

Curriculum Vitae Stefan Finsterle

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EDUCATION

1993 Ph.D. Hydrogeology Swiss Federal Institute of Technology, Zürich, Switzerland
1988 M.S. Env. Eng. Swiss Federal Institute of Technology, Zürich, Switzerland
1985 B.S. Env. Eng. Swiss Federal Institute of Technology, Zürich, Switzerland

RESEARCH INTERESTS

Inverse modeling of non-isothermal multiphase flow systems; fracture and unsaturated zone hydrology; optimization; geostatistics; test design and data analysis.

WORK HISTORY

2005/2006 **Lecturer**, *University of California, Berkeley, California*
since 2001 **Staff Geological Scientist**, (Head Hydrogeology Department February 2006–December 2008) *Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California*
1996 **Visiting Assistant Professor**, *College of Sciences, Clemson University, South Carolina*
1995 **Visiting Scientist**, *School of Engineering, University of Auckland, Auckland, New Zealand*
1994 – 2001 **Geological Scientist**, *Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California*
1993 – 1994 **Post-Doctoral Fellow**, *Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California*
1988 – 1993 **Research Engineer**, *Laboratory of Hydraulics, Hydrology, and Glaciology, Swiss Federal Institute of Technology (ETH), Zürich, Switzerland*

SOFTWARE

Main developer of iTOUGH2 inverse modeling code (<http://esd.lbl.gov/iTOUGH2>)

RECOGNITIONS

2011 U.S. Department of Energy Secretarial Honor Awards
2010 Guest Professor, Jilin University, Changchun, Jilin, China
2005 Berkeley Lab Tech Transfer Award
2003 Berkeley Lab Outstanding Performance Award
1993 Medal of the Swiss Federal Institute of Technology, ETH, Zürich, Switzerland, for an outstanding doctoral dissertation
1989 Diplompreis des Schweizerischen Kulturingenieur Vereins, for an outstanding master thesis in land surveying

Peer-Reviewed Journal Articles, Stefan Finsterle

1. Oldenburg, C.M., B.M. Freifeld, K. Pruess, L. Pan, S. **Finsterle**, and G.J. Moridis, Numerical simulations of the Macondo well blowout reveal strong control of oil flow by reservoir permeability and exsolution of gas, *Proceedings of the National Academy of Sciences*, doi:10.1073/pnas.1105165108, 2011.
2. Xu, T., R. Senger, and S. **Finsterle**, Bentonite alteration due to thermal-hydro-chemical processes during the early thermal period in a nuclear waste repository, *Nuclear Technology*, 174(3), 438–451, 2011.
3. Zhang, Y., L. Pan, K. Pruess, and S. **Finsterle**, A time-convolution approach for modeling heat exchange between a wellbore and surrounding formation, *Geothermics*, 40(4), 251–266, doi:10.1016/j.geothermics.2011.08.003, 2011.
4. Williamson, M., J. Meza, D. Moulton, I. Gorton, M. Freshley, P. Dixon, R. Seitz, C. Steefel, S. **Finsterle**, S. Hubbard, M. Zhu, K. Gerdes, R. Patterson, and Y.T. Collazo, Advanced Simulation Capability for Environmental Management (ASCEM): An overview of initial results, *Technology and Innovation*, 13, 175–199, doi: 10.3727/194982411X13085939956625, 2011.
5. **Finsterle**, S., and Y. Zhang, Solving Simulation-Optimization Problems using iTOUGH2 with the PEST Protocol, *Environmental Modelling and Software*, 10.1016/j.envsoft.2011.02.008, 2011.
6. Takeda, M., T. Hiratsuka, K. Ito, and S. **Finsterle**, An asymmetric diffusion experiment for the determination of diffusion and sorption coefficients of rock samples, *Journal of Contaminant Hydrology*, doi:10.1016/j.jconhyd.2010.12.012, 2011.
7. Zhu, M., J. Meza, D. Moulton, I. Gorton, M. Freshley, P. Dixon, R. Seitz, C. Steefel, S. **Finsterle**, S. Hubbard, and R. Patterson, Development of the Advanced Simulation Capability for Environmental Management (ASCEM), *Technology*, 2010.
8. **Finsterle**, S., and M.B. Kowalsky, A truncated Levenberg-Marquardt algorithm for the calibration of highly parameterized nonlinear models, *Computers and Geosciences*, doi:10.1016/j.cageo.2010.11.005, 2011.
9. **Finsterle**, S., and Y. Zhang, Error handling strategies in multiphase inverse modeling, *Computers and Geosciences*, doi:10.1016/j.cageo.2010.11.009, 2011.
10. Jung, Y., P. Imhoff, and S. Finsterle, Estimation of landfill gas generation rate and gas permeability field of refuse using inverse modeling, *Transport in Porous Media*, doi:10.1007/s11242-010-9659-8, 2011.
11. Kowalsky, M.B., E. Gasperikova, S. **Finsterle**, D. Watson, and S.S. Hubbard, Coupled modeling of hydrogeochemical and electrical resistivity data for exploring the impact of recharge on subsurface contamination, *Water Resour. Res.*, 47, W02509, doi:10.1029/2009WR008947, 2011.
12. Zhang, Y., S. Hubbard, and S. **Finsterle**, A numerical study on sustainable pumping near rivers, *Ground Water*, doi: 10.1111/j.1745-6584.2010.00743.x, 2010.
13. Zhang, Y., B. Freifeld, S. **Finsterle**, M. Leahy, J. Ennis-King, L. Paterson, and T. Dance, Single-well experimental design for studying residual trapping of supercritical carbon dioxide, *International Journal of Greenhouse Gas Control*, 5, 88–98, doi:10.1016/j.ijggc.2010.06.011. 2011.

