

The National Aeronautics and Space Administration (NASA) sponsors the Center for Astronomy Education (CAE) which was setup to develop the teaching and instruction skills of introductory astronomy educators. The CAE serves all levels of educators, from elementary schools to Tier A collegiate research institutes. While a graduate student at Michigan State University (MSU) I attended several of the CAE Workshops which are held throughout the year and throughout the country. My Ph.D. advisor was a strident supporter of the CAE's work and research, and she encouraged me to use the CAE as a means for becoming a better instructor as the CAE methods had, in her opinion and based on student review, vastly improved my advisor's instruction. Indeed, I found my advisor's method of instructing me to be superior to the methods used by other advisors and professors within our own department.

As I am not formally trained in education and do not hold a teaching certification, the CAE was my channel into seeing what education research was telling the community about the classic dogmatic techniques of lecture, homework, and testing. I was surprised to find out that the methods with which I had been taught for over 20 years were not optimal. It was through my interaction with the CAE and their materials that I adopted the education philosophy and pedagogy of interactive instruction and peer instruction. In interactive teaching, much of the instruction time is dedicated to working with the students by not simply lecturing, but asking the students questions, having them work together on small tasks which can be debated at-large, and using methods such as think-pair-share or lecture tutorials. Similarly, in peer instruction, students are asked to question each other, or to critique another student's answer. The purpose of this approach is to generate teachable moments for the instructor. Before a student can be instructed in such a way that the retention is permanent and the understanding is full, the instructor must identify where preconceptions are interfering or where a fallacy exists. Once a teachable moment has been created, then the classic Aristotelian dissemination of knowledge from instructor to pupil can occur.

I find this method of instruction particularly suited to my personality because I have a high level of energy, am very optimistic, am an excellent listener, and have a great deal of compassion and empathy for others. As where a traditional lecturer does not necessarily need these traits, interactive teaching requires being a part of the class as well as its leader. To that end, I need to listen closely to the students. Keeping pace with their youthful energy to learn is another must. It's also important to remain focused through moments of frustration, to remember that the students can learn and that I can do better. But most importantly to me is that I understand how the students feel within the learning environment, ensuring they are not being overwhelmed and shelling-up out of fear or frustration.

The educational philosophy I have adopted also fits well with my educational background and professional experience in math and science. The physics program and Georgia Tech and the astrophysics program at MSU are both highly rated. As such, I had access to some of the nation's best instructors and facilities while a student. This has resulted in me having deep and highly extensible knowledge in the areas of math and science and in particular physics and astronomy. I am proud to say that my two Ph.D. advisors at MSU, and my new colleague at the University of Waterloo, are among the most highly respected and cited researchers in the area of astrophysics. This has had the ancillary benefit of having exposed me to a broader network of peers and fully understanding how one navigates the sciences to achieve long-term goals. This would be a very desirable skill set for any secondary or preparatory level institution interested in hiring me and propelling their students to successful careers.

In my life, I have been fortunate enough to benefit from the hard-work of others, such as my mother and two grandfathers. The opportunities garnered from those benefits have been many and unique. I have

not lived a sheltered life and am well-aware of the educational inequality which exists in the American public school system. As an educator, I also want to work with an organization which provides a robust infrastructure which I could utilize to redistribute the fruits of the many opportunities I've received in life. For example, I would like to use my position as an educator to do outreach work in communities where upward mobility is limited or the where the students (and especially gifted students) do not have access to teachers with broad world-views or advanced degrees.

I would like to work within the outreach setting to give students the opportunity to have their own "AH HA!" moment in life. To have a moment where they think, "I can do anything," or "I want to dedicate my life to ____." The lasting effects of those moments in my life have had a profound and resonating impact on my hopeful, optimistic life outlook and goal setting. As a measure of my success in this endeavor, I would hope to leave students that set specific and attainable goals which lead them into community involvement and academic excellence in the form of scholarships or grants. Ultimately it would be great to have those same students achieve their dreams, and then return to the communities, via their physical or financial influence, and better those communities.

In total, I have the skill sets and educational background to make meaningful contributions across diverse socioeconomic demographics in almost any school setting. Personally, I believe that the pursuit of knowledge and the fostering of innate human curiosity are key to enriching one's own life. This has been one of the driving forces in my life, and I hope to share that students some day.