EARLY CAREER

Mathematical Community

Planting Seeds for Community

Ellen Eischen and Catherine Hsu

It can feel disorienting to find yourself in a new setting without adequate sources of support and connection, in other words without sufficient community. Given the repeated moves an academic career typically entails, as well as some math-specific cultural norms, it is important for young mathematicians to develop robust skills for building and rebuilding their sense of community. Even though you can sign up for official community groups offered by institutions, building a rich sense of community for yourself frequently necessitates taking an active role in connecting with people with whom you can relate about work, hobbies, and other aspects of life. You will likely need to go beyond simply showing up to institutional community-building meetings.

Like seeds planted in a garden, it is impossible to predict which attempts at finding communities will be the most fruitful in the long run. For both of us (EE and CH), the most fortuitous connections have arisen serendipitously from our involvement in a wide range of groups. Making new connections both in and out of work can lead to unexpected sources of joy, learning, and growth. Moreover, building a foundation for your community that can move with you helps ease transitions between stages in your career.

In practice, how can you build a sense of community for yourself that gives you an authentic sense of belonging, social and academic support, connections to future opportunities, and so on? Here are specific examples of community-building that have influenced our own lives, professionally and beyond.

1. **Get out of your comfort zone**. Some opportunities to build community appear to be far from ideal because of an apparent mismatch in interests. As new postdoctoral fellows (EE in Chicago, IL, and CH in Bristol, UK),

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our initial sense of camaraderie with postdocs in our respective departments came from get-togethers that our peers held at bars and pubs, even though we dislike not only beer but also some of the activities around which these events were ostensibly organized. As we experienced, the stated theme of a social event, such as a Super Bowl party, often turns out to be secondary to connecting with others.

2. **Reflect on what you want**. You might seek outreach programs, people with whom to explore a new field, a group focused on professional development, or something entirely different. If you have a clear sense of what you are looking for, it can be easier to notice when key opportunities arise. For several years, EE wrote in her journal about her desire to create a "Women in Math Reading Room," a dedicated space that would include books and articles to help women and members of other underrepresented groups thrive in math and that would also serve as a meeting space for formal or informal discussions sparked by these resources. She felt this could foster community but seemed prohibitively costly to create. Years later, someone asked her if she had ideas for how to spend new funds set aside for women in math, and soon after, EE and CH brought the original idea to fruition. Thanks to support from the department, it has been part of the University of Oregon Mathematics Library for four years now.

3. **Take advantage of built-in support**. A natural place to seek community could be amongst your "academic family," starting with your advisor's students. Although CH was EE's sole graduate student when she began attending conferences, several students of EE's PhD advisor (and of her advisor's advisor) welcomed and encouraged CH. During the pandemic, we started holding virtual "Eischen Group Gatherings," open to everyone mentored by EE, ranging from an undergraduate summer researcher to CH, who is now in a tenure-track position. Rather than focus on mathematical topics, the gatherings provide an opportunity to build and strengthen relationships between participants, who have a wide range of mathematical backgrounds. Depending on attendees' preferences, the meetings have included ice-breakers, career guidance from more senior members, and informal chatting.

4. **Follow up on invitations you receive**. Some of CH's most productive collaborations have arisen from her sending a follow-up email to someone who proposed a potential project idea in passing at a conference. An invitation to speak in a seminar (even if initially posed informally), a chance to discuss a grant application, or an offer to talk about your research over a meal at a conference is a signal that someone is interested in your work. It can be easy to overlook or dismiss informal invitations, but if they interest you, taking the initiative to follow up on them can help you develop in new directions.

5. **Look for opportunities to mentor.** Although early on it can be easy to focus solely on finding mentors for yourself, at every stage of your academic career, you can usually find someone eager for your mentoring. Becoming part of a vertically integrated community can provide a strong foundation for long-term connections. CH is still passing down application tips, cover letter templates, and teaching advice that she received from older graduate students many years ago. Sharing your own knowledge with younger academics can be rewarding in itself, and it strengthens your department to have continuity between different years of graduate students.

