

Curriculum Vitae

Dorthe Wildenschild

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EDUCATION

- **Ph.D., Technical University of Denmark**, Civil and Environmental Engineering (1996)
 - **M.Sc., Technical University of Denmark**, Civil and Environmental Engineering, (1991)
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EMPLOYMENT

- Sept 2014 – now: Oregon State University, School of Chemical, Biological & Environmental Engineering, *Professor*.
 - Feb 2017 – Sept 2021: Oregon State University, College of Engineering, *Associate Dean for Graduate Programs*
 - Aug. 2014 – Feb 2017: Oregon State University, Graduate School, *Associate Dean*
 - Aug. 2014 – Feb 2017: Oregon State University, Office of Postdoctoral Programs, *Director*
 - Sept. 2009 - June 2014: Oregon State University, School of Chemical, Biological & Environmental Engineering, *Associate Professor*.
 - July 2006 - June 2009: Oregon State University, School of Chemical, Biological & Environmental Engineering, *Assistant Professor*.
 - Sept 2002 - 2006: Oregon State University, Department of Geosciences/Department of Civil, Construction & Environmental Engineering. *Assistant Professor*.
 - July 2000 - 2004: Technical University of Denmark, Environment & Resources Department. *Associate Research Professor*.
 - June 1997-June 2000: Lawrence Livermore National Laboratory, Earth and Environmental Sciences, Experimental Geophysics Group. *Postdoctoral Research Staff Member*.
 - July 1996 - May 1997: University of California, Davis, Department of Land, Air and Water Resources. *Postdoctoral Researcher*
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PUBLICATIONS

Papers in international peer-reviewed journals

Li, T., M. Dragila, and **D. Wildenschild**. Linking pore-scale fluid-fluid interfacial curvature in porous media to capillary pressure: The impact of thin film connections, TBD

Brueck, C.L, M. Dragila, J. Nason, **D. Wildenschild**. Colloid attachment and partitioning in variably saturated porous media as affected by wetting phase: An x-ray microtomography-based comparison. TBD.

Paustian, R. L. Andersson, D. Meisenheimer, J.O. Helland, **D. Wildenschild**. The Effect of Wettability and Wettability Alteration on Three-phase Flow in Porous Media. TBD

Ebadi, M., D. Meisenheimer, **D. Wildenschild**, J. McClure, P. Mostaghimi, and R.T. Armstrong (2024) Topological Evolution: An Unexplored Aspect of Hysteresis in Multiphase Flow through Porous Media, *Geophysical Research Letters*, submitted

Mathew, E.S., S. Jackson, **D. Wildenschild**, P. Mostaghimi, K. Tang, and R.T. Armstrong (2025) Deep Learning Assisted Denoising of Fast Polychromatic X-ray Micro-CT Imaging of Multiphase Flow in Porous Media, *Computers & Geosciences*, <https://doi.org/10.1016/j.cageo.2025.105990>

Borges, Y.I.d.S, **D. Wildenschild**, and M.E.G. Boscov (2024). Influence of static and dynamic compaction methods on the pore arrangement of a highly weathered residual soil, TBD

Wildenschild, D., Iltis, G., Ostvar, S. (2023). Biofilm Architecture in Opaque Porous Medium. In: Médici, E.F., Otero, A.D. (eds) *Album of Porous Media*. Springer, Cham. https://doi.org/10.1007/978-3-031-23800-0_80. Also featured in APS/GeoSoilEnviroCARS Science Highlights; April 14 2023.

Meisenheimer, D.E., and **D. Wildenschild**. (2023). Incorporating bubble evolution and transport in constitutive relationships for quasi- and non-equilibrium two-phase flows in porous media. Special issue of *Frontiers in Water* ("Nonequilibrium Multiphase and Reactive Flows in Porous and Granular Materials"). *Front. Water* 5:1167872. <https://doi.org/10.3389/frwa.2023.1167872>

