LEILA FARHADI

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PROFESSIONAL

2020-Present	Associate Professor, **The George Washington University** Department of Civil and Environmental Engineering
2013-2020	Assistant Professor, **The George Washington University** Department of Civil and Environmental Engineering
2012-2013	Post-Doctoral Research Scientist, **NASA, Goddard** Global Modeling and Assimilation Office
2006-2012	Research Assistant, **Massachusetts Institute of Technology, MIT** Department of Civil and Environmental Engineering
2004-2005	Research Assistant, **University of California, Davis** Department of Civil and Environmental Engineering
2002-2004	Research and Teaching Assistant, **Sharif University of Technology,** Department of Civil and Environmental Engineering

EDUCATION

2012 **Massachusetts Institute of Technology**, USA
Ph.D. in Civil and Environmental Engineering
- Dissertation title: Estimation of Land Surface Water and Energy Balance Flux Components and Closure Relation using Conditional Sampling
- Advisor: Dara Entekhabi
- Committee: Guido Salvucci, Dennis Mclaughlin and Mahta Moghaddam

2003 **Sharif University of Technology**, Tehran, Iran
M.Sc. in Water Resources Engineering
- Dissertation title: Numerical Modeling of Irregular Free Surface Flow using the Fully Lagrangian Method of Moving Particle Semi implicit (MPS)
- Advisor: Behzad Ataie Ashtiani

2001 **Sharif University of Technology**, Tehran, Iran
B.Sc. in Civil Engineering

RESEARCH INTERESTS

- ***Land-Atmosphere Interaction***
- ***Data Assimilation:*** Techniques, Development, Application
- ***Applications of Earth Remote Sensing in Hydrology***
- ***Optimization Techniques and Parameter Estimation in Hydrology and Hydraulics***
- ***Application of Numerical Techniques in Hydrological and Hydraulic Modeling***

HONORS AND AWARDS

2019 NSF CAREER Award in Hydrological Sciences, 12/2019

2018 NASA Early Career (New Investigator) Award in Earth Sciences, 05/2018

2018 GW School of Engineering and Applied Sciences Outstanding Junior Teaching Award, 04/2018.

2006 Schoettler Fellowship Award, Department of Civil and Environmental Engineering, MIT, 09/2006

2003 Tavakkoli Prize for the Most Innovative Research and Best Graduate (M.Sc. and PhD) Thesis Award, Sharif University of Technology, 10/2003

REFEREED JOURNAL PUBLICATIONS

# indicates my graduate students, * indicates me as the corresponding author.

In Preparation/ Submitted

21. **Mahmoud, A.,# Farhadi, L.,*** A Framework for Coupled Estimation of Evapotranspiration and Recharge by Assimilating Remotely Sensed Land Surface Temperature and Surface Soil Moisture. In Preparation.

20. **Heidari, P.,# Farhadi, L.,** Mapping Recharge Flux via Assimilation of SMAP Observations with Reduced- Adjoint Variational Data Assimilation Method, In preparation

19. **Heidari, P.,# Farhadi, L.,* Altaf, U.,** Coupled Estimation of Root zone Soil Moisture and Soil Hydraulic Parameters with Reduced-Adjoint Variational Data Assimilation using Near Surface Soil Moisture Observations, Submitted

18. **Abdolghafoorian, A.**,# **Farhadi, L.,*** **Fallah, F.,#** Leblanc, S., Shittu, E. Environmental Impact of Solar Farms, Case Study: Duke Energy Renewables Solar Farms in North Carolina. In Preparation.

Published

17. **Mahmoud, A.,# Farhadi, L.,*** A Variational Framework for Coupled Estimation of Evapotranspiration and Recharge Fluxes by Assimilating Land Surface Soil Moisture and Temperature, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2022,

16. **Heidari, P.,# Farhadi, L.,* Altaf, U.,** Estimation of Root Zone Soil Moisture Profile by Reduced-Order Variational Data Assimilation Using Near Surface Soil Moisture Observations, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2022

15. **Abdolghafoorian. A.**,# **Farhadi, L.** * LIDA: a Land Integrated Variational Data Assimilation Framework for Mapping Land Surface Heat and Evaporative Fluxes by Assimilating Space-Borne Soil Moisture and Land Surface Temperature, Water Resources Research, 2020

