

CURRICULUM VITAE

STEPHEN E. SILLIMAN

Department of Civil Engineering
and Geological Sciences
University of Notre Dame
Notre Dame, IN 46556
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Born 3/12/57 Chicago, Illinois
Married 7/28/84 to Julie Marie Engelhart
3 Children

Education:

1979 B.S.E. Civil Engineering, Princeton University (Magna Cum Laude)

1981 M.S. Hydrology, University of Arizona: Eugene Simpson, Advisor

1986 Ph.D. Hydrology, University of Arizona: Shlomo Neuman, Advisor

Professional Experience:

2002 Associate Dean for Undergraduate Programs, College of Engineering, University of Notre Dame, Notre Dame, Indiana

2000 Professor of Civil Engineering and Geological Sciences, University of Notre Dame, Notre Dame, Indiana

1992 Associate Professor of Civil Engineering and Geological Sciences, University of Notre Dame, Notre Dame, Indiana

1990 Associate Professor of Civil Engineering, University of Notre Dame, Notre Dame, Indiana.

1986 Assistant Professor of Civil Engineering, University of Notre Dame, Notre Dame, Indiana

1984 Research Associate, Department of Hydrology and Water Resources, University of Arizona, Tucson, Arizona

1982 Research Assistant, Department of Hydrology and Water Resources, University of Arizona, Tucson, Arizona

1981 Hydrologist, U.S. Geological Survey, Reston, VA

Professional Memberships:

American Geophysical Union

International Association of Hydrogeologists

National Ground Water Association

American Society for Engineering Education

Honors/Awards in Teaching and Service:

College of Engineering, Outstanding Teacher of the Year, 2003, 1992.

Kaneb Teacher of the Year Award in Civil Engineering and Geological Sciences, 2004, 1999.

Grenville Clark Award (for the faculty “whose volunteer activities serve to advance the causes of peace and human rights to which Grenville Clark devoted his life”), 2002

Rev. Toohey Award for Social Justice, 2004

Fulbright Grant for Research in Israel, 1997-98.

Abbreviated List of Activities:

A. External:

Associate Editor, Water Resources Research, 1992-94, 1998-2002

Associate Editor, Ground Water, 1996 - 2002

Associate Editor, Hydrogeology, 2000 - 2003

Board of Associate Editors, Journal of Hydrology, 1997-2000

American Geophysical Union,

Chair, Groundwater Committee, American 2000-2002

Member, Groundwater Committee, AGU, 1992-present

Ad Hoc Hydrology Section Committee on AGU Publications, 1997-1999

Session organizer and session chair, multiple meetings

Project Leader, Lifewater International

B. Internal:

Associate Dean for Undergraduate Programs

Director, Benin Program, (www.nd.edu/~silliman/Development/benin)

Director, Haiti Experiential Seminar (www.nd.edu/~silliman/Development/haiti/student.html)

Director, Water Resources in Developing Countries (REU), 2002-2005 (www.nd.edu/~reuwater)

Faculty Fellow, Center for Social Concerns, 2003-present

Faculty Fellow, Reilly Center for Science, Technology and Values, 2004-present

Latin American Studies Program Advisory Committee, 2002 – present

Provost’s Committee on Ethics in the Undergraduate Curriculum, 2001-2002

Provost’s Committee on Environmental Teaching and Research, 2000-2001

Engineering College Council, University of Notre Dame, 1990-93, 2000-present

Provost’s Ad Hoc Committee on the Teaching of Ethics, 1999

Peer-Reviewed Publications:

