

Shemin Ge

August 2023

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Education

Ph.D. 1990, Hydrogeology, Johns Hopkins University, Baltimore, Maryland

M.S. 1985, Geotechnical Engineering, University of British Columbia, Vancouver, BC, Canada

B.S. 1982, Geotechnical Engineering, Wuhan University of Technology, Wuhan, China

Professional Experience

1993-present Professor, Department of Geological Sciences, University of Colorado Boulder

2015-2019 Chair, Department of Geological Sciences, University of Colorado Boulder

2019 (fall) Visiting Professor, Swiss Federal Institute of Technology (ETH), Zurich

2012-2014 Program Director, Hydrologic Sciences, US National Science Foundation

2010-2011 Visiting Scientist, US Geological Survey, Menlo Park, California

2004 (spring) Visiting Scientist, CSIRO, Perth, Australia

2003 (fall) Visiting Scientist, University of Cambridge

1990-1993 Hydrogeologist, S.S. Papadopoulos & Assoc., Inc., Bethesda, Maryland

Awards and Honors

2019-2020 Fulbright U.S. Scholar, Understanding water-induced earthquakes, Hong Kong

2019 Arts and Sciences College Scholar, University of Colorado Boulder

2018 O.E. Meinzer Award, Geological Society of America

2016 Birdsall-Dreiss Distinguished Lecturer, Geological Society of America

2010-2011 Blaustein Visiting Professor Fellowship, Stanford University

2006 Fellow, Geological Society of America

2003 Faculty Fellowship, University of Colorado

Selected Professional Service (National and international)

2023- Committee on Justice, Equity, Diversity, Inclusivity, American Geophysical Union Hydrology Section

2019-2020 Task Force for Open Access Evaluation for journal Water Resources Research

2018-2020 US National Research Council Committee on Catalyzing Opportunities for Research in the Earth Sciences: A Decadal Survey 2020-2030

2019 Chair, Program Review Committee, Department of Geology and Geophysics, University of Minnesota-Twin Cities

2018-2021 Chair (2021) O.E. Meinzer Award Committee, Geological Society of America

2018 Site Visit Committee, Natural Sciences and Engineering Research Council of Canada, Industrial Research Chair Grant, The University of Guelph, Ontario, Canada

2017-2019 Co-chair, Overseas Research Advisory Committee on Geothermal Exploration and Seismicity, Korea Geological Survey

2017 Chair, NSF Management Review Panel for Consortium of the Universities for the Advancement of Hydrologic Sciences (CUAHSI)

2016-2018 Chair (2018), Birdsall-Dreiss Lecturer Committee, Geological Society of America

2008-2013 Managing Editor, Hydrogeology Journal

2003-2016 Associate Editor, Geofluids

2003-2007 Associate Editor, Journal of Ground Water
2002-2003 The Science Steering and Evaluation Panel for the Environment for the
Integrated Ocean Drilling Program
1999-2002 Chair, Hydrogeology Program Planning Group, Ocean Drilling Programs

Selected Professional Service (University of Colorado Boulder)

2022-2024 College of Arts and Science Faculty Senate
2022-2023 College of Arts and Science Planning Committee
2021-2023 Hydrologic Science Program Steering Committee
2020-2021 College of Arts and Science, Salary and Grievance Committee
2017-2019 LEAP Growth Grant Panel
2012, 2010 Graduate School Bev Sears Grant Review Panel
2012 Academic Review and Planning Advisory Committee (ARPAC)
2009 Arts and Sciences, Appeals Committee on Academic Rules and Policies
2009 Graduate School Executive Advisory Council
2007-2009 Graduate School Innovative Grant Program Review Panel
2009 Internal Review Committee for CIRES Program Review

Research Projects (last ~10 years)

2023-2026 Groundwater Connection between Glaciers and Streams, NSF
2019-2024 Mechanisms for Injection-Induced Seismicity, DOE
2018-2024 Dynamic Response of Watershed Subsurface System to Extreme Events, NSF
2016-2018 Feasibility of Controlling Induced Earthquakes, USGS
2016-2017 The Subsurface in the American West: Historical and Scientific Lessons, NSF
2012-2014 Powell Center working group on Injection Induced Seismicity, USGS
2013-2017 Pathways to Scalable, Efficient and Sustainable Thermal Energy Storage, NSF
2011-2014 Fluid Flow and Growth of Active Salt Structures at Decadal Timescales, NSF
2010-2014 Impacts of Climate Change on Groundwater Resources, NSF

Invited Presentations and Public Lectures (last ~ 5 years)

