

Teaching: I have extensive teaching experience with a wide range of learners in many different environments, including teaching in a middle school physical science classroom, teaching undergraduate majors and non-majors astronomy courses as a professor at San Jose State University, and teaching college level astronomy to incarcerated students as part of the Boston University Prison Education Program. One of the most important lessons I have learned in teaching is that my background is not representative of the diversity of students today. As an educator, my goal is to recognize and reward the wide range of strengths that students bring with them into the classroom. Teaching at Bard, my main objective will be to create an inclusive environment which 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

A primary component of building an inclusive classroom environment is giving students the support they need in order to embrace growth and challenges. I work to strike a balance between both formative assessment (work that gives feedback on the effectiveness of both my own teaching methods as well as students' learning strategies) and summative assessment (graded work). This sends the message that practice and effort are rewarded, and that students should not be afraid to attempt new and difficult tasks.

As a professor of physics and astronomy at San Jose State University, I challenged undergraduate students in my course on star formation to learn material at a high level. I communicated to students that I believed in their ability to succeed, and that while the material might be challenging, their growth and performance in this class would reflect the effort they put in. I also made sure that the graded assignments and materials sent the same message. By valuing the path to an answer as much as the answer itself, students learned that being able to tell me why they thought an answer was wrong was often as important as being right, and that they should consult me, classmates, textbooks, and the internet rather than leave a problem unattempted. By intentionally reinforcing how past topics and strategies could be applied to new material, offering a wide range of ways that students could demonstrate mastery (e.g., group work, presentations, and open-book exams), and seeking feedback from students on all of these strategies, I ensured that students rose to the level of this course and ultimately succeeded.

At Bard I look forward to engaging students in a wide range of astronomy and physics courses. I have experience implementing hands-on teaching strategies that promote one-on-one teacher-student interactions in class sizes from 10-50, and I have used my training in inquiry-based learning to develop a set of interactive classroom activities for introductory astronomy¹. Overall, my instructional style is flexible and adapts to each unique classroom environment. For example, teaching introductory astronomy in the correctional system, the classrooms have no audio-visual equipment, students have no computers, and their access to STEM classes is limited, leading to a wide disparity in math skills. In response to these challenges, I adapted interactive activities to use only printed materials, implemented additional in-class activities on quantitative reasoning, and prioritized time each week for discussion to give students an avenue to pursue their curiosity about astronomy topics that they encountered.

¹<http://eacmills.com/teaching.html>

As a professor at Bard, I am excited to teach established courses in the department, including Computational Physics, Astrophysics, and Paint and Examination of Paintings (as an oil painter in my free time). However, I am especially enthusiastic about the opportunity to develop new courses. I am interested in bringing together aspects of existing general science courses on Light and Color, Photographic Processes, and Starlight to make a lab course giving students experience in Astrophotography. I am particularly interested in designing a course based on the techniques used in my own radio astronomy research, focused on designing, constructing, and using radio receivers to map the structure of our Galaxy and the signature of dark matter in its rotation. This course would engage students in the hands-on nature of real scientific research, from exploration and hypothesis construction to hardware development, data acquisition, coding and data analysis. and would allow students to explore methods of remote sensing that astronomers use to obtain detailed information on the universe around us without ever having left our solar system. I am also excited about designing a course on astrochemistry for students in physics, chemistry, and biochemistry, which would focus on the development of molecular complexity from the big bang to interstellar clouds to the formation of the solar system, as well as observational spectroscopic methods.

When teaching these courses, my goal is not only for students to gain hands-on experience, but to have a chance to develop their curiosity and self-direction. To do this, I will adopt a project-based and inquiry-oriented learning approach that is centered around student-led semester long investigations. These will incorporate a broad range of skills-building activities, complementing the primary subjects being taught, and modeling the full range of activities involved in scientific research. These include reading, writing and assessing scientific proposals, debating issues with peers, and communicating results to the public. These activities not only give students broader context for the details of the topics covered in these course, they also emphasize the diversity of skills involved in STEM disciplines. This allows students to build on their individual strengths while challenging them to develop new core competencies that will prepare them to excel not just in an academic setting, but in the workplace and the community.

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 mentoring students, 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 work-life balance, mental health resources, and how to combat impostor syndrome). I work to facilitate student growth and independence by giving students research projects for which they can take ownership, and ultimately publish their results. As an advisor at Bard, 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 researcher in my group, but as a student in and outside of school. Ultimately, I see my role as a mentor not to be the single point of support for my students, but to connect them with a larger professional network of training, research expertise, personal role models, and sources of encouragement that can most completely meet their needs and challenge them to grow.

Community Outreach: Finally, at Bard I will carry on with my NSF-funded program of teaching in local prisons. This experience has been an important part of my teaching practice and commitment to making STEM education broadly accessible, and I greatly value the opportunities to interact with and learn from these students. I look forward to building connections with other faculty across the college as I continue this work.