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Attorneys for Cross-Defendant  
INDIAN WELLS VALLEY GROUNDWATER  
AUTHORITY

**SUPERIOR COURT OF THE STATE OF CALIFORNIA**  
**COUNTY OF ORANGE, CIVIL COMPLEX CENTER**

MOJAVE PISTACHIOS, LLC, et al.,  
  
Plaintiffs,  
  
v.  
  
INDIAN WELLS VALLEY WATER  
DISTRICT, et al. ,  
  
Defendants.

Case No. 30-2021-01187275-CU-OR-CJC  
(. Related to Case Nos.:  
30-2021-01187589-CU-WM-CXC;  
30-2021-01188089-CU-WM-CXC;  
30-2022-01239487-CU-MC-CJC; 30-2022-  
01239479-CU-MC-CJC; 30-2022 01249146-  
CU-MC-CJC)

**DECLARATION OF KYLE  
BROCHARD IN SUPPORT OF THE  
INDIAN WELLS VALLEY  
GROUNDWATER AUTHORITY AND  
CITY OF RIDGECREST'S JOINT  
STATEMENT REGARDING  
PROPOSED SPECIAL MASTER  
CANDIDATES**

Judge: Hon. William D. Claster

Date: October 30, 2026  
Time: 1:30  
Dept.: CX101

Trial Date: June 8, 2026

[Exempt from filing fees pursuant to Govt. Code § 6103]

AND CROSS-COMPLAINTS AND  
RELATED ACTIONS.

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Attorneys for Cross-Defendant  
CITY OF RIDGECREST

**DECLARATION OF KYLE H. BROCHARD**

I, Kyle H. Brochard, declare:

1. I am an attorney licensed to practice before all courts of the State of California and a shareholder of Richards, Watson & Gershon, A Professional Corporation, counsel of record for Cross-Defendant Indian Wells Valley Groundwater Authority (the “Authority”) in this action. I have personal knowledge of the facts stated in this declaration and, if called as a witness, could and would testify competently to them.

2. Attached as **Exhibit A** is a true and correct copy of the Groundwater Modeling and More 2026 Program on the “Program” page of the website of Princeton University’s Integrated GroundWater Modeling Center, which I accessed on October 27, 2026 from <https://igwmc.princeton.edu/groundwater-modeling-and-more/program/>. The program is for the Groundwater Modeling and More 2026 conference, formerly called MODFLOW and More, and shows that S.S. Papadopoulos & Associates is a sponsor of the conference and eight employees of S.S. Papadopoulos & Associates were involved in organizing, instructing, presenting, and/or staffing the conference. Specifically, Dr. Matthew Tonkin served with Dr. Reed Maxwell on the Conference Organizing Committee, as was the case in both 2022 and 2024 according to those programs, and Dr. Vivek Bedekar instructed a one-day Contaminant Transport Modeling Short Course at the conference.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on October 28, 2026, at Brea, California.

  
\_\_\_\_\_  
Kyle H. Brochard

# Groundwater Modeling and More 2026: *From Raindrop to Reservoir!*



June 7-10, 2026 at Princeton University

Conference: Monday, June 8 – Wednesday, June 10, 2026

Short Courses: Friday, June 5 – Sunday, June 7, 2026;  
and Thursday, June 11 – Friday, June 12, 2026

Integrated GroundWater Modeling Center  
The logo for the Integrated GroundWater Modeling Center (igwmc) features the lowercase letters "igwmc" in a stylized, rounded font. A blue water droplet is integrated into the letter "g".

#GWM<sup>2</sup>

## Welcome to Groundwater Modeling and More 2026: From Raindrop to Reservoir!

Giving a new name to the “MODFLOW and More” conference and short course series. GWM<sup>2</sup> reflects a more inclusive and forward-looking vision for the discipline of groundwater modeling, while preserving the long-established emphasis and traditions of this very special conference. As in previous renditions, this conference will provide an open and engaging forum for researchers, developers, practitioners, and regulators in the groundwater modeling community to convene, share experiences, and propagate ideas.

### Keynote presentations will be given by:

- **Dr. Taikan Oki**, University of Tokyo, Japan
- **Dr. Steven Loheide**, 2026 Darcy Distinguished Lecturer, University of Wisconsin, Madison

### Sustainability Lunch Panelists introduced and moderated by Dr. Matthew J. Tonkin:

#### *The Role of Models in Adjudications and Other Water Rights Disputes*

- **Russell McGlothlin**, O’Melveny & Myers LLP
- **Sorab Panday**, GSI Environmental
- **Emily Lodolce**, Arizona Department of Water Resources
- **Doug Bartlett**, Clear Creek Associates (a Geo-Logic Company)

### The conference includes featured presentations by:

- **Dr. Laura Condon**, *Developing the next generation US integrated hydrologic model: recent progress and the path forward to a terrestrial hydrology digital twin*
- **Dr. Jeremy White**, *Purpose and complexity in applied groundwater modeling*
- **Dr. Sorab Panday**, *Scientific Story Telling for the Non-Expert*
- **Dr. Otto Strack**, *An exact solution for steady subsurface irrigation with free boundary*
- **Dr. Nick Engdahl**, *Bridging the gap to quantum-computing based hydrological modeling with uncertainty aware simulation tools*
- **Dr. Holly Michael**, *Not your average Ghyben-Herzberg interface: How fresh groundwater gets offshore and why it matters*
- **Dr. Lauren Foster**, *Conceptual Modeling in the Age of AI*
- **James Rumbaugh**, *Groundwater Models Supporting Consumptive Use Permit Decisions in Florida*

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- **Dr. Christopher Green**, *Challenges and opportunities in reactive transport at regional scales*
- **Dr. Chunmiao Zheng**, *Four Decades of Research at the MADE Site and Beyond: Advancing Understanding Through Modeling*

### General sessions are on the following topics:

- **Coastal Hydrology:** Groundwater and Saltwater Intrusion
- **General Applications of Groundwater Models**
- Special Session: **GWEX Global Groundwater Network Community Forum**
- **Hydrology Education and Outreach:** Creative Approaches and Tools for Community Engagement and Learning
- **It’s All Connected:** Surface Water Groundwater Interactions
- Special Session: **MODFLOW as a Community-Based Development Effort**
- **Contaminants and Water Quality**
- **Machine Learning and Next-Generation Computing**
- **Hydrogeology, Vadose Zone, Case Studies, and Reactive Transport**
- **Making Models Better:** Calibrations, Inference, and Uncertainty
- **Sustainable Water Management:** The Role of Safe vs. Sustainable Yield in Groundwater Systems
- **Water Management in Mining and Energy**

## Conference Organizing Committee



**Dr. Reed Maxwell**  
Princeton University  
USA



**Dr. Matthew Tonkin**  
S.S. Papadopoulos  
& Associates, Inc.  
USA



**Dr. Laura Condon**  
University of Arizona  
USA



**Dr. Lisa Gallagher**  
Princeton University  
USA

## Conference Coordinators



**Howard Cohen**  
Princeton University  
USA



**Jasmine Pinchinat**  
Princeton University  
USA

## Integrated GroundWater Modeling Center (IGWMC) – Scientific Advisory Committee



**Dr. Nick Engdahl**  
Washington State  
University  
USA



**Dr. Lauren Foster**  
Neptune Inc.  
USA



**Dr. Christopher Green**  
U.S. Geological Survey  
USA



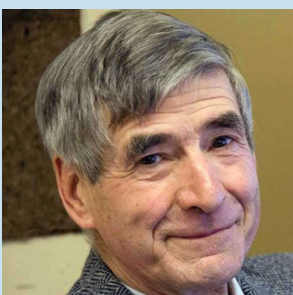
**Dr. Holly Michael**  
Delaware Environmental  
Institute and University  
of Delaware, USA



**Dr. Sorab Panday**  
GSI Environmental, Inc.  
USA



**James Rumbaugh**  
Environmental Simulations  
Incorporated  
USA



**Dr. Otto Strack**  
University of Minnesota  
USA



**Dr. Jeremy White**  
INTERA Incorporated  
USA



**Dr. Chunmiao Zheng**  
Southern University of  
Science and Technology  
China

 $\Sigma^2\Pi$ 

**S.S. Papadopoulos & Associates, Inc.**  
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*Proudly supporting the groundwater modeling community since 1979.*

