

Geomagnetic field intensity

Collecting core samples in the Australian outback

Although it makes up about seven-eighths of the Earth's history, there are many unanswered questions about the Precambrian time period.

Geophysics Assistant Professor Aleksey Smirnov applies paleomagnetism to better understand the Precambrian. "Paleomagnetic study of Precambrian rocks may give us a much better estimate of the age of Earth's inner core," Smirnov explains. "Crystallization of the inner core, for instance, may have resulted in a dramatic increase of geomagnetic field strength." If true, this may provide important insights into early atmospheric chemistry and the evolution of life. Today, the Earth's magnetic field protects the atmosphere and life from solar and cosmic radiation. "Before the geomagnetic field came along, there would have been a high level of radiation, which may have had some effect on early life and atmospheric evolution," adds Smirnov.

Danford Moore, a geophysics major, began working with Smirnov during his first year at Michigan Tech, taking part in undergraduate research.

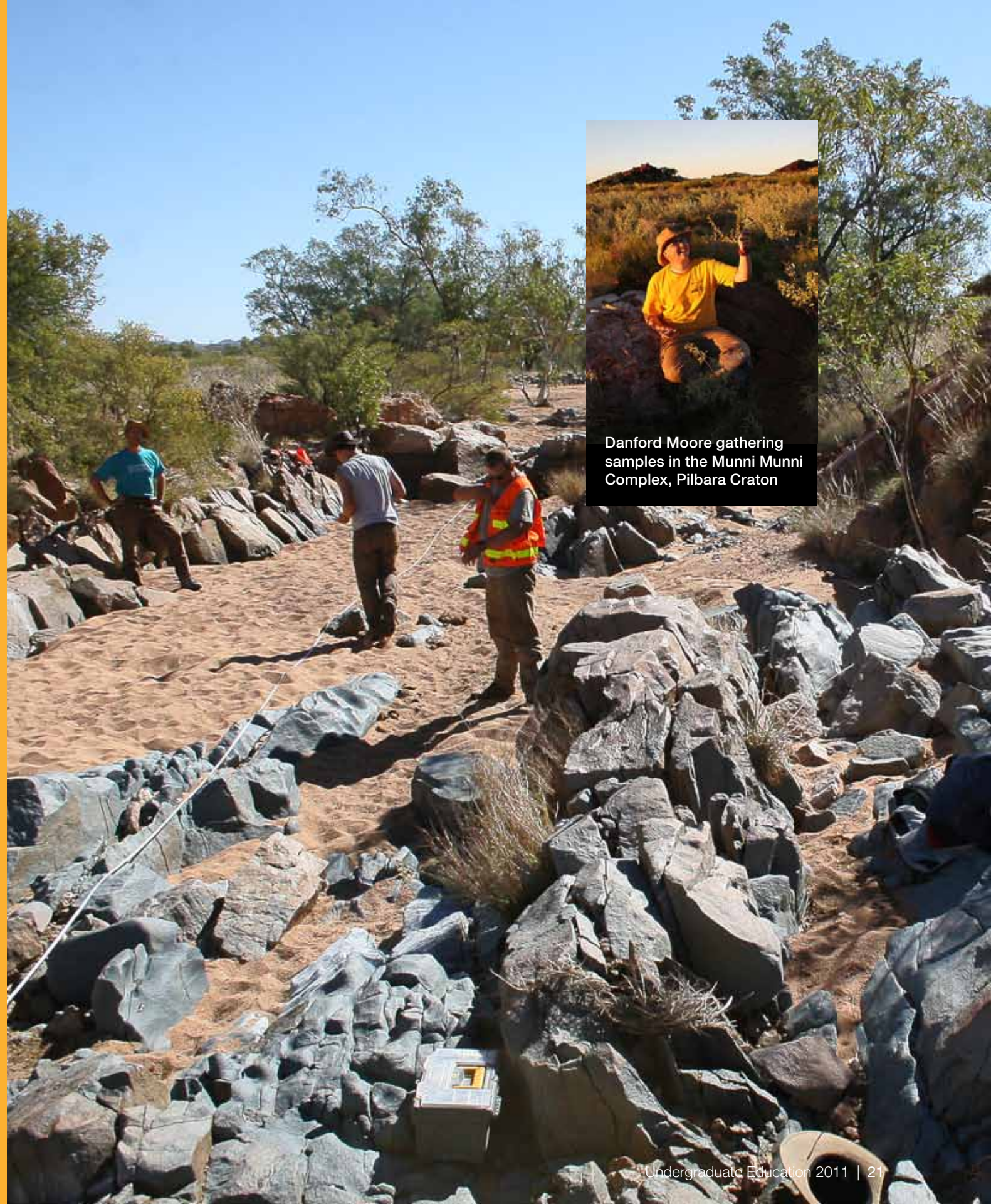
During the past few summers, Moore and Smirnov have camped in the Australian outback for about a month at a time, gathering samples of well-preserved, 2.7 to 3.5 billion year old, Precambrian rocks. On one trip, the two gathered 900 samples from the Pilbara Craton in northwest Western Australia.

"We do the majority of our field work in the middle of the desert," Moore explains. "The desert obviously brings to mind a complete lack of water, and for the most part this proved true for us. We use water for the normal things (i.e. drinking, cooking, cleaning, etc.), but we also use water-cooled drills to collect our core samples. When you collect nearly a thousand core samples over the course of a field season, you go through quite a bit of water, so a fair amount of our planning focuses on water availability.

"The outback is a beautiful and incredible place; however it is also very hazardous. Almost all creatures found in the desert are either venomous, or have the ability to rip you to shreds with bacteria ridden teeth and claws. I don't think there is a single critter in Australia that doesn't have the potential to kill, and that includes the cute ones...strike that, it especially includes the cute ones."

Once back on campus, Moore spends countless hours in the lab preparing and measuring the specimens. He has presented his results at an American Geophysical Union (AGU) meeting.

Moore, now a senior, plans to go on to graduate school. "I am very thankful for the opportunity to participate in undergraduate research, and I can't even begin to explain the impact it has had on my life."



Danford Moore gathering samples in the Munni Munni Complex, Pilbara Craton