- Svadlenak, S. S. Wojcik, O. Ogunlalu, M. Vu, M. Dor, B.W. Boudouris, **D. Wildenschild**, K.A. Goulas, 2023. Upcycling of polyvinyl chloride to hydrocarbon waxes via dechlorination and catalytic hydrogenation, *Applied Catalysis B: Environmental*, <https://doi.org/10.1016/j.apcatb.2023.123065>.
- Kimbrel, E.J. Harper, **D. Wildenschild**, A.L. Herring, and R. Armstrong. 2022. The Effect of Original and Initial Saturation on Residual Nonwetting Phase Capillary Trapping Efficiency. *Int. J of Greenhouse Gas Control*, 120, <https://doi.org/10.1016/j.ijggc.2022.103758>
- Lubbers, J., A.J.R. Kent, D. Meisenheimer, **D. Wildenschild**. 2022. 3D zoning of barium in alkali feldspar. *American Mineralogist*. DOI: <https://doi.org/10.2138/am-2022-8139> (accepted)
- Behnoudfar, D., D.E. Meisenheimer, R. Paustian, M.I. Dragila and **D. Wildenschild**, 2022. Contact Angle Hysteresis in Porous Media Multi-Phase Flow; A new Paradigm? *Advances in Water Resources*, <https://doi.org/10.1016/j.advwatres.2022.104138>
- Paustian, R. L. Andersson, D. Meisenheimer, J.O. Helland, **D. Wildenschild**, 2021. On the Relationship Between Capillary Pressure, Saturation, and Interfacial Area for Three-Phase Flow in Porous Media, *Advances in Water Resources*, 151, 103905, <https://doi.org/10.1016/j.advwatres.2021.103905>
- Meisenheimer, D.E., and **D. Wildenschild**, 2021. Predicting the effect of relaxation on interfacial area development in multiphase flow. *Water Resources Research*, 57, e2020WR028770. <https://doi.org/10.1029/2020WR028770>
- Deboodt, T., **Wildenschild, D.**, Ideker, J.H., Isgor, O.B., 2020. Comparison of thresholding techniques for quantifying portland cement hydrates using synchrotron microtomography. *Construction & Building Materials*, 266, <https://doi.org/10.1016/j.conbuildmat.2020.121109>
- Sun, C., J.E. McClure, P. Mostaghimi, A.L. Herring, D.E. Meisenheimer, **D. Wildenschild**, S. Berg, and R.T. Armstrong (2020). Topological principle as a robust and efficient way to characterize wetting behavior. *J of Colloid and Interf. Sci.* 578, 106-115. <https://doi.org/10.1016/j.jcis.2020.05.076>
- Brueck, C.L, and **D. Wildenschild**. 2020. A proximity-based image processing algorithm for colloid assignment in segmented multiphase flow datasets. *J. of Microscopy*, vol 277(2), <https://doi.org/10.1111/jmi.12874>.
- Meisenheimer, D.E., M.L. Rivers, **D. Wildenschild**, 2020. Optimizing pink-beam fast x-ray microtomography for multiphase flow in 3D porous media, *J. of Microscopy*, vol 277(2), <https://doi.org/10.1111/jmi.12872>.
- Meisenheimer, D.E., J. McClure, M.L. Rivers, **D. Wildenschild**, 2020. Exploring the effect of flow condition on the constitutive relationships for two-phase flow, *Advances in Water Resources*, vol 137 (March 2020), <https://doi.org/10.1016/j.advwatres.2020.103506>.
- Ferreira, T.R., Pires, L.F., **Wildenschild, D.**, Brinatti, A.M., Borges, J.A.R., Auler, A.C., dos Reis, A.M.H., 2019. Lime application effects on soil aggregate properties: Use of the mean weight diameter and synchrotron-based X-ray mu CT techniques, *Geoderma*, Volume 338 Page 585-596.
- Deboodt, T., **Wildenschild, D.**, Ideker, J.H., Isgor, O.B., 2019. Use of iodine for improving phase quantification using x-ray tomography, *Cement and Concrete Research*, Volume 116 Page 102-112
- Deboodt, T., **D. Wildenschild**, J.H. Ideker, and O.B. Isgor, 2018. Use of iodine for improving phase quantification using x-ray tomography, *Cement and Concrete Research*, <https://doi.org/10.1016/j.cemconres.2018.11.004>.
- Andersson, L., A. Herring, S. Schlüter, and **D. Wildenschild**, 2018. Defining a Novel Pore-Body to Pore-Throat “Morphological Aspect Ratio” that Scales with Residual Non-Wetting Phase Capillary Trapping in Porous Media, accepted by *Advances in Water Resources*.
- Ferreira, T.R., L. Pires, **D. Wildenschild**, R. Heck, and A. Antonino, 2018. X-ray microtomography analysis of lime application effects on soil porous system, *Geoderma*, <https://doi.org/10.1016/j.geoderma.2018.03.015>
- Ostvar, S., G. Iltis, S. Schlüter, L. Andersson, B.D. Wood and **D. Wildenschild**, 2018. Resolving the Influence of Flow Rate on Biofilm Growth in Three Dimensions using Microimaging. *Advances in Water Resources*, <https://doi.org/10.1016/j.advwatres.2018.03.018>
- Li, T., S. Schlüter, Dragila, M. Ines, and **D. Wildenschild**, 2018. An improved method for estimating capillary pressure from 3D microtomography images and its application to the study of disconnected nonwetting phase, *Advances in Water Resources*, vol. 114, pp. 249 - 260, <https://doi.org/10.1016/j.advwatres.2018.02.012>, 2018.
- Deboodt, T., J.H. Ideker, O.B. Isgor, and **D. Wildenschild**, 2017. Quantification of synthesized hydration products using synchrotron microtomography and spectral analysis. *Construction & Building Materials*. <https://doi.org/10.1016/j.conbuildmat.2017.09.031>
- Schlüter, S., S. Berg, T. Li, H.-J. Vogel, and **D. Wildenschild**, Time scales of relaxation dynamics during transient conditions in two-phase flow, *Water Resources Research*, pp. 4709 - 4724, 2017
- Deboodt, T., J.H. Ideker, O.B. Isgor, and **D. Wildenschild**, 2017. Quantification of synthesized hydration products using synchrotron microtomography and spectral analysis. *Construction and Building Materials*, <https://doi.org/10.1016/j.conbuildmat.2017.09.031>.
- Herring, A.L., L Andersson, and **D. Wildenschild**, 2016. Enhancing residual trapping of supercritical CO₂ via cyclic injections, *Geophysical Research Letters*, DOI: 10.1002/2016GL070304.

