I remember being fascinated by Washington, D.C., from my first visit. The White House and Capitol Building weren’t just symbols but the seat of power for the greatest country in the world. The decisions and laws made in those buildings didn’t only affect us as Americans, but had an impact on the entire civilization. During one of my trips, I realized that I wanted to come back someday and participate in lawmaking.

I returned in 2013 not as a visitor, but as a Science and Technology Policy Fellow, part of the ASME Congressional Fellows program. To be accepted for the program was a great honor, I knew, but what I didn’t realize in advance was the way that having a trained engineer on a congressional staff could have an important and long-lasting impact on public policy. I thought I would be one of many people trained in the physical sciences helping shape complex technical policy; too often, I was pretty much the only one.

Indeed, what I took home from my year in Washington was not a wonder at the magic of self-government but a realization that engineers and other scientifically trained individuals are not doing enough to influence policy.

So many public policy issues deal with questions that have a science or engineering basis, and those issues are being decided in many cases without an understanding of what is at stake. For instance, during the 113th Congress, which met in 2013 and 2014, only 12 House and Senate members had engineering degrees. A mere 5 to 10 percent of the Congres-
Engineers cannot remain outside the political process. Their expertise is needed to ensure that technical policy is crafted to do the most good.

By Bharat Bhushan

The professional staff who prepare the legislation typically possess physical science or engineering degrees. And at the state level, the numbers are no better.

Engineers could bring a perspective that is too often not considered in the halls of Congress. Too often, we hang back and let important decisions get made by people who don’t really understand scientific and engineering principles behind the policy they are deciding.

WASHINGTON AT WORK

For my fellowship, I was assigned to the Subcommittee on Research and Technology of the House Committee on Science, Space, and Technology. Given my academic background and major focus on nanotechnology, the subcommittee seemed to be the most appropriate training ground and the best opportunity to contribute. Not only is the Subcommittee on Research and Technology responsible for funding for the National Science Foundation and the National Institute of Standards and Technology, as well as other technology agencies and science education programs, but it is also responsible for 21st Century Nanotechnology R&D Reauthorization Act. I approached the chair of the committee and let him know about my expertise; they were keen on having me there.

One of my duties was to prepare the subcommittee for hearings on major bills. For instance, I worked on the preparations for a May 2014 hearing to be titled, “Nanotechnology: From Laborato-
ries to Commercial Products.” That was a topic dear to my heart, as I have spent a good portion of my research career studying nanoscale phenomena.

It turned out that the 21st Century Nanotechnology Research and Development Act hadn’t been reauthorized since 2007, so I prepared a background paper on the technology and prepared critiques on all reviews mandated by Congress on the National Nanotechnology Initiative. And I stressed the need for a set of informational hearings to be followed by enactment of a nanotechnology research and development reauthorization act.

To bolster that case, I prepared a detailed summary of every college and university that awarded degrees in nanotechnology, of public and private R&D funding and capital investments, and of the number of nanotechnology companies, with annual output in dollars and number of jobs created, in districts of all Congressmen on the committee on both sides of the aisle. The purpose was to stress upon committee members that their districts benefited from the nanotechnology field and they needed to be engaged and be supportive.

The logistics involved in holding a hearing can be daunting. I needed to select potential witnesses for the hearing who would provide an expertise in the field, while not neglecting to include one each from the districts of the chairs of both the full committee and subcommittee.

I prepared a hearing request, which had to be approved by the committee chair, and then I prepared a hearing charter to schedule a hearing. Just before the hearing, I helped prepare the hearing documents to be used by my committee with a long list of potential questions.

It wasn't only hearings; I assisted in the preparation of legislation. Unlike the process that's taught in civics classes, the route that most bills take to become law is a tortuous one. To be sure, the path a bill takes includes hearings and mark-ups by the relevant committee, followed by a series of votes in the House and Senate, and if passed using identical language in both houses, then it has to be signed by the president.

But bills are also shaped by lobbyists and stakehold-
We can lobby legislators in favor of policies, educate our fellow citizens on the engineering view of issues—or even run for office.

ers, and get tainted by the political process. The legislators have constituents to please, and a party platform to observe.

As most people realize, the political climate while I was fellow was not conducive toward passing new laws and regulations. The partisan divide was almost unbridgeable. The 110th Congress saw nearly 14,000 pieces of legislation proposed, and about 97 percent were rejected.

But in my time on the subcommittee staff, I was able to see a few landmark pieces of legislation through the committee. For instance, I participated in the putting together of the Frontiers in Innovative Research, Science, and Technology Act, intended to reauthorize funding for various science agencies and programs. In the process, we had to not only develop the legal document, but also negotiate details with various committee members and their staffs, and to continuously seek critiques from inside and outside. And, surprising to me, there were many hearings: ones to introduce the bill, which involved external witnesses, and mark-up hearings organized by the subcommittee and the full committee, for which we prepared responses to proposed amendments.

I also worked on the Revitalize American Manufacturing and Innovation Act of 2013, which provides funding for establishing national networks for manufacturing innovation in targeted areas, and the STEM Education Act of 2014, which provides funding to promote STEM education at all levels, from kindergarten through college, with some focus on economically disadvantaged and minorities.

ENGAGING THE PUBLIC

My time as a Congressional Fellow was a life-changing experience. But let’s face it: there are not enough staff positions in Washington for every engineer to become engaged in policy through that sort of program. I believe it is critical that engineers find a way to become involved with policy making, so it’s important to find ways of doing that closer to home.

Back home in Columbus, for instance, my colleagues and I have created an undergraduate minor in science, engineering, and public policy, a joint program between the College of Engineering and the John Glenn College of Public Affairs at my university. I have been appointed an affiliated faculty member in public affairs and champion the engagement of engineers in public policy at every opportunity. I am giving lectures in a cross-listed course on science and public policy. And I am ready to give talks at other colleges and universities about this and the importance of federal R&D investment, a policy on which I feel strongly.

This sort of engagement can make up for the lack of science and technology literacy among legislators, especially at the state and local levels. There are many ways that engineers can get involved, including directly, by taking up positions on the staff of state or federal representatives—or even by running for office themselves. We can lobby legislators in favor of policies and educate our fellow citizens on the engineering view of issues.

Above all, we must gain the training and experience needed to reach out to the public, both in speaking skills and in writing for a general audience.

There is a longstanding bias among engineers against engaging in public policy debates. We tend to let our research and products do the talking for us. But to me, this approach is mistaken. More than ever before, engineers need to be in policy making or aggressively engage their policy makers. Those of us in academia need to develop minors and develop cross-listed courses on science and public policy. This would provide a window to students on public policy and some may take a path of public policy either full time or in an advisory capacity at some point in their careers.

Engineers have to be champions for pro-science and pro-technology policies. They have the knowledge, passion, and drive to encourage state and federal lawmakers to implement these policies. We would be shirking our professional and social responsibilities if we did not participate to the fullest extent.

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