Science & Technology Policy Challenges and Opportunities in the Obama Administration

…and the role of microbiology

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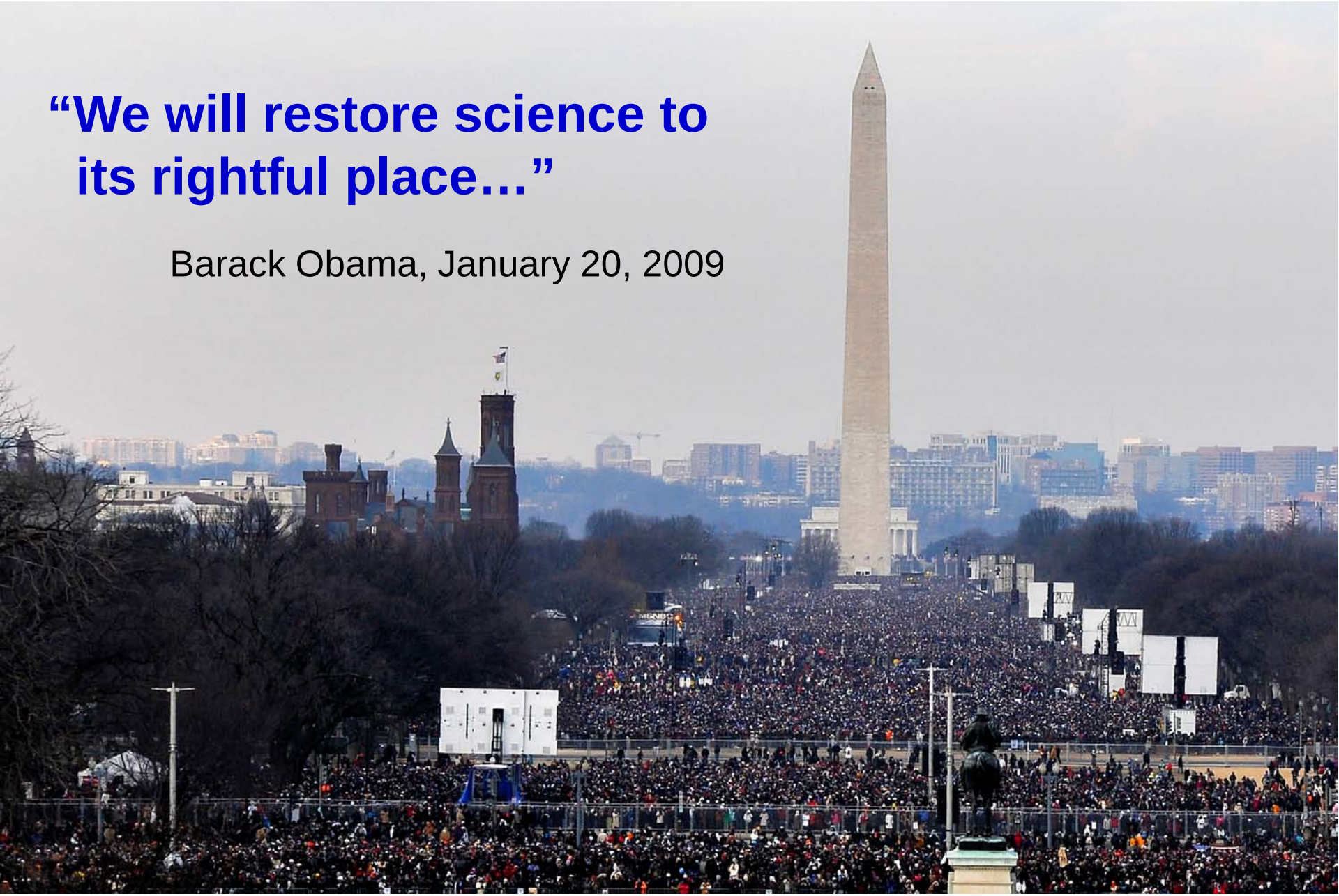
Remarks for the

