

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

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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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The impact of these workshops has been felt by all the participants. The post workshop survey responses have been overwhelmingly positive—100% of the respondents feel that the workshop was worth their time. This includes the group leaders as well as the junior participants. A few responses from the post workshop survey sampled here indicate the positive response: “My group was productive and enthusiastic the whole week and it was a great work environment. Doing math in an all-female group was a really positive experience and I left feeling super motivated.” Another participant said her favorite part of the workshop was “Establishing a new group of collaborators. I’ve honestly never developed this skill and I’m glad to have had this opportunity.” The workshop also provides a time to have in-depth conversations about work-life balance and issues of starting a family or two-body problems (i.e., job searching with a partner who is also an academic) as well as dealing with the promotion and tenure process. For many women participants, they were able to establish a research project despite being in a high-teaching-load institution, or post-pregnancy leave. The workshop has enabled participants to jump start stalled research programs and gain tenure and/or promotion when the prospects had previously seemed unlikely.

Many of our past participants have now returned as group leaders or organizers. As the community continues to grow and flourish, bringing new generations of women into the fold, we remain thankful to the mathematical, government, and industry institutes who facilitate the funding and logistics. It’s so fun to go to conferences and see that mini-symposia related to the WIMB work have been organized by workshop participants. I can catch up with past participants and hear about their ongoing successes and to see how the research projects have developed over the years. Personally, I gained a new sense of direction and excitement about my research portfolio and met many colleagues I know I can count on for career advice and encouragement. I’m lucky to have been able to participate in the first Women in Mathematical Biology workshop and feel equally privileged to continue organizing these workshops and to meet the up-and-coming researchers in my field.



Rebecca Segal

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Collaborating Across Disciplines

Benjamin Braun and Pooja Sidney

As a mathematician whose research is in geometric and algebraic combinatorics (Braun) and a psychologist who studies how children understand math concepts (Sidney), it might not be immediately clear how we benefit from collaborating. However, we have found many shared interests and goals in the realm of mathematics teaching and learning, and our collaboration has developed in positive and unexpected ways. Our goal in this article is to share some of the things we have learned about cultivating and maintaining a productive collaboration across disciplines and to explain why this has been valuable for each of us.

Collaboration has many forms. Many of us collaborate within our own disciplines. Perhaps someone else within our field has disciplinary expertise or access to tools that we do not. Often, these collaborations are transactional, enduring only to serve a given project and ending when that project is completed. Sometimes, collaborations have more depth, are more personal, and reflect relationships in which we continue to invest over time. Many of these long-term collaborations are focused on generating new questions and ideas or making connections between different fields. In this setting, our collaborators often become our friends and help drive our work forward in new and more interesting ways. In our experience, interdisciplinary collaboration can also take both transactional and relational forms, with relational collaboration both requiring more work and being ultimately more fruitful and gratifying. So, what does it take to build a relational, interdisciplinary collaboration? We have found that there are five key ingredients: build a network, identify shared interests and goals, work to understand each other’s disciplines, value multiple types of outcomes, and be patient.

Build a network. One of the critical ingredients in starting a good collaboration is (and yes we know this sounds lame but it is incredibly important) to invest time in building your network. If you don’t *know* people outside your discipline, then it is difficult to *make connections* with people outside your discipline! For example, we met because Ben had served on committees outside the math department with a senior psychology faculty member, Christia Spears Brown. When Pooja was hired, Christia told her to talk to Ben to make a connection with the math department. We

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