

Name Binayak P. Mohanty

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Employment

2014- *Regents Professor, & College of Agriculture and Life Sciences (COALS) Chair in Hydrologic Engineering and Sciences, Texas A&M University, College Station*
2004-2014 Professor (Hydrology), Depts. of Biological and Agricultural Engineering and Ecosystem Science and Management, Texas A&M University, College Station
2001-2004 Associate Professor (Hydrology), Depts. of Biological and Agricultural Engineering and Ecosystem Science and Management, Texas A&M University, College Station
1993-2001 Associate, Assistant, and Post-Doctoral Researcher, Dept. of Environmental Sciences, University of California, Riverside; located at U. S. Salinity Lab, USDA-ARS

Education

1989-1992 Ph.D., Soil and Water Engineering (major) and Environmental Engineering (minor), Iowa State University, Ames, Iowa, USA
1986-1987 M.E., Soil and Water Engineering (major) and Water Resources Engineering (minor), Asian Institute of Technology, Bangkok, Thailand
1981-1985 B.Sc., Agricultural Engineering and Technology, Orissa University of Agriculture & Technology, Bhubaneswar, India

Research Experience

30 years' research experience on advancing water, chemical, and heat transport measurement, modeling/prediction, variability/uncertainty, and parameter estimation in the vadose zone from pore scale to continental scale under agricultural, range, forest, and peri-urban land covers and various hydro-climatic conditions. Research approach includes ground and remote sensing platforms and deterministic and stochastic process models and data assimilation/fusion framework. *Has implemented satellite platforms for Earth surface's hydrologic parameter exploration at multiple scales, and discovered soil moisture scaling rules including the dominant geophysical controls under different hydrologic and climatic conditions.*
As PI or Co-PI, Received 9 NSF, 14 NASA, 1 NIH, 2 ARMY, 1 DOE, and 20+ Local, State, and International Grants totaling about \$ 12 mil
As Co-I, Received KAUST (King Abdullah University of Science and Technology) Institute for Applied Mathematics and Computational Science (IAMCS) at Texas A&M University, Numerical Porous Media Center, and NSF –Science and Technology Center (Semi-Arid Hydrology Riparian Area, SAHRA) totaling about \$ 45 mil
As Lead PI, Developed Large Inter-Disciplinary/Multi-University Team for NSF-STC, ARMY-MURI, NSF-CZO, NSF-CZ Thematic Cluster, NSF-AI Institute, USDA-SAS and funded Texas Water Observatory (TWO) proposals at Texas A&M University
Supervised 20 postdoctoral Researchers, 25 Ph.D. students, and 10 master students; Many currently hold faculty and scientist positions in universities, national labs, and industries
Offered 128 Invited/Keynote/Distinguished Presentations and 335 Other Technical Presentations

Selected Honors and Awards

2023 AFS Distinguished Award for Research, Texas A&M University
2022 Senior Fellow, Texas A&M Agrilife Research
2022 Dean's Research Excellence Award, College of Agriculture and Life Sciences (COALS), Texas A&M University
2017 Fellow, American Association for the Advancement of Science (AAAS)
2016 Distinguished Alumni Award, Asian Institute of Technology (AIT), Bangkok, Thailand
2014 Don and Betty Kirkham Soil Physics Award, Soil Science Society of America (SSSA)
2014 Inaugural Holder of College of Agriculture and Life Sciences (COALS) Chair in Hydrologic Engineering and Sciences, Texas A&M University
2014 Regents Professor, Texas A&M University System (across all Texas A&M campuses)
2014&15 Nominee of Texas A&M University for Edith and Peter O'Donnell Award for

- Engineering, The Academy of Medicine, Engineering, and Science of Texas (TAMEST)
- 2014 TEES Senior Fellow, Texas A&M Engineering
- 2014 Award for Teaching Excellence, Biological and Agricultural Engineering, Texas A&M
- 2013 NASA Group Achievement Award for a Successful Pre-Launch Field Campaign
in Support of SMAP Algorithm and Applications Development
- 2013 William Keeler Faculty Fellow, Texas A&M Engineering
- 2013 & 14 Protégé, The Academy of Medicine, Engineering, and Science of Texas, TAMEST
- 2012 Fellow Soil Science Society of America (SSSA) & Agronomy Society of America (ASA)
- 2012 TAES Fellow, Texas AgriLife Research & TEES Fellow, Texas A&M Engineering
- 2011 Western Association of Agricultural Experiment Station Directors' Research Excellence
Award as a Member of W-2188 "Characterizing Mass and Energy Transport at Different
Vadose Zone Scales" Regional Research Group
- 2010 William Keeler Faculty Fellow, Texas A&M Engineering
- 2007 Ruth and William Neely '52/Dow Chemical Fellow, Texas A&M Engineering
- 1992 Reverend P.T. Taiganides Outstanding Graduate Student Award in Agricultural
and Biosystems Engineering, Iowa State University
- 1985 University Gold Medal for Outstanding Undergraduate Student in
Agricultural Engineering, Orissa University of Agriculture and Technology

