

**JOHN L. WILSON**

Professor of Hydrology  
Department of Earth & Environmental Science,  
New Mexico Institute of Mining and Technology, Socorro, NM 87801  
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**INTERESTS:**

Environmental fluid flow and transport, using field & laboratory experiments and mathematical models, to examine the movement of fluids, chemicals, colloids, and bacteria through hydrologic systems. Current research work is directed toward groundwater contamination, aquifer heterogeneity, stream-aquifer interaction, and mountain block hydrology, including characterization and estimation methods for properties, states and fluxes.

**EDUCATION:**

Ph.D., 1974, Hydrodynamics, Massachusetts Institute of Technology, Cambridge, MA. Dissertation: Dispersive Mixing in a Partially Saturated Porous Medium

C.E. and S.M., 1970, Civil Engineering, Massachusetts Institute of Technology

B.C.E., 1968, Civil Engineering, Georgia Institute of Technology, Atlanta, GA

**EXPERIENCE:**

1984 - present	Professor of Hydrology and Senior Research Hydrologist, New Mexico Institute of Mining and Technology, Socorro, NM
1997 – 2003	Chair, 1999-2002, Vice Chair, 1997-99, 2002-03, Department of Earth & Environmental Science, New Mexico Institute of Mining and Technology, Socorro, NM
1997	Visiting Scientist, Commonwealth Scientific and Industrial Research Organization (CSIRO), Land & Water, Perth, Australia
1984 - 1996	Director of Hydrology Program, New Mexico Institute of Mining and Technology, Socorro, NM
1990	Visiting Professor, Waterloo Centre for Groundwater Research, University of Waterloo, Waterloo, Ontario, Canada
1982 - 1984	Senior Staff Consultant and Head of Sensitivity and Uncertainty Analysis, INTERA Technologies, Inc., Houston, TX
1973 - 1982	Assistant & Associate Professor of Civil Engineering, Massachusetts Institute of Technology, Cambridge, MA

**SELECTED COMMITTEES, SERVICE, ETC.**

1984 - 1997	Associate Editor of the journal <u>Hazardous Waste</u>
1984 - 1992	Member (Chairman, 1986-90), Groundwater Hydrology Committee, American Geophysical Union
1985 - 1989	Associate Editor of the journal <u>Transport in Porous Media</u>
1989 – 2000	Vice Chairman, Science Advisory Committee, EPA Western Region Hazardous Waste Research Center, Stanford University

1989 – 1999	Member, Program Development and Review Board, New Mexico Water Resources Research Institute, Las Cruces
1989 - 1990	Vice Chairman, 1990 Gordon Conference on 'Fluid Flow in Permeable Media'
1991 – 2006	Member, External Advisory Board, NIEHS Superfund Basic Research Program, University of North Carolina, Chapel Hill
1992 - 1995	Associate Editor of the journal <u>Ground Water</u>
1996 – 1998	Member, Horton Award Committee, American Geophysical Union
1996 – 1999	Member, Fellows Committee, Hydrology Section, American Geophysical Union
1998 – 2001	Member, Earth Sciences Review Panel, National Science Foundation
1998 – 1999	Member, Earth Science Council on Terrestrial Sequestration of CO <sub>2</sub> , Department of Energy
2000 – 2003	Member, Executive Committee, and Chair, Modeling Technical Committee, National Vadose Zone Roadmap, Department of Energy
2000 – 2004	Member, Union Fellows Committee, American Geophysical Union
2000 – 2004	Member, Committee on Hydrologic Sciences, National Research Council-National Academy of Science
2000 – 2004	Associate Editor of the journal <u>Advances in Water Resources</u>
2001 – 2005	Board of Directors (Chair 2001-2004; Vice Chair, 2001) and NMIMT Representative, Consortium of Universities for the Advancement of Hydrologic Science Incorporated (CUAHSI)
2002	Member, Committee on Review of a Plan for a New Science Initiative on the Global Water Balance, National Research Council- National Academy of Science.
2003- 2005	Member, Advisory Committee for Geosciences (AC/GEO), National Science Foundation.
2003- 2005	Member and AC/GEO Liaison, Advisory Committee for Environmental Research and Education (AC/ERE), National Science Foundation.
2004	Member, SECURE Earth Initiative Panel, Board of Earth Resources/Board of Radioactive Waste Management, National Research Council- National Academy of Science.
2004 – present	Member, Honors and Recognitions Committee, American Geophysical Union
2005	Member, Review Team for the Interdisciplinary Program in Hydrologic Sciences, Office of the Provost, University of Nevada, Reno, Nevada.
2005	Chair, Earth Sciences Division Peer Review Panel, Lawrence Berkeley National Laboratory, Office of the Director, Berkeley, California.
2005 - present	Member, External Advisory Committee, Institute for Multidisciplinary Earth Studies, National Center for Atmospheric Research, Boulder, Colorado.
2005 - present	Member, External Advisory Committee, Earth & Sun Systems Laboratory, National Center for Atmospheric Research, Boulder, Colorado.
2005 – 2007	Chair, Science Planning Committee, CUAHSI
2005 – 2007	Member, WATERS Design Team, WATERS Joint CLEANER-CUAHSI Observatory Network

