

One of the primary imperatives for the nourishment of science is the viral multiplication of wonder. The same engagements that pique the natural curiosity of youth remain the foundations for the adult drive to learn and ponder and grow, therefore any pedagogical pursuit must consider the viewpoint of the child inside the student. Toward this end, I have dedicated my career to nurturing the basic motivations that power conceptual synthesis and critical thought, being active in educational extension programs at the local community level, and striving to synchronize the tools of the modern university classroom with the gears of the human intellectual will. Teaching is more than just a Socratic dialogue (though it must also be that), *it is the integral and perpetual process of deciphering and fostering the conditions in which learning itself operates.*

While pursuing my doctorate in the Department of Physics & Astronomy at the University of California, Irvine, I worked with the astronomy outreach program led by Professor Tammy Smecker-Hane, in which I was an instrumental part of an initiative that traveled to public and private schools throughout Orange County and the greater Los Angeles metropolitan area. From the fall of 2004 until the spring of 2008, I helped organize many of these excursions and was a primary member of the teaching team at the events themselves. The curriculum, which was tailored for a range of primary and secondary educational levels, typically included (but was not limited to) any combination of the following exercises: viewing the Sun through a filtered telescope in order to learn about sunspots and solar phenomena, lecturing over a slideshow on a particular astronomical topic ranging from planetary neighborhoods to the formation and observation of galaxies, using the students to interactively demonstrate the magnitude of astrophysical scales, and/or guiding a computer lab exercise based on real methods of astronomical research. Designing the presentation of topics that focus on skills useful to a research environment is a critical factor, since it encourages good long-term habits in highly self-motivated students who represent the base of all future research productivity in every field of science.

Much of my outreach experience during this time also involved local students and community members traveling to the UCI observatory, which overlooks the city from a small hill near campus. Hosting these events required the delegation and organization of a cadre of undergraduate and graduate student volunteers, and the capacity to operate a research-grade astronomical observatory while teaching the visitors knowledgeably about the objects in view on any particular night. In this context, the age continuum forced into sharp relief the similarity with which children and adults probe the world: the impetus for curiosity is always a shock to the involuted solipsism of the self, leaving a wake filled with an almost instinctive desire to internalize the phenomenon. The awe-inspiring scales of astronomical thought are a natural stimulus for children in this way, and it wasn't hard to detect a mature shade of that same response in the adults attached to them as well.

During these years, I also undertook the usually-assigned duty of teaching assistant for three

courses (laboratory sections in circuit theory and optics, as well as a discussion seminar for an introductory astronomy course; see my CV for full details), and applied this Friedman-like "shock doctrine" theory to my pedagogical practice. Beginning each recitation section with an observation designed to force open that desire-flow that brought us from the savannah to the moon (*e.g.*, "The universe is a sphere whose center is everywhere and whose boundary is nowhere," as an introduction to large-scale cosmological geometry), I approached the classroom with the intention of finding out how each of my students thought about the world, and popping open the locks that sheltered and limited their usual interactions with knowledge in the bland empiricism of every day. I believe that too often, as scientists, we neglect our own rhizomatic capacity for wonder and instinct for awe: the conference room must begin to sound less like a church of mathematics and more like a celebration of the will to truth. We are a way for the universe to know itself, as Sagan said, but it requires not simply passing the burden of science to our students, but working with them to build a better wheelbarrow.