

Commentary

Bringing science's value to the US Congress

In the study of current problems in physics and other sciences, one concern is often omitted: How do we ensure continued federal support for fundamental scientific research? Much of our work depends on such support. More than 50% of all basic research performed in the US is funded by the federal government.

Many scientists, dedicated to the expansion of the frontiers of human knowledge, believe that the importance of basic science is self-evident and that this work is worthy of federal financial support. In my interactions with members of Congress on both sides of the aisle, I have been encouraged to find that the support for basic science research in many fields, including physics, is largely bipartisan, and that policymakers across the political spectrum understand the value of science and technology to our economy and to America's place in the world. However, there are many competing demands on the ever more constrained federal budget. As Vice President Joe Biden has said, "Show me your budget and I will tell you what you value."

In this climate of constricted funding, it is crucial that we scientists make the case for supporting fundamental research by directly engaging with our elected officials. One of the happiest discoveries I made during my year in the Senate as the American Physical Society (APS) 2014–15 Congressional fellow was

that a lot more discussion of science occurs in the halls of Congress than I expected. In particular, it was fantastic to see how many scientists from a wide range of disciplines communicated with their representatives by presenting their work at briefings and events or by visiting the offices of their legislators to demonstrate the impact of federal investment on their work. Science needs more of you to join in these outreach efforts!

We must do a better job of preparing scientists to engage in the work of science advocacy. I frequently witnessed scientists speaking about their research to an audience of congressional staff in the same way that they would speak at a specialized conference or to an upper-level class; they focused on specific and often technical details rather than presenting the broader picture of the importance and impact of their work. And although researchers nearly always mentioned the name of their home institution, they often forgot to mention the source of their research funding—even when speaking to the people who set the budget and write the checks!

I think many scientists shy away from active advocacy for science because they are unfamiliar with policymaking and do not know how to effectively communicate with a very different audience in an environment foreign to them.

In fact, the policymaking process actually has much in common with the scientific process. In physics we have overarching goals of solving fundamental problems and answering questions

about the nature of the universe. We pursue those goals in incremental steps along a winding path. We refine measurements, revise hypotheses, improve techniques. We often encounter dead ends that force us to backtrack or start over. As we learn more, new questions arise, add to our knowledge, and alter the path. We work in teams, with colleagues and competitors likewise tweaking and methodically pushing toward the goal. External factors, such as new people, ideas, technologies, and techniques, open up new possibilities. And once in a great while, in a eureka moment, we are able to verify a long-held hypothesis, discover something unexpected, or have an insight that alters our understanding of the physical universe.

Making policy is surprisingly similar. Elected officials come into office with big ideas and policies that they would like to see enacted. But because of the way the federal government is structured, no one person can make a major policy change by fiat. Policymakers, too, have to work incrementally—whether tweaking language in bills, revising regulations, or fine-tuning agency policies within the broad structure authorized by Congress. That process, too, is full of twists and turns, with procedural delays, hurdles that can block a painstakingly developed bill from becoming law, and legislative and administration turnover.

To develop ideas into bills that stand a chance of passing, legislators must form coalitions and garner the support of constituents and relevant advocacy



AS A CONGRESSIONAL FELLOW, the author saw many similarities between research and policymaking.

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organizations. Whatever their long-term strategy may be, outside events can drastically reshape their policy work. Yet, as with the scientific eureka moment, occasionally the timing is right, the momentum has built, and a major policy change—the creation of a new program, a fundamental restructuring of an institution, or a substantial budget shift—becomes possible.

So perhaps we scientists should understand better than most what the process of making policy entails. We can see how it, like science, is a long-term effort over which no one has complete control, which requires teamwork, and whose success relies on the active and sustained participation of many individuals.

Of course, the money that is available for conducting basic research is primarily spent on the research itself, leaving relatively little to spend on public relations. But we do have another asset: intelligent, thoughtful, dedicated people. We are our own greatest resource for explaining to policymakers why the nation should invest in research, especially on the types of work that might not pay off for decades but on which our modern society is now based. It is up to us to make the case for science.

Some readers may be skeptical about how much influence we can have. Yet I have learned that government, especially Congress, is a surprisingly personal endeavor. Even in a country of more than 320 million people, personal communications can make the difference. People who get into politics and policy—elected officials and staff alike—are driven at least in part by the desire to help their constituents and the country. They are people people.

Members of Congress and their staff, who are critical gatekeepers, only rarely have a scientific or technological background. However, they are generally smart, engaged individuals who think science is really cool. But if you communicate with them only by discussing the technical details of your research, their eyes may glaze over, just like physicists' generally do at the technical details of policy development and legislation. Instead, we need to convey our passion for science, explain the big-picture importance of our work, and tell our personal stories about the effect science policies and budgets have on our research. Although that form and level of communication is not always the most comfortable for scientists, it is absolutely essential.

Furthermore, in the Senate I saw how important it is for policymakers not just to hear from the most senior people—university administrators, government relations professionals from academic and scientific societies, heads of industry. Those people are heard from routinely, and policymakers know what they are likely to want. In my experience, the people who make the greatest impression are the everyday folks, the people on the ground doing the work. In science, those are the students, postdocs, rank-and-file faculty, and researchers driven by enthusiasm and a thirst for understanding.

So this is a call to all of you, junior and senior, students and faculty, in academia and in industry, to step up to the plate. APS, the American Institute of Physics (which publishes PHYSICS TODAY), the American Astronomical Society, and the American Association for the Advancement of Science all have resources that can help.

Write or call your members of Congress to express your opinions on budgets and bills that affect scientific research. Invite them to your labs when they are in their home districts and show them what you do. Visit Washington. Talk with them and their staff in person. Personalize your advocacy. Explain why you wanted to pursue your research, how it holds your interest, and how it motivates you to work long hours, often for less money than you could make in other jobs.

Legislators and their staff members may not understand the technical details and the fundamental insights of your work, but they will understand that you—and by extension other scientists—believe strongly in the value of basic research. Show them that physics is not an abstract dry pursuit of unintelligible things; share your passion for the discipline. You will make an impression.

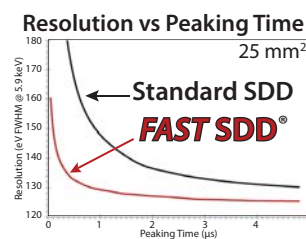
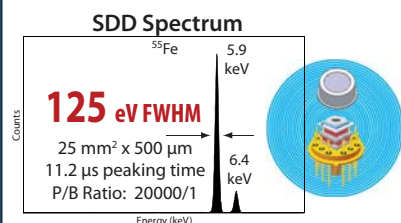
Science doesn't speak for itself. We must speak for it.

The views and opinions expressed here are entirely my own and should not be construed to represent those of the American Association for the Advancement of Science, the American Physical Society, or NSF.

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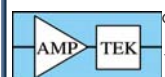
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