American Society for Microbiology Annual Meeting

New Orleans • 23 May 2011


“We will restore science to its rightful place…”
Barack Obama, January 20, 2009

The place of science on the agenda

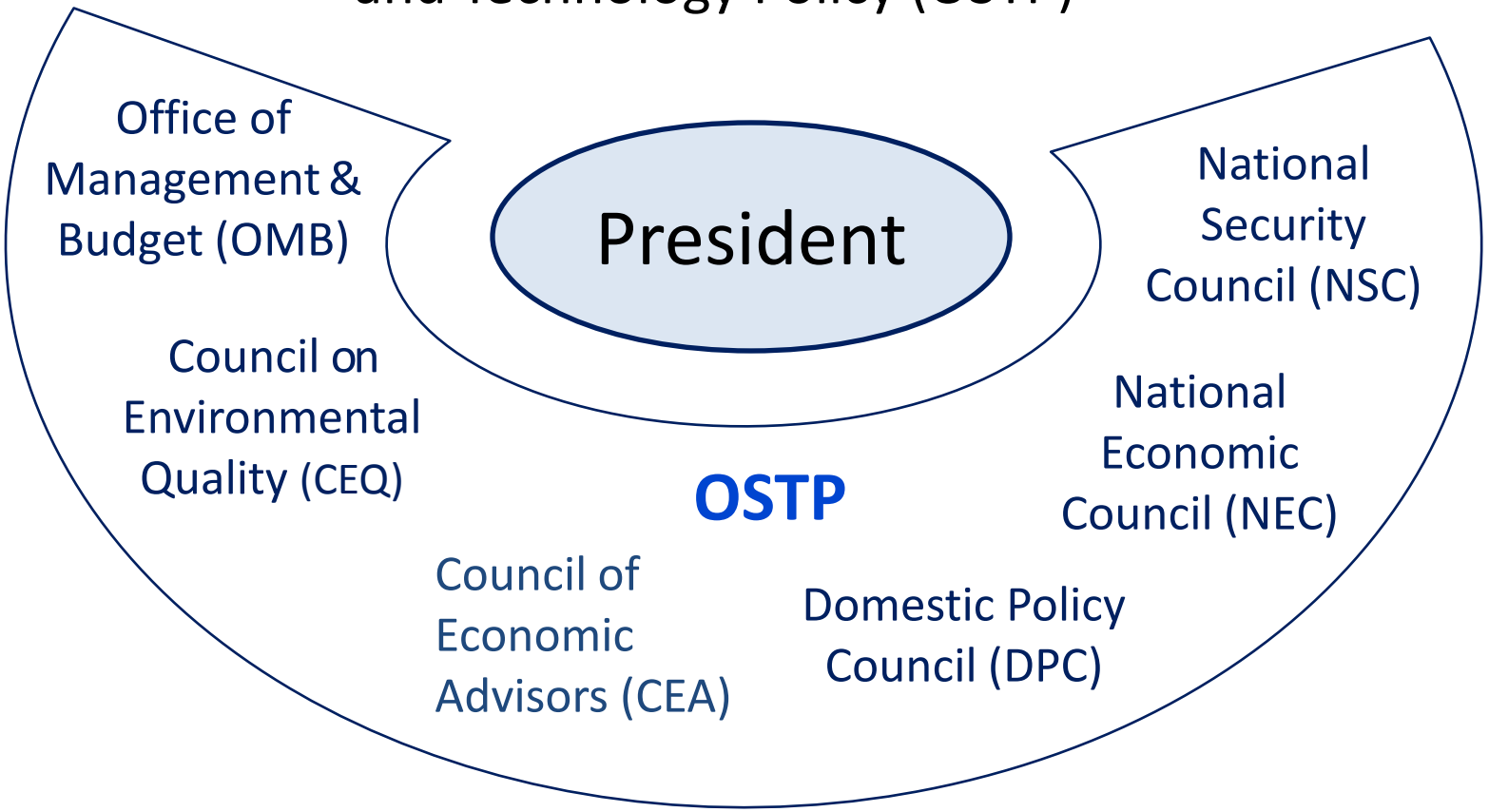
S&T are central to meeting key challenges of

- economic recovery, growth, & development
- biomedicine & health-care delivery
- clean, safe, reliable, & affordable energy
- climate-change mitigation & adaptation
- competing uses of land & water
- the health & productivity of the oceans
- national & homeland security

as well as lifting the human spirit through discovery, invention, & expanded understanding.

The place of science in the White House…

…is centered in the Office of Science and Technology Policy (OSTP)

