Natural & Social Science in the Executive Branch
What Happened Under Obama? What’s Happening Under Trump?

John P. Holdren
Professor of Environmental Science and Policy
Harvard University
Senior Advisor to the Director
Woods Hole Research Center
Former Assistant to President Obama for Science & Technology and Director, Office of Science & Technology Policy
Executive Office of the President of the United States

Daniel P. Moynihan Prize Lecture
American Academy of Political & Social Science
Washington DC • May 17, 2018

Coverage of these remarks

• Personal note #1: history
• The Federal government’s roles in relation to science
• The need for science advice in the White House and Executive Branch agencies
• History of science advice in the Executive Branch 1941-2008
• Science advice in the Executive Branch in the last two administrations
  – What Obama did
  – What Trump is doing
• Personal note #2: looking ahead
Personal note #1: history

- In my junior year in high school (1959-60) I read two books that shaped my aspirations for a career at the intersection of science and policy:

  C.P. Snow (chemist, novelist, civil servant), *The Two Cultures*, 1959. His two “cultures” were (1) the natural sciences & engineering and (2) the humanities & social sciences. His argument was that the gulf between the two had long been widening and that many of the most important challenges facing society were being neglected because of that.

  Harrison Brown (geochemist, scientific statesman), *The Challenge of Man’s Future*, 1954. Like Snow, he saw challenges of overpopulation, resource depletion, the rich-poor gap, & international conflict as intertwined and requiring insights from both the natural & social sciences if the challenges were to be understood and successfully addressed.

Personal note #1 (continued)

- My dream became to pursue an education and a career between and within both cultures, focused on bringing understandings from both to bear on the intertwined societal challenges on which the two authors focused.

- With the help of many remarkable mentors—Holt Ashley, Paul Ehrlich, Harrison Brown (!), Roger Revelle, Gilbert White, Harvey Brooks, George Kistiakowsky, Jerome Wiesner, Ira Michael Heyman, and more—I was able to get away with it.

- The pinnacle of that career was being chosen by President-elect Barack Obama to serve as his Assistant for Science and Technology, Director of the White House Office of Science and Technology Policy, and Co-Chair of the President’s Council of Advisors on Science and Technology and serving him in those capacities through both of his terms as President.

- This talk draws heavily on that experience.
Why science matters to the Federal agenda

Progress in science is essential for advancing...

• economic development & sustainable growth
• biomedicine & health-care delivery
• clean, safe, reliable, & affordable energy and water
• climate-change mitigation & adaptation
• preservation of biodiversity
• protection of the health & productivity of the oceans
• national & homeland security

and for lifting the human spirit through discovery, invention, & expanded understanding.

These are all wholly or partly public goods that will not be adequately secured without Federal government’s engagement.

Federal government roles in science

• Most basic research in natural & social sciences is done in universities, with funding provided mainly by the Federal gov’t.

• Most applied research & development are funded & performed by private firms, but Federal, state, & local gov’ts have important roles in shaping policies that encourage or discourage private-sector R&D.

• It’s also government’s role to devise & implement programs to bring science (and technology) to bear on public goods not adequately addressed in the marketplace—nat’l & homeland security, public health & safety, environment, education, justice...
Who makes Federal science policy?

- Science policy is a shared responsibility of the Congress and the Executive Branch.
- Overarching Congressional science authority is in House Science, Space, & Technology; Senate Commerce, Science & Transportation; and relevant appropriations committees & subcommittees.
- But many other committees also have roles...
  - HOUSE: Agriculture; Armed Services; Energy & Commerce; Natural Resources; Transportation & Infrastructure
  - SENATE: Agriculture, Nutrition, & Forestry; Armed Services; Energy & Natural Resources; Environment & Public Works; Health, Education, Labor, & Pensions

Key executive branch science actors

- Dept of Defense
- Dept of Health & Human Services
- Dept of Energy
- Dept of Agriculture
- Dept of Commerce
- Dept of Interior
- Dept of Homeland Security
- Dept of State
- National Science Foundation
- NASA
- Environmental Protection Agency
The need for science advice in the White House

Given the wide range of science competencies in gov’t agencies and the ability of the President to call on cabinet secretaries & other agency heads for any S&T information he wants, why does the President need a separate S&T advisor and supporting office inside the White House?