- Schlüter, S., S. Berg, M. Ruecker, R. T. Armstrong, H.-J. Vogel, R. Hilfer, and **D. Wildenschild**, 2016. Pore-scale displacement mechanisms as a source of hysteresis for two-phase flow in porous media, *Water Resour. Res.*, 52, 2194–2205, doi:10.1002/2015WR018254.
- Herring, A.L., A.P. Sheppard, L. Andersson, and **D. Wildenschild**, 2016. Impact of Wettability Alteration on 3D Nonwetting Phase Trapping and Transport, *Intl. J. of Greenhouse Gas Control*, 10.1016/j.ijggc.2015.12.026.
- Peszynska, M., A. Trykozko, G. Iltis, S. Schlueter, and **D. Wildenschild**, 2015. Biofilm growth in porous media: Experiments, computational modeling at the porescale, and upscaling, *Advances in Water Resources*, doi:10.1016/j.advwatres.2015.07.008.
- Kimbrel, E.J., A.L. Herring, R.T. Armstrong, I. Lunati, B.K. Bay, and **D. Wildenschild**, 2015. On the Optimization of Capillary Trapping during Geologic CO₂ Sequestration. *Intl. J. of Greenhouse Gas Control*, 07/2015; 42:1-15. doi:10.1016/j.ijggc.2015.07.011
- Armstrong, R., **D. Wildenschild** and B.K. Bay, 2015. The effect of pore morphology on microbial enhanced oil recovery, *Journal of Petroleum Science and Engineering*, Vol 130, June 2015, 16–25. doi:10.1016/j.petrol.2015.03.010
- Herring, A.L., L. Andersson, S. Schlüter, A.P. Sheppard, and **D. Wildenschild**, 2015. Efficiently Engineering Pore-Scale Processes: The Role of Force Dominance and Topology during Nonwetting Phase Trapping in Porous Media, *Advances in Water Resources*, 79, 91–102 (2015), doi: <http://dx.doi.org/10.1016/j.advwatres.2015.02.005>
- Katuwal, S., T. Nørgaard, P. Moldrup, M. Lamandé, **D. Wildenschild**, and L.W. de Jonge, 2014. Linking air and water transport in intact soils to macro-porosity by combining laboratory measurements and X-ray Computed Tomography, accepted, *Geoderma*.
- Schlueter, S., A. Sheppard, K. Brown, and **D. Wildenschild**, 2014. Image processing of multiphase images obtained via X-ray microtomography: A review, *Water Resour. Res.*, 50, doi:10.1002/2014WR015256
- Herring, A.L., L. Andersson, D. Newell, J.W. Carey, and **D. Wildenschild**, 2014. Pore-scale observations of supercritical CO₂ drainage in Bentheimer sandstone by synchrotron x-ray imaging. *Intl. J. of Greenhouse Gas Control*, 25 (2014) 93–101.
- Brown, K.I., A.P. Sheppard, and **D. Wildenschild**, 2014. On the challenges of measuring interfacial characteristics of three-phase fluid flow with x-ray microtomography. *J. of Microscopy*. doi: 10.1111/jmi.12106
- Naveed, M., P. Moldrup, H.J. Vogel, M. Lamandé, **D. Wildenschild**, M. Tuller, and L.W. de Jonge. 2013. Application of Physical Characterization and X-Ray Computed Tomography to Evaluate the Impact of Long-Term Fertilization Practice on Soil Structure Evolution. *Geoderma*, 01/2014; vol 217–218, p. 181–189.
- Lamandé, M., **D. Wildenschild**, F. E. Berriso, A. Garbout, M. Marsh, P. Moldrup, T. Keller, S. B. Hansen, L.W. de Jonge, and P. Schjønning, 2013. X-ray CT and laboratory measurements on glacial till subsoil cores – assessment of inherent and compaction-affected soil structure characteristics. *Soil Science*, July 2013 - Volume 178(7), p. 359–368, doi: 10.1097/SS.0b013e3182a79e1a,
- Herring, A.L., E.J. Harper, L. Andersson, A.P. Sheppard, B.K. Bay, and **D. Wildenschild**, 2013. Effect of Fluid Topology on Residual Nonwetting Phase Trapping: Implications for CO₂ Sequestration. *Advances in Water Resources*, <http://dx.doi.org/10.1016/j.advwatres.2013.09.015>.
- Joekar-Niasar, V., F. Doster, R.T. Armstrong, **D. Wildenschild**, and M.A. Celia, 2013, Trapping and hysteresis in two-phase flow in porous media, *Water Resources Research*, 49, 1–13, doi:10.1002/wrcr.2031.
- Naveed, M., S. Hamamoto, K. Kawamoto, T. Sakaki, M. Takahashi, T. Komatsu, P. Moldrup, M. Lamandé, **D. Wildenschild**, M. Prodanović and L.W. de Jonge, 2013, Correlating Gas Transport Parameters and X-ray Computed Tomography Measurements in Porous Media, *Soil Science*. February 2013, 178(2), 60–68, doi: 10.1097/SS.0b013e318288784c.
- Naveed, M., P. Moldrup, E. Arthur, **D. Wildenschild**, M. Eden, M. Lamandé, H.-J. Vogel, and L.W. de Jonge, 2013. Revealing Soil Structure and Functional Macroporosity along a Clay Gradient Using X-ray Computed Tomography, *Soil Science Society of America Journal*. 77, p. 403–411, doi:10.2136/sssaj2012.0134.
- Wildenschild, D** and A.P. Sheppard, 2013. X-ray imaging and analysis techniques for quantifying pore-scale structure and processes in subsurface porous medium systems. Invited review paper for 35th issue of *Advances in Water Resources*, 51, 217–246. <http://dx.doi.org/10.1016/j.advwatres.2012.07.018>.
- Armstrong, R.T. and **D. Wildenschild**, 2012. Investigating the mechanisms of microbial enhanced oil recovery, *Journal of Petroleum Science and Engineering*, Volumes 94–95, Sept. 2012, p. 155–163, <http://dx.doi.org/10.1016/j.petrol.2012.06.031>.
- Armstrong, R.T., M.L. Porter and **D. Wildenschild**, 2012. Linking Pore-Scale Interfacial Curvature to Column-Scale Capillary Pressure, *Advances in Water Resources*, 46, 55-62, <http://dx.doi.org/10.1016/j.advwatres.2012.05.009>.
- Kulkarni, R., M. Tuller, W. Fink, and **D. Wildenschild**. 2012. Three-dimensional multiphase segmentation of x-ray CT data of porous materials using a Bayesian Markov random field framework. *Vadose Zone Journal*, 11. doi:10.2136/vzj2011.0082.

