Katherine H. Markovich

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Education

Ph.D. Hydrologic Sciences 2018
University of California, Davis

B.Sc Geology 2012
The University of Texas at Austin

Professional Appointments

Assistant Professor 2026-present
The University of New Mexico

Senior Hydrogeologist 2025
INTERA Incorporated

Hydrologist 2024-2025
USGS Upper Midwest Water Science Center

Hydrogeologist 2020-2024
INTERA Incorporated

NSF Division of Earth Sciences Postdoctoral Fellow 2018-2020
University of Arizona

NSF Graduate Research Fellow 2015-2018
University of California, Davis

NSF Climate Change, Water, and Society IGERT Trainee 2013-2015
University of California, Davis

Fulbright Research Fellow 2012-2013
Cambodia

Publications

† student paper

Markovich, K.H., Fienen, M.N. Corson-Dosch, N, Coulon, C., White, J.T., and Gingerich, S.B., 2026. Multi-objective optimization of a hydro-economic model in an over-allocated agricultural basin. *Groundwater*, in press.

Fienen, M.N., Long, A.J., **Markovich, K.H.**, Haj, A.E., Barker, M.I., 2026. Ensemble Methods for History Matching and Uncertainty Quantification with a Watershed Model. *Journal of the American Water Resources Association*, in press.

Hayek, M., White, J.T., **Markovich, K.H.**, Hughes, J.D., and Lavenue, M., 2025. MF6-ADJ: A non-intrusive adjoint sensitivity capability for MODFLOW 6. *Groundwater*, 63(6): 874-888. https://doi.org/10.1111/gwat.70025

Noyes, C.†, Ferguson, G., Seltzer, A., Ng, J., Carroll, K.C., Tyne, R., **Markovich, K.**, Purtschert, R., Stute, M., Severinghaus, J., and McIntosh, J.C., 2025. Variations in Groundwater Recharge and Water Table Elevations Across the Holocene in a Semi-Arid Alluvial Basin. *Water Resources Research*, 61, e2024WR037606. https://doi.org/10.1029/2024WR037606.

White, J.T., Coulon, C., Hugman, R., and **Markovich, K.H.**, 2025. Reliable trade-offs between environment and economy: Implications for mine dewatering and managed aquifer recharge. *Mine Water and the Environment*, https://doi.org/10.1007/s10230-025-01070-z.

Hugman, R.T., White, J.T., Fienen, M.N., Hemmings, B., and **Markovich, K.H.**, 2024. Self-Guided Decision Support Groundwater Modelling with Python. *Journal of Open Source Education*, 7(82), 240. https://doi.org/10.21105/jose.00240.

Ford, C., Ha, W., **Markovich, K.H.** and Zwinger, J., 2024, Jupyter Notebooks for Parameter Estimation, Uncertainty Analysis, and Optimization with PEST++. *Groundwater*, 62: 825-829. https://doi.org/10.1111/gwat.13447.

Markovich, K.H., White, J.T., and Knowling, M.J., 2022. An empirical evaluation of sequential and batch data assimilation approaches to cope with model error in decision-support groundwater modeling applications. *Environmental Modelling & Software*, 156, 105498. https://doi.org/10.1016/j.envsoft.2022.105498.

Markovich, K.H., Condon, L.E., Carroll, K.C., Purtschert, R., and McIntosh, J.M., 2020. A mountain-front recharge component characterization approach combining groundwater age distributions, noble gas thermometry, and fluid and energy transport modeling. *Water Resources Research*, 57(1), https://doi.org/10.1029/2020WR027743.

Rapp, G.A.†, Condon, L.E., and **Markovich, K.H.**, 2020. Sensitivity of Simulated Mountain-Block Hydrology to Subsurface Conceptualization *Water Resources Research*, 56(10), https://doi.org/10.1029/2020WR027714.

Condon, L.E., **Markovich, K.H.**, Kelleher, C.A., Ferguson, G., and McIntosh, J.M., 2019. Where is the bottom of a watershed? *Water Resources Research*, 56(3), https://doi.org/10.1029/2019WR026010.

Markovich, K.H., Manning, A.H., Condon, L.E., and McIntosh, J.M., 2019. Mountain-block Recharge: A Review of Current Understanding, *Water Resources Research*, https://doi.org/10.1029/2019WR025676.

Markovich, K.H. Dahlke, H.E., Arumi, J.L., Maxwell R.M., and Fogg. G.E., 2019. Bayesian hydrograph separation in a minimally gauged alpine catchment, *Journal of Hydrology*, 575, 12881300. https://doi.org/10.1016/j.jhydrol.2019.06.014.

Markovich, K.H., Maxwell R. M., and Fogg. G. E., 2016. Hydrogeological response to climate change in alpine hillslopes, *Hydrological Processes*, 30(18), 3126-3138. https://doi.org/10.1002/hyp.10851.

