- other resources & environment: water, land use, coastal zones, toxics, biodiversity
- national & homeland security: better tools for US troops, cyber- & power-grid security, bio-defense, ensuring safety/reliability of shrinking US nuclear stockpile without nuclear testing

### **Challenges linked to ST&I: Global**

- combating preventable and pandemic disease
- transforming the global energy system & land-use practices to avoid unmanageable climate change
- deploying S&T for poverty eradication, development, & adapting to unavoidable climate change
- managing the competition for land & water among food, fiber, fuel, & ecosystem function
- maintaining the ecological integrity and productivity of the oceans
- reducing risks from nuclear & biological weapons

## President Obama's views on the challenges

- They're interconnected & must be addressed together.
- ST&I are not just germane to success but central.
- Success requires not only applying ST&I to specific challenges but also nurturing the cross-cutting foundations of ST&I.
- Centrality means putting ST&I in the center of what the federal government thinks, says, and does about these challenges – “Science in its rightful place.”
- Interconnectedness mean solutions require partnerships across: federal agencies; branches & levels of government; public, private, & philanthropic sectors; and nations – “All hands on deck.”

## Interconnectedness

- Human well-being depends equally on economic, environmental, and sociopolitical conditions.
  - True “development” and “growth” entail enhancing all three, or at least not advancing one in ways that seriously degrade the others.
- Poverty, ignorance, environmental degradation, and disease are linked in vicious circles of cause & effect.
  - These blights are most effectively attacked together. Often a key to addressing all at once is improving the status & opportunities of women & girls.

### **Interconnectedness** (continued)

- In the USA, reducing health-care costs while extending coverage & improving outcomes is clearly essential for limiting government deficits as well as for other social & economic reasons.
- The clean-energy revolution needed to improve air & water quality and limit climate-change risks will also bring high-quality jobs, spin off new products & businesses, and preserve economic competitiveness.

### **The centrality of ST&I: What do we need?**

- The Economy: innovation that yields better manufacturing techniques, better products & services, and (thus) high-quality, sustainable jobs...
- Health: new IT tools for medical records, doctor-doctor & doctor-patient interaction; better, cheaper diagnostics; faster vaccine development & production; cancer therapies that target only cancer cells...
- Energy: better batteries, cheaper photovoltaic cells, lower-impact biofuels, CO<sub>2</sub> capture & sequestration, safer nuclear fuel cycles, fusion...

### What we need from ST&I (continued)

- Climate Change: better monitoring in-situ & from space; better models on faster computers; regional disaggregation of impacts to support adaptation; better scientific communication for public understanding...
- National & Homeland Security: better detection of conventional & nuclear explosives and of clandestine weapons facilities; faster identification of & response to bio-threats; better defenses against cyber-threats ...

### Cross-cutting foundations of success in ST&I

- the institutions that do most basic research
  - research universities, national labs, nonprofits
- other key infrastructure
  - IT/broadband, high-speed computing, energy, transportation, space technology
- science, technology, engineering, & math (STEM) education
- economic & policy conditions conducive to entrepreneurship, innovation, partnerships
  - IPR, financing, tax policy, export policy, immigration policy, transparency & predictability in regulation)

## **The federal support infrastructure for ST&I**

- S&T-rich cabinet departments & their agencies
  - Defense (with DARPA), HHS (w NIH, FDA, CDC), Energy (w ARPA-E), Commerce (w NOAA, NIST), Interior (w USGS), Agriculture (w NIFA), State/OES
- Free-standing ST&I-linked agencies
  - NSF, NASA, EPA, FCC, SBA
- Executive Office of the President
  - OSTP/NSTC/PCAST, NEC (innovation), DPC (STEM ed), OECC (energy), NSS/HSS (security), OMB (budgets)
- Congress
  - S&T authorizing & appropriations committees