- de Jonge, L.W., P. Moldrup, A.L. Vendelboe, M. Tuller, and **D. Wildenschild**, 2012. Soil Architecture and Physicochemical Functions: An Introduction. doi: 10.2136/vzj2011.0185 *Vadose Zone Journal*, February 2012 v. 11 no. 1 vzj2011.0185.
- Armstrong, R.T. and **D. Wildenschild**, 2012. Microbial Enhanced Oil Recovery in Fractional-Wet Systems: A Pore-Scale Investigation, *Transport in Porous Media*, 92(3), 819-835. DOI 10.1007/s11242-011-9934-3.
- Armstrong, R.T. and **D. Wildenschild**, 2011. Decoupling the Mechanisms of Microbial Enhanced Oil Recovery, SPE146714, paper prepared for the SPE Annual Technical Conference and Exhibition held in Denver, CO, Oct30, Nov 2., 2011.
- Jansik, D.P., **D. Wildenschild** and N.D. Rosenberg, 2011. Flow Processes in the Dry Regime: The Effect on Capillary Barrier Performance. *Vadose Zone Journal*, 10, 1162-1172.
- Wildenschild, D.**, R.T. Armstrong, A.L. Herring, I.M. Young, and J.W. Carey, 2011. Exploring capillary trapping efficiency as a function of interfacial tension, viscosity, and flow rate, *Energy Procedia* 4, 4945-4952.
- Iltis, G., Armstrong, R.T., D.P. Jansik, B.D. Wood, and **D. Wildenschild**, 2011. Imaging Biofilm Architecture within Porous Media using Synchrotron based X-Ray Computed Microtomography. *Water Resour. Res.*, 47, W02601, doi:10.1029/2010WR009410.
- Porter, M. L., **D. Wildenschild**, G. Grant, and J. I. Gerhard (2010), Measurement and prediction of the relationship between capillary pressure, saturation, and interfacial area in a NAPL-water-glass bead system, *Water Resour. Res.*, 46, W08512, doi:10.1029/2009WR007786.
- Davit, Y., G. Iltis, G. Debenesta, S. Veran-Tissoires, **D. Wildenschild**, M. Gerinoc, M. Quintard, 2010. Imaging biofilms in porous media using X-ray computed microtomography, *Journal of Microscopy*, DOI: 10.1111/j.1365-2818.2010.03432.x.
- Joekar-Niasar, V., M. Prodanovic, **D. Wildenschild**, and S. M. Hassanizadeh, 2010. Network Model Investigation of Interfacial Area, Capillary Pressure and Saturation Relationships in Granular Porous Media, *Water Resources Research*, 46, W06526, doi:10.1029/2009WR008585.
- Porter, M.L., M.G. Schaap, and **D. Wildenschild**, 2009. Comparison of Interfacial Area Estimates for Multiphase Flow Through Porous Media Using Computed Microtomography and Lattice-Boltzmann Simulations. doi:10.1016/j.advwatres.2009.08.009, *Advances in Water Resources*.
- Porter, M.L. and **D. Wildenschild**, 2009. Validation of an image analysis method for computed microtomography image data of multiphase flow in porous systems. *Journal of Computational Geosciences*. doi:10.1007/s10596-009-9130-5
- Schaap, M.G., M.L. Porter, B.S.B. Christensen, **D. Wildenschild**. 2007. Comparison of pressure-saturation characteristics derived from computed tomography and Lattice Boltzmann simulations, *Water Resour. Res.*, 43, W12S06, doi:10.1029/2006WR005730.
- Culligan, K.A., **D. Wildenschild**, B.S.B. Christensen, W.G. Gray, and M.L. Rivers, 2006. Pore-scale Characteristics of Multiphase Flow in Porous Media: a Synchrotron-based CMT Comparison of Air-Water and Oil-Water Experiments. *Advances in Water Resources*, 29(2), 227-238.
- Wildenschild, D.**, J.W. Hopmans, A.J.R. Kent, M.L. Rivers, 2005. A Quantitative Study of Flow-Rate Dependent Processes Using X-ray Microtomography. *Vadose Zone Journal*, 4, 112-126.
- Wildenschild, D.**, K.A. Culligan, B.S.B. Christensen, 2004. Application of x-ray microtomography to environmental fluid flow problems. in *Developments in X-Ray Tomography IV*, ed. U. Bonse, *Proc. of SPIE* Vol. 5535, doi.org/10.1117/12.559056, 432-441.
- Culligan, K.A., **D. Wildenschild**, B.S.B. Christensen, W.G. Gray, M.L. Rivers, and A.F.B. Thompson, 2004. Interfacial Area Measurements for Unsaturated Flow Through a Porous Medium. *Water Resources Research*, 40(12), Art. No. W12413 (p.1-12).
- Roberts, J.J. and **D. Wildenschild**, 2004. Electrical Properties of Sand-Clay Mixtures Containing Trichloroethylene and Ethanol. *Journal of Environmental & Engineering Geophysics*, 9(1), March 2004, 1-10.
- Cherepy, N. and **D. Wildenschild**, 2003. Electrolyte management for effective long-term electro-osmotic transport of volatile organics through low-permeability soils. *Environmental Science and Technology*, 37, 3024-3030.
- Wildenschild, D.**, J.W. Hopmans, C.M.P. Vaz, M.L. Rivers, and D. Rikard, 2002. Using x-ray computed tomography in hydrology: Systems, resolutions, and limitations. *Journal of Hydrology*, 267(3-4), 285-297.
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- Wildenschild, D.**, J.W. Hopmans, and J. Simunek, 2001. Flow rate dependence of soil hydraulic characteristics. *Soil Sci. Soc. Am. J.*, 65(1), 35-48.
- Wildenschild, D.** and J.J. Roberts, 2001. Experimental Tests of Enhancement of Vapor Diffusion in Topopah Spring Tuff. *Journal of Porous Media*, 4(1), 1-13.
- Wildenschild, D.**, J.J. Roberts, and E.D. Carlberg, 2000. On the Relationship Between Microstructure and Electrical and Hydraulic Properties of Sand-Clay Mixtures. *Geophysical Research Letters*, 27(19), 3085-3088.

