DEEP
Innovation for:
De-Risking Enhanced
Geothermal Energy Projects

Agenda DEEP 2022 Annual Meeting

28 – 30 September 2022, Salt Lake City, Utah (USA)

Preamble

DEEP project	
Project acronym	DEEP (Innovation for **D**e-risking **E**nhanced Geothermal **E**nergy **P**rojects)
Date	28.09.2022 – 30.09.2022
Venue	Room 206, Crocker Science Center
COVID Regulations	None, Masks are optional for the buildings on Campus

Dear DEEP participants,

We are happy to share with you the agenda for the 3 days meeting on 28-30 September in Salt Lake City, Utah. We are grateful that now the Covid situation and regulations allow us to meet in person and are very excited to hold this meeting in Salt Lake City, Utah.
The key objectives of the meeting are:

1) To update everybody on what has happened in the tasks and WPs in the past 12 months.
2) To plan the next 12 months, the most critical time for DEEP, when we need to wrap up our activities and to ensure a lasting impact beyond DEEP. This implies a strong focus on highlights and operational services.
3) To look beyond DEEP, connect what we do to other ongoing and upcoming projects in our domain and discuss interesting science.
4) To network, exchange and enjoy an in-person meeting in a nice location - especially for early career scientist that may not have had a chance to meet much in person.

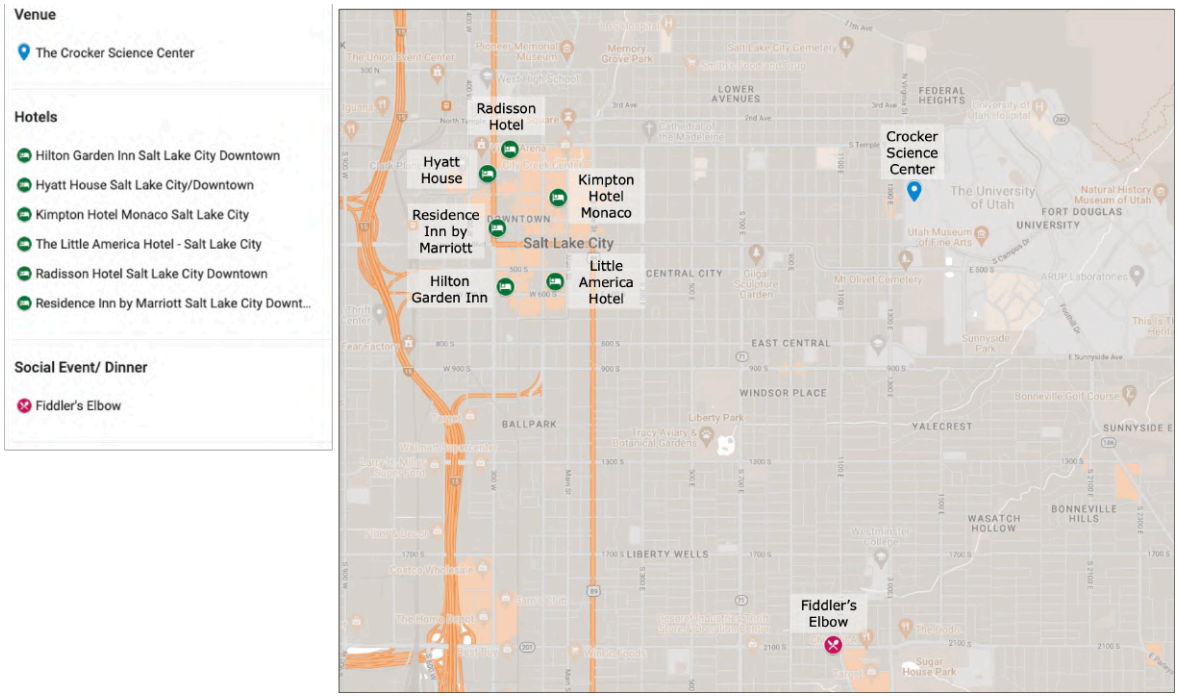
We would like to thank you our local organizer (Kris Pankow and her team) from the University of Utah that have found great locations for the meetings and social events.
To meet the objectives, we plan short presentations that look back and look forwards, interactive and cross-cutting discussion rounds as well as relevant outside perspectives. We plan also a field trip to the FORGE site and the Blundell Power Plant at the beginning of the meeting, this is a friendly time for networking while visiting the demonstration site at the core of the DEEP activities. The next few pages explain the locations of the venue and events as well as include a list of hotels nearby. For the actual agenda, please jump to page 5. Your feedback and suggestions are highly appreciated.

