

Supporting Diversity in Mathematics Departments

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My job and my institution

- Private residential “liberal arts and sciences” research institution in an urban setting.
- Departments of math, applied math and statistics are all distinct and do not interact much.
- Hired in a teaching position with advising and mentoring duties, and special project: build community among (pure) math majors.
- Why build community?
 - ▶ Some highly selective first-year math courses, which make all other students feel like second-class citizens, like they don't belong.
 - ▶ Very low numbers of underrepresented minorities majoring in math, who might also feel like they don't belong.
 - ▶ Same for our graduate students, and for our faculty (currently, all research tenured faculty in math dept are males).
 - ▶ A climate of *posturing*: using words like “trivial”, “follows easily”, etc.

What are some barriers to building community that you face at your institution?

Various techniques on increasing and supporting diversity

- Teaching techniques (active learning, inquiry-based learning, project learning, teamwork).
- “Emerging Scholars” types of programs, to support STEM-intending underrepresented minorities.
- Curriculum adaptations or changes, or supporting teachers in that.
- More mentoring opportunities: summer, weekend or day programs for underrepresented minorities, ongoing seminars. Research Experience Opportunities (REUs).
- Interventions on students: addressing or reducing stereotype threat, decision gaps, fixed mindset (vs growth mindset).
- Interventions on faculty: trainings on biases and implicit biases, diversity trainings, reading groups.
- Building a “social net” for underrepresented groups, and mathematicians (students, faculty) in general.

Plan for this minisymposium

MS19: Increasing Diversity and Inclusion in Mathematics

- 1 9:30am: *Supporting Underrepresented Groups at the Undergraduate Level*, RBR.
- 2 10:00am: cancelled talk. Instead, we will do an activity that should be easily portable to your own department (faculty meeting, teacher training, weekly check-ins, etc).
- 3 10:30am: *Leveraging Students' Cultural Competencies Through Mathematical Modeling*, Cynthia Anhalt, University of Arizona, USA (with Ricardo Cortez, Tulane University, USA; Aliceson Smith, Desert Shadow Middle School, USA).
- 4 11:00am: *Completing the Circle, Going Back to the Source: Indigenizing University Mathematics*, by Edward Doolittle, First Nations University of Canada, Canada.

How to get started?

Get funding...

- MAA (Mathematical Association of America):
 - ▶ Tensor-SUMMA (Strengthening Underrepresented Minority Mathematics Achievement) grants.
 - ▶ NREUP (National Research Experience for Undergraduates Program).
 - ▶ Check out the MAA website, under “Programs” then “Underrepresented Groups” for more resources, for faculty and students.
- AWM (Association for Women in Mathematics) can help student chapters bring speakers in.
- NSF (National Science Foundation), directorate of Human Resource Development has multiple programs that fund proposals.
- Your institution might also have money for this (department, dean, diversity office).

Note: it might be harder to find time, colleagues and students to work with on this, than it is to find money.

How I got things started at my institution

Little by little, trying things out. Social events first.

- Helped the undergrad club get some grad students to be part of their mentoring program (not very successful).
- Started talking to students who had things to say about the math program and courses (referred to me by colleagues).
- Invited the *Women in Math lunch group* to go see a play about Ramanujan: 11 women (3 math majors, 4 grad students, 4 faculty or post-docs) and two significant others.
- Started a newsletter for math majors, the *Monthly Math Memo*.
- Held a study break for students (not very successful: 7 undergrads, a handful of grads).
- Held a *Sophomore Welcome Luncheon* for our newly-declared math majors. 30 students came, room was buzzing! (Cake might have helped. Got some advice from an undergrad.)

Tackling issues as they come up

Events geared towards giving information and advice.

- Organized an event to encourage students taking our calculus courses (who feel “behind” because they did not start out taking a harder course) to take more math and inform them on what they should take next. Created an info packet available on the web.
- Held an info meeting on writing a senior thesis.
- Collected experiences of women in math at Harvard (undergrads, grads, post-docs, faculty, etc), shared them among the group, and shared parts of these to key faculty members.
- Info event on summer research opportunities.

All these are aimed at making members (or prospective members) of the department feel like they are welcome, like they can participate fully, like others have a similar experience to theirs – even though they might not have the social and support network that others have. Hopefully helps students navigate our courses and our major.

Showing Up

While I'm working on getting to know the students and their needs, students are also working on building community among themselves.

