



AT THE CORE

Word from the PI

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Technical Discoveries

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Outreach News

The Communications and Outreach team has grown, held a pilot contest for middle school students, attended public meetings in Beaver County, and got Utah FORGE featured in the University student newspaper!

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Announcements

- Congratulations to the winners of the Geothermal Song Parody Contest. First place has been awarded to Christian Kelley, Maddox Smith, Carson Cheney, Tanu Aaitui. The runner up is Nathan Costello. You can view the videos of the winning group and the runner up [here](#). Thank you Enel Green Power for your generous contribution that made this contest possible.

Word from the PI

Whenever you undertake a project the size and complexity of Utah FORGE, you're going to face challenges. We've certainly faced our share over the past few years - ranging from the COVID pandemic and its resulting restrictions to industry demands on the equipment and personnel.

Thankfully, the many dedicated teams working on the project are veterans in finding solutions. Their level of expertise, together with dedication, resourcefulness, and patience, has allowed us to consistently overcome these challenges successfully.

When the COVID pandemic hit, we faced a new reality. Travel restrictions caused fewer site visits, if any at all, but also increased the amount of virtual meetings; health concerns for site crews and the residents of Milford meant crews couldn't stay in local hotels. Instead, they lived in trailers on the site and underwent frequent testing. In fact, everyone

visiting the site had to meet strict COVID protocols.

Recently, a new challenge surfaced. Demand for drill rigs, site crews, and production shortages of manufactured drilling equipment has impacted our schedule of activities. Planned stimulation of well 16A(78)-32 was postponed for several months because of these limitations. However, we are confident we have overcome this challenge and expect the stimulation to begin shortly.

As life returns to some degree of "normalcy", we've been able to resume more in person activities. In March, I was happy to provide a tour to nineteen students and their professor from the University of Montana. Along with the Utah FORGE site, the students also had a chance to see some of the interesting geological sights in the surrounding area.

I'm also very excited about the pilot song parody contest we and our friends from Enel Green Power conducted in a science class at Milford High. You can read more about the contest in the Communications and Outreach section.

No matter what challenges come our way, we know that through our combined deep experience and commitment to innovation we'll always be able to find a way to be successful, and continue making progress every step of the way.



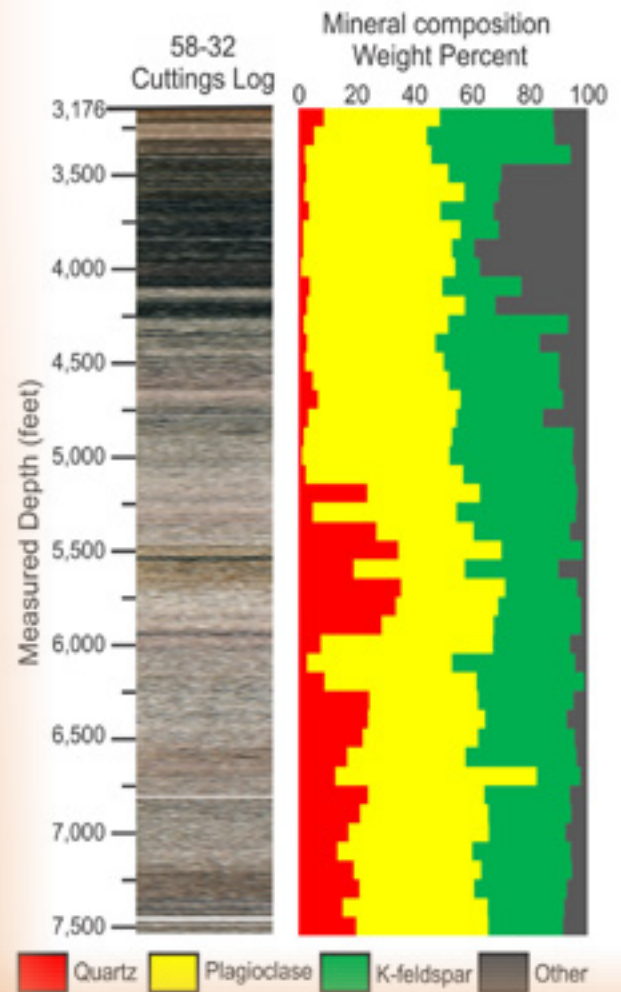
Technical Discoveries

Have you ever wondered what rocks lie below your feet? At the Utah FORGE site - the answer is hot granite.