- Wildenschild, D.** and K.H. Jensen, 1999. Laboratory investigations of effective flow behavior in unsaturated heterogeneous sands. *Water Resources Research*, 35(1), 17-29.
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- Wildenschild, D.,** K.H. Jensen and T. H. Illangasekare, 1994. A laboratory analysis of the effect of macropores on solute transport. *Ground Water*, May-June 1994, 32(3), 381-389.

Books/ Book Chapters

- Foltyn, P., M. Guttman, M. Schneider, S. Fest-Santini, **D. Wildenschild**, B. Weigand, 2020. Fabrication and Evaluation Methods of Micro-structured Surfaces for Droplet Impact Experiments. In: Lamanna G., Tonini S., Cossali G., Weigand B. (eds) *Droplet Interactions and Spray Processes. Fluid Mechanics and Its Applications*, vol 121. Springer, Cham, https://doi.org/10.1007/978-3-030-33338-6_6
- Wildenschild, D.,** M.L. Rivers, M.L. Porter, G.C. Iltis, R.T. Armstrong, and Y. Davit, 2013. Using Synchrotron-based X-ray Microtomography and Functional Contrast Agents in Environmental Applications, Invited book chapter for 2nd edition of *Soil–Water–Root Processes: Advances in Tomography and Imaging*, edited by S.H. Anderson and J.W. Hopmans. CSA Books, <https://doi.org/10.2136/sssaspecpub61.c1>

Recent other publications (Proceedings, Abstracts, Reports, etc. for the last 5 years)

- Li, T, and **Wildenschild, D.** 2024. The Effect of Film Flow on Capillary Pressure Equilibration in Multi-Phase Flow With Disconnected Phase” 16th International Conference on Porous Media, Qingdao, China. Abstract
- Wildenschild, D.,** and C. Brueck, 2023. “Visualizing and quantifying colloid transport in multiphase porous media: Effect of drainage flow rate and colloid hydrophobicity”, American Geophysical Union, Fall Meeting, San Francisco, Dec 11-16, 2023. Abstract H54D-03
- Paustian, R. and **D. Wildenschild**, 2023. “The Effect of Porous Medium Wettability on the Relationship Between Capillary Pressure, Saturation, and Interfacial Area for Three-Phase Flow”. 15th International Conference on Porous Media, Edinburgh, Scotland. Abstract
- Meisenheimer, D.E., and **D. Wildenschild**, 2023. “Incorporating Bubble Evolution and Transport in Constitutive Relationships for Quasi- and non-Equilibrium two-Phase Flows”. 15th International Conference on Porous Media, Edinburgh, Scotland. Abstract
- Wildenschild, D.,** Christopher Brueck, Sassan Ostvar, Gabriel Iltis, Yohan Davit, Steffen Schlüter, Linnéa Andersson, Maoz Dor, and Brian Wood. 2022. “Growth, deposition, and clogging: effect on fluid networks”
- Wildenschild, D.,** Harper, E.J.H., Herring, A.L., and Armstrong, R.T. 2021. “The Effect of Original Saturation on Residual Nonwetting Phase Capillary Trapping Efficiency”, American Geophysical Union, Fall Meeting, New Orleans + virtual, Dec 13-18, 2021. H15H-1138.
- Wildenschild, D.,** D. Behnoudfar, R. Paustian, D.E. Meisenheimer, and M.I. Dragila, 2021. “Contact Angle Hysteresis in Multi-Phase Flow”, American Geophysical Union, Fall Meeting, New Orleans + virtual, Dec 13-18, 2021. H22D-01.
- ~~**Wildenschild, D.** Using microimaging to understand flow and transformation processes of relevance to groundwater remediation, 2020. Twelfth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 31-June 4, 2020, Portland, Oregon~~
- Davis, B. and **D. Wildenschild**, 2020. Reducing Connectivity of Injection Fluid in Porous Media with Applications to Geological Carbon Sequestration, American Geophysical Union Fall Meeting, San Francisco (virtual). Abstract H094.
- Wildenschild, D.** 2020, Using Microimaging to Understand Flow and Transformation Processes of Relevance to Groundwater Remediation. Batelle 2020 Chlorinated Conference, Portland, OR (conference postponed to June 2021)
- Wildenschild, D.** and T. Byington, 2020, Effectiveness of Individual Development Plans (IDPs) in Support of Student Success: Outcomes from a Survey of Postdocs, Western Association of Graduate Schools, Albuquerque, NM, March 8-11, 2020. Abstract.
- Wildenschild, D.,** R. Paustian, D. Behnoudfar, D.E. Meisenheimer and M.I. Dragila, 2019. Exploring Wettability Alteration and Contact Angle Hysteresis in Porous Media Multi-Phase Flow Using 3D Imaging. American Geophysical Union Fall Meeting, San Francisco, Dec 9-13. Abstract H13R-2022.

