OCTOBER 2020

UTAH FORGE
NEWSLETTER

AT THE CORE

Word from the PI

Utah FORGE is entering the most exciting stage of the project as drilling of the first deviated deep well will start in October.

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Technical Discoveries

Site activities are ramping up as the long-anticipated drilling of the first of two highly deviated wells is about to begin. Professor John McLennan and the Utah FORGE Drilling Team has been planning the drilling behind the scenes.

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Outreach News

Tamara Young is excited for the opportunity to work with the Utah FORGE project on education and outreach. Climate change is perhaps the most critical issue of our time, and geothermal energy plays an important role in addressing this issue.

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Announcements

Upcoming October, Utah FORGE will begin drilling of the 16A(78)-32 that will reach a true vertical depth of 8,480 ft. The structure is planned to be drilled vertically 5,940 ft into the ground, and then at a 65o to the east-southeast to a measured depth of approximately 10,800 ft. This well will be used as an injection well for the Utah FORGE project, one of the major structures for the FORGE laboratory.

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Word from the PI

Utah FORGE is entering the most exciting stage of the project as drilling of the first deviated deep well will start in October (see Technical Discoveries section). This is a key asset for trialing and proving EGS technologies, and while such deviated wells are frequently drilled in soft layered rocks for oil and gas production, this is one of the first attempts in hot, hard crystalline granite. It is the first big challenge for the project, and while we have much to learn, the drilling team has the expertise and the resources for success.

I also want to let you know about the continued strong support from the local community. In mid-September, we were warmly received in meetings with officials and stakeholders in Beaver County and Milford city, in which we provided an update on upcoming activities, including the plans for drilling wells, stimulation and monitoring induced seismicity.

Lastly, the Solicitation for R&D is progressing on schedule through the combined efforts of the Utah-based team and the DOE Geothermal Technologies Office. External reviewers are currently assessing the applications, and the results will be announced late this year.

Utah FORGE is forging ahead!

Modeling and Simulation Forum

The fourth Utah FORGE Modeling and Simulation Forum held on August 19th discussed the development of coupled well hydraulics and reservoir hydraulics simulations. These simulations are part of the preparation process for conducting long-term operational simulations of the FORGE reservoir, where multistage stimulation and limited entry are anticipated in the injection well. Robert Podgorney and David Andrs of INL presented "Coupled Simulations of Well and Reservoir Thermal Hydraulics," in which they gave a summary of the well flow simulator, numerical coupling between the well and the reservoir, and a few preliminary examples.

Upcoming Forums:

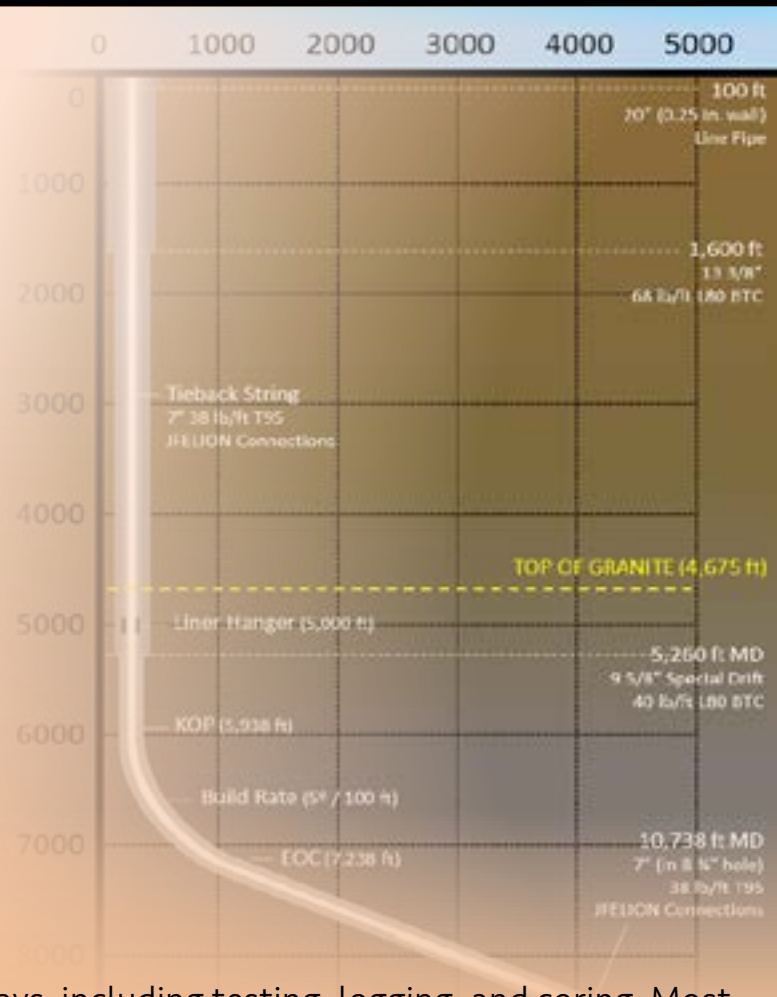
October 28 - Back Analysis of Injection Tests in Zone 2 on Well 58-32