14. **Abdolghafoorian. A.**,# **Farhadi, L.** * . Estimation of Surface Turbulent Fluxes from Land Surface Moisture and Temperature via a Variational Data Assimilation Framework, *Water Resources Research*, 2019, 55(6) 4648-4667

13. **Nabian, M. A.**,# **Farhadi, L.*** MR-WC-MPS: A Multi-Resolution WC-MPS Method for Simulation of Free Surface Flows.*Water.* 2019, 11(7), 1349 (Invited paper)

12. Lu, Y., Steele-Dunne, S. C., **Farhadi, L.**, Van de Giesen, N. Mapping Surface Heat Fluxes by Assimilating SMAP Soil Moisture and GOES Land Surface Temperature Data. *Water Resources Research.* 2017, 53 (12), 10,858-10,877

11. **Abdolghafoorian, A.**,# **Farhadi, L.***, Bateni, S. M., Margulis S. A., Xu, T. Characterizing the Effect of Vegetation Dynamics on the Bulk Heat Transfer Coefficient to Improve Variational Estimation of Surface Turbulent Fluxes. *Journal of Hydrometeorology.* 2017, 18(2) 321-333

10. **Nabian, M. A.**,# **Farhadi, L.*** Multiphase Mesh-Free Particle Method for Simulation of Granular Flows and Sediment Transport. *Journal of Hydraulic Engineering.* 2017, 143(4), 04016102;

9. **Abdolghafoorian, A.**,# **Farhadi, L.*** Uncertainty Quantification in Land Surface Hydrologic Modeling: Toward an Integrated Variational Data Assimilation Framework. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing.* 2016, 69, 2628-2637

8. **Farhadi, L.***, Entekhabi, D., Salvucci, G., Mapping Land Water and Energy Balance Relations Through Conditional Sampling of Remote Sensing Estimates of Atmospheric Forcing and Surface States. *Water Resources Research* 2016, 52 (4), 2737-2752

7. **Farhadi, L.***, Reichle, R. H., De Lannoy, G. J., Kimball, J. S., Assimilation of Freeze/Thaw Observations into the NASA Catchment Land Surface Model. *Journal of Hydrometeorology.* 2015, 16(2), 730-743

6. **Farhadi, L.***, Entekhabi, D., Salvucci, G., Sun, J., Estimation of Land Surface Water and Energy Balance Parameters Using Conditional Sampling of Surface States. *Water Resources Research.* 2014, 50 (2), 1805-1822

5. Sun, J., Salvucci, G., Entekhabi, D., **Farhadi, L.**, Parameter Estimation of Coupled Water and Energy Balance Models Based on Stationary Constraints of Surface States. *Water Resources Research.* 2011, 47(2) W02512 1-16

4. Ataie-Ashtiani, B., Shobeyri, G., **Farhadi, L.**, Modified Incompressible SPH Method for Simulating Free Surface Problems. *Fluid Dynamics Research.* 2008, 40(9) 637-661

3. Ataie-Ashtiani, B., **Farhadi, L.**, Stable Moving Particle Semi-Implicit Method for Free Surface Flows. *Fluid Dynamics Research.* 2006, 38(4) 241-256

2. **Farhadi, L.***, Ataie-Ashtiani, B., Numerical Solution of Water Flow in Unsaturated Zone, *Iranian Journal of Water Research.* 2003, 1(1), 29-39

1. **Farhadi, L.*,** Ataie-Ashtiani, B., Numerical Simulation of Two Different Types of Richards Equation, *Research Proceedings, Sharif University of Technology.* 2002 2(1) 40-51

REFEREED CONFERENCE PUBLICATIONS

# indicates my graduate students or post-doctoral researchers, * indicates me as the corresponding author.

14. **Mahmood, A.#**, **Farhadi, L**. **Farhadi, L.*, Heidary, P.#**, A Framework for Coupled Estimation of Evapotranspiration and Recharge Flux by Assimilating Remotely Sensed Land Surface Temperature and Soil Moisture Observation, in 2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS, 2021, pp. 6455–6457.