Selected Professional Memberships

Member: American Geophysical Union (AGU), American Society of Agricultural and Biological
Engineers (ASABE), American Association for the Advancement of Science (AAAS),
Soil Science Society of America (SSSA), American Meteorological Society (AMS)

Selected Professional Service

Assoc. Editor: *Nature Scientific Reports* (2017-); *Water Resources Research* (2009-2016);
Vadose Zone Journal (2008-2016); *Journal of Environmental Quality* (2001-2007)

Special Issue Editor: Remote Sensing for Vadose Zone Hydrology, *Vadose Zone Journal* (August, 2013)

Committees Served: AGU Horton Medal Committee; AGU Fall Meeting Committee; AGU Soil and
Critical Zone Committee; AGU Remote Sensing Committee; AGU Unsaturated Zone
Committee; SSSA Kirkham Conference Committee; SSSA Kirkham Award Committee

Panel Member: NSF Interdisciplinary Program: Signals in Soil (SitS) Grant Panel, 2019
US National Academies Panel on Modeling Soil Water Dynamics, 2016
NASA Earth Venture Mission Primary Science Panel, 2016
NASA Earth Sciences Applications: Water Resources Grant Panel, 2016
NSF Hydrologic Sciences Grant Panel, 2007, 2009, & 2014
NASA Advancing Collab Connections for Earth Sys Sci (ACCESS) Grant Panel, 2013
DOE Yucca Mountain Infiltration Model Independent Review Panel, 2007-2008
NSF CUAHSI-HMF Water Cycle Advisory Panel, 2005
NASA Inter-Disciplinary Science Grant Panel, 2003

Selected Conference/Workshop/Symposium/Session/Distinguished Lecture Series Organizer:

Chairman/Organizer, *American Geophysical Union* for (29) Technical Sessions (2002-present)

Elected Program/Organizing Committee Member, *Gordon Research Conference - Frontier in Science,
Flow and Transport in Porous Media* (2006-2008)

Member, Organizing Committee, *2014 Texas Water Summit, The Academy of Medicine, Engineering, and
Science of Texas (TAMEST)* (2013-2014)

Chairman, *Symposium/Workshop on Arid Zone Hydrology under Climate Change Scenarios for the 21st Century,*
Institute of Applied Mathematics and Computational Science (IAMCS), Texas A&M (2014)

Member, Planning/Organizing Committee for *Specialty International Conferences*, Soil Science
Society of America (2014-2016)

Organizing Committee, *Third In-Situ and Remote Soil Moisture Sensing Technology Conference: Challenges
and Opportunities in a Changing World* (2014)

Selected Journal Publications

Unsaturated Zone Soil Hydraulics: New Measurement, Modeling, and Scaling Techniques