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IGWMC Organizing Committee

**Matthew J. Tonkin, PhD**  
President and Principal Hydrogeologist



MODFLOW Panelist and Short Course  
Co-Instructor: MODFLOW 6 and FLoPy

**Christian D. Langevin, PhD**  
Principal Hydrogeologist

Short Course Instructors: Contaminant Transport Modeling



**Vivek Bedekar, PhD, PE**  
Associate Engineer



**Christopher J. Neville, MSc, PEng**  
Principal Hydrogeologist

Attending, presenting, and/or staffing SSPA's sponsor booth



**Christopher Muffels**  
Senior Hydrogeologist



**Marinko Karanovic**  
Senior Hydrogeologist



**Gengxin "Michael" Ou, PhD**  
Senior Project Hydrogeologist



**Zhaowei "Jack" Wang**  
Senior Project Hydrogeologist

Featured  
Software



GroundWater Desktop



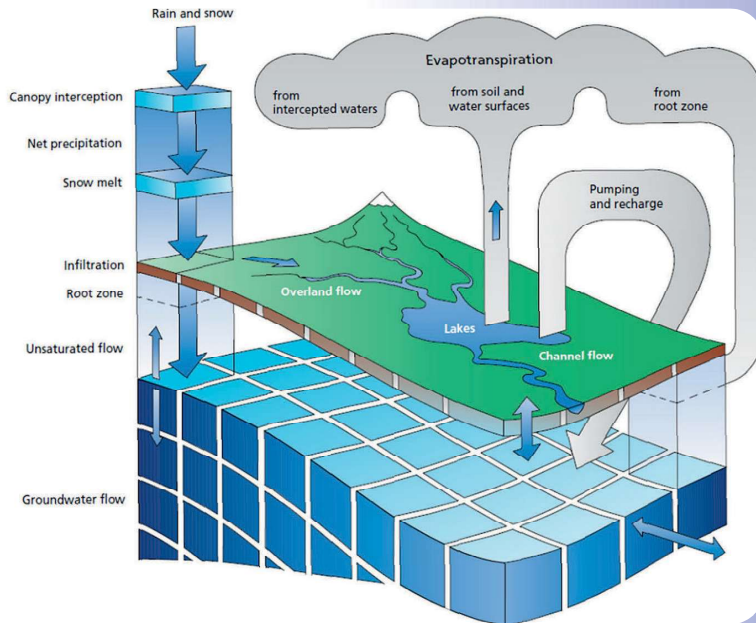
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### Get in touch

Philipp Huttner  
phhu@dhigroup.com  
+49 3067 9998 673

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Comes with an extensive library of reactive transport models applicable to a wide range of problems including emerging contaminants

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**SUNDAY, JUNE 7**

|               |                                                                      |
|---------------|----------------------------------------------------------------------|
| 16:30         | <b>Conference Check-in:</b> Begins Sunday, June 7, at 4:30pm Eastern |
| 17:00 – 18:30 | <b>Welcome Reception:</b> Refreshments and Hors D'oeuvres            |

**MONDAY, JUNE 8**

| TIME          | Friend 101                                                                                                                                                                                                                                                  | COS 104                                                                                                                                                              |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <p><b>Welcome and Opening Address</b></p> <p><i>Featured Presentation:</i> Developing the next generation US integrated hydrologic model: recent progress and the path forward to a terrestrial hydrology digital twin, by <a href="#">Laura Condon</a></p> | <p><i>Opening and Featured Presentation in Friend 101</i></p>                                                                                                        |
| 08:00 – 08:25 |                                                                                                                                                                                                                                                             |                                                                                                                                                                      |
| 08:30 – 10:00 | <p><b>General Applications of Groundwater Models (1 of 2)</b></p> <p>Session chairs: <a href="#">Jim Rumbaugh</a>, <a href="#">Jeremy White</a></p>                                                                                                         | <p><b>It's All Connected: Surface Water/Groundwater Interactions (1 of 2)</b></p> <p>Session chairs: <a href="#">Nick Engdahl</a>, <a href="#">Holly Michael</a></p> |
| 08:30 – 08:45 | <p><a href="#">Metin Ozbek</a>, <a href="#">Nathan Voorhies</a>, <a href="#">Tad Fox</a></p>                                                                                                                                                                | <p><a href="#">Dirk Kassenaar</a>, <a href="#">E.J. Wexler</a></p>                                                                                                   |
|               | <p>Multi-Objective Optimization of Groundwater Extraction and Hydraulic Containment at a Complex Alluvial Site</p>                                                                                                                                          | <p>Integrated surface water and groundwater simulations for sustainable community design: Insights from the response to Hurricane Ian</p>                            |
| 08:45 – 09:00 | <p><a href="#">Barret Kurylyk</a>, <a href="#">R. Bailey Strong</a>, <a href="#">Rob Jamieson</a>, <a href="#">Julia Guimond</a>, <a href="#">Aaron Mohammed</a>, <a href="#">Jeffrey McKenzie</a>, <a href="#">Victor Bense</a></p>                        | <p><a href="#">Marcia Achiaa Frempong</a>, <a href="#">Anner Paldor</a></p>                                                                                          |
|               | <p>Cryohydrogeological Modeling: An Overview of Advances, Challenges, and Emerging Opportunities</p>                                                                                                                                                        | <p>The Impact of River Geomorphic Processes on Groundwater Availability: Insights from Integrated Hydrologic Modeling</p>                                            |
| 09:00 – 09:15 | <p><a href="#">Aaron Mohammed</a>, <a href="#">Ruta Basijokaite</a>, <a href="#">Rebecca Rowe</a>, <a href="#">Jeffrey McKenzie</a></p>                                                                                                                     | <p><a href="#">Jonathan Traylor</a>, <a href="#">Jesse Dickinson</a>, <a href="#">Steve Regan</a></p>                                                                |
|               | <p>Simulating variably-saturated subsurface flow and reactive transport in thawing permafrost environments</p>                                                                                                                                              | <p>Sensitivity of surface and subsurface water exchanges to model structure and coupling scheme in integrated models</p>                                             |
| 09:15 – 09:30 | <p><a href="#">Qing He</a>, <a href="#">Naota Hanasaki</a>, <a href="#">Akiko Matsumura</a>, <a href="#">Edwin H. Sutanudjaja</a>, <a href="#">Taikan Oki</a></p>                                                                                           | <p><a href="#">Amelia Peeples</a>, <a href="#">Nicholas Jadallah</a>, <a href="#">Marie Joe Sawma</a>, <a href="#">Reed Maxwell</a></p>                              |
|               | <p>Global groundwater decline trend simulated by H08-GMv1.0</p>                                                                                                                                                                                             | <p>Channel Width Uncertainty in Integrated Hydrologic Modeling: Scale-Dependent Impacts on Simulated Streamflow</p>                                                  |
| 09:30 – 09:45 | <p><a href="#">Katie Fogg</a>, <a href="#">Eric Morway</a>, <a href="#">Alden Provost</a>, <a href="#">Christian Langevin</a>, <a href="#">Joseph Hughes</a>, <a href="#">Martijn Russcher</a></p>                                                          | <p><a href="#">Kurt Zeiler</a>, <a href="#">Brett Oliver</a></p>                                                                                                     |
|               | <p>The PBST Utility: A Process-Based Approach for Stream Temperature Modeling in MODFLOW 6</p>                                                                                                                                                              | <p>Combining NHDPlus HR and Lidar for Improved Streambed Elevation Estimates in Agricultural, Suburban, and Urban Areas</p>                                          |
| 09:45 – 10:00 | <p><a href="#">Hussain Palagiri</a>, <a href="#">Manali Pal</a><br/><i>WITHDRAWN</i></p>                                                                                                                                                                    | <p><a href="#">Rama Rani</a></p>                                                                                                                                     |
|               | <p>Basin-Scale Delineation and Validation of Groundwater Potential Zones Using an Integrated AHP-GIS Framework: Krishna River Basin, India</p>                                                                                                              | <p>Modeling Groundwater-Surface Water Interactions During River and Floodplain Restoration in the Kissimmee Basin, Florida</p>                                       |
| 10:00 – 10:15 | Coffee Break                                                                                                                                                                                                                                                |                                                                                                                                                                      |

