

# The 1960s



## GROWTH AND CONFIDENCE

*In his January 20, 1961 inaugural address, John F. Kennedy declared that “the torch has been passed to a new generation, born in this century, tempered by war and disciplined by a hard and bitter peace.” He launched a rapid U.S. missile build-up and established the Apollo program to best the Soviet Union in the new frontier of space. The Cold War turned icy with showdowns over Berlin in 1961 and Soviet missiles in Cuba in 1962. Scientific research was part of the Nation’s Cold War arsenal, though Kennedy praised its intellectual value as well. Federal support for research and development stood at \$8 billion in 1960 and would double in five years. Within that total, support of basic research at all federal agencies more than tripled. By 1965, NSF’s budget reached \$416 million, with almost \$276 million supporting research and the rest funding education, including graduate education.*

*There followed enormous growth in large-scale scientific projects and advances across all disciplines, thanks to generous support from an array of federal agencies. As the decade advanced, the Nation’s environmental awareness grew, as did hope that the social sciences would address poverty and crime. During Lyndon B. Johnson’s presidency, higher education gained federal support, though university-government relations became strained over the Vietnam War.*

### Strengthening White House Science

The frightening uncertainties of the Cold War triggered a spurt of new federal R&D programs and the need to coordinate them. Right after *Sputnik*, President Eisenhower appointed a Special Assistant for Science and Technology (later called the Science Advisor), the President’s Science Advisory Committee (PSAC), and created an interagency Federal Coordinating Council for Science and Technology.

Seeking even greater central coordination, in 1961 Senator Henry Jackson (D-WA) recommended that Congress create an Office of Science and Technology in the White House. “The undischarged planning and evaluation responsibilities of the NSF,” he wrote, should be transferred to the new office.

The Board responded by appointing a committee under William O. Baker of Bell Laboratories. Baker had advised a series of Presidents on classified defense matters; he saw the Kennedy team regularly, and so knew its thinking. Baker’s report essentially agreed with Jackson’s assessment, arguing only that the proposed Office of Science and Technology (OST) should be placed in the White House under the Special Assistant. OST’s job should be to review, coordinate, assess and evaluate the state and conduct of federal science and technology. A small staff of “skillful reviewers” would consider a portion of the national total in any given year, working in small panels and drawing on PSAC’s expertise.

**“In today’s world, the tide of political power flows with the tide of scientific and technical power.”**

Senator Henry Jackson (D-WA), Report, Subcommittee on Government Organization, 1961

1960 Kennedy elected President



1960 Integrated circuit devised; the term “silicon chip” first used

1960

### A MATTER OF LOYALTY

The budding antiwar movement reached the Board in the summer of 1966, when Stephen Smale, a Fields Medal-winning mathematician, criticized the United States' Vietnam policy. Some in Congress called for revoking his NSF grant and wanted "no further grants made to individuals whose public statements and actions are clearly intended to give aid and comfort to the enemy."

The Board supported NSF Director Haworth's response, in which he cited NSF's 1956 loyalty policy. Smale had spoken out but not been convicted of any disloyal act. Haworth told Congress the "facts known to the Foundation provide no basis for termination of support to...Professor Smale."

Kennedy's aides wanted to make the Foundation more responsive to White House control. BOB officials and newly appointed Special Assistant for Science and Technology, Jerome B. Wiesner, wanted to reduce the Board from twenty-four to twelve members, and to have the Director serve also as Chairman of the Board. In their view, the Board should become an advisory body only and leave the Foundation's management solely to the Director.

Wiesner and two budget officials met with the Board in closed session on March 15, 1962. Board members objected to requiring the Director to serve as Chairman, arguing it was a conflict. Stratton proposed making the Director the Chair of the Executive Committee instead, a compromise that was later accepted. The Board insisted that it needed twenty-four members to represent all regions and institutional types. The question of making the Board merely an advisory group was dropped.

In late March, President Kennedy issued Reorganization Plan No. 2, which created an OST with policymaking and coordinating powers. The Foundation's official authority remained unchanged.

### Golden Age of Growth

In the decade following *Sputnik*, the Foundation's budget grew tenfold, from \$40 million in FY1957 to \$465 million in FY1967. The Foundation used the funds in strategic ways that resulted in many of the most exciting scientific and technical achievements of the modern era.