December 16 - information TBD

Find out More

Technical Discoveries

Site activities are ramping up as the long-anticipated drilling of the first of two highly deviated wells is about to begin. Behind the scenes there has been a huge amount of planning by the Utah FORGE drilling team, which is led by Professor John McLennan (Department of Chemical Engineering, University of Utah), with strong support from experienced drilling engineers and field specialists, including Bill Rickard (Geothermal Resources Group) and Duane Winkler (consultant). The drill rig (Figure 1) will arrive by the first week of October, and it will take about two weeks for assembly before the drilling can commence.



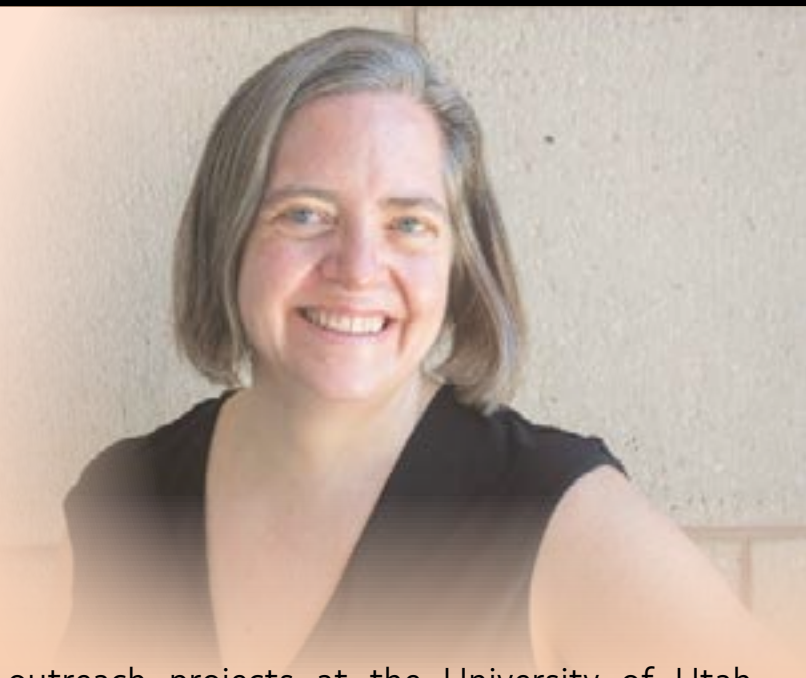
The upper part of the well will be drilled vertically through approximately 4700 feet of soft sediments at which point it will cross the basement contact and penetrate into hard crystalline granite that hosts the reservoir. At about 5000 feet, the well will be "kicked off" and steered gradually at 5°/100 ft until it reaches an inclination of 65° from vertical. The total length of the well will be about 11,000 ft, with the toe being located at a vertical depth of 8500 ft. The granite in the reservoir is very hard, abrasive and hot at 225°C (437°F). Drilling will be slow, taking roughly 140 days, including testing, logging, and coring. Most of the hole will be cased with steel pipe that is cemented in place, and only a short interval at the toe will be open (Fig. 2).