• Absent a capable scientist/technologist on the President’s senior staff, he & his other senior advisors in the White House might not recognize the relevance of science to the choices before the President, thus might not know when he needs to ask a science question of an agency...or what question to ask.

• Specialized knowledge of the science missions & competencies in the agencies is needed to know whom he should ask: what expertise from what agencies to consult on which policy issue.

• It’s often helpful for the President to have a trusted source of science info independent of the agendas of particular agencies.

History of science advice in the White House

• Office of Scientific R&D (OSRD, 1941-47)
  Headed by Vannevar Bush, reporting directly to FDR and now considered the first official “Science Advisor to the President”.

• Ad hoc advisory boards based in DoD (1947-57)
  Army & Navy R&D Board; then Science Advisory Committee (SAC) to the Office of Defense Mobilization; the directors were closest thing to science advisors to Truman & Eisenhower in these years.

• President’s Science Advisory Committee (PSAC, 1957-73)
  Eisenhower converted SAC to PSAC, moved it to the White House, and in 1959 created a new White House Office of S&T (OST) to support it. The OST Director served as PSAC Chair & was known as “the President’s Science Advisor”.
  This model was kept by Kennedy, Johnson, & Nixon (until 1973).
History of White House science advice (continued)

- **OST & PSAC dissolved (1973-76)**

- **Office of Science & Technology Policy (OSTP, 1976–)**
  - Ford got Congress to create OSTP by statute, gaining stability but entailing Senate confirmation of the Director & Assoc Directors.

- **No equivalent to PSAC until 1990**
  - Neither Ford nor Carter appointed a PSAC, relying just on their science advisor, OSTP, and ad hoc panels.
  - Reagan’s 1st science advisor created a Science Advisory Council reporting to him, not the President, in 1981.
  - The equivalent of PSAC was not restored until George H. W. Bush created the President’s Council of Advisors on S&T (PCAST) in 1990 by Executive Order.

History of White House science advice (continued)

- **Strong OSTP & PCAST (1990-2000)**
  - George H. W. Bush (Bush 41) was interested in S&T, appointed a strong science advisor (Alan Bromley) supported by a well staffed OSTP and a strong PCAST, and consulted them regularly.
  - Bill Clinton likewise appointed strong science advisors (John H. Gibbons 1992-1998, Neal Lane 1998-2000) and a strong PCAST, consulted them extensively, and built up OSTP staff.

- **Minimizing S&T in the White House (2001-2008)**
  - George W. Bush (Bush 43) was uninterested in S&T advice, and his OSTP Director (John Marburger) was not confirmed until Oct 2001. He was not made Ass’t to the President for S&T, thus lacked direct access. Two Assoc Dir positions were eliminated. Political types, not scientists, played dominant roles in messaging about science and its policy implications.
Science advice & policy in the Obama White House

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

Putting science “in its rightful place” in the White House entailed Obama’s...

• appointing the 1st-ever CTO (also with the Ass’t to the President title), the 1st CIO, and the 1st Chief Data Scientist
• restoring the full complement of 4 OSTP Assoc Directors and building up the OSTP staff from 45 to 135
• re-energizing the interagency National Science & Technology Council (NSTC)
• quickly launching & empowering a new PCAST (with 3 science Nobel Laureates, 2 university presidents, the VPs of the NAS & NAE, the Chairman of Google, a former OSTP Assoc Director for Science & Undersecretary of Energy...)
• directing that his S&T officials be “at the table” for policy discussions where insights about S&T might be germane
The 3 responsibilities of the Science Advisor and OSTP historically and under Obama

1. Science and technology for policy
   Independent advice for the President & heads of other White House offices, providing whatever facts/insights from natural & social science may be germane to the policy issues with which they are concerned.

2. Policy for science and technology
   Analysis, recommendations, and coordination with OMB and other White House offices on: R&D budgets & related policies; S&T education and workforce issues; scientific integrity & transparency; S&T to improve gov’t operations.

