Teaching Philosophy

I believe students in the Earth sciences learn best by asking questions. I've begun each class I've taught and each mentoring experience I've undertaken by expressing the following: *Even an introductory geology course incorporates elements of chemistry, biology, and physics. If you have a question that seems silly, ask it anyway*. While in both classroom and mentoring contexts, expressing this sentiment is less important than ensuring that it is lived up to, beginning with this statement sets the tone for what I view as an ideal learning environment. Formatting classes around small group collaboration and flipped classroom problem solving further helps to make students comfortable asking questions of each other as colleagues and of me as an instructor. Whenever possible, I prefer to give students enough autonomy to pursue their own interests during classroom projects. To facilitate this, I draw on real world examples which tie concepts we discuss in class to issues in public policy, history, or social justice. For example, when teaching a modeling module about the role of forests in the Earth system while at the University of Pittsburgh, I highlighted local research which links deforestation and loss of root cohesion to erosion—a relevant issue in a steep city with frequent landsliding problems. Whatever class discussion emerges from this tangent is far from wasted time; it adds degrees of nuance to have students consider questions which are not included in the original module. "What are the consequences of moving carbon the from soil into the rivers?" one student might ask; another might go even farther afield and wonder "which neighborhoods in the city have benefited from ongoing afforestation efforts, and how do these efforts relate to historical redlining practices?" In addition to showing a prospective biology or environmental studies major that there is an intellectual home for them in the Earth Sciences, I believe one of the values of a liberal arts education lies in being able to weave together seemingly disparate ideas. This is not just a matter of being able to take a philosophy class alongside a geology class, but in having your experience in each field inform and enrich the other. My pedagogical aim is to give students the background and confidence needed to formulate and pursue their own questions.

Classroom experience

I have served as the sole teaching assistant for both introductory and upper-level Earth sciences courses. I have also served as a frequent guest lecturer and leader of hands-on workshops. In these roles, I gained experience (1) working with instructors to develop curricula, modules, and assignments (2) lecturing and facilitating group activities (3) introducing students to completely new programming and computational tools (4) organizing and planning field trips and (5) grading and ensuring struggling students received the option of additional outside support. As an instructor for Pitt GEOL 1445 (GIS, GPS, and Computer Methods), I learned how to keep students invested during the frustrating, repetitive early stages of learning a new software program—I found using case studies, small group problem solving, and an honesty about the first few weeks of the course kept students engaged. In both this course, and in an introductory class the solar system (The Planets, Pitt GEOL 0870), I picked up strategies teaching to students with different academic backgrounds and interests. For GEOL 0870, it was the first time I or the instructor had taught the course; as a result I had a major role in developing and changing classroom activities and modules. As a teaching assistant for Pitt GEOL 1030 (Atmospheres, Oceans, and Climate), I helped design modules in the box-modelling program STELLA geared towards understanding different components of the Earth system. I have also given guest lectures in many different classes (Pitt GEOL 2049 Paleoclimatology; UB GLY 579 Stable Isotopes; GLY 453/553 Quaternary Dating and Paleoclimate) and organized several workshops for graduate students.

Teaching at Deep Springs

One course I envision offering at Deep Springs would be titled **Fire in the Earth System**. I've begun developing a curriculum for such a course which would offer both an overview of the non-human and human history of fire and its role in shaping the world. We would read scholars from

diverse scientific, anthropological and historical disciplines. Another course I would be eager to offer would be based on my experience teaching Atmospheres, Oceans, and Climate and would be centered around students design their own subject-specific sub-model of a process within the carbon cycle (**Modeling the Global Carbon Cycle**). The final class project will involve linking all the sub-models together into a more fully coupled global carbon cycle model. Such a class would also involve a vigorous interrogation of what models actually are; what they do; and what kinds of questions ought be posed with them. Lastly, I would like to draw on both the extraordinary place Deep Springs exists within and the relevance of dwindling water resources in the region to teach a course speculatively titled **The Past, Present, and Future of Water in the West.** This course would involve an overview of the region's paleoclimate history, spanning the last ice age to the arrival of Euro-American settler groups. The next part of the course would explore the American historical record, delving into the decisions which have brought us to where we presently are. Lastly, we'd explore climate model projections, along with other avenues of thinking about the future (speculative fiction, sociology and urban planning).

Mentoring experience

Four undergraduate mentees at the University of Pittsburgh completed undergraduate theses based on research they undertook with my direction (Shannon Christensen Pitt '18; *"A Radiocarbon Analysis of Holocene Lake Level Changes in Celestine Lake, Jasper National Park, Alberta Canada"* Carissa Root Pitt '21; "*Drought History of Northwestern Montana from Studies of Rock Lake Sedimentology and Oxygen Isotopes*" Jen Steeple Pitt '22; "*Linkages Revealed Between Wildfires and Mercury Accumulation in Lake Sediments from Eastern Washington*" Owen Shaffer Pitt '22; "*6800 Year Fire History of Blue Lake, NV").* I am particularly proud of the work these students did, as undergraduate theses were neither required nor common in the department—in 2022 I served on the committee of ¾ of publicly presented undergraduate theses. Two of these theses include contributions to works which are currently published or nearing submission to a peer-reviewed journal. Four former mentees have gone on to pursue graduate studies in the Earth and environmental sciences (Christensen completed a MS at the University of Minnesota-Duluth; Root is pursuing a PhD at the University of Pennsylvania; Steeple is pursuing a MS at the University of Maryland; and mentee Michelle Kim, Pitt '20 has completed a MS at the University of Wyoming). At least three former undergraduate mentees were first generation college students and four mentees have come from underrepresented minorities in the geosciences. Several students achieved their research and academic goals during the early months of the Covid-19 pandemic, particularly when their off-campus employment, which was necessary for their room and board, was put at risk by the shutdown. Working with students during this vulnerable time was an important lesson in being empathetic and mindful of their lives outside of the lab and classroom.

During my first year as a postdoctoral researcher based at the University at Buffalo, I have served as a mentor in the Collegiate Science and Technology Entry Program, which aims to provide undergraduate students from traditionally underrepresented backgrounds with hands-on experience working in STEM fields. Undergraduate mentee Dephil Jones (UB '24) undertook a project which combined soil carbon maps and observed incidences of permafrost-driven hazards (such as landslides and thermokarsts). More recently, I served as an advisor for two REU students (Aspen Marshall, University of Utah '26 and Camryn Nelson, Embry-Riddle Aeronautical University '26) who developed original research projects examining the influence Lake Erie ice cover on hazardous lake-effect snowstorms.

While I strive to make each student feel like there is a career in the Earth sciences for them, I recognize students will wind up following many different paths. At a minimum, I aim to have each student finish a class or mentoring experience with a new set of critical thinking skills to help understand the world and how they might fit into it.