

Dr Hongkyu Yoon

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Education and Professional Career

1990-1997 BS in Civil and Environmental Eng., Korea University, Seoul, Korea
1997-1999 MS in Environmental Eng. In Civil Eng., Korea University, Seoul, Korea
2000-2005 PhD in Environmental Eng. In Civil Eng., University of Illinois at Urbana-Champaign (UIUC), Urbana, IL, USA
2005-2006 Postdoctoral Fellow, Civil and Environmental Eng., UIUC, IL, USA
2006-2010 Visiting Research Assistant Professor, Civil and Environmental Eng., UIUC, IL, USA
2010-2013 Postdoctoral Fellow, Geomechanics Department, SNL, Albuquerque, NM, USA
2014-2015 Senior Member of Technical Staff, SNL, NM, USA
Since 2016 Principal Member of Technical Staff, SNL, NM, USA

Commitment, Appointments and Scientific Volunteer Jobs

2-14-1018 Review committee in US DOE Environmental Molecular Sciences Laboratory (EMSL) user programs
2014-2018 PI in the Center for Frontiers of Subsurface Energy Security, US DOE Energy Frontier Research Center Program
2019- Theme leader and SNL leader in the Science-informed Machine Learning for Accelerating Real Time Decisions in Subsurface Applications (SMART) Initiative – Carbon Storage (2019-2028), US DOE Office of Fossil Energy and Carbon Management
2019- editorial board for Journal of Contaminant Hydrology
2021 Guest editor of a special issue on “Deep learning and machine learning in flow, transport, and water resources management”, 2021, Journal of Contaminant Hydrology
2021- Co-organizer of Damage Mechanics Challenge on Brittle-Ductile Materials, <https://purrr.purdue.edu/groups/damagemechanicchallenge>
2015 Organizer of 3D printing for geoscience applications, SNL supported workshop, Santa Fe, NM
2007- Co-organizer of 40+ conference sessions and workshops
2002- memberships in InterPore (2016-present), AGU (2002-present), ACS (2010-present), EGU (2016-), GoldSchmidt (2012-), SEG (2016-), SSA (2021-)

Professional Awards, Offers and Recognitions

2014 Early Career Laboratory Directed R&D award, SNL (2014-2017)

Most important Publications (maximum 10)

(Peer reviewed journal articles / books / patents)

- [1] H. Yoon, A.J. Valocchi, C. J. Werth and T. Dewers. Pore-scale simulation of mixing-induced calcium carbonate precipitation and dissolution in a microfluidic pore network, *Water Resour. Res.*, 48, W02524, 2012.
- [2] H. Yoon, Q. Kang and A.J. Valocchi. Lattice Boltzmann-based approaches for pore-scale reactive transport, *Reviews in Mineralogy & Geochemistry*, 80, 393-431, 2015.
- [3] H. Yoon, K.N. Chojnicki, and M.J. Martinez. Pore-scale analysis of calcium carbonate precipitation and dissolution kinetics in a microfluidic device. *Environmental science & technology*, 53 (24), 14233-14242, 2019.
- [4] H. Yoon and T. Dewers. Characteristics of pore structures of Mississippian Selma Chalk using dual focused ion and SEM 3D imaging and lattice-Boltzmann simulations. *Geophysical Research Letters* 40, 4294–4298, 2013.
- [5] T. Kadeethum, D. O'Malley, Y. Choi, H.S. Viswanathan, N. Bouklas and H. Yoon. Continuous conditional generative adversarial networks for data-driven solutions of poroelasticity with heterogeneous material properties, *Computers & Geosciences*, 167, 105212, 2022.

- [6] T. Kadeethum, F. Ballarin, Y. Choi, D. O'Malley, H. Yoon and N. Bouklas. Non-intrusive reduced order modeling of natural convection in porous media using convolutional autoencoders: comparison with linear subspace techniques, *Adv. In Water Res.* p.104098, 2022.
- [7] K.A. Klise, D. Moriarty, H. Yoon and Z. Karpyn. Automated contact angle estimation for three-dimensional X-ray microtomography data. *Advances in Water Resources*, 95, pp.152-160, 2016.
- [8] K.W. Chang and H. Yoon. Permeability-controlled migration of induced seismicity to deeper depths near Venus in North Texas. *Sci Rep*, 12, 1382, 2022.
- [9] K.W. Chang, H. Yoon, Y. Kim and M.Y. Lee. Operational and geological controls of coupled poroelastic stressing and pore-pressure accumulation along faults: Induced earthquakes in Pohang, South Korea, *Sci Rep*, 10, 2073, 2020.
- [10] L. Jiang, H. Yoon, A. Bobet and L. Pyrak-Nolte. Mineral Fabric as a Hidden Variable in Fracture Formation in Layered Media, *Sci Rep* 10, 2260, 2020.