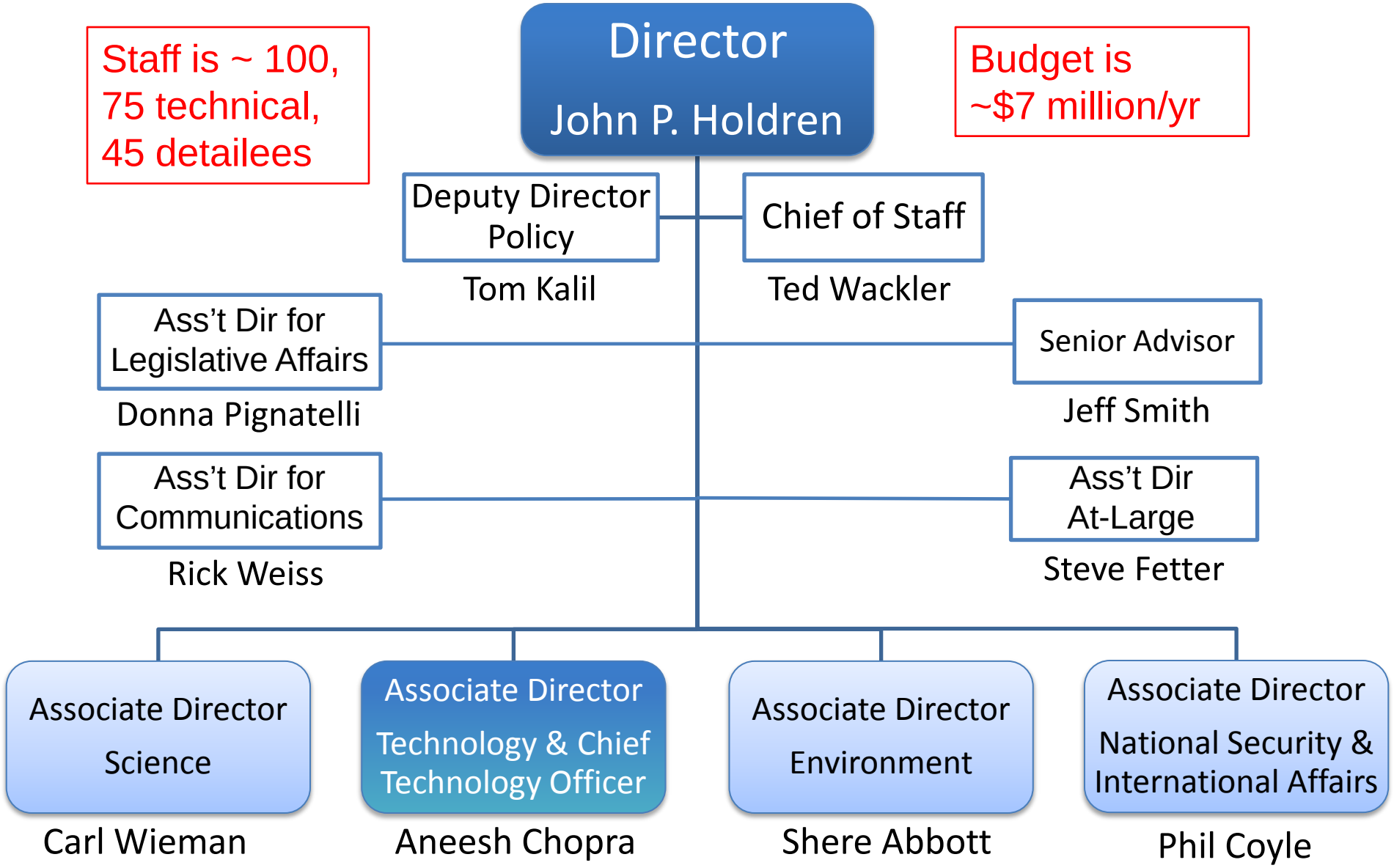


EOP also includes Offices of: Vice President, Chief of Staff, Cabinet Affairs, Communications, Intergovernmental Relations, Public Engagement, Legal Counsel, US Trade Representative, Energy & Climate Change, and more.

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

OSTP structure



Under President Obama, both Holdren and Chopra are "Assistant to the President".

OSTP-managed entities

- 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
  - Coordinates S&T activities that cross agency boundaries
- President's Council of Advisors on Science and Technology (PCAST)
  - Co-Chairs J Holdren & E Lander
  - Vice-Chairs W Press & M Savitz
  - 16 other members from academia, industry, NGOs
  - Helps link White House to wider ST&I community

Under President Obama…

- OSTP technical staff has doubled, and the number of Associate Directors has been restored to the statutory four.
- The rank of Assistant to the President has been restored to the OSTP Director and given to the CTO / Associate Director for Technology.
- The National Science and Technology Council (NSTC) has been revitalized.
- PCAST has become more active and more relevant.

What else has President Obama done to restore science to “its rightful place”?

What he's done: 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)

With the 1st seven NAS members he appointed

What he's done: using the bully pulpit

Highlighting S&T in speeches…

- throughout the campaign
- Inaugural Address
- January 2009 joint session of Congress
- 2009 annual meeting of the NAS
- June 2009 Cairo, Egypt (S&T for development)
- Sept 2009 Albany NY (American Innovation Strategy)
- October 2010 MIT (energy strategy)
- State of the Union (Jan 2010, Jan 2011)
- Kennedy Space Center (April 2010)
- and many, many more.