There are ways to indirectly ‘see’ what lies below the surface using geophysical sensing techniques, but the only way to recover physical samples from thousands of feet below is to drill a well. The samples recovered allow us to directly measure the properties of the granites and give us an understanding of their history, from the time they crystalized from magma about 25 to 9 million years ago to today. Rock samples recovered during drilling come in two varieties: cuttings and core.

Cuttings are fragments of rock pulverized by the drill bit that are circulated back to the surface by a viscous drilling fluid. At the surface, cuttings are typically collected every 10 ft providing a semi continuous record of the rock types intersected by the well. In figure 1 you can see the color changes that reflect chemical/mineral changes. Despite these differences the granites are dominated by three minerals; quartz, plagioclase feldspar and K-feldspar, the most common minerals in the earth’s crust.

Core samples are cylinders of rock cut by a specialized drill bit with a hollow center. Due to the significant expense involved with coring operations only 151 ft of core have been recovered from 41,448 ft (7.85 miles) of drilling at Utah FORGE to date. Cutting core is time intensive due to the multiple ‘trips’ in and out of the well with long strings of drill pipe to cut the rock at depth and return it to the surface. A one way ‘trip’ can take 6 hours or more, depending on how deep the core is being recovered from. The deepest core retrieved at the Utah FORGE site comes from 10,987 ft



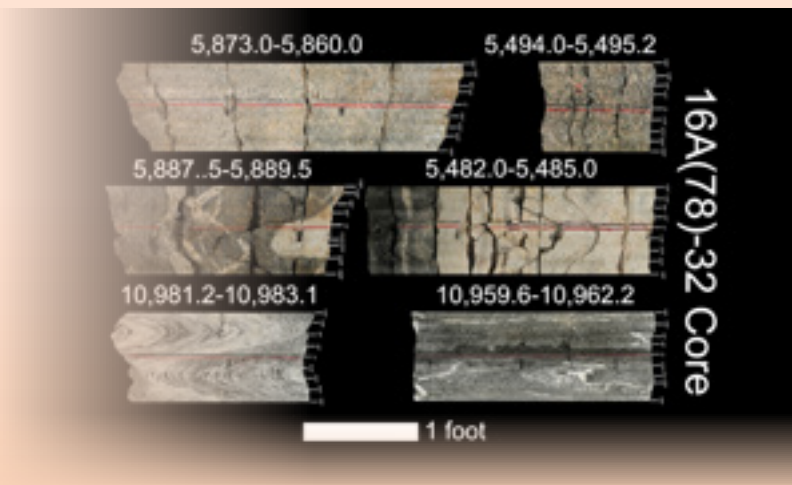
Cuttings and their mineral composition from well 58-32.

(over 2 miles) down a 7” well where temperatures reach almost 430°F. As seen in figure 2, the core samples come in a variety of colors and textures, reflecting differing compositions and histories. Those core samples provide invaluable insights into the physical and mechanical properties of the hot dry rock enclosing the Utah FORGE EGS reservoir.

Additionally, the drilling and recovery of rock materials permit correlation with outcrops on the surface. Thus we now know that the rocks

Technical Discoveries (continued)

exposed a few miles away in the Mineral Mountains to the east are identical to the ones appearing in the cores and cuttings. This means we can study other aspects like fracture patterns in the Mineral Mountains to determine their character beneath Utah FORGE. The other key point is that granitic rocks make up the basement rocks for most continental landmasses, thus what we are learning at Utah FORGE will help to unlock the energy giant that lies everywhere beneath our feet.



Cores recovered from well 16A(78)-32.

Featured Publication

“In-situ Stresses and Fractures Inferred from Image Logs at Utah FORGE.”