2006 – 2008	Member, O.E. Meinzer Award Committee, Hydrogeology Division, Geological Society of America
2006 – 2008	President Elect, Hydrology Section, American Geophysical Union
2006 – 2010	Member, American Geophysical Union Council (Corporate Board of Directors)
2006 – 2008	Chair, AGU Hydrology Section Fellows Committee
2007	Department of Energy, Basic Research Needs for Geosciences Panel
2008 – 2010	President, Hydrology Section, American Geophysical Union

#### **HONORS OF THE LAST FIFTEEN YEARS:**

1992 Darcy Lecturer, National Ground-Water Association and the Association of Ground-Water Scientists and Engineers  
 1992 Freeman Lecturer, Boston Society of Civil Engineers and Mass. Inst. of Technology  
 1993 Fred Holmsley Moore Distinguished Lecturer, University of Virginia  
 1994 Elected Fellow of the American Geophysical Union  
 1996 Elected Fellow of the Geological Society of America  
 1996 O.E. Meinzer Award, Geological Society of America  
 1998 Distinguished Research Award, New Mexico Institute of Mining & Technology  
 2006 Hydrologic Sciences Award, American Geophysical Union

#### **SELECTED PUBLICATIONS OF THE LAST TWELVE YEARS:**

(out of over 150 total peer reviewed publications)

Cardenas, M. B., and J. L. Wilson, The Relationship Between the Shape and Drag of Triangular Bedforms: a Numerical Simulation Study, Journal of Geophysical Research- Earth Surface, under revision, 2008.

Holt, R.M., R. Glass. and J.L. Wilson, "Spatial Bias in Laboratory Estimated Unsaturated Properties," Water Resources Research, resubmitted, 2008.

Cardenas, M. B., J. L. Wilson, and R. Haggerty, Residence Time of Bedform-Driven Hyporheic Exchange, Advances in Water Resources, accepted, 2008.

Sigda, J. and J.L. Wilson, "From Catchments to Conduits: Vadose Zone Faults and Climate," Vadose Zone Journal, accepted, 2008.

Zhou, X., H. Guan, H. Xie, and J.L. Wilson, "Analysis and Optimization of NDVI Definitions and Areal Fraction Models in Remote Sensing of Vegetation," Int'l J. of Remote Sensing, in press, 2008.

Cardenas, M.B. and J.L. Wilson, "The Thermal Regime of Dune-Covered Sediments Under Gaining and Losing Water Bodies," Journal of Geophysical Research- Biogeosciences, 112, G04013, doi:10.1029/2007JG000485, 2007.

Cardenas, M.B. and J.L. Wilson, "Exchange Across a Sediment-Water Interface with Ambient Groundwater Discharge," J. Hydrology, 346, 69-80, doi:10.1016/j.jhydrol.2007.08.019, 2007.

Cardenas, M.B. and J.L. Wilson, "Driving while under the influence: Pumping-driven circulation under the influence of regional groundwater flow," in A New Focus on Groundwater-Seawater Interactions, Eds. Sandford, W., C. Langevin, M. Polimio, and P. Povinec. IAHS Publ. 312, Int'l Assoc. Hydro. Science, Wallingford, UK, 229-236, 2007.

Murray, C. J., A. L. Ward, and J. L. Wilson, Influence of Clastic Dikes on Vertical Migration of Contaminants at the Hanford Site, Vadose Zone J., 6: 959-970, doi:10.2136/vzj2007.0004, 2007

Cardenas, M.B. and J.L. Wilson, "The Effects of Current-Bed Form Induced Fluid Flow on the Thermal Regime of Sediments," Water Resources Research, 43, W08431, doi:10.1029/2006WR005343, 2007.

Cardenas, M.B. and J.L. Wilson, "Dunes, Turbulent Eddies, and Interfacial Exchange with Permeable Sediments," Water Resources Research, 43, W08412, doi:10.1029/2006WR005787, 2007.

Cardenas, M.B. and J.L. Wilson, "Hydrodynamics of Coupled Flow Above and Below a Sediment-Water Interface with Triangular Bedforms," Advances in Water Resources, 30, 301-313, doi:10.1016/j.advwatres.2006.06.009, 2007.