"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, April 27, 2009

What he's done: Presidential events

First Astronomy Night on the South Lawn, October 2009

Historic visit to laboratories at the National Institutes of Health, September, 2009

Presidential events (continued)

First White House Science Fair, October 2010

Dropping by NYC Science Fair, March 2011

"Whenever I get a chance to go to a science fair, I go."

- President Obama at NYC Science and Engineering Fair, March 2011

What he's done: honoring STEM teachers

President Obama honoring educators who have shown excellence in teaching and mentoring students in mathematics and science at an awards ceremony at the White House, January 6, 2010.

…and STEM students

What he's done: Calling on PCAST for advice

- PCAST studies requested and completed:
  - The science and technology of 2009-H1N1 Influenza
  - Reengineering the Influenza Vaccine Production Enterprise
  - Assessment of the National Nanotechnology Initiative
  - Prepare and Inspire: K-12 STEM Education
  - Accelerating the Pace of Change in Energy Technologies
  - Realizing the Full Potential of Health IT to Improve Healthcare
  - Designing a Digital Future: Networking and IT R&D
  - Advanced manufacturing
  - Biodiversity preservation and ecosystem sustainability
- PCAST studies underway:
  - The science of biological carbon sequestration
  - STEM Higher Education – the first two years
  - The health of the US research enterprise

Meeting with PCAST & OSTP Senior Staff (11-04-2010)

What he's done: Federal S&T budgets

- Huge boost for S&T in the stimulus/recovery package.
- New goals for investments in S&T (4-09) : double budgets of basic science agencies in 10 yr; make Research & Experimentation Tax Credit permanent: lift public + private investment in R&D to ≥ 3% of GDP.
- FY2010 budget (~$150B for Federal R&D) + Recovery Act put us on track to meet the goals.
- President's FY2011 budget would have continued on track if the Congress had passed it.
- Despite setbacks, S&T fared better in the FY2011 Continuing Appropriations Act than most other sectors.

