

DIVERSITY STATEMENT: AMANDA YOUNG

Fostering an inclusive environment creates a stimulating and diverse community of researchers that enables innovative collaborations.¹ As a female mathematician, I have a personal understanding of the barriers faced by women in the sciences as well as the impact of encouraging mentors and academic enrichment programs. I am passionate about advancing these efforts and creating a warm, supportive atmosphere for all underrepresented groups.

In the early stages of my career I participated in several activities aimed at promoting diversity in mathematics, including volunteering for the UC Davis *STEM for Girls* event and helping to establish *Association for Women in Mathematics* (AWM) chapters at UC Davis and the University of Arizona. Moving forward, I wanted to learn more on how to effectively support positive change. I realized the importance of becoming a proactive mentor and stepping into a leadership role in these initiatives. Motivated by my desire to become a better advocate, last December I successfully applied to the *Diversity in Leadership* program through the Munich Center for Quantum Science and Technology (MCQST). This program introduced me to new tools and research, and has shaped the way I want to support and mentor students now and in the future.

Diversity in Leadership and related research. The aim of the Diversity in Leadership program is to help train future leaders and develop skills for mentoring and supporting underrepresented groups in the sciences. The program includes “introductions to active bystander training, conflict management, leadership and mental health, and hands-on training in gender issues in the field of physics.” One of the most impactful events of this leadership series for me was the unconscious bias workshop. This is a tough subject to navigate, and I remember feeling nervous before the start of the session. However, this was quickly assuaged by the leader. He started the meeting by stating that everyone has implicit biases, but it is about recognizing them and making the commitment to actively address them that is important. This made a difficult conversation feel safe, and exemplified the kind of skill I wanted to build through the program.

Beyond the skill development, I was also very much impacted by the studies on implicit biases in gender and race I was first exposed to in this meeting [6, 8]. In [6], identical resumes for a lab manager were sent out for review to science faculty at research institutions with the only differences being the name and gender. In all categories, the female applicant was scored lower. The results in [8] showed a similar bias in ethnicity, where interview requests were measured for the same resume and applicant photo for which the only differences were the name and presence of a head scarf. These studies are recent (2012 and 2016, respectively), and show the impact implicit biases can unintentionally have on diversity. This research showed me that I need to be more cautious and self-aware when I am reading student submissions and messages (homework sets, applications, emails, etc.). More broadly, though, this speaks to the progress that still needs to be made.

Implicit associations naturally develop through our cognitive processes, and one way to measure unconscious biases is through the Implicit Association Test [2]. Unfortunately, a common result from this test is “that people who have no intention to discriminate may still do so in their behavior toward others who vary in age, gender, class, race/ethnicity, sexuality, religion, and nationality among other social groupings,” [1]. In addition, research suggests that initiatives prior to the early 2000’s had at best a negligible effect on diversity in the workforce [4, 7]. I believe that these studies support the need for a more conscientious and data-driven approach for addressing the lack of diversity in the sciences. Moreover, since bias can be unintentional, this also implies that we need to help develop an educated community of allies to support our students, staff, and faculty in moments of need.

¹For a nice exposition on the benefits of a diverse workplace, see <https://www.scientificamerican.com/article/how-diversity-makes-us-smarter/>

A few proposals for research-driven initiatives. Research indicates that one effective path for closing the gender gap in science is to address individual biases with separate programs aimed at “targets” such as female and male applicants, and “perceivers” such as faculty members or hiring boards (see [3] and references within).

For the targets, evidence supports that exposure to non-traditional scientific role models or mentors who outwardly support diversity has a positive impact [3]. To this end, I will make an effort to provide examples of non-traditional scientists in my classes (such as Emmy Noether and Katherine Johnson), and welcome students from all gender and cultural backgrounds into my research group. To make myself available to graduate students outside of my research group, I will support AWM activities and participate in student seminars. In addition, I will organize lunch or coffee events between graduate students from underrepresented groups and seminar speakers to facilitate contact with external researchers. I will also advertise student diversity programs (such as university courses or trainings) to help students educate themselves and build a network of peer allies. In instances of gender bias, I have taken comfort in having a compassionate and caring support system, as well as access to knowledge to contextualize my experiences. It is my hope that through these measures I can provide similar support to our community.

Initiatives for perceivers such as implicit bias trainings are becoming more common and have shown positive results, but more research is still needed in this area [3]. Moreover, implicit biases is only one of the issues faced by underrepresented groups in the sciences. Regardless, evidence supports that effective change occurs from programs that “(1) are grounded in theory and evidence, (2) involve active learning and responsibility rather than lecturing or forced training, (3) avoid assigning personal blame or guilt, and (4) include evaluation plans of intervention efficacy,” [3, 5]. This also illustrates a particular point that makes these issues so challenging: How can we address instances of unconscious harm without causing more harm? I would like to work together with our staff, faculty and university community to find ways to positively address these issues and normalize difficult conversations.

I believe that a clear step forward is to initiate cooperation with social science and gender/cultural studies departments as well as diversity offices to become better educated and effective at implementing change. One goal of this collaboration would be to develop an integrated *Diversity in the Sciences* active-learning program and seminar series for students, postdocs and faculty members. Similar to the program at MCQST, the aim of this series would be to build tools and discuss diversity related issues through the lens of established and ongoing research. To be sensitive to issues regarding power dynamics, I would design activities that are both separate and together for the respective groups (e.g., faculty vs. students and postdocs). I think it is specifically important to include activities for students and postdocs in this series as it would help foster an educated network of peer allies for targets, and preemptively train future perceivers.

Conclusion and reflections. The Diversity in Leadership program at MCQST has given me a starting point from which I can explore effective diversity measures and research. Implicit bias is only one part of the larger conversation, and I am also committed to addressing these other dimensions of diversity and inclusion. While I have learned so much, I am excited to know more and I look forward to continuing my efforts to grow and develop positive change as a supportive mentor, supervisor, and colleague. I look forward to cooperating with other faculty, staff, and university members as we work together to find solutions that fit best our students and community.

REFERENCES

- [1] M.R. Banaji, R. Bhaskar, and M. Brownstein. When bias is implicit, how might we think about repairing harm? *Current Opinion in Psychology*, 6(183-188), 2015.
- [2] M.R. Banaji and A.G. Greenwald. *Blindspot: Hidden biases of good people*. Penguin Books Limited, 2014.
- [3] T.E.S. Charlesworth and M.R. Banaji. Gender in science, technology, engineering, and mathematics: Issues, causes, solutions. *Journal of Neuroscience*, 39(37):7228–7243, 2019.

- [4] F. Dobbin and A. Kalev. *The Oxford handbook of diversity and work*, volume 1. Oxford, 2013.
- [5] S.K. Kang and S. Kaplan. Working toward gender diversity and inclusion in medicine: myths and solutions. *Lancet*, 393:579–586, 2019.
- [6] C. Moss-Racusin, J. Dovidio, V. Brescoll, M. Graham, and J. Handelsman. Faculty’s subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*, 201211286, 2012.
- [7] E.L. Paluck and D.P. Green. Prejudice reduction: what works? a review and assessment of research and practice. *Annu Rev Psychol*, 60:339–367, 2009.
- [8] D. Weichselbaumer. Discrimination against female migrants wearing headscarves. *Institute of Labor Economics (Germany)*, IZA DP No. 10217, 2016.