Advocating on Capitol Hill for Mathematics Funding

Scott Hershberger

Since 2007, 28 undergraduates from Georgia's Fifth Congressional District, which includes almost 75% of Atlanta, have spent a summer doing mathematics research at the Mathematical Sciences Research Institute Undergraduate Program (MSRI-UP) in Berkeley. Through lectures, small group work, and mentoring, the nationwide program shows such students that they, too, can pursue graduate school and careers in math. Indeed, the first MSRI-UP participant to earn a PhD in mathematics is now an assistant professor at Emory University, also in the Fifth District.

MSRI-UP has succeeded in introducing undergrads from historically underrepresented groups to advanced mathematical research thanks to the dedication of its leaders, but to make their vision a reality year after year, Duane Cooper and fellow program directors depend on funding from the National Science Foundation (NSF).

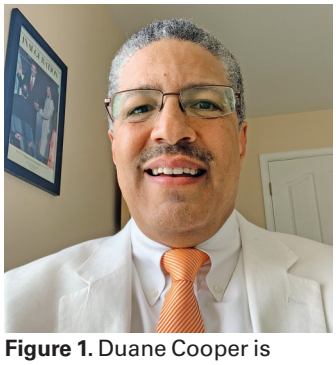

Figure 1. Duane Cooper is a member at large of the AMS Council and sits on the Committee on Science Policy.

That was the message that Cooper, an associate professor of mathematics at Morehouse College, brought to Capitol Hill in virtual meetings with congressional staffers from Georgia earlier this year. Federal funding for the NSF may seem like an impersonal topic, but as Cooper noted with staffers, NSF dollars have a tangible positive impact on the lives of his congresspeople's constituents. The story resonated with the staffers, one of whom told Cooper that they like to include local anecdotes in their senator's speeches.

Cooper was one of eleven mathematicians, most of them members of the AMS Committee on Science Policy (CSP), who met with congressional staffers in the latest round of Hill visits arranged by the AMS Office of Government Relations. As part of its long-standing efforts to advocate for mathematics in Congress, the AMS facilitates these opportunities for mathematicians to convey to legislators the importance of NSF funding or contribute their technical expertise on other issues. "I found it illuminating and worthwhile, and I think others would, too," Cooper said.

The Faces and Stories of Mathematics Funding

Meetings between members of the public and the office of a US representative or senator usually involve policy staffers rather than elected officials. Typically young and bright, staffers often spend three to four hours in back-to-back appointments with constituents lasting less than a half hour each. One staffer might focus entirely on science and technology or juggle a portfolio including the judiciary, foreign affairs, and more.

CSP members worked in pairs for this year's virtual Hill visits. Cooper was accompanied by CSP member Jordan Ellenberg in meetings with staffers for Senator Raphael Warnock, Senator Jon Ossoff, and Representative Nikema Williams. Likewise, the two talked with staffers for Ellenberg's senators and representative from Wisconsin. AMS Director of Government Relations Karen Saxe attended all six of their meetings.

Beforehand, Saxe shared the staffers' LinkedIn pages and helped craft an effective message. Though NSF funding in general enjoys bipartisan support in Congress, legislators and staffers might not realize how crucial the agency is to the mathematics community—some 70% of federal funding for basic mathematics research in the US comes from

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Figure 2. Rosa Orellana is a member at large of the AMS Council and sits on the Committee on Science Policy.

the NSF [1]. "NSF is basically *the* funding agency if you're doing mathematical research," said Rosa Orellana, a professor at Dartmouth College and CSP member.

Orellana teamed up with fellow CSP member Joe Silverman, AMS Executive Director Catherine Roberts, and AMS Associate Director of Government Relations Tyler Kloefkorn to visit the offices of congresspeople from New Hampshire, Massachusetts, and Rhode Island. Orellana talked about "curiosity-driven research as opposed to problem-solving research" and why both are important. For example, she said, curiosity-driven research on prime numbers led centuries later to the foundations of current internet cryptography, while future algorithms resistant to quantum computers may harness elliptic curves.

"[The staffers] don't understand how difficult it is to get funding," Orellana said. "So I was able to share this with them, and how it impacts your confidence and […] your ability to recruit students."

The staffers were receptive, taking notes and asking follow-up questions, Cooper said. Although the impact of each Hill meeting in isolation is difficult to measure, the cumulative result of the AMS's advocacy is that staffers and legislators have mathematicians' faces and stories to draw on when negotiating next year's funding levels for the NSF.

Connecting with Policymakers

Funding for research is far from the only policy issue relevant to mathematicians. In other virtual Hill visits by mathematical scientists over the past two years, Noah Giansiracusa voiced concerns about biases in algorithms, Cynthia Dwork explained differential privacy, and Po-Shen Loh discussed COVID-19 tracking and prevention. Any mathematician who wants to connect with the offices of their representative and senators can reach out to the AMS Office of Government Relations,[1] which will facilitate the appointments.

The AMS also sponsors graduate students to attend the Catalyzing Advocacy in Science and Engineering (CASE) workshop[2] in Washington, DC, organized by the American Association for the Advancement of Science. The four-day program covers the structure of Congress and the federal budget and appropriations processes, culminating in a series of meetings with congressional staffers.

Figure 3. Graduate students Sumun Iyer and Sangsan Warakkagun at the CASE workshop in 2019.

In the process, CASE fellows learn how to talk about basic research with policymakers. "Try to make it relatable to them, express your enthusiasm without launching into vocabulary they're not going to understand, give them lots of examples, make it visual," said Sumun Iyer, a PhD candidate at Cornell University who attended the workshop in 2019.

Scientists need to advocate for the NSF on an ongoing basis because Congress annually considers competing budget priorities. For fiscal year 2022, the Biden administration requested $10.2 billion for the NSF, but Congress approved only $8.8 billion. For fiscal year 2023, the president requested $10.5 billion, and Congress will determine the final amount in the fall of 2022.

Only one out of the 25 meetings in the latest round of Hill visits was with a Republican office, since the mathematicians who took part mostly live in Democratic communities. But to strengthen bipartisan support for the NSF, the mathematics community must cultivate relationships with legislators from both parties. "We certainly need more mathematicians as volunteers for the Hill visits who reside in Republican states," Cooper said.

At next year's CSP meeting in Washington, DC, Saxe hopes to see a return to in-person Hill visits. In the meantime, Orellana encourages others in the community to make virtual Hill visits about the NSF or another policy issue relevant to their expertise.

"It is a very good way to get involved and to advocate for mathematical research," she said.

References

[1] National Science Foundation, *FY 2023 Budget Request to Congress*, Overview p. 15, Mar. 28, 2022. https://www.nsf.gov/about/budget/fy2023/toc.jsp

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Credits

Figure 1 is courtesy of Duane Cooper.
Figure 2 is courtesy of Gael Popescu.
Figure 3 is courtesy of Anita Benjamin, AMS.
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[1] https://www.ams.org/government/Contact-Us

[2] https://www.ams.org/government/dc-case-fellowship