Three responsibilities (continued)

3. Serving as the President’s S&T emissary to...
   - Exec Branch agencies with S&T roles
   - Congress
   - the nongovernmental S&T community nationally & internationally
   - foreign gov’t officials

With the Chair of the House Science Committee

At the National Academy of Sciences

With U.S. & South Korean S&T agency officials
**OSTP’s specific responsibilities also included...**

- providing White House oversight for NSF and NASA;
- carrying out a range of functions in support of National Security and Emergency Preparedness Communications;
- developing interagency & multi-sector S&T initiatives in support of the President’s agenda;
- chairing and managing the NSTC and co-chairing its five standing committees;
- providing administrative & analytical support for PCAST;
- overseeing U.S. S&T cooperation with other countries (in partnership with the State Department).

**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
  - Five standing committees: Science; Technology; Environment, Natural Resources, and Sustainability; National and Homeland Security; and STEM education
  - Coordinates S&T activities that cross agency boundaries, including such major initiatives as the US Global Change Research Program, the National Climate Assessment, the National Nanotechnology Initiative, and the Networking and Information Technology R&D program
NSTC activities, 2009-2017

- Published ~90 reports and strategic plans coordinating interagency S&T programs
  - Topics included STEM education, National Nanotechnology Initiative implementation, global change research, Materials Genome Initiative, National Plan on Civil Earth Observations, neuroscience research, biosurveillance, coastal mapping, ocean hypoxia and harmful algal blooms....
- Convened interagency task-force activities to support Ebola response, space weather, and federal S&T-workforce capacity building and produced recommendations for policy development and implementation on these topics.

*Insights from social science played a role in most of these efforts.*

NSTC reports for this period are archived at

https://obamawhitehouse.archives.gov/administration/eop/ostp/nstc/docsreports

OSTP-managed entities (continued)

- President’s Council of Advisors on Science and Technology (PCAST)
  - A PCAST or its equivalent has existed under every U.S. President since Eisenhower.
  - The Obama PCAST had ~20 members, all but one of whom were part-time, uncompensated Special Government Employees, appointed by the President. One co-chair comes from this “outside” group.
  - The other Co-Chair is the Assistant to the President for S&T / OSTP Director.
  - PCAST’s function is to provide an additional high-caliber source of S&T advice for the President, linking the President and OSTP to the outside S&T community.
  - Administrative support for PCAST is provided by an Executive Director and two deputies housed in OSTP.
Over President Obama’s two terms, his PCAST produced 38 studies of S&T topics on which he wanted the advice of the Nation’s S&T community

- 13 were about applications of infotech, big data, nanotech, robotics, 3-D printing, etc., to strengthen the U.S. economy;
- 8 were on how to advance biomedicine & public health;
- 7 were on energy & environment, including climate change;
- 4 were on improving science and math education;
- 3 were on S&T issues in national & homeland security; and
- 3 were on other roles of S&T in society (e.g., forensic science in the courtroom)

All entailed integration of insights from natural & social science.

Many of the recommendations were embraced by President Obama and became the basis of robustly funded initiatives in his administration. See https://obamawhitehouse.archives.gov/administration/eop/ostp/pcast/docsreports
What else Obama did to keep his pledge

• Placed early priority on...
  – scientific integrity
  – open data & public access
  – STEM education & inclusion
  – clean energy & climate change
  – advancing biomedicine & public health
  – strengthening international cooperation in S&T
  – tech innovation for economic recovery & growth
  – rebalancing NASA to boost science, advanced tech
  – exploiting modern IT & private-sector innovation talent to improve the responsiveness & effectiveness of gov’t

Keeping the pledge (continued)

• Launched unprecedented number of initiatives using public-private-academic partnerships to make progress on national & global challenges, including:
  – S&T for economic recovery & sustainable growth;
  – STEM education & inclusion;
  – info technology, connectivity, advanced computing;
  – biomedicine & public health;
  – national & homeland security;
  – international S&T cooperation;
  – energy & environment.

