

HARVARD GSAS SCIENCE POLICY GROUP AND DMS POLICY PATH

REPORT ON WASHINGTON, D.C. TRIP APRIL 6th – 8th 2016

The GSAS Science Policy Group (<http://projects.iq.harvard.edu/sciencepolicy>) is made up of graduate students interested in the intersection of science and policy. Similarly, the DMS Policy Path is a graduate student-run group under the Division of Medical Sciences at Harvard Medical School. We engage Harvard students in public policy, communication, and funding concerns surrounding the scientific research enterprise in the United States, and serve as an information gateway for graduate students interested in pursuing public policy and government careers after Harvard. Activities include topical discussion sessions, journal clubs, invited speakers, career panels, and a course on science op-ed writing during the January term.

The Washington, D.C. trip is the flagship event of the GSAS Science Policy Group and DMS Policy Path and accomplishes the following objectives:

- Fosters a productive and ongoing dialogue between Harvard scientists, agency leaders, and decision-makers in Washington, D.C. about issues in science and public policy.
- Connects students and the Office of Career Services with career opportunities for Harvard-trained scientists in public service and initiates relationships with potential employers.
- Provides an immersive experience for students to grasp the science policy landscape in Washington, D.C. and identifies skills to be successful in that arena.

Thirteen students were selected for the 2016 Washington, D.C. trip from over 30 applicants, reflecting a keen interest in Science Policy among graduate students from programs across the Graduate School of Arts and Sciences, the Medical School, and the School of Engineering and Applied Sciences. Some were already driven to pursue a career in science policy, and others sought a general understanding of how decisions about science are made in government, or how scientific information is communicated among legislators, staff, scientists, agency leadership, and voters.

The GSAS Science Policy Group and the DMS Policy Path thank all the agencies for hosting our group. Meetings this year included the National Academy of Sciences (NAS), the Department of State, the Harvard Office of Federal Relations, the Senate Budget Committee, the House Committee on Science, Space, and Technology, the Environmental Protection Agency (EPA), the Department of Defense (DoD), the National Institutes of Health (NIH), the National Science Foundation (NSF), the White House Office of Science and Technology Policy (OSTP), and Science Magazine.

The group also thanks Dean David Cardozo, Lisa Rossini, and Paula Cole of the Division of Medical Sciences, Dean Garth McCavana of the Graduate School of Arts and Sciences, Dr. Laura Stark of the Office of Career Services, Jim Clem of the Center for the Environment, and Jon Groteboer of the Harvard Office of Federal Relations for their support and guidance during the planning of the trip. We also thank our group presidents Rachel Cotton and Joseph Timpona for feedback and discussion on the Washington, D.C. trip and in compiling this report.

The group thanks all the departments and organizations that agreed to contribute funds. The visit would not have been possible without their financial and organizational support:

Division of Medical Sciences (DMS)
Harvard University Center for Environment (HUCE)
Graduate School of Arts and Sciences (GSAS)
GSAS Graduate Student Council (GSC)

Finally, we thank the participants for enthusiastically representing the group and the University and for preparing the summaries of the agency visits.

Anjali Tripathi – G5, Astrophysics
Kayla Davis – G2, Biological and Biomedical Sciences
Chamith Foneska – G3, Biological and Biomedical Sciences
Stephanie Guerra – G4, Biological and Biomedical Sciences
Radhika Mathur – G4, Biological and Biomedical Sciences
Deepali Ravel – G5, Biological and Biomedical Sciences
Christine Ordija – G6, Biological Sciences in Public Health
Katie Dagon – G5, Earth and Planetary Sciences
Vinidhra Mani – G4, Immunology
*Nicole Bedford – G4, Organismic and Evolutionary Biology
Meghan Blumstein – G2, Organismic and Evolutionary Biology
*Jacob Baron – G4, Physics
Adam Carte – G2, Systems Biology

*DC Trip Coordinator



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National Academy of Sciences (NAS)

Author: Nicole Bedford

Date: Wednesday April 6, 2016

Time: 8:00 – 9:00am

Location: Keck Building C500, 500 5th Street, NW, Washington, DC 20001

Meeting with: Anne-Marie Mazza – Senior Director, Committee on Science, Technology and Law (CSTL)

