



Energy A.I. 2026 6th Annual Hackathon Introduction

Dr. Michael Pyrcz and Dr. John Foster
Energy A.I. 2021-2026 Hackathon Hosts
Hildebrand Department of Petroleum and Geosystems Engineering

Dr. Matt Balhoff
Sponsor and Advisor
Chair of the Hildebrand Department of Petroleum and Geosystems Engineering

Dinghan Wang and Nataly Buitrago-Chacon
Hackathon Architects and Mentors, Graduate students in PGE

Rowan Halliday, Gabby Banales, Jaime Haider and Stacia Miller
Coordinators of Chaos



Appreciation

Appreciation to the student participants, the hackers!

Thank you for your enthusiasm!



None of this would be possible without our sponsors. Thank you for supporting Energy Data Science Education!

Thank You to Our Sponsors

Platinum



Silver



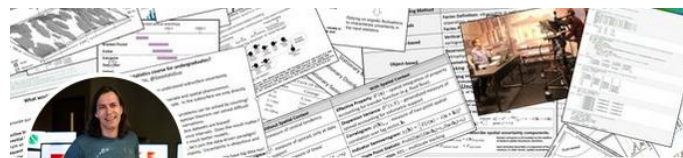
Bronze





Who's Running this Show?

Professor Michael Pyrcz (aka GeostatsGuy)
Hackathon Host



Michael Pyrcz
@GeostatsGuy

Assoc. #Prof @UTAustin @CockrellSchool @txgeosciences @daytum_io |
#geostatistics #DataAnalytics #DataScience #MachineLearning #author #dad
#github #YouTube



John Foster
@johntfoster

Professor John T. Foster
Hackathon Host

Dr. Nataly Chacon-Buitrago, UT PGE
(PhD complete Nov. 2025), soon BP
Hackathon Architect



Dinghan Wang, PhD Candidate PGE
Hackathon Architect





Appreciation

Rowan Halliday
Coordination



Stacia Miller
Communication, Promotion,
Photography



Jaime Haider
Organizing, Student Engagement

Professor Matt Balhoff
PGE Chair
Strong support and engagement



Gabby Banales
Organizing, Student Engagement





Welcome Message



Professor Matt Balhoff
Chair of the Hildebrand Department of Petroleum and Geosystems Engineering



Petroleum / Mining / Spatial Engineering and Science Leadership in the Fourth Paradigm

'We are the original data-driven science, we have been big data long before tech learned about big data!'

1930-1940s

1950-1960s

1980-1990s

>1990s

Probability and
Stationarity
Kolmogorov

Volume
Variance in
Mining
Kriging

Geostatistics
Mathematical
Morphology
Matheron

Applications in Oil
and Gas,
Environmental
Journal, Verly, Deutsch

Spatial Statistics, Big
Data Analytics and
Machine Learning

'Complicated, heterogeneous, sparsely sampled, vast systems with complicated physics and high value decisions.'



What is a Hackathon?

'an event in which a large number of people meet to engage in collaborative computer programming.'

Dictionary.com

'The goal of a hackathon is to create functioning software or hardware by the end of the event'

Wikipedia



Mentors

Eduardo Maldonado-
Cruz

Jose Salazar

Fabian Laugier

Sarah McDonnell

Guillaume du Lac

Jaimie Vargas

Tyrel Krohn

Vrishank Jannu

Mide Mabadeje

Lei Liu

Vikram Jayaram



Eric Qian

Wen Pan

Travis Salomaki

Sercan Gul

Hyeok Kong

Marcelo Jimenez

Misael Morales

Hector Martinez

Varun Gupta

Charles (Cheolkyun) Jeong





Judges

**Dimitrios
Belvanis**

Data Engineer



Andy Flowers

Manager, Enterprise AI



Philip T Mantaring

HR Advisor, Academic and
Technical Programs



Jaimie Vargas

Russel Zhao



Hector Martinez

Data Analytics Supervisor





Who is Here to Build? Longhorns from all over the 40 acres!

Teams, from UT Austin Cockrell, Jackson, Natural Sciences, McCombs, Liberal Arts, etc.

