

Blowing in the Wind: Ryan Ewing Explores Sand Dunes



Ryan Ewing fell in love with geology when he took his first class in it at Colorado College and got out in the field. He says it's "low hanging fruit" to take students out to spectacular sites and get them asking questions. For him, it's been a love affair ever since. Finding his specialty, on the other hand, was a more gradual, almost subliminal, process.

"It seemed like every class I took, I would end up doing a project on sand dunes," he says. His first field trip stopped at the world's largest gypsum dune field at White Sands, New Mexico. A class in geomorphology explored Great Sand Dunes National Monument in Colorado.

For graduate school, he came to the Jackson School of Geosciences to work with Gary Kocurek, one of the world's top experts on Aeolian processes (those driven by wind). With

recent expansions to the school, he and Kocurek are now part of a larger sedimentology and geomorphology group that focuses on any process that moves sand. Ewing says the program has really blossomed during his time here and he will miss working with such a large group of specialists in his field.

Ewing is trying to understand how sand dunes create exotically patterned desert landscapes on Earth and Mars. His work aims to understand how long the pattern-forming process takes in different environments and how those environments shape and move the dunes. His work is fundamental rather than applied, but it could have implications for society. Farmers in Africa, for example, might benefit from improved forecasts of how the Sahara desert might evolve in response to a warming climate.

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Ewing with Professor Gary Kocurek in the Gran Desierto, Mexico. "The dunes in these photos are called 'star dunes,'" says Ewing, "which means they have three or more arms that radiate from a central peak. Note the truck in the lower right corner for scale. They are about 100m high. We were deciphering the chronology of the dune field pattern ... sort of sounds like the Da Vinci Code."

Ewing starts a two year National Science Foundation (NSF) post doctoral appointment in fall 2009. He says an NSF post doc is ideal because he is paid to do his own research anywhere he chooses and isn't tied to one institution. He will be spending one year at Princeton University and one year at Caltech. After that, he plans to stay in academia and eventually become a university faculty member.

For his post doc, he plans to travel 635 million years into the past. Scientists have found evidence suggesting that Earth's climate was radically different then. It's been dubbed the Snowball Earth hypothesis. If true, at times, the

entire planet was covered in ice. Ancient lithified sand dune fields that date from that time still exist in Australia and West Africa. Ewing plans to study these rocks for clues about the wind at that time. Wind is one of the most poorly understood aspects of ancient climate.

"Yet it's arguably one of the most important because it drives the most energy around Earth and drives ocean currents and anything else that's going on on the surface," he says. "So having an ability to tie down what was going on wind-wise in that period of Earth's history would be really cool."

IF YOU WOULD LIKE TO TALK TO RYAN OR OTHER CURRENT STUDENTS AT THE JACKSON SCHOOL, CONTACT PHILIP GUERRERO, GRADUATE PROGRAM COORDINATOR, AT PHILIPG@MAIL.UTEXAS.EDU OR 512-471-6098.

Mapping Sand

As a graduate student, Ewing won a highly competitive grant from the National Center for Airborne Laser Mapping, a research center funded by the National Science Foundation. The prize: one aerial lidar survey of the dune field at White Sands, New Mexico, covering 15 square miles. To pay out of pocket would have cost him \$30,000. High resolution three-dimensional characterizations of the morphology of the dunes had never been collected before.

An additional two surveys were funded by the

Jackson School and the National Park Service (NPS). By making three maps over one and a half years, he can investigate how the dunes evolve and migrate from season to season as prevailing winds shift. The NPS will use his work to make long term predictions for how the dunes will change and better understand the impact of tourism and other activities within the field. Ewing will take this data with him and, with the help of his future graduate students, continue to analyze them and publish new results.