Looking forward to meeting you all in Utah!

Federica, Stefan & Banu

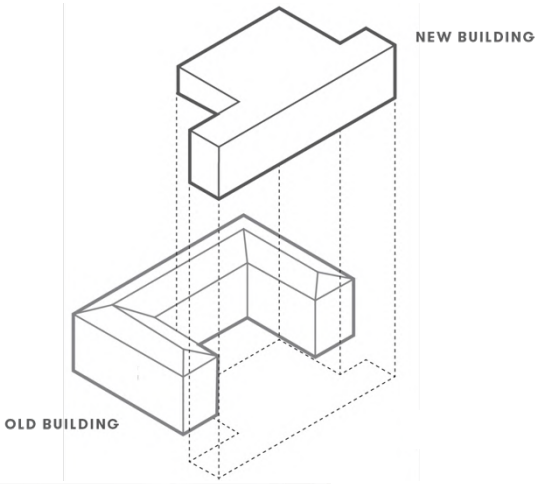
This project has been subsidized through the Cofund GEOTHERMICA, which is supported by the European Union's HORIZON 2020 programme for research, technological development and demonstration under grant agreement No 731117.

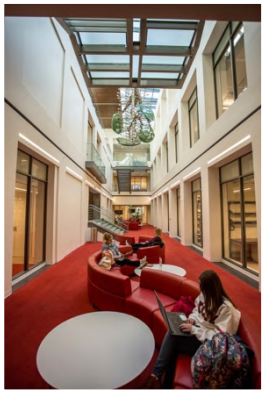
Location of Venue & Social Events on Map



Location & Transportation

Venue: Crocker Science Center (old Museum of Natural Science) – Room 206
Address: 1390 Presidents' Cir Crocker Science Center, Salt Lake City, UT 84112, United States
Website: https://www.holmes.us/portfolio-articles/crocker-science-center/





The meeting venue is located ca. 4 km from Downtown Salt Lake City.
UTA TRAX is Salt Lake Valley's light rail system. It has three main lines – the Red, Green and Blue Line. The Crocker Science Center is located in the premises of the University of Utah campus. To reach the meeting venue from downtown, board the Red Line at Courthouse stop and get off at Stadium Station. Alternatively, take the bus (2 or 220) and get off at U President`s Circle (NB Stop B/C). To reach the venue from the Airport, take the Green Line to Court House and transfer to the Red Line to University. The one-way fare to and form the airport is $2.50.

Taxi and shuttle services/share rides are also available at the Ground Transportation desk at the Airport terminal.

Field Trip on Day 1: Field trip to the FORGE Site (led by Joe Moore)
The plan is to visit the Opal Mound Fault, the Blundell Power Plant, the site of the former Roosevelt Hot Springs resort, and the FORGE site.




**Please wear sturdy shoes (no open toes) and long pants and have a long sleeve shirt and a hat. Note that it can get really windy. Hard hats and safety glasses will be provided, but if you have your own, please feel free to bring them along.

Social Event on Day 2: Dinner at Fiddler's Elbow
Address: 1063 East 2100 South, Salt Lake City, United States
Website: https://fiddlerselbowslc.com/


List of Accommodations options near the event venue
There are many hotels or Airbnb in Salt Lake City, and most of you prefer to book online. We have not made reservation, but we do list a few hotels that are well located. All of the following accommodations are available at booking.com or other search engines:

1. Little America Hotel - Downtown
2. Radisson Hotel – Downtown
3. Kimpton Hotel Monaco Salt Lake City – Downtown
4. Residence Inn by Marriott Salt Lake City Downtown
5. Hilton Garden Inn Salt Lake City Downtown
6. Hyatt House Salt Lake City Downtown

Agenda

Wednesday 28 September 2022

Field Trip to FORGE site (lead by Joe Moore) – Full Day

Transportation as well as lunch boxes will be provided.