2023 George Mason University: Groundwater Dynamics under a Changing Climate
2022 Mountain Climate Conference, Gothic, CO: Shallow Groundwater in Mountain Watersheds
2021 Gustavus Adolphus College: Groundwater under a Changing Climate
2021 American Geophysical Union Conference: Coupling Pore Pressure and Poroelastic Stress, Implications to Induced Seismicity
2020 American Geophysical Union Conference: Groundwater in Tibet – invisible and restless,
2020 The 4th Financial News earthquake Forum, South Korea: Insights and Foresights from Pohang Earthquakes
2019 Swiss Federal Institute of Technology in Zürich. Fluid Induced Earthquakes
2019 Alumni Directors Club Symposium, Univ of Colorado Boulder. Fluid induced earthquakes
2018 California State University Fresno, Groundwater and Climate Change
2018 Colorado Environmental Management Society, Fluid Induced Earthquakes
2018 Association of Environmental and Engineering Geologists, San Joaquin Valley Chapter, Reservoir and Inject Induced Earthquakes
2018 Keynote Lecture, 45th Congress of the International Association of Hydrogeologists, Fluid injection induced seismicity: A hydrogeology perspective.

Students Supervised as Principal Advisor

Ph.D. students: Claudia Corona (Postdoc Colorado School of Mines), Megan R. Brown (Assistant Prof Northern Illinois Univ), Sarah G. Evans (Assistant Prof Appalachian State Univ), Matthew Weingarten (Assistant Prof San Diego State Univ), Lyndsay Ball (Researcher USGS), Paula Cutillo (Specialist Bureau of Land Management), S. Chereé Stover (BP), Gordon McCurry (lecturer Univ of Colorado), Miles Waite (Principal at Waite-Heindel Environmental Management)

M.S. students: Corrine Liu, Cameron Chambers, Scott Stokes, Kelleen Lanagan, Lauren Salberg, Katherine Pfeiffer, Steven Henning, Nora Catolico, Nadine Reitman, Jessica King, Miori Yoshino Harms, Brent Aigler, Kenneth Babcock, Gregory Robertson, Katherine Kahn, Stephanie Tomusiak, Steven Shultz, John Marler, David Kinner, Jeffery Bails, Jennifer Hinds, Andrew Horn, Minru Liao, Barbara Breuer

Undergraduate Students (Honor Thesis and Mentee): Nick Ayres (current), Aiden Marler, Rebecca Holmes, Alexis Ahlert, Toby Halamka, Christine Nims, Naomi Ochwart, Isabel Villaneda-van Vloten, Christian Johnson, Alex McCaffree, Jonathan Galeano, Allison Cech, Rosalyn Adler, Peter Dalen, Angela Cook, Jacob Bauer, Lauren Romer

Selected Publications

Ge, S., J. Silverstein, J. Eklund, P. Limerick, and D. Stewart (2023), Fixing the flawed Colorado River Compact, *Eos*, 104, <https://doi.org/10.1029/2023EO230232>.

Boyet, A., S. De Simone, S. Ge and V. Vilaras (2023). Insights on post-injection seismicity through analysis of the Enhanced Geothermal System at Basel (Switzerland). *Communications Earth and Environment*.

Corona, C. R., S. Ge, and S. Anderson (2023). Water-table Response to Extreme Precipitation Events. *Journal of Hydrology* 618. <https://doi.org/10.1016/j.jhydrol.2023.129140>

Scott Stokes, S. Ge, M. Brown, E. Menezes, A. Sheehan, K. Tiampo (2023). Pore Pressure Diffusion and Onset of Induced Seismicity. *Journal Geophysical Research: Solid Earth* <https://doi.org/10.1029/2022JB026012>

Xiao-Wei Jiang, Hong-Yu Xie, Shemin Ge, Han Tang, Shu-Cong Tan, Xu-Sheng Wang, Li Wan, Yijian Zeng (2023). On the Extinction Depth of Freezing-induced Groundwater Migration. *Journal of Hydrology*. <https://doi.org/10.1016/j.jhydrol.2023.129358>

Corona, C. R. and Ge, S. (2022). Examining subsurface response to an extreme precipitation event using HYDRUS-1D. *Vadose Zone Journal*, e20189. <https://doi.org/10.1002/vzj2.20189>

Ge, S. and M.O. Saar (2022). Review: Induced seismicity during geoenery development—A hydromechanical perspective. *Journal Geophysical Research*, 127, <https://doi.org/10.1029/2021JB023141>

Brown, M. R., S. Ge, E. Screaton (2022). A Simple Relation to Constrain Groundwater Models Using Surface Deformation. *Ground Water*. May-Jun; 60(3): 410–417

Zhang, M., S. Ge, Q. Yang, and X. Ma (2021). Impoundment-associated hydro-mechanical changes and regional seismicity near the Xiluodu reservoir, Southwestern China. *Journal Geophysical Research*, 126, <https://doi.org/10.1029/2020JB021590>

Kaown, D. K. K. Lee, J. Kim, J. Woo, S. Lee, I.W. Park, D. Lee, J.Y. Lee, H. Kim, S. Ge and I.W. Yeo (2021). Earthquakes and very deep groundwater perturbation mutually induced. *Scientific Reports* 11:13632, <https://doi.org/10.1038/s41598-021-92937-y>