## **Responsibilities of OSTP and the S&T Advisor**

- Policy for science and technology
  - Analysis, recommendations, & coordination with other White House offices on R&D budgets & related policies, S&T education and workforce issues, interagency S&T initiatives, broadband, open government, scientific integrity...
- Science and technology for policy
  - Independent advice for the President about S&T germane to all policy issues with which he is concerned

## Organization of OSTP and its affiliates

- The S&T Advisor is both...
  - Assistant to the President (“Senior White House staff”, not subject to Senate confirmation) and
  - the Senate-confirmed Director of OSTP
- Office of Science and Technology Policy has...
  - 4 Senate-confirmed Associate Directors (Science, Technology-CTO, Environment, National Security & International Affairs)
  - Staff of about 90: 65 technical, of whom more than half are detailed from other agencies; budget ~\$7M

## Organization (continued)

- National Science & Technology Council (NSTC)
  - Deputy secretaries & undersecretaries of cabinet departments with S&T missions, plus heads of NSF, NIH, NASA, NOAA, NIST, EPA, USGS, CDC
  - Nominally chaired by the President; chaired in practice by the OSTP Director / Science Advisor; administered by OSTP
- President’s Council of Advisors on Science and Technology (PCAST)
  - Co-Chairs Holdren and Lander
  - 18 other members from academia, industry, NGOs

## Indicators of the priority on ST&I: Presidential appointments

- Five Nobel Laureates in science
  - Energy Secretary Chu, OSTP Associate Director for Science Wieman, NCI Director Varmus, PCAST Members Molina and Zewail
- Another 25+ members of the NAS, NAE, IOM, and American Academy of Arts & Sciences
  - Including heads of NIH, NOAA, USGS, FDA, NIFA
- A CTO (Chopra) and a CIO (Kundra) in the White House for the first time
- An engineer running EPA (Lisa Jackson)

**ST&I have never been so prominent in leadership positions.**

## The President with the first 7 NAS members appointed in his Administration



NAS Board Room, 27 April 2009

## Indicators of priority: speeches & events

Highlighting ST&I in...

- Speeches throughout the campaign for the Presidency, then Inaugural Address and speeches at: 2009 annual meeting of the NAS, Cairo Egypt, Albany NY, MIT, 2010 State of the Union, Kennedy Space Center...
- White House events with nat'l middle-school and high-school science & math winners, National Medal of Science and National Medals of Technology & Innovation winners, groups of US astronauts (on 7 occasions), US Nobel Prize winners, math & science teaching award winners, PECASE winners.

**No president has ever talked as much about ST&I.**

## With middle-school "Mathletes" in the Oval Office



## Indicators of priority: PCAST studies

Studies requested by President Obama from PCAST:

- Science of H1N1 influenza
- National Nanotechnology Initiative (NNI) Review
- Building capability for future influenza response
- Health IT for better outcomes at lower cost
- Improving K-12 STEM education
- Accelerating energy-technology innovation
- Advanced manufacturing
- Networking & Information Technology R&D Review
- Biodiversity & ecosystem management for sustainability

**PCAST has never been asked to do so much so soon.**

## The President and his PCAST



Pres Obama meeting with his Council of Advisors on Science & Technology 3-12-10

## **Obama initiatives in ST&I**

### Investments in S&T

- Science got a huge boost in the stimulus/recovery package (American Recovery & Reinvestment Act -- ARRA) and the FY2009 / FY2010 budgets, giving 2009-10 the highest federal research spending ever.
- Total ARRA funds for S&T, including IT & transportation infrastructure, applied energy technology, space exploration, exceed \$100 billion.
- Investment goals announced last year: double budgets of basic science agencies in 10 yr; make Research & Experimentation Tax Credit permanent: lift public + private investment in R&D to  $\geq 3\%$  of GDP.

