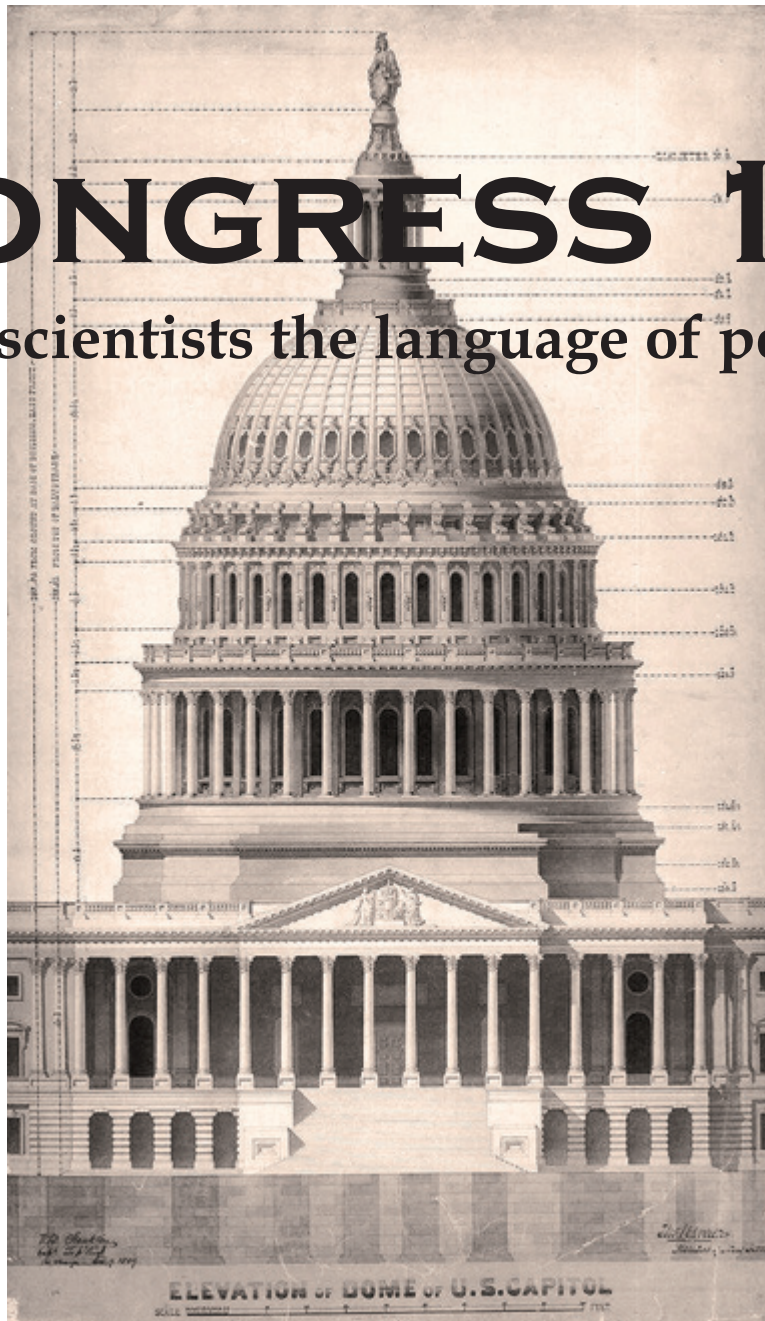


# CONGRESS 101

## Teaching scientists the language of policymakers

by Temina Madon



1859 drawing by architect Thomas U. Walter of the elevation of the Capitol dome.

What Berkeley student hasn't at some point felt exiled out here on the western edge of the country, isolated from the political conversations taking place in the nation's capitol? Or frustrated at only hearing the word "academic" used pejoratively by the media? It doesn't have to be this way; much of what goes on here is in fact relevant to society's larger questions. While the links between academic science and actual policy may sometimes be difficult to perceive, many people have managed to prosper in both worlds.

Take, for example, Vernon Ehlers, the first physicist to serve in Congress. He began his career at UC Berkeley in the 1960s, where he received his doctorate and later taught in the physics department. While at UC Berkeley, he spent much of his time engaged in nuclear and atomic physics research at the Lawrence Berkeley National Laboratory, and eventually became close friends with the legendary Glenn Seaborg, father of radiochemistry and discoverer of some 13 elements. At Berkeley, Ehlers met many researchers concerned by national security policy, nuclearization, and war. He also became

aware of the lack of scientific input into the national policymaking process.

Over time, Ehlers began to venture into politics himself, initially at the local level, addressing environmental issues in his home town of Grand Rapids, Michigan. Today, he is a sixth-term member of the House of Representatives (R-MI), where he chairs the Subcommittee on Environment, Technology and Standards of the House Science Committee. His tenure in Congress has been marked by an unwavering commitment to education and research in science, technology, engineering, and math.