Including:

TBD

TBD

Petroleum and Geosystems Engineering, Operations Research, Mechanical Engineering, Geological Sciences, Materials Science Engineering, Electrical and Computer Engineering, Data Science, Computer Science, Aerospace Engineering, Mathematics, McCombs, Math, Physics, Economics, Neuroscience,



The Hackathon Rules

Submit to GitHub by 12:00 noon, February 1st:

<input type="checkbox"/> Well-documented Python workflow in a Jupyter Notebook. See template in resources folder.	[Team_Name].ipynb
<input type="checkbox"/> Short presentation with executive summary, goals, workflow choices and defense, results and discussion. See template in root.	[Team_Name].pptx
<input type="checkbox"/> Populate solution in this DataFrame saved as a .csv file. See template in root.	solution.csv

Complete 10:00 am, February 1st :

- ☐ Team confirmation form, with team name, and members

Participation: All team members contribute to the above products and participate in the presentation. There are various roles!

Coding: Use only open source and methods / workflows developed during the hackathon. Provide code for testing and scoring. All code submitted in Jupyter Notebook. **Readable code!**



The Hackathon Rules

Our academic staff have volunteered to assist over the weekend.

- **Please let them know that we appreciate. Please treat them with great respect.**
- **Let's all do house keeping, clean up and disposal of recycling and waste in your work area and general areas, as we go. Take out the trash. Offer to help the staff!**
- **Share contacts within your team in case you get locked out. PGE student can open external door if locked.**



The Hackathon Rules

Participate in the Scheduled Workshops and Working Sessions

Treat All other Hackers, Hosts, Mentors, Judges, Coordinators with the utmost respect.

Use code from others, but cite all code used from other sources in your workflows and presentations, e.g., figure captions.

Pyrcz, M.J. (2020) GeostatsPy 0.0.19 [Source code]. <https://github.com/GeostatsGuy/GeostatsPy>

Foster, J.T., (2015) 1DPDpy 1.0 [source code]. <http://dx.doi.org/10.5281/zenodo.15795>

Work Hard, Learn and Have Fun!



The Hackathon Rules

The data has been sanitized. Do not attempt to hack the source!

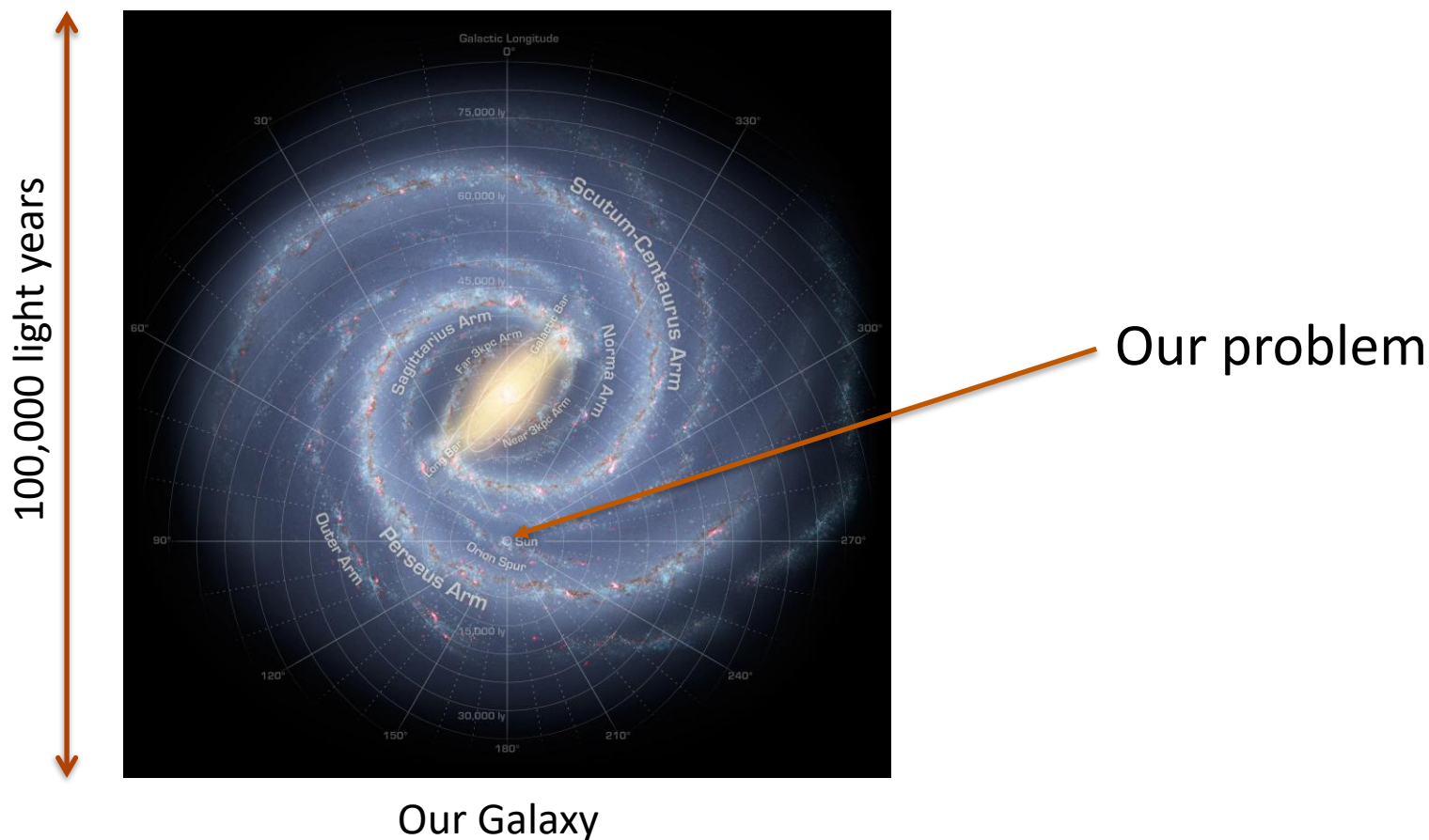
But here's a hint...