Yeo, I.W., M.R. Brown, S. Ge, and K.K. Lee (2020). Causal mechanism of injection-induced earthquakes through the Mw 5.5 Pohang earthquake case study. *Nature Communications* 11 2614. <http://doi.org/10.1038/s41467-020-16408-0>

Rau GC, Cuthbert MO, Post VEA, Schweizer D, Acworth RI, Andersen MS, Blum P, Carrara E,

- Rasmussenm TC, Ge S. (2020). Future-proofing hydrogeology by revising groundwater monitoring practice. *Hydrogeology Journal* 28 (8), 2963-2969.
- Ellsworth, W.L., D. Giardini, J. Townend, S. Ge, and T. Shimamoto (2019). Triggering of the Pohang, Korea, Earthquake (Mw 5.5) by Enhanced Geothermal System Stimulation, *Seismological Research Letters*. doi.org/10.1785/0220190102
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- Brown, M.R. and S. Ge (2018). Small earthquakes matter in injection induced seismicity. *Geophysical Research Letters*, 45, doi.org/10.1029/2018GL077472
- Brown, M.R. and S. Ge, 2018, Distinguishing Fluid Flow Path from Pore Pressure Diffusion for Induced Seismicity, *Bulletin of the Seismological Society of America*, doi.org/10.1785/0120180149
- Evans, S.G., S. Ge, C. Voss, and N. Molotch (2018). The role of frozen soil in groundwater discharge predictions for warming alpine watersheds. *Water Resources Research*, 54, doi:10.1002/2017WR022098
- Reed, A.L., A.P. Novelli, K.L. Doran, S. Ge, N. Lu, and J. S. McCartney (2018). Solar District Heating with Underground Thermal Energy Storage: Pathways to Commercial Viability in North America. *Renewable Energy*, doi:10.1016/j.renene.2018.03.019
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- Brown, M.R., S. Ge, A.F. Sheehan, and J.S. Nakai (2017). Evaluating the Effectiveness of Induced Seismicity Mitigation: Numerical Modeling of Wastewater Injection near Greeley, *Journal Geophysical Research*, 122, 6569–6582, doi:10.1002/2017JB014456.
- Nakai, J.S., M. Weingarten, A.F. Sheehan, S.L. Bilek, and S. Ge (2017). A possible causative mechanism of Raton Basin, New Mexico and Colorado earthquakes using recent seismicity patterns and pore pressure modeling. *Journal Geophysical Research*, 122, doi.org/10.1002/2017JB014415
- Evans, S.G. and S. Ge (2017). Contrasting hydrogeologic responses to warming in permafrost and seasonally frozen ground hillslopes. *Geophysical Research Letters*, 44, doi:10.1002/2016GL072009
- Catolico, N., S. Ge, and J. McCartney (2016). Numerical Modeling of a Soil-borehole Thermal Energy Storage System. *Vadose Zone Journal*, doi:10.2136/vzj2015.05.0078
- Weingarten, M., S. Ge, J.W. Godt, B.A. Bekins, J.L. Rubinstein (2015). High-rate injection is associated with the increase in U.S. mid-continent seismicity, *Science*, 348(6241), 1336-1340
- Evans, S.G., S. Ge, and S. Liang (2015). Analysis of groundwater flow in mountainous, headwater catchments with permafrost. *Water Resources Research*, 51, doi:10.1002/2015WR017732
- McGarr, A. B. Bekins, N. Burkardt, J. Dewey, P. Earle, W. Ellsworth, S. Ge, S. Hickman, A. Holland, E. Majer, J. Rubinstein, A. Sheehan (2015). Coping with Earthquakes Induced by Fluid Injection, *Science*, 347(6224)
- Ge, S. and S. Gorelick (2015). Groundwater and Surface Water. In: *Encyclopedia of Atmospheric Sciences*, 2nd edition, 3, (209–216), G. R. North (editor-in-chief), J. Pyle and F. Zhang (editors).
- Weingarten, M. and S. Ge (2014). Insights into water level response to seismic waves: A 24-year high-fidelity record of global seismicity at Devils Hole, *Geophysical Research Letters*, 41, doi:10.1002/2013GL058418
- Reitman, N., S. Ge, K. Mueller (2014). Groundwater flow and its effect on salt dissolution in Gypsum Canyon watershed, Paradox Basin, southeast Utah, USA, *Hydrogeology Journal*

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- Marler, J. and S. Ge (2003). The Permeability of the Elkhorn Fault Zone: A case study from South Park, Colorado, *Journal of Ground Water*, 41(3), 321-332.
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- Screaton, E. and S. Ge (1997). An Assessment of along-strike fluid flow and heat transport within Barbados accretionary complex: Results of Preliminary Modeling, *Geophysical Research Letters*, 24(23), 3085-3088.
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