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From the bench to the beltway—a scientist's journey to public policy

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My path from bench science to public policy was set in the spring of 2003 when the United States invaded Iraq.

At the time, I was a graduate student in the Molecular Biology Department at Princeton, learning cell and developmental biology from Eric Wieschaus, who had helped revolutionize embryology and was awarded the Nobel Prize. His instruction was simple yet powerful – ask interesting and important questions and devise experiments to answer them. Wieschaus spent most of his days in the lab, generating fruit flies with unique genetic backgrounds that his students and postdocs could experiment with, helping us interpret results, and providing us with ideas and inspiration for future experiments. I didn't grasp it at the time, but this training in the scientific method turned out to be just as valuable outside the laboratory and in my future public policy career. (Fig. 1).

As we were pursuing truth in the laboratory, something troubling was taking place in foreign policy and national security circles. The invasion of Iraq followed months of disinformation by the White House, its pro-war allies in Congress, a disappointing swath of the media, and numerous 'experts' throughout Washington DC think tanks. Even academia played its part — our own Dean of Princeton's Woodrow Wilson School penned a piece in the New York Times titled "Good Reasons for Going Around the UN" and argued how "... Soldiers ... would find irrefutable evidence that Saddam Hussein's regime possesses weapons of mass destruction." and how "even without such evidence, the United States and its allies can justify their intervention if the Iraqi people welcome their coming and if they turn immediately back to the United Nations to help rebuild the country."

We now know the war was one of our biggest foreign policy blunders, resulting in the death of hundreds of thousands of Iraqi civilians, thousands of U.S. service members, and costing taxpayers trillions of dollars – all while making America less popular and the middle east more dangerous. That's not all. Destabilizing Iraq also enabled the rise of ISIS and other terrorist groups, further destabilizing the middle east and contributing to a mass exodus of migrants to Europe which in turn exacerbated anti-immigrant and anti-muslim sentiments and empowered the far right and white nationalists.

At the time, and as a scientist, I was learning that data and objectivity are everything. But in foreign policy, and for a decision as monumental as going to war, evidence seemed to be the last thing decision makers cared about.

The issue was also personal. I grew up in Iran during the bloody Iran-Iraq war. Even though Tehran was far from the major conflict along the border, war still affected every aspect of my life. My family would wake up in the middle of the night to bombs dropping. At school, war consumed our conversations, the games we played, our art projects, and fueled our childhood anxieties. And beyond the physical destruction and death toll, I watched war transform society for the worse. War gave hardliners every excuse to label critics as enemies of the state, it allowed them to more easily violate human rights, silence dissenting voices, and make democracy and self-expression ever more elusive.

Eventually, my family left Iran – and everything we knew and loved – to start over in America.

So, for me, it was difficult to watch those who had never experienced war claim it would bring about democratic change and restore human rights when my own experience living in that part of the world suggested otherwise.

To come to terms with my own frustration, disbelief, and feelings of powerlessness at the path our nation's leaders were embarking us on, I started learning about government by attending lectures and taking courses in other departments. I also came to know a group of Princeton scientists who were working with policy makers to reduce the risk of nuclear weapons and to improve biological security. They were led by Frank von Hippel, whose engagement with Soviet scientists during the Cold War had helped Reagan and Gorbachev reach arms control agreements, and by Christopher Chyba, an expert on nuclear arms control and biological security who was looking for a biologist to develop strategies to minimize the possibility of biotechnology being used to produce biological weapons.

This was my ticket to better understand the world of public policy. I finished my dissertation and landed a joint appointment between Princeton University and Secretary-General Kofi Annan's office at the United Nations. I was working to develop technical and policy bio-security solutions at Princeton, and testing to see if they could get international traction through the UN.

My learning curve at the UN was steep, largely because policy making is about a lot more than evidence and data. It's also about balancing stakeholders and getting buy-in from key individuals and groups. Consider, for example, why we don't have a climate policy in the United

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Fig. 1. Veterans Day event at the White House. Here's how the conversation went:
 Senator Franken: "Mr. President, this is my LD, Ali Nouri. LD stands for Legislative Director."
 President Obama: "Al, I know what an LD is. I used to have one of those."
 Vice President Biden (chuckling): "Nouri, is that an Irish name?"
 Me (thinking): "How did I end up here?"

States. This isn't simply because we don't all agree on climate science, although that's a big challenge, but rather that climate change mitigation will create new winners and losers, and the losers – namely the fossil fuel interests – have powerful political allies. Any effective and lasting policy change requires either the balancing and appeasing of various political interests, or sweeping political change.

After finishing up my assignment at the UN, I applied to the AAAS Congressional fellowship program, which places scientists in the heart of Congressional offices. I wanted to better understand how the political process interacts with the underlying science.