The National Academy of Sciences (NAS) was founded by Congressional mandate and signed into Law by President Abraham Lincoln in 1863. The NAS is “charged with providing independent, objective advice to the nation on matters related to science and technology” and is comprised of 2,250 elected members spanning myriad disciplines. Historically, the Academy’s primary role was to advise the government on matters of military preparedness, but the utility of a national scientific advisory body during peacetime was soon recognized. Today, the NAS encompasses three academies and is formally known as the National Academies of Sciences, Engineering and Medicine. The NAS receives the bulk of its funding from the Federal Government. However, the NAS remains independent of the government and strives to maintain political neutrality in all its activities. As such, the NAS assumes an advisory role rather than providing explicit recommendations to government. The NAS attempts both to synthesize science for policy, and to inform policy for science. Priorities for NAS reports can be identified either externally or internally from Academy members. Externally, NAS studies are congressionally mandated, requested by federal agencies, or funded by private institutions or foundations. Round tables, forums, and committees are convened with individual stakeholders in private or public sessions. Academy members volunteer their time when serving on such committees. Reports can be accessed online at <http://www.nap.edu/>.

We spoke with Ms. Mazza in depth regarding the CSTL. Ms. Mazza explained that the committee has two purposes: first, to provide a venue for collaboration between lawyers and scientists and second, to co-produce studies that examine the intersection of Science and Law. Of particular interest is how expert scientific testimony is used in court. We discussed the Daubert Standard, a series of Supreme Court decisions regarding the admissibility of scientific evidence in federal cases. We also discussed the legal and ethical concerns of emerging technologies such as CRISPER/Cas9. The CSTL was recently involved in hosting an International Summit on Human Gene Editing.

Opportunities

A unique opportunity offered by NAS is the Christine Mirzayan Science and Technology Policy Graduate Fellowship Program. This is one of the few Science Policy fellowships available to non-U.S. citizens. As a Christine Mirzayan Fellow, you are encouraged to participate in think tanks, congressional hearings, and other policy-related activities in the D.C. area. During the 12-week program, you are assigned a senior staff mentor and will conduct literature reviews, analyze data, and attend briefings. More information on this and other fellowships can be found at <http://www.nasonline.org/about-nas/careers/>.

Department of State

Author: Deepali Ravel

Date: Wednesday April 6, 2016

Time: 10:00-11:00 AM

Location: US Department of State Room 2846, 2201 C St NW Washington, DC, United States

Meeting with:

Dr. Genya Dana;

Senior Science Policy Officer, Office of the Science and Technology Advisor, US Department of State

Dr. Jessica Petrillo;

Bureau of Oceans and International Environmental and Scientific Affairs, Office of International Health and Biodefense

Dr. Jennifer Seedorff;

Bureau of Oceans and International Environmental and Scientific Affairs, Office of International Health and Biodefense

Dr. Nathaniel Schaeffe;

Bureau of Oceans and International Environmental and Scientific Affairs, Office of Science and Technology Cooperation

Dr. Stephanie Aktipis;

Bureau of Oceans and International Environmental and Scientific Affairs, Office of Conservation and Water

Dr. Rowena Watson;

Bureau of Oceans and International Environmental and Scientific Affairs, Office of Conservation and Water

Dr. Benjamin Schmitt;

Bureau of Energy Resources, Office of Energy Diplomacy

Former Secretary of State Madeline Albright established the Department of State's Office of the Science and Technology Advisor in 2000. According to the Office's website, it has a three pillar strategy:

"Bringing to bear the vast resources of the U.S. science community to build science capacity across the Department."

"Promoting the role of science engagement for confidence building with countries and regions viewed as foreign policy priorities."

"Working with the Deputy Secretary and the "E" Under Secretary and their staff to implement and build a coordinated science and technology innovation strategy so that the Department can connect research, development and discovery generated within the high- tech and private sectors to foreign policy priorities."

The members of the office that we spoke with worked with projects supporting all three of these missions. Our primary host, Dr. Genya Dana, described the way the office works to set the tone of the State Department's approach to science and technology and to coordinate many agencies across the US government to further these goals. Dr. Dana has played several roles in the position of Senior Science Policy Officer, including acting as a negotiator at conferences like the International Synthetic Biology Convention and advocating for STEM in sustainable development and poverty alleviation efforts. More recently, she has acted as the liaison between her office and the African Affairs Bureau, with the goal of bringing science, technology, and capacity building into their conversations.

We also had the privilege to talk to several others who work in the Office of the Science and Technology Advisor. Their research backgrounds spanned physics to public health, and they each discussed very broad portfolios of projects. Dr. Schmitt mentioned bringing the design, analysis, and international collaboration skills from his background in astronomy/engineering to a new role involving infrastructure and energy security in the Nordic and Baltic regions. Dr. Aktipis discussed her role as a AAAS fellow in coordinating and negotiating environmental issues at the UN as well as her current role in the Office of Water and Conservation working on topics like biodiversity. Dr. Schaeffle is in the Office of Science and Technology Cooperation and discussed how the office establishes bilateral agreements that facilitate collaborations between the US and countries, builds "Global Innovation" practices, and finds the right partners in other countries to work with US technical agencies. Dr. Seedorff, from the Office of International Health and Biodefense, discussed work on specific global and regional health issues as well as on the Global Health Security Agenda. We also heard from another member of the team who came from a public health background and works to facilitate engagement and understanding between diplomats and health practitioners/scientists.