- Petruzi, N.M., S.E. Silliman, and C. Kulpa, "Bacterial Mobilization and Diversity as a Function of Rate of Extraction From a Monitoring Well", 2005, Submitted, Water Resources Research.
- Silliman, S.E., M. Boukari, P. Crane, and F. Azonsi, "Initial Observations on Element Concentrations of Groundwater in Central Benin", 2006, Submitted, Journal of Hydrology.
- Silliman, S.E., and M. Boukari, "International Student Collaboration Through Projects Using Common Software and Field Experiences: Foundation to Project Development", 2006, Frontiers in Education, 2006 National Conference, Abstract Accepted, Paper Submitted.
- Silliman, S.E., C. Hamlin, P. Crane, and M. Boukari, "International Collaborations and Incorporating the Social Sciences in Research in Hydrology and Hydrologic Engineering", 2006, Submitted, Journal of Hydrologic Engineering,
- Petruzzi, N.M., and S.E. Silliman, "A device for collection of groundwater bacteria under natural flow conditions", Ground Water Monitoring and Remediation, 2006, 26(1), 85-91.
- Silliman, S., M. Boukari, and C. Crane, "A Collaborative Project In West Africa: Student Research Experience In Development", 2005, Frontiers in Education, Section T1A.
- Silliman, S.E., K. Abbott, G.C. Clark, and L. McWilliams, "Use of a Tablet PC and Wireless Connectivity for Effective Lectures in a Large Lecture Hall", Proceedings of the 2005 Annual Conference, 2005, American Society of Engineering Education.
- Pieronek, C., L.H. McWilliams, S.E. Silliman, J.J. Uhran, M. Gunty, C. Graf, "Monolith or Mosaic: Using Demographics and Detailed Surveys to Understand the Many and Varied Dimensions of First-Year Female Engineering Students", Proceedings of the 2005 Annual Conference, 2005, American Society of Engineering Education.
- McWilliams, L.H., C. Pieronek, S.E. Silliman, C. Graf, M. Gunty, "Survey Results for Students in a First-Year Engineering Course", Proceedings of the 2005 Annual Conference, 2005, American Society of Engineering Education.
- Uhran, JJ, Jr., S.M. Batill, and S.E. Silliman, "A curriculum renovation revisited", Proceedings of the 2005 Annual Conference, 2005, American Society of Engineering Education.
- Dunn, A.M., S.E. Silliman, S. Dhamwichukorn, and C.F. Kulpa, 2005, "Demonstration of Microbial Transport into the Capillary Fringe via Advection from Below the Water Table", Journal of Hydrology, 306(1-4), 50-58.
- Nicholl, S.; Talley, J. W., and Silliman, S. Model verification of TPD-MS for estimation of release energy values for PAHs on mineral sorbents. *J. of Env. Chem. & Tox.* 2004, Vol. 23, No. 11, 203-208.
- Berkowitz, B., S.E. Silliman and A.M. Dunn, "Impact of the capillary fringe on local flow, chemical migration, and microbiology", Vadose Zone Journal, 3, 534-548, 2004.
- Silliman, S. and L. McWilliams, "Observations on Benefits/Limitations of an Audience Response System", Proceedings of the 2004 Annual Conference, American Society of Engineering Education.

- McWilliams, L., S. Silliman and C.L. Pieronek, "Modifications to a Freshman Engineering Course Based on Student Feedback", Proceedings of the 2004 Annual Conference, American Society of Engineering Education.
- Pieronek, C., L. McWilliams, and S. Silliman, "A Demographic Characterization of First-Year Engineering Students", Proceedings of the 2004 Annual Conference, American Society of Engineering Education.
- Tyler, S., S. Silliman and M. Campana, "Undergraduate program focuses on international water issues in water resources", EOS, Transactions, American Geophysical Union, 85(9), 89,92, 2004.
- Dunn, A., and S.E. Silliman, "Air and Water Entrapment in the Vicinity of the Water Table: A laboratory study on heterogeneous sands", Ground Water, 41(6), 729-734, 2003.
- Silliman, S.E., "Comparison of education models for increasing student exposure to engineering in developing countries", Conference proceedings, the American Society of Engineering Education, 2003.
- Pieronek, C., L. McWilliams, and S. Silliman, "Initial Observations on Student Retention and Course Satisfaction Based on First-Year Engineering Student Surveys and Interviews", American Society of Engineering Education, Proceedings 2003 Annual Conference, 2003.
- Silliman, S.E., B. Berkowitz, J. Simunek, and M. th. van Genuchten, "Fluid Flow and Chemical Migration Within the Capillary Fringe", Ground Water, 40(1), 76-84, 2002.
- Silliman, S.E., R. Dunlap, M. Fletcher and M.A. Schneegurt, "Bacterial transport in heterogeneous porous media: Observations from laboratory experiments", Water Resources Research, 37(11), 2699-2708, 2001.
- Silliman, S.E., "Laboratory study of chemical transport to wells within heterogeneous porous media", Water Resources Research, 37(7), 1883-1892, 2001.
- Silliman, S.E., and L. Zheng, "Comparison of observations from a laboratory model with stochastic theory: Initial analysis of hydraulic and tracer experiments", Transport in Porous Media, 42(1/2), 85-107, 2001.
- Cole, B.E., and S.E. Silliman, "Utility of simple models for capture zone delineation in heterogeneous unconfined aquifers", Ground Water, 38(5), 665-672, 2000.
- Silliman, S.E., and B. Berkowitz, "Sampling for the variogram within fractured media containing multiple fracture sets", Mathematical Geology, 32(5), 543-560, 2000.
- Zheng, L., and S.E. Silliman, "Estimating the variance and integral scale of the transmissivity field using head residual increments", Water Resources Research, 36(5), 1353-1358, 2000.
- Silliman, S.E. and G. Mantz, "The Effect of Measurement Error on Estimating the Hydraulic Gradient in Three-Dimensions", Ground Water, 38(1), 114-120, 2000.

