

#DatafyingEnergy

From October 2, 2023



2023 SPE Europe Energy GeoHackathon



Italian Section



Netherlands Section



London Section



Romanian Section



Croatian Section



Central Ukraine Section



Geothermal Technical Section



Data Science and
Engineering Analytics
Technical Section

2023 SPE Europe Energy GeoHackathon

Organizing Committee



Laura Precupanu

SPE Europe Region



Central Ukraine Section



Croatian Section



Italian Section



London Section



Netherlands Section



Geothermal Technical Section



Romanian Section



Data Science and
Engineering Analytics
Technical Section



Pejman
SHOEIBI OMRANI



Mike
GUNNINGHAM



Laura
PRECUPANU



Gabrijel
GRUBAČ



Javad
SHOKRI



Luca
MOTTI



Johannes
REHLING



Stefan
CARPENTIER



Alexandr
MOCANU



Marius
NIȚU



Boris
VIDOŠ



Kanad
KULKARNI



Taras
POPADYNETS



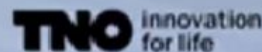
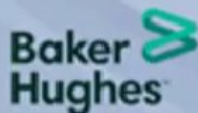
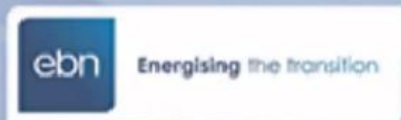
Pavel
KAZAKOVTSEV



Junichi
SUGIURA

2023 SPE EUROPE GEOHACKATHON

OUR SPONSORS



HISTORY OF SPE EUROPE GEOHACKATHON

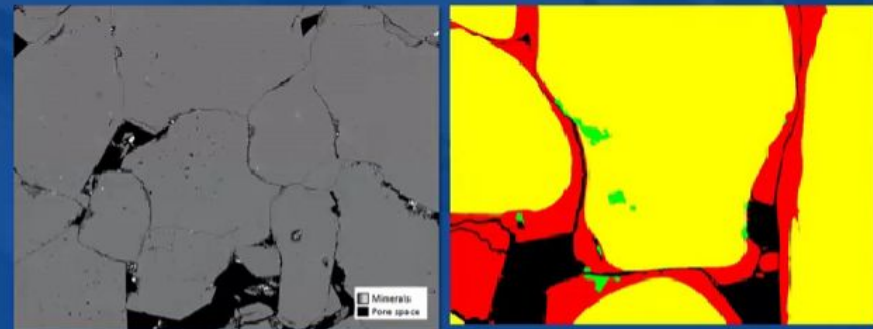
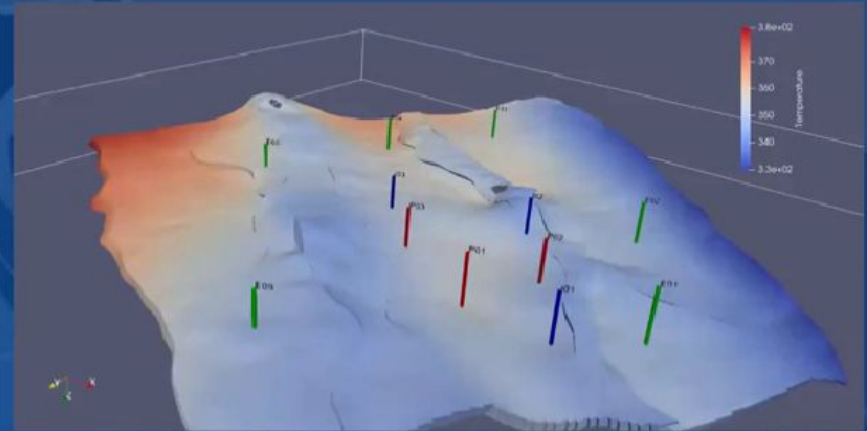


2021 - 1st SPE Europe GeoHackathon

- Challenge was develop a geothermal project
- Lots of participation
- Overall, a lot of effort was put in and this was highly appreciated

2022 -2nd SPE Europe GeoHackathon

- Image recognition challenge – distinguish between rock grains and secondary deposition material
- Range of code developed to solve the problem
- Close competition between the teams



2023 SPE EUROPE ENERGY GEOHACKATHON

Do You Like Challenges?



