Common Challenges & Shared Opportunities for the USA and Brazil in Science, Technology, and Innovation

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“Science, technology, and innovation proceed more rapidly and more cost-effectively when insights, costs, and risks are shared. ... That is why my administration is ramping up participation in – and our commitment to – international science and technology cooperation.”

Address to National Academy of Sciences, April 27, 2009
Pervasive challenges linked to ST&I

• economic prosperity: ST&I as drivers (infotech, biotech, nanotech, advanced manufacturing...)

• health care: better outcomes for all at lower cost

• energy: affordable, reliable, cleaner energy (including reduced oil use, less pollution)

• other resources & environment: water, land use, coastal zones, toxics, biodiversity, sustainability

• national & homeland security: detection & disarming of explosive devices, cyber- & power-grid security, bio-defense, protecting nuclear materials from theft
Global challenges linked to ST&I

• **Health**: Defeating preventable and pandemic disease
• **Development**: Eradicating poverty and providing the possibility of sustainable prosperity for all
• **Energy-Climate**: Providing for societies everywhere the energy their economies need without wrecking the climate their environments need
• **Land-Water**: Managing the intensifying competition for the world’s land & fresh water among food, fiber, fuel, infrastructure/industry, and ecosystem function
• **Oceans**: Maintaining their ecological integrity & productivity
• **WMD**: Avoiding use of nuclear and biological weapons
President Obama recognizes that...

- Meeting the global challenges is essential to US national well-being.
- Meeting the pervasive challenges everywhere is also essential to US national well-being.
- The global challenges are interconnected with each other and with the pervasive challenges.
- ST&I are not just helpful for success with these interconnected challenges, they are indispensable.
He also recognizes that...

• Success requires not only applying ST&I to specific challenges, but also nurturing the foundations of strength in ST&I:
  – research universities & national labs;
  – other aspects of S&T infrastructure including broadband, high-speed computing, & space technology;
  – science, technology, engineering, and math (STEM) education;
  – economic and policy conditions conducive to entrepreneurship & innovation (financing, IPR, tax policy, trade policy, immigration policy...)

And he recognizes that...

• The multifaceted character of the national and international challenges and the connections among them mean success will depend on the strengths of the partnerships we can build among:
  – federal agencies;
  – legislative & executive branches;
  – federal, state, and local authorities;
  – the public, private, and non-profit sectors
  – the nations of the hemisphere and the world.
These views have been apparent in...

- the way President Obama has talked about ST&I to the country and the world;
- the number of distinguished scientists, engineers, and innovators he has appointed to leadership positions;
- the assignments and instructions he has given to the offices, agencies, and departments across the Executive Branch, and to the President’s Council of Advisors on Science and Technology (PCAST); and
- the initiatives he has launched -- and the budgets he has provided for them – in the domains of ST&I, science & math education, and international S&T cooperation.
“We will restore science to its rightful place…”

Barack Obama, January 20, 2009
The indispensability 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, $\text{CO}_2$ capture & sequestration, safer nuclear fuel cycles, fusion...
What we need from ST&I (continued)

• **Agriculture**: stress-tolerant crop varieties, livestock resistance to disease, farmer access to knowledge & markets through IT

• **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...
Science “in its rightful place”: budgets

Investments in ST&I

• 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, exceeded $100 billion.

• Investment goals announced in 2009: double budgets of basic science agencies; make Research & Experimentation Tax Credit permanent; increase public + private investment in R&D to ≥ 3% of GDP.
Basic & applied research by agency

in billions of constant FY 2012 dollars
Major Obama ST&I initiatives

• large increases for clean & efficient energy in 2009 Recovery Act, 2010-2013 budgets, including creation of Advanced Research Projects Agency for Energy (ARPA-E)
• first-ever combined fuel-economy/CO$_2$ tailpipe standards
• revival of US Global Change Research Program (with $2.5 billion annual budget) and launch of National Assessment of Climate Change
• creation of first National Oceans Policy, implemented through cabinet-level National Oceans Council
• launch of American Innovation Strategy, including “Educate to Innovate”, “Startup America”, and “American Manufacturing Partnership”
International cooperation: Obama initiatives

• Reviving & strengthening the high-level Joint Commission Meetings on S&T cooperation with Brazil, China, India, Japan, Russia, S Korea

• Nurturing the strong S&T cooperation that has long existed with the EU, Canada, Australia, NZ...