1. Mohanty, B.P., M.D. Ankeny, R. Horton, and R.S. Kanwar. Spatial Analysis of Hydraulic Conductivity Measured Using Disc Infiltrometer. *Water Resources Research*. 30(9),2489-2498, 1994.
2. Mohanty, B.P., R.S. Kanwar, and C.J. Everts. Comparison of Saturated Hydraulic Conductivity Measurement Methods for a Glacial Till Soil. *Soil Science Society of America Journal*. 58(3), 672-677, 1994.
3. Mallants, D., B.P. Mohanty, D. Jacques, and J. Feyen. Spatial Variability of Hydraulic Properties in a Multi-Layered Soil Profile. *Soil Science*. 161(3), 167-181, 1996.
4. Shouse, P.J. and B.P. Mohanty. Scaling of Near-Saturated Hydraulic Conductivity Measured Using Disc Infiltrometers. *Water Resources Research*. 34(5), 1195-1205, 1998.
5. Mohanty, B.P., and Z. Mousli. Saturated Hydraulic Conductivity and Soil Water Retention Properties Across a Soil-Slope Transition. *Water Resources Research*. 36(11), 3311-3324, 2000.
6. *Zhu, J., and B.P. Mohanty. Upscaling of Soil Hydraulic Properties Under Steady State Evaporation and Infiltration. *Water Resources Research*. 38 (), 10.1029/2001WR000704, 2002.
7. Saito, H., J. Simunek, and B.P. Mohanty. Numerical Analysis of Coupled Water, Vapor, and Heat Transport in Vadose Zone. *Vadose Zone Journal*. 5: 784-800, 2006.
8. Mohanty, B.P. and J. Zhu. Effective Hydraulic Parameters in Horizontally and Vertically Heterogeneous Soils for Steady-State Land-Atmosphere Interactions. *Journal of Hydrometeorology*. 8(4), 715-729, 2007.
9. *Hong, M., B.P. Mohanty, and Z. Sheng, An Explicit Scheme to Represent the Bidirectional Hydrologic Exchanges Between the Vadose Zone, Phreatic Aquifer, and River. *Water Resources Research*. 56, doi:10.1029/2020WR027571, 2020.
10. *Hong, M., and B.P. Mohanty, Representing Bidirectional Hydraulic Continuum Between the Stream and Hillslope in the National Water Model for Improved Streamflow Prediction, *Journal of Advances in Modeling Earth Systems*. doi.org/10.1029/2022MS003325, 2023.

Remote Sensing of Soil Hydrologic Parameters: Fingerprinting, Connectivity, and Assimilation

11. *Sharma, S.K., B.P. Mohanty, J. Zhu. Including Topography and Vegetation Attributes for Developing Pedo-Transfer Functions. *Soil Science Society of America Journal*. 70: 1430-1440, 2006.
12. *Ines, A.V.M. and B.P. Mohanty. Parameter Conditioning with a Noisy Monte Carlo Genetic Algorithm for Estimating Effective Soil Hydraulic Properties from Space. *Water Resources Research*. 44, 10.1029/2008WR006125, 2008.
13. *Jana, R., B.P. Mohanty, and E. Springer, Bayesian Implementation of Multi-scale Pedo-Transfer Functions with Non-Linear Bias Corrections. *Water Resources Research*. 10.1029/2008WR006879, 2008.
14. *Das, N.N., B.P. Mohanty, and E.G. Njoku. A Markov Chain Monte Carlo Algorithm for Upscaled Soil-Vegetation-Atmosphere-Transfer Modeling to Evaluate Satellite-Based Soil Moisture Measurements. *Water Resources Research*. 44, 10.1029/2008WR006472, 2008.
15. *Ines, A.V.M. and B.P. Mohanty. Near-Surface Soil Moisture Assimilation to Quantify Effective Soil Hydraulic Properties Using Genetic Algorithm. 2. with Air-Borne Remote Sensing During SGP97 and SMEX02. *Water Resources Research*. 45, 10.1029/2007WR007022, 2009.
16. *Shin, Y., B.P. Mohanty, and A.V.M. Ines, Soil Hydraulic Properties in One-Dimensional Layered Soil Profile Using Layer-Specific Soil Moisture Assimilation Scheme. *Water Resources Research*. 48, W06529, doi:10.1029/2010WR009581, 2012.
17. *Jana, R., and B.P. Mohanty, On Topographic Controls of Soil Hydraulic Parameter Scaling at Hillslope Scales. *Water Resources Research*. 48, W02518, doi:10.1029/2011WR011204, 2012.
18. *Kim, J., and B.P. Mohanty, A Physically-Based Hydrological Connectivity Algorithm for Describing Spatial Patterns of Soil Moisture in the Unsaturated Zone. *J. Geophysical Research-Atmosphere*, 122, doi:10.1002/2016JD025591, 2017.

Preferential Flow and Transport: Characterization, Modeling, and Uncertainty Quantification