| MONDAY, JUNE 8 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                               |                                                                                                                                    |                                                                                                                                     |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| TIME           | Friend 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                               | COS 104                                                                                                                            |                                                                                                                                     |
| 10:20 – 10:40  | Featured Presentation: Purpose and complexity in applied groundwater modeling, by Jeremy White                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                               | Featured Presentation in Friend 101                                                                                                |                                                                                                                                     |
| 10:45 – 12:00  | General Applications of Groundwater Models (2 of 2)<br>Session chairs: Sorab Panday, Jeremy White                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                               | It's All Connected: Surface Water/Groundwater Interactions (2 of 2)<br>Session chairs: Christopher Green, Holly Michael            |                                                                                                                                     |
| 10:45 – 11:00  | Raoul Collenteur, Cas Neyens, David Brakenhoff, Mark Bakker                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Rain or shine, improve your aquifer test data using time series analysis                                                      | Nicholas Jadallah, Mary Michael O'Neill, Reed Maxwell                                                                              | Remote Sensing-Constrained Hydrologic Simulations Quantify Groundwater Pumping Impacts in the Upper Colorado River Basin            |
| 11:00 – 11:15  | Helen Siegel, Hai Pham, Trevor Budge, Veronica Yonce                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Next-Generation Groundwater Modeling for the Hanford 100 Areas: Integrated Parent-Child Framework with Predictive Uncertainty | Varut Guvanasen, Teresa Pilato                                                                                                     | Development of an Integrated Surface Water/Groundwater Model to Enhance the Accuracy of Convective Storm Prediction                 |
| 11:15 – 11:30  | Aoqi Sun, Wenjie Xu, Chen Yang                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Progressive groundwater decoupling may drive a shift toward faster and shallower terrestrial water cycling                    | Janet Barclay, Lauren Koenig, Jeremy Diaz, Samantha Oliver, Magdalen Bresee, Yingda Fan, Xiaowei Jia, Alison Appling, Galen Gorski | Enhancements to a national stream temperature model to better represent groundwater-dominated temperature regimes and small streams |
| 11:30 – 11:45  | Alastair Black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | When Groundwater Models Leave the Modeller: Evidence, Precaution and Decision                                                 | Harry Stone, Maria Pereira Fleury, Michael Gallagher, Adam Atchley, Reed Maxwell                                                   | Disentangling Topographic-Hydrologic Controls on Forest Growth using Drone-Based Remote Sensing                                     |
| 11:45 – 12:00  | Frank Tsai, Yuqi Song, Sharfaraj Khadam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | A Framework for CONUS MODFLOW Model Development                                                                               | Joseph Hughes, Jeremy White, Wesley Zell, Mohamed Hayek, Katherine Markovich                                                       | Groundwater Pumpage-Induced Streamflow Capture in the Continental United States                                                     |
| 12:10 – 13:40  | Lunch – Mentor Lunch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                               | Commons D301                                                                                                                       |                                                                                                                                     |
|                | Sustainability Lunch Panel: The Role of Models in Adjudications and Other Water Rights Disputes<br><br>Panel: Sorab Panday (GSI Environmental), Russell McGlothlin (O'Melveny & Myers LLP), Emily Lodolce (Arizona Department of Water Resources), Doug Bartlett (Clear Creek Associates, a Geo-Logic Company)<br><br>Moderator: Matt Tonkin                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                               |                                                                                                                                    |                                                                                                                                     |
| 13:45 – 14:45  | This panel brings together technical, knowledge transfer, and legal experts at the forefront of water resource analysis to engage in an open, moderated discussion on the use of models in water rights disputes and adjudications. The session opens with a 15-minute talk covering key technical concepts, including approaches to estimating available water resources, resolving methodological differences, the concept of “Adversarial Collaboration,” and the strategies for managing and communicating model limitations. Panelists will represent a range of perspectives, from technical modeling and policy transfer to legal practice, offering attendees a rich, cross-disciplinary dialogue on how models shape and inform high-stakes water rights decisions. |                                                                                                                               |                                                                                                                                    |                                                                                                                                     |
| 14:45 – 15:00  | Coffee Break                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                               |                                                                                                                                    |                                                                                                                                     |

| MONDAY, JUNE 8 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TIME           | Friend 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | COS 104                                                                                                                                                                                                         |
| 15:05 – 15:25  | <i>Featured Presentation: Scientific Story Telling for the Non-Expert</i> , by <a href="#">Sorab Panday</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <i>Featured Presentation in Friend 101</i>                                                                                                                                                                      |
| 15:30 – 16:30  | <i>Special Session: GWEX Global Groundwater Network Community Forum</i><br>Session chairs: Laura Condon, Katie Markovich, Chunmiao Zheng                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Hydrology Education and Outreach: Creative Approaches and Tools for Community Engagement and Learning<br>Session chairs: Lauren Foster, Sorab Panday                                                            |
| 15:30 – 15:45  | <p>This session will be an interactive community forum discussing the ongoing work of the GEWX Global Groundwater Network to bring together the groundwater modeling, climate and earth systems modeling communities. Our goal is to improve groundwater representation in global simulations. In this session we will be discussing:</p> <ol style="list-style-type: none"> <li>1. The physical processes, spatial scales and hydrogeologic settings that are most critical to better represent hydrologic exchanges with the subsurface at the global scale;</li> <li>2. Pathways to better connect the groundwater community and its work with global modeling; and</li> <li>3. Blockers to scientific exchanges between our communities.</li> </ol> | <a href="#">Lisa Gallagher</a> , Reed Maxwell<br>Learning, creating, and sharing: A science communication framework for water and climate education                                                             |
| 15:45 – 16:00  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <a href="#">Hikari Fukuda</a> , Anh Cao, Kei Yoshimura<br>Evaluating Flood Preparedness Education Using Structural Equation Modelling: A Comparative Study of Japan and the Philippines                         |
| 16:00 – 16:15  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <a href="#">Jasmine Pinchinat</a> , Lisa Gallagher, Mario Soriano, Reed Maxwell<br>Integrating Creative Evaluation Tools into Climate and Water Education: A Multi-Year Look at Student Engagement and Learning |
| 16:15 – 16:30  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <a href="#">Fleford Redoloza</a> , Trevor Budge<br>System Model of the Hanford Site Central Plateau Pump-and-Treat System                                                                                       |
| 16:40 – 17:00  | Software Demonstration Introductions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                 |
| 17:30 – 19:30  | SOFTWARE DEMONSTRATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | POSTER SESSION                                                                                                                                                                                                  |

*Software demonstrations are listed on program pages 10 and 11, and the poster presentations are listed on page 12; both will be held at the [Carl A. Fields Center](#).*

## Software Demonstration – Monday, June 8

### Featured Software:

#### 1. Groundwater Modeling System (GMS), *by Alan Lemon (Aquaveo)*

Aquaveo's flagship desktop environment for developing, simulating, and visualizing 3D groundwater flow and contaminant transport models. Developed in close collaboration with the modeling community (USACE, USGS), GMS provides an integrated workflow from raw site data to a calibrated, decision-ready model. Key features include: Pre-processing: Grid-independent conceptual modeling on a GIS map, with the numerical grid regenerated as the design evolves; Subsurface Characterization: Boreholes, cross sections, TINs, solids, and 3D stratigraphic models built from field data; Modeling Engines: Full MODFLOW family (MF6, USG-Transport, etc.), MT3D family, SEAWAT, MODPATH, mod-PATH3DU, and HydroGeoSphere; Meshing & Gridding: Structured grids, unstructured Voronoi grids, quadtree refinement, and finite-element meshes; Calibration & Uncertainty: PEST with parallel runs, pilot points, sensitivity analysis, and Monte Carlo; and Visualization: Animated contours, particle tracking, fence diagrams, isosurfaces, and 3D fly-throughs.

GMS is used worldwide for water-resource planning, wellhead protection, mine dewatering, contaminant remediation, and regulatory compliance.

#### 2. Timflow, *by Mark Bakker and David Brakenhoff, (Delft University of Technology and Artesia)*

Timflow is a new open-source analytic element model for the simulation of both steady and transient flow in multi-aquifer systems. Timflow gives quick answers as there is no grid and no time stepping. Groundwater features are represented directly with analytic elements including wells, rivers, and leaky walls. Applications vary from designing well fields (including horizontal wells) and capture zone delineation to pumping test analysis and construction site dewatering.

#### 3. Pastas, *by Raoul Collenteur, Mark Bakker, and David Brakenhoff (Hydroconsult, Delft University of Technology, and Artesia)*

Pastas is an open source Python package for processing, modeling, and analyzing groundwater time series. With Pastas you can efficiently model your hydraulic head time series to better understand the groundwater system and the stresses impacting the groundwater fluctuations. Data-driven models can be created, calibrated, and analyzed with just a few lines of Python code with the built-in optimization, visualization, and statistical analysis tools. This year, we will be introducing Pastas 2.0, along with all its new features, such as the forecasting and scenario module.

#### 4. arti3d, *by Ali Meyal and Devi Gurung (Anchor QEA)*

arti3d offers a modern, integrated GUI for reactive transport modeling, supporting MODFLOW-based codes (MODFLOW, MT3DMS and PHT3D), MODFLOW-USG (with transport), and muFlowRT a next-generation engine that integrates OpenFOAM with PhreeqcRM. Features include unstructured grids for variably saturated and multiphase flow and transport.

