Diversity Statement

If an engineer designs a better mousetrap, does the performance of the mousetrap reflect the personal story of its inventor in any way? Maybe not. But the choice to invest oneself in mousetraps - as opposed to solar cells, biofuels, or renewables - does reflect something of the inventor's story. As engineers, our personal experiences inform the problems we choose to solve, and lack of diversity in our ranks creates blind-spots: we risk becoming fixated upon the metaphorical mousetraps of the world and failing to see the bigger challenges in front of us.

I grew up in a small town in central Wisconsin, and I loved it there. Life was comfortably quiet but there was still plenty to do - lakes and rivers for fishing, trails for running, and even a small shopping mall downtown. As an undergraduate, I never imagined much more for myself than a return to the familiarity and comfortable quietude of small town life in the midwest. However, when I applied to graduate schools, professor Ed Cussler gave me perhaps the second best piece of professional advice I've ever received: broaden your world and "get out of the midwest". So I did. I went to California for graduate school, and then the UK for my postdoc. Small town life still holds a special place in my heart - it's part of my story - but in choosing to broaden my world I have seen and learned more than I ever imagined. Even still, I know that the world has more to offer than what any single individual can experience. By listening to one another - and giving everyone access to that discussion - we give ourselves the best opportunity to create a world that benefits everyone (not just those in want of a better mousetrap). When it comes to reaping the rewards of a diverse student body at the graduate and undergraduate levels, the principal challenges are (1) recruiting, (2) retaining, and (3) including.

Recruiting students from a diverse range of backgrounds can be especially challenging due to the so-called "pipeline problem". For example, women are under-represented in most STEM graduate programs in part because women are under-represented at the undergraduate level. And women are under-represented in STEM at the undergraduate level because they take fewer STEM electives at the highschool level, and so on down the "pipeline". Somewhere between elementary school and middle school, there are complex social and enviornmental pressures that push women away from STEM (or just towards something else). However, the pipeline problem does not absolve a department from its responsibility to diversity - instead, it motivates outreach to forestall (or eliminate) the branchpoint.

One of my preferred tools for outreach is origami - the art of paperfolding. The raw materials are universally accessible, and the creative process appeals to both boys and girls alike in elementary school and middle school. Superficially, origami is just good fun (making birds, airplanes, fortune tellers, and so on), but as students challenge themselves (making spiders, beetles, and dinosaurs) it

becomes apparent that origami is really a mathematical discipline. It lays a strong foundation for geometry, spatial reasoning, and patient problem solving, all of which translate to STEM. Similar advantages can be had from other crafts like knitting, where social pressures even favor girls over boys. During my postdoc, I co-taught a weekly origami club at a local elementary school, and it was remarkable to see the kids enthusiasm and progress over time.

Retaining students from under-represented categories can also be a challenge in STEM. Students from under-represented categories face greater social/cultural barriers to building a support network within the department (friendships, study groups, etc.). The lack of such a support network negatively impacts educational outcomes (not to mention mental health outcomes), and can lead to students dropping out of the program. From my experiences, retention can be especially challenging for first-generation college students, nontraditional students, and neurodiverse students.

During my PhD, I tutored a first-generation college student in ChemE through the ESTEEM program at UCSB. First-generation college students have higher dropout rates and longer graduation times, partly due to inadequate financial/educational support from family. I was very grateful for the opportunity to participate in this program, and if given the opportunity I would like to help establish or continue similar programs in the future.

Including students from diverse backgrounds means making sure that their voices are heard. Some students face much greater barriers in this respect, especially (1) students from underrepresented demographics, (2) nontraditional students, (3) international students, and (4) neurodiverse students. Groups (1) - (3) face greater social/cultural barriers to feeling included, and group (4) may face internal battles or external stigmas when trying to make their needs known.

In my undergraduate and graduate work, the system was adequately equipped to support me and my needs - even when I had three young kids at home. But not all of my peers have been so lucky. In undergrad, I had a lab partner with dyslexia and dyscalcula; she could not reliably read and record measurements, but she did not feel comfortable disclosing this disability until it was too late. In graduate school, I had a neighbor with five kids who was failing in multiple classes and needed study partners but had no personal contacts to lean on. If given the opportunity, I would work with university services like disability resources and nontraditional student resources to give these students the best possible opportunity for success in the program.

If given the opportunity, I would continue to support the department's efforts to recruit, retain, and include students from diverse backgrounds. I look forward to hearing their stories, helping them to "see a bigger world" even in their own department, and guiding them as they find their place in the field of Chemical Engineering.