Exponent®
Engineering & Scientific Consulting

Ali Moradi Gharehtapeh, Ph.D.

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Professional Profile

Dr. Moradi has a demonstrated history of working in hydrology, water resources and environmental engineering. He specializes in numerical modeling of subsurface processes, energy and mass transfer in porous media, and groundwater modeling.

Dr. Moradi has experience with statistical analysis, uncertainty quantification, and sensitivity analysis of complex mathematical models. His expertise includes:

- Developing numerical models to study vapor intrusion and subsurface transport of VOCs such as PCE and TCE
- Studying remediation of heavy metals such as chromium in fine-grained soils
- Using state-of-the art statistical approaches to analyze complex environmental systems
- Simulating methane leakage using numerical transport models
- Surface hydrology and flood frequency analysis under climate change scenarios
- Forensic geotechnical and geo-environmental studies

Dr. Moradi has consulting experience in assessing water loss in residential water distribution systems using statistical approaches, modeling and field studies. He has worked on projects involving feasibility studies of power plants and environmental site assessment. Dr. Moradi's Ph.D. research focused on developing scalable and sustainable systems for renewable energy storage in the form of heat in subsurface unsaturated zone. These systems were proposed to increase the energy storage efficiency and address the problems posed by traditional systems that store energy in shallow aquifers, potentially resulting in energy loss due to groundwater movement and water quality concerns.

Dr. Moradi performed the first ever 3-D intermediate laboratory experiments on heat transfer in unsaturated soils. In addition to experimental studies, he formulated a fully coupled heat and mass transfer model to better understand non-isothermal processes in the subsurface.

Additionally, Dr. Moradi developed a novel framework for a coupled thermally-enhanced bioremediation and renewable energy storage system.

Dr. Moradi was an assistant professor of Environmental Resources Engineering at Humboldt State University and served as a consultant working on a wide range of hydrogeological and geo-environmental projects prior to joining to Exponent.

Academic Credentials & Professional Honors

Ph.D., Civil and Environmental Engineering, Colorado School of Mines, 2016

M.Sc., Civil and Environmental Engineering, University of Massachusetts, Dartmouth, 2013

M.Sc., Civil and Environmental Engineering, Iran University of Science and Technology, 2009

B.S., Civil Engineering, K.N. Toosi University of Technology, Iran, 2006

Golden Colorado Sustainability Award of the Year (2016)

National Association of Energy Engineering award (2015)

Edna Bailey Sussman Foundation Environmental Fellowship (2014)

Academic Appointments

Assistant Professor, Department of Environmental Resources Engineering, Humboldt State University, 2018

Prior Experience

Hydrogeologist (Colorado), Bryant Consultants, 2019-2020

Assistant Professor, Humboldt State University, 2017-2019

Environmental Engineer, Sama Consulting Engineering, 2007-2010

Professional Affiliations

American Society of Civil Engineers (ASCE)

International Society for Porous Media (Interpore)

Languages

Persian

Azerbaijani

Publications

Tamizdoust, M.M., Moradi, A. and Ghasemi-Fare, O., 2020, February. Numerical Analysis of variation of saturation and moisture transport at the vicinity of a heat source. In Geo-Congress 2020: Geo-Systems, Sustainability, Geoenvironmental Engineering, and Unsaturated Soil Mechanics (pp. 349-357). Reston, VA: American Society of Civil Engineers.

Goodarzi, M.R., Fatehifar, A. and Moradi, A., 2020. Predicting Future Flood Frequency Under Climate Change Using Copula Function. Water and Environment Journal, 34(S1), pp.710-727.

Schwartz, M., Li, Z., Sakaki, T., Moradi, A. and Smits, K., 2019. Accounting for temperature effects on the performance of soil moisture sensors in sandy soils. Soil Science Society of America Journal, 83(5), pp.1319-1323.

Moradi, A., M Smits, K. and O Sharp, J., 2018. Coupled Thermally-Enhanced Bioremediation and Renewable Energy Storage System: Conceptual Framework and Modeling Investigation. Water, 10(10), p.1288.

Başer, T., Dong, Y., Moradi, A.M., Lu, N., Smits, K., Ge, S., Tartakovsky, D. and McCartney, J.S., 2018. Role of Nonequilibrium Water Vapor Diffusion in Thermal Energy Storage Systems in the Vadose Zone. Journal of Geotechnical and Geoenvironmental Engineering, 144(7), p.04018038.