- Berkowitz, B., H. Scher, and S. Silliman, "Anomalous transport in laboratory-scale, heterogeneous porous media", *Water Resources Research*, 36(1), 149-158, 2000. {Correction appeared 36(5), 1371, 2000.}
- Zheng, L. and S. Silliman, "Estimating the theoretical semivariogram from finite numbers of measurements", *Water Resources Research*, 36(1), 361-367, 2000.
- Silliman, S.E. and G. Mantz, "Incorporating data related uncertainty in the definition of wellhead capture zones", in *Interdisciplinary Perspectives on Drinking Water Risk Assessment and Management*, IAHS Publication No. 260, 53-56, 2000.
- Silliman, S.E., and L. Ketchum, Jr., "Student involvement in water development / treatment in rural settings", in *Interdisciplinary Perspectives on Drinking Water Risk Assessment and Management*, IAHS Publication No. 260, 171-173, 2000.
- Silliman, S.E., J. Fein, and P. Johnson, "Hydrogeology", in "Research: From the Core to the Crust", *Geotimes*, 44(7), 38-39, 1999.
- Silliman, S.E., L. Zheng, and P. Conwell, "The use of laboratory experiments for the study of conservative solute transport in heterogeneous porous media", *Hydrogeology Journal*, 6, 166-177, 1998.
- Silliman, S.E., and S. Caswell, "Observations of measured hydraulic conductivity in two artificial, confined aquifers with boundaries", *Water Resources Research*, 34(9), 2203-2213, 1998.
- Silliman, S.E., and C. Frost, "Monitoring of the hydraulic gradient using a three-point estimator", *Journal of Environmental Engineering*, 124(6), 517-523, 1998.
- Conwell, P.M., S.E. Silliman, and L. Zheng, "Design of a piezometer network for estimation of the variogram of the hydraulic gradient: The role of the instrument", *Water Resources Research*, 33(11), 2489-2494, 1997.
- Cole, B., and S. Silliman, "Capture zones for passive wells in heterogeneous unconfined aquifers", *Ground Water*, 35(1), 1997.
- Cole, B. and S. Silliman, "Estimating the horizontal gradient in heterogeneous, unconfined aquifers: Comparison of three-point schemes", *Ground Water Monitoring and Remediation*, Spring, 84-91, 1996.
- Silliman, S.E., "The importance of the third dimension on transport through saturated porous media: Case study based on transport of particles", *Jour. of Hyd.*, 179, 181-196, 1996.
- Silliman, S.E., "Sample support in a single fracture: Considering the definition and control of the support of a water sample", *Geophys. Res. Letters*, 22(11), 1145-1147, 1995.
- Silliman, S.E., J. Ramirez, and R.L. McCabe, "Quantifying downflow through creek sediments using temperature time series: One dimensional solution incorporating measured surface temperature", *Jour. of Hyd.*, 167, 99-119, 1995.
- Silliman, S.E., "Particle transport through two-dimensional, saturated porous media: influence of physical structure of the medium", *Jour. of Hyd.*, 167, 79-98, 1995.

