The MADE Challenge for Groundwater Transport in Highly Heterogeneous Aquifers: Insights from 30 Years of Modeling and Characterization at the Field Scale and Promising Future Directions
Conveners and Program Committee

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Thank You to Our Sponsors

The organizers of this Chapman Conference wish to acknowledge the generous support for this conference.
Social Program

CONCERT

The concert will take place in the Church of Monteolivete on Tuesday, 6th of October 2015, at 21:00 h.
(Address: Plaza de Monteolivete, 3; corner of Avenida de la Plata and Calle del Alcalde Reig, in front of the Opera House; https://goo.gl/maps/8wsCTgkYyVo)

WALKING TOUR

There will be a two-hour walking tour of the old quarters of Valencia, given by an official guide, on Wednesday, 7th of October 2015. It will start at 16:00 from the river side of the Serranos Towers (Address: Calle Conde de Trénor, 11, https://goo.gl/maps/z86bfno2Gf32)

CONFERENCE DINNER

The conference dinner will take place in the Hotel Astoria Palace of Valencia on Wednesday, 7th October 2015, at 21:00 h.
(Address: Plaza de Rodrigo Botet, 5; https://goo.gl/maps/W7z1Q2joctQ2)
Scientific Program
MONDAY, OCTOBER 05

9:00 a.m.– 1:00 p.m. **Review of MADE Site Experiments and Similar Ones**

9:00 a.m. –9:05 a.m. Welcoming Remarks

9:05 a.m. –9:15 a.m. Introductory Remarks

9:15 a.m. –9:45 a.m. Chunmiao Zheng | A Brief History of the MADE Site

10:15 a.m. –10:45 a.m. Break

10:45 a.m. –11:15 a.m. Alraune Zech | Is Unique Scaling of Aquifer Macrodispersivity Supported by Field Data?

11:15 a.m. –11:45 a.m. Graham E Fogg | The MADE Site and Limitations of the Hydrologic Approach

11:45 a.m. –12:15 p.m. Georg Teutsch | Goal Oriented Parametrization of Transport Models – Recent Advances in Field Characterization and Data Analysis Methods

12:15 p.m. –1:00 p.m. Discussion

4:00 p.m.– 7:00 p.m. **Poster Session**
Presiding: James Butler

M-1 Duane R Hampton | Can local ADE-based models predict contaminant breakthrough?

M-2 Bradley Harken | Goal-Oriented Site Characterization: High Permeability Zones and Preferential Flow Paths
M-3 **Savannah Miller** | Comparison of the Classical Advection Dispersion Equation and a Temporally Nonlocal Version of the Advection Dispersion Equation to Model Solute Transport in Highly Heterogeneous Media at the Macrodispersion Experiment (MADE) Site.

M-4 **Alessandro Comolli** | Quantification of Anomalous Transport in Correlated Heterogeneous Media Using Coupled Continuous Time Random Walks

M-5 **Kevin R Roche** | Turbulent Hyporheic Exchange in Permeable Sediments

M-6 **Francesca Boso** | Prediction of Solute Concentration in the Presence of Uncertainty: beyond Moments

M-7 **Christophe C Fripiat** | Time-scale-dependent analysis of multiple-peaked breakthrough curves obtained in weakly stratified aquifers

M-8 **Nicole Lyn Sund** | Small Time Asymptotics of Solute Transport at High Peclet Number and the Effect on Velocity Correlation

M-9 **Veronica L Morales** | Topological characteristics and channel properties of porous media that underpin anomalous transport

M-10 **Brian D. Wood** | Development of an effective advection-dispersion-reaction equation involving chemical mixing
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<td>Reassessing the MADE direct-push hydraulic conductivity data using an improved calibration procedure</td>
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Thomas Vienken | Chasing the tracer - combining conventional salt tracer testing with Direct Push electrical conductivity logging for the characterization of a highly permeable fluvial aquifer