- Lubbers, J., A.J.R. Kent, D. Meisenheimer, and **D. Wildenschild**, 2019. Using MicroCT to Quantify 3D Zoning in Sandine: Implications for Open System Processes, American Geophysical Union Fall Meeting, San Francisco, Dec 9-13. Abstract V23E-0230.
- Harper Kimbrel, E.J., **D. Wildenschild**, A.L. Herring, and R.T. Armstrong, 2018. Exploring the effect of reservoir residuals on CO₂ trapping: A study of non-wetting phase saturations, topologies, and final trapping efficiency. 14th International Conference on. Greenhouse Gas Control Technologies. Abstract.
- Herring, A.L., **D. Wildenschild**, V. Robins, A. Sheppard, 2018. The impact of cyclic injection cycles on capillary trapping: comparison of ambient- and reservoir-condition experiments. 14th International Conference on. Greenhouse Gas Control Technologies. Abstract.
- Kimbrel, E.J. Harper, A.L. Herring, R. Armstrong, and **D. Wildenschild**, 2018. The Effect of Original and Initial Saturation on Residual Nonwetting Phase Capillary Trapping Efficiency. 10th International Conference on Porous Media, Abstract.
- D. Wildenschild**, Sassan Ostvar, Gabriel Ittis, Yohan Davit, Steffen Schlüter, Linnéa Andersson, Brian Wood, 2018. Using 3D Microimaging to Evaluate the Effect of Nutrient Flow Rate on Biofilm Growth in Porous media. 10th International Conference on Porous Media, Abstract.
- Li, T., M.I. Dragila, S. Schlüter, and **D. Wildenschild**, 2017. Interfacial Curvatures and Nonwetting Phase Trapping for Two-Phase Flow in Porous Media, 9th International Conference on Porous Media, Abstract.
- Meisenheimer, D., M.L. Rivers, and **D. Wildenschild**, 2017. Bubble Formation and its Effect on Interfacial Area Evolution and Topology in Two-Phase Flow, 9th International Conference on Porous Media, Abstract.
- Meisenheimer, D., M.L. Rivers, and **D. Wildenschild**, 2017. Using interfacial area to close descriptions of transient and quasi-static two-phase flow, 9th International Conference on Porous Media, Abstract.
- Brueck, C. and **D. Wildenschild**, 2017. Exploring unsaturated colloid deposition and mobilization in 3D with x-ray microtomography, 9th International Conference on Porous Media, Abstract.
- Schlüter, S., T. Li; H-J. Vogel, S. Berg, and **D. Wildenschild**, 2017. Time scales of relaxation dynamics during hydraulic non-equilibrium in two-phase flow, 9th International Conference on Porous Media, Abstract.

PRESENTATIONS

Invited presentations at international meetings (last 8 years)

- Center for Sustainable Subsurface Resources (CSSR) Annual Conference, Bergen, Norway, Sept 18-19. 2024. "Pore-scale imaging experiments of relevance to carbon and hydrogen storage".
- ~~International Conference on Tomography of Materials & Structures (ICTMS 2024), Cap Town, South Africa, July 1-5, 2024. "Bubble Evolution and Transport in Multi-Phase Fluid Systems: Radiation-Induced Exsolution vs. Continuum Flow", **INVITED**. (unable to attend due to illness)~~
- 16th International Conference on Porous Media. Interpore 2024; *Interfaces, interfaces everywhere...a special session in honor of Dorthe Wildenschild*, Qingdao, China, May 13-16, 2024. "The Effect of Film Flow on Capillary Pressure Equilibration in Multi-Phase Flow With Disconnected Phase"
- 2022 CMWR (Computational Methods in Water Resources) conference, June 19-23, 2022. Gdansk, Poland "Growth, deposition, and clogging: effect on fluid networks" **KEYNOTE**
- ToScA (Tomography for Scientific Advancement) North America 2021, University of Texas, TX, USA, 24 - 26 May 2021. "Mission Impossible: Imaging Biofilms with X-rays". (virtual), **INVITED**
- "2021 Anneliese Niethammer Lecture Series", University of Stuttgart, March 2nd, 2021. "Contact Angle Hysteresis in Multi-Phase Flow". (virtual). **INVITED**
- ~~International Conference on Tomography of Materials & Structures (ICTMS 2019), Cairns, Australia, July 18-22, 2019. "Exploring Wettability States and Alterations in Porous Media Multi-Phase Flow Systems Using 3D Imaging", **KEYNOTE**. (unable to attend – passport delay)~~
- Princeton University, Transport in Disordered Environments, January 23-25, 2019. "Exploring Wettability State and Alteration in Porous Media Multi-Phase Flow Systems: Applications to CO₂ Storage" **INVITED LECTURE**
- Research Training Group (DROPIT): Droplet Interaction Technologies, Summer School, Stuttgart, Germany, Sept 21. 2018, "Exploring wettability states and alterations in porous media multi-phase flow systems using 3D imaging" **KEYNOTE**
- University of Stuttgart, Institute for Hydrodynamics and Hydrosystems, Annual Retreat, Georgenhof, Germany, Sept 19, 2018. "Using 3D Microimaging to Evaluate the Effect of Nutrient Flow Rate on Biofilm Growth in Porous Media".

- Research Training Group (DROPIT): Droplet Interaction Technologies, Summer School, Bergamo, Italy, Sept 17, 2018, "Measuring micron-scale characteristics of materials, fluids, and interfaces in porous media: Applications in environmental engineering"
- Elizabeth & Frederick White Conference - Frontiers in Gas-Solid Processes from the Atomic Scale to the Parsec. Australian National University, Canberra, Australia, Sept 5-7, 2018. "Exploring Wettability States and Alterations in Porous Media Multi-Phase Flow Systems Using 3D Imaging: Applications to CO₂ Storage". **KEYNOTE**.
- 10th International Conference on Porous Media; New Orleans, LA, May 14th-17th, 2018. "Using 3D Microimaging to Evaluate the Effect of Nutrient Flow Rate on Biofilm Growth in Porous media"
- 8th International Conference on Porous Media; *Minisymposium in honor of Geoffrey Mason*, Cincinnati, May 12th, 2016. "Curvature Measurement, Nonwetting Phase Trapping and Film Flow in Porous Media"
- University of Saskatchewan, Breakthroughs in Water Security Research: The Global Institute for Water Security Distinguished Lecture Series, Nov 5th 2015. "Demystifying the pore: Using high-resolution imaging to better understand fluid flow in porous media"
- MIMENIMA, University of Bremen, Germany, July 6, 2015. "Measuring morphological and topological characteristics of fluids in porous media: Applications to environmental science and engineering problems"
- MODFLOW and More 2015: Modeling a Complex World, Golden, CO, May 31st, 2016 "Confessions of an Experimentalist: A talk about CO₂, groundwater and the need for modelling"
- IOR Norway Workshop, Univ. of Stavanger, April 30, 2015. "Quantifying pore-scale phenomena of relevance to large-scale EOR using x-ray tomography"
- IOR Norway, Univ. of Stavanger, April 28-29, 2015. "Quantifying microbial enhanced oil recovery processes at the pore-scale with microimaging"
- **2014 Distinguished Darcy Lecturer of Groundwater Science** (48 lectures in the US and at international sites during 2014 calendar year).
- 2014 Gordon Conference on Flow and Transport in Permeable Media, Bates College, Lewiston, ME, July 6-11, 2014, "Three-phase flow in porous media: On spreading films, wettability alteration, and the relationship between capillary pressure, saturation and interfacial area"

