

## Teaching Philosophy and Experience

I have served as a university professor for the past 30 years. I have taught a range of undergraduate and graduate courses in geology, geophysics, environmental science, nonlinear dynamics, general physics, computer programming, and advanced math applied to physics. My goal for teaching, at any level, is to encourage students to think independently and creatively. My teaching style adapts to meet the challenges of each course. I consider publishing with students an extension of teaching. My peer-reviewed published papers are primarily (15 out of 21) with student authors. I have over 65 papers presented at national and international scientific meetings that are co-authored with students, including Tanuj Guha (DS '16) who was a student in my course at Deep Springs in summer 2018.

I have extensive experience in a large classroom lecture setting (over 120 people) teaching a class of undergraduate pre-medical students the basics of physics. While this setting is a polar opposite to Deep Springs, some fundamentals are the same. I help students move beyond passive learning in the classroom and when completing assignments. I help students gain confidence when presented with problems of a type they have not seen before. I encourage students to participate in classroom discussions, either with the entire class or in small groups. I am available to students outside of class to discuss any aspect of the course or their life and thereby help them advance as an individual and as a student. I have been gratified with student response over the years, with many writing on anonymous evaluations that they enrolled in the course because it was a dreaded requirement and left truly loving the material, especially physics.

At the graduate level, I've taught a course on Advanced Mathematics for Physicists for the past ten years. This is a course that begins with Ordinary Differential Equations and moves forward, with a focus on applications to physics problems. For the past few years, I've added a Python programming component to the course, with ten modules that include control flow, Python functions, and list comprehensions. My philosophy is that I want students to leave the course able to solve problems outside the classroom. This means they will have access to a wide variety of tools not necessarily available in the classroom, including textbooks, Wolfram Alpha, online matrix solvers, tables of integration and differentiation, etc. I give students access to a wide range of materials as part of the class. They have a textbook and are given pdf files with the associated student guide (with extra solved problems) and teachers guide (with answers to all problems). I'd like the students to be in an optimal environment to master the material. In addition, the students each give an in-class presentation where they teach a section of the material to the class. For many of my graduate students this is their first opportunity to teach, so this is a useful exercise for gaining perspective and experience. Finally, the students apply a topic from the class, such as Fourier

analysis, to an actual data set, which helps them make the transition from textbook exercises to research applications.

I enjoyed teaching a course at Deep Springs for a summer appointment in 2018. It was a learning experience for me to work with students with such a broad array of backgrounds. While my teaching goals remained the same, the means of reaching the end were different. At that time, the students were highly motivated to support each other, far more than they strove for a particular grade or to impress me. Within that environment, the students completed the readings to the best of their ability, led and participated in class discussions, and each completed an original research project. The students chose their own research subject, completed analysis using techniques covered in the class, presented their results to the class, and compiled the results in the format of a research manuscript. Rubrics were provided at each step for guidance. I think that with the diverse backgrounds and talents of Deep Springs students, it is critical to be flexible in the means of mastering knowledge. I spent almost no time lecturing. Instead, I facilitated helping the students grapple with the course material collectively, often through discussions that flowed over into the dining hall and while walking about campus.

I recognize that Deep Springs needs more from faculty teaching than is found in a classroom. The isolation of the campus, and limited staff and faculty, results in a dynamic where all community members serve as support and role models. All community members help to sustain each other and are the primary source for conversation, encouragement, and help, as needed. I've seen DS faculty serve as mentors to a range of challenges associated with young adulthood. In addition, there is the important role of advising students as they consider life after the valley. In this regard I have years of experience advising students on academic choices both in school and after graduation. My years of experience connecting with and helping students navigate young adult transitions will enable me to support Deep Springs students in ways that meet varied needs both within and beyond the classroom.

My philosophy for teaching at Deep Springs is to provide courses that help students to grow and to go forth and lead lives of service. To me, for scientific preparation, that means students can think critically and express themselves regarding scientific topics. I propose a range of possible courses to achieve this goal:

- The Geology of Deep Springs valley. This could be limited to the valley including the alluvium of the valley floor and the rich structural geology as one nears Westgard pass (e.g., Poleta folds). We would start by learning the basics of identifying minerals and attributes of local geologic formations. We could create a geologic section. We could extend this knowledge to geologic mapping of a small region within the valley. If time permits, we could include geology slightly

beyond the valley, and study and then explore prime examples of basin and range faulting in Death Valley and recent (~600 years ago) volcanism at the Mono-Inyo craters in the Owens valley.

- The Geomorphology of Deep Springs Valley. There is immense satisfaction in looking out over a landscape, wherever you may be in the world, and having insights into the processes by which the region formed. We'll begin by focusing on the geomorphology of Deep Springs Valley (DSV). What are the processes by which DSV is primarily flat-bottomed while surrounded by rugged mountains? Are there signs of glaciation? What are distinguishing attributes of the DSV dried lake bed? We will consider landform description, geomorphic processes (including different types and mechanisms of erosion), and landform evolution through time. If we find we've exhausted a study of DS valley, and time permits, we can extend the course to study glacial geomorphology with emphasis on the Sierra Nevada mountains including U-shaped valleys, hanging valleys, lateral and terminal moraines, and glacial erratics. We can study geomorphology through the lens of remote sensing data, geologic maps, topographic maps, and hands-on field trips (even if the SB is in strict physical isolation and the field trip is a hike from campus).

