Our backyard is our laboratory in Earth Science, immersing students in a round-the-clock and immersive experience. My aim as an instructor is to equip students with scientific principles and tools that make them capable of building a story of how the Earth system works today and how it has evolved through the past. To achieve this goal, I emphasize the importance of building foundational quantitative skills and generating multiple hypotheses based on a set of presented evidence. First, I will first discuss how I incorporate quantitative skills in my teaching by breaking down complicated processes into tractable components governed by basic physics and chemistry. Next, I will explain how I have encouraged students to "build a story" by interpreting datasets in more than one framework in order to generate a plurality of hypotheses. Finally, I will outline my pedagogical approach in the classroom.

Quantitative skills | In teaching, I believe in starting with fundamentals. More than building crucial transferable skills, this approach allows students to see that a complicated process can be broken down into simpler parts. I emphasize the importance of going back to the basics for understanding the Earth system in both my course curricula and assignments. For example, when I taught *EPS10: A Brief History of the Earth*, during a class on the Earth's formation I included a discussion of how elements were created during the big bang. Through exposure to how elements were first synthesized at the start of the solar system (including the basics of nuclear fusion), students gained an intuitive understanding of the relative abundance of different chemical elements in our solar system and their chemical tendencies during the differentiation of the Earth.

Today, programming skills are an indispensable toolset in the Earth Sciences. Therefore, I believe it is crucial to incorporate programming exercises into geoscience classrooms, at both introductory and upper levels. In *EPS 261: Sea-level change*, a mixed graduate and undergraduate course I taught in Spring 2019, I offered tutorials in Matlab and Python to assist students in completing the class assignments, including the development of code simulating the elastic sea-level fingerprint of a melting ice sheet.

Telling a Story | Earth history is full of events characterized by sparse data and multiple interpretations. To immerse students in the research questions of our field, I provide pieces of direct evidence and allow students to explore a space of interpretation. For example, in a laboratory dealing with the Great Oxygenation Event I asked students to weigh out different hypotheses based on the multiple forms of evidence that exist. I built a hands-on stratigraphic column of the sedimentary deposits that comprise this event, and encouraged students to engage as researchers, for example, by providing Geiger counters to determine whether detrital uraninite, indicative of a low oxygen environment, existed in a rock sample of this formation. I created a lab on the end-Cretaceous mass extinction, which drew figures and datasets from papers from two sides of the debate surrounding the cause for the mass extinction, including fundamental papers invoking the Chicxulub meteor impact or volcanic outgassing from eruption of the Deccan Traps.

I find it useful for students to engage with research literature in the field. However, in order for students to gain the ability to synthesize this information into a larger framework of the Earth system, I encourage students to immerse themselves in creatively imagining the world's past. I believe this form of creative synthesis is a major learning objective of field experiences, as students are required to gather knowledge from classroom and laboratory settings and apply these concepts to reasoning about the complex reality of the geologic record. In the past I have engaged with students to achieve this type of critical thinking, merging discussions of literature with geologic field evidence, as I designed a daylong field trip for the course *EPS 10: A Brief History of the Earth*, and served as an assistant on a weeklong field trip for the undergraduate sedimentology course.

Pedagogical approach | My approach to the classroom emphasizes personal connections and trust. I aim to create an environment where learning occurs together, such that a dialogue is built between students and the instructor. I hope to run a classroom where different forms of learning and different styles of thought are valued and actively engaged. As a teaching assistant I built this environment by conducting a student survey at the start of the semester asking questions about goals and approaches to learning. I met with students individually to learn about their individual goals and understand their unique background. In my classroom I want to be inclusive of different backgrounds and thought processes.

Student evaluations of the classes I taught at Harvard have provided me with constructive feedback that has helped refine my teaching. I have also taken a teaching course at Harvard entitled "Driving Diversity in STEM: How to foster an inclusive classroom". I earned a Certificate for Distinction in Teaching after receiving excellent evaluations for teaching the introductory Earth science course *EPS 10: A Brief History of the Earth*.