13. **Heidary, P.#**, **Farhadi, L.*,** Altaf, M. U., A Reduced-Adjoint Variational Data Assimilation for Estimating Soil Moisture Profile from Surface Soil Moisture Observations, in 2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS, 2021, pp. 6458–6460.

12. **Farhadi, L.***, D. Entekhabi, G. Salvucci, Mapping Land Water and Energy Balance Relations Through Conditional Sampling of Remotely Sensed Surface Soil Moisture and Temperature States, The International Geoscience and Remote Sensing Symposium 07/2015, *Proceeding of IGARSS* 2015, paper #1348.

11. **Abdolghafoorian, A. #**, **Farhadi, L.*,** Estimation of Surface fluxes of Heat and Moisture and Their Uncertainty Using Variational Data Assimilation Methodology, *Proceeding of the International Geoscience and Remote Sensing Symposium 2015, Proceeding of IGARSS* 2015, paper #3379.

10. **Nabian, M. A. #, Farhadi, L.*,** A Multiphase Mesh-free Particle Method for Modeling Sediment Transport via Dam-Break. In the *Proceeding of the 2015 ASME-JSME-KSME Joint Fluid Engineering Conference.* (received Award of Excellence for Outstanding Paper)

9. **Nabian, M. A.#**, **Farhadi, L.***, Numerical Simulation of Solitary Wave Using the Fully Lagrangian Method of Moving Particle Semi Implicit, *Proceeding of the 2014 ASME 4th Joint US-Europian Fluid Engineering Division Summer Meeting*, Paper # FEDSM2014-22237, pp. V01DT30A006; 12 pages

8. **Nabian, M. A.**,# **Farhadi, L.***, A Stable Moving Particle Semi Implicit Method for Modeling Waves Generated by Submarine Landslides, *Proceeding of the 2014 ASME Int. Mechanical Engineering Congress and Exposition*, Paper # IMECE2014-40419, pp. V007T09A019; 10 pages

7. **Nabian, M. A.**,# **Farhadi, L.***, Simulating Water Waves Generated by Underwater Landslide with MPS and WC-MPS, *Proceeding of the 11th International ASME International Conference on Hydrodynamics, ICHD*, 2014, pp. 859-866. ISBN 978-981-09-2175-0.

6. **Farhadi, L.** Estimation of Land Surface Water and Energy Balance Flux Components and Closure Relation Using Conditional Sampling, In the *Seminar Archive of the NASA Global Modeling and Assimilation Office* (Greenbelt, MD, USA 11/2011)

5. Moghaddam, M., Entekhabi, D., **Farhadi, L.**, Goykhman, Y., Liu, M., Mahajan, A., Nayyar, A., Shuman, D., Teneketzis, D., Initial Analysis and Demonstration of a Soil Moisture Smart Sensor Web, *Proceedings of the Earth Science Technology Conference* (East Adelphi, MD, June 2008)

4. **Farhadi, L.,** Ataie-Ashtiani, B., A Stable Moving Particle Semi-Implicit Method for Free Surface Flows, *Proceedings of the Computational Methods in Water Resources Conference* (Chapel hill, NC, May 2004)

3. **Farhadi, L.,** Ataie-Ashtiani, B., A Meshless Technique for Simulating irregular Free Surface, *Proceedings of the First Engineering National Congress*, 8 pages (Tehran, Iran, February 2003)

2. **Farhadi, L.,** Ataie-Ashtiani, B., Fully Meshless Lagrangian Numerical Method for Prediction of Free Water Surface, *Proceedings of the International Conference on Hydraulics of Dams and River Structures*, (Tehran, Iran, June 2003)

1. **Farhadi, L.,** A Particle Meshless Method for Simulating Incompressible Inviscid Free Surface Fluids, *International Conference on Civil Engineering*, (Malang, Indonesia, September 2003)

INVITED PRESENTATIONS

15. **Farhadi, L.,** Mapping Evapotranspiration and Recharge Fluxes from Remotely Sensed Land Surface Soil Moisture and Temperature, Global Council for Science and Environment, Washington DC, USA 06/2022

14. **Farhadi, L.,** Applying Space Based Observations to Understanding Water, Energy and Carbon Cycles, SEAS Center for Women in Engineering, GWU, WiE Webinar, Washington DC, USA 02/2022