The Hackathon Rules

The data has been sanitized. Do not attempt to hack the source!

We can provide the following general location of the data set.





Hackathon Team Scoring

Results: 75% - Results, Results, Results!

- Average of rank transform of accuracy error measure and uncertainty model goodness over all groups.

Presentation: 20% - and We Must Be Able to Communicate Our Work!

- Executive summary, project goals, workflow description, results and discussion, **novel data analytics, and data and model viz**, finish on time

Workflow: 5% - Others Must Understand our Work for Adoption!

- Scoring metrics: readable code, efficient code, documentation of steps

Use the provided templates for results, workflow and presentation. Follow the submission guidelines and submit on time.

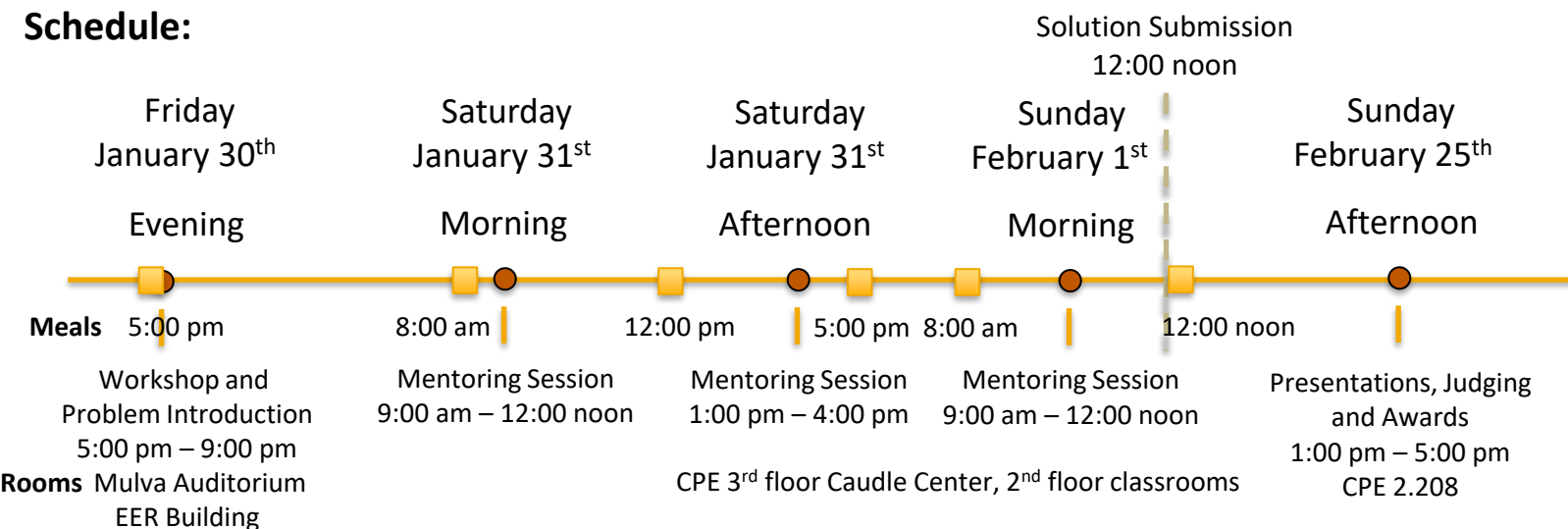


The Plan at 30,000 ft

Apply Data-driven Solutions with Data Analytics and Machine Learning



Schedule:



Enhance Learning



Promote collaboration & data-driven science



Inspire Innovation

Teams:

Register teams of 3-5, which can include students from other departments and schools (Current UT student, EID required), but one student must be a UT PGE student and one 1 undergraduate student per team (could be the same student).

