

Broadening the Horizons of Teaching and Diversity in Mathematics Departments

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In recent years, there have been a wide variety of initiatives that have looked to change the culture of mathematics. From websites showcasing mathematicians from different backgrounds (e.g. Mathematically Gifted & Black and Lathisms) to blog posts highlighting the stories of LGBT mathematicians,¹ the message is clear: our stories matter. Mathematics is often viewed as removed from the human experience; however, the experiences of those who do and are perceived as capable of doing mathematics play a fundamental role in shaping our community. As Evelyn Lamb mentions in “The danger of a single story,”² “When there is a dominant narrative of who mathematicians are, people who don’t fit the mold feel like there is no place for them in mathematics.” The reality is that members from historically underrepresented groups may experience our mathematics community differently, and oftentimes spaces to share these experiences do not exist in our departments. The initiatives we will discuss are not a way of bringing sociopolitical issues into mathematics; they are a way of addressing the issues that are inherent in the way the mathematics community has been built.

The Power of Many Stories

All of the authors of this piece have been the only woman in a roomful of mathematicians. During the postdoc job search this past year, the first author often found herself delivering a seminar talk to a roomful of men. It is pretty

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¹<https://blogs.ams.org/inclusionexclusion/2017/06/28/love-simeq-love-a-celebration-of-lgbt-mathematicians>

²<https://blogs.scientificamerican.com/roots-of-unity/the-danger-of-a-single-story-in-mathematics>

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easy to feel like you don’t belong when time and again you find yourself the “only one” of any minoritized group in a gathering of mathematicians. When we encounter established mathematicians who look like us, regardless of their field of research, it creates a sense of belonging and validates our experiences.

Mathematicians across different subfields and institutions are rarely brought together into the same room. For example, we have three different fields of mathematics represented (i.e., geometric group theory, math bio, and number theory) among the authors from two different institutions. Although three of us are in the same department, since we are all in different research areas, there is no natural space for us to interact mathematically (i.e., in seminars or classes) and discuss our shared (or divergent) experiences of our department and of the broader mathematical community.

Mathematicians Are Also Teachers

There is a connection between issues that we see as teachers in mathematics classrooms and the experiences that we have as students in mathematics classrooms and participants in other mathematical spaces. In many ways, teaching is a natural entry point for conversations about equity and inclusion in mathematics, because as mathematicians we spend so much of our time teaching mathematics (to students and to one another). Framing our thinking about how these issues impact our teaching provides a focus for the conversations, as well as a foundation for considering the ways these issues show up in broader contexts. The hope is that this has a ripple effect where thinking critically about how we teach our students who have had different mathematical experiences than us can positively impact how we interact with our colleagues, collaborators, and mentees who may also have different experiences of the mathematical community than we do.

Inspired by her experience at the 2016 Women and Math program at IAS,³ the fourth author sought an open space within her local mathematical community for people to share their stories in mathematics. The Horizons Seminar was founded at Brown University in fall 2016 as a result. Similarly, the Teaching & Diversity Seminar was founded in 2017 at the University of Illinois as a way to create a communal space to discuss the experiences of students, teachers, and researchers in mathematics.

Horizons Seminar

With an organizing committee of six in the first year,⁴ the seminar was dedicated to three distinct but strongly connected goals:

³The fourth author was particularly moved and motivated by Piper H’s speech “How to Become a Liberated Mathematician in 13 Years” at WAM 2016.

⁴Founding organizers include two graduate students, three postdocs, one tenure-track faculty member, and the list continues to change every year.

- to discuss issues of diversity and inclusion in STEM fields,
- to provide career advice to graduate students and young faculty, and
- to promote the work of mathematicians from traditionally underrepresented groups.

All these goals center on shedding light and highlighting the human side of mathematics—the side that is often underplayed, ignored, and even rejected in the dominant narrative. Through Horizons we hope to challenge this often oversimplified narrative and expose the many layers of truth beneath the identity of a mathematician.

We organized four to six lunch seminars every semester ranging over a large variety of topics. A sample list of past events include Making Mathematics Accessible for Students with Disabilities, The Lonely Reality of an Academic Dreamer (from an undocumented first-generation college student to a professor at Williams College), Gender Differences in Recognition for Group Work, etc.⁵ In these seminars, our speakers shared their own journey in academia, talked about their experiences in mentoring students and developing curricula that meet students' needs, presented their research on how diversity (or the lack thereof) affects the STEM community, and hosted discussions on why diversity and inclusion are essential to sustaining the development of mathematical community. Meanwhile, to provide more guidance, support, and outreach opportunities for young scholars, we also organized events like "How to create a website," "Info session for graduate students," "Meeting the new postdocs," "What's happening at ICERM,"⁶ etc.

Horizons receives funding from the Brown math department, Brown University Faculty Lectureship Funds, ICERM, and faculty grants to run the seminar. These funds allow us to cover the speakers' travel and accommodation expenses and provide free pizza and beverages at the seminar to attract more participants.

