

# Improving Understanding and Treatment of Uncertainty in Groundwater Science and Management Workshop



SOCIETY OF EXPLORATION  
GEOPHYSICISTS  
Connecting the World of Applied Geophysics

## PROGRAM

11, 18, and 25 February 2025 • Virtual

Program schedule times are based on **Eastern U.S. time, UTC/GMT -5 hrs. start times are different each day. Please make sure to check the schedule and follow the equivalent times.**

### Day One Equivalent daily start times based on the host time on 11 February 2025:

California & Vancouver: 11:00am; Calgary & Colorado: 12:00pm; Houston, Mexico City: 1:00pm; Lima & Toronto & New York City: 2:00pm; Rio de Janeiro & Santiago: 4:00pm; St. John's Canada: 3:30pm; London: 7:00pm; Frankfurt & Lagos: 8:00pm; Johannesburg and Bucharest: 9:00pm; Kuwait City: 10:00pm; Baku: 11:00pm.

**February 12, 2025:** Mumbai: 12:30am; Jakarta: 2:00am; Beijing & Perth: 3:00am; Tokyo: 4:00am; Adelaide: 5:30am; Sydney: 6:00am

### Tuesday, 11 February: Day 1 – Modeling

Session Co-chairs: Eduardo DeSousa and Seogi Kang

Discussion Moderators: Anneli Guthke and Sina Saneiyani

Time	Presentation <i>Presenter</i>
2:00 – 2:10 pm	<b>Workshop Co-chair Welcome and Introduction</b> <i>Geoff Pettifer and Anneli Guthke</i>
2:10 – 2:15 pm	<b>SEG Welcome</b> <i>Joe Reilly, SEG President-elect</i>
2:15 – 2:45 pm	<b>Reducing uncertainty in characterizing reactive transport processes by integrating multisource hydrogeophysical datasets and groundwater modeling</b> <i>Dr. Xueyuan Kang, Research Associate, Department of Geology, Colorado School of Mines, USA</i>
2:45 – 3:15 pm	<b>Quantifying groundwater response and uncertainty in beaver-influenced mountainous floodplains using machine learning-based model calibration</b> <i>Lijing Wang, Assistant Professor, Department of Earth Sciences, University of Connecticut, USA</i>
3:15 – 3:45 pm	<b>Bayesian inversion with complex geological priors using deep generative models</b> <i>Niklas Linde, Full Professor, Institute of Earth Sciences, Faculty of Geosciences and Environment, Quartier UNIL-Mouline, Switzerland</i>
3:45 – 4:15 pm	<b>Fast Fourier Hydrology: Linear and Non-linear Perspectives on resolution and uncertainty in hydraulic testing</b> <i>Michael Cardiff, Professor and Department Chair, Department of Geoscience, University of Wisconsin-Madison, USA</i>
4:15 – 4:25 pm	<b>Break</b>

4:25 – 4:35 pm	<b>Platinum Sponsor Presentation</b>
4:35 – 5:05 pm	<b>Making Models that Matter</b> <i>Ty Ferré, University Distinguished Professor, Hydrology and Atmospheric Sciences, University of Arizona, USA</i>
5:05 – 5:35 pm	<b>Qualitative Uncertainty – the elephant in the room</b> <i>Saskia Noorduijn, Post Doctorial Researcher, Flinders University, Adelaide, Australia</i>
5:35 – 6:05 pm	<b>Groundwater modeling and uncertainty analysis: an industry perspective</b> <i>Jeremy White, Decision Support Science Director, Principal Hydrogeologist, INTERA, Perth, Australia</i>
6:05 – 6:15 pm	<b>Break</b>
6:15 – 7:45 pm	<b>Discussion Session</b>

**Day Two Equivalent daily start times based on the host time on 18 February 2025:**

California & Vancouver: 7:00am; Calgary & Colorado: 8:00am; Houston, Mexico City: 9:00am; Lima & Toronto & New York City: 10:00am; St. John's Canada: 11:30am; Rio de Janeiro & Santiago: 12:00pm; London: 3:00pm; Frankfurt & Lagos: 4:00pm; Johannesburg and Bucharest: 5:00pm; Kuwait City: 6:00pm; Baku: 7:00pm; Mumbai: 8:30 pm; Jakarta: 10:00pm; Beijing & Perth: 11:00pm;

