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The President's Scientist

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The science advisor to the US president has the opportunity to influence how scientific research is supported by the federal government, as well as the ways in which science and technology can be applied to meet the needs of society.

On March 19, 2009, John P. Holdren became President Barack Obama's science advisor. Holdren, a physicist, was previously a professor of environmental policy and director of the program on Science, Technology, and Public Policy at Harvard University's John F. Kennedy School of Government and director of the Wood's Hole Research Center. The science advisor to the US president, who by tradition also serves as director of the Office of Science and Technology Policy (OSTP), has a unique role. He (to date, all science advisors have been male) is the voice for science and technology (S&T) policy within the administration. The science advisor is expected to give the president objective, confidential advice based on the best information available on the state of science and the nation's technological capabilities, regardless of political or other considerations. The science advisor position is not unique to the US. However, countries with parliamentary systems usually have a minister, whose responsibilities include science and technology; and many serve an advisory function as well.

The science advisor to the US president is a member of the president's White House team, comprised of all the president's senior aides, who work together to ensure that the president's priorities are being implemented on all policy matters. The science advisor must support the president's decisions, regardless of whether he agrees with them, and avoid being seen as a lobbyist of the scientific community. As D. Allan Bromley stated in his 2004 book *The President's Scientists: Reminiscences of a White House Science Advisor*, "the moment the Advisor is perceived to be functioning on behalf of the scientific community…his effectiveness and the cooperation that he receives from the other senior staff members disappear almost instantaneously."

Harvey Brooks, who was considered by many to be the father of science policy in the US, found it helpful to define two kinds of science policy: "policy for science," e.g., funding and regulation of research and development (R&D) activities, and "science for policy," e.g., S&T applied to broader societal needs such as health, energy, environment, and national security (Brooks, 1988). Given the breadth of the policy domain covered by this definition of science policy, the science advisor must be knowledgeable and current on a wide range of issues such as counterterrorism and national security; climate change and the environment; biodiversity; energy production and consumption; information technology, internet access, and cybersecurity; biomedical research and health; science and engineering education and work force development; space exploration and science; food safety; R&D funding; and other issues.

The science advisor works closely with his counterparts in the Office of Management and Budget (OMB) on all issues related to funding and regulations, e.g., ensuring that the budgets of cabinet-level departments and agencies reflect the president's S&T priorities. The science advisor also convenes agency heads or deputies, under the auspices of the National Science and Technology Council (NSTC), to develop priorities for interagency activities and follow up where necessary. S&T are important to the missions of most departments and agencies, with many supporting R&D activities in universities, national laboratories, and industry. However, heads of departments and agencies have wide-ranging responsibilities and lack resources to focus on S&T activities. This is the job of the science advisor.

During the G.H.W. Bush, Clinton, and Obama administrations, the position of science advisor has included the title "Assistant to the President," a designation reserved for senior aides reporting directly to the president. The title implies that the science advisor has direct, personal access and interaction with the president, which should be used sparingly because the president's calendar is always crowded. The title also signals that the science advisor is to be considered a member of the president's team of senior advisors and is to be included in all White House discussions relating to S&T. It is important to note, however, that science advisors who have not held the title "Assistant to the President" have indicated that the lack of the title did not prevent them from communicating with the president.

The Office of Science and Technology Policy or OSTP is a small federal agency, with its own budget appropriation, that is also part of the Executive Office of the President (EOP) (http://www.ostp.gov). OSTP consists of a US Senate-confirmed director and up to four Senate-confirmed associate directors. The current staff numbers more than 60, including specialists on detail from other federal agencies. OSTP was created during the Ford Administration by "The National Science and Technology Policy, Organization, and Priorities Act of 1976." H. Guyford Stever served as the first director. The Act authorizes OSTP to advise the president and others within the EOP on the impacts of S&T on domestic and interna-

