

Teaching: The experience that most shaped my philosophy was the year I spent as a graduate student NSF GK-12 fellow, teaching 2 days a week in a Los Angeles middle school classroom. My teaching style was a change for the students: using my training in inquiry-based learning to teach via active discussions and hands-on lab experiences. As a result, I saw many students that had been written off by the teacher— because they did not turn in their homework, or pay attention to lectures— shine in this environment. However, I also realized that in teaching this way, I was not engaging many of the girls in the class. Having experienced firsthand how much student success actually depends on instructional style, my philosophy as an educator is that my primary objective is to create an inclusive environment that respects that students backgrounds and learning styles vary from my own, and provides in response a variety of instruction and assessment styles that cater to a broad range of students strengths and needs.

As a professor at San Jose State, I will put my philosophy into practice by bringing my research into the classroom for undergraduate majors. Having students form a team to lead different aspects of a research project allows students to make contributions using their individual strengths, and to explore the interdisciplinary nature of research. One project that I have planned is to involve students in finding complex molecules in space via identifying spectral lines. This project synthesizes students knowledge of physics, chemistry, astronomy, computer science, and biology to do everything from measure the Doppler shift of a spectral line to discuss the importance of a given molecule for life on earth. Students will practice the diversity of skills that go into doing research, from visual inspection and pattern finding, to recording results, reading related popular science articles for context, and communicating their findings. The professional skills they gain will be broadly relevant to all careers, not just scientific research.

I am particularly excited to incorporate critical thinking skills into my teaching for undergraduate non-majors at San Jose State. I vividly remember a class as an undergraduate where our first homework was to come up with evidence that the stars we see are billions of years old. I was stumped— this was not an answer that could be found in a textbook, or as a Google search. Ultimately this class taught me to value thinking, reasoning, research, and discussion with my classmates. All of skills are even more relevant today when the internet provides a massive flow of information with nearly instant viral spread. In my classes at San Jose State, I will teach students to process this flow by weekly analyzing and debunking a current internet rumor or conspiracy theory. Over the semester we will move on to more serious issues: for example results of medical, pharmaceutical, or climate studies, ultimately creating a science literate group of students who are practiced in applying methods used in class to real-life situations.

Mentoring: In contrast to teaching, I believe the longer-term nature of mentoring means student success depends as much on interactions outside of classroom as inside of it. In teaching seminars for the summer research students I mentor, I have worked to maintain this balance by focusing both on research skills (including reading papers, giving presentations, and choosing a career path) and holistic professional development (including discussions of my work-life balance, mental health resources, and how to combat impostor syndrome and stereotype threat). As an advisor I dedicate significant time to my students, via regular in- and out-of-office meetings, including lunch, coffee, and hosting dinners at my house, and am available to them on the platform they choose: not just through e-mail but via phone calls or texts. As a mentor at San Jose State, my students will be a priority in my schedule, and I will work to build a relationship

where they are comfortable discussing their needs for success, not just as a research student in my group, but as a student and in their life outside of school.

As a Jansky fellow I have independently mentored six undergraduate research students. Four of my students are now in graduate programs. and one has a first author paper near submission. I work hard to make their experience different than my first taste of undergraduate research, where I spent a whole year doing data reduction before I understood the goal of what I was doing, and why it was important. I make sure my students know how their research fits into the “big picture”, so that they understand not just the research they are doing, but how it contributes to larger objectives and answering important questions in our field. I also work closely with students to tailor the design of their research project to complement their strengths and interests (for example in coding, chemistry, math, or art), so that they enjoy and take full ownership of their project.

I credit much of my success and persistence in the field, even now as a postdoctoral researcher, to the excellent relationship I had with my undergraduate advisor. She was always available to talk and to share advice and perspective, from the reassuring statement that there is a graduate school out there to fit everyone, to critiques of candidates being interviewed for faculty jobs. Her mentoring taught me that an important part of helping students to succeed is to demystify the path to becoming astronomer, so that students understand the steps and skills needed to thrive not just as an undergraduate but far beyond. Not all of my advising relationships have been as strong, and as a result I also see my role as a mentor not to be the single point of support for my students, but to be a person who connects them with a larger professional network of training, research expertise, personal role models, and sources of encouragement that can more completely meet their needs.

Diversity: Building connections to a wider network is especially important to me for successfully mentoring a diverse group of students. For two years, I have run a summer research program for students from traditionally underserved groups¹, work I will continue at San Jose State. I trained local mentors, designed and ran both a weekly summer seminar, and continued a formal mentoring relationships with the students after the summer. In doing this I recognized that my own background and experiences differ from those of my students in many ways, and that it is important for students to see people who look like them succeeding, and to have sources of advice specific to their own experience. In response I arranged an on-site Diversity Speaker Series to connect students to colleagues who can serve as additional role models.

Much of my inspiration comes from being a graduate student at UCLA, where the students I taught were largely latino/a, but this diversity was not reflected in our department which had only one latino graduate student, and no latino/a postdocs or faculty. Since that epiphany I have been constantly working to improve my own understanding of the issues surrounding the lack of diversity in our field, and to be involved in initiatives to combat this. I feel strongly as a woman in astronomy that providing equal opportunities for all underrepresented backgrounds of race, gender, disability and sexuality is a necessary prerequisite for excellence in education and research. At San Jose State I will be committed to continuing the initiatives I have begun, and maintaining the reputation of this department as an example of the highest standards of teaching, mentoring, and diversity in the field.

¹<http://www.aoc.nrao.edu/~bmills/index4.html>