Congressman Vernon Ehlers (R-MI), left, meets with Nobel laureate the director of the Lawrence Berkeley National Lab Steven Chu in 2005.

photo courtesy Berkeley Lab

## Why Washington Needs More Scientists

Many scientists drawn into the world of policy share a sense that greater numbers of researchers should be involved in the decision-making process. Bruce Alberts, a biochemistry professor at UC San Francisco and former President of the National Academies, has been a strong advocate for the role of science in policy. During his tenure at the Academies he helped establish fellowship programs that bring scientists and engineers to Capitol Hill, with the goal of influencing lawmakers and convincing them to embrace evidence-based approaches in their work.

Today, there are several organizations that encourage researchers from academia and industry to advise government on issues related to technology, environment, health, foreign affairs, and research. One such program, administered by the American Association for the Advancement of Science (AAAS), places early- and mid-career scientists in Congressional offices and in various executive branch agencies—including the National Institutes of Health, National Science Foundation, and less expected places like the State Department and the Agency for International Development.

This year, I am serving as an AAAS fellow in the US Senate, where I explore legislative issues that include international health, health insurance regulation, and health information technology. While these issues draw heavily on science and research, the results of the decision-making process can be unexpected, because policy doesn't always reflect reason alone—political feasibility and ideology also influence outcomes. Although the average politician may find this observation quite normal, it can surprise the uninitiated scientist. After all, academic research communities are typically governed through self-regulation and professional norms, with rules of conduct, ethics, and safety determined by consensus. Because the process is transparent, data tend to trump personal values.

However, in federal government, particularly in recent years, evidence is less likely to dominate decisions about fundamental issues like civil rights, diplomacy, energy policy, or social policy. Rather, these decisions can be driven by ideology, rhetoric, and the desire to satisfy small but vocal or influential in-

terest groups. A recent example is the decision by former Food and Drug Administration (FDA) Commissioner Lester Crawford to delay over-the-counter access to Plan B, a potent form of birth control known as the “morning after” pill. The medication is currently available in the United States with a prescription, and it has been available without a prescription in some European countries since 2000. Its safety and utility—even for teenagers—have been unambiguously established by many careful clinical studies.

In 2003, scientists on two FDA advisory committees reviewed available data on the drug's safety and efficacy and nearly unanimously recommended its approval for non-prescription sales in the United States. In the past, the FDA has generally followed the advice of its scientific advisory panels, yet the final approval for this drug has been delayed for nearly three years—largely because of the moral objections of a small minority of Americans with religious bias against birth control.

This outcome, which ultimately prompted Assistant Commissioner for Women's Health, Susan Wood, to resign from the FDA's professional scientific staff, has elicited protest from some sectors of the scientific community, including the editorial board of the *Journal of the American Medical Association*. Yet the administration has so far not responded to scientists' concerns that the review process obscured scientific evidence in favor of ideology.

Many organizations and professional societies have called on Congress to restore the scientific integrity of the FDA. While lawmakers prize scientific integrity, the values-driven arguments posed by opponents of this medication cannot reasonably be countered by facts. There are no sound, scientific, evidence-based arguments for barring over-the-counter use of this drug. In the face of irrational arguments, what scientist or legislator would want to fight?

This is one of the great ironies of the role of science in policy: scientists must often counter value judgments and beliefs with evidence and hypothesis-driven data. As a scientist, it becomes a great craft to present an evidence-based policy prescription within a framework that makes sense, even in the context of values and morals.

Even after scientists find an entrée into Congress, they continue to face significant barriers. For example, Congressional staffers may be too busy to learn about the fundamental underpinnings of network structures and distributed systems before making pivotal decisions on internet regulation. Many of these staffers have sophisticated legal backgrounds but limited experience managing new technologies or defining research priorities. Nonetheless, these are the people with major decision-making power and control over the nation's purse-strings. While experts are routinely brought to testify at Congressional hearings and provide input into the complex policy-making process, the selection of witnesses for hearings is carried out by those same staffers who struggle with limited experience in science and technology. As a result, the “expertise” brought to the Hill may be distorted, reflecting business interests over technical information and data.

## Bridging the Gap

One organization independent of the federal government that ties Berkeley to Washington is the National Academies (NAS). Established by Congressional mandate in 1863, the National Academies study and report to the government on some of the most controversial and cutting-edge issues in science and technology. For example, with the current limitations on federal support for embryonic stem cell research, the NAS has tried to fill the void in providing research guidelines in this burgeoning field. Often their work examines the interfaces between academic research, human welfare, domestic and foreign policy, and international relations. More than 100 professors at Berkeley serve on the Academies, providing a means for local scientific expertise to be heard in Washington.

