

Smart CCUS: Geophysical Innovations for Subsurface Energy and Carbon Management
29 June – 02 July 2026
Pennsylvania State University
University Park, Pennsylvania, USA

TECHNICAL PROGRAM

Day 1: Geophysical Site Characterization	
Monday, 29 June 2026	
7:00 - 8:00	REGISTRATION AND CONTINENTAL BREAKFAST
8:00 - 8:30	Workshop Welcome Lee Kump , Dean, College of Earth and Mineral Sciences, The Pennsylvania State University Sanjay Srinivasan (Workshop Chair) , Professor of Petroleum and Natural Gas Engineering, The Pennsylvania State University
8:30 - 9:30	Workshop Keynote: Integrating Geophysical Technology with AI and HPC to Enable Safe and Cost-Effective CCS Monitoring MORE INFO Biondo Biondi , Stanford University
Geophysical Site Characterization I	
Session Chairs: Jenny Joyce (ExxonMobil) and Sherilyn Williams-Stroud (Texas A&M University)	
9:30 - 10:15	Keynote: Geophysics for CCUS Development and Deployment in Midwestern and Northeastern USA Neeraj Gupta , Battelle
10:15 - 10:30	BREAK
10:30 – 11:00	Invited Talk: Machine Learning Applications for Interpretation in CCUS David Tang , ExxonMobil MORE INFO
11:00 - 11:20	Integrated Geoscience Insights from CO ₂ EOR Fields Informing CCS and CCUS Stephen Schneider , ExxonMobil
11:20 - 11:40	Seismic Properties of Basal Cambrian Sandstones: Ultrasonic Tests Under In-Situ Conditions ABSTRACT Douglas Schmitt , Purdue University
11:40 - 12:00	Decision-Relevant Impact of Geological Prior Uncertainty on CO ₂ Storage ABSTRACT Jianing You , Stanford University
12:00 - 1:00	LUNCH (PROVIDED)
Geophysical Site Characterization II	
Session Chairs: Douglas Schmitt (Purdue University) and Tieyuan Zhu (The Pennsylvania State University)	
1:00 - 1:45	Keynote: Illuminating Subsurface Uncertainty with Seismic Attributes, ML, and Explainable AI MORE INFO Heather Bedle , University of Oklahoma
1:45 - 2:15	Invited Talk: Geophysical Insights into CO₂-EOR and Permanent Storage: Managing Geomechanical Risk from Farnsworth to the San Juan Basin MORE INFO William Ampomah , New Mexico Tech
2:15 - 2:35	Artificial Intelligence Prediction of Geomechanical Properties from Seismic Attributes: Application to Carbon Sequestration in the San Juan Basin ABSTRACT Adewale Amosu , New Mexico Tech

2:35 - 2:55	Anisotropy in Basaltic Reservoirs: Disentangling Fabric and Crack-Controlled Elasticity and Implications for Carbon Storage ABSTRACT George Okoko , Lamont-Doherty Earth Observatory of Columbia University
2:55 - 3:20	BREAK
3:20 - 3:40	Assessing an Offshore Carbon Storage Opportunity in the Corsair Trough, Offshore Gulf of Mexico ABSTRACT Eddie Talen , Gulf Coast Carbon Center, Bureau of Economic Geology, University of Texas at Austin
3:40 - 4:00	AI-Driven Extraction of Legacy Well Logs to Support CCUS Site Characterization in Michigan ABSTRACT Usman Ayobami , Core Extract
4:00 - 5:00	Panel Discussion: Technical and Commercial Challenges and Opportunities in CCUS Panelists: Gordon Holmes, ExxonMobil; Sherilyn Williams-Stroud, Texas A&M University; Neeraj Gupta, Battelle; Biondo Biondi, Stanford University Moderator: Jenny Joyce, ExxonMobil
5:00 - 5:30	BREAK + WALK TO POSTER RECEPTION
5:30 - 7:30	Poster Reception <i>See end of program for listing</i>
Day 2: Cost Effective Monitoring	
Tuesday, 30 June 2026	
7:00 - 8:00	CONTINENTAL BREAKFAST
Cost Effective Monitoring I Session Chairs: Biondo Biondi (Stanford University) and Heather Bedle (University of Oklahoma)	
8:00 - 8:45	Keynote: Electromagnetic Monitoring of Subsurface Fluid Injection: Opportunities and Challenges MORE INFO David Alumbaugh , Lawrence Berkeley National Lab
8:45 - 9:15	Invited Talk: Toward Quasi-Real-Time Monitoring of km-Scale Reservoirs using Marine Portable Seismic Sources and Optimized DAS Takeshi Tsuji , University of Tokyo
9:15 - 9:35	DASEventNet: Integrated Automatic Microseismic Detection and Location using DAS data for Real-time Monitoring of Geothermal, Carbon Storage, and Hydrogen Systems Pengliang Yu , The Pennsylvania State University
9:35 - 9:55	Q Impedance Full Waveform Inversion: Theory and Application to Frio CO ₂ Storage Site Tieyuan Zhu , The Pennsylvania State University
9:55 - 10:30	BREAK
10:30 - 10:50	Exploring AI in Electromagnetic Data Acquisition for Fluid Imaging in Carbon Capture and Storage (CCS) ABSTRACT Miguel Silva , Energy Transition International, Inc.
10:50 - 11:10	Cost-Effective Microseismic Monitoring of Inert-Gas Stimulation with DAS ABSTRACT Xinxin He , The Pennsylvania State University
11:10 - 11:30	Bayesian Full-waveform Monitoring of CO ₂ Storage with Fluid-flow Priors via Generative Modeling ABSTRACT Haipeng Li , Stanford University
11:30 - 11:50	CCUS at the Crossroads Hesham Moubarak , Terra Altai
11:50 - 1:00	LUNCH (PROVIDED)

