a partial list of bridge and post-baccalaureate programs in
math in the United States.
  We advertise through a mix of email, social media, and
word of mouth. We maintain a list of participants from past
lunches and are able to email reminders about upcoming
meetings and advertise on online platforms like the Algebraic
Geometry Discord channel (as both organizers are
algebraic geometers). Additionally, participants advertise
to their departments and colleagues.

How to Start Conversations
Our primary goal with “Lunch in the Time of Covid” was
(and still is) to start conversations about issues that are
affecting young mathematicians. With this in mind, each
lunch starts as a panel discussion but slowly becomes a
broader discussion where anyone can contribute. No matter
your time constraints as an organizer of an event like this,
it is wise to include time near the end for the audience
to make their voices heard. This can be a formal Q&A,
perhaps with questions collected throughout the panel as
many webinar platforms allow, or a more informal call for
audience members to chime in. (In the spirit of our more
informal format, we opted for the latter with great success.)
Fortunately, all of the lunch topics after the first week were
suggested by past audience members, so we can say with
confidence that our audience is passionate about being
involved and sharing their experiences.
  We have been very open about our own limitations—
both organizers are white and have a postdoctoral position.
For this reason, we make extra efforts to invite panelists and
participants that have different experiences than us. Early
on, we began reaching out to trusted mathematicians in
our lives who, in one way or another, are not traditionally
represented at these types of events. We asked them who
would make a good panelist, what topics we should not
neglect, and generally how we were doing so far. We have re-
ceived valuable advice at every step of the way, and continue
to benefit from the wisdom of these peers and mentors.
Beyond broadening the conversation, we want to send a
clear message that all are welcome in these conversations.
For anyone who is considering planning a similar event in
the future, we encourage you to think early and often about
who your audience is and how you are serving their needs.

How to Keep the Momentum Going
After the first week, all of our topics have been developed
from audience suggestions. Often, a participant shares their
passion and experience for a particular topic and they are
able to serve as a panelist in a future lunch. This is one of
the real strengths of an event series, as opposed to a stand-
alone event: we have been able to dedicate time and future
events to focus on important topics brought up by the audi-
ence. However, even with a one-time panel, you can solicit
feedback ahead of time. As with all things organizational,
reach out to people you trust to diversify your perspective
on what is important and what should be emphasized. Further-
more, as one participant pointed out, planning an
event like this with someone, particularly someone whose
background or viewpoints are different than your own, is
good experience for the types of collaboration and service
that you will be doing the rest of your career.

In Conclusion
Based on participant and panelist feedback, “Lunch in the
Time of Covid” has been an essential series of conversations
for many early-career mathematicians. Both organizers saw
a need for an online community to discuss what things are
really like during a global pandemic. We encourage anyone
who sees a similar need in their community to follow our
model (or their own path!) as we continue to face the chal-
lenges brought on by the COVID-19 pandemic.
  One of the unique benefits of going virtual during the
global pandemic has been the ability to host these lunches
for participants across many branches of mathematics and
start conversations and community-building that would be
unlikely to happen otherwise. Even as the world recovers
from COVID-19, we believe in the importance of these
informal discussions and hope to inspire others to start
something similar.

Credits
Photo of Kristin DeVleming is courtesy of the author.
Photo of Andrew Kobin is courtesy of the author.

Unconscious Bias in
Academic Mathematics

Danny Krashen

In recent years, as a society, we have made significant
progress at reducing explicit sources of bias. We now un-
derstand that we cannot explicitly discriminate on the basis
of gender, race, and other protected categories in a range of
situations. On the other hand, it has also become strikingly

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Early Career

clear that despite this progress, bias still exists in our society, and this has highlighted the importance of being aware of systemic and unconscious (implicit) bias. Here, I would like to primarily focus on unconscious bias. This is much more subtle than explicit bias, as it is intrinsically connected to the ways in which we see the world, and assumptions we make without knowing it.

Academic life involves fairly constant evaluation of others, whether it is the grading of student exams, reading applications to graduate school, peer review of articles, or evaluation of grant applications, we seem to always be making judgments, often of great consequence to others. In each of these situations of evaluation, I have had to deal with unconscious bias in myself as well as in others. Understanding this bias is important for those of us whose decisions directly affect those entering our field. It is equally important for early-career mathematicians to understand the culture they are entering, with its pitfalls and complexities.

Unconscious bias can be difficult to deal with because it is... unconscious.

On the other hand, this statement also highlights the principal tool we have to mitigate it: making things conscious and explicit. While it would be nice to be able to completely rid ourselves of the tendency towards bias, I can’t envision any constructive way of moving towards this. Instead, I would suggest that by making processes more public and transparent to scrutiny by ourselves and others, we can make real and substantial progress towards reducing the negative effects of bias in practice.