Cardenas, M.B. and J.L. Wilson, "The Influence of Ambient Groundwater Discharge on Hyporheic Zones Induced by Current-Bedform Interactions," J. of Hydrology, 331, 103-109, doi:10.1016/j.jhydrol.2006.05.012, 2006.

Cardenas, M. B, and J.L. Wilson, Comment on "Flow resistance and bed form geometry in a wide alluvial channel" by Shu-Qing Yang, Soon-Keat Tan, and Siow-Yong Lim, Water Resources Research, Vol. 42, W06601, doi:10.1029/2005WR004663, 2006.

Guan, H., J.L. Wilson and O. Makhnin, Geostatistical Mapping of Mountain Precipitation Incorporating Auto-searched Effects of Terrain and Climatic Characteristics, J. of Hydrometeorology, Vol. 6, No. 6, p. 1018-1031, 2005.

Guan, H, E.R. Vivoni and J.L. Wilson, Effects of atmospheric teleconnections on seasonal precipitation in mountainous regions of the southwestern U.S. : A case study in northern New Mexico, Geophysical Research Letters, 32, L23701, doi:10.1029/2005GL023759, 2005.

Water: Challenges at the Intersection of Human and Natural Systems, Pacific Northwest National Laboratory, PNWD-3597, Richland, WA, 50 pp., 2005

Advisory Committee for Environmental Research and Education, Complex Environmental Systems: Pathways to the Future, National Science Foundation, Washington, DC., 12pp., 2005

Neupauer R.M. and J.L. Wilson, "Backward Probability Model Using Multiple Observations of Contamination to Identify Groundwater Contamination Sources at the Massachusetts Military Reservation," Water Resources Research, Vol. 41, W02015, doi:10.1029/2003WR002974, 2005.

Cardenas, M.B., J.L. Wilson and V. Zlotnik, "Impact of Heterogeneity, Bed Forms and Channel Curvature on Subchannel Hyporheic Exchange, Water Resources Research, Vol. 40, No. 8, doi:10.1029/2004WR003008175-189, 2004

Wilson, J.L. and H. Guan, "Mountain-Block Hydrology and Mountain-Front Recharge," in Groundwater Recharge in a Desert Environment: The Southwestern United States, edited by F. M. Phillips, J. Hogan, and B. Scanlon, 2004, American Geophysical Union, Washington, DC, 2004.

Neupauer R.M. and J.L. Wilson, "Forward and Backward Location Probabilities for Sorbing Solutes in Groundwater," Advances in Water Resources, Vol. 27, No. 7, 689-705, July, 2004.

Neupauer R.M. and J.L. Wilson, "Numerical Implementation of a Backward Probabilistic Model of Ground-Water Contamination," Ground Water, Vol. 42, No. 2, 175-189, 2004.

Committee on Hydrologic Science, Groundwater Fluxes Across Interfaces, National Academy Press, Washington, DC, 85 pp., 2004.

Neupauer R.M. and J.L. Wilson, "Backward Location and Travel Time Probabilities for a Decaying Contaminant in an Aquifer," Contaminant Hydrology, Vol. 66, p.39-58, doi:10.1016/S0169-7722(03)00024-X, 2003.

Sigda, J. and J.L. Wilson, "Are Faults Preferential Flow Paths through Semi-arid and Arid Vadose Zones?," Water Resources Research, Vol. 39, No. 8, 1225, doi:10.1029/2002WR001406, 2003.

Molz, F.J., C.L. Dinwiddie, and J.L. Wilson, "What Does an Instrument Measure? A Physical Basis for Calculating Spatial Weighting Functions Applicable to Hydraulic Conductivity and Intrinsic Permeability Measurements," Water Resources Research, Vol. 39, No. 4, 1096, doi:10.1029/2001WR001220, 2003.

Holt, R.M., J.L. Wilson, R. Glass, "Error in Unsaturated Stochastic-Models Parameterized with Field Data," Water Resources Research, Vol. 39, No. 2, doi:10.1029/2001WR000544, 2003.

Holt, R.M., J.L. Wilson, R. Glass, "Spatial Bias in Field-Estimated Unsaturated Hydraulic Properties," Water Resources Research, Vol. 38, No. 12, 1311, doi:10.1029/2002WR001336, 2002.

Tidwell, V.C., and J.L. Wilson, "Textural Attributes of a Rock and Their Relationship to Permeability: A Comparison of Digital Image and Minipermeameter Data," Water Resources Research, Vol. 38, No. 11, 1261, doi:10.1029/2001WR000932, 2002.