- Silliman, S.E., C.C. Cady, and K. Snyder, "Application of a UV-Curing resin to hydrodynamic studies in porous media", *Ind. Eng. Chem. Res.*, American Chemical Society, 33(8), 1997-2001, 1994.
- Dronfield, D., and S.E. Silliman, "Velocity dependence of dispersion for transport through a single fracture of variable roughness", *Water Resources Research*, 29(10), 3477-3484, 1993.
- Cady, C.C., S.E. Silliman, and E. Shaffern, "Variation in aperture estimate ratios from hydraulic and tracer tests in a single fracture", *Water Resources Research*, 29(9), 2975-2982, 1993.
- Silliman, S.E., and D.F. Booth, "Analysis of time-series measurements of sediment temperature for identification of gaining vs. losing portions of Juday Creek, Indiana", *Journal of Hydrology*, 146, 131-148, 1993.
- Robinson, R. S. Silliman, and C. Cady, "Identifying fracture interconnections between boreholes using natural temperature profiling: II. Application to a fractured dolomite", *The Log Analyst*, 34(1), 69-77, 1993.
- Preston, S.D., V.J. Bierman, Jr., and S.E. Silliman, "Impact of flow variability on error in the estimation of tributary mass loads", *ASCE Journal of Environmental Engineering*, 118(3), 402-419, 1992.
- Silliman, S.E. and A.L. Wright, "Generation of random fields characterized by discrete regions of constant value", *Applied Mathematics and Computation*, 45, 293-311, 1991.
- Silliman, S.E., "The influence of grid geometry on structure present within discrete random fields", *Journal of Hydrology*, Vol. 113, 171-191, 1990.
- Silliman, S.E. and C.E. Neuzil, "Borehole determination of formation thermal conductivity using a thermal pulse from injected fluid", *Journal of Geophysical Research*, 95 (86), 8697-8704, 1990.
- Silliman, S. and D. Higgins, "An analytical solution for steady state flow between aquifers through an open well", *Ground Water*, 28(2), 184-191, 1990.
- Silliman, S.E., "An interpretation of the difference between aperture estimates derived from hydraulic and tracer tests in a single fracture", *Water Resources Research*, 25(10), 2275-2283, 1989.
- Silliman, S.E. and R. Robinson, "Identifying fracture interconnections between boreholes using natural temperature profiling: I. Conceptual basis", *Groundwater*, 27(3), 393-402, 1989.
- Preston, S.D., V.J. Bierman, Jr. and S.E. Silliman, "An evaluation of methods for the estimation of tributary mass loads", *Water Resources Research*, 25(6), 1379-1389, 1989.
- Silliman, S.E. and A.L. Wright, "Stochastic analysis of high-permeability paths in the subsurface", *Water Resources Research*, 24(11), 1901-1910, 1988.
- Silliman, S.E. and R. Deuell, "Observations regarding comparison of hydraulic and chemical tracer tests", *Proceedings of the 4th Canadian/American Conference on Hydrogeology*, Hitchon and Bachu (ed.), National Water Well Association, 1988.

Silliman, S.E., L. Konikow and C. Voss, "Laboratory investigation of longitudinal dispersion in anisotropic porous media", *Water Resources Research*, 23(11), 2145-2151, 1987.

Silliman, S.E. and E.S. Simpson, "Laboratory evidence of the scale effect on solute transport", *Water Resources Res.*, 23(8), 1667-1673, 1987.

Hsieh, P.A., J.V. Tracy, C.E. Neuzil, J.D. Bredehoeft and S.E. Silliman, "A transient laboratory method for determining the hydraulic properties of 'tight' rocks -- I. Theory", *Int. Journal of Rock Mech. and Min. Sci. and Geomech.*, 18(3), 245-252, 1981.

Neuzil, C.E., C. Cooley, S.E. Silliman, J.D. Bredehoeft and P.A. Hsieh, "A transient laboratory method for determining the hydraulic properties of 'tight' rocks -- II. Applications", *Int. Journal of Rock Mech. and Min. Sci. and Geomech.*, 18(3), 253-258, 1981.