Other presentations by Wildenschild (last 5 years)

- American Geophysical Union, Fall Meeting, San Francisco, Dec 11-16, 2023. "Visualizing and quantifying colloid transport in multiphase porous media: Effect of drainage flow rate and colloid hydrophobicity"
 - 2023 Interpore Conference, 22-25 May, Edinburgh, Scotland, "The Effect of Porous Medium Wettability on the Relationship Between Capillary Pressure, Saturation, and Interfacial Area for Three-Phase Flow"
 - 2023 Interpore Conference, 22-25 May, Edinburgh, Scotland, "Incorporating Bubble Evolution and Transport in Constitutive Relationships for Quasi- and non-Equilibrium two-Phase Flow"
 - American Geophysical Union, Fall Meeting, New Orleans + virtual, Dec 13-18, 2021. "Contact Angle Hysteresis in Multi-Phase Flow"
 - American Geophysical Union, Fall Meeting, New Orleans + virtual, Dec 13-18, 2021. "The Effect of Original Saturation on Residual Nonwetting Phase Capillary Trapping Efficiency"
 - Anneliese Niethammer Lecture Series, University of Stuttgart, March 2nd, 2021. "Contact Angle Hysteresis in Multi-Phase Flow",
 - ~~Twelfth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 31-June 4, 2020, Portland, Oregon. "Using microimaging to understand flow and transformation processes of relevance to groundwater remediation" (cancelled due to COVID-19)~~
 - Western Association of Graduate Schools, Albuquerque, NM, March 8-11, 2020. "Effectiveness of Individual Development Plans (IDPs) in Support of Student Success: Outcomes from a Survey of Postdocs, remote oral presentation.
 - American Geophysical Union, Fall Meeting, San Francisco, 2019. "Exploring Wettability Alteration and Contact Angle Hysteresis in Porous Media Multi-Phase Flow Using 3D Imaging"
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INTERNAL AND EXTERNAL POSITIONS, MISCELLANEA

2024 Interpore Society, Honors and Awards Committee, Chair
2023 Interpore Society, Strategic Planning Committee, member
2023 Journal for Tomography of Materials and Structures, Editor
2023 Interpore Journal, Editor
2023 Reviewer, DOE Energy Frontier Research Centers, Management Review
2000-10 Member, American Geophysical Union, Unsaturated Zone Technical Committee
2007-09 Chair, American Geophysical Union, Unsaturated Zone Technical Committee
2007-13 Associate Editor of Vadose Zone Journal
2009 - Member, Editorial Board of Advances in Water Resources
2011-12 Member of organizing committee, 2012 Gordon Research Conference on Flow and Transport in Permeable Media, Les Diablerets, Switzerland.
2013-14 Member of organizing committee, 2014 Gordon Research Conference on Flow and Transport in Permeable Media, Bates College, MD.
2014-18 Board member, Science Advisory Council, Center for Geologic Storage of CO₂
2014-18 Interpore Council member, International Society for Porous Media

AWARDS AND RECOGNITIONS

2023 International Society of Porous Media (Interpore) Honorary Lifetime Achievement Award
2014 NGWA Henry Darcy Distinguished Lecturer 2014, (48 lectures internationally)
2009-2010 University of Aarhus (Denmark) Research Fund: Visiting Researcher Award
2002-2006 "Talent" grant from the Danish Science & Technology Foundation
1996-1997 Postdoctoral Research Fellowship from Danish private philanthropic foundation (Univ. of CA, Davis)

GRANT AND CONTRACT SUPPORT

Current

3D imaging of microbial biofilm architecture in opaque porous media to assess its intelligent response to environmental stress, DOE Office of Science (BER), Bioimaging Research Program, **PI: \$1,815,000 (total), \$1,085,457 (OSU)**, 09/01/24-8/10/27
Collaborative Research: Fundamental Controls on Capillary Trapping of scCO₂ in Geologic Storage: Linking Pore and Reservoir Scales, DOE Office of Science (BES/Geosciences), **PI: \$852,269 (total), \$535,498 (OSU)**, 09/01/24-8/10/27
REU Supplement award for Undergraduate Research Experiences, NSF CBET/CASIS, **PI: \$16,000** 1/1/25-9/30/25
ISS: Biofilm growth and architecture in porous media: exploring the effect of gravitational and interfacial forces on biofilm growth patterns, NSF CBET/CASIS, **PI: \$525,438**, 10/1/23-9/30/26
Energy-efficient and effective reservoir drainage, Centre for Sustainable Subsurface Resources (CSSR) <https://cssr.no/>, **\$15.801**, 12/31/2026