Once the well is completed, a series of tests will be run to facilitate the development of the EGS reservoir. For example, in-situ stress conditions will be determined from short term injection experiments, during which microseismicity will be carefully monitored, and the orientation and distribution of the fractures in the granite will be interpreted from a Formation MicroScanner Image (FMI) log. Integration of all these results, along with other R&D activities, will be used to plan the second deviated well.

Data Archive

Use Data Dashboard or search GDR for research data and other information important to the Utah FORGE project.

Outreach News



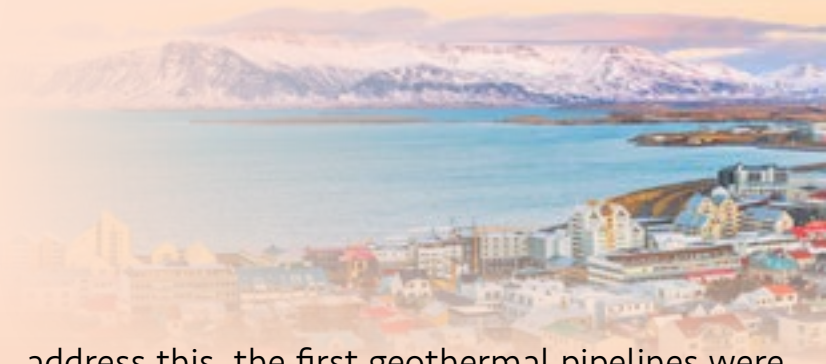
Tamara Young is excited for the opportunity to work with the Utah FORGE project on education and outreach. Climate change is perhaps the most critical issue of our time, and geothermal energy plays an important role in addressing this issue. Tamara is a non-traditional graduate student in the Department of Physics & Astronomy, studying Physics Education Research with Professor Lauren Barth-Cohen in the Department of Educational Psychology. Tamara has worked as a teacher and educator for more than 20 years teaching multiple areas of science at the middle-grades, high school, and college levels in rural, urban and online settings. They have also collaborated in a variety of STEM outreach projects at the University of Utah. Tamara earned their Master's degree in Physics from the University of Utah and their Bachelor's degree in Physics from Utah State University. With their background in education and science, their passion for outreach, and concern about the climate crisis, Tamara hopes to be able to make a significant and meaningful contribution to the goals of the Utah FORGE project.

Solicitations

The review of full applications is in progress and on track, with selection notifications being expected in about two months. To recap, the Solicitation announcement was issued April 30 and full applications were submitted by August 10. The Solicitation covers 5 topic areas, including zonal isolation, estimation of stress parameters, characterization of reservoir stimulation and evolution, stimulation and well configuration, and integrated laboratory and modeling studies. Up to 19 contracts are expected to be awarded for a total maximum amount of $46 million.

InfoReady & FORGE Solicitations Webpage

Did You Know?



Did you know that the city of Reykjavík, the capital of Iceland, is widely recognized for its geothermal energy?

Many first think of the word 'ice' when hearing Iceland, but surprisingly Iceland is also known for its use of Earth's heat. Due to its geological location directly on the mid-Atlantic ridge, it is constantly supplied by an enormous amount of underground magmatic and geothermal heat. The literal translation of Reykjavík is "steamy bay" that comes from the steam discharge associated with natural geothermal activity.