• Convening the Multilateral Economic Forum, making the G-20 the top body for international economic coordination, advancing the Copenhagen-Cancun-Durban climate-change agendas – all with strong ST&I focus

• Making ST&I the centerpiece of US development policy

• Streamlining the visa procedures that apply to visiting scientists & technologists
Internat’l cooperation: initiatives (continued)

Presidential Policy Directive on Global Development (September 2010)

• Global Climate Change Initiative
  
  clean energy, sustainable landscapes, resilience & adaptation

• Global Food Security Initiative
  
  Global Agriculture & Food Security Program, Feed the Future

• Global Health Initiative
  
  strengthening health systems; focus on maternal & child health, family planning, nutrition, infectious diseases, neglected tropical diseases
US-Brazil ST&I cooperation: early history

• 1950s: US-Brazil Fulbright Commission to promote higher-education exchanges between the USA & Brazil started in 1957

• 1960s and 1970s: scientist–to-scientist, university-to-university, and science academy to science academy interactions growing

• 1980s: US-Brazil Agreement on S&T Cooperation signed 1984 (renewed automatically ever since); establishment of Joint Commission Meetings to implement it

• 1990s: Common Agenda on the Environment meetings begun 1995; Framework Agreement on Space Cooperation concluded 1996; first Education MOU was 1997
US-Brazil ST&I cooperation: 2000-2008

GOVERNMENT-TO-GOVERNMENT INITIATIVES LAUNCHED

• 2000: Consultative Committee on Agriculture
• 2003: Consultative Group on Energy; Partnership on Education
• 2006: Working Group on Public Health
• 2007: Steering Group to Advance Cooperation on Biofuels; Working Group on Health
• 2008: Task Force on the Sustainability of Biofuels

BUSINESS-TO-BUSINESS FOCUS ON INNOVATION

• 2007: Brazil-US Business Council Innovation Summit
US-Brazil ST&I cooperation: 2009-2012

• 2009: meeting in Washington of the ministerial-level US-Brazil Joint Commission on S&T Cooperation, producing several new MOUs (about which more below)

• 2010: MOU on Cooperation Regarding Climate Change; US Brazil Tropical Forest Conservation Act; MOU on Advancement of Women

• 2011: Joint Initiative on Urban Sustainability; Framework Agreement on Cooperation in the Peaceful Uses of Outer Space; Obama-Rousseff Summit (more below)

• 2012: new MOU on Cooperation in Education (with emphasis on education & training of 21st century workforces)
The March 2011 Obama-Rousseff Summit

• Overall theme was Brazil and USA as partners addressing the global issues of peace, security, and development with democracy, human rights, and social justice.

• Role of science, technology, and innovation received strong emphasis, in which the two presidents:
  
  – elevated energy cooperation to a “Strategic Energy Dialogue”
  
  – directed enhanced links between educational institutions and strengthening other bilateral partnerships
  
  – proposed Working Group on satellite-based Earth observations, environmental monitoring, and disaster mitigation & response
Another major theme discussed by the two presidents was increased exchanges of students. This subsequently led to announcements of:

- President Obama’s “100,000 Strong in the Americas” initiative, and
- President Rousseff’s “Science Without Borders” initiative
The framework for expanding S&T cooperation

MINISTERIAL LEVEL JOINT US-BRAZIL COMMISSION ON S&T COOPERATION

• Last Joint Commission Meeting (JCM), held in Washington DC in June 2009, reviewed the full range of joint US-Brazil S&T activities in basic science, health, energy, agriculture, Earth observation, space, generated new cooperation on

  — measurement sciences and standards
  — joint NIH-CAPES fellowships
  — ethanol production from lignocellulosic feedstocks
  — climate-resilient agriculture
  — enhanced networking among institutions
The JCM on S&T Cooperation (continued)

• The March 12-13 JCM here in Brasilia is being co-chaired by Minister of Science, Technology, and Innovation Dr Marco Antonio Raupp and me.

• Focuses of the meeting include:
  – scientific and academic exchanges
  – Innovation programs and policies
  – disaster management
  – ocean science, technology, and observations
  – measurement standards
  – progress reports on other domains of cooperation
A key to strengthening the relationship is... knowledgeable & committed leaders.