## STATEMENT OF TEACHING INTERESTS

### 1. SUMMARY OF TEACHING PHILOSOPHY & EXPERIENCE

Real learning is, almost by definition, active learning; it requires confronting areas of missing or incorrect knowledge and consciously constructing a broader, more accurate understanding. As a teacher, I provide my students with a structured framework to engage a course's content and expand the limits of their knowledge and analytical abilities. I use active learning techniques to help students through this process, emphasizing a deep understanding of fundamental physical laws and the connections between phenomena occurring in different physical domains. I also seek to inspire my students with a passion for the material that will sustain them through the hard work that learning requires, and to connect their coursework to the world outside the classroom.

My experience in classroom instruction and as a research advisor has allowed me to hone my personal teaching style, and informs my understanding of effective teaching methods. I have served as a teaching assistant in introductory and upper-level astrophysics courses, as the primary instructor for an introductory astronomy course, and am preparing to co-teach an E&M course this spring. I have advised and mentored nine undergraduate students through summer and thesis research projects; two of these students published first-author papers in the *Astronomical Journal*, half are now pursuing graduate studies, and several received awards from professional organizations and their departments.

A concrete example of my approach to teaching comes from the astronomy course I taught at the University of Washington. I began a class with a lecture describing how the density of stars on the sky reveals information about the structure of our Galaxy, and walked students through the spatial distribution of stars we would see from different locations inside galaxies of various shapes. Students then worked in small groups to measure stellar densities from Palomar Sky Survey images. Plotting their data on a sky map and comparing their results to our earlier predictions, the students concluded that the Milky Way is a disk-like system, with the Sun offset somewhat from the center. We then discussed the results as a class, exploring how a range of stellar luminosities and the presence of dust impact our simple star-count analysis of the structure of the Milky Way.

While classroom meetings provide a course's central structure, students who engage the material consistently outside of class make the most impressive gains. To encourage this, I post lecture slides and notes on-line so that students can review the main thrust of my lecture as they study. I repeatedly encourage students to form study groups to review these notes and benefit from one another's knowledge; I emphasize that explaining material they 'already understand' often provides additional insights, cements those concepts in their mind and provides practice for capstone oral presentations.

I encourage my students to engage in peer learning early and often, but I am strongly committed to my role as a primary resource and mentor for each of my students. My job is to help my students in their studies and professional development, and that commitment does not end when the class period comes to a close. In addition to clearly defined office hours, I operate with an open door policy, encouraging students to drop in if they are feeling stuck or confused by any aspect of the class.

Table 1: Summary of Quantitative Teaching Evaluations

| Question | Score |
| --- | --- |
| The class as a whole was: | 4.11/5 |
| The content of the class was: | 4.01/5 |
| The instructor's contribution to the class was: | 4.41/5 |
| The instructor's effectiveness in teaching the subject matter was: | 4.26/5 |

One area of my teaching that I have worked hard to improve is assessing and evaluating my students' mastery of a subject. While I use tests to provide indispensable motivation for students to synthesize material, I find they sometimes encourage short-term memorization rather than true integration of knowledge. I therefore evaluate students on a wide array of their work, weighting grades from problem sets, written papers, and oral presentations as strongly as mid-term and final exams. For each of these components, I base my grades on a comparison between each student's work and a previously distributed rubric. In addition to helping make my grading more transparent to the students, placing their grades on an absolute scale explicitly encourages cooperation instead of competition.

Finally, it is important to remember that I am no less a learner than my students. I constantly seek feedback on my teaching from students, colleagues, and other educational resources. As an example, I regularly requested supplemental evaluations of my teaching from the University of Washington's Center for Instructional Development and Research (CIDR). I have summarized my numerical scores from these evaluations above, and detailed evaluations prepared by a CIDR facilitator who interviewed my students about my effectiveness as a teacher are available upon request. Through these consultations, I identified assessment and evaluation as an area of weakness in my courses, and now help students better understand the criteria in advance I will use in assessing their work, and also provide clearer feedback for work I have evaluated.