

# Teaching Statement

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Two years ago, I had just plopped fifteen high schoolers onto the dock at Monterey, California. After five days at sea, they were exhausted from hauling up and down sails, walking at a perpetually changing incline, and, for some, heaving over the rail. Nevertheless, upon seeing their parents, many of them enthusiastically began spouting tales of hardened life at sea. They had plotted a course by compass around the curves of Half Moon Bay, plowed through a soup of moon jellies under a silent fog, and plunged their hands into buckets of mud to hunt for benthic critters, among other adventures.

That was one of many voyages I had the pleasure of partaking in as a sailor and a marine science educator before starting graduate school. I taught elementary to college students basic sail theory, marine biology and ecology, oceanography, navigation techniques, and seamanship. I particularly enjoyed the casual, spontaneous, hands-on nature of these learning environments.

While my teaching adventures no longer include tide charts nor trade winds, I have tried to implement many of the skills and strategies I learned at sea to my new domain of computer science. For example, last spring I organized a computer graphics station for Science Day, an annual event at Dartmouth where graduate students teach kids about their research through fun, hands-on activities. There had never been a computer science station at this event before, so I found it an exciting challenge to come up with one. I set up ray tracing in real life, where we shone a laser from a “camera” through an image plane (a clear plastic sheet with a drawn grid of pixels) onto a scene of colorful block towers and colored in each pixel with markers according to where the laser landed.

I also incorporated creative, hands-on elements into the Master’s in Digital Arts reading course I designed and taught in winter 2020. The goal of this course was for students to gain inspiration and background knowledge for their master’s theses. I accomplished this goal by having students read and present a variety of research papers in digital arts, listen to presentations from potential advisors, and research and present a “state of the art report” on a topic of their choice. To encourage active participation, I had each student write down one or two questions on a Post-it Note during every presentation and post them on a white board for the presenter to answer. This solution had threefold benefits:

1. It forced students to actively listen and reflect on the presentation in order to formulate questions
2. It acted as an equalizer and added a veil of anonymity for shy students
3. It provided many questions for the presenters to answer, some of which spawned follow-up discussions involving the entire class

Along with tactile activities, I try to incorporate variety and flexibility into my teaching, both in planning the structure and activities of every class and in how students can complete their coursework. It is abundantly clear, through both my own experiences and decades of research, that many learning styles exist and what works for one student may not work for another. For example, in the reading course, I required students to connect with every paper by marking it up while reading – the markings could be notes, questions, highlights, drawings, or even emotional reactions. By not requiring formal notes or summaries but allowing markings of any kind, I encouraged students to develop whatever strategy worked best for them to digest the material. Although there was initially friction to not allowing passive digital interaction, students expressed that it helped them to understand the material better and some even learned something new about their own learning style.

As illustrated above, I believe that developing creative, hands-on teaching strategies for computer science will be pivotal in conveying technical material in an accessible way for students of all ages. With computers becoming as ubiquitous as humans ourselves in the modern world, I believe that having a basic understanding of how computers work will become nearly as essential as understanding how our own bodies work, and that computer science will become a core science like biology, chemistry, or physics. I am eager to usher in this new era and continue to explore new ways to pass on my love for this subject.