#### 5. MIKE SHE, *by Philipp Huttner (DHI)*

MIKE SHE is a fully integrated hydrological and groundwater simulation software system designed to model the whole water cycle incl. bilateral coupling of all water components. It combines surface water, unsaturated zone, groundwater, evapotranspiration, irrigation and river interactions within a single, physically-based framework. In addition, MIKE SHE can be used as an addon tool for other groundwater models by deactivating the 3D groundwater module. This turns MIKE SHE into a powerful soil water balance model that can produce spatially and temporarily varying groundwater recharge with high resolution for your MODFLOW or FEFLOW groundwater model.

#### 6. GSFLOW-USG, *by Sorab Panday (GSI Environmental Inc.)*

GSFLOW USG represents coupled watershed and groundwater processes within a fully integrated, three dimensional framework, enabling simulation of tightly linked surface–subsurface interactions across complex hydrogeologic settings. The approach supports flexible, unstructured discretization, allowing independent representation of surface and subsurface domains to capture heterogeneity in topography, stratigraphy, and hydraulic properties. Surface runoff, snow accumulation and melt, lateral hillslope flows, and soil zone water balances are solved simultaneously with groundwater flow, while allowing two way exchange between surface and subsurface and among stream networks and aquifers. The framework further supports three dimensional transport of solutes and heat, and density dependent flow, along with explicit representation of preferential flow paths such as wells or fractures. Together, these capabilities provide a mass conserving platform for evaluating dynamic feedbacks among hydrologic processes and assessing system response under changing natural or managed conditions.

#### 7. ModelMuse, *by Richard B. Winston*

ModelMuse is a graphical user interface (GUI) for several versions of MODFLOW, SUTRA, and other models. This software package provides a GUI for creating the input files for the models, running the models, and displaying the output from the models. In ModelMuse, the spatial data for the model are independent of the grid, and the temporal data are independent of the stress periods. Being able to input these data independently allows the user to redefine the spatial and temporal discretization at will. ModelMuse supports parameter estimation with PEST in MODFLOW and SUTRA models.

## 8. HydroFrame, *by Amy Defnet, George Artavanis, and Bill Hasling (Princeton University)*

HydroFrame is a platform to facilitate easy interaction with large computationally intensive hydrologic models and massive simulated outputs. Our tools enable users to subset model inputs and outputs for any watershed in the US, run their own simulations, and visualize and analyze existing model outputs or newly generated results and forecasting. We also develop free educational tools and lesson plans to teach students of all ages about groundwater and the hydrologic cycle.

## 9. ParFlow-CLM, *by Nick Jadallah and Amelia (Mia) Peebles (Princeton University)*

ParFlow-CLM is a numerical model that simulates the hydrologic cycle from the bedrock to the top of the plant canopy. It integrates 3D variably-saturated subsurface flow with overland flow (ParFlow) and land surface processes (CLM) using physically-based equations to rigorously simulate fluxes of water and energy in complex real-world systems. ParFlow-CLM is a computationally advanced model that can run on laptops and supercomputers and has been used in hundreds of studies evaluating hydrologic processes from the hillslope to the continental scale. ParFlow-CLM code is open source, and we promote a community of active users and developers interested in advancing computational hydrology and improving hydrologic understanding. In addition to core capabilities, we will highlight many new model advancements that include a complete Python integration (including running in Jupyter Notebooks), many different output formats (including NetCDF), and full GPU back-end capability.

## 10. ModelWatcher, *by Lauren Foster (Neptune Inc.)*

ModelWatcher provides a transparent, reproducible, and easy-to-follow framework for organizing and visualizing results of an optimization algorithm coupled with a physics-based model. The pipeline is triggered whenever new output is detected, providing real-time and automatic visualization of calibration results. ModelWatcher enhances modeling workflows by encouraging collaboration among team members on custom visuals, enabling early and efficient decision making within the calibration process, and ultimately increasing the payoff and efficiency of calibration efforts.

## 11. GroundWater Desktop (GWD), *by Marinko Karanovic (S.S. Papadopoulos & Associates, Inc.)*

GroundWater Desktop is a 3D Windows application built for groundwater modelers, environmental scientists, and engineers. It provides a versatile, intuitive interface to explore and visualize complex geological and spatial data.

Leverage robust analysis tools specifically developed for hydrogeologic investigations, groundwater mapping, and the management of contaminated sites.

GWD is used in small and large environmental consulting companies as well as government agencies worldwide. With a freely-available 3D viewer, GWD provides an effective means to present and share your data and visualization files with colleagues and clients.

## 12. Texture2Par, *by Vivek Bedekar (S.S. Papadopoulos & Associates, Inc.)*

Texture2Par is a software tool developed by S.S. Papadopoulos & Associates for the California Department of Water Resources that converts geologic and geophysical information, including well logs and airborne electromagnetic (AEM) data, into spatially distributed texture models and aquifer properties for groundwater models. The software uses geostatistical methods such as kriging and cokriging together with zonation, anisotropy, depth-dependent transformations, and upscaling techniques to generate texture models that help identify and evaluate potential managed aquifer recharge (MAR) sites, as well as model-ready hydraulic conductivity and storage parameter fields for groundwater models that are consistent with available subsurface data and hydrogeologic understanding.

## 13. Visual MODFLOW Flex, *by Colton Lanthier (Waterloo Hydrogeologic)*

Waterloo Hydrogeologic's Visual MODFLOW Flex is a comprehensive groundwater modelling platform designed to support the development, calibration, and visualization of complex hydrogeologic MODFLOW models. Built on an intuitive and flexible interface, it integrates conceptual modelling, numerical simulation, and advanced data management tools to help environmental and water resource professionals make informed decisions with confidence. Supporting industry-standard engines such as MODFLOW, MT3DMS, and SEAWAT, Visual MODFLOW Flex is widely used for groundwater flow, contaminant transport, and remediation projects around the world.

## 14. Hydrology Information Sources & Databases, *by Willow Dressel and Zac Painter (Princeton University)*

Willow Dressel and Zac Painter are STEM librarians in the Princeton University Library. Filling in for Emily Wild, Chemistry and Geosciences Librarian, they will be providing conference attendees with hydrology information sources, library research guides, data management information, and demonstrations of access to water data, imagery, and bibliographic databases.

## Poster Session – Monday, June 8

### Poster Presentations, by topic

#### General Applications of Groundwater Models

|                                                                                                               |                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Simin Akbariyeh</u> , Marti Bayer-Raich, Jon Whitley, Eric Hicks, Mackenzie Hirt, Matthew Zenker           | Capture-Based Optimization and Remediation Time Analysis of a Pump-and-Treat System at a PFAS-Impacted Aquifer                               |
| Marti Bayer-Raich, <u>Simin Akbariyeh</u> , Jon Whitley, <u>Eric Hicks</u> , Mackenzie Hirt, Matthew J. Zenke | Estimating mass extraction and remediation time for pump-and-treat schemes with capture zone analyses                                        |
| <u>Charalampos Ntigliakis</u> , Josh Roberts, Alastair Black                                                  | Using the Source Impact Library to quantify environmental impacts from abstraction shutdown in UK regional models                            |
| Sunny Titus, <u>Alden Provost</u> , Martijn Russcher, Christian Langevin                                      | UTVD: A new advection scheme for unstructured grids in MODFLOW 6                                                                             |
| Martijn Russcher, <u>Alden Provost</u> , Christian Langevin, Sunny Titus                                      | Incorporating boundary-flow location information for more accurate simulation of flow and transport                                          |
| Micheal Keester, <u>Philip Webster</u> , James Beach, Chris Drabek, Ye Hong Chen                              | Incorporating New Core-Derived Consolidation Data into a Regional MODFLOW 6 Aquifer Compaction Model of the Greater Houston Area, Texas, USA |
| <u>Stacia Prazen</u> , Daniel Walters, Rebecca Anderson, Steve Young, Matt Seigler, Allison Johnston          | Simulating Recharge of Recycled Water to Inform Managed Aquifer Recharge Decisions in the Treasure Valley                                    |
| <u>Hai Pham</u> , Robin Weatherl, Michelle Pedrazas, Cheng Cheng                                              | From Vadose Zone to Saturated Zone: A Coupled Modeling Approach for Evaluating Cr(VI) Remedial Designs at the Hanford 100-HR-3 Operable Unit |
| <u>Gertrudis Carolina Sayago Bautista</u> , Skyler Sorsby, Roselyne Laboso, William Gottobrio                 | Raindrop to Recharge: A Comparison of Recharge Estimation Methods in a Nevada Desert Aquifer System                                          |
| <u>Esra Gulsen</u> , Max Hillermann, Pu Xia, Allan Jones                                                      | Floodwaters Rising                                                                                                                           |
| <u>Zhaowei (Jack) Wang</u> , Louis Manzella, Christopher Muffels, Vivek Bedekar                               | An Appealing Approach to Represent Hydraulic Barrier Wall: Using the Connected Linear Network (CLN) Package                                  |
| <u>Jianfeng Su</u> , Ruta Basijokaite, Aaron A Mohammed, Tao Wen                                              | Three-Dimensional Contaminant Transport Modeling of a Surface Spill in Fractured Appalachian Plateaus Bedrock                                |
| <u>Reed Maxwell</u>                                                                                           | Compensatory Root Water Uptake and PFT-Aware Water Stress: Improving Groundwater-Vegetation Coupling in ParFlow-CLM                          |
| <u>Reed Maxwell</u>                                                                                           | Solar-Zenith-Modulated Fractional Snow Cover Resolves the Peak-Accuracy vs Melt-Timing Trade-Off in ParFlow-CLM                              |