The 2011 Continuing Appropriations Act

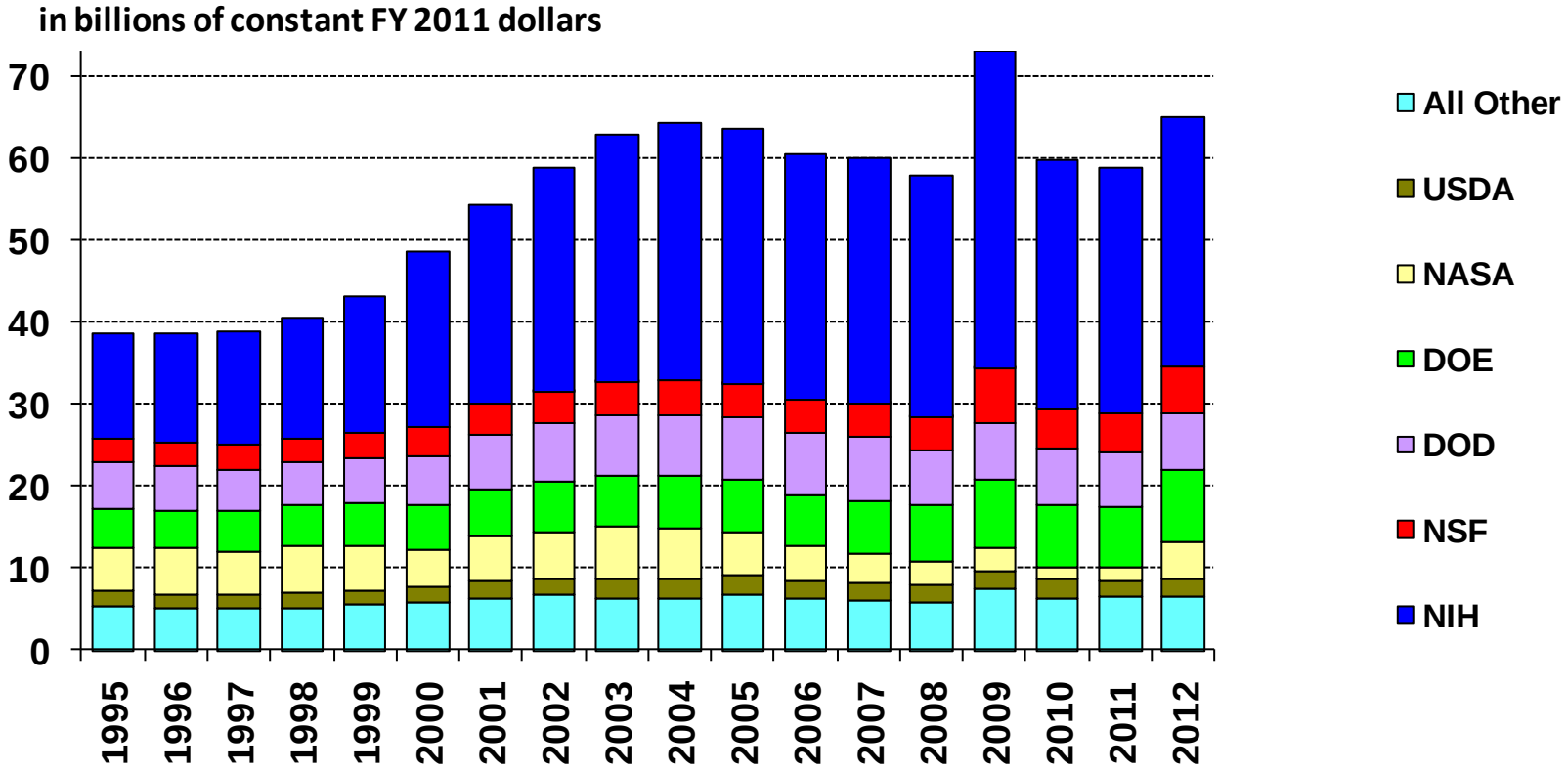
Billions of current dollars

	2010	2011
NIH	31.0	30.7
NASA	18.7	18.5
DOD S&T (6.1-6.3)	13.5	12.1
NSF	7.0	6.9
DOE Office of Science	4.9	4.9
NOAA	4.7	4.3
USGS	1.1	1.1

The President's FY2012 R&D Budget

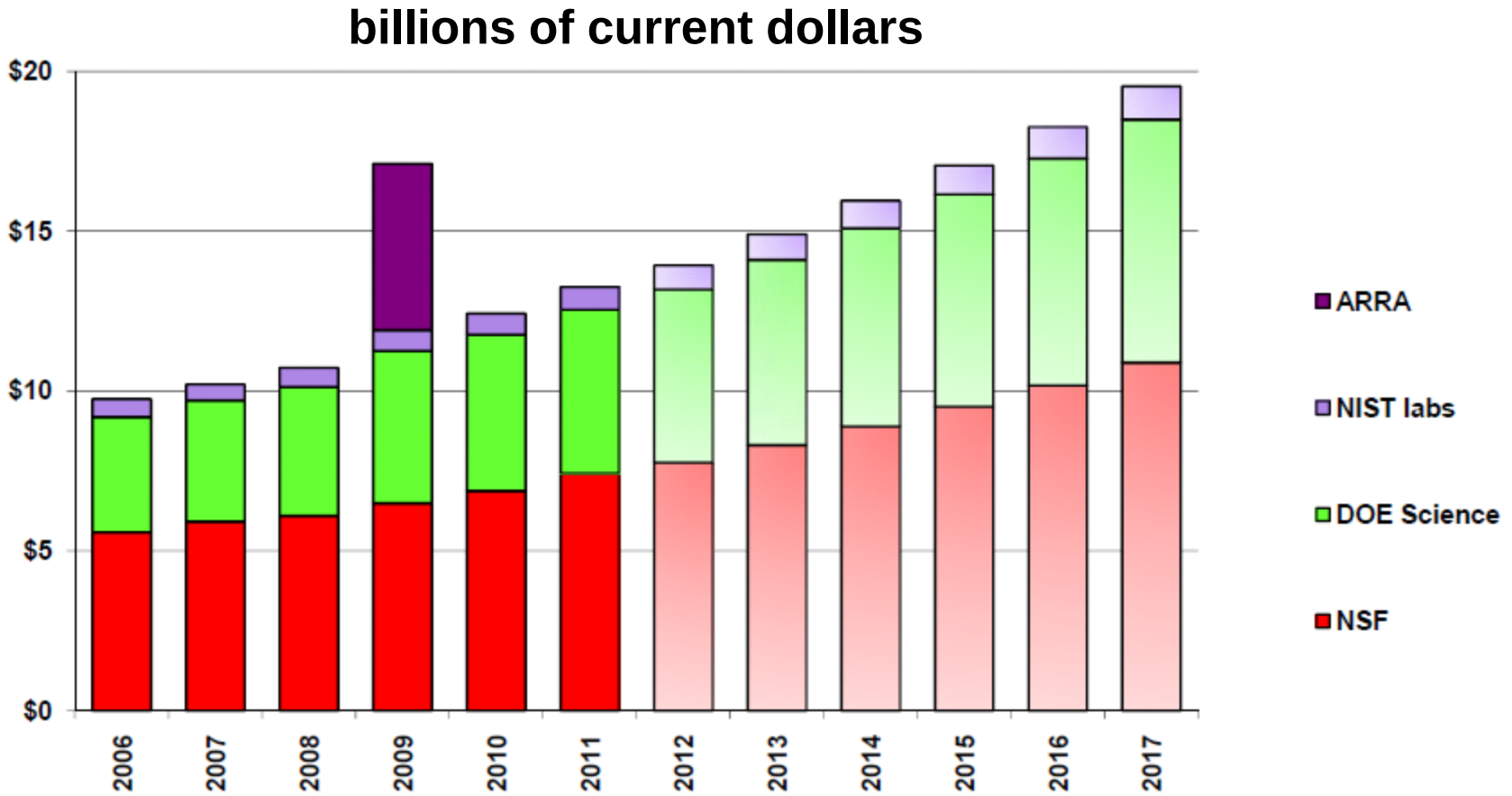
- $147.9B for Federal R&D—up $0.8B from FY2010 enacted
- Nondefense R&D = $66.8B—up $4.1B (6.5 percent)
- Basic & applied research = $66.1B—up $6.9 billion (11 percent)
- NIH—$31.8B (up 2.4 percent)
- DOE total—$13.0B (up 20 percent)
  - DOE's Office of Science—$5.4B (up 10.7 percent)
- NASA—$9.8B (up 6 percent)
- NOAA—$5.5B (up 15.8 percent)
- DHS—$1.05B (up 19 percent)
- National Science Foundation—$7.8B (up 13 percent)
- NIST—$764M (up 15.1 percent)
- Defense Department's R&D portfolio—$76.6B (-4.9 percent)