Moradi, A., Smits, K.M., J., McCartney, J.S., Lu, N. 2016. Heat Transfer in Unsaturated Soil with Application to Borehole Thermal Energy Storage. Vadose Zone Journal.

Başer, T., McCartney, J.S., Moradi, A., Smits, K.M., Lu, N., 2016. Impact of a Thermo-Hydraulic Insulation Layer on the Long-Term Response of Soil-Borehole Thermal Energy Storage Systems. GeoChicago 2016: Sustainability, Energy and the Geoenvironment. Chicago. Aug. 14-18. pp. 1-10.

Pennell, K.G., Scammell, M.K., McClean, M.D., Suuberg, E.M., Moradi, A., Roghani, M., Ames, J., Friguglietti, L., Indeglia, P.A., Shen, R. and Yao, Y., 2016. Field data and numerical modeling: A multiple lines of evidence approach for assessing vapor intrusion exposure risks. Science of The Total Environment, 556, pp.291-301.

Moradi, A., Smits, K. M., Cihan, A., Massey, J., McCartney, J.S., 2015. Impact of Coupled Heat Transfer and Water Flow on Soil Borehole Thermal Energy Storage (SBTES) Systems: Experimental and Modeling Investigation. Geothermics 57, 56-72.

Moradi, A., Tootkaboni, M., Pennell, K.G., 2015. A variance decomposition approach to uncertainty quantification and sensitivity analysis of the Johnson and Ettinger model. Journal of the Air and Waste Management Association 65(2), 154–164.

Saeedi, M, Li, L.Y., Moradi Gharehtapeh, A. 2013. Effect of alternative electrolytes on enhanced electrokinetic remediation of hexavalent chromium in clayey soil, International Journal of Environmental Research 7(1), 39-50.

Presentations

Coupled Thermally-Enhanced Bioremediation and Renewable Energy Storage System: Conceptual Framework and Modeling Investigation, Interpore, Valencia, Spain, May 2019.

Understanding Natural Gas Methane Leakage from Buried Pipelines as Affected by Soil and Atmospheric Conditions – Field Scale Experimental and Modeling Study, American Geophysical Union fall meeting, New Orleans, LA, December 11-15, 2017.

Pore scale Assessment of Heat and Mass transfer in Porous Medium Using Phase Field Method with Application to Soil Borehole Thermal Storage (SBTES) Systems, AGU, San Francisco, California, December 2015.

Pore Scale Assessment of Thermal Conductivity-Saturation Relationship in Porous Medium Using Phase Field Method for Application to Hydrogeological Models, MODFLOW and more conference, Golden, Colorado, June 2015.

Impact of Coupled Heat Transfer and Water Flow on Soil Borehole Thermal Energy Storage (SBTES) Systems: Experimental and Modeling Investigation, AGU, San Francisco, California, December 2014.

Soil Moisture and Thermal Behavior through Unsaturated Soil Affecting Soil Borehole Thermal Energy Storage (SBTES) Systems: Experimental and Modeling Investigation, Gordon research conference, Lewiston, Maine, July 2014.

Predicting vapor intrusion exposures using field data and non-deterministic modeling approaches, Environmental Engineers and Scientists of 2050: Education, Research, and Practice, AEESP 50th anniversary conference, Golden, Colorado, July 2013.

Uncertainty analysis of vapor intrusion models using stochastic response surface method, American Chemical Society (ACS) 244th National Meeting, Philadelphia, Pennsylvania, August 2012.

Development of a Stochastic Response Surface Method for Evaluating Vapor Intrusion Models, Northeast Superfund Research Program integrative research translation activity (RTA): Complex Mixtures and Exposures: Analyzing, Modeling and Predicting Fate and Effects at Multiple Levels of Environmental and Biological Systems, Woods Hole, Massachusetts, April 2012.

Assessing Vapor Intrusion and Risk: Development of a Conceptual Site Model, Superfund Research Program Retreat, Brown University, January 2012.

Electrochemical removal of heavy metals from clayey soil using iron Nano particles, National conference of chemical engineering, Young Researchers club, Tehran, Iran, March 2010.

Evaluating the effect of Nano-Sized Zero-Valent iron barrier and Acetic acid solution as a catholyte on removal of hexavalent chromium by electrokinetic method, 3rd National Conference on World Environmental Day, Iran, Tehran June 2009.

Peer Reviews

Geotechnical and Geological Engineering

Environmental Fluid Mechanics

Water Resources Research

Vadose Zone Journal

International Journal of Heat and Mass Transfer

Geotechnical Testing Journal, Hydrogeology Journal

Soil Science Society of America Journal