Neupauer R.M. and J.L. Wilson, "Backward Probabilistic Model of Groundwater Contamination in Non-Uniform and Transient Flow," Advances in Water Resources, Vol. 25, No. 7, p. 733-746, 2002.

Daniel B. Stephens, et al., "Letter to the Editor on a National Strategy for Vadose Zone Science and Technology," Vadose Zone Journal, Vol. 1, No. 1, p. 197-198, 2002.

Committee on Hydrologic Science, Review of USGCRP Plan for a New Science Initiative on the Global Water Balance, National Academy Press, Washington, DC, 32 pp., 2002

Committee on Hydrologic Science, Predictability & Limits-to-Prediction in Hydrologic Systems, National Academy Press, Washington, DC, 118 pp., 2002

Neupauer R.M. and J.L. Wilson, "Adjoint Derived Location and Travel Time Probabilities for a Multi-dimensional Groundwater System," Water Resources Research, Vol. 37, No. 6, p. 1657-1668, 2001.

Rawling, G., L.B. Goodwin, and J.L. Wilson, "Internal Architecture, Permeability Structure, and Hydrologic Significance of Contrasting Fault Zone Types," Geology, Vol. 29, No. 1, p. 43-46, January, 2001.

Wawersik, W.R., J.W. Rudnicki, P. Dove, J. Harris, J.M. Logan, L. Pyrak-Nolte, F.M. Orr Jr, P.J. Ortoleva, F. Richer, N.R. Warpinski, J.L. Wilson, and T-F. Wong., "Terrestrial Sequestration of CO<sub>2</sub> – An Assessment of Research Needs," Advances in Geophysics, Vol. 43, p. 97-177, 2000.

Tidwell, V.C. and J.L. Wilson, "Heterogeneity, Permeability Patterns, and Permeability Upscaling: Physical Characterization of a Block of Massillon Sandstone Exhibiting Nested Scales of Heterogeneity," SPE Reservoir Evaluation and Engineering, Vol. 3, No. 4, p. 283-291, 2000.

- Neupauer, R.M., B. Borchers, and J.L. Wilson, "Comparison of Inverse Methods for Reconstructing the Release History of a Groundwater Contamination Source," Water Resources Research, Vol. 36, No. 9, p. 2469-2475, 2000.
- Li, C.L. and J.L. Wilson, "Heuristic Theory on Diffusive Mixing Behavior at Fracture Junctions," in Remediation in Rock Masses, H.I. Inyang and C.J. Bruell, Editors, Amer. Soc. of Civil Engineers, Reston, Va., 2000.
- Tidwell, V.C. and J.L. Wilson, "Upscaling Experiments Conducted on a Block of Volcanic Tuff: Results for a Bimodal Permeability Distribution," Water Resources Research, Vol. 35, No. 11, p. 3375-3387, 1999.
- Neupauer R.M. and J.L. Wilson, "Adjoint Method for Obtaining Backward-in-time Location and Travel Probabilities of a Conservative Groundwater Contaminant," Water Resources Research, Vol. 35, No. 11, p. 3389-3398, 1999.
- Tidwell, V.C. and J.L. Wilson, "Permeability Upscaling Measured on a Block of Berea Sandstone: Results and Interpretation," Mathematical Geology, Vol. 31, no. 7, pp. 749-769, 1999.
- Sigda, J., L.B. Goodwin, P.S. Mozley and J.L. Wilson, Permeability Alteration in Small Displacement Faults in Poorly Lithified Sediments: Rio Grande Rift, Central New Mexico," in Faults and Subsurface Fluid Flow in the Shallow Crust, W.C. Haneberg, P.S. Mozley, J. C. Moore and L.B. Goodwin (eds), Geophysical Monograph 113, American Geophysical Union, Washington DC, pp. 51-68, 1999.
- Tidwell, V.C., A.L. Gutjahr and J.L. Wilson, "What Does an Instrument Measure? Empirical Spatial Weighting Functions," Water Resources Research, Vol. 35, No. 1, p. 43, 1999.
- Tidwell, V.C. and J.L. Wilson, "Laboratory Measurement of Permeability Upscaling: Results for the Topopah Spring Member of the Paintbrush Tuff," in Tuff Handbook, UNESCO, New York, 1998.
- Bolster, C.H., G.M. Hornberger, A.L. Mills, and J.L. Wilson, "A Method for Calculating Bacterial Deposition Coefficients Using the Fraction of Bacteria Recovered from Laboratory Columns," Environmental Science & Technology, Vol. 32, No. 9, pp 1329-1332, 1998.
- Stockman, H. W. , C. Li, and J.L. Wilson, "A Lattice-gas and Lattice Boltzmann Study of Mixing at Continuous Fracture Junctions: Importance of Boundary Conditions, Geophys. Res. Lett. , Vol. 24 , No. 12 , pp. 151-156, 1997.
- DeFlaun, M.F., C.J. Murray, W. Holben, T. Schreibe, A. Mills, T. Ginn, T., Griffin, E. Majer, and J.L. Wilson, "Preliminary Observations on Bacterial Transport in a Coastal Plain Aquifer," FEMS Microbiology Reviews, Vol. 20, pp. 473-487, 1997.
- Davis, J.M., J.L. Wilson, F.M. Phillips, and M.B. Gotkowitz, "Relationship between Fluvial Bounding Surfaces and the Permeability Correlation Structure," Water Resources Research, Vol. 33, No. 8, pp. 1843-1854, 1997.
- Tidwell, V.C. and J.L. Wilson, "Laboratory Method for Investigating Permeability Upscaling," Water Resources Research, Vol. 33, No. 7, pp. 1607-1616, 1997.
- Wilson, J.L. and J. Liu, "Field Validation of the Backward-in-time Advection Dispersion Theory," Proceedings of the 1996 HSRC/WERC Joint Conf. on the Environment, Great Plains-Rocky Mountain Hazardous Substance Center, Manhattan, Kansas, 1997.