6. **Team up with people from adjacent fields**. You might be able to build a robust community by including people who work in related fields, or even outside mathematics, and have goals in common with members of your field. For instance, writing is a nearly universal requirement in academia, so you could seek out a writing accountability group, either informally with people you know from a variety of disciplines or more formally through a program such as the National Center for Faculty Diversity and Development's 14-Day Writing Challenges.[1]

7. **Find an online community**. A vital source of community for EE comes from the four (or more) hours each month she spends meeting—over Zoom—with the Advisory Board and Exhibits Committee of the newly forming Seattle Universal Math Museum (SUMM). Virtual tools vastly increase the possibilities for meeting with groups who share a common interest, especially if that interest is rare. To avoid Zoom fatigue, you might limit the number of online communities you try simultaneously and just consider ones with no in-person analogue available to you.

8. **Join affinity groups**. When you are the only one or one of only a few in a particular demographic group in your department or school, affinity groups can provide a much-needed sense of community and belonging. We participated in Women in Numbers (WIN) workshops, which facilitate new research collaborations among women in number theory. In addition to their mathematical value, such communities can combat isolation. Attending for the first time as an assistant professor, EE and several other women discovered they all had been grappling with similar challenges alone. Attending as a graduate student, CH was inspired by the role models she met who have dedicated time and energy to promoting women in mathematics research.

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[1]*Information about NCFDD writing programs is provided at* `https://www.facultydiversity.org/14-day-challenge`.

9. **Participate in activities purely for fun**. The workload and pressure to excel in mathematics research, among other difficulties, can quickly become overwhelming. Being proactive about finding hobbies that you do for your own enjoyment can help you build a fulfilling community. CH has enjoyed organizing intramural sports teams; her math department's inner tube water polo team, the Floating Tori, even won back-to-back championships towards the end of her graduate career. Similarly, EE's experience during her postdoctoral years was enriched by participating in (theatrical) improvisation classes, a hobby that was new to her at the time but later grew to intersect with her professional life.

10. **Don't let rejection hold you back**. We have both enjoyed the culture of potlucks and informal gatherings of friends and neighbors in Eugene, Oregon (home to the University of Oregon). Before moving to Oregon, we found that invitations to similar events were sometimes met with less enthusiasm. It can feel deflating when your efforts at community-building are met with resistance or rejection, but you can respond productively by reaching out to broader groups of people or asking for suggestions from someone familiar with local customs.

Building community is a continuing process. As you grow and circumstances change, your approach to building community will evolve to serve your needs. For years, CH's mathematical community has sprouted from mathematicians linked to EE. More recently, EE has started to meet mathematicians who introduce themselves as conference friends of CH. You never know how a new connection might expand your community.

Ellen Eischen   Catherine Hsu

Credits

Photo of Ellen Eischen is courtesy of Miles Truesdell.
Photo of Catherine Hsu is courtesy of Kevin Brinker.

Women in Mathematical Biology

Rebecca Segal

Nine years ago, newly tenured and pregnant with my second child, I was feeling a bit unfocused. I heard about a collaborative workshop for women in mathematical biology hosted at the Institute for Mathematics and its Applications (IMA). I was accepted, reaped the benefits of attending, and have now spent the years since organizing similar workshops. Since graduate school, I have been part of the AWM community, but this research workshop at the IMA was a new dimension for me. Working on a nascent research project for a week with a group of smart, interesting, and enthusiastic women brought me full circle back to my undergraduate days at Bryn Mawr College. The intense shared experience, the mentoring both formal and informal, the networking, and the development of a group bond has been a source of continued joy in my mathematical career and one that I hope carries others forward as well.

Kristin Lauter started a Women In Numbers (WIN) workshop in order to grow and support more women researchers in Number Theory. The success of that workshop has inspired 25 different research networks to be established, Women in Mathematical Biology (WIMB) being one. The structure is generally established so that senior women will mentor and collaborate with bright young women in their field on a part of their research agenda of their choosing, while the junior participants will develop a network of colleagues and supporters and encounter important new research areas to work in, thereby improving their chances for successful research careers.

A primary goal of the workshops in the research networks is to create and foster high-quality research collaborations between women. In the WIMB workshops, we also aim to provide our groups an opportunity for positive professional growth and development for all participants. Group collaboration is exciting in this context because it provides a tangible and supportive way to learn about a new problem, develop new skills, and connect with new colleagues. New and fresh eyes bring unexpected observations that can lead the project forward. However, we also acknowledge that group collaboration can be challenging, especially when members do not have prior history together or common training. Some time is required to learn each other's strengths. As an organizer, I work with the groups to make sure that each member of the group feels able to contribute and grow as part of the research effort.

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