14. Neerdael, B., and S. **Finsterle**, The use of numerical models in support of site characterization and performance assessment studies of geological repositories, *Nuclear Engineering and Technology*, 42(2), 145–150, 2010.
15. Lehtikoinen, A., J.M.J. Huttunen, S. **Finsterle**, M.B. Kowalsky, and J.P. Kaipio, Dynamic inversion for hydrological process monitoring with electrical resistance tomography under model uncertainties, *Water Resour. Res.*, 46, W04513, doi:10.1029/2009WR008470, 2010.
16. Zhang, Y., C.M. Oldenburg, and S. **Finsterle**, Percolation-theory and fuzzy rule-based probability estimation of fault leakage at geologic carbon sequestration sites, *Env. Earth Sci.*, 59, 1447–1459, doi:10.1007/s12665-009-0131-4, 2010.
17. Lehtikoinen, A., S. **Finsterle**, A. Voutilainen, M.B. Kowalsky, and J.P. Kaipio, Dynamical inversion of geophysical ERT data: state estimation in the vadose zone, *Inverse Problems in Science and Engineering*, 17(6), 715–736, doi:10.1080/17415970802475951, 2009.
18. Mukhopadhyay, S., Y.W. Tsang, and S. **Finsterle**, Parameter estimation from flowing fluid temperature logging data in unsaturated fractured rock using multiphase inverse modeling, *Water Resour. Res.*, 45, W04414, doi:10.1029/2008WR006869, 2009.
19. Senger, R., T. Xu, P. Marschall, and S. **Finsterle**, Modeling approaches of two-phase flow phenomena associated with corrosion of SF/HLW canisters in a proposed repository in Opalinus clay, Switzerland, *Physics and Chemistry of the Earth*, 33, S317–S326, 2008.
20. Xu, T., S. Senger, and S. **Finsterle**, Corrosion-induced gas generation in a nuclear waste repository: Reactive geochemistry and multiphase flow effect, *Appl. Geochem.*, 23, 3423–3433, doi:10.1016/j.apgeochem.2008.07.012, 2008.
21. Kowalsky, M.B., J. Birkholzer, J. Peterson, S. **Finsterle**, S. Mukhopadhyay, and Y. Tsang, Sensitivity analysis for joint inversion of ground-penetrating radar and thermal-hydrological data from a large-scale underground heater test, *Nuclear Technology*, 164(2), 169–179, 2008.
22. Freifeld, B.M., S. **Finsterle**, T.C. Onstott, T. Toole, and L.M. Pratt, Ground surface temperature reconstructions: Using in situ estimates for thermal conductivity acquired with a fiber-optic distributed thermal perturbation sensor, *Geophysical Research Letter*, 35, L14309, doi:10.1029/2008GL034762, 2008.
23. Kiryukhin, A.V., N.P. Asaulova, and S. **Finsterle**, Inverse modeling and forecasting for the exploitation of the Pauzhetsky geothermal field, Kamchatka, Russia, *Geothermics*, 37, 540–562, doi:10.1016/j.geothermics.2008.04.003, 2008.
24. **Finsterle**, S., C. Doughty, M.B. Kowalsky, G.J. Moridis, L. Pan, T. Xu, Y. Zhang, and K. Pruess, Advanced vadose zone simulations using TOUGH, *Vadose Zone J.*, 7:601–609, doi:10.2136/vzj2007.0059, 2008.
25. Salve, R., N.Y. Krakauer, M.B. Kowalsky, and S. **Finsterle**, A qualitative assessment of microclimatic perturbations in a tunnel, *Int. J. Climatol.*, 28(15), 2081U3, doi:10.1002/joc.1697, 2008.
26. **Finsterle**, S., and M. B. Kowalsky, Joint hydrological-geophysical inversion for soil structure identification, *Vadose Zone J.*, 7:287–293, doi:10.2136/vzj2006.0078, 2008.
27. Revil, A., N. Linde, A. Cerepi, D. Jougnot, S. Matthäi, and S. **Finsterle**, Electrokinetic coupling in unsaturated porous media, *J. Colloid Interface Sci.*, 313, 315–327, doi:10.1016/j.jcis.2007.03.037, 2007.
28. Zhang, Y. C. M. Oldenburg, S. Finsterle and G. S. Bodvarsson, System-level modeling for economic evaluation of geological CO₂ storage in gas reservoirs, *Energy Conservation and Management*, doi:10.1016/j.enconman.2007.01.018, 48(6), 1827–1833, 2007.

