Field Studies Class Summer 2016

By Maria Richards

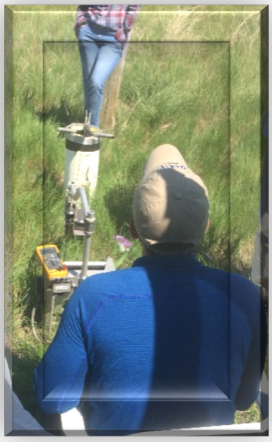
The 2016 Field Studies Class traveled to Colorado, Wyoming, Montana, Idaho, Utah and back through Colorado to Dallas. It was two weeks of learning about and collecting heat flow data, seeing and touching a billion years of rock outcrops, meeting with "real" geologists & geophysicists in the field from state and federal offices, exploring national parks, learning to back-country camp, and making lifetime friendships.

Yes, SMU Students discover from Faculty and Staff that even a rest stop is an opportunity to learn. For some reason most of them never knew that Jackalopes existed! From top to bottom s-curve: Maria Richards (staff), Ian Richards (faculty), Matt Hornbach (faculty), Stephanie Schwob (staff), undergraduate students: Courtney McCracken, Jesse Dawson, Tucker Zukowski, Alex Santos, Omar Abdelrazik, and masters student: Casey Brokaw.

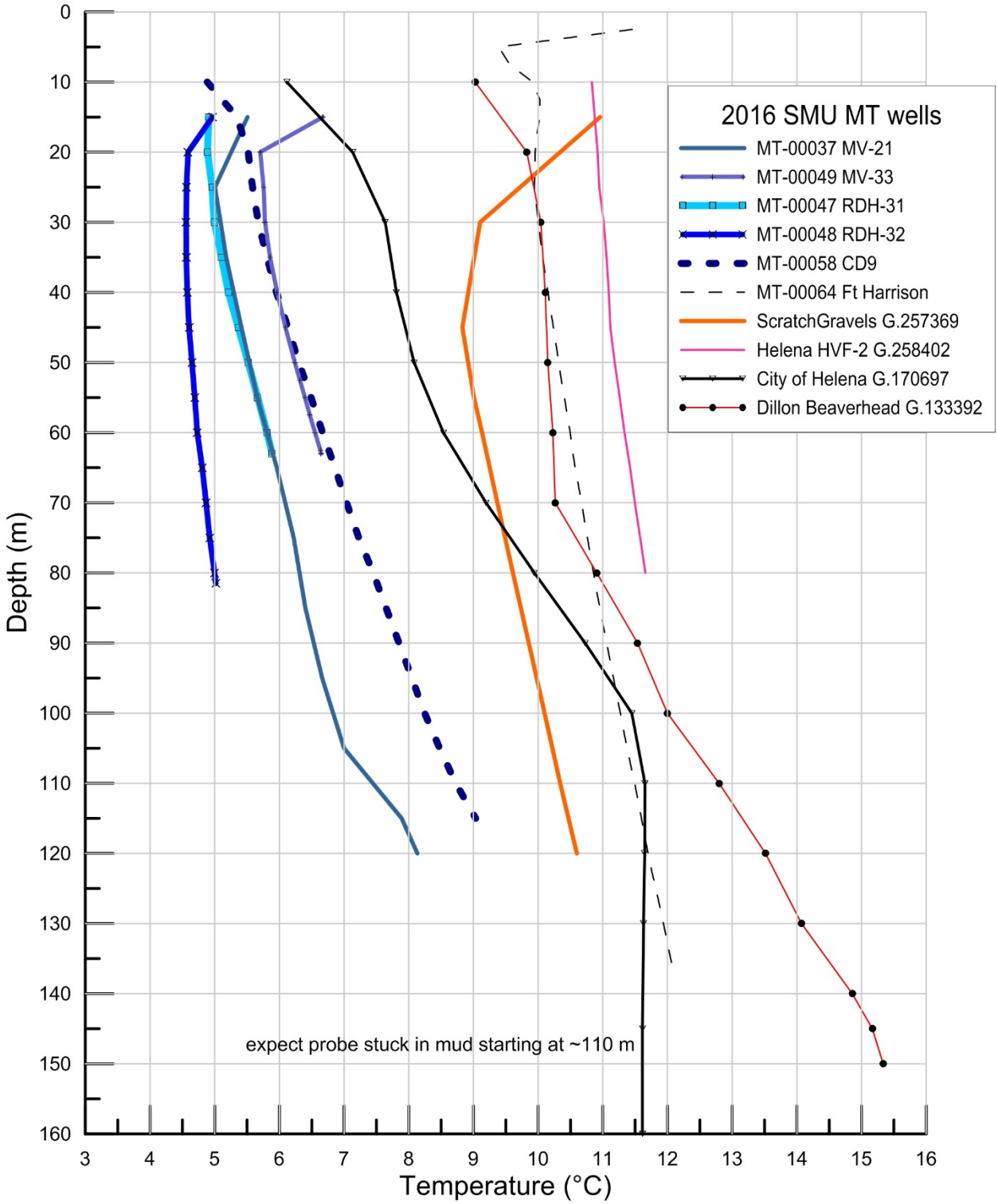
Ian Richards (faculty center) teaches students about the geologic history of the Wind River Canyon on US 20 as we are about to drive through.