- Tidwell, V.C. and J.L. Wilson, "A Comparison of Simple Upscaling Models with Multisupport Permeability Data Measured on a Block of Berea Sandstone," Proceedings of the Third Annual Conf. on the Int'l Assoc. for Mathematical Geology, V. Pawlowsky-Glahn (Ed.), Vol. 2, pp. 737-742, CIMNE, Barcelona, 1997.
- Wilson, J.L., "Dueling Time Constants: Competing Processes in Aquifer Contamination and Remediation," Groundwater-Quality Protection: Remedial Technology and Management of NAPL Problems, Taipei, Taiwan, 1997.
- Wilson, J.L., "Removal of Aqueous Phase Dissolved Contamination: Non-Chemically Enhanced Pump and Treat," Subsurface Restoration Handbook, C.H. Ward, J. Cherry, and M. Scalf (Eds.), Ann Arbor Press, Chelsea, Michigan, 271-285, 1997.
- Wilson, J.L., "Visualization Experiments at the Pore Scale," Groundwater and Subsurface Remediation, H. Kobus, B. Barczewski, and H.-P. Koschitzky, Eds., Springer Verlag, pp. 89-98, 1996.
- Wilson, J.L. and J. Liu, "Backtracking to Find the Source of Pollution," Waste Management: from Risks to Reduction, R. Bahda et al, Eds., ECM Press, Albuquerque, New Mexico, pp. 181-199, 1995.
- Wan, J. and J.L. Wilson, "Colloid Transport in Unsaturated Porous Media," Water Resources Research, Vol. 30, No. 4, pp. 857-864, 1994.
- Davis, J.M., J.L. Wilson and F.M. Phillips, "A Portable Air-Minipermeameter for Rapid In-Situ Field Measurements," Ground Water, Vol. 32, No. 2, pp. 258-266, 1994.
- Wan, J. and J.L. Wilson, "Visualization of the Role of the Gas-Water Interface on the Fate and Transport of Colloids in Porous Media," Water Resources Research, Vol. 30, No. 1, pp. 11-23, 1994.
- Wan, J., J.L. Wilson, and T.L. Kieft, "The Gas-Water Interface as an Influence on the Transport of Microorganisms Through Unsaturated Porous Media," Applied and Environmental Microbiology, Vol. 60, No. 2, pp. 509-516, 1994.
- Wilson, J.L., "Visualization of Flow and Transport at the Pore Level," Transport and Reactive Processes in Aquifers, T.H. Dracos & F. Stauffer, Eds., Balkema, Rotterdam, pp. 19-36, 1994.
- Linderfelt, W.R. and J.L. Wilson, "Field Study of Capture Zones in a Shallow Sand Aquifer," Proc. IAHR Int'l Sym. on Transport and Reactive Processes in Aquifers, T.H. Dracos & F. Stauffer, Eds., Balkema, Rotterdam, pp. 289-294, 1994.
- Davis, J.M., R. Lohman, F.M. Phillips, J.L. Wilson, and D. Love, "Architecture of the Sierra Ladrones Formation, Central New Mexico: Depositional Controls on the Permeability Correlation Structure," Geological Society of America Bulletin, Vol. 105, No. 8, pp. 998-1007, 1993.
- Soll, W., M. Celia, and J.L. Wilson, "Micromodel Studies for Three-Fluid Porous Media Systems: Pore-Scale Processes and Capillary Pressure-Saturation Relationships," Water Resources Research, Vol. 29, No. 9, pp. 2963-2974, 1993.
- Robin, M.J.L., A.L. Gutjahr, E.A. Sudicky, and J.L. Wilson, "Cross-Correlated Random Field Generation with the Direct Fourier Transform Method," Water Resources Research, Vol. 29, No. 7, pp. 2385-2397, 1993.
- Holford, D., S. Schery, J.L. Wilson and F. Phillips, "Modeling Radon Transport in Dry, Cracked Soil," Journal of Geophysical Research, Vol. 98, No. B1, pp. 567-580, 1993.