19. Mohanty, B.P., R.S. Bowman, J.M.H. Hendrickx, and M.Th. van Genuchten. New Piecewise-Continuous Hydraulic Functions for Modeling Preferential Flow in An Intermittent-Flood-Irrigated Field. *Water Resources Research*. 33(9), 2049-2063, 1997.
 20. Mohanty, B.P., R.S. Bowman, J.M.H. Hendrickx, J. Simunek, and M.Th. van Genuchten. Preferential Transport of Nitrate to a Tile Drain in an Intermittent-Flood-Irrigated Field: Model Development and Experimental Evaluation. *Water Resources Research*. 34(5), 1061-1076, 1998.
 21. *Kohne, J.M., and B.P. Mohanty. Water Flow Processes in a Soil Column with a Cylindrical Macropore: Experiment and Hierarchical Modeling. *Water Resources Research*. 41(), 10.1029/2004WR003303, 2005.
 22. *Castiglione, P., P.J. Shouse, B.P. Mohanty, D. Hudson, and M. Th. van Genuchten. Improved Tension Infiltrometer for Measuring Low fluid Flow Rates in Unsaturated Fractured Rock. *Vadose Zone Journal*. 4:885-890, 2005.
 23. *Arora, B., B.P. Mohanty, and J.T. McGuire, Inverse Estimation of Parameters for Multi-Domain Flow Models in Soil Columns with Different Macropore Densities. *Water Resources Research*. 47, doi:10.1029/2009WR009451, 2011. (featured article in WRR)
 24. *Arora, B., B.P. Mohanty, and J.T. McGuire, Uncertainty in Dual Permeability Model Parameters for Structured Soils. *Water Resources Research*. 48, W01524, doi:10.1029/2011WR010500, 2012.
- ## Multi-Scale Soil Moisture: Remote Sensing, Physical Controls, Scaling, Fusion, and Application
25. Mohanty, B. P., T.H. Skaggs, and J.S. Famiglietti. Analysis and Mapping of Field-Scale Soil Moisture Variability Using High Resolution Ground-Based Data During the Southern Great Plains 1997 (SGP97) Hydrology Experiment. *Water Resources Research*. 36(4), 1023-1031, 2000.
 26. Mohanty, B. P., and T.H. Skaggs. Spatio-Temporal Evolution and Time-Stable Characteristics of Soil Moisture Within Remote Sensing Footprints with Varying Soil, Slope, and Vegetation. *Advances in Water Resources*. 24(9-10), 1051-1067, 2001.
 27. Jacobs, J., B.P. Mohanty, E.C. Hsu, and D.A. Miller. SMEX02: Field Scale Variability, Time Stability, and Similarity of Soil Moisture, *Remote Sensing of Environment*. 92: 436-446, 2004.
 28. *Das, N.N., and B.P. Mohanty. Root Zone Soil Moisture Assessment Using Remote Sensing and Vadose Zone Modeling. *Vadose Zone Journal*. 5: 296-307, 2006.
 29. *Joshi, C., and B.P. Mohanty, Physical Controls of Near-Surface Soil Moisture Across Varying Spatial Scales in an Agricultural Landscape During SMEX02. *Water Resources Research*. 46, doi:10.1029/2010WR009152, 2010.
 30. Crow, W.T., A. Berg, M.H. Cosh, A. Loew, B.P. Mohanty, R. Panciera, P. De Rosnay, D. Ryu, and J. Walker, Upscaling Sparse Ground-Based Soil Moisture Observations for the Validation of Satellite Surface Soil Moisture Products. *Review of Geophysics*. 50, doi:10.1029/2011RG000372, 2012.
 31. *Ines, A.V.M., B.P. Mohanty, and Y. Shin, An Unmixing Algorithm for Remotely Sensed Soil Moisture, *Water Resources Research*. 49, 408-425, doi:10.1029/2012WR012379, 2013.
 32. *Shin, Y., and B.P. Mohanty, Development of a Deterministic Downscaling Algorithm for Remote Sensing Soil Moisture Footprint Using Soil and Vegetation Classifications. *Water Resources Research*. 49, doi: 10.1002/wrcr.20495, 2013.
 33. *Gaur, N., and B.P. Mohanty, Land-Surface Controls on Near-Surface Soil Moisture Dynamics: Traversing Remote Sensing Footprints, *Water Resources Research*. 52, doi:10.1002/2015WR018095, 2016.
 34. *Gaur, N., and B.P. Mohanty, A Nomograph to Incorporate Geophysical Heterogeneity in Soil Moisture Downscaling. *Water Resources Research*. doi:10.1029/2018WR023513, 2019.
 35. *Kathuria, D., B.P. Mohanty, and M. Katzfuss, Multiscale Data Fusion for Soil Moisture Estimation: A Spatial Hierarchical Approach, *Water Resources Research*. 55, doi:10.1029/2018WR024581, 2019.
 36. *Sehgal, V., N. Gaur, and B.P. Mohanty, Global Flash Drought Monitoring using Surface Soil Moisture. *Water Resources Research*, 57, doi:10.1029/2021WR029901, 2021.