**February 19, 2025:** Tokyo: 12:00am; Adelaide: 1:30am; Sydney: 2:00am

**Tuesday, 18 February: Day 2 - Parameterization**

**Session Co-chairs: Anneli Guthke and Seogi Kang**

**Discussion Moderators: Geoff Pettifer and Eduardo DeSousa**

<b>Time</b>	<b>Presentation</b>
10:00 – 10:05 am	<b>Co-chair Welcome and Introduction</b>
10:05 – 10:35 am	<b>Probabilistic Geomodeling: from “best guess” to the incorporation of uncertainties in structural models</b> <i>Florian Wellmann, Professor, Chair of Computational Geoscience, Geothermics and Reservoir Geophysics, RWTH Aachen, Germany</i>
10:35 – 11:05 am	<b>Addressing structural uncertainty in groundwater models</b> <i>Kerry Bardot, Research Fellow, School of Earth Sciences, University of Western Australia, Perth, Australia</i>
11:05 – 11:35 am	<b>Groundwater-Surface Water Interactions using integrated methods</b> <i>Paul McLachlan, Assistant Professor, Department of Environmental and Resource Engineering, Danmarks Tekniske Universitet, Denmark</i>
11:35 – 12:05 pm	<b>Unveiling Subsurface Secrets: Utilizing Logging Tools for Clay Identification and Hydrogeological Assessments</b> <i>Katerina Yared, CCS and geothermal project manager for Projeo Corporation, and owner and President of Orka Switch Solutions LLC, USA</i>
12:05 – 12:15 pm	<b>Break</b>
12:15 – 12:25 pm	<b>Platinum Sponsor Presentation</b>
12:25 – 12:55 pm	<b>Uncertainty in petrophysical relationships: does it matter?</b> <i>Andrew Binley, Professor, Lancaster Environment Centre, Lancaster University, Lancaster, UK</i>

12:55 – 1:25 pm	<b>Navigating Uncertainty in Transport Phenomena within Heterogeneous Aquifers</b> <i>Felipe de Barros, Associate Professor of Civil and Environmental Engineering, University of Southern California, USA</i>
1:25 – 1:55 pm	<b>Precision in Profiling: Advanced Logging Techniques for Salinity Determination in Aquifers</b> <i>Katerina Yared, CCS and geothermal project manager for Projeo Corporation, and owner and President of Orka Switch Solutions LLC, USA</i>
1:55 – 2:05 pm	<b>Break</b>
2:05 – 3:35 pm	<b>Discussion Session</b>

**Day Three Equivalent daily start times based on the host time on 25 February 2025:**

California & Vancouver: 4:00am; Calgary & Colorado: 5:00am; Houston, Mexico City: 6:00pm; Lima & Toronto & New York City: 7:00am; St. John's Canada: 8:30am; Rio de Janeiro & Santiago: 9:00am; London: 12:00pm; Frankfurt & Lagos: 1:00pm; Johannesburg and Bucharest: 2:00pm; Kuwait City: 3:00pm; Baku: 4:00pm; Mumbai: 5:30pm; Jakarta: 7:00pm; Beijing & Perth: 8:00pm; Tokyo: 9:00pm; Adelaide: 10:30pm; Sydney: 11:00pm

**Tuesday, 25 February: Day 3 – Applications**

Session Co-chairs: Detlef Bringemeier and Moses Adebayo

Discussion Moderators: Craig Ulrich and Detlef Bringemeier

<b>Time</b>	<b>Presentation</b>
7:00 – 7:05 am	<b>Co-chair Welcome and Introduction</b>
7:05 – 7:35 am	<b>Effective communication of uncertainty in technical reviews of groundwater modelling projects: learnings from a five-year legal case.</b> <i>Kevin Hayley, Principal Hydrogeologist/Geophysicist and Director, Groundwater Solutions, Melbourne, Australia</i>
7:35 – 8:05 am	<b>Reducing uncertainties in contaminated soil and groundwater characterization using the induced polarization method</b> <i>Dr Deqiang Mao, Professor of Hydrogeology, Department of Hydraulic Engineering, Shandong University, China</i>
8:05 – 8:35 am	<b>4D Geoelectrical monitoring to reduce uncertainties in the predictive monitoring of urban groundwater recharge potential</b> <i>Sebastian Uhlemann, Professor of Environmental Geophysics, Faculty of Geosciences, University of Bremen, Bremen, Germany</i>
8:35 – 9:05 am	<b>Mitigation of Water Borehole Failures Using Integrated 1D Resistivity Probing and Very Low Frequency Electrometric Method Techniques</b> <i>Aaron E. Auduson, Associate Professor of Geophysics, Federal University Lokoja</i>
9:05 – 9:15 am	<b>Break</b>
9:15 – 9:25 am	<b>Platinum Sponsor Presentation</b>

9:25 – 9:55 am	<p><b>Nitrate vulnerability projections from Bayesian inference of multiple groundwater age tracers</b></p> <p><i>Dr. Arash Massoudieh, Professor and Chair, Civil and Environmental Engineering, The Catholic University of America, USA</i></p>
9:55 – 10:25 am	<p><b>Accelerating the Use of ML/AI in Groundwater Applications: Physics-informed Groundwater Contamination Monitoring</b></p> <p><i>Haruko Murakami Wainwright, Assistant Professor of Civil and environmental Engineering, Massachusetts Institute of Technology, USA</i></p>
10:25 – 10:55 am	<p><b>Structure, salinity, and uncertainty: System-scale mapping with airborne electromagnetics in the lower Mississippi River Valley supports multi-disciplinary hydrologic applications</b></p> <p><i>Burke J. Minsley, Research Geophysicist, Geology, Geophysics, and Geochemistry Science Center, U.S. Geological Survey, Denver, USA</i></p>
10:55 – 11:05 am	<b>Break</b>
11:05 am – 12:35 pm	<b>Panel Discussion Session</b>