



# AT THE CORE

## Word from the PI

The last few months have been an exciting time for the Utah FORGE team. Two new deep wells were completed and the University of Utah entered contract negotiations with 17 R&D selectees.

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## Technical Discoveries

The drilling of 16A(78)-32, our first highly deviated large diameter well, was a great success. A first of its kind in geothermal, completed in record time, exceeding expectations by 40%!

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## Outreach News

Students of Professor Sara Yeo developed a survey to better understand the public's knowledge of geothermal energy. The Utah FORGE team has grown, welcoming two University of Utah students, Laurie Larson and Téa Schmid!

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## Announcements

Well 56-32, used for deployment of seismic sensors during stimulation experiments, was successfully completed. Reaching a total depth of 9,145 ft, it was completed about 2 weeks ahead of schedule. According to Reed Hycalog, the bit manufacturer, the drilling set a record for a bit run of 1,208 ft in 53 hours.

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## Word from the PI

The last few months have been an exciting time for the Utah FORGE team. Two new deep wells were completed – setting records for rates of penetration – electricity was brought to the drill pads, presentations were given to elected state and federal officials, and negotiations between R&D project managers and the University of Utah were initiated.

Well 16(32)-32 was completed in mid-January. This is the first of the two wells that will be used to create the reservoir and circulate fluids through it. It is also the first highly deviated, large diameter well drilled into hot, hard granite for geothermal applications. It reached a length of 10,987 ft and a vertical depth of 8,561 ft relative to the rotary table.

Drilling rates exceeded expectations by 40%. In a few months we will open fractures near the toe of the well where temperatures are expected to be near 445°F.

Well 56-32 was completed shortly after well 16A(78)-32. Applying the lessons learned from previous drilling, rates of penetration again exceeded expectations. Well 56-32 was drilled to a depth of 9,145 ft. This is the deepest and hottest well drilled yet at the Utah FORGE site. The temperature at the base of the well is expected to be close to 450°F.

Because drilling can account for as much as 45% of the total cost of a geothermal project, improving drilling rates can have a large impact on the total project cost.



## Modeling and Simulation Forum

The M&S forum has been scheduled for April 21, 2021. Click [here](#) to register!

Topic: An overview of Modeling and Simulation related to FORGE Research Awards

Presenter: Rob Podgorney (INL)

Check the [website](#) for more updates!

## Featured Publication

**“High-resolution Bayesian spatial autocorrelation (SPAC) quasi-3-D Vs model of Utah FORGE site with a dense geophone array”**

Hao ZHANG, Kristine PANKOW (2021)

Find the full publication [here](#).

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

## Technical Discoveries

The drilling of 16A(78)-32, our first highly deviated large diameter well, was a great success. A first of its kind in geothermal, it was completed well ahead of schedule. Significantly, it provided a critical need for refining drilling methods and reservoir characterization techniques.

For example, the promise of polycrystalline diamond compact (PDC) bits was demonstrated. Part of this success stems from changing the bit design by moving from 16 mm to 13 mm cutters (the points on the bit) and eliminating torque control components to reduce vibration.

Additionally, motor fits, agitation, and stabilizer configurations were adjusted to optimize the rate of penetration, minimize torque and drag, and improve time on bottom. Vibration data were also collected in real-time. “Physics-based drilling” played a significant role as well, which



incorporates monitoring, evaluating, and mechanical specific energy (MSE) calculations. Daily direct communications between specialists (Scout Technologies), Texas A&M University researchers, and rig supervisors were a critical asset.

We used Schlumberger’s Petromac taxi and Thru-bit’s logging system. The taxi conveyed tools down the subhorizontal lateral and the Thru-bit system meant that circulating fluids could be used to keep the tools cool. The results will be used to model and plan upcoming operations where stimulation at the toe will be carried out to create hydraulic networks to establish a heat exchange system.



## Data Archive

Utah FORGE has released an online [Data Dashboard](#)! Easily access all of Utah FORGE research data by visiting our intuitive, user-friendly, “one stop” compendium to find all the data, interactive tools, and other information important to the Utah FORGE project all at your fingertips.

## Outreach News

In the Fall Semester of 2020, students in Professor Sara Yeo's Capstone course in the University of Utah's Department of Communication, developed a survey focused on individuals' awareness, knowledge, and opinions of geothermal energy. The survey data are in, and the preliminary results are encouraging.

The initial data indicate that 45% of respondents support the use of geothermal energy, 47% see geothermal as beneficial and 28% support EGS. That's especially encouraging since only 16% felt they are well informed about EGS.

The responses gathered from participants living in Utah mostly mirrored those of people living in the other ten western states in which the survey was conducted. One interesting difference: Utahns were more than twice as likely to believe that EGS could potentially make geothermal energy accessible across the U.S., 55% compared to 23%.

The survey responses are now being analyzed by Dr. Yeo and her colleagues. We'll use these data as a baseline to measure the efficacy of our out-



reach and communication efforts going forward.

Utah FORGE's team has grown! We're excited to have two interns from the University of Utah join us. Laura Larson is majoring in Film and Media Arts, with an emphasis on Animation. She'll be working on a variety of visuals to help tell the Utah FORGE story. Additionally, Téa Schmid, who is majoring in Communications with an emphasis in Strategic Communications, will be helping create content for the website and social media. Welcome aboard, Laurie and Téa!

## Solicitations

The Federal Review Panel accepted 17 proposals across five topics in Solicitation 2020-1. Utah FORGE and the selectees have now entered into contract negotiations.

To see the full list of awardees for each topic visit the [Utah FORGE Solicitations page](#).



## Partner Spotlight

Celebrating its 10th anniversary this year, Geo-Energie Suisse AG (GES) is a Swiss company focused on deep geothermal energy for electricity and heat production. The founding members include municipal utilities and regional energy supply companies from all over Switzerland. Geo-Energie Suisse employs ten people, and it is also supported by numerous external specialists.

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## Upcoming Events



April 19 - 30, 2021

**EUROPEAN  
GEOPHYSICAL  
UNION GENERAL  
ASSEMBLY**

[Virtual](#)



April 19 - 23, 2021

**SEISMOLOGICAL  
SOCIETY OF  
AMERICA ANNUAL  
MEETING**

[Virtual](#)



May 21-26, 2021

**WORLD  
GEOHERMAL  
CONGRESS**

[Virtual](#)



June 20-23, 2021

**55TH US ROCK  
MECHANICS /  
GEOMECHANICS  
SYMPOSIUM**

[Houston, TX](#)

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