Stanford EARTH

SCHOOL OF EARTH, ENERGY & ENVIRONMENTAL SCIENCES

Subsurface Data Science

A joint collaboration of the following Stanford affiliate programs

Natural Gas Initiative
Stanford Exploration Project
Stanford Center for Earth Resources Forecasting
SUPRI-B: Reservoir Simulation
Smart Fields
Basin and Petroleum System Modeling Group
Stanford Center for Induced and Triggered Seismicity
Stanford Earth Sciences Algorithm & Architectures Initiative

Subsurface Data Science Inaugural Workshop
October 7, 2019

Stanford University | Tresidder Memorial Union Oak Room | 495 Lagunita Dr | Stanford, CA

Time	Topic	Speaker
8:00 – 8:30 a.m.	**BREAKFAST**	
8:30 – 8:35 a.m.	Welcome Remarks	**Naomi Boness**
8:35 – 8:50 a.m.	A Concise History of Stanford's Century and a Quarter Involvement with the Subsurface	**Steve Graham**
8:50 – 9:10 a.m.	Overview of Stanford Subsurface Data Science	**Biondo Biondi**
9:10 – 9:30 a.m.	Developing an Intelligent Agent for Subsurface Uncertainty Quantification	**Jef Caers**
9:30 – 9:50 a.m.	Use of Deep Learning-Based Modeling in History Matching and Production Optimization	**Lou Durlofsky**
9:50 – 10:10 a.m.	How Machine Learning Can Help with Seismic Imaging	**Biondo Biondi**
10:10 – 10:30 a.m.	Value of Information in Reservoir Forecasting: A Simulation-Regression Approach	**Tapan Mukerji**
10:30 – 10:50 a.m.	**BREAK**	
10:50 – 11:45 a.m.	**ROUNDTABLE WORKING SESSION**	

Getting past the buzz words: How can Stanford collaborate with our partners to maximize the academic and business potential of data science?

- What are some real examples of how machine learning or AI have added value?
- What are the major hurdles and obstacles for realizing big value from big data? Are they related to technology, business applications or a lack of organizational understanding and alignment?
- What are some ways to leverage data science skills/expertise across Stanford research groups?
- How could Stanford better partner with external companies and organizations to identify areas for collaboration and joint research projects?

11:45 – 12:45 p.m.	**LUNCH** Applied Data Science: Guest presentations from two Stanford startups Kelvin Inc and Ondaka	

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12:45 – 1:05 p.m.	Machine Learning for Understanding Petroleum Systems	**Allegra Hosford Scheirer**
1:05 – 1:25 p.m.	Physics Informed Machine Learning for Uncertainty Quantification of Subsurface Flow Dynamics	**Hamdi Tchelepi** **Daniel Tartakovsky**
1:25 – 1:45 p.m.	Imaging the Groundwater Systems of California: Integration of Remote Sensing and Geophysical Data	**Rosemary Knight**
1:45 – 2:05 p.m.	Machine Learning for Improved Analysis of Natural and Induced Seismicity	**Greg Beroza** **Mostafa Mousavi**
2:05 – 2:25 p.m.	**BREAK**	
2:25 – 2:45 p.m.	Detection and Modeling of Subsurface Deformation in the Permian Basin Using Insar	**Karissa Pepin**
2:45 – 3:05 p.m.	Using Data Science to Validate Geomechanics Models in Unconventional Reservoirs	**Mark Zoback**
3:05 – 3:25 p.m.	Training an Agile, Knowledgeable and Diverse Talent Pool at the Interface of Data and Earth Sciences	**Margot Gerritsen**
3:25 – 3:40 p.m.	**BREAK**	
3:40 – 4:20 p.m.	**ROUNDTABLE WORKING SESSION**	

Data Science Talent: Supply and Demand

- How could this community enhance the education of millennials interested in Subsurface Data Science?
- What Data Science talent do you need? How do you find the right people? How do you retain them?
- What do you think is the role of academia in Data Science? How much of Data Science is "science" to be taught vs. a craft to be practiced?
- How can we foster collaboration between Stanford graduates, Stanford startups, current Stanford research groups, and external companies?

4:20 – 5:00 p.m.	Summary and Discussion
5:00 – 6:00 p.m.	**RECEPTION AND TECHNOLOGY SHOWCASE**