

Teaching Statement

When I gave my first lecture as co-instructor of an undergraduate class (numerical methods), I was immediately surprised by the small skills I had never known were missing. I have always had a knack for telling a story and explaining my ideas, but – for example – I had never been asked to write large clear letters on a whiteboard. As the course went on, I learned that it was not just the small skills that needed development; from the planning to the delivery, I had to understand a new audience and learn a new medium for my storytelling. I am excited for the opportunity to continue developing my skills in this area – to educate the next generation of chemical engineers is a serious responsibility and a remarkable privilege.

As a fourth-year PhD student (2016), I was awarded the CSP teacher/scholar fellowship at UCSB to co-teach an undergraduate numerical methods course with professor Mike Gordon. The course covered root finding for linear and non-linear systems of equations, optimization, curve fitting, numerical differentiation/integration, and ODE methods, all with an emphasis on problems relevant to chemical engineering (reaction kinetics, thermodynamics, mass/energy balances, etc.). The course also served as an introduction to computer programming (Matlab) with weekly recitations in the computer lab. I was given a lot of responsibility and freedom as a co-instructor; I prepared and delivered half of the lectures and wrote half of the problems for homeworks and exams. I also introduced new teaching tools, including ‘automated TA’ programs that would help students check their progress (without giving the answers) to identify potential problems at the earliest stages. There was near-unanimous support for this resource among the students, and I believe it helped direct focus towards the core concepts of the course, alleviating some of the burden for debugging and troubleshooting code.

Overall, my experience as a co-instructor was a challenging but rewarding introduction to the pedagogical responsibilities entrusted to engineering faculty, and I am grateful for the opportunity and for the mentorship that I received. At the same time, I know that there is room to grow, and the lessons I learned in 2016 have already begun to wane in relevance. For example, the medium of in-class lectures is being displaced in favor of virtual learning due to concerns surrounding COVID-19. However, even after in-class activities can resume, it is likely that a ‘blended learning model’ combining the best of in-class and online education will persist. Besides changes in the medium, there are also changes to the audience: shorter attention spans, increasing neurodiversity, more non-traditional students, and so on. In many respects, virtual learning is uniquely suited for

reaching today's students – it gives each student the opportunity to process course material on his/her own time and in his/her own way. I am excited for the opportunity to learn a new medium and find new/better ways to reach today's students. For example, I would like to develop supplementary study materials that are audio-only. Many students have long walks/commutes built into their schedule, during which it is impractical to watch a video lecture or read a text-book but easy to stay focused on something like a podcast. Virtual learning is also more conducive to engaging guest speakers from industry, for whom it is difficult to appear on-campus for a 2pm lecture, but comparatively easy to record and upload responses to student questions on his/her own time.

Speaking on a practical level, I am qualified and capable of teaching any undergraduate core course in the [DEPARTMENT NAME] curriculum; transport, thermodynamics, kinetics, process design, process control, and numerical methods. I can also teach a number of core classes at the graduate level, and I am especially qualified to teach [COURSE NAMES], and [COURSE NUMBERS] also are also appealing to me. Beyond teaching existing core classes, I would also be eager to incorporate lectures on [SUBJECT] into the [SERIES] and, if one does not already exist, I would like to propose a complex fluids project for the unit operations lab.

Beyond the classroom setting, I am excited for the opportunity to mentor graduate and undergraduate students in a professional but personable research setting. When I first came to UCSB, my only research experience was with industry (3M) and I initially struggled transitioning to the pace and depth of academic research. If not for the patient encouragement from my advisors in those early months, I may never have found my way in this field. I am eager to pay that forward to the next generation of students, to help them realize their own potential as chemical engineers. As a particular focus, I would like to serve as a mentor to non-traditional students, transfer students, and international students at the undergraduate level. These students can bring really unique experiences and perspectives, but they are often in need of additional support structures and can easily slip through the cracks.