## **More ST&I initiatives: energy & climate**

- \$80 billion for clean & efficient energy in ARRA
- creation of ARPA-E (\$400M in 2009-10, \$300M proposed for 2011), energy-innovation hubs
- first-ever fuel-economy/CO<sub>2</sub> tailpipe standards
- strengthened bilateral partnerships on energy & climate change w Brazil, China, India, Japan, Russia...
- US Global Change Research Program increased to \$2.56 billion for FY2011 (19.4% real increase).
- Inter-agency task force led by OSTP, CEQ, NOAA on coordination of government's adaptation activities
- continuing pursuit of comprehensive energy-climate legislation in the Congress

### **Initiatives: investments continue**

The President's FY2011 ST&I budget proposals

- All federal R&D reaches \$147.7 billion.
- Nondefense R&D = \$66.0 billion, up 4.8% in real terms.
- All research (basic + applied) grows 4.5% real.
- NASA R&D = \$11.0 billion, up 17% real.
- NIH = \$32.1 billion, up 2.0% real.
- Basic research = \$33.0 billion, up 3.3% real.
- DOD basic research reaches \$2.0 billion, up 8.0% real.
- NSF, DOE Science, NIST labs on track to double 2007-17.

### **The President's American Innovation Strategy**

- Invest in the building blocks of innovation
  - restore leadership in fundamental research
  - boost STEM education
  - strengthen physical infrastructure
  - develop an advanced IT “ecosystem”
- Promote competitive markets to spur innovation
  - support capital markets that fund innovation
  - encourage innovation-based entrepreneurship
  - boost public-sector & community innovation
  - promote American exports

## **The American Innovation Strategy** (continued)

- Catalyze breakthroughs for national priorities
  - unleash a clean-energy revolution
  - support advanced-vehicle technology
  - drive breakthroughs in health IT
  - address other “grand challenges” of the 21<sup>st</sup> century

## **STEM-education initiatives**

- Joint efforts of the White House (OSTP, DPC) & the Dept of Education, some with NSF, HHS, DoD, DOE, NASA
- New national goals: moving American kids from middle to top of international rankings on science & math tests, increasing American proportion of college graduates to first in the world by 2020.
- \$4.4 billion “Race to the Top” in the ARRA includes preference to states whose proposals emphasize innovation in STEM education.
- “Educate to Innovate” program (11-09) for K-12 STEM education w \$500+ million in private-sector & philanthropic support; “Change the Equation” added 9-10

**CHANGE THE EQUATION**  
 "It's time to restore science to its rightful place, and . . . to wield technology's wonders to meet the demands of a new age." *President Barack Obama*

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improving  
inspiring  
achieving

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### Our Mission and Goals

**Our Mission**  
 Through its network of more than 100 CEOs, Change the Equation pledges to create widespread literacy in science, technology, engineering and math (STEM) as an investment in our nation that empowers us all.

**Our Goals**  
 Change the Equation works towards three critical goals:

- **Great Teaching.** Improve STEM teaching at all grade levels, with a larger and more diverse cadre of highly capable and inspirational STEM teachers.
- **Inspired Learners.** Inspire student appreciation and excitement for STEM programs and careers to increase success and achievement in school and opportunities for a collegiate education, especially among females and students of color.
- **A Committed Nation.** Achieve a sustained commitment to improving STEM education from business leaders, government officials, STEM educators and other stakeholders through innovation, communication, collaboration and data-based decision making.

**About Change the Equation**  
 Our Mission & Goals  
 What We Do  
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**Video Center**

www.changetheequation.org

## Initiatives on principles & procedures

- Stem-cell guidelines
  - expanding stem-cell lines that can be used with federal support while respecting ethical boundaries
- Scientific integrity principles
  - ensuring openness, transparency, reliance on peer-reviewed science across Federal agencies
- Reporting procedures for Federal grants
  - streamlined and made consistent across agencies
- Open government
  - new & expanded access to databases at every agency

the WHITE HOUSE PRESIDENT BARACK OBAMA

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## Open Government Initiative

TRANSPARENCY • PARTICIPATION • COLLABORATION

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My Administration is committed to creating an unprecedented level of openness in Government. We will work together to ensure the public trust and establish a system of transparency, public participation, and collaboration. Openness will strengthen our democracy and promote efficiency and effectiveness in Government.