Aware of the underground heat available, Icelanders have learned to adapt to their environment. Since the arrival of the first Scandinavian settlers in the late 800s, Icelanders have utilized geothermal sources for bathing and cooking. One of their popular traditional foods, Hverabrauð, is a bread loaf cooked in the steam from a geyser for 24 hours. Up into the early part of the 20th century, coal was the main source of energy and air pollution was a serious problem. To address this, the first geothermal pipelines were installed in 1934, and since then Reykjavík has been continuously expanding geothermal utilization. Reykjavík now has the largest district heating system in the world (700 MWthermal), which is run by Orkuveita, and more than 60 million cubic meters of hot water flow through the distribution system. Hot water supply comes from low temperature geothermal areas around Reykjavik and from high temperature geothermal fields in the Hengill area to the east of the city. These hotter resources are mainly used to generate electricity, but a significant amount of heat also supplies the district heating scheme. The combination of geothermal fields and hydroelectric dams means that more than 99% of all the electricity used in Iceland comes from renewable sources.

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Lectures and Podcasts

Utah FORGE has published first episodes of FORGE Webinars and Podcasts. The first webinar featured Dr. Stuart Simmons, a geoscientist on the Utah FORGE team, to discuss the role of geology in geothermal energy production and talk about concepts of heat transfer, enthalpy, and power. In our first podcast, our host Chris Katis discussed what geothermal energy is and how it is used today with our co-host Dr. Stuart Simmons.

New episodes of Utah FORGE Webinars and Podcasts will be published on the Utah FORGE website and shared on our social media. Check back regularly to find out more about our project and geothermal energy!

Partner Spotlight

Jim Rutledge is part of the Utah FORGE seismic monitoring team lead by Dr. Kristine Pankow at the University of Utah. He brings to the Team an expertise in downhole seismic instrumentation and the monitoring of reservoir microseismicity induced during injection stimulations.

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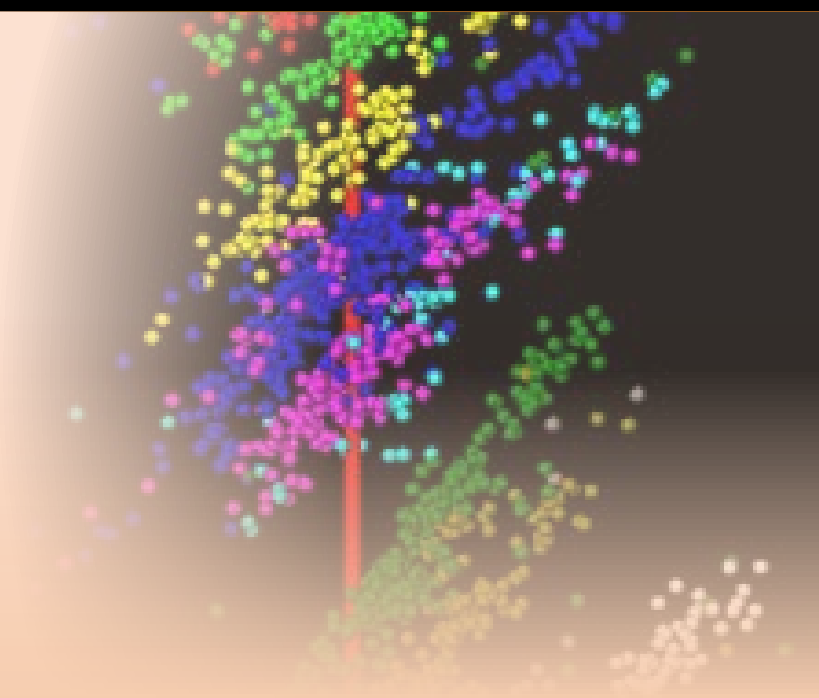

Upcoming Events

October 18 - 23
2020 Annual GRC Meeting

Virtual

October 26
Utah Governor's Economy & Energy Summit

Salt Lake City, Utah

November 9 - 13
Week of STEM

Virtual

November 13 - 16
AIChE Annual Meeting & Student Competition

Virtual