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Scientists, Engineers Urge Universities and K-12 Schools to Strengthen Collaboration

NSF Director Arden Bement speaking in the plenary address

More than 500 participants in an innovative National Science Foundation program that places graduate students in K-12 classrooms gathered for their annual meeting in Washington, D.C., to discuss how to strengthen partnerships between K-12 and graduate science, technology, engineering, and mathematics (STEM) communities.

The three-day meeting, sponsored and organized by AAAS through an NSF grant, ran 9-11 March and featured discussions on how graduate students can bring their STEM research results and methodology to classrooms to stimulate interest in science and engineering among students and teachers.

Currently in its eighth year, the NSF Graduate Teaching Fellows in K-12 Education Program (GK-12) provides grants to universities across the United States to support graduate students in STEM fields. For up to two years, the graduate students partner with local K-12 teachers to design engaging, inquiry-based STEM lessons and activities that enrich and expand school curricula.

Through GK-12, graduate students also have an opportunity to acquire additional skills—including communication, teaching, and team building—not currently provided in more traditional graduate programs.

"The GK-12 [Program] integrates research with education—an integral concept for the National Science Foundation," NSF Director Arden Bement said in a plenary address at the conference. "The value of funding the GK-12 Program is that it communicates science in the community and sustains engagement and creativity."

Over its lifetime, the GK-12 Program has funded 6335 fellows, worked with 8845 teachers, and engaged 550,533 K-12 students in almost every state, with the number of new grant proposals continuing to rise.

"Both AAAS and GK-12 have as part of their core mission the goal of helping scientists communicate their work to the general public," said Betty Calinger, project manager for the GK-12 Program at AAAS.

While the program exposes the K-12 community to role models, inquiry-based learning, and top

research, the fellowship cultivates scientists' communication skills.

For many fellows, it can be difficult to translate their ongoing research in the laboratory to a new audience.

Colby Kearns presenting at the poster session

"It was a challenge to figure out how to communicate my graduate research to second-grade students," said Colby Kearns, a conservation and environmental science graduate student at the University of Hawaii at Hilo. "In communicating science, you need to make sure your lesson is relevant, interesting, and accessible for the students to want to learn."

After working with Sylvie Bright, a teacher at Waikoloa Elementary School in Waikoloa, Hawaii, Kearns designed a series of lessons that examined Hawaii's sandy shoreline habitats.

"You don't teach about squirrels if there aren't any around," Kearns joked at a poster session. "The shoreline of Hawaii is both relevant and accessible for the students."

In addition to engaging local K-12 classrooms, GK-12 encourages programs to communicate science through media outreach and online resources for the local community.

At the Baylor College of Medicine in Houston, Texas, the GK-12 program is a unique partnership between the Center for Educational Outreach and the Graduate School of Biomedical Science in collaboration with the Houston Independent School District.

In addition to pairing local graduate students with K-12 teachers, the Baylor College of Medicine created BioEd Online, an educational resource for educators, students, and parents that contains science news, lesson plans, slides, and articles on cutting-edge topics.

"BioEd Online, a peer-reviewed resource, works because it contains easy-to-understand information that is of interest to the general public," said Nancy P. Moreno, editorial director of BioEd Online and an associate professor at Baylor College of Medicine.

Beyond organizing the GK-12 Annual Meeting, AAAS is responsible for other technical support including developing and maintaining the program's website and communicating with the GK-12 universities across the United States. In addition, AAAS hopes to increase the number of GK-12 participants in sessions at future AAAS Annual Meetings.

At an afternoon session on 10 March, participants were introduced to the many ways in which AAAS supports the work of young scientists through its science education and career-development programs.

"Borrowing a line from another meeting—AAAS can help scientists from K to gray," said Richard Weibl, director of the AAAS Center for Careers in Science and Technology. "Shaping a career in science is not a solitary experience."

Weibl highlighted several AAAS resources including ScienceCareers.org and the Minority Scientists Network (MiSciNet), the ENTRY POINT! program for scientists with disabilities, the Science NetLinks database of standards-based lesson plans and tools, and the GrantsNet database of funding resources.

The message: AAAS is involved in science and career programs and partnerships aimed at a broad, diverse audience.

Richard Weibl

Later in the session, Brianne Miers, manager of communications and marketing for the AAAS Science & Technology Policy Fellowships program, introduced two fellows: Frances Colón, a

AAAS Fellow at the U.S. Department of State, and Christophe McCray, a AAAS Fellow at the U.S. Department of Defense. Both Colón and McCray spoke of their involvement as part of this program, which is celebrating its 35th year, and the importance of communicating science to a broader audience.

In addition to sessions on STEM careers, the meeting featured two poster sessions, small group discussions, networking events, and an "Iron Scientist" competition in which teams of graduate students and teachers competed to design a classroom science experiment with a single object in under 10 minutes.

"The creativity and enthusiasm seen throughout the meeting from the GK-12 community is infectious," said Daryl Chubin, principal investigator for the GK-12 program and director of the AAAS Center for Advancing Science & Engineering Capacity. "We are confident that their students are the beneficiaries."

In one of the more lively lectures, Bill Hammack, a chemical engineer who teaches chemical and biological engineering at the University of Illinois at Urbana-Champaign, stressed the urgency for university faculty to communicate science to the public.

"[Universities] are the only institution fully committed to the idea of a general or liberal education—that believes in the broadening of the individual and has a true scientific research mission," said Hammack, who's often heard on National Public Radio's *Marketplace*. "[T]he universities are the only place in society that will try to fulfill this [education] mission."

Benjamin Somers

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