Table 1. Presidential Science Advisors

Truman	Oliver E. Buckley	Engineer	1951–1952
	Lee A. DuBridge	Physicist	1952–1953
Eisenhower	Lee A. DuBridge	Physicist	1953–1956
	Isidor I. Rabi	Physicist	1956–1957
	James R. Killian, Jr.	Engineer and Administrator	1957–1959
	George B. Kistiakowsky	Chemist	1959–1961
Kennedy	Jerome B. Wiesner	Engineer	1961–1963
Johnson	Jerome B. Wiesner	Engineer	1963–1964
	Donald F. Hornig	Chemist	1964–1969
Nixon	Lee A. DuBridge	Physicist	1969–1970
	Edward E. David, Jr	Engineer	1970–1973
Ford	H. Guyford Stever	Physicist and Engineer	1973–1977
Carter	Frank Press	Geophysicist	1977–1981
Reagan	George A. Keyworth, II	Physicist	1981–1985
	William R. Graham, Jr.	Physicist	1986–1989
G.H. Bush	D. Allan Bromley	Physicist	1989–1993
Clinton	John H. Gibbons	Physicist	1993–1998
	Neal F. Lane	Physicist	1998–2001
G.W. Bush	John H. Marburger III	Physicist	2001–2009
Obama	John P. Holdren	Physicist	2009–present

Information based on data from the Office of Science and Technology Policy (OSTP) webpage http://www.ostp.gov and Wikipedia.

tional affairs; lead an interagency effort to develop and implement sound S&T policies and budgets; work with the private sector to ensure that federal investments in S&T contribute to economic prosperity, environmental quality, and national security; build strong partnerships among federal, state, and local governments, other countries, and the scientific community; and evaluate the scale, quality, and effectiveness of the federal effort in S&T. OSTP has been able to do some of these things better than others. The science advisor has served as director of OSTP since the agency's establishment.

Science Advisors: A Brief History

Science advising to presidents can be traced back to World War II (WWII) and Vannevar Bush (Table 1). Bush served as head of the Office of Scientific Research and Development under Presidents Franklin D. Roosevelt and Harry Truman. In 1945, he authored *Science: The Endless Frontier*, a report advocating the creation of a governmental agency to fund science and engineering R&D (Bush, 1945). The report served as a guide in establishing the National Science Foundation (NSF) in 1950.

Following WWII, Presidents Truman and Eisenhower appointed eminent scientists as advisors, but the Russian launch of *Sputnik* elevated the position to report directly to the president (Killian, 1977). Subsequent presidents appointed scientists—most were physicists—and engineers to help guide science policy. During the early Cold War years, two of the highest-priority policy issues were nuclear weapons and the space race, areas that involved physics and engineering.

Most presidents have appointed highly qualified science advisors; however, their impact depended on their personal relationships with the presidents and sometimes outside influences. Science advisors for both Presidents Kennedy and Johnson found their access to the presidents hindered by discontent within the scientific community over the Vietnam War. This disconnect was amplified during the Nixon administration, culminating in the resignation of his science advisor, Edward E. David, after public disclosure that members of the President's science advisory committee disagreed with several of Nixon's policies. David's duties were assigned to H. Guyford Stever, then director of NSF. When President Ford assumed office, he brought Stever to the White House as his full-time science advisor and the first director of the OSTP (Stever, 2002). Frank Press, science advisor to President Carter, taking a lesson from the experiences of some of his predecessors, emphasized that his job was to serve the President rather than represent the scientific community.

The modern era of science advisors, which we will define as the end of the Cold War, began with D. Allan Bromley, President G.H.W. Bush's science advisor, who was the first to hold the title, "Assistant to the President for Science and Technology." Bush, with Bromley's advice, issued the first technology policy statement and created an external advisory committee, the President's Council of Advisors in Science and Technology (PCAST). Bush signed the Global Change Research Act of 1990 as well as the 1992 U.N. Framework Convention on Climate Change, which served as the foundation for the Kyoto Accord and subsequent agreements (Bromley, 2004). Bromley also gave considerable attention to international issues and coordinating the S&T activities of federal agencies.

President Clinton's two science advisors, John H. Gibbon and Neal Lane, worked to improve funding for science (especially the physical sciences) and engineering research. Gibbons emphasized connections between S&T and national needs, particularly in the areas of energy, environment, climate change, and new technologies (Gibbons, 1997). Lane focused on establishing Clinton's National Nanotechnology Initiative and the "Twenty-First Century Research Fund," which provided large increases for federal research. Other priorities included energy R&D, international cooperation in S&T, post-Kyoto negotiations, the doubling of the National Institutes of Health (NIH) budget (a congressional initiative), stem cell research, the human genome project, cybersecurity, and missile defense.

President G.W. Bush's science advisor, John H. Marburger, III, came into office 9 months into the administration. Marburger did not have the "Assistant to the President" title but indicated that