A proposed major expansion of the Foundation's focus came before the Board in 1961. Foundation staff members, in touch with university and college administrators around the Nation, had heard that while they were grateful to get some overhead from each investigator's individual grant (usually 15 percent in the early years, though much higher later on), the totals in any one year were unpredictable. These administrators wanted to improve their facilities and programs systematically without having to depend on fluctuating levels of overhead. NSF staff proposed the creation of "institutional grants," which the schools could spend flexibly. The Board liked the idea and asked the Foundation to implement the new grants as soon as possible.

But there was another, related issue to address. Institutions won NSF research awards based on scientific merit, creating what Board Chair Eric Walker called "a kind of spiraling situation" in which the best institutions got better. As Walker told Congress in 1965, colleges in "New England and on the West Coast...get a higher percentage of the grants...pay higher salaries, attract better people, and continue to submit the best proposals.... It is very difficult, and I think quite undesirable, to fight excellence. It is hard to weed out the fault without eradicating the virtue."



1960 First weather satellite

1960 Jacob and Monod discover genes are turned on/off by other segments of DNA (Nobel 1965)



1961 Antarctic Treaty signed to continue scientific cooperation in region begun in IGY

1961

As a remedy, the Director proposed the creation of University Science Development Grants, designed for the second twenty or so schools that aspired to be “centers of excellence.” The Board approved the program in June 1962, but deferred it when additional appropriations did not materialize. Through 1972, NSF would invest more than \$180 million in the program, which greatly expanded the capabilities in research and science education of many U.S. institutions. NSF’s commitment to institutional grants over time fostered excellence nationwide, allowing many research universities to gain worldwide preeminence.

Growth also meant an expansion of large-scale science. NSF’s Antarctic program was flourishing, and by FY1967, in addition to the Green Bank and Kitt Peak observatories, the Foundation had five stellar telescopes operating and a sixth under construction. The Foundation also launched Kitt Peak’s counterpart in the Southern Hemisphere, Cerro Tololo Inter-American Observatory in Chile. In November 1965, NSF became the government’s lead agency for ground-based astronomy.

Other large-scale projects sprang up. The National Center for Atmospheric Research housed the High Altitude Observatory to study sun-related phenomena. Ship-based ocean-drilling studies around the world suggested that sea floor spreading caused continental drift, an achievement that sparked strong, ongoing support for activities in geophysics and oceanography. New marine biology field stations started operations—NSF-supported scientists studied the Great Barrier Reef ecosystem and counted species in and along the Amazon River. The Board approved “Big Biology” in the form of the International Biological Program, which ran from 1968 to 1974. A less successful effort was “the great project Mohole,” which the Board took up in Executive Committee. The plan to drill a hole through the sea floor to the juncture with the mantle, or “Mohorovic discontinuity,” was so problematic that by the time Congress cancelled the program in 1967, critics had dubbed it “project no hole.”

### More than an Advisory Board

As the Foundation’s activities became ever more robust, Board members wrestled with the ongoing question of how involved they should be in managing the agency’s affairs. The Board had fought off the Kennedy Administration’s efforts to reduce the Board’s influence, but members themselves admitted from time to time that the Board “should stop worrying about details and possibly ‘stepping on toes’...,” as was recorded in the minutes of one long self-examination session in November 1965. Members at that meeting decried “the custom of determining what matters should be brought before the Board primarily on a dollar basis rather than on a policymaking basis.” Instead of micromanaging operational details, the Board should be “more sensitive” to “what science can do for the public.”

### NSF FLIES HIGH

World War II’s unprecedented air campaigns heightened interest in meteorology. Responding to a National Academy of Sciences recommendation, in 1960 the National Center for Atmospheric Research (NCAR) was organized in Boulder, Colorado, under the auspices of NSF. Its mission is to conduct research on a larger scale than what any single university could accomplish. A few years after the center’s founding, the Board approved plans to build on Table Mountain a new state-of-the-art NCAR facility—Mesa Laboratory, one of architect I. M. Pei’s first U.S. buildings.



1961 First electronic watch marketed

1963 Kennedy assassinated; Johnson becomes President.



1963 Quasars discovered

1964 Great Society/Civil Rights Act passed

1963

1964



PhotoDisc

On the other hand, members at the meeting strongly reconfirmed that the Board should serve more than a purely advisory function. The Board, they said, was “an excellent platform from which to act” and had “stood up to the Government for the scientific community in previous crises.” The Director was “in an anomalous position, being responsible to the President, Congress and the Board,” and could best be helped by the Board’s giving him a “basis for objecting to action by other parts of the Government,” or even acting as “a ‘burr’ to the Government, if necessary.”