Thursday 29 September 2022

Innovation in sensors, real-time monitoring and big-data analysis for EGS

8:00 – 8:30	*Coffee/ light early breakfast*	
8:30 - 8:40	Welcome to Utah Campus by the VP of Research and the Deans of the College of Science and College of Mines and Earth Science	(Univ. of Utah)
8:40 - 8:45	Welcome by Project Coordinator	Stefan Wiemer (ETH)
8:45 – 8:50	**WP1 Introduction: where do we stand?**	Remi Fiori (EOST)
8:50 – 9:15	"An Assessment of the Performance of High Temperature Digital Geophones and Fibre Optic Seismic Sensors During the FORGE 16A Stimulation, April 2022"	Ben Dyer (GES)
9:15 – 9:40	"Contribution of mini-seismic arrays and dense network of low-cost stations for the induced micro-seismicity monitoring"	Remi Fiori & Jean Schmittbuhl (EOST)
9:40 – 10:00	"Overview and first results of passive seismic broadband network in the Lower Rhine Graben, Germany"	Claudia Finger (IEG)
10:00 – 10:30	*Coffee break*	
10:30 – 10:35	**WP2 Introduction: where do we stand?**	Claudia Finger (IEG)
10:35 - 10:50	"Using machine learning for microseismic event detection and phase picking: model comparison and evaluation on FORGE dataset"	Peidong Shi (ETH)
10:50 - 11:05	"Building a twin digital dataset for FORGE: numerical simulations of seismic wave propagation"	Claudia Finger (IEG) & Laura Ermert (ETH)
11:05 - 11:20	"Full wavefield modelling of DAS cable and ground coupling response using Discrete Particle Schemes"	Nicolas Celli (DIAS)
11:20 – 11:35	"A semblance-based microseismic event detector for DAS data"	Francesco Grigoli (UNIPI)*
11:35 – 11:50	"Characterisation of microseismicity at FORGE with DAS"	Katinka Tuinstra (ETH)
11:50 – 12:05	"Subsurface monitoring using seismic ambient noise and earthquakes"	Hongrui Qiu (LBL)
12:15 – 13:45	*Lunch break*	
13:45 – 14:15	*Industry perspective* - Haute-Sorne EGS Project, Switzerland	Peter Meier (GES)
14:15 – 14:45	*Industry perspective* - Strasbourg sequence, France	Jean Schmittbuhl (EOST)
14:45 – 15:45	All WPs discussion, next steps and planning	Moderator: F. Lanza

15:45 – 16:15	*Coffee break*	
16:15 – 16:40	*Outside view (FORGE focus)* – FOGMORE and FOAL projects	Jonathan Ajo Franklin (RICE)*
16:40 – 17:05	*Outside view (FORGE focus)* – "Seismic Monitoring During the 2022 Utah FORGE Stimulation"	Kris Pankow (UUTAH)
17:05 – 17:30	*Outside view (FORGE focus)* – "Drilling and Stimulation Activities at Utah FORGE"	John McLennan (EGI-UTAH)
19:00 – 21:30	*Organized Dinner at Fiddler's Elbow*	

** (online)*

Friday 30 September 2022

Innovation in forecasting models and risk management for induced seismicity

8:00 – 8:30	*Coffee/ light early breakfast*	
8:30 – 8:35	**WP3 Introduction: where do we stand?**	Federico Ciardo (ETH)
8:35 – 8:50	"An update on hybrid induced seismicity models"	Corinne Layland-Bachmann (LBL)
8:50 – 9:05	"A coupled hydro-mechanical-statistical approach for modelling induced seismicity in fractured media"	Federico Ciardo (ETH)
9:05 – 9:20	"Machine Learning models for forecasting induced seismicity"	Arnaud Mignan (Mignan Risk Analytics)
9:20 – 9:45	*Outside view* – "Statistical forecasting of earthquake swarms"	Nicholas Van der Elst (USGS)
9:45 – 10:15	*Coffee break*	
10:15 – 10:20	**WP4 Introduction: where do we stand?**	Federica Lanza (ETH)
10:20 – 10:35	"Probabilistic seismic risk assessment for the FORGE EGS site"	Iason Grigoratos (ETH)
10:35 – 10:50	"Elastic characterization at FORGE: P-wave tomography and VSP subsurface imaging"	Hongrui Qiu (LBL)
10:50 – 11:05	"ATLS in action: testing the real-time workflow during the FORGE 16A Stimulation, April 2022"	Federica Lanza & Antonio Pio Rinaldi (ETH)
11:05 – 11:10	**WP5 Introduction: where do we stand?**	Federica Lanza (ETH)
11:10 – 11:25	"An overview of the draft general guideline"	Annemarie Muntendam-Bos (TUD)
11:25 – 11:40	"Public perceptions of EGS"	Julia Cousse (UNIGE)*
11:40 – 12:05	*Outside view* – "Induced seismicity red-light thresholds for enhanced geothermal prospects in the Netherlands"	Ryan Schulz (STANFORD)
12:15 – 13:45	*Lunch break*	
13:45 – 14:15	Swiss perspective	Stefano Benato (BFE)
14:15 – 15:45	All WPs discussion, next steps and planning	Moderator: S. Wiemer
15:45 – 16:00	*Goodbye coffee*	

** (online)*