#### It's All Connected: Surface Water / Groundwater Interactions

|                                                                                                                                                |                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Hang Chen</u> , Chen Xiong                                                                                                                  | Geophysics-informed hydrologic modeling reveals contrasting shallow and bedrock responses of headwater catchments to warming                                         |
| <u>Joseph Wilder</u> , Tayyab Mehmood, John Lope                                                                                               | Simulating Flood and Drought Response in South Florida Using a Unified Integrated Modeling Framework: Surface-Subsurface Process Controls Across Hydrologic Extremes |
| <u>Grace Pleasant</u> , Stephen Saller                                                                                                         | From Aquifer to Estuary: Groundwater-Surface Water Interactions Governing Pollutant Loading to Biscayne Bay                                                          |
| <u>Omowumi Erukubami</u> , Austin Farnum, Danielle Pratt, Holly Michael, Paul Imhoff, Larry Trout, Tyler Barber, Chris Overcash, Carolyn Voter | Examining the Impacts of Bidirectional Interactions Between Surface and Subsurface Systems in a Coupled Coastal Urban Hydrologic Model                               |
| <u>Wes Zell</u> , James McCreight                                                                                                              | Does coupling the National Hydrologic Model to MODFLOW improve stream discharge simulation performance in an agriculturally intensive regional river basin?          |
| <u>Ali Gebriil</u>                                                                                                                             | Modeling Groundwater Development in Eureka, Montana: A Tool for Mitigation Planning                                                                                  |
| <u>Aynaz Ghasemi</u> , Nick Engdahl                                                                                                            | The Role of Heterogeneity in Shaping Transport Behaviors Through a High-Alpine Headwaters Catchment                                                                  |
| <u>Ayane Ataka</u> , Naota Hanasaki, Kei Yoshimura                                                                                             | Identifying Groundwater Supply Constraints in the Global Hydrological Model H08                                                                                      |

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- > PFAS
- > Sustainable Groundwater Management
- > Groundwater Quality

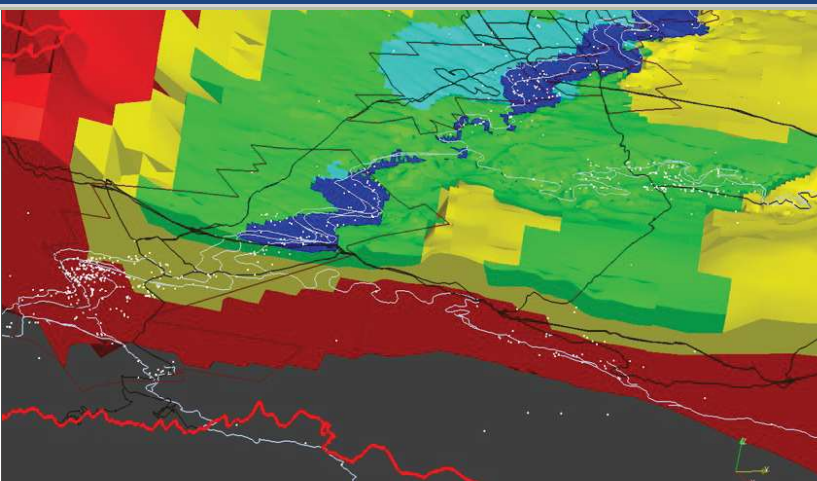
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| TUESDAY, JUNE 9 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                         |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TIME            | Friend 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | COS 104                                                                                                                                                                                                                                 |
| 08:00 – 08:25   | Opening and Featured Presentation<br><i>Featured Presentation:</i> Bridging the gap to quantum-computing based hydrological modeling with uncertainty aware simulation tools, <a href="#">by Nick Engdahl</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <i>Opening and Featured Presentation in Friend 101</i>                                                                                                                                                                                  |
| 08:30 – 10:00   | <i>Special Session:</i> MODFLOW as a Community-Based Development Effort<br>Session Chairs: Alden M. Provost, Eric D. Morway                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Contaminants and Water Quality<br>Session chairs: Nick Engdahl, Reed Maxwell                                                                                                                                                            |
| 08:30 – 08:45   | MODFLOW supports science, policy, and water-resource decisions across government, consulting, and research worldwide. Recent changes at the USGS and the emergence of a formal governance model have raised questions about what the future of MODFLOW looks like and how the hydrologic modeling community can shape it. This special session brings together developers, practitioners, and stakeholders for a close look at the present state and future of MODFLOW. Participants will hear the latest updates directly from core contributors, learn how the new governance structure secures stability and transparency, and see how community-driven development is strengthening the platform.                                                                                                                                                                                                                                  | Shubham Goswami, Abia Katimbo, Sahila Beegum, Sorab Panday, Daniel Snow, Arindam Malakar, Alakananda Mitra, Chittaranjan Ray<br>MODFLOW-Based Unified Modelling Framework for Water and Nutrient Transport in Agro-Hydrological Systems |
| 08:45 – 09:00   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Cathy Wang, Mario Soriano, Danyka Byrnes, Reed Maxwell<br>Quantifying legacy nitrogen transport from agricultural lands to streams and groundwater using integrated hydrologic and particle tracking models                             |
| 09:00 – 09:15   | In addition to technical talks, the session features an interactive component where attendees can ask questions, discuss priorities, and explore opportunities to engage in MODFLOW's long-term roadmap.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Wyatt Tatge, Samuel Shaheen, Fengchao Sun, Rob Rioux, William Miller-Brown, Quinn Zacharias, James Saiers<br>Hydrologic Controls on Chemical Weathering in a Headwater New England Catchment                                            |
| 09:15 – 09:30   | This session includes:<br><ul style="list-style-type: none"> <li>Introduction: Stability, Stewardship, and the Future of MODFLOW 6, <a href="#">by Michael N. Fienen, U.S. Geological Survey</a></li> <li>Community Contributions: Past, Present, and Future, <a href="#">by Christian D. Langevin, S.S. Papadopoulos &amp; Associates, Inc.</a></li> <li>Parallel MODFLOW 6 – Designed to Get You the Speedup Without the Headache, <a href="#">by Martijn J. Russcher, Deltares</a></li> <li>MODFLOW 6 as the Foundation for the Netherlands' Next-Generation Regional and National Groundwater Models, <a href="#">by Timo Kroon, Deltares and the Netherlands Hydrological Instrument (NHI)</a></li> <li>Q&amp;A Session with MODFLOW 6 Development Team, moderated by Janet Barclay, U.S. Geological Survey</li> <li>Closing Remarks: MODFLOW 6 Beyond 2026, <a href="#">by Eric D. Morway, U.S. Geological Survey</a></li> </ul> | Andrew Ashton<br>Modeled PFAS Signatures in Groundwater Considering Vadose Zone Leaching, Air-Water Interface Adsorption, and Soil Heterogeneity Across Various Soil Types                                                              |
| 09:30 – 09:45   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Liangchao Zou, Georgia Destouni <i>WITHDRAWN</i><br>Semi-analytical modeling of PFAS transport from the unsaturated zone to groundwater                                                                                                 |
| 09:45 – 10:00   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Session discussion.                                                                                                                                                                                                                     |
| 10:00 – 10:15   | Coffee Break                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                         |