Cost Effective Monitoring II	
Session Chairs: Mrinal Sen (University of Texas at Austin) and Haipeng Li (Stanford University)	
1:00 - 1:45	Keynote: An Overview of the Methods of Uncertainty Quantification: Application to Time-Lapse Seismic Data Mrinal Sen , University of Texas at Austin MORE INFO
1:45 - 2:15	Invited Talk: Current and Future CO₂ Monitoring: What's Needed for CCS Success Gordon Holmes , ExxonMobil
2:15 - 2:35	Computational CCS Mitigation of Acquisition Footprints: A U-Net Framework to Upscale Marine Portable Active Seismic Source ABSTRACT Ahmad Bahaa , The University of Tokyo
2:35 - 2:55	Cost-effective Seismic Monitoring and Characterization of Fracture Dynamic Changes in CCUS Hao Hu , University of Oklahoma
2:55 - 3:20	BREAK
3:20 - 3:40	Differential Borehole Gravity Tool Prototype Testing: Initial Results ABSTRACT George Okoko , Lamont-Doherty Earth Observatory of Columbia University
3:40 - 4:00	Subsurface CO ₂ Monitoring: From Hierarchical Viscoelastic FWI to 1D Simultaneous Hybrid Quantum-PINN Inversion Sohini Dasgupta , The University of Texas at Austin
4:00 - 4:20	Adaptive Sparse Seismic Data Acquisition Planning for CO ₂ Sequestration Monitoring ABSTRACT Qi Hu , Stanford University
Day 3: Integrity and Risk / Artificial Intelligence	
Wednesday, 01 July 2026	
7:00 - 8:00	CONTINENTAL BREAKFAST
Integrity and Risk Session Chairs: Bailian Chen (Los Alamos National Laboratory) and David Alumbaugh (Lawrence Berkeley National Lab)	
8:00 - 8:45	Keynote: Reservoir Integrity in CCUS: Where do the Most Significant Risks Lie? MORE INFO Sherilyn Williams-Stroud , Texas A&M University
8:45 - 9:15	Invited Talk: Integrated Mechanistic Understanding of the Most Active Injection-Induced Earthquake System Known and Implications for Large-Scale Injection Operations MORE INFO Katie Smye , Center for Injection and Seismicity Research, University of Texas at Austin
9:15 - 9:35	Understanding CCS Monitoring Techniques: Micro-Scale Characterization and In-Situ Resistivity Monitoring for Time-Dependent Studies in the Silurian Dolomite Formation ABSTRACT Ganesh C. Thakur , University of Houston
9:35 - 9:55	Machine Learning predictions of Reservoir Properties and Induced Seismicity at Utah FORGE EGS Reservoir Pengliang Yu , The Pennsylvania State University
9:55 - 10:30	BREAK
10:30 - 10:50	Microseismicity Analysis at the Illinois-Basin Decatur Project Site using an Integrated Deep Learning Workflow Hongkyu Yoon , Sandia National Laboratories ABSTRACT
10:50 - 11:10	Estimating Magnitude Exceedance Probability of Induced Seismicity for CCS Using Coupled Flow-Geomechanical Simulations, Fault Slip Analysis, and Importance Sampling ABSTRACT Qi Hu , Stanford University