— PRESIDENT OBAMA, 04/21/09



**LATEST BLOG POSTS**

June 18, 2010 at 1:34 PM EDT  
Ending Lobbyist Appointments to Agency Boards and Commissions  
A new Presidential Memorandum directs agencies in the Executive Branch not to appoint or re-appoint currently-registered federal lobbyists to advisory boards or commissions.

**PARTICIPATE NOW**

Change the Game in Cybersecurity  
Help refine game-changing concepts in cybersecurity research and development.

Apps for Healthy Kids  
\$60,000 in prizes to innovative software tools and games that encourage children – directly or through their parents – to be active and eat healthy.

**OPEN GOVERNMENT DASHBOARD**

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Department of Commerce: ██████████

Department of Defense: ██████████

Department of Education: ██████████

Department of Energy: ██████████

Department of Health and Human Services: ██████████

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Department of the Interior: ██████████

Department of Homeland Security: ██████████

Department of Housing and Urban Development: ██████████

Department of Social Security Administration: ██████████

Department of Environmental Protection: ██████████

Department of Health and Human Services: ██████████

Department of Justice: ██████████

Department of Labor: ██████████

Department of State: ██████████

Department of Transportation: ██████████

Department of the Treasury: ██████████

Department of Veterans Affairs: ██████████

Department of the Interior: ██████████

Department of Homeland Security: ██████████

Department of Housing and Urban Development: ██████████

Department of Social Security Administration: ██████████

Department of Environmental Protection: ██████████

More Information

An Official Web Site of the United States Government

Sunday, June 27, 2010 | Text: [Icons] | Share [Icon]

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Page 1 of 62 (1,547 records) Results per page: 25 | 50 | 100

Name (click for metadata and to rate dataset)	Rating	Agency	XML	CSV/TXT	KML/KMZ	Shapefile	RDF	Other
<b>Formal Enforcement Actions Fiscal Year 2009</b> The annual data tables contained in this document provide summary statistics on the civil enforcement activities of the United States Trustee Program. These tables summa...	★★★★★ (11 votes)	DOJ/USTP						
<b>Informal Enforcement Actions Fiscal Year 2009</b> The annual data tables contained in this document provide summary statistics on the civil enforcement activities of the United States Trustee Program. These tables summa...	★★★★★ (5 votes)	DOJ/USTP						

## Partnerships: working w the private sector

- Firms fund 67% of US R&D, perform 72%.
- Pres Obama has proposed to make the Research & Experimentation tax credit permanent.
- Recovery Act has helped start & grow clean-energy businesses across the country.
- Small Business Innovation Research (SBIR) initiative provides funding from diverse agencies for many avenues of innovation.
- Small business lending bill (signed 9-27-10) increases loans & cuts taxes for entrepreneurs.
- DOE's energy-innovation hubs link national labs, universities, and industry

The screenshot shows the SBIR.gov website interface. At the top, there is a search bar and a navigation menu with links for CONTACTS, ABOUT SBIR & STTR PROGRAMS, CONFERENCE & EVENTS CENTER, SBIR & STTR SOLICITATIONS, FEDERAL AGENCY LINKS, STATE RESOURCES, LINKS, and PAST AWARDS. The main content area is titled "SBIR/STTR KEY SOLICITATION DATES" and lists several open solicitations with their closing dates.