We were given several valuable pieces of advice regarding steps to take as graduate students as well as what it's like to work at the State Department. Particularly, they advised us to take advantage of opportunities to take courses at places like Harvard Kennedy School and to learn how to write actively and concisely.

Overall, we gained the sense that the scientists working in this office had the chance to work across many different topics in a setting that is highly collaborative and often fast-paced. They did stress the complexity of the environment and that at times they have to represent opinions that they do not necessarily agree. However, they each appeared to hold a high degree of responsibility within the Office and derive a strong sense of purpose from the work.

Opportunities:

All of the staff members that we spoke with had a STEM or public health background and entered the State Department through fellowship programs. The majority entered through the **AAAS Science & Technology Policy Fellowship** program or through the related **Professional Science & Engineering Society Fellowship** Program (sponsored specifically through the American Institute of Physics or the Institute of Electrical and Electronics Engineers). One person served as a **Presidential Management Fellow** with the Office. The **Embassy Science Fellows** program and **Science Envoy** program were also mentioned as ways for scientists to engage with the State Department on international issues.

Harvard Office of Federal Relations

Author: Vinidhra Mani

Date: Wednesday April 6, 2016

Time: 12:00 – 1:00pm

Meeting with: Jon Groteboer

The Harvard Office of Federal Relations serves as an interface between Harvard and the US government (primarily Legislative and Executive branches). We had the opportunity to meet with Jon Groteboer, Associate Director of Federal Relations, who was extremely wonderful and accommodating. The major focus areas of the office are academic research and financial aid-related issues. Other areas include foreign policy, mostly surrounding bringing the best and brightest to Harvard without hassle and keeping them safely in the United States.

The office itself is very small and Harvard has very few lobbyists. Jon and the others in the office work directly with congressional representatives rather than “shoe-leather lobbying”. In some ways to prevent Harvard from being conceived as having an overshadowing presence by itself, much of the work is driven not by Harvard alone, but in the greater general interest of the Association of American Universities (AAU). The AAU is a coalition of the top 60 research institutions in the US (and 2 in Canada). It is a rather elite group of institutions that work together in order to improve policy surrounding academic institutions that are typically of common interest.

We learned about “earmarks”, which were a way that Congress used to allocate funds for specific projects or to specific institutions (earmarks do not exist anymore). This was frowned upon because the measures that resulted did not use a merit-based method of appropriating funds to the most deserving or the most equipped for the task. Additionally, earmarks tended to heavily benefit specific local causes or institutions more so than on a national level. While Harvard didn’t partake in this, earmarks are how institutions like Boston University were actually able to rise up and become a part of the elite group in the AAU.

We also spoke briefly with Jon about the stigma that is associated with a Harvard presence on the Hill. Generally, the agendas are driven as a “bulk” through the AAU. Jon was saying that there are definitely measures that Harvard is not always aligned with the AAU on. As long as these are not overall damaging, Harvard will support but somewhat take a “back-seat” on most of these issues. However, at the end of the day, the main concern for Jon and colleagues in the office is to be able to protect Harvard’s endowment- the single most precious resource!

Senate Budget Committee: Minority Staff

Author: Meghan Blumstein

Date: Wednesday April 6, 2016

Time: 2:00 – 3:00pm

Location: Senate Dirksen Building, Room 624, Washington, DC 20002

Meeting With:

Kusai Merchant (PhD) – Senior Budget Analyst for Energy and Environment

Steve Newell (MS, PhD) – Senator Sander’s Personal Office (Health Policy)

The Senate Budget Committee

The Senate Budget Committee was created in 1974 to consolidate fiscal planning and oversight into one office, with a corresponding office in the house. The goal of consolidation was to enable better budgeting and prioritization of goals while overseeing spending and revenue generation. The committee is responsible for drafting the government’s planned budget and following subsequent spending by the federal government. The chair of the budget committee is determined by the party in power, which in the Senate means the party with 51 or more seats. Currently, Senator Mike Enzi (R) serves as chair and Bernie Sanders (D) serves as the ranking member.