Grants and Awards

Water Resources Research Top Downloaded Paper 2020
Where is the bottom of a watershed?

Water Resources Research Top Downloaded Paper 2019
Mountain-block Recharge: A Review of Current Understanding

NSF Division of Earth Sciences Postdoctoral Fellowship 2018
$174,000

American Geophysical Union Fall Meeting 2017
Outstanding Student Paper Award

NSF-CONICYT Graduate Research Opportunities Worldwide Fellowship 2016
$15,000

Ernest E. Hill Fellowship 2016
$5,000

Henry A. Jastro Fellowship 2016
$3,000

NSF Graduate Research Fellowship 2015
$132,000

NSF Integrative Graduate Education and Research Traineeship 2013
$96,000

Institute for International Education Fulbright Research Fellowship 2012
$15,000

UT Austin Undergraduate Research Fellowship 2011
$3,000

Teaching and Mentorship

Lead Instructor Spring 2026
ENVS 430L - Advanced Environmental Science, University of New Mexico

Lead Instructor Fall 2025
ENVS 423L - Water in the Earth System, University of New Mexico

Workshop 2025
Advanced Groundwater Modeling Techniques with MODFLOW 6 and PEST++. Co-taught with J. Hughes, C. Langevin, J. White, R. Hugman, and M. Fienen in Madison, WI.

Online Short Course 2024
Applied Decision Support Groundwater Modeling with Python: A Guided Self-Study Course. Co-taught with M. Fienen, J. White, and A. Alzraiee

Conference Workshop 2024
Intro to Predictive Modeling Workflows with python, pyEMU, and PEST++. Co-taught with M. Fienen, J. White, and A. Alzraiee at the MODFLOW and More Conference held in Princeton, NJ.

Online Short Course 2023
Applied Decision Support Groundwater Modeling with Python: A Guided Self-Study Course. Co-taught with M. Fienen, J. White, B. Hemmings, and R. Hugman

Dissertation Committee 2023-2024
Quintin Muhlenkamp, Ph.D. student, University of New Mexico

Co-Advisor 2018-2020
Garrett Rapp, M.S. student, University of Arizona

Guest Lecture 2019
HWR 417A/517A Fundamentals of Water Quality, University of Arizona

Lead Instructor 2017
HYD 245, Climate Change, Water, and Society, UC Davis

Lead Instructor 2017
HYD 201B Hydrologic Sciences Student Seminar

Guest Lecture 2016
HYD 273, Intro to Geostatistics, UC Davis

Guest Lecture 2016
ATM 005, Our Changing Atmosphere

Guest Lecture 2016
HYD 245, Climate Change, Water, and Society, UC Davis

Teaching Assistant 2016
HYD 146, Advanced Hydrogeology and Contaminant Transport, UC Davis

Mentor 2015-2016
Cecilia Gonzalez, AggieMentors, UC Davis

Teaching Assistant 2015
ECL 298- 2016 Workshop for NSF GRFP

Guest Lecturer 2015
HYD 010- Water, Power, Society

Conference Activity

First-Authored Papers Presented (Oral)

Markovich, K.H., Budge, T., Tomusiak, S., Martinez, G., and Ruskauff, G., Plateau-to-river Model version 9.1: A next-generation modeling workflow for decision support at the Hanford Site Central Plateau. Oral presentation at the 2024 American Geophysical Union Fall Meeting in Washington, D.C.

Markovich, K.H., Coulon, C., Hugman, R.E., and White, J.T., Reliability-based optimization of an open pit mine dewatering system to support sustainable water management, MODFLOW & More conference held in Princeton, NJ, Spring 2024.

Markovich, K.H., White, J.T., and Knowling, M.J. An empirical evaluation of sequential and batch data assimilation approaches to cope with groundwater model error, PEST conference held in La Jolla, CA, Spring 2023.

Markovich, K.H., White, J.T., and Knowling, M.J. Rapid, reproducible, and wrong? Exploring sequential data assimilation as a coping mechanism for model structural error in groundwater decision support modeling, European Geophysical Union Annual conference (virtual), Spring 2022.

Markovich, K.H., Manning, A.H., Condon, L.E., and McIntosh, J.M., Mountain-block recharge: Current understanding, barriers to quantificaion, and the role of technological innovations. Invited

presentation, American Ground Water Trust New Mexico Groundwater Conference, Fall 2020, (virtual).

Markovich, K.H., Condon, L.E., Kubicki, C.E., Carroll, K.C., and McIntosh, J.M. Disentangling age distributions of long-screened production wells for quantifying mountain-block recharge. Oral presentation at the 2019 American Geophysical Union Fall Meeting in San Francisco, CA.

Markovich, K.H., Condon, L.E., Kubicki, C.E., Carroll, K.C., and McIntosh, J.M., A multi-tracer approach for characterizing mountain-block recharge to the Tucson basin. Invited presentation, Geological Society of America Annual Meeting, Fall 2019, Phoenix, AZ.

