My professional experiences as an Air Force meteorologist and as a software developer have inspired my teaching philosophy. One example is the on-the-job training I received after formally certifying as a weather forecaster. All new Air Force forecasters are sent to one of eight hubs around the world. There they produce forecasts on a daily basis, engaging in the scientific method by analyzing observations and testing predictions. Far from a solo endeavor, each shift combines people with a range of abilities; there are always a few seasoned technical sergeants around to answer questions as they arise. While stationed in Germany I realized that this hub concept is a successful model for classroom learning for two reasons. One, it allows time to hone skills using an iterative question-answer process and, two, the collaborative atmosphere encourages mentoring relationships to form between experienced and inexperienced colleagues. These ideas are found in the following definition, which encapsulates my teaching philosophy.

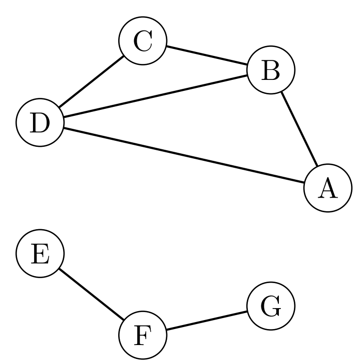
Learning is the iterative process of asking and answering questions.

In my teaching and service I aim for three goals, each of which addresses an aspect of this definition. First, I share problems–both mathematical and applied–which build intuition and inspire students to integrate the course material into the broader context of their education, to convey the "why". I package these problems to take advantage of active learning principles. Second, I structure my courses to encourage students with a diverse array of learning styles to spend the time necessary to master computational aspects of the material, to absorb the "how". To achieve this goal I carefully manage the lecture pace and employ techniques which bolster inclusiveness. Finally, I strive to build accessible interdisciplinary mentoring networks, in particular through my position in the UCSB Student Chapter of the Society for Industrial and Applied Mathematics (SIAM).

While teaching vector calculus, I developed the idea of a *demonstration module* to build intuition and inspire students. Though I stressed the intimate ties to physical theories like fluid dynamics, not all students continue on to study these fields. In a course crammed with new concepts and definitions, I sought complementary applications which minimized additional technical vocabulary. Taking advantage of my software development background, I collected familiar, day-to-day problems around which I could build a compelling mathematical narrative. For instance, describing touchscreen interaction as an application of the geometry of planar curves, discussing a self-driving car to introduce constrained optimization and highlighting the use of linear algebra in data science.

Whereas an example is performed by the teacher, these *demonstrations modules* are designed to push students to develop their curiosity using small group experimentation. Here is one example.

> *Imagine a social network, an edge connecting every pair of friends. In the example to the right, how could we write a program to suggest person A befriend person C?*



Generally, a few groups are able to articulate an approach to the problem which uses search techniques from introductory computer science. Using this or other ideas, a consensus forms that it is useful to first identify the component $\{A, B, C, D\}$ which contains A. The new question of how to identify components in a social network is familiar and easily solved using basic facts from linear algebra. I then guide the groups through the solution and its properties with a series of short, open-ended questions (see my website for a handout). The solution leads naturally to the problem of finding clusters in big datasets. Even in a large lecture hall, the experimentation phase of this demonstration produced meaningful group work in a short time. As a result, I am constantly on the lookout for problems and stories which motivate and illustrate mathematical concepts.

I employ a number of techniques to achieve my second goal of facilitating computational mastery. For instance, I utilize a mix of low- and hi-tech methods to assess student learning. My lectures include frequent questions in which I poll the audience with a multiple choice question, then ask one or two students to explain their answers. Periodically, I request anonymous, written feedback of the sort normally relegated to end-of-course evaluations. Anonymity provokes responses from students who don't normally speak during class and criticism that wouldn't have been voiced at all. Though not suitable for every assignment, I find the statistics available within online homework systems indispensable for pinpointing problems. I have utilized the MAA's homework system WebWork for each of the three classes I have instructed. Finally, online course management software allows me to establish a forum-based dialogue to reinforce and expand upon concepts.

Timely assessments are crucial to properly pacing lectures. The first time I taught vector calculus, I learned that I assumed too much familiarity with spatial reasoning. The very next lecture was devoted almost entirely to sketching examples of lines, planes and more complex objects in three dimensions. Another pacing technique is that I use chalk–versus slides–as it forces an economy of words. Chalk also provides more flexibility to respond to student questions on the spot. Outside of the previously mentioned *demonstration modules*, I follow an example-centric lecture style and rely on the textbook for precise statements of theorems. Supplementary materials such as hand-written notes, multimedia aides and links to external readings are distributed electronically. However, in future courses I intend to weave multimedia presentations and computer experiments into lecture.

The flexibility of my lectures does not mean they lack structure. A recent student explained that I am "*always prepared but never simply worked off pre-written notes. Adapted well to the class and what they knew or how fast they learned.*" I assess and respond to student progress to lessen anxiety, applying a few straightforward methods to foster a more inclusive learning environment. Foremost, I make an effort to regularly use students' names. This demonstrates the value I place on two-way communication and encourages students to approach me with their problems. Knowing names can also help prevent a small number of people from dominating the classroom. To promote collaboration, my grading de-emphasizes exams in favor of homework. It is my intention to guide students to explore collaborative learning; to realize that they are not alone in their questions. I have encountered many disadvantaged students who struggled to earn a technical degree because of a tendency to "go at it alone." These students either lacked family support for or knowledge of higher education, attended schools which poorly prepared them for college or found themselves outside of the college preparatory track even if such options were available.

The need for inclusiveness does not end in the classroom. For example, as a first-generation college student I only recently embraced the importance of mentoring relationships. I can see now that my undergraduate career would have benefited from a mentor to connect my interest in the mathematics of signal processing to potential employment and graduate school opportunities. Therefore, as a STEEM mentor I meet weekly with a handful of community college transfer students in mathematics to discuss precisely these issues, as well as mathematical problems. I reach a wider audience through my position as an officer in the UCSB Student Chapter of SIAM. Last fall we hosted a weekly seminar in computational science featuring a diverse, interdisciplinary cast of graduate student speakers. These weekly talks detailed the history, theory and application of a famous algorithm in a manner suitable for an undergraduate audience. The attendance was so overwhelming, we had to change the location after the first day. This spring, we showcased graduate student research in a one-day event dubbed the STEMposium which was organized along with graduate student groups in chemistry and engineering. The event featured an undergraduate poster contest, a keynote speaker who works in pharmaceutical design at Pfizer and lunch for over 125 attendees. In addition to promoting mentorship, these events illuminate the range of opportunities available to all practitioners of the mathematical sciences.