

# Curriculum Vitae

## Dorthe Wildenschild

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### EDUCATION

- **Ph.D., Technical University of Denmark**, Civil and Environmental Engineering (1996)  
Dissertation title: "Characterization of Unsaturated Hydraulic Parameters for Homogeneous and Heterogeneous Soils". Advisor: Karsten H. Jensen
  - **M.Sc., Technical University of Denmark**, Civil and Environmental Engineering, (1991)  
Dissertation title: "Laboratory Investigations of Macropore Flow and Transport in Clayey Soils.". Advisor: Karsten H. Jensen
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### EMPLOYMENT

- Sept 2002 - present: Oregon State University, Department of Geosciences/Department of Civil, Construction & Environmental Engineering. *Assistant Professor.*
  - July 2000 - present: 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.*
  - May 1996 - June 1996: Technical University of Denmark, Institute of Hydrodynamics and Water Resources. *Postdoctoral Researcher.* Editing Ph.D. thesis for publication in international journals.
  - March 1992 – April 1996: Technical University of Denmark, Institute of Hydrodynamics and Water Resources. *Postgraduate Researcher, Teaching Assistant.* Nine month internship at University of Colorado, Boulder, CO, October 1992-July 1993.
  - December 1993 - February 1994: University of Colorado at Boulder, Department of Civil, Environmental and Architectural Engineering. *Research Assistant.* Laboratory work - setting up detailed preferential flow experimental facility for verification of two-domain numerical model.
  - October 1991 - March 1992: Institute of Hydrodynamics and Water Resources, Technical University of Denmark. *Research Assistant.* Numerical modeling with fully distributed 3-dimensional hydrological model (MIKESHE) - optimization of arid zone irrigation demand on multiple scale field plots.
  - February 1990 - October 1990: Department of Geology and Geotechnical Engineering, Technical University of Denmark. *Teaching Assistant.* Teaching introductory physical geology lab, assisting with field trips and preparing course material.
  - February 1990 - April 1990: Department of Environmental Sciences and Engineering, Technical University of Denmark. *Research Assistant.* Computer assistant, implementing hydrologic and geologic data for landfill investigation, creating two- and three-dimensional illustrations for interpreting the data.
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### PUBLICATIONS

#### *Papers in refereed international journals*

- Culligan, K.A., **D. Wildenschild**, B.S.B. Christensen, W.G. Gray, and M.L. Rivers, 2005. 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 (SPIE, Bellingham, WA, 2004), 432-441.

- Culligan, K.A., **D. Wildenschild**, B.S.B. Christensen, W.G. Gray, M.L. Rivers, and A.F.B. Tompson, 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.
- Vaz, C.M.P., J.W. Hopmans, A. Macedo, L.H. Bassoi, and **D. Wildenschild**, 2002. Soil Water Retention Measurements Using a Combined Tensiometer-Coiled TDR Probe, *Soil Sci. Soc. of Am. J.*, 66(6), 1752-1760.
- 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.
- Wildenschild, D.** and K.H. Jensen, 1999. Numerical modeling of observed effective flow behavior in unsaturated heterogeneous sands. *Water Resources Research*, 35(1), 29-42.
- Wildenschild, D.**, K. H. Jensen, K.J. Hollenbeck, T.H. Illangasekare, D. Znidarcic, T. Sonnenborg and M.B. Butts, 1997. A two-stage procedure for determining unsaturated hydraulic characteristics using a syringe pump and outflow observations. *Soil Sci. Soc. Am. J.*, 61(2), 347-359.
- 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.

*Recent other publications (Proceedings, Abstracts, Reports, etc. for the last 3 years)*

- Schaap, M.G., B.S.B. Christensen, M.L. Porter, and **D. Wildenschild**, 2006. Linking experimental capillary pressure-saturation data Lattice Boltzmann simulations. *Computational Methods in Water Resources (XVI)*, Copenhagen, Denmark, June 19-22 2006.
- McClure, J., D. Adalsteinsson, **D. Wildenschild**, and C.T. Miller. 2006. Computation of Interfacial Areas, Common Line Lengths and Interfacial Curvatures from Experimentally Derived Data. *Computational Methods in Water Resources (XVI)*, Copenhagen, Denmark, June 19-22 2006.
- Porter, M.L. M.G. Schaap, and **D. Wildenschild**, 2006. Capillary pressure-saturation curves: Toward simulating dynamic effects with the Lattice-Boltzmann method. *Computational Methods in Water Resources (XVI)*, Copenhagen, Denmark, June 19-22 2006.
- Wildenschild, D.** 2005. Effect of pore structure on multi-phase flow – pore and lab scale experiments. Conference on Multi-scale Modelling of Flow and Transport in Porous Media Centro Stefano Franscini, Monte Verità, Switzerland, April 7 - 12, 2006. Abstract.
- Porter, M.L., **D. Wildenschild**, M.G. Schaap, 2005. Investigating Dynamic Behavior in Experimental Capillary Pressure-Saturation Curves Using a Lattice-Boltzmann Model. *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H33A-1365.
- Jansik, D.P. and **D. Wildenschild**, 2005. Estimating Film Flow Behavior in a Crushed Volcanic Tuff. *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H33A-1367.
- Wildenschild, D.** and S.A. Bradford, 2005. Interfacial Area Estimates for a NAPL-Water System and Their Effect on Predicting Groundwater Remediation Efficiency. *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H33A-1372.
- Basagaoglu, H., P. Meakin, S. Succi, and **D. Wildenschild**, 2005. Multiphase Flow in Micro-fracture Junctions. *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H42A-03.
- Wildenschild, D.**, K.A. Culligan, B.S.B. Christensen, W.G. Gray, M.L. Rivers, 2004. Comparison of Air-Water and Oil-Water Multi-Phase Flow Experiments in Glass Bead Packs, Advanced Photon Source Activity Report 2003, (Argonne National Laboratory, Argonne, IL; ANL-04/16, December 2004) Can be accessed at <http://www.aps.anl.gov/News/Reports/index.html> and search on last name of author under the 2003 reports.