| TUESDAY, JUNE 9 |                                                                                                                                                                                   |                                                                                                                 |                                                                                                                                                                                                          |                                                                                                                                   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| TIME            | Friend 101                                                                                                                                                                        |                                                                                                                 | COS 104                                                                                                                                                                                                  |                                                                                                                                   |
| 10:20 – 10:40   | <i>Featured Presentation:</i> Not your average Ghyben-Herzberg interface: How fresh groundwater gets offshore and why it matters, by <a href="#">Holly Michael</a>                |                                                                                                                 | <i>Featured Presentation in Friend 101</i>                                                                                                                                                               |                                                                                                                                   |
| 10:45 – 12:00   | <b>Machine Learning and Next-Generation Computing (1 of 2)</b><br>Session chairs: <b>Jeremy White, Lauren Foster</b>                                                              |                                                                                                                 | <b>Coastal Hydrology: Groundwater and Saltwater Intrusion</b><br>Session chairs: <b>Laura Condon, Holly Michael</b>                                                                                      |                                                                                                                                   |
| 10:45 – 11:00   | <a href="#">Aman Singh</a> , <a href="#">Sorab Panday</a> , <a href="#">Jamie Kim</a>                                                                                             | Regression-Enhanced Random Forest Model Application for Groundwater Level Predictions in Long Beach, California | <a href="#">Christian Langevin</a> , Mark Bakker, <a href="#">Sorab Panday</a> , <a href="#">Ron Falta</a> , <a href="#">Alan Lemon</a> , <a href="#">Chris Patterson</a> , <a href="#">Alex Defalco</a> | Implementation of a New Seawater Intrusion Package for MODFLOW 6                                                                  |
| 11:00 – 11:15   | <a href="#">Robert Wienroeder</a> , <a href="#">Charuleka Varadharajan</a> , <a href="#">Stefan Broda</a> , <a href="#">Felix Biessmann</a>                                       | Hybrid Spatiotemporal Modeling for Forecast-Anywhere Groundwater Level Prediction                               | <a href="#">Anner Paldor</a> , <a href="#">Yipeng Zhang</a>                                                                                                                                              | Alongshore topography is a dominating factor in modeling Offshore Freshened Groundwater systems                                   |
| 11:15 – 11:30   | <a href="#">Joshua Larsen</a>                                                                                                                                                     | Public and self-supplied domestic water use modeling for the conterminous United States                         | <a href="#">Hugo Loaiciga</a>                                                                                                                                                                            | Coupled groundwater flow, salt transport, and heat transport simulation in layered coastal aquifers to prevent seawater intrusion |
| 11:30 – 11:45   | <a href="#">Xiao Xia Liang</a> , <a href="#">Erwan Gloaguen</a> , <a href="#">Reed Maxwell</a>                                                                                    | Temporal Sensitivity in Data-Driven Hydrology: Linking Water Dynamics and Deep Learning Model Performance       | <a href="#">Yu Zhang</a> , <a href="#">Daniil Svyatsky</a> , <a href="#">J. David Moulton</a> , <a href="#">Joel Rowland</a>                                                                             | Integrating Hydrology and Eco-Geomorphology to Advance Coastal Groundwater and Saltwater Intrusion Prediction                     |
| 11:45 – 12:00   | <a href="#">Michael Morphey</a> , <a href="#">Travis Smiley</a> , <a href="#">Lauren Foster</a> , <a href="#">Leslie Gains-Germain</a>                                            | Groundwater Surrogate Models with Uncertain Source Conditions                                                   | <a href="#">Yuqi Song</a> , <a href="#">Frank Tsai</a> , <a href="#">Michael Attia</a> , <a href="#">Jian Luo</a>                                                                                        | Modeling Seawater Intrusion under Climate Stress in the Mississippi River Delta Using a Hydrogeological Digital Twin              |
| 12:00 – 13:10   | Lunch                                                                                                                                                                             |                                                                                                                 | <i>Commons D301</i>                                                                                                                                                                                      |                                                                                                                                   |
| 13:15 – 13:45   | <i>Keynote Presentation:</i> Evolution of Global Hydrology in the Anthropocene, by <a href="#">Dr. Taikan Oki</a> , Professor at The University of Tokyo, Meguro-ku, Tokyo, Japan |                                                                                                                 | <i>Featured Presentations in Friend 101</i>                                                                                                                                                              |                                                                                                                                   |
| 13:50 – 14:10   | <i>Featured Presentation:</i> Conceptual Modeling in the Age of AI, by <a href="#">Dr. Lauren Foster</a> , Neptune and Company                                                    |                                                                                                                 |                                                                                                                                                                                                          |                                                                                                                                   |
| 14:15 – 14:35   | <i>Featured Presentation:</i> Groundwater Models Supporting Consumptive Use Permit Decisions in Florida, by <a href="#">James Rumbaugh</a> , Environmental Simulations, Inc.      |                                                                                                                 |                                                                                                                                                                                                          |                                                                                                                                   |
| 14:35 – 15:00   | Coffee Break                                                                                                                                                                      |                                                                                                                 |                                                                                                                                                                                                          |                                                                                                                                   |

| TUESDAY, JUNE 9 |                                                                                                                                                       |                                                                                                                                      |                                                                                                                           |                                                                                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| TIME            | Friend 101                                                                                                                                            |                                                                                                                                      | COS 104                                                                                                                   |                                                                                                                                                           |
| 15:05 – 15:25   | <i>Featured Presentation: Challenges and opportunities in reactive transport at regional scales, by Dr. Christopher Green, U.S. Geological Survey</i> |                                                                                                                                      | <i>Featured Presentation in Friend 101</i>                                                                                |                                                                                                                                                           |
| 15:30 – 16:45   | <b>Machine Learning and Next-Generation Computing (2 of 2)</b><br>Session chairs: Jim Rumbaugh, Lauren Foster                                         |                                                                                                                                      | <b>Hydrogeology, Vadose Zone, Case Studies, and Reactive Transport</b><br>Session chairs: Christopher Green, Nick Engdahl |                                                                                                                                                           |
| 15:30 – 15:45   | <u>Tyler Kamp</u> , Skyler Sorsby, Roselyne Laboso, William Gottobrio, Cliff Baines                                                                   | Comparison of Explainable AI and PEST-HP for Evaluating Model Sensitivity                                                            | <u>Raghu Suribhatla</u> , Murray Einarson, Charles Payne                                                                  | Development and Calibration of Numerical Models from Environmental Sequence Stratigraphy-based Geologic Models - Evaluation of Prior Geologic Information |
| 15:45 – 16:00   | <u>Roselyne Laboso</u> , Skyler Sorsby, William Gottobrio                                                                                             | Applying Machine Learning to Hydrographs to Identify Different Types of Hydraulic Stresses in a Coastal Groundwater System           | <u>Deviyani Gurung</u> , Ali Meyal, Dimitri Vlassopoulos, Olivier Atteia                                                  | In Situ Groundwater Remediation with Layered Double Hydroxides: Injection Strategies for Bimolecular Reactions                                            |
| 16:00 – 16:15   | <u>Daniel Burnell</u> , Jle Xu, Justin Cooper, James Ross                                                                                             | Quantum Computing and Machine Learning for Groundwater Flow and Solute Transport Modeling                                            | <u>Philipp Huttner</u> , Steve Blake, Maximilian Winderl, Douglas Graham                                                  | High resolution modelling of groundwater recharge for MODFLOW with MIKE SHE                                                                               |
| 16:15 – 16:30   | <u>Jevon Harding</u> , Shirley Wade                                                                                                                   | Transitioning a Statewide Groundwater Modeling Program to MODFLOW 6: Lessons Learned from the Southern Trinity Aquifer Model (Texas) | <u>Hiroko Hort</u> , Richard Niswonger, Sorab Panday                                                                      | Ecohydrology and West Nile Virus Risk: Advancing a Coupled Water-Disease Modeling Framework                                                               |
| 16:30 – 16:45   | <u>William Gottobrio</u> , Brent Waters, Skyler Sorsby, William Grimes                                                                                | Groundwater Modeling Process Overview for Small Modular Reactor Nuclear Power Plant Licensing                                        | <u>Jennifer Sano</u>                                                                                                      | Integrated Geological and Numerical Modeling to Support a Technical Impracticability Evaluation at a Former Coal Tar Processing Facility                  |
| 17:00 – 19:00   | <b>POSTER RECEPTION</b>                                                                                                                               |                                                                                                                                      |                                                                                                                           |                                                                                                                                                           |
|                 | <i>Poster presentations are listed by topic on program pages 18–19. Carl A. Fields Center.</i>                                                        |                                                                                                                                      |                                                                                                                           |                                                                                                                                                           |
| 19:30 – 21:30   | <i>Conference Party: Live music, appetizers, and refreshments</i>                                                                                     |                                                                                                                                      | <i>Graduate Hotel, Princeton</i>                                                                                          |                                                                                                                                                           |

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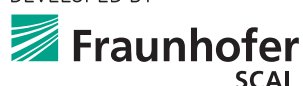
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## Poster Reception – Tuesday, June 9, 2026