29. Lehtikoinen, A., S. **Finsterle**, A. Voutilainen, L. M. Heikkinen, M. Vauhkonen, and J. P. Kaipio, Approximation errors and truncation of computational domains with application to geophysical tomography, *Inverse Problems and Imaging*, 1(2), 371–389, 2007.
30. **Finsterle**, S., Comment on “Seepage into drifts and tunnels in unsaturated fractured rock” by Dani Or, Markus Tuller, and Randall Fedors, *Water Resour. Res.*, 42, W07603, doi:10.1029/2005WR004777, 2006.
31. Linde, N., S. **Finsterle**, and S. Hubbard, Inversion of tracer test data using tomographic constraints, *Water Resour. Res.*, 42(4), W04410, doi:10.1029/2004WR003806, 2006.
32. Zhang, Y., H. H. Liu, Q. Zhou, and S. **Finsterle**, Effects of diffusive property heterogeneity on effective matrix diffusion coefficient for fractured rock, *Water Resour. Res.*, 42, W04405, doi:10.1029/2005WR004513, 2006.
33. **Finsterle**, S., Demonstration of optimization techniques for groundwater plume remediation using iTOUGH2, *Environmental Modelling and Software*, 21(5), 665–680, doi:10.1016/j.envsoft.2004.11.012, 2005.
34. Kowalsky, M., S. **Finsterle**, J. Peterson, S. Hubbard, Y. Rubin, E. Majer, A. Ward, and G. Gee, Estimation of field-scale soil hydraulic parameters and dielectric parameters through joint inversion of GPR and hydrological data, *Water Resour. Res.*, 41, W11425, doi:10.1029/2005WR004237, 2005.
35. **Finsterle**, S., and C.M. Oldenburg, Research advances in vadose zone hydrology through simulations with the TOUGH codes, Preface to special section of *Vadose Zone J.*, 3: 737, 2004.
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37. Ghezzehei, T. A., R. C. Trautz, S. **Finsterle**, P. J. Cook, and C. F. Ahlers, Modeling coupled evaporation and seepage in ventilated tunnels, *Vadose Zone J.*, 3: 806–818, 2004.
38. Gallagher, P. M., and S. **Finsterle**, Physical and numerical model of colloidal silica injection for passive site stabilization, *Vadose Zone J.*, 3: 917–925, 2004.
39. Kitterød, N.-O., and S. **Finsterle**, Simulating unsaturated flow fields based on saturation measurements, *Journal of Hydraulic Research*, 42, 121–129, 2004.
40. Kowalsky, M.B., S. **Finsterle**, and Y. Rubin, Estimating flow parameter distributions using ground-penetrating radar and hydrological measurements during transient flow in the vadose zone, *Adv. Water Resour.*, 27(6), 583–599, 2004.
41. Unger, A., S. **Finsterle**, and G. S. Bodvarsson, Transport of radon gas into a tunnel at Yucca Mountain—estimating large-scale fractured tuff hydraulic properties and implications for the ventilation system, *Journal of Contam. Hydrol.*, 70, 152–171, 2004.
42. Vasco, D.W., S. **Finsterle**, Numerical trajectory calculations for the efficient inversion of flow and transport observations, *Water Resour. Res.*, 40, W01507, doi:10.1029/2003WR002362, 2004.
43. Engelhardt, I., S. **Finsterle**, and C. Hofstee, Experimental and numerical investigation of flow phenomena in nonisothermal, variably saturated bentonite/crushed rock mixtures, *Vadose Zone J.*, 2: 239–246, 2003.
44. Engelhardt, I., and S. **Finsterle**, Thermal-hydrologic experiments with bentonite/crushed rock mixtures and estimation of effective parameters by inverse modeling, *Applied Clay Science*, 23, 111–120, 2003.