How does unconscious bias arise? Let me start with an example. Let’s imagine how I might evaluate a new job candidate at my department. While this may not be the case for many others, from my own experience as a faculty member at more than one university, I have never received any particular instructions on evaluation criteria for new job candidates. Therefore, my typical process used to be something like this. I would browse through their job application, letters, and their work online, see them give a talk, and maybe have lunch with them when they come for a campus interview. Perhaps the following day, I would vote in a departmental hiring meeting based on my “gut” feeling about them as a candidate. This would be based on a combination of how impressive their work was, how well I imagined they would fit in with my department, combined with my ability to visualize them as a colleague. This internal imagination and visualization carries quite a lot of weight, and it is, in its nature, unexamined. We are not well equipped to ask questions such as “Why does this person feel impressive, while this other person doesn’t?” More often, we simply look to confirm our intuition, generally using details of the applications or our interactions with them, or consonant opinions of our colleagues. We thereby grant ourselves further license to leave our methods unexamined.

The main point here is that there may be a large number of reasons that a candidate feels “impressive” and these may have a lot to do with factors such as gender, race, and many other things, which if made explicit, would be somewhat horrifying to most of us. I know that I have fallen into this at various points in the past—making assumptions about other people based on my “gut feeling,” without realizing that this feeling was an effect of their gender or racial identity and my own bias.

As a mathematician, I feel that my training has made me particularly vulnerable to this. In mathematics, we are trained to hone our intuition and imagination to seek out pattern and truth, and then use formal logical arguments to establish what we find. Unfortunately, in the real world, this often amounts to: go with your gut and then rationalize. Practical problems, such as hiring decisions, require a different process entirely.

How do we mitigate bias? One useful strategy is to minimize the unconscious influence by establishing predetermined criteria for our decision making. This need not be overly formal, and for a job candidate may simply include such factors as: high quality research contributions, establishment of a long-term research program, synergy of research area with departmental interests, and success mentoring graduate students, postdocs (and probably more things as well). Of course these are fuzzy concepts, particularly from the point of view of a mathematician; however, the point is not that we can pretend to accurately “measure” these things, but rather that these things are what we have decided are of value to us, and these things should explicitly guide our discussion and evaluation. When comparing two candidates, we can then think more about “do they have high-quality research contributions?” and less about “do I feel like they seem really smart/strong?”

The National Science Foundation, in its grant reviewing panels, does a fairly good job at this by presenting criteria against which applicants are judged. While not perfect, and perhaps it is the nature of group dynamics that perfect solutions are not realistic, such a setting still prevents the more egregious abuses.

We see the same pattern throughout various other evaluations we perform in academia.

When grading an exam, do we first look at the numerical scores, and then try to “feel” what a passing score is like, based on our impressions of the students. If so, we are setting ourselves up for unconscious bias. We can prevent this by deciding on what criteria we should look for for particular letter grades, deciding in advance roughly what kind of a score should correspond to which letter grade. These can be modified if we realize later that the exam was not as well written as we wanted, and some problems were harder or easier than we had assumed, but starting with some idea of how grades will work is essential.

When accepting students into a graduate program, it is tempting to focus on numerical scores, such as GRE subject
As we look for unbiased criteria for graduate students, GRE subject scores seem problematic. While I haven’t found data on the math subject score as a predictor of success, the usefulness of subject tests has been examined in general as well as in physics in particular. While moderate positive correlations seem to exist between GRE subject scores and grades during the first year of graduate school (https://doi.org/10.1037/0033-2909.127.1.162), it didn’t seem correlated to other measures of success for physics graduate students (https://doi.org/10.1126/science.274.5288.710). Besides this, evidence that GRE subject scores in physics suffer from gender bias is discussed in various places, for example (https://www.aps.org/publications/apsnews/199607/gender.cfm).

These studies really just scratch the surface of a literature in which I am still largely uninitiated; however, I believe that they do serve to illustrate that these are ideas whose validity can be reasonably explored, tested, and refined as we try over time to make the moral arc of our profession bend towards inclusion.

Danny Krashen

Credits
Photo of Danny Krashen is courtesy of Max S. Gerber.

Rethinking the Teaching and Learning of Mathematics in Light of COVID-19

Della Dumbaugh and William McCallum

Viewing the Pandemic as an Opportunity

During the spring of 2020, COVID-19 prompted the non-profit Bill McCallum cofounded, Illustrative Mathematics (IM), to put considerable energy into developing resources. Bill McCallum is a professor of mathematics at the University of Richmond, and she is an associate editor of Notices. Her email address is ddumbaugh@richmond.edu.

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