Teaching & Diversity Seminar

With an organizing committee of three graduate students (Vanessa, Marissa, and Simone), this seminar had similar goals to the Horizons seminar's of discussing issues of diversity and inclusion while also promoting engagement with these issues through professional development related to teaching. We organized four seminars per semester with the following goals:

- to discuss issues of diversity and inclusion in STEM fields;

⁵These talks were given by Tilak Ratnanather (Johns Hopkins University), Pamela Harris (Williams College), and Heather Sarsons (Harvard University), respectively.

⁶ICERM stands for The Institute for Computational and Experimental Mathematics, a research institute located in downtown Providence, RI.

- to provide a safe space for graduate students to bring their full identities to the mathematics community; and
- to promote self-reflection and conversations about the role of inclusion, equity, and justice in the classroom.

We developed our seminar under the umbrella of our department's graduate AWM chapter because it allowed us to be supported by the structure of an established organization. By bringing people with expertise into this space it became more than just a space for us to be in community with one another; it was also a space for us to learn. We brought in speakers from within and outside our campus community to give talks on relevant topics such as "Rehumanizing mathematics: A vision for the future," "Navigating culture in the classroom," "Addressing equity and inclusion in mentoring relationships," "Changing the 'face' of mathematics," and many more.⁷

The AWM Teaching and Diversity seminar receives funding to bring in outside speakers through our AWM Student Chapter's departmental support.

Starting Your Own Seminar Series

1. Reach out to members of your department to form an organizing team (e.g., graduate students, postdocs, faculty, etc.).
2. Discuss the mission and vision for the seminar, choose a format (e.g., meeting time and frequency), and set goals to accomplish.
3. Explore available funding opportunities for external speakers and refreshments.
4. Brainstorm a list of speakers to invite that are within your budget (ask colleagues for suggestions).
5. Extend an invitation to the speaker early and be as flexible as you can.
6. Promote, promote, promote! Advertise within and outside your department broadly.

Suggestions for Topics and Speakers

If you're struggling to come up with a list of speakers for your seminar, there are many creative ways to add more names to your list. Take a look at some of the many blogs hosted by the AMS. For example, the AMS blog *inclusion/exclusion* has articles written by many mathematicians who have thought a lot about creating inclusive math spaces. You can also find experts in math education who are skilled at interfacing with mathematicians by looking at the speaking list for conferences such as the annual Critical Issues in Mathematics Education workshop series at MSRI. You don't need to start from scratch; there are successful

⁷Dr. Rochelle Gutiérrez (College of Education, University of Illinois at Urbana-Champaign), graduate student and faculty panel, Dr. Daniel Wong (Director of Mentoring and Bridge Programs for Diversity, Equity & Inclusion), Dr. Candice Price (University of San Diego).

programs whose missions align with your goals and whose organizers have lots of relevant experience to share.

Remember, if you are inviting a speaker to discuss equity issues or share expertise outside their primary research area, make sure to give them the opportunity to share their scholarly work as well. This can be through speaking in an area seminar, giving a colloquium talk, or meeting with faculty who have similar research interests.

You don't need to have funding for external speakers to run a seminar! Check out resources and organizations within your university (most universities have teaching centers, offices for diversity and inclusion, and campus-wide equity initiatives). We also encourage you to reach out to colleagues in other departments, including education, psychology, and the sciences, who are doing relevant work.



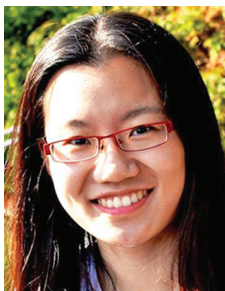
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Credits

Photo of Marissa Kawehi Loving is by Autumn Kent.
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Assistant Professor of Mathematical Physics

→ The Department of Mathematics at ETH Zurich (www.math.ethz.ch) invites applications for the above-mentioned position (non tenure track).

→ Candidates should hold a PhD or equivalent in mathematics or physics, and should have demonstrated the ability to carry out independent research work. At the assistant professor level, commitment to teaching students of mathematics, physics, and other natural sciences and engineering, and the ability to lead a research group are expected. The new professor will be part of the National Centre of Competence in Research NCCR SwissMAP (www.nccr-swissmap.ch).

→ Assistant professorships have been established to promote the careers of younger scientists. The initial appointment is for four years with the possibility of renewal for a three-year period.

→ **Please apply online:**
www.facultyaffairs.ethz.ch

→ Applications should include a curriculum vitae, a list of publications, a statement of future research and teaching interests, and a description of the three most important achievements. The letter of application should be addressed **to the President of ETH Zurich, Prof. Dr. Joël Mesot. The closing date for applications is 31 December 2019.** ETH Zurich is an equal opportunity and family friendly employer, strives to increase the number of women professors, and is responsive to the needs of dual career couples.