Daily Work

We met with two members of Bernie Sanders’ staff, Kusai Merchant and Steve Newell, one who works for the committee (Kusai) and the other in Sanders’ personal office (Steve). Both jobs entail interacting with a broad-array of topics, including many non-science related topics. Neither gets into any particular topic in depth, but rather, they work on a wide breadth of subjects. Both gentlemen cited that the skills they developed during their PhD of learning new topics quickly, asking the right questions of the right people, and thinking critically about information presented, helped them in their daily work. They also both felt that their respective PhD’s prepared them for some of the daily frustrations one may feel from policy setbacks and mismatched political agendas. Both Dr. Merchant and Dr. Newell stressed, as did many others we met

throughout the trip, that their job is to represent the positions and values of their senator and party, regardless of their own personal beliefs. However, as a result of this, they both found positions in offices that they feel comfortable supporting.

Paths Taken

Kusai graduated from Stanford University in 2004 with a doctorate in Chemistry. He entered the political realm, after a post-doc at the NIH, as a AAAS fellow in the personal office of Senator Harry Reid. After finishing his fellowship, Kusai moved to the Environmental Defense Fund (EDF) for six years, where he worked as a Policy Specialist and Policy Manager. Kusai eventually returned to the hill two years ago as the Senior Budget Analyst for Energy and Environment for the Senate Budget Committee.

Steve Newell graduate with his PhD and MS in Social Psychology and a MS in Medical Sciences, Health Outcomes, and Policy from the University of Florida in 2015. Upon graduating, Steve received a AAAS fellowship and began work in Bernie Sanders' personal office.

House Committee on Science, Space and Technology: Minority Staff

Author: Christine M. Ordija

Date: Wednesday, April 6, 2016

Time: 4:00 -5:00pm

Location: 394 Ford House Office Building, 2nd and D Streets SW, Washington, DC 20515

Meeting with:

Marcy Gallo; Staff Director for the Subcommittee on Environment

Kim Montgomery; Professional Staff on the Subcommittee on Research and Technology

The House Committee on Science, Space and Technology has jurisdiction over much of the U.S. Federal non-defense and non-biomedical related research and development activities. Complete or partial jurisdiction extends to a multitude of Federal agencies including the National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), National Weather Service (NWS), National Institute of Standards and Technology (NIST), White House Office of Science and Technology Policy (OSTP), Department of Energy (DOE), Environmental Protection Agency (EPA), Department of Transportation (DOT), National Oceanic and Atmospheric Administration (NOAA), Federal Aviation Administration (FAA), Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), United States Geological Survey (USGS) and the United States Fire Administration.

An early predecessor to the now permanent House Committee on Science, Space and Technology, the Select Committee on Astronautics and Space Exploration, was created in 1958 in response to Russia's launch of the first satellite, Sputnik 1. From the 'Space Race' to combatting terrorism after the attacks of September 11, 2001 and now to increasing American competitiveness in science and technology, major scientific needs can be traced in the Committee's past and ongoing agenda.

As the United States House of Representatives is a majority run institution however, 2/3 of staff and resources for the Committee on Science, Space and Technology fall under Republican control, with 1/3 remaining for Democrats. The current ranking majority member and Chairman of the Committee is Republican Congressman Lamar Smith, representing the 21st Congressional district of Texas. The ranking minority member is Democratic Congresswoman Eddie Bernice Johnson of the 30th Congressional district of Texas.

We had the pleasure of speaking with Democratic staffers, Marcy Gallo, Staff Director for the Subcommittee on Environment and Kim Montgomery with the Subcommittee on Research and Technology. Committees are the work engines of Congress, and as with other congressional authorizations committees, the House Committee on Science, Space and Technology may hold hearings and roundtables on specific bill proposals and policy issues, engage in the markup process to develop a bill proposal further, recommend modifications to the full chamber and report legislation. While not at all related to appropriations, much of this authorizations legislation lays the very groundwork for R&D at affected agencies and includes oversight, program implementation and re-authorization. Committee staff helps Congress to amend, negotiate and debate legislation on its way through the respective chambers in the hopes of generating bills that ultimately reach agreement and the President's desk. The understanding that some pieces of legislation and scientific topics are far more contentious than others however remains highly relevant.

In an informative and lively discussion, the importance of remaining to do good work at the House Committee on Science, Space and Technology, even when in the minority party, was underscored. Despite the challenges of a highly and increasingly polarized Congress, much time is devoted to creating bills potentially palatable to both parties. Bills are often

created that pertain to emerging scientific issues or the specific interest of individual Committee members and increased community involvement in policy creation is requested. Notably the caliber of work conducted by Congress is not improved with rapidity and desired legislation may be a long time in coming.