2023 SPE Europe Energy GeoHackathon

#DatafyingEnergy from 2nd October 2023

> ONLINE <

BOOTCAMPS

(October 2023)



Data Science Lectures
from Experts



Technical Sessions on
Geothermal Energy



> ONLINE <

HACKATHON

(November – December 2023)

1010100
1010110
1010

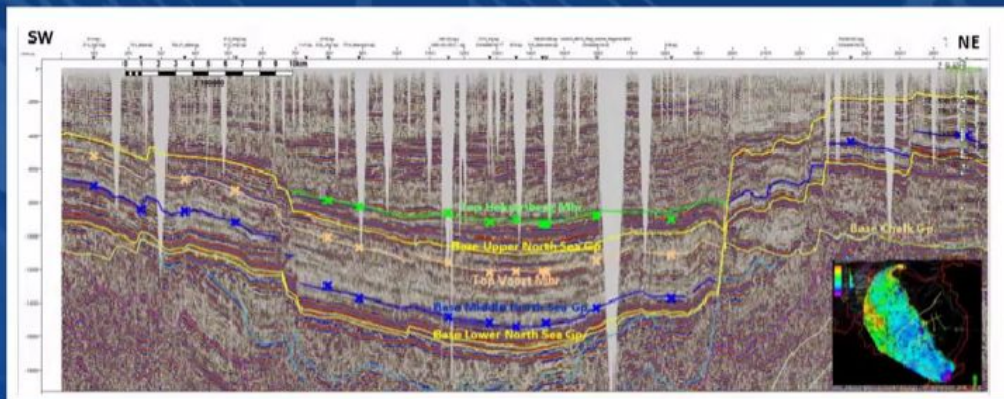
Geothermal Field
Datasets



Teamworking &
Networking

CHALLENGE DESCRIPTION

CREATE AN IMAGE OF SUBSURFACE & CONTRIBUTE TO GEOTHERMAL ENERGY DEVELOPMENT

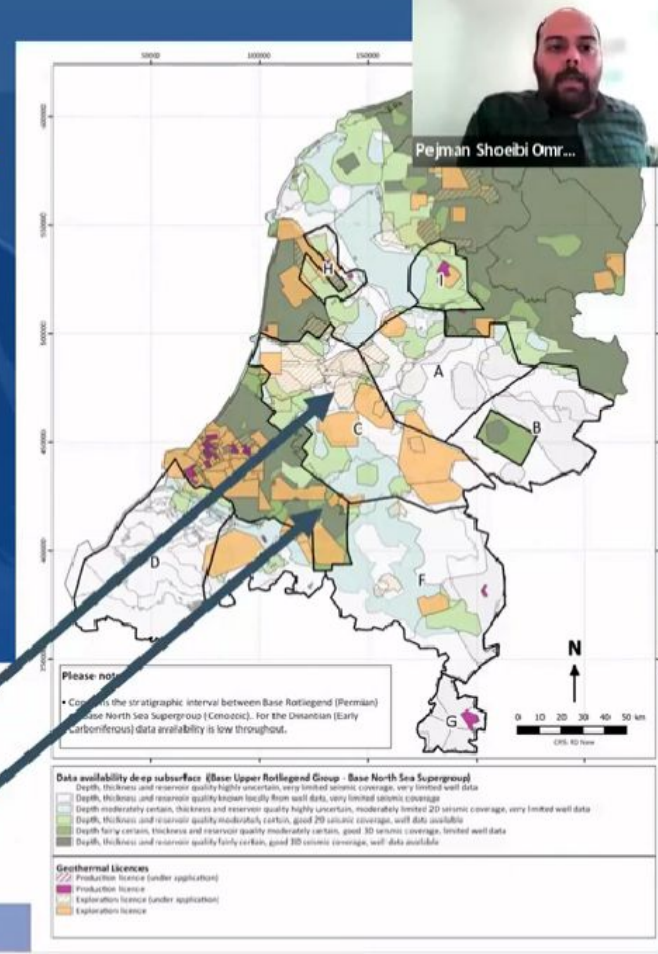


SCAN focuses on the 'white spots'. On this map they're actually coloured white, grey and light green

3D seismic and abundant well data available: not a 'white spot', not part of SCAN

scan ↑

3



INTRODUCTION TO SCAN

SCAN is a geothermal exploration project in the Netherlands that will accelerate the development of geothermal energy projects in areas where little data is available, by:

- Acquiring over 1700 km of new 2D regional seismic lines
- Reprocessing of vintage seismic data (500-4000 m)
- Drilling of data acquisition wells

Funded by the Ministry of Economic Affairs and Climate, executed by EBN and TNO.