*Virtually all of these built on insights from both natural and social science.*
A partial list of Obama Administration S&T initiatives

**INNOVATION FOR THE ECONOMY**
- American Innovation Strategy
- Startup America
- Materials Genome Initiative
- Data.gov
- Challenge.gov
- Advanced Mfg Partnership / Nat’l Network for Mfg Innovation

**STEM EDUCATION**
- Educate to Innovate
- STEM Master Teacher Corps
- 100kin10
- STEM Inclusion Initiative
- Computer Science for All

**INFOTECH / COMPUTING**
- ConnectED
- Big Data Initiative
- Nat’l Strategic Computing Initiative

**BIOMEDICINE & HEALTH**
- Neuroscience / BRAIN Initiative
- Combating Antimicrobial Resistance
- Precision Medicine Initiative (PMI)
- Cancer Moonshot

**NAT’L SECURITY / INTERNAT’L S&T**
- Cybersecurity Initiative
- Space Weather Strategy
- Science Envoys
- Mission Innovation

**ENERGY & ENVIRONMENT**
- New fuel-economy/CO₂ standards
- ARPA-E, Energy Innovation Hubs
- Climate Action Plan & COP21
- Social Cost of Carbon
- National Ocean Policy
- Arctic Initiative / AESC
- Pollinator Initiative

For details and more initiatives see [https://obamawhitehouse.archives.gov/the-press-office/2016/06/21/impact-report-100-examples-president-obamas-leadership-science](https://obamawhitehouse.archives.gov/the-press-office/2016/06/21/impact-report-100-examples-president-obamas-leadership-science)

**Dimensions of Obama’s embrace of social science**

- Interdisciplinary appointments in policy positions, e.g.
  - Ashton Carter (physics, history, international studies) at Defense
  - France Cordova (English, anthropology, astrophysics) at NSF
  - Samantha Power (journalism, law) as UN Ambassador
  - Cass Sunstein (political science, law) at OMB’s Office of Information and Regulatory Affairs

- Strength in social science at OSTP, e.g.
  - Assistant Director for Social Science Daniel Goroff (economics, mathematics; on leave from Sloan Foundation)
  - Assistant Director for Innovation Policy David Hart (political science, innovation studies; on leave from George Mason University)
  - Senior Advisor for Social & Behavioral Sciences Maya Shankar (psychology, cognitive science)
Obama embrace of social science (continued)

- Addition to the U.S. Global Change Research Program (USGCRP) of a major component on behavioral issues in climate-change causes, consequences, and remedies

- Reconstitution of the NSTC’s Subcommittee on Social and Behavioral Sciences

- Vigorous defense of NSF’s budget for social-science research and associated peer-review process

- Creation of a Social & Behavioral Sciences Team (SBST) to apply social-science insights in government

- Executive Order on “Using Behavioral Science Insights to Better Serve the American People”

The Social and Behavioral Sciences Team

- The SBST was created in OSTP in 2014 under the leadership of cognitive scientist Maya Shankar with kibitzing from OSTP Deputy Director Tom Kalil and OIRA Director Cass Sunstein.

- It recruited eminent experts in applied behavioral science from across the nation to work with Federal departments and agencies to use cutting-edge insights from that domain to increase the effectiveness of Federal policies and programs for the benefit of the American people.

- Achievements through 2016 included...
  - Increasing retirement security for armed-forces members through active choices & e-mail prompts for enrollment in the Thrift Savings Plan;
  - Expanding access to credit for small-family farms through targeted outreach;
  - Helping student-loan borrowers manage their debt;
  - Testing approaches for improving non-scientists’ knowledge about climate;
  - Supporting consumer adoption of renewable energy sources;
  - Advancing criminal-justice reform;
  - Helping families get health-care coverage;
  - Improving administration of unemployment-insurance benefits.
Executive Order on Using Behavioral Science

- Obama’s EO on “Using Behavioral Science Insights to Better Serve the American People” (September 2015) was inspired by the SBST’s early successes and sought to widen its application across the government.

- The EO formalized the placement of the SBST under the Subcommittee on Social and Behavioral Sciences of the National Science & Technology Council, and it...
  
  - noted that “Where Federal policies have been designed to reflect behavioral science insights, they have substantially improved outcomes for the individuals, families, communities, and businesses those policies serve”;
  
  - called on all Executive departments & agencies to “develop strategies for applying behavioral science insights” to their policies, programs, and operations;
  
  - directed the SBST to provide “advice and policy guidance” to the departments and agencies in support of these responsibilities, and to issue written guidance to the agencies within 45 days of the order and as needed thereafter;
  
  - required an annual report detailing progress implementing the order.