- Attended a student *Women in Math and Physics* event, to show some faculty presence and support.
- Attended a *Gender Gap in Math* event put on by students, saw there other faculty, some of whom would become allies.

From this stemmed two things:

- an ongoing collaboration with a few key students, highly motivated to have better gender diversity in the math major;
- and a discussion among 2 other faculty members and me, about what we can do to support diversity.

Faculty diversity discussions

With other faculty members who came to the gender gap panel:

- Over the summer, started reading literature on supporting diversity.
- Brainstorming about how to include more faculty, what our goals were, what our needs were, what we thought the needs of the students might be, how we could support teaching staff grappling with issues of diversity...

Led me to organize a little “diversity training” at our fall teacher training. **This changed everything.** My plan for the next 30 minute slot (after my talk) of this minisymposium is to give you such a mini-training, and encourage you to lead one at your institution!

Diversity Discussion Group officially starts

During the training, mentioned the start of a reading group on issues of diversity and inclusion in math. Got a few responses, enough for a critical mass to get us started.

- Meetings every other week, with usually a reading to do ahead of time. Readings might be from research literature; experiences of minorities in math or science; resources on allyship.
- Special meetings:
 - ▶ Invited 2 graduating seniors to give us their honest thoughts and feedback on the department.
 - ▶ Took an allyship training by our Office of BGLTQ student life.
 - ▶ (Other available trainings: bystander training from Office of Sexual Assault Prevention and Response, Gender 101 from Women's Center, MOOC on religious literacy...)
 - ▶ Upcoming: meeting at Brown University with students and faculty to discuss issues of diversity and inclusion in math. We have both students and faculty going. Hiro Tanaka of Harvard organizing with the Horizons Organizing Team at Brown.

Diversity Discussion Group continues

- Some actions taken:
 - ▶ Look at our student data: achievement gaps, choice gaps, stereotype threat in our students. Planning for an intervention with our students.
 - ▶ Cleaning our offices, making them and the department feel more welcoming (following research literature on CS classrooms).
 - ▶ Organized two advising dinners, where students taking calculus and interested in taking more math can come to dinner, with 6 faculty for 10-12 students.
 - ▶ Training for our course assistants (undergrads who grade problem sets and hold sections) included a mini diversity training, and this part of the training got the highest rating (most useful).
- Coming up:
 - ▶ Chocolate tour of Cambridge? (Advising event.)
 - ▶ Beautifying the math department.
 - ▶ Dedicated posterboard for math student groups to advertize their events.
 - ▶ Info session on the process of applying to graduate school (collaboration with students).
 - ▶ A website on how to ask for a recommendation letter.

Student initiatives

Students also need to do their own thing, separate from faculty.

- Students started a “gender inclusivity in math” group.
- Speaker series in the fall, where faculty can come, hear students’ questions, “show up”, discuss afterwards, be available to students.
- Women in Math conference in the spring, aimed at local undergrads.
- Some social events were they discuss how things are, without faculty present. They might tell me a few major things that came out (such as difficulty to find a study group).

Listening to students is important

Sometimes they just need someone to talk to! Someone who will understand how hard it can be. That in itself can be therapeutic.

Sometimes though, things can be changed! And students might have excellent ideas about how to change things. This has led to joint efforts:

- Math Night (from a “gripe session”).
- Students producing their own informational pamphlet, to give to prospective math majors or students who just want to take more math courses.

Some key take-aways

- Find collaborators, allies at all levels: undergrads, grads, post-docs, faculty.
- The hope is that the social net you build will be self-sustaining...
- Any little thing you do, word will get around.

So, where do I start?

- Add a blurb to your personal homepage about how you support diversity. (See math.harvard.edu/~rbr for example and links.)
- Get someone to do a training in your department! Ask around for a couple colleagues who will commit to come, then invite the whole department. (And/or offer such a training yourself.)
- Talk to students. Seek them out. Interview graduating seniors. Ask your colleagues to refer students to you.
- Ask students what they want or need, and ask them to help you make this happen. Seek their input and help. (“Gripe session”.)
- Attend student events, if they are ok with it. Support students in organizing what they want to organize.
- Start a discussion group. Or even just read one thing with a couple colleagues. Find a way to spark discussions. You never know who your allies might turn out to be.

Who will commit to doing one thing
by the end of the academic year?