13. **Farhadi, L.** Coupled Estimation of Evapotranspiration and Recharge from Remotely Sensed Soil Moisture and Land Surface Temperature, American Geophysical Union, San Francisco, CA, USA 12/2019

12. **Farhadi, L.** Assimilation of Freeze-Thaw (F/T) Observations into the NASA Catchment Land Surface Model, Arctic Group, Elliot school of international Affairs, George Washington University, Washington DC, USA 11/2017

11. **Farhadi, L.** Understanding Earth's Water and Energy Cycle from Space, SEAS 1001 Seminar Series, George Washington University, Washington DC, USA 11/2017

10. **Farhadi, L.** Assimilating Remotely Sensed Land Surface State Data into the Coupled Water and Energy Balance Model, American Water Resources Association- National Capital Region (AWRA-NCR), Applications of Remote Sensing and Space Technologies in Water Resources Management, Remote Sensing, Washington DC, USA 04/2017

9. **Farhadi, L.** Mapping Land Water and Energy Balance Relations Through Conditional Sampling of Remote Sensing Estimates of Atmospheric Forcing and Surface States, Center for Ocean-Land-Atmospheric (COLA) Studies at George Mason University, Fairfax, VA, USA 10/2016

8. **Farhadi, L.** Estimation of Land Surface Evapotranspiration Using Variational Data Assimilation Method: Application Drought Monitoring, American Water Resources Association- National Capital Region (AWRA-NCR), Water Resources Symposium on Rethinking the Value of Water: Innovations in research, Technology, Policy and Management, the Water Environment and Management Panel, Washington DC, 04/2016

7. **Farhadi, L.** A Hessian-Based Method for Uncertainty Quantification of Parameters of Terrestrial Water and Energy Balance Equations, American Geophysical Union, San Francisco, CA, USA, 12/2015.

6. **Farhadi, L.** Uncertainty Quantification in Land Surface Hydrological Modeling, US Department of Agriculture (USDA), Hydrology and Remote Sensing Laboratory, Greenbelt, MD, USA 10/2015

5. **Farhadi, L.** Development of Data Assimilation Techniques for Hydrological Applications, Catchment-Based Hydrological Model Data Assimilation (CAHMDA VI) and Hydrologic Ensemble Prediction Experiment (HEPEX-DAFOH III) Joint Workshop, Austin, Texas, USA 07/2014 (*Keynote speaker*)

4. **Farhadi, L.** Mapping Land Water and Energy Balance Relations Through Conditional Sampling of Remotely Sensed Surface Soil Moisture and Temperature States, IEEE International Geoscience and Remote Sensing Symposium, Milan, Italy 07/2015.

3. **Farhadi, L.** Remote Sensing and Data Assimilation Techniques in Hydrology, Office of Vice President of Research, George Washington University, DC, USA, 02/2014.

2. **Farhadi, L.** Estimating Key Parameters of Water and Energy Balance Models by Conditional Sampling of Land Surface State Variable, Department of Civil and Environmental Engineering, George Washington University, Washington, DC, USA, 03/2012.

1. **Farhadi, L.** Estimation of Land Surface Water and Energy Balance Flux Components and Closure Relation Using Conditional Sampling, NASA Global Modeling and Assimilation Office Seminar Session, Greenbelt, MD, USA 11/2011

PROFESSIONAL AFFILIATIONS

Co- Editor of Journal of Hydrology, Elsevier (2022-present)

Review Editor of Journal of Frontiers in Big Data (2017- Present)

Reviewer Board of Remote Sensing Journal (2019- Present)

Member of American Geophysical Union (AGU) (2006-Present)

Member of European Geophysical Union (EGU) (2020-Present)

Science Collaborator, Global Modeling and Assimilation Office (GMAO)/ NASA, Goddard (2013-2017)

Member of American Meteorological Society (AMS) (2011-Present)

Member of American Society of Civil Engineers (ASCE) (2013-Present)

Member of IEEE Geosciences (2015-Present)

Member of American Society of Mechanical Engineers (ASME) (2013-2018)

Member of ASCE Watershed Management Technical Committee (WMTC) (2014)

Member of American Water Resources Association- National Capital Region (AWRA-NRC) (2014- Present)

Member of Green Water-Infrastructure Academy (2016-2018)