Diversity, Equity, and Inclusion Statement

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Given the outsized impact that the field of computing has on the world today, it's our responsibility as educators to ensure that all students, regardless of background or identity, are able to explore their interests and achieve their full potential. To that end, I make a conscious effort to foster a welcoming environment in my courses while helping with computing outreach efforts and developing open educational resources.

DSC 10: *Principles of Data Science* is taken by hundreds of non-majors each quarter, many of whom are learning to program for the first time. As such, I strive to create an environment in which students feel a sense of belonging and that the course staff has a vested interest in their success. In the **first lecture**, I take inspiration from Rebecca Nugent's talk, *We're All Data Scientists*[1], by instilling the idea that nobody is predisposed to be a "data science" person and that all students have the ability to succeed in the course. A week into the class, when the pace starts to ramp up, I **reassure** students that it's okay to be struggling, to approach the course with a growth mindset, and that we have ample support dedicated to their success. And in the final lecture of the quarter, I **conclude** by showing students my sub-par first-year transcript, reminding them that no matter what their grade ends up being, it is but a small snapshot of their skills as a data scientist and that there's plenty of room for growth.

In class, I choose my words carefully to avoid ostracizing students who feel behind. One practice I've adopted in class is to ask "What questions do we have?", which makes it clear that questions are expected, rather than "Do you have any questions?", which may make it seem that students shouldn't have questions. Students notice such nuances; in a DSC 10 survey, one student said:

> *"After explaining any concept, he would always ask "What questions do we have about this topic?", which created a very comfortable and inclusive environment to be able to ask questions, and encouraged students to ask those questions."*

Another way in which I try to show my investment in my students' success is to refer to students by name as often as I can. This can be challenging to do in large courses, but one tip I've picked up on recently is to ask anyone who asks or answers a question in lecture, "remind us of your name again?" Students recognize these efforts; in course evaluations, one wrote:

> *"He is very reachable outside of the class and provide me extra advice on academic planning. He also [remembers] our names and faces and say hi to us when we meet outside of the class and makes me feel remembered."*

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[1] Nugent, R. (2017) We're all data scientists | Rebecca Nugent | TEDxCMU. https://www.youtube.com/watch?v=YMnqPTLoj7o.

Students from marginalized communities benefit from seeing representation in their teachers, so I prioritize hiring a diverse staff of instructional assistants in each of my courses. This can be challenging, as students with certain gender and ethnic identities are less likely to express interest than others; as a result, we need to make deliberate efforts to reach out to such students. I've found success in this regard by making announcements in lecture, posting on previous terms' course forums, and encouraging individual students to apply. I also led the development of **this page**, which contains video testimonies from past instructional assistants about the benefits of teaching.

The aforementioned efforts can help students from all backgrounds feel welcomed in computing courses, but many interested students on campus choose not to enroll in computing courses designed for computing majors, often due to their perceived pace, workload, and competitiveness. One solution is to design coursework specifically for students who aren't computing majors. As a graduate student in my final term at Berkeley, I designed and taught a data-focused **introductory programming course**, where I introduced Python, tabular data manipulation, and visualization to a cohort of 18 students from across campus, none of whom had written a line of code before. When surveyed why they signed up for the course, one student said:

> *"I have always wanted to learn Python and other programming languages, but I did not want to struggle in a class full of expert programmers where I lacked the basic knowledge to even pass. This class allows me to actually learn CS in a setting where the teachers understand that I am starting from ground zero."*

I've begun to investigate what such a course might look like at UCSD by surveying students who dropped DSC 10 after the first week and asking what they'd like from a "general education version of DSC 10."

On the more theoretical side, as a junior undergraduate, I designed and taught a student-run **discrete math course** that introduced ideas at a welcoming pace. The goal of the course was to prepare students for the rigorous required discrete math and probability course that one needed to succeed in to declare the computer science major at Berkeley.

To support the goal of enabling more students to study computing at the university level in the first place, I've helped instructors at other universities, community colleges, and high schools adopt data science curricula. Most recently, I worked with faculty at MiraCosta College, a community college near UCSD, to write syllabi for new data science courses that they plan to teach. The goal of these new courses is to make it possible for their students to transfer to UCSD's data science major and graduate within two years, which is currently impossible due to the unique setup of the major. MiraCosta's student body is far more diverse than the set of students who have historically enrolled in UCSD's data science major, and the hope is that by reducing the barrier to transferring and completing the data science major at UCSD, students from a wider range of backgrounds will be able to complete the

program and reap the benefits it provides. I also spoke at *Predicting the Future with Data Science*, a panel hosted by two of MiraCosta's computing-related student organizations, to excite their students about the prospect of a career in computing. At least one of the students in attendance transferred to UCSD and took DSC 10 with me.

Lastly, I strongly believe in making all of the materials in my courses freely and publicly available; virtually everything I've made for my courses is linked from **rampure.org**. This ensures that all of my students have access to the same resources and are free of any additional financial burdens; if students had to pay to access course materials, they wouldn't all be able to[2]. I also post all of the exams I write publicly, because if I didn't post old exams, students with friends who took the course in prior offerings would have an advantage that students without those connections wouldn't have. This makes my job significantly more challenging – by far, the single artifact I spend the most time developing each term is my class' final exam – but makes the experience more equitable for students.

Another benefit of making resources publicly available is that those not at my institution can benefit from them, which further helps to expose a broader audience to computing. According to a survey on the course website, the materials from the discrete math course I created in Fall 2018 are still being discovered in 2023 by a variety of learners, from university students in India, Taiwan, and the UK, to high school students, and even a retired dentist. I've encouraged other instructors who are comfortable with doing so to also host their materials publicly, and I maintain **dsc-courses.github.io**, an archive of websites for courses in UCSD's data science program. At the end of the day, I believe that students aren't paying tuition to watch lectures or complete homeworks, but rather, to be part of a community of teachers and students who they can learn alongside; it doesn't hurt my students if others can access their course materials as well.

At Michigan, I'd like to be involved in department- and institution-wide initiatives that expose underrepresented students to computing, both at the university and at other institutions in the area. In particular, I'd love the opportunity to develop new data science coursework under the EECS label, which I believe can be a vehicle for exposing students to computing who may not otherwise be interested. If the position allows for it, I'd also like to work with Mark Guzdial on the Program in Computing for the Arts and Sciences. I will continue to develop open educational resources, hopefully partnering with other faculty in EECS and across campus to do so. Finally, I will keep trying my best to ensure that all of my students – regardless of socioeconomic status, race, ethnicity, gender, or disability status – feel welcomed in my courses and feel that they have a chance to succeed in our field.

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[2] Kaji, R. (2021) We need to help students overcome their textbook troubles. https://www.timeshighereducation.com/campus/we-need-help-students-overcome-their-textbook-troubles