### POSTER PRESENTATIONS

#### Coastal Hydrology: Groundwater and Saltwater Intrusion

|                                                                                                                           |                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Siska de Vreeze</u> , Holly Michael, Omowumi Erukubami, Carolyn B. Voter                                               | Modeling and mapping groundwater flooding and salinization in the East-Dover (DE) area                                                                     |
| <u>Dannielle Pratt</u> , Anner Paldor, Ryan Frederiks, Holly Michael                                                      | Antecedent hydrological conditions and site characteristics as the primary control on surge salinization                                                   |
| <u>Jia Zhang</u> , Yao Hu                                                                                                 | Propagation of tidal stage and salinity signals into an adjacent aquifer: calibration and forcing sensitivity in a wetland reserve                         |
| <u>Hanni Blair</u> , Derrik Williams                                                                                      | Groundwater Modeling to Inform Regulatory Agency and Stakeholder Discussions of Seawater Intrusion Mitigation Strategies in the Salinas Valley, California |
| <u>Chieh-Ying Chen</u> , Dannielle Pratt, Keryn Gedam, Matthew Kirwan, Tahmidur Rahman Junayed, Riley Leff, Holly Michael | A coupled modeling framework to study the impacts of hydrologic stressors on ecosystem response in the coastal critical zone                               |
| <u>Tahmidur Rahman Junayed</u> , Holly A. Michael, Dannielle Pratt, Sasha Sehgal                                          | Mechanistic Modeling of Evapoconcentration and Root Water Uptake Inhibition in Salinizing Coastal Transition Zones                                         |

#### Contaminants and Water Quality

|                                                                                                             |                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <u>Brian Mailloux</u> , Laurina Xie, Heidi O'Neill, Nicholas Procopio, Steven Chillrud, Mark Bakker         | Possible trends of PFAS and Uranium in New Jersey Private Wells: New data from when a home sells twice.               |
| Jake Smith, Jacob Chu, <u>Raghu Suribhatla</u>                                                              | Estimating Field-scale Air-Water Interfacial Area for PFAS Fate and Transport Evaluation                              |
| <u>Himmat Basnet</u> , Eunsang Cho, Seonggyu Park, Sangchul Hwang                                           | Hydrologic Simulation and PFOS Transport in the San Antonio River Watershed: SWAT+ Insights for Coupling with MODFLOW |
| <u>Eric Morway</u> , Ayman Alzraiee, Timothy Gates, Richard Niswonger, Martijn Russcher, Christian Langevin | Dynamic Simulation of Salinity-Dependent Evapotranspiration Using the MODFLOW 6 API                                   |

#### Hydrogeology, Vadose Zone, Case Studies, and Reactive Transport

|                                                                                 |                                                                                                                                              |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Trevor Budge</u> , Will Nichols, Sean Sexton                                 | Remedial Process Optimization Approach and Application on the Central Plateau at the Hanford Site                                            |
| <u>Alberto Casillas-Trasvina</u> , Tiantian Zhou, Menberu Meles, Scott Bradford | Modeling Recharge and Travel Times Across a Thick Vadose Zone in California's Central Valley                                                 |
| <u>Sebastián Vázquez-Gasty</u> , Sorab Panday, James McCord                     | A Physically Based MODFLOW Framework for Modelling Variably Saturated Flow in Heap Leaching Systems                                          |
| <u>Benjamin West</u> , Laura Condon                                             | Using Integrated Hydrologic Modeling to Investigate the Spatiotemporal Characteristics of Droughts in Catchments with Human Water Management |

#### Machine Learning and Next Generation Computing

|                                                                                                                             |                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <u>Rodrigo Herrera</u>                                                                                                      | Breaking the Windows Shell and Biting the Apple: A Performance Benchmark of ARM Silicon for Groundwater Modeling    |
| <u>Maria Pereira Fleury</u> , Reed Maxwell, Yueling Ma                                                                      | Mapping Water Table Depth Across Brazil Using a Random Forest Model                                                 |
| <u>Schuyler Robinson</u> , Poonam Kulkarni, Emily Stockwell, Katlyn Schmeltzer, Jordan White, Joseph Scalia, Charles Newell | Optimizing PFAS Plume Remediation with Groundwater Modeling and Machine Learning                                    |
| <u>Michael Ou</u>                                                                                                           | Space-Time Kriging for Reconstructing Contaminant Plume Evolution from Irregular Monitoring Data                    |
| <u>Tom Glose</u> , Scott Stokes, Jacob Bauer                                                                                | Benchmarking MODFLOW API for Re-Run and Time-Parallelization in USGS Large Test Models                              |
| <u>Wes Bonelli</u> , Michael Reno, Marnix Kraus                                                                             | Next generation Python tools for MODFLOW                                                                            |
| <u>Zhaoyu Zhang</u> , Akiyuki Kawasaki, Qing He, Abdul Moiz                                                                 | Model-consistent EA-LSTM explanations for diagnosing runoff controls across Japanese basins                         |
| <u>Mehdi Ghasemizade</u>                                                                                                    | Comparative Evaluation of Data-Driven and Physics-Based Approaches for Modeling Groundwater-Induced Land Subsidence |
| <u>Adam Janzen</u>                                                                                                          | Comparison of Methods for Estimating Time-Varying Recharge for MODFLOW Model Input                                  |

**POSTER PRESENTATIONS, CONTINUED****Making Models Better: Calibration, Inference, and Uncertainty**

|                                                                                                      |                                                                                                                                            |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Trent Farnum</u> , Andrew Leaf, Michael Fienen                                                    | PEST++IES How Many Iterations and Realizations, Finding the Point of Diminishing Returns                                                   |
| <u>Yun Huang</u>                                                                                     | On the Usefulness of Groundwater Models                                                                                                    |
| Jonathan Quiroz, Steve Young, <u>Shuo Yang</u>                                                       | Reducing Groundwater Model Nonuniqueness through Parameter Bounding and Multi-type Calibration Data                                        |
| <u>Lauren Sather</u> , Eric Chiang, Garrett Rapp                                                     | From Calibration to Decision Making: Using Ensemble Methods and Uncertainty Analysis to Estimate the Chino Basin Safe Yield                |
| <u>Marie Joe Sawma</u> , Amanda Triplett, Andrew Bennett, Peter Melchior, Laura Condon, Reed Maxwell | Simulation-Based Inference for Spatially Distributed Parameter Estimation in Integrated Hydrologic Models                                  |
| <u>Amandeep Singh</u> , Sorab Panday, Brian Partington, Thomas Henderson                             | Advancing Groundwater Management Under Uncertainty: Ensemble Modeling in Southern California                                               |
| <u>Prashanth Khambhammettu</u> , Scott Potter, Michael Kladias, Marc Killingstad                     | Next-Generation Parameterization Methods for Subsurface Heterogeneity: Enhancing Groundwater Models and Remedial Strategies                |
| <u>Prashanth Khambhammettu</u> , Scott Potter, Michael Kladias                                       | Unpopular Opinion: The Ensemble Delusion and Why Automated Uncertainty is No Substitute for Expert-Guided “Subsurface Weather” Forecasting |
| <u>Daniel Burnell</u> , Mahade IbnSalam, Jie Xu                                                      | Modeling Tool for Simulating Advective Transport and Back-diffusion in Highly Heterogeneous Media                                          |

**Mining and Energy**

|                                                                      |                                                                                                                                                         |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Alan Jang</u> , Steve Meyerhoff                                   | Climate-Driven Controls on Groundwater Recovery and Pit-Lake Evolution at a Post-Mining Site in the Western United States                               |
| <u>Aya Mohamed</u> , Assaf Wunsch, Philine Tullius, Kyle Williams    | Turning Monitoring Data into Insights: Understanding Shallow Subsurface Dynamics in Closed Tailing Facilities Through Data-Driven Infiltration Modeling |
| <u>Aya Mohamed</u> , Carolyn Lambert, Vladimir Ugorets, Assaf Wunsch | Evaluating the Impact of Land Subsidence Induced by Pumping Activities on Mine Water Management and Regulatory Permitting                               |
| <u>Rodolfo Ordoñez</u> , Mauricio Muñoz, Cristian Ortiz              | Coupled Simulation of Unsaturated Flow and Consolidation in Tailings Deposits Using MODFLOW-USG Transport                                               |
| <u>German Ibarra</u> , Jeff Randall                                  | Evaluating the impact of overbreak zone representation on pore pressure distributions                                                                   |