2023 SPE EUROPE ENERGY GEOHACKATH CHALLENGE



- Using Machine Learning for establishing the relation between seismic data and rock properties. ML seismic inversion of acoustic impedance for identifying reservoir properties for geothermal deployment
- ML seismic inversion of acoustic impedance for identifying reservoir properties for geothermal deployment
- Bonus Question 1: ML facies classification
- Bonus Question 2: ML seismic interpretation of horizons or units
- Data from the SCAN 2D seismic campaign will be used for this Hackathon.

2023 SPE EUROPE ENERGY GEOHACKATH CHALLENGE



- Data from several lines and wells (in the representative lines) will be supplied:
 - Seismic inversion data (full package, all derived properties as well)
 - Seismic inversion reports
 - Full stacks
 - Offset/Angle stacks
 - Velocities
 - Processing reports
 - Well logs

2023 SPE Europe Energy GeoHackathon: BOOTCAMPS SCHEDULE



Session	Topic	Date	Time
1	Intro to Geothermal Energy and the Role of Seismic in this Field Elisabeth Moellendorff, Baker Hughes	2 nd October 2023	14:00 (GMT+1)
2	Geophysics Basics Magdalena Markovic Juhlin, Uppsala University	4 th October 2023	15:00 (GMT+1)
3	Seismic Data Processing Jozsef Orosz, OMV	9 th October 2023	15:00 (GMT+1)
4	Machine Learning Methods 1 Mateusz Zareba, Halliburton	10 th October 2023	15:00 (GMT+1)
5	Seismic Data Interpretation Luca Fava, OMV Petrom	11 th October 2023	15:00 (GMT+1)
6	Seismic Inversion - Rock Physics/Reservoir Characterization Kirill Siraev, GeoSoftware	13 th October 2023	15:00 (GMT+1)
7	Introduction to Python Vikas Kooneti	16 th October 2023	15:00 (GMT+1)
8	Machine Learning Methods 2 Pavel Didenko, GeoSoftware	19 th October 2023	15:00 (GMT+1)
9	Seismic Facies Interpretation using Machine Learning Mihir Gandhi, David Manzano, Sachit Saumya, SLB	24 th October 2023	15:00 (GMT+1)
10	Introduction and Overview of the SCAN Dataset, Introducing the training dataset Johannes Rehling, EBN	25 th October 2023	13:00 (GMT+1)
11	Q&A regarding problem statement Stefan Carpentier, TNO	1 st November 2023	13:00 (GMT)

ALL SESSIONS WILL BE RECORDED AND MADE AVAILABLE TO PARTICIPANTS

2023 SPE EUROPE ENERGY GEOHACKATHON

1. Intro to Geothermal Energy and the Role of Seismic in this field

Elisabeth Moellendorff

Session: Intro to Geothermal Energy and the Role of Seismic



Abstract: Overview of deep geothermal systems; existing capacity, applications, and potential of deep geothermal in Europe; Seismic: wave types, reflection vs. refraction, acquisition processing, CDP, migration, resolution, 2D vs. 3D, VSP, Limitations and other methods, and Q&A.



Elisabeth Moellendorff

Baker Hughes

Bio: Elisabeth Moellendorff, holding an M.Sc. in mechanical engineering, co-authored two patents during her work with Baker Hughes on innovative casing designs for deep geothermal wells in Germany. She spent 5 years as a wireline engineer in the North Sea before transitioning to roles such as Data Acquisition Coordinator at Total Energies and Service Delivery Coordinator for Wireline in Norway. For two years, she served as a Pressure Testing and Sampling Advisor in geoscience for the North Sea. Currently, she is the RTS Sales Lead for Geothermal in Europe, focusing on reservoir technical services.