- Wildenschild, D.** J.W. Hopmans, and M.L. Rivers, 2004. X-ray CMT Study Shows that Drainage Boundary Condition is Responsible for Dynamic Effect in Sandy Material. *Eos Trans. AGU*, 85(46), Fall Meet. Suppl., Abstract H33A-0454.
- Culligan, K.A., **D. Wildenschild**, B.S.B. Christensen, and W.G. Gray, 2004. A Study of Oil-Water and Air-Water Interfacial Areas Measured Using Synchrotron-based CMT. *Eos Trans. AGU*, 85(46), Fall Meet. Suppl., Abstract H33A-0450.
- Wildenschild, D.** 2004. Application of x-ray microtomography to environmental fluid flow problems, *International Symposium on Optical Science and Technology, SPIE's 49<sup>th</sup> Annual Meeting: Developments in X-ray Microtomography IV*. Denver 2-6 August, 2004. Abstract.
- Schaap, M.G., P.de Willigen, B.S.B. Christensen, **D. Wildenschild**, K.A. Culligan, W. Bouten, and K.H. Jensen, 2003. Multi-phase flow at the pore-scale: Making lattice Boltzmann simulations fit experimental data. *Eos Trans. AGU*, 84(46), Fall Meet. Suppl., Abstract H32A-0531, 2003.
- Looms, M.C., K.H. Jensen, **D. Wildenschild**, B.S.B. Christensen, J. Gudbjerg, 2003. Influence of Air Discontinuity and Wall Effects on the Measurements of Hydraulic Parameters Under Dynamic Conditions. *Eos Trans. AGU*, 84(46), Fall Meet. Suppl., Abstract H32A-0527, 2003.
- Wildenschild, D.**, K.A. Culligan, B.S.B. Christensen, and M.L. Rivers, 2003. Using x-ray microtomography for quantifying pore scale parameters. Advanced Photon Source User Activity Report for 2002. Can be accessed on-line at [http://www.aps.anl.gov/aps/activity\\_reports/webars.html](http://www.aps.anl.gov/aps/activity_reports/webars.html) and search on last name of author under the 2002 reports.
- Wildenschild, D., 2003. The evils associated with image processing of grey-scale high-resolution x-ray tomography data. *Abstract*. Seminar on Pore Scale Study of Porous Media Processes, . May 16<sup>th</sup> 2003, Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC
- Culligan, K.A., **D. Wildenschild**, M.G. Schaap, B. S.B. Christensen, W.G. Gray, A.F.B. Tompson, 2003, On the Measurement of Interfacial Areas in Multiphase Porous Media Flow. *Abstract*. Workshop on Simulation and Optimization April 28, 2003, Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC
- Wildenschild, D.**, 2003. Investigating multiphase flow processes at the micro-scale: Is it pertinent to solving environmental problems, *Abstract*, Proc. of the EGS-AGU-EUG Joint Assembly, Nice, France. April 6.-10. 2003. *Geophysical Research Abstracts*, vol. 5, 12599, 2003.
- Culligan, K.A., **Wildenschild, D.**, Schaap, M.G., Christensen, B.S.B., Gray, W.G., Tompson, A.F.B., 2003. On the measurement of interfacial areas in multiphase porous media flow. *Abstract*, Proc. of the EGS-AGU-EUG Joint Assembly, Nice, France. April 6.-10. 2003. *Geophysical Research Abstracts*, vol. 5, 04811, 2003
- Wildenschild, D.**, B.S.B. Christensen, K.A. Culligan, M.L. Rivers, and J.W. Hopmans, 2003. Identifying pore-scale geometry and interfacial properties for multi-phase flow using synchrotron-based micro-imaging. Proc. of the SIAM Conference on Mathematical and Computational Issues in the Geosciences, Minisymposium on Pore and Macro Scale Modeling and Experiments, Austin, TX, March 17-20, 2003.
- Culligan, K.A., **D. Wildenschild**, B.S.B. Christensen, W.G. Gray, A.F.B. Thompson, 2003. Interfacial Area Measurements for Unsaturated Flow Through a Porous Medium. Workshop on Multiscale Modeling of Environmental Systems, Research Triangle Park, North Carolina, February 2-17, 2003.

