

Zuleima T. Karpyn, Ph.D.

Professor and Chair, Petroleum and Natural Gas Engineering, The Pennsylvania State University
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EDUCATION

9/01 - 5/05 **Ph.D., Petroleum and Natural Gas Engineering**, The Pennsylvania State University.
1/99 - 5/01 **M.S., Petroleum and Natural Gas Engineering**, The Pennsylvania State University.
9/91 - 8/97 **B.S., Chemical Engineering**, Universidad Central de Venezuela.

HONORS AND AWARDS

- Fulbright U.S. Scholar, Fulbright – Colciencias Innovation and Technology, 2016-2017.
- Energi Simulation (formerly Foundation CMG) Chair in Fluid Behavior and Rock Interactions, 2014-.
- Quentin E. and Louise L. Wood Endowed Faculty Fellow in Petroleum and Natural Gas Engineering, The Pennsylvania State University, 2010.
- Wilson Award for Excellence in Teaching, The Pennsylvania State University, 2010.
- Faculty Early Career Development (CAREER) Award, National Science Foundation, 2008.
- Outstanding Service to the American Association of Petroleum Geologists - Eastern Section, as Technical Program Co-Chair of the AAPG-SPE 2008 Eastern Meeting, Pittsburgh, Pennsylvania, 2008.

PROFESSIONAL EXPERIENCE

7/18 – 6/19 **Administrative Fellow, Office of the Executive Vice President and Provost**, The Pennsylvania State University.

1/18 – present **Chair, Petroleum and Natural Gas Engineering Program**, John and Willie Leone Family Department of Energy and Mineral Engineering, The Pennsylvania State University.

7/16 – present **Professor of Petroleum and Natural Gas Engineering**, John and Willie Leone Family Department of Energy and Mineral Engineering, The Pennsylvania State University.

7/13 – 6/14 **Interim Director of the EMS Energy Institute**, College of Earth and Mineral Sciences, The Pennsylvania State University.

8/11 – 6/16 **Associate Professor of Petroleum and Natural Gas Engineering**, John and Willie Leone Family Department of Energy and Mineral Engineering, The Pennsylvania State University.

1/05 – 7/11 **Assistant Professor of Petroleum and Natural Gas Engineering**, John and Willie Leone Family Department of Energy and Mineral Engineering (formerly Department of Energy and Geo-Environmental Engineering), The Pennsylvania State University.

RECENT REFEREED PUBLICATIONS

- 1) Purswani, P., and Karpyn, Z.T., 2019 "Laboratory Investigation of Chemical Mechanisms Driving Oil Recovery from Oil-Wet Carbonate Rocks". *Fuel*, Volume 235, 406-415. DOI: 10.1016/j.fuel.2018.07.078.
- 2) Zhou, S., Liu, D., Cai, Y., Karpyn, Z.T., and Yao, Y., 2018, "Comparative analysis of nanopore structure and its effect on methane adsorption capacity of Southern Junggar coalfield coals by gas adsorption and FIB-SEM tomography". *Microporous and Mesoporous Materials*, 272 (December): 117-128. DOI: 10.1016/j.micromeso.2018.06.027.
- 3) Zhou, S., Liu, D., Cai, Y., Karpyn, Z.T., and Yao, Y., 2018, "Petrographic Controls on Pore and Fissure Characteristics of Coals from the Southern Junggar Coalfield, Northwest China". *Energies*, 11 (1556): 1-22. DOI: 10.3390/en11061556.
- 4) Dewers, T., Heath, J., Yoon, H., Ingraham, M., Grigg, J., Mozley, P., and Karpyn, Z.T., 2018. Part I-3, "Pore-to-Core Characterization of Shale Multiphysics", in *Geological Carbon Storage: Subsurface Seals and Caprock Integrity*, American Geophysical Union, 384 pages, ISBN: 978-1-119-11864-0.