The Academies function through committees and boards, comprised of the nation's most respected and established scientists, engineers, and physicians. Because of the Academies' intellectual integrity and independence, their recommendations are often acted upon by Congress. Indeed, much of the nation's health, economic, and foreign policy is driven by these reports. Recent reports that are likely to trigger Congressional legislation include those on economic competitiveness and the science workforce, terrorism and bioterrorism, the health care crisis in developing countries, and childhood obesity. However, other reports, such as the Academies' recommendations to change our climate-altering ways, have not been greeted with much enthusiasm in the White House.

By staying abreast of the Academies' latest releases, and by understanding their content and recommendations, you have an opportunity to influence political discussion. An email to key representatives and senators, communicating the importance of new findings from the National Academies, gives you a chance to frame the arguments presented and influence the policymaking process.

One difference between academic science and policy is specialization. Scientists are only expected to stay up-to-date in a narrow field of discipline, but to be relevant to the larger community one must keep up with a much wider range of issues. A good way to do this is to peruse the front sections of scholarly journals with policy and news sections. Some of the best examples are *Science*, *Nature*, and *Chemical & Engineering News*, which cover academic research as well as industry and give more time to international news than your average American newspaper. EurekaAlert!, a service provided by the publishers of *Science*, offers online science and technology news organized by research topic. For news and opinions on how science impacts the developing world (which is where most humans live), read [www.scidev.net](http://www.scidev.net) or the World Health Organization's website. For those with some down time in front of the computer, listen to audio files from National Public Radio (NPR), which are available for free on the web. NPR provides comprehensive cover-



Photo courtesy of Temina Madon

The author, Temina Madon, gets first-hand experience with science policy as a Congressional Science Fellow with the American Association for the Advancement of Science.

age of science and technology, often in the context of public health, global climate change, and poverty.

Easier than hunting down the information yourself, try signing up for e-newsletters from scholarly journals, non-governmental organizations like the Union of Concerned Scientists, and think-tank groups like the Kaiser Family Foundation (for news on HIV/AIDS, public health, and other health-related policy). Many professional societies, including the American Society for Cell Biology and the American Chemical Society, now send out "action alerts" and legislative news of interest to researchers. Of course, you can also find interesting science news on blogs and through RSS (Rich Site Summary) feeds; Chris Mooney, author of the partisan book *The Republican War on Science*, runs a particularly popular science blog.

Once you've become familiar with the issues, why not put your expertise to use advising local or national policymakers? In the process of helping politicians to make better science policy decisions, you may also help to secure the future of federally funded science research. And who knows—one day you, too, may end up running for office.

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## Profiles in Science Policy

Another scientist revered for his role in public policy is Joseph Roblat, a nuclear physicist who won the Nobel Peace Prize in 2005 for his leadership in nuclear arms control. Roblat was a Polish-born Jew who left for Great Britain on a physics fellowship just as Nazi Germany began its invasion of Poland. He later came to the United States to work on the Manhattan Project, believing the Americans' effort could prevent an out-and-out nuclear war. However, upon learning of the German's failed nuclear bomb project, he returned to London to work on civilian research and to raise humanitarian concerns about nuclear weaponization. Through a series of influential scientific gatherings known as the Pugwash conferences, Roblat would ultimately lead British and American government officials to embrace nuclear arms control, resulting in the signing of the Nuclear Test Ban Treaty of 1963.

Physicists aren't the only scientists to have played a role in federal policy-making. Alvin Novick, a distinguished professor of biology at Yale who died just a year ago, is certainly remembered for his contributions to science and medical research; yet it is his leadership as an AIDS advocate that will remain his legacy. Dr. Novick became a voice for people with AIDS in the earliest days of the epidemic, not only speaking against uninformed discrimination and stigmatization, but also directing policymakers to use sound scientific judgment in matters of public health. He pioneered the expansion of needle exchange programs, now recognized as one of the most effective interventions for IV drug users at risk of HIV.

## Jump into the fray

Get your feet wet by trying a few of the ideas below to determine which aspects of science policy are most interesting to you.

### Get informed

In addition to the resources listed above, read science policy publications like “Science and Government Report” and “Issues in Science and Technology” or newspaper science sections like that in the *New York Times*.