In order to work for the House Committee on Science, Space and Technology, both politics and policy must be simultaneously juggled and the opportunity to briefly become a mini-expert in many different scientific disciplines regularly presents itself. PhDs are degrees frequently held among Democrats on the Committee and the AAAS is again a common route for scientists to get there. Complex 'ecosystem' thinking is helpful for these critical roles at the intersection of science and policy and persons passionate and knowledgeable about science ideally serve as its best advocates.

Environmental Protection Agency (EPA)

Author: Katie Dagon

Date: Thursday April 7, 2016

Time: 10:00 – 11:00 am

Location: 1200 Pennsylvania Ave, N.W., Washington, DC 20460

Meeting with:

Robert Kavlok, PhD – Deputy Assistant Administrator for Science, Office of Research and Development

Robert Fegley – Program Support Staff Chair, Office of Science Policy

Maureen Gwinn, PhD – Special Assistant, Immediate Office of the Assistant Administrator

Elizabeth Corona – Immediate Office of the Assistant Administrator

Cecilia Alcalá, MPH – ASPPH fellow, National Center for Environmental Assessment

Lenny Bankester, MNR – Program Analyst, Office of Program Accountability and Resource Management

Kevin Kuhn, PhD – Science Advisor to the Chief Innovation Officer

Keely Maxwell, PhD – General Anthropologist, National Homeland Security Research Center

Larke Williams, MA – Environmental Engineer, Office of Science Policy

Susan Burden, PhD – Physical Scientist, Office of Science Policy

Megan Fleming, MA – Biologist, Office of Science Policy

Teneille Walker, PhD – Biologist, National Center for Environmental Assessment

Rachel Matney - Immediate Office of the Assistant Administrator

At the EPA, we visited with a large group of staff from the Office of Research and Development (ORD). Their setup is somewhat unusual in that they are a regulatory office also doing science, tasks usually kept separate in the federal government. Robert K. started the conversation by giving a brief overview of the functions of ORD, including a sense of the organizational structure of EPA as a whole. ORD has 1,755 employees, making up about 10% of the total EPA workforce. Scientists are the majority, accounting for about 1,200 of the total. They also have 13 labs and research facilities outside D.C., with particularly large centers in Research Triangle Park, North Carolina and Cincinnati, Ohio. Some of the labs are location-specific to focus on regional issues, such as the Pacific Northwest and the Great Lakes.

Robert F. described the Office of Science Policy within ORD as being structured in two main groups. The regional offices help with implementing regulations. There is a smaller group of people working with the large program offices (e.g. Air and Radiation), which put out most of the agency regulations. Often times they will pull in ORD researchers as needed to assist with policy, and to make sure the regulations are grounded in the latest science. They are the ones sitting in meetings and advocating for science. Maureen noted that she is an example of an EPA scientist who transitioned from the lab bench to policy. The policy office tends to take a broad view – covering everything from nanomaterials to hydraulic fracturing.

After the overview, we discussed how the EPA manages research timelines and priorities. ORD is often thinking long-term, in contrast with the program offices which think day-to-day. The lead contamination water crisis in Flint, Michigan was noted as an example of an unexpected issue that EPA had to deal with suddenly. EPA also sometimes plans science and research based on direct orders from the President and the Administrator. Aside from those cases, each program composes a Strategic Research Action Plan that look 4 years ahead. Each program office has various priorities, including both science and regulatory wants and needs, so this process is always a balancing act. The Board of Scientific Councilors also weighs in on research plans.

We also discussed the changing nature of peer review, which has made defending science more important. Susan used the example of the hydraulic fracturing report to illustrate how the public comment procedure works. The EPA is constantly interacting with not only the public, but also various science advisors and councilors throughout the process of drafting and releasing these reports.

Several of the meeting attendees were current or former AAAS and PMF fellows. We learned more about the differences between those two fellowships, including the fact that PMF has an eligibility time limit within your graduation date. We ended the meeting underscoring the importance of communication and writing as valuable skills for scientists who want to work in policy; a common theme for many of the meetings of this trip.