Federal Research by Agency, FY 1995-2012



FY 2009 figures include Recovery Act appropriations.
2011 figures are prelminary estimates of final 2011 appropriations.
Research includes basic research and applied research.
MAY '11 OSTP

2010 projection for NSF, DOE Science, NIST labs



2006-2010 figures are enacted budget authority; 2012-2017 figures are projections in the 2011budget.
FEBRUARY '10 OSTP

What he's done: Other S&T initiatives

- The American Innovation Strategy (9-09, 10-10)

  investing in the foundations of strength in S&T, reforming tax & other policies, catalyzing breakthroughs

- Educate to Innovate (11-09)

  >$700M in private & philanthropic support for partnerships to improve STEM education, "Change the Equation" (10-11)

- Startup America (3-11)

  more partnerships & policies to support entrepreneurs

- International S&T cooperation (from the beginning)

  JCMs, Science Envoys, S&ED, BPC

- plus health IT, data.gov, Wireless Initiative (WI^3)…

Initiatives on principles & procedures

- Stem-cell guidelines
  - expanding stem-cell lines that can be used with federal support while respecting ethical boundaries
- Visa MANTIS procedures
  - streamlining procedures for the MANTIS system that applies to visas for scientist & technologists
- Streamlining reporting on federal grants
  - Simplified progress reports, uniform across agencies
- Scientific integrity principles, guidelines, policies
  - 3-09-09 Presidential principles memorandum, 12-17-10 OSTP Director's guidelines, 4-17-11 agency progress reports
  - agency draft policies due 7-17-11

The role of microbiology

Microbiology and the great challenges

- economic productivity & growth: manufacturing with microbes, economic applications of synthetic biology
- health & disease: understanding & defeating food-borne, water-borne, & infectious diseases; beating antibiotic-resistant bacteria
- energy & climate change: microbes in biofuel production; microbial roles in atmospheric levels of CO_2, CH_4, & N_2O and in climate-change feedbacks
- other resources & environment: biodegradation & bio-remediation of toxic substances; microbial aspects of sustainable agriculture & animal husbandry
- maintaining the ecological integrity & productivity of the oceans: much of it is about microbes

Microbiology: the big cross-cutting questions

- Who is there?

  What are the dimensions of microbial biodiversity (in soils, fresh water, sea water & sediments, in and on plants & animals)

- What are they all doing & how do they do it?

  What are the roles of all these microbial species in regulation of environmental chemistry, in other ecosystem functions & services, and in plant & animal physiology & pathology?

- How will global change affect them?

  A mostly warmer, moister world? A more acidic ocean?

Are we doing enough microbiology research?