Awards:

Winners of the A.I. Hackathon will be awarded bragging rights and \$5,000 for first place, \$2,500 for second place, \$1,000 for third place and \$500 for fourth place teams.



The Plan for Today's Workshop

DAY 1 / Jan. 23rd - Energy A.I. Hackathon 2026 Workshop Schedule

5 pm – 5:15 pm: Hackathon Welcome, Introduction and Review Plan and Rules, Prof. Balhoff / Prof. Pyrcz

5:15-6:30 pm: Essential Energy Data Science, Numpy, Pandas, Git - Prof. Foster

6:30 – 7:00 pm: Feature Importance, Engineering and Selection, Multivariate Analysis and Shapley Values
Prof. Pyrcz

7:00 – 7:30 pm: Uncertainty Models – Prof. Pyrcz

7:30 – 8:00 pm: Machine Learning Basics, Train and Tune Overview of Methods - Prof. Pyrcz

8:00 – 8:30 pm: Machine Learning in Python, scikit-learn and TensorFlow Packages – Prof. Foster

8:30 – 9:00 pm: Introduce the Energy A.I. Hackathon Problem and Mystery Data Set – Prof. Pyrcz / Prof. Foster

9:00 pm - : Teams Break-out for Initial Data Review and Planning

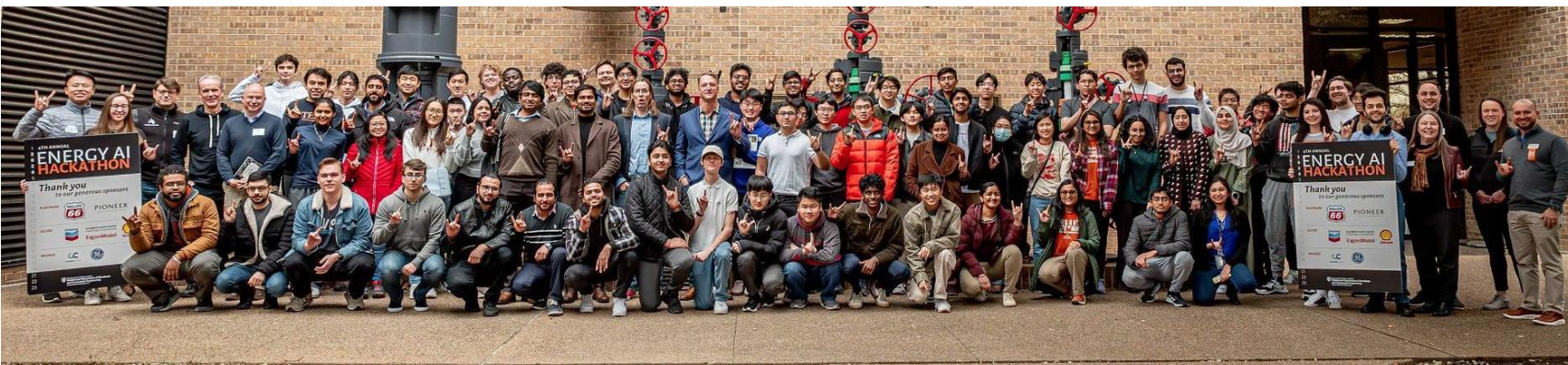


The Plan for Today's Workshop

DAY 1 / Jan. 30th - Energy A.I. Hackathon 2026 Workshop Schedule

It is a lot of work, stick with it, it will be worth it!

Hackathon Finish photo from 2024.



Hackathon Finish photo from 2025.





Top Teams from Last Year

DATAKOMRADES, First Place

Fehmi Özbayrak, Ibrahim Hassan
Gomaa, Zulkuf Azizoglu, Paawan
Desai, Yevgeniy Samarkin



Green Bay Frackers, Second Place

Satvik Duddukuru, Joshua Yue, Parth
Gupta, Akshat Kumar, Rashed Alsuhabi



Don't Jump to Complexity



Deep learning generated image of Professor Pyrcz.



Deep learning generated image of Professor Foster.