



A WORD FROM...

Abbe Herzig, *AMS Director of Education*



Courtesy of the author.

In August, I joined the Office of Government Relations of the American Mathematical Society in Washington, DC, to serve as the Director of Education. This position provides me with the remarkable opportunity to collaborate with stakeholders both within and beyond the AMS to strengthen mathematics education, particularly at the graduate level and with a focus on students traditionally underserved by the mathematics community. My vision for this role is guided by my research on graduate mathematics education and my own path as a mathematics learner.

Like so many of you reading this, I have loved mathematics for as long as I can remember. As a child, I studied patterns around me and jumped at any chance to learn new mathematical ideas. I thought math was just a tool, a means to an end, not realizing that it was an entire field of study. When my older brother began receiving college brochures, I saw mathematics listed as a major, and from then on I was hooked. I entered college determined to major in mathematics, despite the misguided advice from my high school

teachers that math would not give me many career options. They were wrong, of course—since that time I have worked as a statistician in the nonprofit sector, a leader of software engineers building healthcare quality metrics in a commercial corporation, a consultant to the United Nations and the Legal Defense Fund, a mathematics education researcher, and a teacher at the K–12, undergraduate, and graduate levels. Nonetheless, I was not aware of these options at the time, so I entered college thinking that a mathematics major was mostly a dead end.

While in high school, I had some experience tutoring mathematics, and I had had inspiring teachers, so I aspired to be a teacher and pursued certification to teach secondary mathematics. I took every possible opportunity to teach mathematics and to learn about the connections between pedagogy and learning. At some point, my math professors argued that I was “too smart” to be a teacher and convinced me to pursue a career in statistics instead. Still, education always had a magnetic pull on me, and I returned to education whenever I could, teaching mathematics and statistics and participating in education-related service. Ultimately, I acknowledged that mathematics and education were my natural professional homes. My professors’ pessimistic view of the value of teachers, my long-standing passion for education, and the intrigue and excitement of mathematics inevitably led me to a career as a researcher in postsecondary mathematics education.

My research and the body of scholarship in which it resides suggest that graduate students are more likely to complete degrees when they perceive themselves as belonging in their academic programs and professional communities and identify themselves as mathematicians (similar ideas of belonging and engagement have been shown to be important as early as elementary school). Authentic mathematical experiences that allow students to see themselves as mathematicians are critical to their persistence in mathematics. Not surprisingly, students traditionally underserved by the mathematics community face much greater obstacles to belonging and identity in mathematics.

My research also identified specific policies and practices that supported student success, particularly for underserved students. For example, one department pivoted from a curriculum designed for students with prior opportunities to achieve and instead focused on a vision to develop the next generation of leaders in the discipline. This vision led to admissions practices that prioritized evidence of leadership skills above specific technical skills and revision of the curriculum to accommodate students without as much prior experience. With this change, enrollment of women reached parity very quickly. In other cases, doctoral, master’s, and bachelor’s degree-granting institutions collaborated to develop seamless pathways for talented students to pursue graduate degrees and

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provided the support they needed along the way (this was in the early years of what has grown into the Math Alliance, <https://www.mathalliance.org>). Other doctoral programs implemented innovative admission processes. Instead of relying on a strict rank-ordering based on quantitative measures like GRE scores, courses taken, and GPAs, they examined applications for student characteristics that may not be reflected in tests and transcripts. For example, not all colleges offer the same rigorous courses, and not all students are able to leave home to participate in a summer REU. Even so, there may be complementary evidence of motivation and potential to succeed, reflected in essays, letters of recommendation, leadership experience, or other activities. By considering all the qualities and experiences that a student brings to their mathematics studies, this approach to admissions opened graduate education to a broader population of talented students while still maintaining high academic standards. While these initiatives all differ, they have common threads: a commitment to fostering student success (a practice I think of as sowing seeds instead of pulling weeds) and the differentiation between future potential and prior opportunity.

As Director of Education for the AMS, I look forward to hearing your ideas about how we can build on these and other educational models to cultivate evidence-based policies, practices, and programs that support learning, engagement, and success for all students. Some initiatives might include:

- Disseminating successful strategies for graduate education by building networks of faculty and other policy-makers to share education models that support student success; see, for example, aimath.org/pastworkshops/keepinggrads.html and aimath.org/pastworkshops/gemstones2.html.
- Expanding graduate students' awareness of the broad range of mathematical careers available to them.
- Supporting mathematics faculty in preparing students for that range of careers, including preparation to pursue advanced study and providing the training and experiences needed for those career paths.

I will also support the AMS Committee on Education and provide leadership and advocacy for mathematics education policy in discussion with policymakers, other professional societies, and organizations such as the National Academies and the US Department of Education.

Our AMS community comprises tens of thousands of talented and committed mathematicians and mathematicians-in-training. Through collaboration with policymakers, faculty, academic departments, professional organizations, government agencies, and other stakeholders, we can collectively contribute invaluable insight to the development of effective and equitable graduate education. When we provide current and prospective graduate students with authentic opportunities to choose, to learn, and to do mathematics, we not only provide greater access to educational and career experiences for them, but we enrich the mathematical enterprise overall.

I eagerly look forward to working with you.