**Sustainable Water Management: The Role of Safe vs Sustainable Yield in Groundwater Systems**

|                                                                       |                                                                                                                              |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <u>Pranta Bhowmik</u> , Md. Aminul Haque Laskor, Md. Mohaimenul Islam | Assessing Groundwater Sustainability in Intensive Agricultural Zones: A GIS-AHP Approach in Kishoreganj District, Bangladesh |
| Laura Rodriguez, Hongbin Zhan, Peter Knappett, <u>Sonia Lopez</u>     | On the Inland Saltwater and Freshwater Interaction and its Impact on Water Resource Management                               |
| <u>Saif Haider</u> , Muhammad Rashid                                  | Quantifying Climate and Land Use Change Impacts on Aquifer Behavior Through Numerical Simulation                             |

| WEDNESDAY, JUNE 10 |                                                                                                                                                                                                                                                                                                               |                                                                                                              |                                                                                                                                                                  |                                                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| TIME               | Friend 101                                                                                                                                                                                                                                                                                                    |                                                                                                              | COS 104                                                                                                                                                          |                                                                                                                                                     |
| 08:00 – 08:25      | Opening and Featured Presentation<br><i>Featured Presentation: Four Decades of Research at the MADE Site and Beyond: Advancing Understanding Through Modeling</i> , by Dr. Chunmiao Zheng, Eastern Institute of Technology, Ningbo, China, and Southern University of Science and Technology, Shenzhen, China |                                                                                                              | <i>Opening and Featured Presentation in Friend 101</i>                                                                                                           |                                                                                                                                                     |
| 08:30 – 09:45      | Making Models Better: Calibration, Inference, and Uncertainty (1 of 2)<br>Session chairs: <b>Jeremy White, Sorab Panday</b>                                                                                                                                                                                   |                                                                                                              | Sustainable Water Management: The Role of Safe vs. Sustainable Yield in Groundwater Systems<br>Session chairs: <b>Matt Tonkin, Jim Rumbaugh</b>                  |                                                                                                                                                     |
| 08:30 – 08:45      | <u>Mohammad Afzal Shadab</u> , Nicholas Jadallah, Reed Maxwell                                                                                                                                                                                                                                                | Scale-Dependent Role of Soil Capillarity in Integrated Surface-Subsurface Hydrologic Simulations             | <u>Katherine H. Markovich</u> , Michael N. Fienen, Nicholas Corson-Dosch, Cecile Coulon, Jeremy T. White, Stephen B. Gingerich                                   | Balancing environment and economy in an agricultural basin: Moving beyond scenarios with multi-objective optimization                               |
| 08:45 – 09:00      | <u>David Brakenhoff</u> , Mattijs Borst, Mark Bakker                                                                                                                                                                                                                                                          | Cross-sectional analytic element modeling - estimation of aquifer parameters and dike stability with timflow | <u>Prathiksha Raghava</u> , Prakash kumar Jha, Drew Gholson                                                                                                      | A benchmark study for Mississippi delta region food-water nexus; An Integrated Modeling approach                                                    |
| 09:00 – 09:15      | <u>Leonardo Sandoval</u> , Reed Maxwell, Amy Defnet, Laura Condon                                                                                                                                                                                                                                             | Operationalizing Continental-Scale Integrated Hydrologic Modeling with ParFlow-CLM                           | <u>Merhawi GebreEgziabher</u> , Scott Jasechko, Debra Perrone                                                                                                    | National-Scale Lithologic Controls on Drainable Porosity and Managed Aquifer Recharge Potential                                                     |
| 09:15 – 09:30      | <u>Vivek Bedekar</u>                                                                                                                                                                                                                                                                                          | Uncertainty in Groundwater Modeling: Between Acknowledgment and Illusion                                     | Danael Aceves Pafilla, Rogelio Ledesma Ruiz, <u>Laura Rodríguez Lozada</u> , Daisy Nuñez Flores, Margarito Vázquez del Carmen, Rosario Sánchez, Jurgen Mahlkecht | Groundwater recharge in crisis: Analyzing the impact of urban growth on Monterrey's aquifer health in the face of the Rio Grande current conditions |
| 09:30 – 09:45      | <u>Mark Bakker</u> , David Brakenhoff                                                                                                                                                                                                                                                                         | What is difficult to do in MODFLOW but easy in analytic elements?                                            | <u>Sharlet Alice Ndede</u> , Valmy Awuor Otieno, Patrick Murung <i>WITHDRAWN</i>                                                                                 | From Safe Yield to Sustainable Yield in the Baricho/Sabaki Wellfield (Coastal Kenya): Scenario-Based Groundwater Modeling for Expansion Planning    |
| 09:45 – 10:00      | Coffee Break                                                                                                                                                                                                                                                                                                  |                                                                                                              |                                                                                                                                                                  |                                                                                                                                                     |

| WEDNESDAY, JUNE 10 |                                                                                                                                                                                                |                                                                                                                                                                            |                                                                                            |                                                                                                                     |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| TIME               | Friend 101                                                                                                                                                                                     |                                                                                                                                                                            | COS 104                                                                                    |                                                                                                                     |
| 10:05 – 11:35      | <b>Making Models Better: Calibration, Inference, and Uncertainty (2 of 2)</b><br>Session chairs: Christopher Green, Holly Michael                                                              |                                                                                                                                                                            | <b>Water Management in Mining and Energy</b><br>Session chairs: Jim Rumbaugh, Nick Engdahl |                                                                                                                     |
| 10:05 – 10:20      | <u>Louisa Pawusch</u> , Andrew Bennett, Peter Melchior, Laura Condon, Danielle Tijerina-Kreuzer, Reed Maxwell                                                                                  | Quantifying Hydraulic Conductivity Sensitivity in Continental-Scale Steady-State Groundwater Simulations                                                                   | <u>Yinuo Wang</u> , Hongbin Zhan, Junyuan Zhang, Zehao Chen, Laura Rodriguez Lozada        | Aquifer Thermal Energy Storage: Implications for Integrated Water and Energy Management                             |
| 10:20 – 10:35      | <u>Farshid Felfelani</u> , Tanjila Akhtar, Aubrey Dugger, Yadu Pokhrel, Wesley Zell                                                                                                            | Advancing Groundwater Representation in Land Surface Modeling: Case Studies in Incorporating Lateral Subsurface Flow and Pumping, Model Coupling, and Cross-Scale Dynamics | <u>Mickey Rush</u> , Daniel Birdsell, Renee Reichenbacher, Parker Rehmus                   | Evaluating the Hydrothermal Footprint of Geothermal Energy Development in Complex Rift Settings using MODFLOW 6 GWE |
| 10:35 – 10:50      | <u>Erik Toller</u> , Victor Blomqvist, Andrea Marinelli, Moa Berg                                                                                                                              | Using discrete fracture networks to improve continuum models                                                                                                               | <u>Julianna Huba</u> , David Boutt, Danielle Hare, Brendan Moran                           | Shifts in Aquifer Mechanics from Climate and Geochemical Impacts in the Salar de Atacama, Chile                     |
| 10:50 – 11:05      | <u>Dave Estrella</u> , Bianca Mintz                                                                                                                                                            | When Water Levels Aren't Enough: Incorporating Water Budget Uncertainty into Groundwater Flow Model Calibration                                                            | <u>Michael Sweetenham</u>                                                                  | Evaluating the Impacts of Raw Water Withdrawals on Surface Water and Groundwater at a Lithium Mine                  |
| 11:05 – 11:20      | <u>Nico Higgs</u> , Youssef Loukili, Allan MacGregor, Steven Siciliano                                                                                                                         | Sequential Assimilation of Concentration Data into Groundwater Transport Models: Solving the Zero-Variance Problem                                                         | <u>Roseanna Neupauer</u> , Maya Leizerovich, Shemin Ge                                     | Impact of Geothermal Energy Production on Hot Springs                                                               |
| 11:20 – 11:35      |                                                                                                                                                                                                |                                                                                                                                                                            | <u>Bruno Lapi</u> , Benjamin Rizzardini, Maximiliano Hebel, Jose Yañez                     | ENSI-Based Calibration of a Lithium Brine Reserve Model in the Salar de Atacama, Chile                              |
| 11:40 – 12:10      | Awards and Closing                                                                                                                                                                             |                                                                                                                                                                            |                                                                                            |                                                                                                                     |
| 12:15 – 13:15      | <b>Keynote Closing Presentation: Groundwater Recharge Regimes are in Flux</b> , by Steven Loheide, Professor, Department of Civil & Environmental Engineering, University of Wisconsin-Madison |                                                                                                                                                                            | Featured Presentation in Friend 101                                                        |                                                                                                                     |
| 13:15 – 14:30      | Lunch                                                                                                                                                                                          |                                                                                                                                                                            | Friend Center, Convocation Room                                                            |                                                                                                                     |

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## NOTES



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