Recent Invited Presentations (Since 1999 - numerous contributed presentations)

2006, "Groundwater Studies in Rural Benin, Africa", El Dia del Aqua Day, Department of Hydrology and Water Resources, University of Arizona, March 2, 2006.

2004, "Water Resources in Developing Countries", IAESTE-US conference, February, Baltimore, Maryland.

2004, "Water Resource Development in Benin, West Africa: Technical Cultural and Economic Challenges", University of Buffalo, February, 2004

2004, "Classroom experiments using an interactive Audience Response System" , Computer Services Management Symposium, March, Santa Fe, NM.

2002, "Linking Science and Society in Developing Countries: Water Resources Development in Rural Communities of Haiti and Benin", November, Taylor University.

2001, "Wellhead Protection Uncertainties Related to Salt-Water Intrusion and Land Use Changes, Coastal Aquifer System, Benin, Africa", Venice, Italy, March, 2001, Action 621 "Groundwater management of coastal karstic aquifers" (1997 – 2002), sponsored by the European Commission in the framework of the Scientific and Technological Cooperation.

2000, "Developing water supplies in Benin, Western Africa", to be presented, November 9, Taylor University.

2000, "Issues of hydrogeology in Benin, Western Africa", to be presented, November 10, Taylor University.

2000, "Observations on water supply in Benin, Western Africa", September 8, University of Nevada at Reno.

2000, "Study of microbial and chemical transport in heterogeneous porous media", September 9, University of Nevada at Reno.

- 1999, “Chemical and microbial transport experiments in highly heterogeneous media under controlled laboratory conditions”, September, GSF Institute of Hydrology, Munich, Germany.
- 1999, “Chemical and microbial transport experiments in highly heterogeneous media under controlled laboratory conditions”, September 1, Kansas Geological Survey.
- 1999, “Safe water supply in developing countries: The rural Haiti experience”, September 2, Kansas Geological Survey.
- 1999, “Temperature and Climatic Impacts on Juday Creek”, May 18, University of Washington.
- 1999, “Development of Domestic Water Supplies in Haiti”, May 19, University of Washington.
- 1999, “Studies of groundwater flow and transport: Theory, lab and field results”, April 27, Guest Lecture, Purdue University.
- 1999, “Laboratory investigation of stochastic theory and microbial transport”, May 27, U.S. Geological Survey, Research Group, Reston, VA.
- 1999, “Advanced analysis of water level measurements: Opportunities in 2-D and problems in 3-D”, May 28, U.S. Geological Survey, Groundwater Group, Reston, VA.

Project Funding:

- Principal Investigator, “International: Collaborative research in Benin: Opportunity for undergraduate engineering / geoscience students”, The National Science Foundation, \$33,400, 2005-2006
- Principal Investigator, “Benin Nitrate Project, 2005”, The West Foundation, \$30,000, 2005-2006.
- Principal Investigator, Private support for research and education in Benin and Haiti, \$50,000, 2005-2006.
- Principal Investigator, “The Impact of Physical Heterogeneity and Connectivity on LNAPL Entrapment and Dissolution”, The National Science Foundation, \$144,026, 2004-2006.
- Co-principal Investigator (primary author), HP-mobility grant, HP Corporation, \$90,000 in support and equipment, 2004-2005.
- Principal Investigator, “Benin Nitrate Project, 2004”, The West Foundation, \$40,000, 2004-2005.
- Principal Investigator, “An REU Site on Water Resources in Developing Countries”, National Science Foundation, \$189,600, 2002-2005
- Principal Investigator, “Groundwater Characterization in Central Benin using Element Analysis”, National Science Foundation, \$26,000, 2002-2006
- Collaborator, Environmental Molecular Science Institute, University of Notre Dame, National Science Foundation, \$5+ Million, 2002-2007.
- Principal Investigator, “Air Entry Barriers: Mechanism for Creating High-Permeability Pathways Above the Water Table”, National Science Foundation, \$100,000, 2001 - 2003.

Principal Investigator, Private Support for Experiential Seminar in Haiti, ~\$32,000, 2001-present.