I'm also interested in developing courses on:

- Computer logic: from vacuum tubes to Python programming
- Archimedes: from fundamental discoveries to modern applications  
"Give me a lever long enough and a fulcrum on which to place it, and I shall move the world." Archimedes

Statistics and Probability for an informed citizen

- "Lies, damned lies, and statistics." Origin unknown; popularized by Mark Twain

Geology, Geomorphology, and Resources of the Ukraine: political implications and consequences. How has Ukraine's geology and geomorphology contributed to its status as a contested region—from Soviet-era annexations in the 20th century to the ongoing war?

## DEI Statement

Diversity, Equity, and Inclusion (DEI) establishes standards and practices that have informed my actions professionally and personally. While DEI is currently out of political favor on a national level, I remain committed to promoting diversity, equity, and inclusion in the workplace and society.

While I have taken numerous DEI training courses, most have been only marginally useful because they provided examples of discrimination and remediation that were too blatant. The examples provided were not applicable to more subtle expressions of discrimination that are more prevalent and also more challenging to address. I also participated in two full-day workshops that I found more helpful. From those workshops, I came to understand that all humans have biases. Studies of pre-verbal infants found they fear people who have a different skin color than their caregivers. That knowledge had a profound impact on my understanding of the universal prevalence of bias. My ongoing goal is to become consciously aware of my biases and try to minimize them. Concurrent with those efforts, I strive for awareness to ensure my innate biases do not influence my actions and decisions. This includes awareness when participating in the decisions of hiring colleagues and accepting students. More broadly, I seek opportunities to help implement systemic changes to make our society more fair to traditionally disrespected and disadvantaged groups.

In the classroom, I have tried to create an environment that eliminates common microaggressions. I consider it is the responsibility of faculty to ensure students feel safe and welcome. I ask students to be respectful of each other and of me. I love language, so it has always been a pleasure to work on correct pronunciation of a student's name. Once I learned that mispronunciation of names is a common microaggression, I doubled down on my efforts to ensure respectful and correct pronunciation. I also know it is integral to learn and use the pronouns a student prefers. On the first day of each class, I ask students to communicate to me any disabilities or need for accommodations, such as for religious holidays (e.g., issues with exam dates). I also make the class aware of the existence of the Office of Disability Services at Wright State. I ask students to consider whether they have an undiagnosed need for a disability accommodation and have worked with students through the process of receiving accommodations from the Office of Disability. I correct others, in the classroom and beyond, when there is sexist language or any actions that single out students based on gender, sexual orientation, race, or ethnicity. Further, I have diversified the names used in homework and exam questions and have edited my visual lecture materials so a diversity of individuals is included. I strive to create an environment where each individual is recognized and appreciated for who they are.

In the classroom, working on a more systemic level, I make a point to share information about opportunities and programs relevant to students from historically disadvantaged backgrounds. An imbalance of information perpetuates an imbalance in opportunity. For instance, towards the end of each term, I share that many graduate programs in the sciences (except medicine) provide student support packages that cover tuition plus a modest stipend for living expenses. I know this knowledge has opened doors for students who aspired to continue their science education and conduct research but previously thought they could not afford graduate school. I've also made changes to my practices to be more inclusive. I formally held office hours only in my office, but learned some groups find this off-putting, so I moved some 'office hours' to the campus coffee shop and thereby started reaching more students.

While serving on University and Professional committees I have had opportunities to influence systemic improvements. I was a founding member of an "Evaluation Oversight committee" at the University of South Florida which devised guidelines for best practices to try to ensure informed and unbiased faculty annual evaluations and tenure and promotion recommendations. As President of the Nonlinear Geophysics section of the American Geophysical Union (AGU), I was a member of its Council (a governing body). We amended the AGU mission statement to add a list of values that included a diversity statement. We were also actively involved in working to improve representation of traditionally under-represented groups on AGU journal editorial boards, the Awards committee, and early career opportunities, recognizing these as necessary steps towards reducing systemic, institutional bias.

In my time serving as a faculty member, there was a surge in Islamophobia following the "Muslim ban" in the United States in 2016. The ban was on entry into the US for people from certain Muslim-majority countries. Students at Wright State who were from these countries, plus those who were misidentified as being from these countries, were affected. Some students expressed to me how they felt increasingly unwelcome and afraid. Many students had to cancel trips to their home countries as they would likely be banned re-entry into the US. The University administration made statements of support for all students, but students expressed to me that it came across as platitudes. I felt somewhat limited in my available actions on campus, but I taped a copy of the University non-discrimination policy to my office door. I attribute that small gesture to subsequently being asked to serve on the Master's committee of every current master's physics student of mid-eastern nationality or Muslim identity. I do my best to serve as an ally to students as they complete their degrees, ensuring they feel safe, valued, and well-advised.

While this is beyond the direct scope of the Reich chair, as a member of the DS community I would support actions related that we could take to directly support and expand

DEI efforts and awareness at Deep Springs college. We could select books for the community to read with an aim to enhance perspectives, deepen understanding, and spark dialogue. These could be books that help each member to identify personal filters and bias (e.g., “What if I say the Wrong Thing” by Vernā Myers or “Thinking at the Speed of Bias” by Sara Taylor) or informative texts such as a history of the structural inequalities in American society (e.g., “A People’s History of the United States” by Howard Zinn). We could prioritize diversifying the curriculum and seek instructors and/or speakers who can share understanding and promote discourse on topics related to DEI. Institutionally, we can reexamine whether the established practices at Deep Springs college promote inclusive hiring and selection of students and if there are additional efforts we can make to better foster and support a diverse community.