"Tamara is the most enthusiastic teacher I have ever encountered! The positivity and care she brings to the course makes it an extremely fun experience. She is very helpful and patient in labs, as she loves the concepts and is therefore willing to explain them in great detail. She helped make the field trip to Western Mass. particularly fun and engaging as a learning experience!" Anonymous student in EPS 10 (Brief History of the Earth)

"She is very inclusive and creates a space for unique and critical thinking about the issues surrounding sea-level" Anonymous student in EPS 261 (Sea-Level Change)

Inclusive engagement | My goal is to make science accessible to communities who, through social inequalities, are excluded from its intellectual and socioeconomic opportunities. For me this work is inextricably entwined with my goals as a scientific researcher. While at Harvard, I served as a leader for Harvard Graduate Women in

Science & Engineering (HGWISE) for four years. I initiated the development of HGWISE Guys, a subgroup dedicated to connect allies and advocates of women in science. I founded the Bias & Beer journal club, which meets monthly to read scholarship on bias in science, raising awareness and discussion around subtle and overt forms of sexism and racism that plague the science community. I instigated and led the first annual Wikipedia-thon, focused on highlighting the accomplishments of women and minority scientists, and began a movie discussion series on race and science.

I am passionate about improving the recruitment and retention of underrepresented minorities in science. To this end, I have served on a number of panels for the Harvard W.E.B. du Bois society, the graduate underrepresented minorities group, and Summer Research Opportunities at Harvard, a program aimed at underrepresented minorities in science. I have also given presentations to visiting middle school student groups from underserved communities in the Boston area at the Harvard Natural History Museum and the Harvard Foundation for Intercultural and Race Relations science conference. I have visited elementary school classroom settings, giving interactive geology demonstrations. I believe confidence in math skills is valuable for everyone, not only scientists. For four years, I weekly tutored incarcerated people to pass the math GED exam, in New Jersey and Massachusetts, with the goal of empowering their job search post-release.

In the Earth sciences, people of color make up 6% of Ph.D. students[1]. Women make up 44% of Ph.D. students, but only 8% of full professors[2]. These numbers are disconcerting because they point to a systematic pattern of exclusion. Because gender and race disparities exist at the undergraduate level, and grow wider at higher-level positions, undergraduate teaching plays an important role in the recruitment and retention of underrepresented minorities students[4,5].

In my teaching I will emphasize the accomplishments of geoscientists belonging to underrepresented minority groups and underline the importance of course context to marginalized communities and the environment they inhabit. In teaching Earth science concepts it is important to provide the social context for scientific discoveries and research practices. For example I will include historical context of 18th and 19th century geologists, highlighting the involvement of renowned scientists in problematic research related to human race and gender. Further, I intend to shed light on under-credited research conducted by women in the 19th and 20th century. For example, when I taught *EPS 261: Sea-level change,* I led a discussion-based seminar on the social impact of modern sea-level rise, focusing on its disproportional effect on marginalized communities across the globe.

Mentoring | As an assistant professor I look forward to mentoring graduate and undergraduate students. Over my time at Harvard, it has been extremely rewarding to advise four undergraduates in independent research, including a senior thesis project. The senior thesis student I advised was recognized for outstanding research with the *Harvard Hoopes Prize*, an honor awarded to the top 3% of the graduating class, and I guided this student in preparing their thesis as a first-author publication (Cleveland-Stout et al., submitted, *Quaternary Science Reviews*). I encouraged and prepared my undergraduate

students to present their research at the AGU Fall Meeting, in addition to smaller meetings focused on paleoclimate and sea-level change. I advised a junior project in Women, Gender, and Sexuality Studies focused on critiquing medical science and its control of women's anatomical representations. I have also worked closely with junior graduate students within my research group to develop research ideas, new programming skills, and publications.