Markovich, K.H. Dahlke, H.E., Arumi, J.L., Maxwell R.M., and Fogg. G.E., Revealing the Hidden Water Budget of an Alpine Volcanic Watershed Using a Bayesian Mixing Model. Invited Union presentation, American Geophysical Union Fall Meeting, Fall 2018, Washington D.C.

Markovich, K.H., Arumi, J.L., Fogg, G.E., and Maxwell, R.M. Climate Change and Storage Response in Alpine Endmember Catchments using Integrated Modeling and Streamflow Recession Analysis. Oral presentation at the 2015 American Geophysical Union Fall Meeting in San Francisco, CA.

Markovich, K.H. and Pierce, S.A., Integrated remote and in situ analysis of a playa lake groundwater system in northern Chile. Proceedings of the International Association of Hydrogeologists Conference on the Hydrogeology of Arid Environments, March 2012, Hannover, Germany.

First-Authored Papers Presented (Poster)

Markovich, K.H., Arumi, J.L., Dahlke, H.E., and Fogg, G.E. Revealing the Hidden Water Budget of an Alpine Volcanic Watershed Using a Bayesian Mixing Model. Poster presentation at the 2017 American Geophysical Union Fall Meeting in New Orleans, LA.

Markovich, K.H., Fogg, G.E., Dahlke, H.E., and Maxwell, R.M. Where will the flow go after the snow? Case study of the Diguilln Watershed, Central Chile. Poster presentation at the 2016 American Geophysical Union Fall Meeting in San Francisco, CA.

Markovich, K.H., Maxwell, R.M., and Fogg, G.E., Investigating the hydrogeologic controls on memory and feedbacks to climate change in alpine groundwater systems: An integrated modeling approach. Poster presentation at the 2014 American Geophysical Union Fall Meeting in San Francisco, CA.

Markovich, K.H. and Neumann, R.B., Modeling Vulnerability of Arsenic-Free Wells in Kandal Province, Cambodia. Oral Presentation at the Mid-Year Enrichment Workshop, March 2013, Bangkok, Thailand.

Markovich, K.H. and Pierce, S.A., Multi-temporal remote sensing analysis of salars in El Loa Province, Chile: Implications for water resource management. Poster presentation at the 2011 American Geophysical Union Fall Meeting in San Francisco, CA.

Markovich, K.H., Befus, K., Forster, R., Reyes, D., Robertson, W., and Sharp, J.M., Hydrogeology of an Alluvial Aquifer with High Levels of Nitrate and Ammonia. Poster presentation at the 2011 Geological Society of America Annual Meeting in Minneapolis, MN.

Co-Authored Papers Presented (Poster)

Fienen, M.N., Haj, A.E., Long, A.J., Barker, M.I., and **Markovich, K.H.** Challenges and solutions for parameter estimation in data-intensive landscape models with PEST++ and the iterative ensem-

ble smoother. Poster presentation at the 2024 American Geophysical Union Meeting in Washington, D.C.

Invited Seminars and Panels

Panelist, EXCITES LAUNCH: Learning About the Unspoken Norms for Careers in Higher Education Workshop; Beyond academic jobs, University of New Mexico, Fall 2024, Albuquerque, NM.

Speaker, A multi-tracer approach for characterizing mountain-block recharge: Case study of the Tucson basin in southeastern Arizona. Department of Hydrology and Atmospheric Sciences Weekly Colloquium, University of Arizona, Fall 2019, Tucson, AZ.

Speaker, Mountain-block recharge: Where and how much does it matter? Tucson Chapter of the Arizona Hydrological Society, Spring 2019, Tucson, AZ.

Speaker and Panelist, Climate change and mountain groundwater: An integrated field and numerical approach, CUAHSI-AGU H3S Cyberseminar Series on Early career scientists conquer new frontiers: An H3S conversation, Spring 2019, (virtual).

Service

Session Chair, American Geophysical Union Annual Meeting 2024
Session title: Advances in Decision Support Modeling for Water Resource Management

Reviewer 2015-present
Journal of Hydrology, Water Resources Research, Hydrology and Earth System Sciences, Geophysical Research Letters, Hydrological Processes, Natoinal Science Foundation, Department of Energy, National Fund for Scientific and Technological Development (Chile)

Session Chair, Geological Society of America Annual Meeting 2019
Session title: Mountain Groundwater

Vice President 2016-2019
Early Career Hydrogeologist Network, US National Chapter of the International Association of Hydrogeologists

Member 2015-2017
UC Davis Hydrologic Sciences Graduate Group Seminar Planning Committe

Hydrologic Sciences Representative 2014-2016
UC Davis Graduate Student Assembly

Professional Memberships

International Association of Hydrogeologists

American Geophysical Union

Geological Society of America