National Research Programs at ORD

Air, Climate & Energy
Chemical Safety for Sustainability
Safe and Sustainable Water Resources
Sustainable and Healthy Communities
Human Health Risk Assessment
Homeland Security

National Research Laboratories and Centers

Health and Environmental Effects Lab
Exposure Research Lab
Risk Management Lab
Environmental Assessment Center
Computational Toxicology Center
Homeland Security Center
Environmental Research Center

Fellowship Opportunities

American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellowships
Association of Schools and Programs of Public Health (ASPPH)/EPA Environmental Health Fellowship Program
EPA Office of Research and Development Post-Doctoral Research Program
National Academy of Sciences/National Research Council Resident Research Associateship Program
Oak Ridge Institute for Science and Education (ORISE) Fellowships
Presidential Management Fellows (PMF) Program



Department of Defense (DoD): Office of the Assistant Secretary of Defense for Research and Engineering

Author: Kayla Davis

Date: Friday April 8, 2016

Time: 10:00 – 11:00am

Location: 4800 Mark Center Drive, Alexandria, VA 22350: Conference Room 4

Meeting with: Robin Staffin, PhD- Director for Basic Research, Dr. Rebecca Parkhurst, PhD AAAS Fellow in Diplomacy, Security, and Development section, Dr. Jiwei Lu, PhD visiting faculty, Camylle Coley, PhD- Senior Advisor to the Director

The Department of Defense has a goal to fund the best basic research grants. This is important because basic research is seen as a pace setter for technology development. Although the funding concentration is on basic research, and the DoD does enforce the definition of basic research, they try to find relevance in the research to the real world. The basic research that is funded is completely unclassified, without a specific application to the DoD in mind. Robin says “to make the biggest impact to a mission, you’ve got to look long term. If you try to tailor it (research) to a specific goal, you’ll get a result sooner, but it won’t be as good.” He reiterated his point by reminding us “new foundations make the biggest differences”.

Priorities for new research projects can come from the Secretary of State, members of the research department, or Robin. Some of the current priorities include synthetic biology, cognitive neurobiology, engineering materials, human social behaviors, nanotechnologies and, quantum information.

The DoD meets with foreign ministries of defense to discuss basic research projects and funding. Currently the DoD is stressing the importance of grant applications with a focus in neuroscience and artificial intelligence. Previously the major priorities of the department of defense have been to offset nuclear weapons, and develop precision weapons, stealth technology and advanced adversaries. Robin predicts that the next will likely be artificial intelligence.

The DoD has a large interest in STEM education and would like to build a work force that has the needed requirements and competency in STEM fields. The DoD has several programs that they use to enforce STEM education. These are the SMART program that supports undergraduates and graduates seeking a STEM degree in return for civilian service. The DoD also administers the National Defense Science and Engineering Graduate Fellowship (NDSEG) award, and they are currently working to improve the programs community feel and provide extra opportunities for award winners. Overall the DoD is interested in pushing STEM education measures for all students but especially military dependents by improving education for both teachers and students.

Acquisition, technology, and logistics (ATL) has a university that trains the technical workforce as well as teaches them to recruit the best companies to assist the DoD. ATL also teaches basic research for STEM and scientific diplomacy to help build better relationships with allies. Overall, there are 1.5 million people at the DoD before contractors and the military. Of that, ATL makes up about 200,000 employees; this is where many scientists are employed. Robin would like to see more involvement from scientists at the DoD and notes that although DoD employs a large number of scientists, not many of them are in senior positions of responsibility. This might be because the DoD has a particular interest in scientists with a background in business for their senior responsibility positions.

National Institutes of Health (NIH): Office of Science Policy and Office of Strategic Coordination

Authors: Radhika Mathur and Chamith Fonseka

Date: Thursday April 7, 2016

Location: Building 31, 9000 Rockville Pike, Bethesda, MD

Meeting with:

LYRIC JORGENSEN, PhD;

Office of the Deputy Director for Science, Outreach, and Policy (now Deputy Director of the White House Cancer Task Force at Office of the Vice President)

STEPHANIE COURCHESNE-SCHLINK, PhD;

Lead Health Science Policy Analyst

The National Institutes of Health (NIH) is comprised of 27 individual agencies and the Office of the Director, which coordinates efforts across the separate institutes and centers. Located on a 300-acre campus in Bethesda, MD, the NIH has an annual budget of \$32 billion dollars and employs over 18,000 people in pursuit of its three-part mandate:

1. To foster innovative research for protecting and improving health
2. To support and train the biomedical research workforce
3. To communicate discoveries in health to the general public

Nearly 80% of the NIH budget is allocated for funding research grants at external institutions, while about 10% is used for funding research at the Institutes and Centers that make up the NIH. Although the NIH lacks the power to enforce a regulatory framework for biomedical research, it can choose to allocate grant funding contingent upon meeting specific requirements - thus allowing the agency to maintain research standards through “the power of the purse”.