The Board enhanced the Foundation’s effectiveness in other ways, members noted. Because “the Board has a rotating membership, the academic community feels close to the Board,” and hence to the Foundation itself. What’s more, “instead of the staff being limited to discussing ideas and plans among themselves,” Foundation staff members benefit by “having to present recommendations to a Board with policymaking power. . . . The very act of having to prepare presentations to the Board is apt to provide an objective viewpoint, which makes the staff carefully consider the wider view.”

As it celebrated its 15th anniversary in 1965, the Board believed it was fulfilling the vision of self-governance by a pluralistic, merit-driven enterprise that Vannevar Bush outlined in *Science—The Endless Frontier* twenty years before.

### Expansion into Engineering and Applied Research

From late 1964 through early 1968, the Foundation’s authorizing committees in the House and Senate considered the Foundation’s future role. The leader of the inquiry was Congressman Emilio Daddario (D-CT), chairman of the Subcommittee on Science, Research and Development of the House Committee on Science and Astronautics. Daddario held extended hearings in 1965 with an eye to extending the Foundation’s mandate to include engineering, social sciences, and applied research. Because the Director and the Board embraced Daddario’s aims—albeit cautiously—they were listened to in crafting amendments to the original 1950 Act. The amendments became law in July 1968 as P.L. 90-407. The situation unfolded much as in the mid-1950s: Congress perceived the Foundation as successfully managing its growth and rewarded it with broader responsibilities.

Daddario was a friend of the Foundation. He believed in the federal patronage of basic research and the coupling of research with education. The *zeitgeist* was shared by his Senate counterpart, Edward M. Kennedy (D-MA), who held similar hearings as chairman of the Special Subcommittee on Science of the Senate Committee on Labor and Public Welfare. In 1965, NASA’s astronauts were national heroes, computers were rare items of public wonder, and physicists enjoyed particular prestige. Conventional wisdom held that if other fields adopted the methods of physical science, they could solve the Nation’s problems.



1965 Discovery of microwave background by Penzias and Wilson



1967 Regulation of genes through “chemical recognition”

1965

1966

1967

NSB Chair Walker

NSB Chair Handler  
NSF Director Haworth

The National Science Board benefited at this moment by having a plainspoken engineer as chairman, Eric A. Walker, president of Pennsylvania State University. Walker advocated an explicit role for engineering at NSF even as it maintained its mission in science.

Five Board members testified and two more gave written answers during Daddario's 1965 hearings. Bryn Mawr College President Katharine E. McBride praised NSF's awards to small colleges. Father Theodore M. Hesburgh, president of the University of Notre Dame, agreed the Foundation could diversify funding beyond the coasts: Midwest institutions produced thirty-two percent of the Nation's students in science and engineering, but received less than that percentage of federal research funds. Hesburgh eloquently argued for upgrading the social sciences at NSF, a position he had steadfastly held over eleven years on the Board. Harvey Brooks, Dean of Engineering and Applied Science at Harvard University, urged that NSF expand from thirteen percent of all federal academic research to closer to thirty percent.

The Board and Director worked closely with Daddario and Kennedy through 1966 and 1967 on the wording of amendments to the Act. Their insistence that the change not dilute NSF's core mission won the day. The final House report said applied research "should not... obscure and overcome the important work in basic research" at the agency. The amendments gave NSF explicit authority to support the social sciences and engineering, as well as a clearer role in international scientific cooperation, computer technology, and data collection on the federal scientific effort.

Finally, the amendments clarified the roles of Board and Director—giving the Director more flexible authority in relation to the Board to help him run a bigger operation. The Board was empowered to issue an annual report, a new forum through which to speak on the health of science and engineering.

## A CHAMPION FOR SOCIAL SCIENCE

In 1958, Reverend Theodore M. Hesburgh, an early, influential member of the Board, was named head of a committee tasked with defining the Foundation's commitment to social science. Most decisionmakers then at the Foundation were from the physical sciences. During one meeting from which Hesburgh was absent, his committee—"in a stormy session," according to accounts—watered down the draft report and tried to bring it to a vote, a move resisted by Board Chair Detlev W. Bronk. Upon Hesburgh's return, he insisted that the Board vote on the original language. Writes historian J. Merton England, "perhaps this time the members were in a good mood, or perhaps they hesitated to challenge his obvious conviction." In any event, they approved the initial report.



**1967** Pulsars discovered by Bell-Brunnell, graduate student of Hewish (Nobel 1974)

**1968** Nixon elected President



**1969** Meteorites found in Antarctica; first practical way to sample them

**1969** Neil Armstrong first man on the moon

1968

1969