What Trump has done (or proposed) so far

- Appointed or nominated fact-averse ideologues to key Executive Branch S&T-related posts, e.g.
  
  - Mick Mulvaney at OMB; Scott Pruitt at EPA; Ryan Zinke at Interior; Betsy DeVos at Education; James Bridenstine at NASA; Tom Price at HHS (since resigned);

- Proposed big cuts in non-defense R&D (20% for FY18)
  
  - $6 billion (20%) at NIH; $1.6B (11%) at DOE Energy R&D; $800M (11%) at NSF; $200M (47%) at EPA S&T

- Proposed eliminating much Earth observation/analysis
  
  - Zeroing Earth-observation functions of DISCOVR (NASA)
  
  - Zeroing OCO-3, PACE, and CLARREO missions (NASA)
  
  - Zeroing the national Carbon Monitoring System (NASA)
  
  - Cutting ocean grants & programs by $250M (NOAA)
What Trump has done or proposed so far

Budgets: Trump FY18 & FY19 versus FY17 (% change in nominal dollars)

Only good news is FY18’s proposed cuts for DoD S&T, NIH, NSF, NASA S&T are now gone.
What he’s done (or proposed) so far (continued)

- Allowed drain of S&T and diplomatic talent from the Department of State without replacement; but replaced a Secretary of State who supported Paris accord & Iran nuclear deal with one who doesn’t
- Driven out pro-environment public servants from EPA, Dept of Interior, Dept of Energy
- Rescinded Obama environmental Executive Orders
  - Expansion of Federally protected lands & waters
  - Clean Power Plan: coal-plant NSPS, methane strategy
  - Climate-change preparedness EOs: USA and international
  - Social Cost of Carbon, consideration of climate change in NEPA
- Dropped or altered websites w climate information

What he’s done (or proposed) so far (continued)

- Reversed many other environmental decisions from the Obama administration, notably by
  - Approving the Keystone pipeline
  - Rejecting ban on chlorpyrifos pesticide
  - Dropping bans on offshore drilling in Atlantic, Alaska
  - Lifting ban on dumping coal-mine waste into streams
  - Removing Yellowstone grizzly bear from endangered list
  - Announcing U.S. withdrawal from Paris accords & halting U.S. climate assistance to developing countries

The New York Times of 5 October 2017 counted 48 Trump environmental rollbacks up to that point.

The Washington Post in May 2018 tallied over 3,000 false or misleading statements by the President since the start of his term
What he’s done (or proposed) so far (continued)

• Packed Federal courts with unqualified ideologues chosen for their inclination to overturn regulations and authorize Executive overreach.

• Joined Congress in enacting “tax reform” that differentially benefits the well off and (less widely publicized) harms U.S. colleges & universities.

• Imposed changes in immigration/visa regulations & enforcement that have...
  – reduced attractiveness & accessibility of U.S. universities to foreign students;
  – made it more difficult & less attractive for non-US-citizen STEM-degree holders to come here or stay here; and
  – hobbled foreign attendance at international STEM conferences held in the United States.

• Continues to attempt to sabotage the Affordable Care Act

• Withdrew from the multilateral Iran nuclear agreement with no Plan B

What’s next?

Personal note #2: looking ahead

• Regardless of what President Trump may accomplish in selected domains (North Korea??), his ignorant, bigoted, bullying, prevaricating, “America Alone” stance has demeaned his office, damaged our democracy, and diminished U.S. standing in the world.

• There will be no rescuing this presidency short of jettisoning Trump, either at the ballot box in 2020 or by Congressional intervention sooner (preferable but less likely).

• Natural and social scientists, with their penchant for evidence and analysis, should find the courage to raise their voices about the reality of these propositions and the need to once again restore science “to its rightful place” after Trump is gone.

• I’m sure that, if Daniel Patrick Moynihan were still with us, he’d be leading the charge.
“Everyone is entitled to his own opinion, but not his own facts.”

Thank You!