Operating out of the Office of the Director at NIH, the Office of Science Policy strives to identify and support policies that strengthen biomedical research and help develop the workforce. Examples include initiating and coordinating large-scale, multi-agency research efforts such as the Brain Initiative and Precision Medicine Initiative, creating funding opportunities for early-career researchers such as the Early Independence Award, and funding transformative, paradigm shifting research through the NIH Common Fund such as the Knockout Mouse Phenotyping Program. The Office of Science Policy also works on setting broad, overarching policy issues such as strengthening human subject protections; however, the office must often try to balance proactively determining policy with responding to crises involving biomedical research. In addition, the Office of Science Policy helps communicate about research initiatives to the general public in coordination with the White House and other federal agencies.

Working at the science policy office at the NIH involves writing reports and developing presentations to many different audiences including policymakers, agency administrators, and the lay public. It is essential to have outstanding communication skills and to be able to find the right message for each audience. Success in science policy careers also requires the ability to think with a broad edge - to think big picture, to follow policy issues before they become law, and to anticipate the implications of controversies as they arise. The office recommends the American Association for the Advancement of Science (AAAS) Fellowship as an entryway to careers in science policy at the NIH and beyond. Tips for the AAAS Fellowship include showing a demonstrated interest in science policy and being able to speak knowledgeably on the issues of the day.



National Science Foundation (NSF): Division of Biological Infrastructure (DBI)

Author: Adam Carte

Date: Friday April 8, 2016

Time: 12:00 - 1:00pm

Location: 4201 Wilson Boulevard, Arlington, VA 22230: Room 360

Meeting with:

Alan Tessier, Deputy Division Director in the Division of Environmental Biology; Jane Silverthorne, Deputy Assistant Director, Directorate for Biological Sciences; Linda Hyman, Division Director for MCB, Associate Provost of Graduate Program at Boston University Medical School; Reed Beaman, Program Director for Division of Biological Infrastructure; Peter McCartney, Program Director for Division of Biological Infrastructure

As their website states, The Division of Biological Infrastructure (DBI) supports varied activities that provide the infrastructure for contemporary research in biology. These broadly include instrumentation-related activities, research resources, and training opportunities. DBI constitutes one of the National Science Foundation's five major areas of investment in the Directorate for Biological Sciences' (BIO). The others areas of investment are the Division of Environmental Biology (DEB), the Division of Integrative Organismal Systems (IOS), the Division of Molecular and Cellular Biosciences (MCB), and the Emerging Frontiers (EF) Division. Administrative members either hold permanent positions or are rotating program directors typically tapped from academia for 1 to 2 year terms.

Meeting Overview

In meeting with representatives from the National Science Foundation's Division for Biological Infrastructure, the group gained myriad information concerning the goals of both the NSF and DBI and the opportunities that exist at those entities. Furthermore, a productive dialogue took place in which the participants from the NSF were able to ask our group multiple questions about implementing new policies for respective programs. To start, the representatives from the NSF detailed their roles in the organization and explained to us exactly how they got involved with the NSF. Alan, Reed, and Peter came from academic backgrounds and entered as aforementioned rotating program directors, and Linda is a current rotating program director. They explained that being a rotating division director is a great way to get exposure to the NSF and learn how exactly administrative work like funding decisions and infrastructure building and maintenance actually function. Alan, Reed, and Peter decided to leave their respective academic posts for permanent positions because they enjoyed being involved in the NSF administratively so much.

After learning about the NSF and specifically DBI for some time, we were then able to answer several questions that members were interested in. One topic of interest was whether principle investigators should be required to allow their students to participate in outside-of-lab experiences in order to get funding from the NSF. Linda was especially interested in if and why some of us were considering careers outside of academia. The consensus responses seemed to be concerns over competition for job opportunities, lack of adequate wages for hours worked, challenges in obtaining funding, and a yearning to work on broader issues.

Partway through the meeting, Jane Silverthorne joined us and detailed some of the opportunities for working overseas at the NSF. The Office of International Science and Engineering has positions that entail working with organizations similar to the NSF in other countries, collaborating with the State Department to build scientific infrastructure in other countries, and working in alliances (e.g., the Large Hadron Collider) to advance science in large-scale projects. She reminded us that, "A PhD is a license to work anywhere in the world".

Beyond research funding, the NSF enables the country's scientific workforce and enhances the public's understanding of science and technology. When asked if they feel a sense of fulfillment in their vocation, the members resoundingly agreed that working at the NSF is a great way to make a difference beyond oneself. Working at the NSF is a public service guided by advancing science, and members are always working for the betterment of others.