Wei, M., R. Bowman, J.L. Wilson and N. Morrow, "Wetting Properties and Stability of Silane Treated Glass Exposed to Water, Air and Oil," Journal of Colloid and Interface Science, Vol. 157, pp. 154-159, 1993.

Wilson, J.L., "Induced Infiltration in Aquifers with Ambient Flow," Water Resources Research, Vol. 29, No. 10, pp. 3503-3512, 1993.

#### **SELECTED INVITED PRESENTATIONS OF THE LAST TWELVE YEARS:**

(out of over 150 invited and contributed talks during the same period)

"Blobs, Bugs and Colloids: Microscopy of Porous Media," Keynote Address, U.S. Geological Survey Toxic Substances Hydrology Technical Meeting, Colorado Springs Colorado, September, 1993.

"Recent Visualization and Column Studies of Colloids and Bacteria in Porous Media," 1993 Fred Holmsley Moore Distinguished Lecture, Department of Environmental Sciences, University of Virginia, Charlottesville, Virginia, September 30, 1993.

"Using Geological Information in Geostatistical Modeling," (with M.Davis and F. Phillips) Geological Society of America (GSA) Annual Meeting, Boston, Massachusetts, October, 1993.

"On the Role of Analytical Elements in Groundwater Modeling," Analytical Element Modeling of Groundwater Flow, Indiana University, Indianapolis, Indiana, April, 1994.

"Visualization of Flow and Transport at the Pore Level," Keynote Address, IAHR Int'l Sym. on Transport and Reactive Processes in Aquifers, ETH, Zurich, Switzerland, April, 1994.

"On the Role of Groundwater Modeling in Hydrogeologic Practice," Keynote Address, Special Session on Applications of Groundwater Modeling to Groundwater Contamination Problems. Geological Association of Canada/Mineralogical Association of Canada Annual Meeting, Waterloo '94, Waterloo, Ontario, May, 1994.

"Capture Zone Delineation: Models and Experiments," Groundwater Research Seminar, Robert S. Kerr Laboratory, Environmental Protection Agency, Oklahoma, City, Oklahoma, June, 1994.

"Mixed Natural And Forced Gradient Field Tracer Experiments," Gordon Research Conference on Fluid Flow in Permeable Media, Procter Academy, New Hampshire, August, 1994.

"Processes Controlling the Distribution of Oil, Air and Water," Intrinsic Bioremediation of Groundwater, U.S. Environmental Protection Agency, Denver, Colorado, September, 1994.

"Field Tracer Experiment Design Problems at the Borden Site," Second Tracer Workshop, University of Texas, Austin, Texas, November 14-15, 1994.

"Pollutant Transport and Management in Heterogeneous Aquifers," (Short course with Steve Gorelick), 10 Lectures, the 16th International Course, ETH, Zurich, Switzerland, March 26-31, 1995.

"Complications When Multiphase Flow Encounters Mobile Colloids," Dunwalke Workshop on Flow in Porous Media, Princeton University, Dunwalke Estate, New Jersey, April 28-30, 1995.

"Experiments at the Pore Scale," VEGAS Symposium, University of Stuttgart, Stuttgart, Germany, September 26-27, 1995.

"A New Assay for Microbiological Hydrophobicity," CSIRO, Perth, Australia, May 20, 1997.

"Relationships Between Geochemical and Physical Heterogeneities," (with R.W. Smith, T.L. McLing, A.L. Schafer, and D.J. Swift), AGU Spring Meeting, Baltimore, June, 1997.



"Visualisation of Groundwater Flow and Transport Through a Microscope," Inst. of Engineers and University of Melbourne, Melbourne, Australia, 9 July, 1997.

"Aquifer Heterogeneity and Optimal Containment of Contaminants," (Short course with Steve Gorelick and Lloyd Townley), 8 Lectures, University of New South Wales and CSIRO, Sydney, Australia, July 15-18, 1997.

