

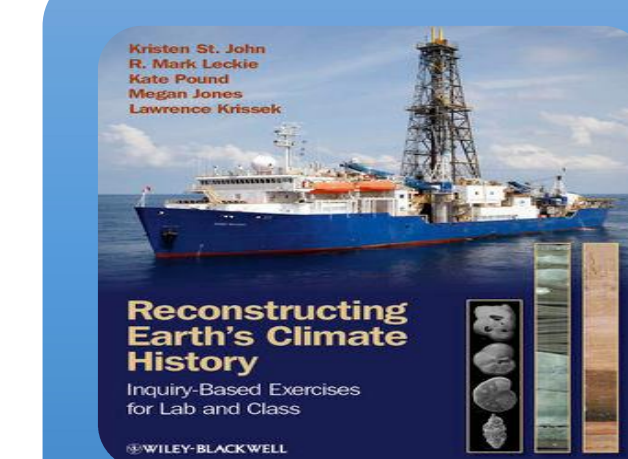
Paying Paleoclimatology Forward: an academic multigenerational journey linking professional development to curriculum development

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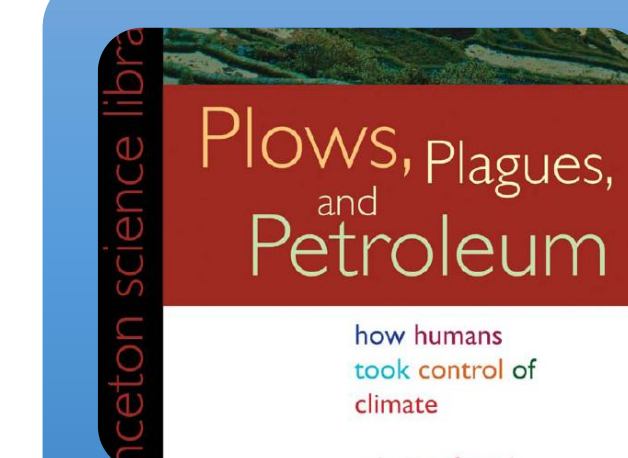
ABSTRACT

The first author has long taught climate science and earth sciences at University of Texas- El Paso (UTEP), a research-oriented minority-serving institution (MSI) with majors in Geology and Environmental Science. He was one of the first instructors to teach the American Meteorological Society (AMS)'s Climate Studies course and participate in their Climate Diversity Program for MSIs. In 2012, he received the opportunity to participate in "School of Rock," an MSI faculty professional development program sponsored by the NSF, organized by the Consortium for Ocean Leadership, and offered at the Gulf Coast Repository (Texas A&M, College Station), the North American repository for marine sediment cores. It was an intensive training program interpreting and utilizing marine sediment cores to teach Earth's climate history. The School of Rock experience was so positive for the first author that he immediately developed a provisional UTEP class in paleoclimatology based on the workshop curriculum. It was the best-received course he had ever taught, and was formally added to the UTEP curriculum. The first author was invited by School of Rock's organizers to help propose, implement and be one of the instructors/mentors in a similar follow-up professional development program, "MSI-REACH," at the Gulf Coast Repository in summer 2015 and 2016. The second author, who reconstructs Quaternary paleoenvironments using lacustrine sediment cores, was a top-performing graduate student in the first organized UTEP paleoclimatology course, and chosen to be the teaching assistant / lab instructor the second time it was offered. After receiving his doctorate under the first author, Dr. Collins accepted a faculty position at Texas A&M University- San Antonio, another MSI, where he is developing new sophomore- and senior- level climate and paleoclimate science classes and implementing parts of the "School of Rock," "MSI-REACH," "School of Ice," and "Climate Diversity Project"-based curricula in his introductory Earth Science courses. This narrative demonstrates how a professional development program positively influenced students and echoed down through multiple institutions, acting as a "force multiplier" for the transmission of scientific knowledge.

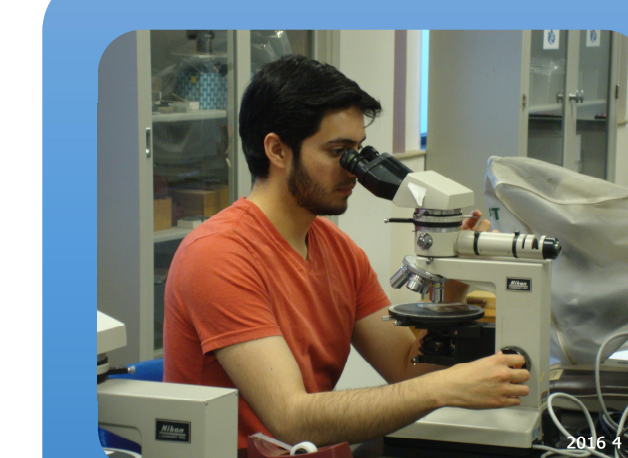
Paleoclimatology Course Layout



Textbook and Lab Manual used at "School of Rock/MSI-REACH"



Supplemental Reading by William Ruddiman

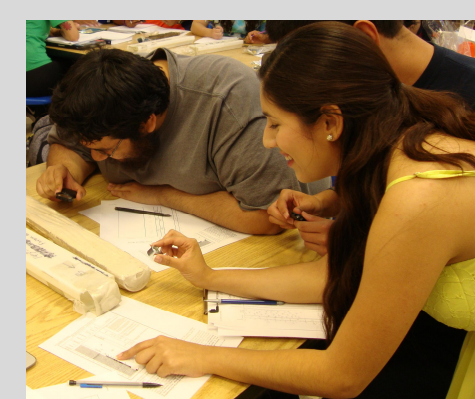


Hands on experience with actual deep sea cores and smear slides

STUDENT FEEDBACK

"Really expanded on the basic concepts learned from previous classes. Helped to synthesize things learned from (prior courses in) mineralogy, sedimentology, geoscience processes, tectonics/structure, climatology."

-- Ana Quevedo, Environmental Science/Geology major



"Enjoyed the hands on analysis of smear slides, cores, and working with real actual data rather than hypothetical examples."

-- Kagan Richard, Geology Graduate Student



"Hands on experience with samples, data, and proxy data was great. More hands on made it better. Sediment data was useful even as a bio major."

-- Natalie Peters, Biology major



Transmission of Scientific Knowledge from Workshop



Professional Development as a "Force Multiplier"

Transmission of knowledge- in this case, of climate science and paleoclimatology- from nationally funded workshops acts as a force multiplier. The hierarchical figure above demonstrates the influence one workshop, School of Rock in 2012, had on hundreds of students from training just one instructor. Additionally, the ability to transmit knowledge peer-to-peer or instructor-to-instructor can span multiple universities and lead to other collaborative projects, as we have already done. These workshops create an incredible return on investment. To date, the 2012 School of Rock has influenced over 400 students of Gill and Collins alone across two HSI universities and a HSI community college.

How long will the chain go on? Like sediments settling on the bottom of the ocean and building up to tell stories of different events and times, a single professional development opportunity trickles down to developing new courses and developing new expert teachers.