Opportunities

I-CORPS Program: \$50,000 in funding to a team of three people to foster entrepreneurial collaborations (graduate students, postdoctoral fellows, or principal investigators with an industry/business mentor)

http://www.nsf.gov/news/special_reports/i-corps/

AAAS Fellowships at the NSF: <https://www.nsf.gov/od/oia/activities/aaasfellows/index.jsp>

White House Office of Science and Technology Policy (OSTP)

Authors: Steph Guerra and Anjali Tripathi

Date: Friday April 8, 2016

Time: 2-3PM

Location: Eisenhower Executive Office Building

Meeting with:

DR. MEREDITH DROSBACK, Assistant Director, Education and Physical Sciences

COL. ALVIN DREW, Assistant Director, Space and Aviation Security

ELEANOR CELESTE, Policy Analyst, Medical and Forensic Sciences

ANDREW COY, Assistant Director, Making

DR. AUSTIN BROWN, Senior Policy Analyst, Energy Research and Development

HANNAH SAFFORD, SINISI Fellow

The Office of Science and Technology Policy (OSTP) was established by a congressional statute in 1976 with the mandate to advise the President and his Executive Office on all domestic and international issues that are affected by science and technology. OSTP is one of the eleven entities of the Executive Office of the President, and its relative importance and relevance varies by administration. Under President Obama, OSTP currently employs 125 individuals - the largest it has ever been.

OSTP plays an advisory role in two primary ways. First, it acts upwardly by providing the president with timely, relevant, and accurate scientific information that he can use for policy decisions. Second, OSTP acts outwardly by working with federal scientific agencies to coordinate priorities and programming. OSTP is responsible for managing both inter-agency collaboration and partnerships with the academic and private sector. The priorities of OSTP are defined by multiple parties: top-down direction from the President, natural percolation from federal agencies, OSTP staff members keeping a pulse on the scientific community, and even concerned citizens. Though OSTP has a small budget compared to other agencies (e.g. DOD, DOE), staff said they are still able to accomplish a lot from within this office. Col. Drew used the memorable metaphor that while OSTP does not have a big stick (i.e. funding) like other agencies, it does have a baton to set the tempo to which other agencies can synchronize their actions and priorities.

We met with six OSTP staff, with each of OSTP's four divisions (Environment & Energy, National Security and International Affairs, Science, Technology & Innovation) represented. Their backgrounds were fascinatingly diverse: a former astronaut and air force officer (Alvin Drew), an astronomer (Meredith Drosback), a lawyer interested in bioethics (Eleanor Celeste), a biophysicist (Austin Brown), an educator (Andrew Coy), and a current policy and environmental engineering graduate student (Hannah Safford). While there seems to be no standard path into an OSTP career, several staff members started their science policy careers as AAAS Fellows. It should be noted that none of the staff we spoke with had been with OSTP in the previous administration, although there are some career staff in OSTP. Several, in fact, were on federal detail, loaned from other agencies to work on the specific project of interest.

The initiatives undertaken by the OSTP are no less diverse and reflect the current administration's broad interests. Those in attendance worked on everything from the Precision Medicine Initiative (PMI) and Computer Science for All to Forensics and Clean Energy - not to mention the annual White House Science Fair. With this being a transition year, efforts are underway to ingrain programs in their respective agencies beyond the executive - to provide continuity across administrations.

The OSTP programs and the staff describing them embodied the congenial and fast-paced intellectual nature of the office. Work life balance seemed strong, and all speakers seemed certain that their work made an impact. One described the work at OSTP as being like "intellectual whiplash", but in a really great way. Staff get to focus on a wide variety of projects but also become experts in specific areas and have ownership over their portfolios. Overall, the staff members we met were happy to be part of the OSTP culture of setting the tempo for science in our nation's capital.

Science Magazine

Author: Jacob Baron

Date: Friday April 8, 2016

Time: 4:00 – 5:00 pm

Meeting with: Jeffrey Mervis

Jeffrey Mervis is a journalist and writer for *Science* magazine. He has a unique perspective on science policy – he specifically covers stories about science policy, aimed at informing scientists.

We discussed his role as a reporter working for a scientific journal, as well as journalistic strategies in general. We had a lively discussion about the role of graduate student funding in determining research and career paths. He asked for our opinions about a story he was working on. The story was about a study that found that students on an RA grant were more likely to end up with a research job than students on a fellowship or training grant.

Although he acknowledged that policy makers are often not amenable to scientific progress, he made it clear that scientists are not blameless. He emphasized the idea of scientific elitism, indicating that science communication is often hindered by scientists' tendency to communicate in language difficult for non scientists to understand. He suggested that scientists can be more persuasive by realizing that strategies for changing minds are not typically evidence-based.

Interestingly, he has found that scientists tend to mischaracterize policy more than policy makers mischaracterize science. He gave examples of scientists (Carl Sagan, Stephen Hawking, etc) who had succeeded in "selling" science to a broader audience.