SOME FEDERAL RESEARCH INITIATIVES

- NIH's Human Microbiome Project
- DOE's Joint Genome Institute
- NSF's Dimensions of Biodiversity Program
- ARPA-E's Microbial Fuels Program
- NASA's Exobiology & Evolutionary Biology Program
- various USDA programs

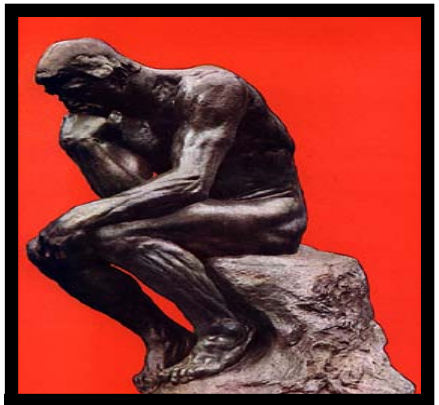
A comprehensive inventory seems to be lacking. (Does ASM have one?)

The Subcommittee on Life Sciences of the NSTC is considering setting up an interagency microbiology WG.

Managing the risk dimension

Biosafety

Biosecurity



Bioethics

Accidental exposure to a pathogen or toxin could adversely affect:

- Laboratory workers
- General public
- Plants and animals
- Environment

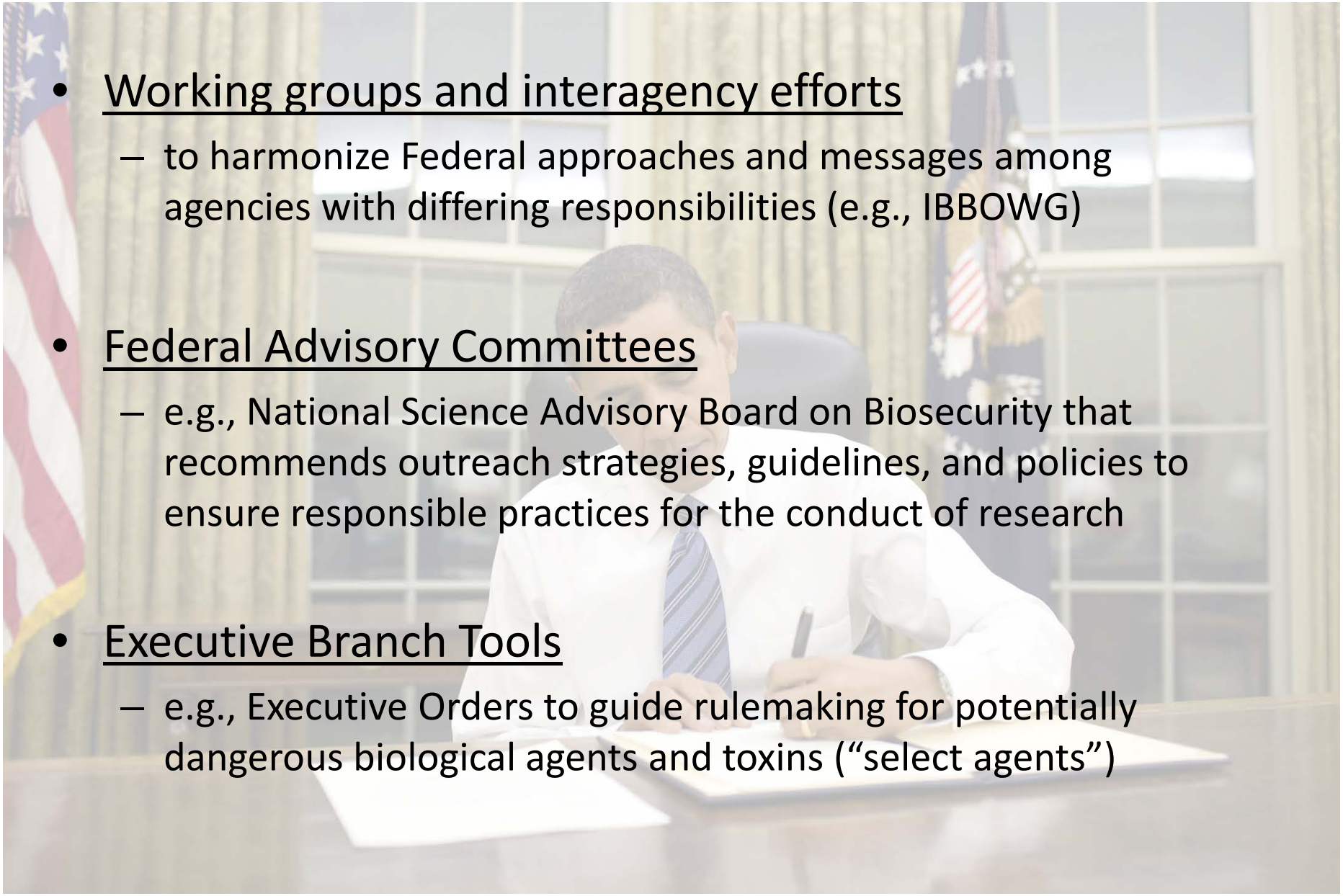
Deliberate misuse of technology to cause harm to:

