

Roy Haggerty
Dept. of Geosciences, Oregon State University 104 Wilkinson Hall, Corvallis, OR 97331
(541) 737-1210 haggertr@geo.oregonstate.edu

PROFESSIONAL PREPARATION

Stanford University, Stanford, CA; Applied Earth Sciences (Hydrogeology); PhD, 1996
Stanford University, Stanford, CA; Applied Earth Sciences (Hydrogeology); MS, 1993
University of Alberta, Edmonton, Canada; Honors Geology; BSc with First Class Honors, 1990

APPOINTMENTS

Associate Professor, Geosciences, Oregon State University. Assistant Prof. 1996-2002.

Research Activities: Groundwater - surface water interactions; residence time of groundwaters; fate and transport of nutrients in groundwater, flow and transport in the hyporheic zone of streams; tracer tests; diffusion and mass transfer in porous and fractured media; mathematical modeling of solute transport, groundwater flow, and geologic/geophysical problems.

Educational Activities: Classes - Hydrogeology; Heat and Mass Transfer in the Environment; Intro Earth Sciences; Role of Fluids in Geologic Processes; Scaling in Hydrology; Flow and Transport in Fractured Rock. Research with undergraduates - Hydrologic research projects with undergraduates in years, including groundwater - surface water interactions and surface water and hydrogeochemical cycle. Undergraduate advisees have been co-authors on 2 papers in *Geophysical Research Letters*.

Other: *Adjunct Associate Professor, Civil Construction & Environmental Engineering, OSU; 1999-present.*
Adjunct Associate Professor, Fisheries & Wildlife, OSU, 2004-present. Visiting Scientist, Water Resources Engineering, KTH, Sweden, Summer, 2000.

PUBLICATIONS

Zinn, B., L. C. Meigs, C. F. Harvey, C. Freiherr von Schwerin, and R. Haggerty, Laboratory visualization of solute transport in heterogeneous porous media, *Environmental Science and Technology*, in press.

Haggerty, R., C. F. Harvey, C. F. v. Schwerin, and L. C. Meigs What controls the apparent timescale of solute mass transfer in aquifers and soils? A comparison of diverse experimental results. *Water Resources Research* 40(1), W01510, doi: 10.1029/2002WR001716, 2004.

Gooseff, M. N., S. M. Wondzell, R. Haggerty, and J. Anderson, Comparing transient storage modeling and residence time distribution (RTD) analysis in geomorphically varied reaches in the Lookout Creek basin, Oregon, USA. *Advances in Water Resources*, 26, 925-937, 2003.

Cliff, J.B., P.J. Bottomly, R. Haggerty, and D. D. Myrold, Modeling the effects of diffusion limitation on nitrogen-15 isotope dilution experiments with soil aggregates, *Soil Sci. Soc. Am. J.*, 66(6), 1868-1877, 2002.

Geiger, S., R. Haggerty, J.H. Dilles, M.H. Reed, and S.K. Matthai, New insights from reactive transport modelling: the formation of the sericitic vein envelopes during early hydrothermal alteration at Butte, Montana. *Geofluids* 2(3), 185-201, 2002.

Bremer, C. W., P. U. Clark, R. Haggerty, Modeling the subglacial hydrology of the late Pleistocene Lake Michigan Lobe, Laurentide Ice Sheet, *GSA Bull.*, 114(6), 665-674, 2002.

Cvetkovic, V., and R. Haggerty, Transport with multiple-rate exchange in disordered media, *Phys. Rev. E*, 65(5), DOI 10.1103/PhysRevE.65.051308, 2002.

Haggerty, R., S. M. Wondzell, and M. A. Johnson, Power-law residence time distribution in the hyporheic zone of a 2nd-order mountain stream, *Geophys. Res. Lett.*, 29(13), DOI 10.1029/2002GL014743, 2002.

Haggerty, R., S. W. Fleming, L. C. Meigs, and S. A. McKenna, Tracer tests in a fractured dolomite, 2., Analysis of mass transfer in single-well injection-withdrawal tests, *Water Resources Research*, 37(5), 1129-1142, 2001.

McKenna, S. A., L. C. Meigs, and R. Haggerty, Tracer tests in a fractured dolomite, 3., Double porosity, multiple-rate mass transfer processes in two-well convergent-flow tests, *Water Resources Research*, 37(5), 1143-1154, 2001.

Fleming, S. W., and R. Haggerty, Modeling solute diffusion in the presence of pore-scale heterogeneity: Method development and an application to the Culebra Dolomite Member of the Rustler Formation, New Mexico, USA, *Journal of Contaminant Hydrology*, 48, 253-376, 2001.

Schroth, M. H., J. D. Istok, and R. Haggerty, In-situ evaluation of solute retardation using single-well push-pull tests, *Advances in Water Resources*, 24, 105-117, 2000.