### Express yourself

- ✉ Write letters to scientific journals expressing policy views on news items, recent research articles, or academic politics. For local magazines and papers, write a letter to the editor or an op-ed piece explaining, for example, how a recent news item such as the Patriot Act impacts researchers or your own work by limiting international scholars’ access to visas.
- ✉ Speak with deans and chairs in your department about the issues faced by researchers at your university—from problems with Department of Defense grants or NIH study sections to issues of ethics and academic honesty, or bans on entire fields of research. Barriers to research at UC Berkeley might include the cumbersome restrictions placed on federal funding of stem cell research, or the costly regulations required for “dual use” research, such as the study of the anthrax genome (which, in principle, could wreak havoc in the hands of bioterrorists).
- ✉ Email or write letters to members of Congress about federal and legislative issues that impact scientists—these letters actually do get read if they’re not just “form letters.” Encourage colleagues from other institutions to sign on to a letter that you distribute by email—consensus among scientists is powerful evidence for policy-makers.

### Focus, focus

Keep your letters, emails, and solicited commentary to the point and aimed at the appropriate audience. For example, don’t bring up your great arguments for increasing the National Science Foundation’s funding at the local school board meeting—they would probably rather hear your opinion of teaching intelligent design in science classrooms.

### Be creative

Start a science policy blog or weekly digest for colleagues in your department or field of research, posting relevant news items, grant opportunities, and links to useful laboratory resources. Encourage faculty, postdocs, and fellow students to comment and participate. Check out the synthetic biology wiki page for a remarkably successful example at [syntheticbiology.org](http://syntheticbiology.org).

## Know what’s going on outside the ivory tower

Check out some of the public-private partnerships that exist on the edges of your research field, where findings from academia are translated into products for popular consumption. Good places to find some of these efforts are professional schools—including law schools, medical schools, departments of public health, and schools of public policy, but here’s a quick list to get you started.

- If you’re a microbiologist, find out what the bio-security think tanks are talking about—examples include Stanford’s CISAC, the Center for International Security and Cooperation, and the Center for Strategic and International Studies in Washington, DC.
- If you’re a biophysicist working on viral replication and translation, what are the G8 countries doing to ensure that medicines for HIV/AIDS and other viral pathogens are available in the developing world? What is the Gates Foundation doing to help alleviate the burdens of infectious disease and poverty in sub-Saharan Africa?
- If you work in database architecture, what is the Electronic Frontier Foundation, a non-profit digital rights group, working on, and what are the current interests of open source advocates like Larry Lessig or Richard Stallman?
- If you work in operations research, how is the expertise from industry being applied to social problems, like the delivery of food and drugs to remote parts of the developing world?

## Could science policy be in your future?

It may sound strange for a student to spend a summer or a month in the nation's Capitol, but medical students and residents do it all the time. Interning in a Senator's office or federal agency gives you a hands-on feeling for how policy is developed, negotiated, and implemented. Start thinking early about applying for a science policy or science writing fellowship. There are lots of opportunities to consider at each stage of a scientist's career.

### UCDC

Graduate students engaged in doctoral research and Berkeley faculty members are encouraged to contact the UC program in Washington DC for opportunities to speak, research, and teach in Washington. One or two advanced doctoral students work in the program as teaching assistants each semester, while pursuing their own research and taking advantage of resources in the capitol.

### Day trip

Participate in professional societies' lobbying days—whether in DC or in Sacramento. While you may hate your first trip to the Capitol (as I did), you're likely to learn how little time and information members of Congress actually have when making decisions with far-reaching consequences.

### Policy at home

One of the richest experiences for the scientist interested in policy can be serving on a policy-making committee of the faculty, deans, or department heads at Berkeley. There are also UC-wide policy committees that draw student members from all UC campuses. These committees function in much the same way as the committees of the National Academies, the NIH, and the Congress.

### Policy fellowships

A complete listing of health policy fellowships, for doctoral students as well as senior researchers, is available at [kaiseredu.org/policy\\_index.asp](http://kaiseredu.org/policy_index.asp)

Science and technology policy fellowships and sabbatical programs can be more difficult to locate, but here is a sample:

- ✓ American Association for the Advancement of Science:  
Science and Technology Policy Fellowships  
[fellowships.aaas.org](http://fellowships.aaas.org)
- ✓ National Academies:  
The Christine Mirzayan Science and Technology Policy Graduate Fellowship  
[nationalacademies.org/policyfellows](http://nationalacademies.org/policyfellows)  
Jefferson Science Fellows and other fellowship programs  
[nationalacademies.org/fellowships](http://nationalacademies.org/fellowships)
- ✓ Princeton University, Institute for Advance Studies:  
Global Science Corps  
[globalsciencecorps.org](http://globalsciencecorps.org)
- ✓ National Institutes of Health, Office of Science Policy and Planning:  
[ospp.od.nih.gov/fellowships](http://ospp.od.nih.gov/fellowships)
- ✓ Presidential Management Fellowship:  
[pmf.opm.gov](http://pmf.opm.gov)
- ✓ U.S. National Commission for UNESCO  
[state.gov/p/io/unesco/programs](http://state.gov/p/io/unesco/programs)



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