I landed the fellowship and chose to work in the office of Senator Jim Webb, a Democrat from Virginia whose reputation as a Vietnam war hero and service as a former Navy Secretary gave him tremendous credibility in his early critique of the Iraq war and his efforts to bring rational thinking to US foreign policy.

I began working for him in 2008, right before the presidential election, when the economy was in free fall and Congress was working to rescue it. One of the first major bills I worked on was the stimulus package – a giant spending bill to boost funding for infrastructure, research, and other areas.

The fast pace of Congress was exhilarating but also alarming. With hundreds of amendments to the Bill, Senate leaders set up voting marathons with amendments every 15 min. That meant that we staffers had a short time window to research the issue, understand its impact, talk to other Senate offices, call outside experts, and synthesize all that information to come up with vote recommendations to brief "the boss."

Life on the Hill was fast, unpredictable, stressful, exhilarating. I fell in love with the work and stayed for the next 10 years.

As a Hill staffer, I was constantly bombarded by information and requests from constituents, lobbyists, advocacy organizations, the business community, the nonprofit sector, and just about anyone else with an interest in public policy. But, to my surprise, organizations that represented scientists and translated and communicated science to Congress were hard to come by. So I made it a point to proactively reach out to scientists to make sure their views were represented in almost everything we did. It always paid off.

In one instance, Senator Webb wrote to President Obama and met with him in person to discuss the work of a Stanford Engineering Professor who had shown a remarkably strong linkage between black carbon (a component of soot) and short term climate effects. That effort helped

policy makers to eventually incorporate black carbon into the Convention on Long-range Transboundary Air Pollution. Whether it was speaking with environmental scientists on issues related to the use of Agent Orange in Vietnam, or to nuclear physicists on the Fukushima nuclear plant disaster and lessons learned for the US fleet, we made a point of bringing scientists into the national conversation.

After Senator Webb announced his retirement, I learned that Senator Al Franken, a Democrat from Minnesota who sat on the powerful Energy



Fig. 2. Above the Fray. Like any other graduate student, I needed an outlet to get through my dissertation so I learned how to become a pilot. In my video series, Above The Fray, I interview scientists and others about public policy while flying them in a single engine Cessna. You can watch episodes here: <https://bit.ly/2ydmZg>.

and Natural Resources Committee, was looking to hire an advisor. Franken liked having scientists on staff and at any given point in time there were 3–5 scientists from various disciplines working for him. I got the job and was soon put in charge of running the energy subcommittee that he chaired, and also became his senior advisor on environment and agriculture policy. Eventually, after working on his staff for several years, I became his legislative director. It was the most fascinating job I held on the hill because I no longer handled a discrete set of issues, but oversaw the entire legislative operation. That meant I got to help guide every initiative the Senator undertook, participate in all policy discussions, read and approve all memos, speeches, and vote recommendations, and work closely with other Senate offices to coordinate strategy – all while mastering the arcane procedures of the Senate so I could help shepherd our legislative priorities on the Senate floor.

Working in Congress made me keenly aware of the power of an organized constituency. And of all the constituencies I worked with, I was most impressed by an unsuspected one: farmers. Few interest groups are as sophisticated and successful as farmers when it comes to shaping policy. Farmers study up on their lawmakers, regularly visit their offices in D.C. and in the district, and form relationships — even friendships — with members and their staff. Farmers also keep up with federal policies that could impact their operations, organize themselves into powerful entities, and work with coalition partners to advance their agendas. Because of these efforts, Congress takes farmers and the issues they care about very seriously.

Scientists would be wise to take lessons from farmers. Science and evidence will play a greater role in decision-making if scientists take time to build relationships with lawmakers; organize trips to Congressional

offices that are more frequent, more focused, more personal; and weigh in on policy matters. If scientists do that, Congress will be better informed on important policy issues, and better equipped to address the challenges faced by the scientific community.

I left the Senate in 2018 determined to take the lessons I learned on the Hill and elevate the role of science and evidence in policy-making. I assumed the presidency of the Federation of American Scientists (FAS), an organization that was formed by scientists in 1945 whose mission was, and still is, to reduce the risks from nuclear weapons, fight disinformation, advance scientific research, secure its benefits for the general public, and address the societal implications of disruptive technologies. (Fig. 2).

To help with this mission, we are building and fostering a network of scientists to develop relationships with federal officials and to actively use evidence and science to inform the work of lawmakers, those in the executive branch, and other policy makers.

Whether the issue is how to use gene-editing technology in an ethical manner, or AI in a responsible way, answers to these societal questions require the participation of the science community. And while technical expertise is a great entry point for scientists to contribute to these discussions, our role goes beyond that. A good scientist is not just a technical expert, but is someone who is also trained to analyze evidence and to look at issues critically and with a healthy dose of skepticism. As such, there is a world of opportunity for graduate students, post-doctoral fellows, faculty members, and others in STEM professions to apply these principles to help build a better and more informed world. I hope you'll join us in this endeavor and bring more evidence based thinking to policy making.