- 5) Purswani, P., Tawfik, M.S., and **Karpyn, Z.T.**, 2017. "Factors and mechanisms governing wettability alteration by chemically tuned waterflooding: a review". *Energy & Fuels*, 31 (8):7734-7745. DOI: 10.1021/acs.energyfuels.7b01067.
- 6) Abdelmalek, B., **Karpyn, Z. T.**, Liu, S., Yoon, H., and Dewers, T., 2017. "Gas permeability measurements from pressure-pulse decay laboratory data using Pseudo-pressure and Pseudo-time transformations". *Journal of Petroleum Exploration and Production Technology*, <https://doi.org/10.1007/s13202-017-0376-5>.
- 7) Chakraborty, N., **Karpyn, Z.T.**, Liu, S., and Yoon, H., 2017. "Permeability evolution of shale during spontaneous imbibition". *Journal of Natural Gas Science and Engineering*, 38 (February): 590-596, DOI: 10.1016/j.jngse.2016.12.031.
- 8) Klise, K., Moriarty, D., Yoon, H., and **Karpyn, Z.T.**, 2016. "Automated contact angle estimation for three-dimensional X-ray microtomography data". *Advances in Water Resources*, 95 (September): 152–160, DOI: 10.1016/j.advwatres.2015.11.006.
- 9) Brunet, J.-P., Li, L., **Karpyn, Z.T.**, Huerta, N., 2016. "Fracture opening and self-healing: critical residence time as a unifying parameter for diverging cement fracture property evolution under carbon sequestration conditions". *International Journal of Greenhouse Gas Control*, 47 (April): 25-37. DOI: 10.1016/j.ijggc.2016.01.024.
- 10) Cao, P., **Karpyn, Z.T.**, and Li, L., 2016. "The role of host rock properties in determining potential CO₂ leakage pathways". *International Journal of Greenhouse Gas Control*, 45 (February): 18-26. DOI: 10.1016/j.ijggc.2015.12.002.
- 11) Torrealba, V. A., **Karpyn, Z. T.**, Yoon, H., Klise, K. A., and Crandall, D., 2016. "Pore-scale investigation on stress-dependent characteristics of granular packs and their impact on fluid distribution". *Geofluids*, 16(1): 198-207. DOI: 10.1111/gfl.12143.
- 12) Cao, P., **Karpyn, Z.T.**, and Li, L., 2015. "Self-healing of cement fractures under dynamic flow of CO₂-rich brine". *Water Resources Research*, 51(6): 4684-4701. DOI: 10.1002/2014WR016162.
- 13) Aksu, I., Bazilevskaya, K., and **Karpyn, Z.T.**, 2015. "Swelling of clay minerals in unconsolidated porous media and its impact on permeability". *GeoResJ*, 7(September): 1-13. DOI:10.1016/j.grj.2015.02.003.
- 14) Alexis, D., **Karpyn, Z.T.**, Ertekin, T., and Crandall, D., 2015. "Fracture permeability and relative permeability of coal and their dependence on stress conditions". *Journal of Unconventional Oil and Gas Resources*, 10(June): 1-10. DOI:10.1016/j.juogr.2015.02.001.
- 15) Yan, Q., Lemanski, C., **Karpyn, Z.T.**, and Ayala H., L.F., 2015. "Experimental investigation of shale gas production impairment due to fracturing fluid migration during shut-in time". *Journal of Natural Gas Science & Engineering*, 24(May): 99-105. DOI:10.1016/j.jngse.2015.03.017.
- 16) Li, X., Akbarabadi, M., **Karpyn, Z.T.**, Piri, M. and Bazilevskaya, E., 2015. "Experimental investigation of carbon dioxide trapping due to capillary retention in saline aquifers". *Geofluids*, 15(1-2): 1-14. DOI: 10.1111/gfl.12127.
- 17) Thararoop, P., **Karpyn, Z.T.**, and Ertekin, T., 2015. "A production type-curve solution for coalbed methane reservoirs". *Journal of Unconventional Oil and Gas Resources*, 9(March): 136-152. DOI:10.1016/j.juogr.2014.12.001.
- 18) Thararoop, P., **Karpyn, Z.T.**, and Ertekin, T., 2015. "Development of Material Balance Equation for Coalbed Methane Reservoirs Accounting for the Presence of Water in the Coal Matrix and Coal Shrinkage and Swelling". *Journal of Unconventional Oil and Gas Resources*, 9(March): 153-162. DOI:10.1016/j.juogr.2014.12.002.
- 19) Ghazanfari, E., Pamukcu, S., Pervizpour, M., and **Karpyn, Z.T.**, 2014. "Investigation of generalized relative permeability coefficients for electrically assisted oil recovery in oil formations". *Transport in Porous Media*, 105(1): 235-253. DOI: 10.1007/s11242-014-0368-6.
- 20) Landry, C. J., **Karpyn, Z.T.**, and Ayala, O.M., 2014. "Relative permeability of homogeneous-wet and mix-wet porous media as determined by pore-scale Lattice Boltzmann modeling". *Water Resources Research*, 50(5): 3672-3689. DOI:10.1002/2013WR015148.
- 21) Landry, C. J., **Karpyn, Z.T.**, and Ayala, O.M., 2014. "Pore-scale lattice Boltzmann modeling and 4D x-ray computed microtomography imaging of fracture-matrix fluid transfer". *Transport in Porous Media*, 103 (3): 449-468. DOI:10.1007/s11242-014-0311-x.

PROFESSIONAL SERVICE

- *Editorial boards:*
 - *Associate Editor*, Transport in Porous Media, 2018-present.
 - *Assistant Editor-in-Chief*, Journal of Petroleum Science and Engineering, 2014-2017.
 - *Associate Editor*, Society of Petroleum Engineers Editorial Review Committee, Society of Petroleum Engineers Journal, 2009-2014.
 - *Guest Editor*, Special issue of International Journal of Oil, Gas and Coal Technology, "Pore-Scale Flow and Transport Processes in Petroleum Reservoirs", 2010-2011.
- *Technical reviewer of research grants:*
 - Early Career Research Program, Office of Science, U.S. Department of Energy, 2015, 2017.
 - Natural Sciences and Engineering Research Council of Canada (NSERC), 2014, 2016.
 - Technology Foundation STW, The Netherlands, 2015.
 - Earth Sciences (EAR) – Hydrologic Sciences, National Science Foundation, 2015.
 - Office of Basic Energy Sciences (BES), U.S. Department of Energy, 2011, 2013, 2014.
 - Petroleum Research Fund, New Directions Proposal, American Chemical Society (ACS-PRF ND), 2011, 2013, and 2014.
 - Faculty Early Career Development (CAREER) Program, National Science Foundation, 2012.
 - The Petroleum Research Fund, Doctoral New Investigator Proposal, American Chemical Society (ACS-PRF DNI), 2008.
- *Technical reviewer for various refereed journals* (2005-present), approx. 40 reviewed manuscripts.
- *Member of professional and learned societies: Society of Core Analysts (SCA), 2005-present; American Geophysical Union (AGU), 2003-present; Society of Petroleum Engineers (SPE). 1999-present.*