- Humans
- Plants and animals
- Environment

Controversial uses and consequences of technology:

- Germline interventions
- Synthetic biology
- Genetically modified organisms

Policy toolbox for addressing risks



- Working groups and interagency efforts
  - to harmonize Federal approaches and messages among agencies with differing responsibilities (e.g., IBBOWG)
- Federal Advisory Committees
  - e.g., National Science Advisory Board on Biosecurity that recommends outreach strategies, guidelines, and policies to ensure responsible practices for the conduct of research
- Executive Branch Tools
  - e.g., Executive Orders to guide rulemaking for potentially dangerous biological agents and toxins (“select agents”)

Executive Order 13546

Signed by President Obama in July 2010

- Called for creation of a Federal Experts Panel to craft recommendations relating to "select agents"—microbes that pose significant safety or security risks

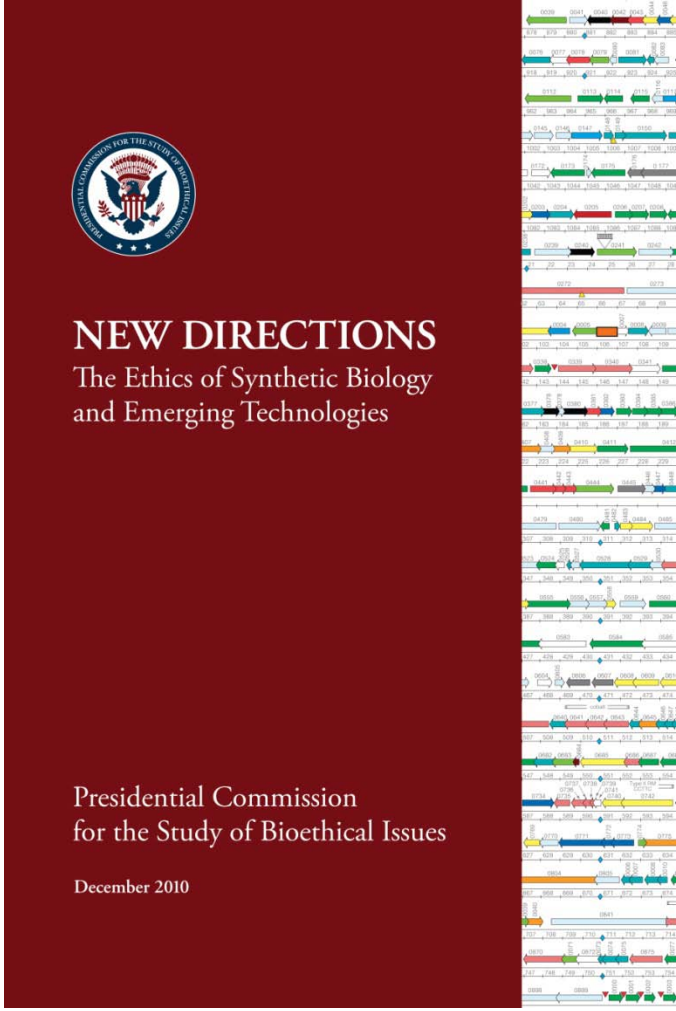
- Panel presented recommendations in Nov. 2010 to HHS/USDA/Attorney General
  - Designates certain agents and toxins as "Tier 1" (the greatest risk of deliberate misuse with most significant potential for mass casualties or devastating effects to the economy)
  - Reduces the number of microbes and toxins on the select agent list
  - Establishes best practices to ensure reliability of personnel working with Tier 1 agents and toxins
  - Establishes physical security and cyber security practices for Tier 1 labs

- In response, HHS/USDA/Attorney General now working on revisions to existing Select Agent Regulations and crafting new guidelines—all to be released for public comment in October 2011

- Final regulations and guidelines expected in October 2012

Synthetic Biology

At President Obama's request, the Presidential Commission for the Study of Bioethical Issues (PCSBI) produced a report assessing the state of the science and the regulatory landscape.



Two OSTP-led committees are looking at synthetic biology policy:

- Synthetic biology working group
  - led to the release of Federal guidance to commercial providers of synthetic double-stranded DNA in October 2010
  - is informing a revision of NIH Guidelines for Research Involving Recombinant DNA to include synthetic DNA
  - is reviewing PCSBI recommendations and considering implementation strategies
- Emerging Technologies Interagency Policy Committee
  - Horizon scanning
  - Review of non-security policy related to synthetic biology

There has never been a better time for micro-biologists to increase their engagement with policy-makers and the public.

The Obama Administration would welcome your thoughts.

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