Haggerty, R., S. A. McKenna, and L. C. Meigs, On the late-time behavior of tracer test breakthrough curves, *Water Resources Research*, 36(12), 3467-3479, 2000.

Hollenbeck, K. J., C. F. Harvey, R. Haggerty, and C. J. Werth, Estimation of continuous mass-transfer rate distributions, *Journal of Contaminant Hydrology*, 37(3-4), 367-388, 1999.

Schroth, M. H., J. D. Istok, G. T. Conner, M. R. Hyman, R. Haggerty, and K. T. O'Reilly, Spatial variability in situ aerobic respiration and denitrification rates in a petroleum-contaminated aquifer, *Ground Water*, 36(6), 924-937, 1998.

Haggerty, R., M. H. Schroth, and J. D. Istok, Simplified method of "push-pull" test data analysis for determining in situ reaction rate coefficients, *Ground Water*, 36(2), 314-324, 1998.

Haggerty, R., and S. M. Gorelick, Modeling mass transfer processes in soil columns with pore-scale heterogeneity, *Soil Science Society of America Journal*, 62(1), 62-74, 1998.

Haggerty, R., and S. M. Gorelick, Multiple-rate mass transfer for modeling diffusion and surface reactions in media with pore-scale heterogeneity, *Water Resources Research*, 31(10), 2383-2400, 1995.

Harvey, C. F., R. Haggerty, and S. M. Gorelick, Aquifer remediation: A method for estimating mass transfer rate coefficients and an evaluation of pulsed pumping, *Water Resources Research*, 30(7), 1979-1991, 1994.

Haggerty, R., and S. M. Gorelick, Design of multiple contaminant remediation: Sensitivity to rate-limited mass transfer, *Water Resources Research*, 30(2), 435-446, 1994.

SYNERGISTIC ACTIVITIES - EXAMPLES

1. Senior personnel in HJ Andrews Long-Term Ecological Research Site. This is a large, multi-PI, NSF-funded project seeking to understand the long-term dynamics of forest and river ecosystems of the Pacific Northwest, with the central research question of "How do land use, natural disturbances, and climate change affect three key sets of ecosystem services: carbon and nutrient dynamics, biodiversity, and hydrology?" I am the one of the researchers investigating the contributions of hyporheic exchange to the stream ecosystem and biogeochemistry. In this role I interact with ecologists, foresters, soil scientists, and biologists .

2. Participated in large tracer test study and analysis at Waste Isolation Pilot Plant (WIPP), New Mexico, 1995-9. Large, interdisciplinary group of engineers, statisticians, chemists, geophysicists, and geologists responsible for tracer test, analysis, and submission of parameters to be used in Performance Assessment for WIPP site. I was responsible for model development to understand diffusion of a suite of benzoic acid tracers into matrix rock. Resulting analysis led to several papers. One of the computer codes has been adopted for use in the Performance Assessment Annual Sensitivity Analysis, which is part of ongoing evaluations of the safety of the WIPP.

3. Participated in design of Long-Term Diffusion Experiment (LTDE), Äspö Hard Rock Laboratory, Sweden, 1998-9. Group responsible for design of LTDE consisted of nuclear chemists, geologists, hydrologists, and chemical engineers. Work was used to help design multi-year subsurface test of diffusion in granitic rock (currently underway), to be used in understanding radionuclide retention in eventual Swedish nuclear repository.

4. Co-leader of large geologic field trip to Western Canada, 1993. Along with one other graduate student, I organized, planned, fund-raised (65% of cost), and managed a 3-week, 5000-mile trip for 15 participants and 6 guides, including an aerial tour of the Canadian Cordillera.

COLLABORATIONS AND OTHER AFFILIATIONS

Recent Collaborators: Steve Wondzell, US Forest Service; Lucy Meigs; Sandia National Laboratories; Vladimir Cvetkovic, Royal Institute of Technology (Sweden); Martin Schroth, ETH (Switzerland); Charlie Harvey, MIT; Jack Istok, Peter Clark, John Dilles, Brian Wood, Enrique Thomann, Ed Waymire, all OSU.

Graduate Advisors: Steven Gorelick (Dept. of Geological and Environmental Sciences, Stanford University); Paul Roberts (Dept. of Civil Engineering, Stanford University); Tom Hewitt (Dept. of Petroleum Engineering, Stanford University); Brian Wagner (US Geological Survey, Menlo Park, CA).

Thesis Advisor and Postgraduate-Scholar Sponsors: Michael Gooseff (Utah State Univ.); Sebastian Geiger (ETH, Switzerland); Sean Fleming (Univ. British Columbia); Claudius Freiherr von Schwerin, Justin Iverson, Michael Kelly, Robert Healy (all in private consulting); John Pearch (WA Dept. of Ecology), Justin LaNier (Oregon State Univ.), Ken Kokkeler (US Air Force), Matthew Johnson (Coffey Laboratories).