Pengju XING, Andy WRAY, Edgar Ignacio Velez ARTEGA, Aleta FINNILA, Joseph MOORE, Clay JONES, Erik BORCHARDT, John MCLENNAN.

Find the full publication [here](#).

Check out the [publications page](#) on the Utah FORGE website for more!

Modeling and Simulation Forum

Now called the UTAH FORGE M&S COMMUNITY UPDATE

New format in 2022:

Registration details are available on the [Modeling and Simulation page](#)

Next Monthly Community Update is April 20.

Media Corner

A [short glimpse at the area](#) around the Utah FORGE site and its renewable resources; geothermal plant, natural hot springs, wind, solar, and biomass.

A [unique time lapse of activities](#) during drilling of the first deep deviated well 16A(78)-32 with a 360 deg view around the Frontier Drilling rig and the site. (Best viewed in the YouTube App.)

Outreach News

Over the past few months, the Communications and Outreach team has grown, held a pilot contest for middle school students, attended public meetings in Beaver County, and got Utah FORGE featured in the University student newspaper!

Utah FORGE has been incredibly lucky when it comes to finding amazing student interns. Recently, joining us is Surbhi Ghodke, a first-year graduate student in the U's School of Architecture and Planning, who's creating fantastic images and graphics for the project. She says she's excited to be working with us because of the promising EGS research that will hopefully lead to more clean and renewable energy. In her free time, Surbhi loves to travel, visit architectural landmarks, sketch, and watch Netflix documentaries. Welcome aboard!

Committed to helping students better understand concepts of geothermal energy in an informative and fun way, we partnered with our friends at Enel to hold a pilot parody song contest at Milford High School! Working in teams, middle schoolers in Mr. Taylor's science class submitted short music videos, replacing the lyrics of popular songs with their own lyrics incor-



porating geothermal terms. The budding songsters were helped with an in-class visit from Enel experts, information from Utah FORGE, and a field trip to the Cove Fort geothermal plant. In April, at the Milford City Council meeting, the winners will be presented with iPads, courtesy of Enel.

Speaking of Milford, on March 15 we attended community meetings to provide updates to the County Commission and the City Council. Among those who attended were staff members of U.S. Rep. Chris Stewart, Beaver City officials, and Utah state Senator Evan Vickers. The Commissioners and Councilmembers reiterated their continued support for the project.

There are nearly 33,000 students attending the University of Utah. With so much happening around campus, many of them aren't aware of the important research being conducted on topics outside of their own field of study. Thankfully, they all had a chance to learn a little more about the Utah FORGE project and the research in a recent story in [The Daily Utah Chronicle](#), the student newspaper.

As always, join us on social media to stay up-to-date on all the happenings at Utah FORGE!



Partner Spotlight

Enel is a clean energy leader and innovator that's electrifying the economy in North America with a mission to combat the climate crisis and build a low-carbon future. For over 20 years, Enel has advanced the economic, social and environmental benefits of clean electrification in the US and Canada.



[Read More](#)

Upcoming Events



April 19-23, 2022

**SSA
ANNUAL
MEETING**

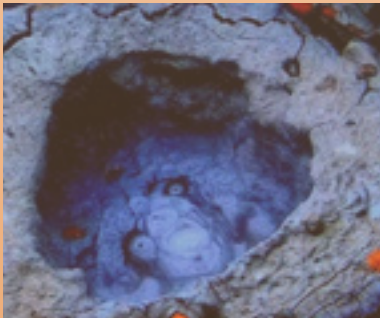
[Bellevue, WA](#)



June 26-29, 2022

**56TH US ROCK
MECHANICS /
GEOMECHANICS
SYMPOSIUM**

[Santa Fe, NM](#)



August 28-31, 2022

**GEOTHERMAL
RISING
CONFERENCE**

[Reno, NV](#)



April 17-21, 2023

**WORLD
GEOTHERMAL
CONGRESS**

[Beijing, China](#)

Down the Pipe at the Site

- Stimulation of well 16(78)-32 begins mid-April
- Drilling of the second deep deviated well is planned for the end of 2022.