Co-Principal Investigator, Alcoa Foundation Education Funds (includes support for work in Benin and Chile), 1998 - present, ~\$100,000.

Principal Investigator, Contract with U.S. Geological Survey to perform transport experiments in anisotropic media, \$24,011, 9/10/99-9/10/00.

Principal Investigator, "Planning grant: Characterization of water flow in fractured crystalline rock, Benin", National Science Foundation, \$3,200, 10/15/99 - 10/14/00.

Principal Investigator, "An REU site in the Department of Civil Engineering and Geological Sciences at the University of Notre Dame", NSF, \$155,000, 1997-2001.

Principal Investigator, "Impact of Measurement Instrument and Conceptual Model on Analysis of Subsurface Heterogeneity", U.S. Department of Energy, \$389,804, 1995-1999.

Principal Investigator, "Investigation of the three-point scheme for assessment of groundwater field sites", U.S. Geological Survey, \$48,000, 1996-1998.

Principal Investigator, Fulbright Research Grant in Israel, \$30,000, 1997-1998.

Principal Investigator, "GAANNP research fellowships in CE/GEOS", U.S. Department of Education, \$350,000 (1994-1997).

Principal Investigator, "Hydrodynamic Controls on Particle Transport Through Heterogeneous Porous Media", U.S. Department of Energy, Supplemental Funds, \$69,000, 1994-1995.

Principal Investigator, "Hydrodynamic Controls on Particle Transport Through Heterogeneous Porous Media", U.S. Department of Energy, \$373,322, 1992-1995.

Principal Investigator, "St. Joseph Basin Commission Juday Creek Study for MACOG", St. Joseph River Basin Commission, \$11,200, 1992.

Principal Investigator, "Development of the Subsurface Equipment for Bioremediation of the Sandia Site", Argonne National Laboratory, \$60,000, 1991.

Principal Investigator, "Development of a Groundwater Handbook for Well-Head Protection", The City of Elkhart, \$10,000, 1991.

Principal Investigator, "Development of an Undergraduate Laboratory for the Hydrologic Sciences at Notre Dame", National Science Foundation, \$161,434, 1988-1991.

Principal Investigator, "Proposed investigation of environmental effect of application of oil field brine to Michigan roadways", KEDA, \$210,310, 1988-1991.

Co-Principal, "An NSF REU site in the Department of Civil Engineering at the University of Notre Dame", National Science Foundation, 1987/88/90/92/94.

Principal Investigator, "Characterization of fracture geometry utilizing particulate tracers and borehole temperature", U.S. Geological Survey, \$344,832, 1987-1990.

Principal Investigator, "Movement of Microorganisms through the subsurface: Numerical

analysis of the threat of biological contamination to Indiana's groundwater", Indiana Water Resources Research Center, \$42,500, 1987.

Courses Taught:

Groundwater Hydrology and Hydrology Lab: Senior and First Year Graduate Students.

Introduction to Engineering Systems: Freshman.

Concepts in Civil Engineering: Sophomores.

Haiti Seminar: (see www.nd.edu/~silliman/Development/haiti/student.html).

REU Program: (see www.nd.edu/~reuwater).

Geostatistics: Graduate Students.

Probability Theory: Graduate Students.

Geostatistics (in French) at the Universite d'Abomey-Calavi, Benin, May, 2003

Third-World Water Supply: Seniors.

Undergraduate Research: Seniors.

Advanced Groundwater: Graduate Students.

Physical Geology: Undergraduates.

Graduate Students:

Ms. Pamela Crane, pursuing the MS with continuation to the Ph.D.

Previous Ph.D.'s: Dr. Andrea Dunn, Dr. Bryce Cole, Dr. Li Zheng, Dr. Stephen Preston (co-advisor)

Previous Masters: Mr. Tim Carlsen, Mr. Peter Conwell, Ms. Clara Galbis-Reig, Ms. Kathleen Kovacs, Mr. Tim Ling, Ms. Gloria Mantz, Mr. James Nelson, Mr. Yong Peng, Mr. Nicholas Petruzzi, Mr. Reed Robinson, Mr. Benjamin Roope, Ms. Andrea Dunn.