## RECENT PRESENTATIONS

### *Invited talks at international meetings*

- 2006 Flow and Transport in Permeable Media Gordon Research Conference, Proctor Academy, New Hampshire, July 30 - August 4. 2006 " Pore-scale imaging of multi-phase flow in porous media using x-ray microtomography - potential and limitations"
- International conference on Multiscale Modelling of flow and transport in porous media, Ticino, Monte Verita, Switzerland April 7-12<sup>th</sup> 2006. KEYNOTE on "Measurable effects of structure and heterogeneities on flow and transport at the pore and column scale"
- SPIE International Symposium on Optical Science and Technology, Special Session on "Developments in X-Ray Tomography IV", Denver, August 2.-6., 2004. "Application of x-ray microtomography to environmental fluid flow problems"
- Nordic Research Training Course on the Application of X-ray Synchrotron Radiation in Chemistry, Physics, Biology and Medicine, University of Aarhus Conference Center, Sandbjerg Estate, June 23.-29. 2004.

“Application of synchrotron-based x-ray microtomography to environmental fluid flow problems: Experiences from the Advanced Photon Source (USA)”

- EGS-AGU-EUG Joint Assembly, Nice, France, April 6.-10. 2003: “Investigating multiphase flow processes at the micro-scale: Is it pertinent to solving environmental problems? ”.
- SIAM Conference on Mathematical and Computational Issues in the Geosciences, Minisymposium on Pore and Macro Scale Modeling and Experiments, Austin, TX, March 17-20, 2003, “Identifying pore-scale geometry and interfacial properties for multi-phase flow using synchrotron-based micro-imaging”.
- American Geophysical Union, 2002 Fall Meeting, San Francisco, CA, December 6-10, 2002. “Quantitative analyses of pore-scale multi-phase flow processes: An application of synchrotron-based micro-imaging in the environmental sciences.
- American Geophysical Union, 2001 Spring Meeting, Boston, MA, May 29-Jun 2, 2001: “Visualizing and quantifying pore scale fluid flow processes with x-ray microtomography”.

*Other presentations (last 3 years)*

- Oregon State University, Applied Mathematics and Computation Seminar. “Effective Parameters for Unsaturated Flow in Heterogeneous Porous Media - Experiments and Modeling” November 4<sup>th</sup>, 2005.
- Oregon State University, Subsurface Biosphere IGERT Open House Faculty Presentations. March 8<sup>th</sup>, 2005. “Using Synchrotron-Based X-ray Microtomography in Subsurface Research”.
- Oregon Graduate Institute, School of Science and Engineering, Beaverton, OR, May 14., “Application of Synchrotron-based Micro-imaging in the Environmental Sciences: A Pore Scale View of Flow Processes in Porous Media”
- Oregon State University, Hydrophiles Winter Seminar Series, Corvallis, OR, Feb. 4., 2004. Quantitative micro-imaging of flow in porous media”
- Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC. Seminar on “Pore Scale Study of Porous Media Processes”, May 16<sup>th</sup> 2003. “The evils associated with image processing of grey-scale high-resolution x-ray tomography data”

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## AWARDS/RESEARCH GRANTS

- 2006: NSF Hydrology Program: (US\$ \$130,897) for “Collaborative Research: Experimental and Numerical Characterization of Thin Films in Three-Dimensional Porous Media. D. Wildenschild (PI)
- 2006: Oregon State University, Research Equipment Reserve Fund (RERF) (\$26636) for “Purchase of High Performance Computing cluster nodes for computational science research in the College of Science (COS)”. CO-PI with M. Peszynska, A. Faridani, R. Higdon, R. Landau.
- 2005: NSF Hydrology Program (US\$ 5,179) for “Collaborative Research: Interfacial Dynamics in Multi-Phase Flow and Transport Processes” REU Supplement. (PI)
- 2004: NSF Hydrology Program (US\$ 238,348) for “Collaborative Research: Interfacial Dynamics in Multi-Phase Flow and Transport Processes” (PI)
- 2003: Oregon State University, General Research Fund, (US\$ 7,600) for: “Investigating Subsurface Pore Scale Flow Processes With OSU’s X-ray Microtomography Facility” (PI)
- 2000: Danish Technical Research Council, ‘Talent project’ Type 2. Three-year research grant (DKK 2.61 mill.) for: “The use of x-ray micro-tomography and pore-scale modeling to evaluate dynamic and equilibrium pore-scale processes in porous media” (PI)
- 1999: Institute of Geophysics and Planetary Physics, Lawrence Livermore National Laboratory (US\$ 13,000) for: X-ray tomography to determine moisture distribution in a soil sample for various outflow conditions (PI)
- 1996: Awards from the following Danish foundations were granted for a one-year (US\$ 35,000) Postdoctoral Research Fellowship at University of California, Davis:  
COWI-Fonden, Fisker & Niensens Fond, Civilingenioer Aage Corrits Mindefond,  
Otto Moensteds Fond, Kaj and Hermilla Ostenfelds Fond, G.A. Hagemanns Fond