

Emma Tosch · Diversity, Equity & Inclusion Statement

Theory of Change

The field of computing has now conducted decades of research into its shortcomings to recruit and retain a population of students and faculty who are representative of the nation's population. Many efforts have focused on improving the pipeline. Core to any pipeline argument are two perspectives: (1) that there are *passive* forces that correlate with a **lack of incentives or encouragement** given to under-represented groups and (2) that there are *active* forces **pushing these groups out**. Outreach and mentoring efforts focus almost exclusively on the former. Focusing on the latter is uncomfortable and contentious. In order to move the needle, we need our efforts to address both types of forces.

My perspective on improving DEI in computing is informed by personal observation. While I try to read the works of — and talk to — experts, I am not one. This statement explains the mental model I've built to understand the mechanisms behind: demographic trends I've seen, individual outcomes of people I've mentored, the perspectives and lived experiences of my friends and peers, and my own challenges and experiences. Thus, this document represents a snapshot in time; my perspective, goals, and actions have evolved and will continue to evolve over the years.

My core hypothesis is that many of the **highest performing** members of under-represented groups leave computing early because they **excel in other, more rewarding disciplines**. I believe these students get better mentorship, recognition, and opportunities in other fields. Meanwhile, I believe the remaining students learn to manage circumstances that range from being merely isolating and lonely to outright toxic by **withdrawing from the environment**.

My core approach is not novel. It is based on relationship-building: (1) communicating directly with students to establish trust and boundaries, (2) beginning conversations about students' basic needs and emphasizing that I am a resource, (3) creating a low-stress, low-stakes environment where students can feel free to talk about a breadth of issues that matter to them, and (4) always ensuring that no matter what they say, I will support them. Some concrete actions to effectuate improved recruitment and retention are:

- Inviting students from the introductory courses to enroll in graduate-level courses (waiving pre-requisites) as a way of learning more about what computing research is. At UVM I taught only upper-level courses and therefore have limited contact with junior students. My first course was the least diverse educational environment I have ever been in. Consequently, I enlisted the help of one of our lecturers to advertise my courses to early students who would otherwise not meet the pre-requisites.
- Designing assignments and course projects with many degrees of freedom, emphasizing creativity and process over meeting a pre-defined product. When teaching Reinforcement Learning, I separated out skill-building assignments from creative/synthesizing assignments. I had students start on their final projects in the second week of class and gave them qualitative feedback that connected to the topics we were covering.
- Co-teaching courses with faculty from departments with different enrollment demographics. Co-teaching was not an established practice at UVM and due to a variety of factors outside my control, I was not able to co-teach at UVM. I co-taught a large required course at UMass and believe the practice improved the quality of the course due to both (a) differing perspectives and backgrounds of the instructors, as well as (b) providing multiple and diverse points of contact for students.

Fundamentally my approach to educational environments has been informed by my own experiences, which are key to understanding my educational philosophy and its relationship with hierarchies, learning, and labor: I came to computing from the humanities, graduated from a historically women's liberal arts college, and was unschooled for five years during my K-12 education.

Evidence of Action

My record exemplifies a long-standing dedication to: **leadership** in diversity-focused organizations, **resourcefulness** in acquiring funding for diversity initiatives, and **investment** in building lasting mentoring relationships with diverse students. For example: I **revitalized the women's group** at UMass, first as co-chair, continuing as treasurer and web master; I authored an **external grant proposal** to the National Center for Women and Information Technology (NCWIT), to fund a **technical workshop** series whose objective was parity in teacher and student representation; and I've mentored **women, under-represented minorities, and first-generation and low-income college students** throughout my time in computing. Some of these students have continued in academia; others have gone into industry, and still others have left the field. I regularly communicate to my mentees that there is **always a path back into computing**, should they leave.

My most recent DEI efforts have focused on **improving recruitment efforts to PhD programs**. In Fall 2020, I realized that the virtualization of conferences might have an impact on my ability to recruit students. Furthermore, coming from a less-well-known institution, the best pathway would be direct outreach. Together with Dr. Brittany Johnson-Matthews at George Mason University, I have co-founded and co-organized a now-annual¹ virtual PhD recruiting event that has spanned over two dozen institutions and attracts prospective students from across the United States and around the world.² As I wrote in our [2020 event description](#):

This event was designed with the observation that many students do not consider an advanced degree in computing because they believe academia is not for them. This was an issue before the pandemic and will lead to a disastrous shortcoming of computing professionals in the United States, given volatility [*sic*] in US immigration policy. Our objective is to match junior (i.e., new) faculty members whose recruiting efforts have been hampered by the pandemic with students whose career prospects may have been hampered by the pandemic.

Through this event we will discuss PhD training as work: we will discuss pay, benefits, and norms. We advocate that students view the PhD as an apprenticeship and highlight the variety of career paths that the PhD opens up. We emphasize that the priority for students and faculty alike will be finding a healthy working relationship between the two parties. Finally, in recognition of the fact that the PhD application process can be daunting, especially when students face inordinate stress and uncertainty, we aim to smooth the path for them.

In addition to recruiting students through traditional means (e.g., posting on social media, leveraging our professional networks, sharing on mailing lists, direct outreach, etc.), we acquired a list of institutions from the company CodePath. CodePath is a student-driven and community-based non-profit that bootstraps skills-based computing curricula at educational institutions. Their mission is to diversify the pool of computing professionals and as a result, they have focused on building relationships with minority-serving institutions, historically Black colleges and universities, and historically women's colleges. We used their list of institutions to identify department chairs and reach out to them directly.

After our event, we enroll all students who applied in a mailing list and open up the event Discord server for public use. The mailing list provides advice, instruction, resources, and encouragement for

¹We did not run the event this year, but intend to resume in 2023.

²<https://phd-recruiting.com>

potential applicants. The Discord server provides a central meeting place for applicants, including social support via private affinity group channels. During our second run of the event in 2021, we were happy to have a student participant from 2020 speak on our current student panel.

We intend to continue running this annual event. Given its growth in popularity from 2020 to 2021, we hope to form an organizing committee for 2023. Our short-term goals are to increase participation in our post-event surveys and to continue collecting data on whether these events are having a positive impact on participants, whether or not they decide to pursue a PhD. We will be looking into partnering with the Computing Research Association (CRA); in 2022 I served as both a reviewer and a mentor for the [CRA/NSF CSGrad4Us](#) Fellowship program and believe there are opportunities for synergistic activities between these two initiatives.