The students and I were determined to see Old Faithful erupt, and we did. Tucker, Casey, Courtney, Omar, Jesse, and Alex are the best group of students I've traveled with yet. As a result of this trip, Tucker is now working on a Senior Thesis related to fluid flow through fractures and the impact on the shallow heat flow in the Cheyenne area. He is incorporating available oil/gas well log and lithology data to map deeper than we could measure.

This is where “on top of the world” exists: The Continental Divide just west of Marysville, Montana. This is also where Dave Blackwell and students in the 1970s drilled wells for a National Science Foundation research study of the radioactivity and heat flow of the area. Matt Hornbach and I are continuing to temperature log these same wells to study if we can detect climate change over the past 40+ years. Answer – yes. The next step is to forward model future climate conditions.



Well temperature logging took place in the Denver Basin near Sterling (CO), Cheyenne (WY), Laramie (WY), Saratoga Hot Springs (WY), Helena (MT), Marysville (MT), and Dillon (MT). Our probes are small enough to fit into a 1.5“ pipe and/or can be dropped into a 12” pipe with straighteners attached. Our cable lengths are 200 to 650 meters. The temperature precision is 0.001°C, providing an accuracy with depth included of 0.01°C. The Geothermal Lab uses probes built by Bob Spafford in the 1970s that have lasted all these years because students learned the importance of taking care of them, and because Bob built tools to withstand field work and everything that comes with it. Nevertheless, they were due for maintenance and repairs.



Examples of what the temperature logs look like from this trip at the Montana sites. Notice how cold the ground temperatures are even at 80 meters! 5°C = 41°F It was cold on the Continental Divide even in June. The warm swing at the top of these is from the surface air heating the top 20-30 meters of the air in the well. CD-9 and Fort Harrison are the two sites we are logging for climate change analysis.

Courtney McCracken, Alex Santos, Tucker Zukowski, Omar Abdelrazik, Ian Richards, [INL researchers: Travis McLing, Earl Mattson, Rob Podgorny] Matt Hornbach, Casey Brokaw, Jesse Dawson

Our early morning visit to Idaho National Lab in Idaho Falls was a surprising highlight. Dave Blackwell this, Dave Blackwell that, Dave, Dave, Dave .... so much of their data came from Dave and his students' decades of data collection and research in the Snake River Plain! The current students see Dave in the Geothermal Lab on Tuesdays, but never realized the significance of what he has accomplished. Plus students saw that geothermal research was important and the interesting lives led by those in the field.

Every student was assigned a geologic location to report on along the trip. We drove about 30 miles out of the way (on Interstate 70) to see the San Rafael Reef exposure (left). Being on the ground brought a book's information (right) to life. The Utah Department of Transportation knows that geologists want to get out of their vans to see more.

The Black Canyon of the Gunnison National Park in central Colorado was on top of the list of places to see since no one in the group had ever been there. We hiked to the edge of the rim in between rain and in the morning hiked the base along the river before heading to Great Sand Dunes National Park in southern Colorado. Our southern students felt much more comfortable on sand than snow. As it was the last day before the long drive home, they got to play.

Working with students and their heat flow data continues to be the most interesting research for me. If you want to see what collecting heat flow data on the Beaufort Sea looks like, check out the Geothermal Lab blog for more pictures and stories at http://blog.smu.edu/geothermallab/about-us/blog/.