"The Backward-advection Dispersion Approach for Travel Time and Location Probabilities in Flow Fields," Center for Water Research, Univ. of Western Australia, 6 August, 1997.

"Changes in Petrophysical and Hydraulic Characteristics of Faulted Poorly Consolidated Sand, Sante Fe Group, Central New Mexico," (with J. Sigda) GSA Penrose Conf. on Faults and Fluid Flow, Taos, New Mexico, September, 1997.

"Dueling Time Constants: Competing Processes in Aquifer Contamination and Remediation," The First Int'l Conf. on Groundwater-Quality Protection: Remedial Technology and Management of NAPL Problems, Taipai, Taiwan, December, 1997.

"Groundwater Adjoint Problems Revisited," Shlomo Neuman Symposium, University of Arizona, Tucson, Arizona, October, 1998.

"Morphology, Heterogeneity and Scaling of Permeability on Four Blocks of Rock," University of Paris VI, Paris, France, November, 1998.

"Groundwater Adjoint Problems in Groundwater Hydrology," Applied Mathematics Workshop, Univ. of Nebraska, Lincoln, Nebraska, March, 1999.

"Groundwater Production Wells and Induced Infiltration," Riverbank Infiltration Conference, National Water Research Institute, Louisville, Kentucky, November, 1999

"Viability of Rapid *in situ* Measurement of Hydraulic Properties," Vadose Zone Characterization Meeting, Pacific Northwest National Laboratory, Richland, Washington, January, 2000.

"Spatial Bias in Unsaturated Hydraulic Property Estimates: Origin, Impact and Relevance," (with R.M. Holt and R.J. Glass), Environmental Science Management Program Annual Meeting, Department of Energy, Atlanta, Georgia, April, 2000.

"Hydrogeological Influence of Clastic Dikes on Vadose Zone Transport at the Hanford Site, Southcentral Washington," (with C. Murray, M. Fayer, D. Horton, P. Long, and W. Clement); Environmental Sedimentology: Hydrogeology of Sedimentary Aquifers, SEPM/IAS Research Conference, Santa Fe, September, 2000.

"Relationship between Visual Attributes of Rocks and Their Permeability Structure: A Comparison of Digital Image and Minipermeameter Data," (with V. Tidwell), Environmental Sedimentology: Hydrogeology of Sedimentary Aquifers, SEPM/IAS Research Conference, Santa Fe, September, 2000.

"Concepts and Principles for Backward-in-time-and-space Modeling of Location and Travel Time Probabilities" (with R M Neupauer), AGU Spring Meeting, Boston, Massachusetts, June, 2001.

"Travel Time Probabilities of Groundwater Tracers and Contaminants" (with R M Neupauer), AGU Spring Meeting, Boston, Massachusetts, June, 2001.

"Aqueous Phase Diffusion Coefficients of Environmental Tracers" (with R.S. Bowman and P. Hu), GSA Annual Meeting, Boston, Massachusetts, November, 2001.

"Vadose Zone: Past, Present, Future," Eighth Biannual Unsaturated Zone Interest Group Meeting, August, 2001 Idaho Falls, Idaho

"Diffusion Coefficients of Hydrologic Tracers Measured by a Taylor Dispersion Technique," (with R.S. Bowman and P. Hu), GSA Annual Meeting, Boston, Massachusetts, November, 2001.

"Gas Minipermeameters," GSA Annual Meeting, Boston, Massachusetts, November, 2001.

"Building an Understanding of Mountain-Block Recharge" (with H. Guan), 2<sup>nd</sup> Annual Meeting, SAHRA, Tucson, Arizona, February, 2002.

"Receptor Based Modeling: Adjoint Methods for Flow and Transport", Gordon Conference on Flow and Transport in Permeable Media, Andover, New Hampshire, August 2002.

"Synthetic Sediments and Stochastic Groundwater Hydrology," AGU Fall Meeting, San Francisco, California, December, 2002.

"Receptor Based Modeling: Adjoint Methods for Flow and Transport", Distinguished Lecturer, Texas A&M University, College Station, March, 2003.

"Receptor Based Modeling: Adjoint Methods for Flow and Transport in Hydrologic, Ocean and Atmospheric Sciences", Georgia Institute of Technology, Atlanta, Georgia, April, 2003.

"Geostatistical Methods in Probabilistic Groundwater Models: Accomplishments and Failures", Keynote Presentation, Symposium on Probabilistic Approaches & Groundwater Modeling, EWRI 2003 World Water & Environmental Congress, ASCE, Philadelphia, Pennsylvania, June, 2003.