45. Houseworth, J. E., S. **Finsterle**, and G. S. Bodvarsson, Flow and transport in the drift shadow in a dual-continuum model, *Journal of Contam. Hydrol.*, 62–63, 133–156, 2003.
46. **Finsterle**, S., C. F. Ahlers, R. C. Trautz, and P. J. Cook, Inverse and predictive modeling of seepage into underground openings, *J. of Contam. Hydrol.*, 62–63, 89–109, 2003.
47. Mays, D. C., B. Faybishenko, and S. **Finsterle**, Information entropy to measure temporal and spatial complexity of unsaturated flow in heterogeneous media, *Water Resour. Res.*, 38(12), 1313, doi:10.1029/2001WR001185, 2002.
48. Liu, H. H., G. S. Bodvarsson, and S. **Finsterle**, A note on unsaturated flow in two-dimensional fracture networks, *Water Resour. Res.*, 38(9), 1176, doi:10.1027/2001WR000977, 2002.
49. **Finsterle**, S., J. T. Fabryka-Martin, and J. S. Y. Wang, Migration of a water pulse through fractured porous media, *J. Contam. Hydr.*, 54 (1–2), 37–57, 2002.
50. **Finsterle**, S., and R. C. Trautz, Numerical modeling of seepage into underground openings, *Mining Engineering*, 53(9), 52–56, 2001.
51. **Finsterle**, S., Using the continuum approach to model unsaturated flow in fractured rock, *Water Resour. Res.*, 36(8), 2055–2066, 2000.
52. Moridis, G. J., S. **Finsterle**, and J. Heiser, Evaluation of alternative designs for an injectable barrier at the Brookhaven National Laboratory Site, Long Island, New York, *Water Resour. Res.*, 35(10), 2937–2953, 1999.
53. Ahlers, C. F., S. **Finsterle**, and G. S. Bodvarsson, Characterization of subsurface pneumatic response at Yucca Mountain, *J. Contam. Hydr.*, 38(1–3), 47–68, 1999.
54. Wang, J. S. Y., R. C. Trautz, P. J. Cook, S. **Finsterle**, A. L. James, and J. Birkholzer, Field tests and model analyses of seepage into drift, *J. Contam. Hydr.*, 38(1–3), 323–347, 1999.
55. **Finsterle**, S., and B. Faybishenko, Inverse modeling of a radial multistep outflow experiment for determining unsaturated hydraulic properties, *Advances in Water Resources*, 22(5), 431–444, 1999.
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57. **Finsterle**, S., and P. Persoff, Determining permeability of tight rock samples using inverse modeling, *Water Resour. Res.*, 33 (8), 1803–1811, 1997.
58. Pruess, K., S. **Finsterle**, G. Moridis, C. Oldenburg and Y.-S. Wu, General-purpose reservoir simulators: the TOUGH2 family, GRC Bulletin, 53–57, 1997.
59. **Finsterle**, S., and K. Pruess, Solving the estimation-identification problem in two-phase flow modeling, *Water Resour. Res.*, 31 (4), 913–924, 1995.

3 Book Chapters

153 Conference Papers and Abstracts

42 Technical Reports