Peter Dietrich | Direct push driven in situ color logging tool for high resolution characterization of soils and unconsolidated sediments

Alexandria Kuhl | Quantifying Impacts of Solute Transport on Time Lapse ERT at a Michigan Ecotone

Mackenzie Cremeans | Preliminary Testing of a Streambed PVP, and its Application to Groundwater-Surface Water Interactions in a Stream in Jutland, Denmark

Buba Ankidawa Sr. | Assessing Suitability of Hand Drilling Techniques for Abstracting Shallow Alluvial Aquifers along River Benue Floodplain, North Eastern Nigeria

Claus P Haslauer | Modelling Non-Linear Spatial Dependence with Applications to MADE Hydraulic Conductivity Data

Liangping Li | Bridging Multiple-point Geostatistics and Parameter Estimation for Better Flow and Transport Modeling

Teng Xu | Joint characterization of non-Gaussian hydraulic conductivities and non-Gaussian porosities by the normal-score ensemble Kalman filter
M-30  **Veronique Bouzaglou** | Assimilation of Contamination Data for the Hydrogeological Characterization of a Heterogeneous Aquifer

M-31  **Lindsay A Mcmillan** | Inverse flow and transport modelling to understand contaminant transport experiments in a highly heterogeneous shear zone at the Grimsel Test Site in Switzerland

M-32  **Daniel O'Malley** | Stochastic inverse tomography of highly heterogeneous aquifers

M-33  **Michael C Sukop** | Characterizing the Hydraulic Conductivity of the Biscayne Aquifer of South Florida

M-34  **Anli Bourhane** | Harmonic analysis of hydrogeological time-series: a new high-resolution method to characterize highly heterogeneous coastal aquifers

M-35  **Chanse M Ford** | Characterizing Heterogeneous Groundwater Discharge in the Headwaters of the White River, Manistee National Forest, Michigan

M-36  **Angang Li** | Coupled Effects of Hyporheic Flow Structure and Biogeochemical Heterogeneity on Nutrient Dynamics in Rivers

M-37  **Jeff Pepin** | The Groundwater Flow Patterns Associated with the Formation of the Truth or Consequences, New Mexico Geothermal Resource
M-39  Priyanka B N | Parameter Estimation in Coastal Phreatic Aquifer near Mukka (Karnataka, India)

M-40  Rimma Abdrashitova | Geo-fluid model formation groundwater OF petroleum horizons Western megablock of the West Siberian megabasin

M-41  Peter Bayer | Joint Impact of Fracture Topography and Aperture Distribution on Flow and Transport

M-42  Martin Löfgren | Investigating the aperture of hydraulically conductive fractures in crystalline rock by electrical means.

M-43  Urban Svensson | Modelling flow and transport in a granitic rock, with focus on the sub metre scale

TUESDAY, OCTOBER 06

9:00 a.m.– 1:00 p.m.  New high-resolution methods to characterize highly heterogeneous aquifers

Presiding: James Butler

9:00 a.m. –9:30 a.m.  James J Butler Jr | Recent advances in hydrogeologic characterization of the shallow subsurface using direct-push technology

9:30 a.m. –10:00 a.m.  Peter Dietrich | Progress in hydraulic methods since the beginning of MADE - Opportunities and limitations for the investigation of highly heterogeneous aquifers (Invited)
10:00 a.m. –10:30 a.m. **Avinoam Rabinovich** | Frequency Dependent Hydraulic Properties Estimated from Oscillatory Pumping Tests in an Unconfined Aquifer

10:30 a.m. –11:00 a.m. Break

11:00 a.m. –11:30 a.m. **Anja Klotzsche** | High resolution subsurface characterization of the Krauthausen aquifer using GPR full-waveform inversion (Invited)

11:30 a.m. –12:00 p.m. **Harald Klammler** | A Passive Flux Meter for Down-Hole Measurement of Water and Contaminant Fluxes in Rock Fractures