"Hydrologic Impacts of Faults in Granular Media", Hydrology Keynote Presentation, Institute of Geophysics and Planetary Physics, Workshop on Fluid Flow and Transport Through Faulted Igimbrites and other Porous Media, Santa Fe, New Mexico, September, 2003.

"Revolutions in Observation Driven Hydrology, Then and Now", Session on Henry Darcy's 200th Birthday, GSA Annual Meeting, Seattle, Washington, November, 2003.

"Twenty Years of Prejudice Toward Contaminant Hydrogeology", GSA Annual Meeting, Seattle, Washington, November, 2003.

"A Scientific Perspective of Water Issues in the United States", Water, Science and Policy in the 21<sup>st</sup> Century, Knoxville, Tennessee, October 2004.

"Mountain Block Hydrology and Mountain Front Recharge", GSA Annual Meeting, Denver, Colorado, November, 2004.

"Barriers and Disincentives to Quality Groundwater Modeling in Practice," GSA Annual Meeting, Denver, Colorado, November, 2004.

"Living with a Limited Water Supply," 85<sup>th</sup> Ann. Mtg. of American Meteorological Society, San Diego, January, 2005.

"Water Percolation across the Soil-bedrock Interface in Mountainous Terrain" (with H. Guan), GSA Annual Meeting, Salt Lake City, Colorado, November, 2004.

"Mountain Front Recharge and the Role of Hillslope Processes above the Mountain Front," AGU Fall Meeting, San Francisco, California, December, 2005

"Consortium of Universities for the Advancement of Hydrologic Science Inc. (CUAHSI) Science Plan: A Community-based Infrastructure," AGU Fall Meeting, San Francisco, California, December, 2005.

“A Vision For Advancing Hydrologic Research,” Int’l Seminar on Catchment Science, University of Sheffield, Sheffield, England, February, 2006.

“Mountain Front Recharge: The Role Of Hillslope Processes Above The Mountain Front,” Seminar, University of California, Merced, California, April, 2006.

“Multiphysics Modeling Of Strongly Coupled Free-Flowing And Porous Fluid Flow,” Seminar, Florida State University, Tallahassee, Florida, April, 2006.

“Multiphysics Modeling Of Physical, Thermal And Chemical Processes Along Sediment-Water Interfaces: Towards Fundamental Understanding And Mechanistic Predictions” (with B. Cardenas), AGU Fall Meeting, San Francisco, CA, December, 2006; Abstract B22C-01, Fall Meet. Suppl., Eos Trans. AGU, 87(52), 2006.

“The River-Bed Hyporheic Zone,” Symposium on River Terrace and Flood Plain Hydrology, Las Cruces, New Mexico, February, 2007.

“Ground Water In An Interdisciplinary World,” keynote address, 2007 Ground-Water Summit, National Ground Water Association, Albuquerque, New Mexico, April, 2007.

“Can Hydrologic Scientists Learn To Speak Up And With One Voice?,” European Geological Union Ann. Mtg., Vienna, Austria, April, 2007.

“Driving While Under The Influence: Pumping-Driven Circulation Under The Influence Of Regional Groundwater Flow” (with Bayani Cardenas), IUGG XXIV General Assembly, Perugia, Italy, July, 2007.

“Evolution of Hydrologic Science: the New Mexico Tech Example” (with F.M. Phillips, R.S. Bowman, J.M.H. Hendrickx , and E.R. Vivoni), GSA Annual Meeting, Denver, Colorado, October, 2007; Geological Society of America Abstracts with Programs, Vol. 37(7), 240, 2007.

## RECENT CONSULTING

Recent consulting focused on SuperFund and other aquifer remediation cost allocation and insurance coverage through litigation, mediation, arbitration and/or panel allocation, and on tort litigation. Most sites included DNAPL’s, especially chlorinated solvents, or MTBE, and all sites included mobile groundwater plumes of organic compounds or metals. The principal remediation measures were removal of source area and hydraulic control of the plumes.

These recent consultancies dealt with sites located in:

- Glendale and Burbank , CA
- Puente Valley, CA
- Tucson, AZ
- Boundbrook, NJ
- Phoenix, AZ
- Central Valley, CA
- Santa Monica, CA
- Santa Rosa, CA
- Sacramento, CA
- Long Island, NY
- Rialto, CA

Other consultancies involved (1) modeling studies in support of litigated water resource allocations along the Rio Grande and Pecos River watersheds, for the N.M. State Engineer and for the U.S. Attorney; (2) optimization of groundwater resources for Tampa Bay Water Co (with Waterstone Inc., and Intera, Inc.); (3) developing a long term roadmap for future DOE sponsored vadose zone research (through INL).