Program Opportunity	Closing Dates
NIH & CDC PHS 2011-1 SBIR Contract Solicitation	November 8, 2011
NSF STTR Program Phase I Solicitation FY-2011	November 17, 2010 (5 p.m. proposer's local time)
National Science Foundation Small Business Innovation Research Program Phase I Solicitation FY-2011 (Release 2)	December 03, 2010
Joint-Agency SBIR Funding Opportunity Announcement - Robotics Technology Development and Deployment	December 20, 2010 (5 p.m. proposer's local time)
2010 SBIR Omnibus Solicitations of the NIH, CDC, FDA and ACF	April 5, August 5, December 5
<b>AIDS and AIDS-Related Receipt Dates</b>	
May 7, September 7, January 7	

## Harnessing private innovation: prizes and challenges

- Prizes & challenges harness the ingenuity that lurks in individuals, schools, firms all across the society.
- Sponsors/organizers set an ambitious goal without prescribing the best means to achieve it, pay only for results.
- The Administration's new [challenge.gov](http://challenge.gov) website provides 1-stop shopping for innovators looking for opportunities.

The screenshot shows the Challenge.gov website. At the top, there is a navigation bar with "HOME" and "FIND CHALLENGES" buttons, and a search bar containing the text "e.g.: 'Apps' or 'Health'". The main header features the Challenge.gov logo and the tagline "Government Challenges, Your Solutions". Below this, a dark blue banner reads "Challenge.gov is a place for citizens and government to solve hard problems together." with a "Sign Up and Participate" button and a "Learn More" link. The main content area is divided into "Featured Challenges" and "BROWSE GOVERNMENT CHALLENGES". The featured challenge is "Apps for Healthy Kids", created by the U.S. Department of Agriculture, with a \$55,500 prize pool and 10 supporters. A "Support This" button is visible. The browse section lists various categories such as Science & Technology, Environment, Health, Education, Economy, Defense, International Affairs, Immigration, and Test Category 2.

## Prizes and challenges (continued)

- The recent Progressive Insurance / DOE Automotive X-Prize illustrates the leverage in this approach.
  - \$10M in prizes for super-fuel-efficient passenger vehicles (over 100 miles per gallon of gasoline equivalent) called forth \$100M+ in investments in innovation by competitors.
  - Winning designs achieved up to 200 MPGe.

## Automotive X-Prize awards, September 16, 2010



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### **Partnerships: International ST&I cooperation**

- Reviving & strengthening the high-level Joint Committee Meetings on S&T cooperation with Russia, China, India, Brazil, Japan, & S Korea
- Convening the Multilateral Economic Forum MEF w strong focus on energy-climate cooperation
- ST&I as a centerpiece of Cairo speech (Science Envoys, centers of excellence), USAID strategy
- Pursuing increased internat'l cooperation in space
- Streamlining the visa procedures that apply to visiting scientists & technologists

### **Partnerships: US-Europe ST&I cooperation**

- Europe remains a crucial strategic partner of the USA, the two having huge mutual interests in the economic, environmental, & security realms.
  - Common ST&I challenges include broadband & spectrum management, e-government & e-health technologies, clean energy & smart grids, more
- Cooperation in ST&I is a core element of the US-Europe relationship and is being strengthened.
  - OSTP has met with science leadership of UK, France, Germany, Italy, Netherlands, Denmark, Sweden, Norway, Poland – and EU – to discuss strengthening existing efforts and building new ones.

### **US-Europe ST&I cooperation** (continued)

- US-EU Joint Consultative Group (JCG) on S&T meeting in Washington May 10-11, 2010
  - 25+ representatives from EU & its member states and 50 participants from 15 US science agencies
- Focuses included...
  - bilateral cooperation in R&D on infotech, nanotech, energy, biomedicine, cyber infrastructure, homeland security, and Earth-observing systems;
  - how better to prioritize global challenges in food security, global health, sustainable energy, and climate change.

### **ST&I for sustainable well-being: the prospects**

- The leaders of the USA and the EU clearly recognize both the challenges and the opportunities in this domain.
- Much has been and is being achieved in ST&I by our countries individually and together, and increasingly in the last couple of years.
- But there is much more to do, and getting it done under the financial constraints we all face will take all the ingenuity – and cooperation – we can muster.