11:10 – 11:30	AI-Enabled Analysis of Distributed Acoustic Sensing Data for Blast-Induced Seismic Response and Predictive Geohazard Monitoring ABSTRACT Xiaozhen Song , The Pennsylvania State University
11:30 – 11:50	The EPA's Underground Injection Control Program Cassandra Cosans , UIC Program, Office of Water, EPA
11:50 – 1:00	LUNCH (PROVIDED)
Artificial Intelligence (AI) Optimization Session Chairs: Sanjay Srinivasan (Penn State) and David Tang (ExxonMobil)	
1:00 - 1:45	Keynote: Distributed Sensing and Deep Optical Flow for CO₂ Storage Monitoring MORE INFO Weichang Li , Zhejiang University
1:45 - 2:15	Invited Talk: Foundation Models for Seismic Inversion in CCUS MORE INFO Youzuo Lin , University of North Carolina at Chapel Hill
2:15 - 2:35	AI for Induced Seismicity Monitoring: Lessons from Utah FORGE for CCUS and Subsurface Energy Systems ABSTRACT Ayush Goyal , Lightscline Inc.
2:35 - 2:55	Deep Learning for CO ₂ Plume Reconstruction and Prediction from Sparse 4D Seismic under Diverse Geologic Scenarios ABSTRACT Arif Rustamov , University of Southern California
2:55 - 3:20	BREAK
3:20 - 3:40	Generating Realistic Training Data for Machine-Learning-Based Seismic Interpretation ABSTRACT Kai Gao , Los Alamos National Laboratory
3:40 - 4:00	Uncertainty-Aware Adaptive CO ₂ Plume Monitoring via Sequential Conditional Variational Autoencoders ABSTRACT Jiefu Chen , University of Houston
4:20 - 4:40	Spatiotemporal Deep Learning for Prediction and Monitoring of Geological CO ₂ Storage: Application to the Quest CCS Project ABSTRACT Jodel Cornelio , University of Southern California
Day 4: Hackathon <i>Virtual and In-Person Presentations</i>	
Thursday, 02 July 2026	
7:00 - 8:00	CONTINENTAL BREAKFAST
Hackathon: Class VI CO₂ Permit Review Assistant	
8:00 - 8:10	Welcome Fawz Naim , PhD Geoscientist
8:10 - 8:40	TAMU (Team: Terrabytes) Joseph Hlavac, Omer Iqbal, Touka Elsayed, Shynggys Kudaibergenov , Texas A&M University
8:40 - 9:10	University of Oklahoma (Team: NAHR GeoBot) Noor UI Huda Choudhry, Aniq Ahmad, Rajkumar Mondal, Hilmi Putra , University of Oklahoma
9:10 - 9:40	PennState (Team: NittCarbAI) Khalil Buckmire, Ianna Gomez Mendez, Miao Jin, Rosemary Tosanwumi , The Pennsylvania State University
9:40 - 10:10	BREAK
10:10 - 10:40	NGRI (Team: Deep Pore Dynamics) Dharma Gadela, Shubham Yadav, Pavan Naga Sai Chittinedi, Lokesh Vaska , National Geophysical Research Institute

10:40 - 11:10	NGRI (Team: Petroblindes) Uma Vadapalli, Pariki Shyman, Aniruddh Rao, Gantepaka Balakrishna, Yatharla Yuktha Reddy , National Geophysical Research Institute
11:10 - 11:40	<i>Guest Talk: The Law of Geologic Carbon Sequestration</i> Hannah Wiseman , The Pennsylvania State University
11:40 - 12:00	Announcement and Closing Comments Fawz Naim , PhD Geoscientist

POSTER PRESENTATIONS AND RECEPTION

MONDAY, 29 JUNE

5:30 - 7:30

Station 1	A Hybrid Approach for Near-Surface Shear-Wave Velocity Inversion Under Limited Dispersion Information ABSTRACT Shu Luan , China University of Petroleum (East China)
Station 2	Multi-Attribute Learning for CO ₂ Saturation Mapping from Seismic Data ABSTRACT Shu Luan , China University of Petroleum (East China)
Station 3	In Situ Near-Field Distributed Acoustic Sensing and its Application for Stress Probing at Field Scale ABSTRACT Xinxin He , The Pennsylvania State University
Station 4	Seismic and Poroelastic Properties of Brines at In-Situ Conditions ABSTRACT Anthony Wendel , Purdue University
Station 5	Preliminary Rock Physics Modeling to Evaluate Fluid Effects in Basalts Bryan Steven Reina Mejía , Universidad Nacional de Colombia – Purdue University
Station 6	Implicit Full-Waveform Inversion Based on Stress-Strain Equations for DAS Data ABSTRACT Zhengpeng Xu , China University of Petroleum (East China)
Station 7	Time-lapse Viscoacoustic Full Waveform Monitoring: Application to North Sea OBC Dataset Tieyuan Zhu , The Pennsylvania State University
Station 8	Characterizing Induced Fracture Networks at the Field-Scale using 4D Seismic Data Tieyuan Zhu , The Pennsylvania State University
Station 9	Assessment of CO ₂ Storage Potentials and Long-Term Containment Risk in the Australian Cooper Basin Joseph Hlavac , Texas A&M University
Station 10	Enhanced Rock Weathering of Basalt as a Carbon Dioxide Removal Strategy: Processes, Performance, and Research Gaps ABSTRACT Daniel Usoh , Federal University of Technology Owerri
Station 11	CCS Success through Community Engagement Sanjay Srinivasan , The Pennsylvania State University
Station 12	Geologic Modeling and Data Assimilation for CO ₂ Sequestration in Point Bar Reservoirs Sanjay Srinivasan , The Pennsylvania State University
Station 13	DeepONet Model of Viscous Fingering for EOR and CO ₂ Storage Jodel Cornelio , University of Southern California
Station 14	CO ₂ Leakage Modeling with Caprock Fracturing and Reaction-Induced Permeability Jodel Cornelio , University of Southern California