12:00 p.m. –12:30 p.m. **David W Hyndman** | Quantifying the Value of High Resolution Characterization Data for Flow and Transport Predictions at the Highly Heterogeneous MADE Site

12:30 p.m. –1:00 p.m. Discussion

3:00 p.m. – 7:00 p.m. **Geostatistical Property Modeling**

3:00 p.m. –3:30 p.m. **J. Jaime Gómez-Hernández** | Geostatistical Property Modeling

3:30 p.m. –4:00 p.m. **Fred J Molz** | Complexity, Nonlinear Dynamics, Emergence and the Origin of Stochastic Fractals in Hydrological, Biogeochemical and Sedimentation Processes (Invited)

4:00 p.m. –4:30 p.m. **Niklas Linde** | Tomogram-based Appraisal of Geostatistical Models

4:30 p.m. –5:00 p.m. Break
5:00 p.m. –5:30 p.m. **Felipe de Barros** | Assessing Uncertainty in Groundwater-Driven Human Health Risk Predictions (Invited)

5:30 p.m. –6:00 p.m. **Erica R Siirila-Woodburn** | *Rethinking the Breakthrough Curve: Effects of Heterogeneity and Reducing the Associated Uncertainty*

6:00 p.m. –6:30 p.m. **Monica Riva** | New Statistical Scaling Model for Highly Heterogeneous and Non Gaussian Variables and Increments

6:30 p.m. –7:00 p.m. Discussion

**WEDNESDAY, OCTOBER 07**

9:00 a.m.– 1:00 p.m. **Can Local ADE-based Models with Sufficient Detail Successfully Predict Transport?**

9:00 a.m. –9:30 a.m. **Gedeon Dagan** | From heterogeneity characterization to prediction of transport in highly heterogeneous aquifers (with application to MADE)

9:30 a.m. –10:00 a.m. **Daniel Fernandez-Garcia** | Can Local ADE-based Models with Sufficient Detail Predict the Anomalous Transport Observed at the MADE Site (Invited)

10:00 a.m. –10:30 a.m. **Marco Bianchi** | Explaining "anomalous" solute transport at the Macrodispersion Experiment (MADE) site from a geological perspective

10:30 a.m. –11:00 a.m. Break
11:00 a.m. –11:30 a.m. **Guillaume Pirot** | Comparison of different conceptual models for uncertainty propagation on contaminant transport prediction

11:30 a.m. –12:00 p.m. **Mine Dogan** | Simulating the MADE plume through high resolution characterization

12:00 p.m. –12:30 p.m. **Aldo Fiori** | The impact of non-Gaussian logconductivity distributions on transport, with application to the MADE experiment.

12:30 p.m. –1:00 p.m. Discussion

**THURSDAY, OCTOBER 08**

9:00 a.m. – 1:00 p.m. **Alternatives to Local ADE-based Models for Highly Heterogeneous Media**

9:00 a.m. –9:30 a.m. **Vladimir Cvetkovic** | Field-scale tracer experiment in an aquifer with highly variable hydraulic and retention properties: Can modelling predict the outcome with reasonable confidence?

9:30 a.m. –10:00 a.m. **David Andrew Benson** | Upscaling at the MADE site: When, Why, How, and What Next? (Invited)

10:30 a.m. –11:00 a.m. Break

11:00 a.m. –11:30 a.m. **Marco Dentz** | Continuous Time Random Walks for Non-Fickian Solute Transport Under Heterogeneous Flow and Mass Transfer For Uniform and Radial Flow Conditions (Invited)

11:30 a.m. –12:00 p.m. **Allen Gerhard Hunt** | Percolation theory for solute transport in realistic porous media
12:00 p.m. –12:30 p.m.  **Diogo Bolster** | The Spatial Markov Model for Preasymptotic and Anomalous Transport - To correlate or not to correlate?

12:30 p.m. –1:00 p.m.  Discussion