Past

Mechanisms for CO₂ Storage in the Presence of Residual Oil, NORCE Norwegian Research Center AS, 80,000 NOK => **\$9,375**, 12/31/2024
MRI: Development of a State-of-the-art High-Resolution Tomography Facility Customized for Dynamic (4D) Imaging, D. **Wildenschild (PI)**, K. Sharp, B. Bay, F. Colwell, M. Evans, NSF MRI Program, **\$836,816 (from NSF)**, 10/01/15-12/31/20.
Interface-Driven Multi-Field Processes in Porous Media – Flow, Transport and Deformation, D. **Wildenschild (PI)**, Rainer Helmig. Univ of Stuttgart, **€ 10,000**. 01.01.2019-03.30.2020.
Using X-Ray Computed Microtomography to Investigate MJF Agent/Powder Interactions, OSU/HP SEED grant, D. **Wildenschild (PI)**, with Dr Jim Stasiak, HP. **\$10,000**, 1/1/2018 to 2/28/2019
Interfacial Controls on Dynamics and Equilibration in Porous Media. D. **Wildenschild (PI)**, NSF Hydrology Program, **\$431,155**, 04/01/14-03/31/19.
Three-Phase Capillary Pressure, Hysteresis and Trapping in Mixed-Wet Rock, J.O. Helland (PI), D. **Wildenschild (co-PI)**, M. Prodanovic (co-PI), Norwegian Research Council and Conoco Phillips, **\$170,000 for OSU**, 09/30/14-09/01/2017.
A detailed study of the CO₂-brine capillary trapping mechanism as applied to geologic carbon storage. US DOE BES, D. **Wildenschild (PI)**, M.G. Schaap, **\$787,976/424,557 for OSU**, 09/01/11-11/30/16

Colloid Mobility in Soils: Fundamental Pore-Scale Mechanisms, Simplifications and Practical Relevance for Risk Analysis. M. Schaap and **D. Wildenschild (co-PI)**, USDA AFRI Program. **\$239,662 for OSU**, 10/01/13-09/30/16.

Hybrid Modeling in Evolving Porous Media, M. Peszynska (PI), **D. Wildenschild (co-PI)**, NSF Division of Mathematical Sciences, **\$299,905**, 09/15/11-09/14/14

Collaborative Research: CDI-Type II - Revolutionary Advances in Modeling Transport Phenomena in Porous Medium Systems, NSF CDI Program. C.T. Miller, C.T. Kelley, **D. Wildenschild (co-PI)**, **\$1,7 mill. (OSU portion: \$300,000)** 12/01/09-11/30/13.

Microbial Activity and Precipitation at Solution-Solution Mixing Zones in Porous Media. DOE ERSP Program. F.S. Colwell, R. Gerlach, A. Mitchell, G. Redden, **D. Wildenschild (co-PI)**, B.D. Wood, **1,213,902**, 04/01/09-05/31/12.

Integrated Experimentation and Hybrid Modeling for Control of Multiphase Flow and Reaction in CO₂ Injection and Storage, LANL LDRD. J.W. Carey, P. Lichtner, Q. Kang, S. Backhaus, Y. Zhao, D. Moulton. A. Abdel-Fattah, A. Valocchi, C. Werth, **D. Wildenschild (Co-PI)**, **\$1.65 mill., (OSU portion: \$270,000)** 10/01/09-09/30/12.

Biosurfactant Enhanced Oil Recovery: A Pore-scale Investigation of Interfacial and Microbial Interactions. ACS Petroleum Research Fund, **D. Wildenschild (PI)**, **\$147,198**. 09/01/08-09/31/12.

Three-dimensional Imaging and Quantification of Biomass in Porous Media. DOE ERSP Program. **D. Wildenschild (PI)** and B.D. Wood, **\$149,985**, 04/01/09-03/31/11.

CMG Collaborative Research: Mathematical and Experimental Analysis of Transport Phenomena in Highly Heterogeneous Porous Media. B. Wood, **D. Wildenschild (co-PI)**, E. Waymire, E. Thomann, V. Bokil. NSF Collaboration in Mathematical Geosciences (CMG). **\$421,739**, 07/01/08-06/30/10.

Colloidal transport in variably saturated porous media: A detailed evaluation of colloid mobilization mechanisms. OSU IWW USGS mini-grant. **D. Wildenschild (PI)**, **\$8,728**. 04/01/09-09/31/09.

Three-Dimensional Imaging and Quantification of Biomass in Porous Media. **D. Wildenschild (PI)**. OSU General Research Fund. **\$8,850**. 06/08-05/09

Collaborative Research: Experimental and Numerical Characterization of Thin Films in Three-Dimensional Porous Media. **D. Wildenschild (PI)** – REU Supplement NSF Hydrology. **\$11,307**, 08/01/06-07/31/09.

Collaborative Research: Experimental and Numerical Characterization of Thin Films in Three-Dimensional Porous Media. **D. Wildenschild (PI)**. NSF Hydrology. **\$130,897**, 08/01/06-07/31/09.

Purchase of High Performance Computing cluster nodes for computational science research in College of Science (COS). OSU Research Equipment Reserve Fund (RERF). M. Peszynska, A. Faridani, R. Higdon, R. Landau, **D. Wildenschild (co-PI)**. **\$26,636**. 04/06.

Collaborative Research: Interfacial Dynamics in Multi-Phase Flow and Transport Processes, **D. Wildenschild (PI)** – REU Supplement, NSF Hydrology Program, **\$5,179**

Collaborative Research: Interfacial Dynamics in Multi-Phase Flow and Transport Processes, **D. Wildenschild (PI)**, NSF Hydrology Program, **\$238,348**, 06/01/04-05/31/06.

Investigating Subsurface Pore Scale Flow Processes With OSU's X-ray Microtomography Facility. **D. Wildenschild (PI)**, OSU General Research Fund. **\$7,600**. 04/03-09/05.

The use of x-ray micro-tomography and pore-scale modeling to evaluate dynamic and equilibrium pore-scale processes in porous media. **Personal grant to D. Wildenschild (PI)**. Danish Technical Research Council (Talent Project). (DKK 2.61 mill.) ~**\$435,000**. 07/00-07/04.

X-ray tomography to determine moisture distribution in a soil sample for various outflow conditions, **D. Wildenschild (PI)**. Institute of Geophysics and Planetary Physics, Lawrence Livermore National Laboratory. **\$13,000**. 11/99-11/00.