

# BRUCE L. JACOBS

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## EDUCATION

1998	Ph.D.	Environmental Engineering	Massachusetts Institute of Technology
1987	M.S.	Water Resources Engineering	Massachusetts Institute of Technology
1985	B.S.	Civil Engineering	Wayne State University

## PROFESSIONAL HISTORY

1994-date	Environmental Engineering Consultant
1994-1998	Massachusetts Institute of Technology
1994-1998	Northeastern University
1987-1994	Camp Dresser & McKee International
1984	US Army Corps of Engineers

## REGISTRATION

Professional Engineer, Massachusetts

## REPRESENTATIVE EXPERIENCE

As an environmental engineering consultant, Dr. Jacobs has broad experience in hydrology and environmental water quality. He has extensive experience in environmental subsurface site characterization and remedial design, and the generation and the application of numerical models in support of these efforts. Dr. Jacobs is an expert in the application of numerical models for ground-water, hydrologic, and hydraulic analysis, is the developer of the visualization code, Environmental Insite, and is the co-author of Camp Dresser & McKee's proprietary ground-water visualization software. Dr. Jacobs has also contributed to a variety of ground- and surface-water quality studies. These studies include well capture-zone analysis, modeling the impact of channel modifications on stream water quality, and performing statistical analysis of streamflow.

### Ground-water Analysis and Modeling

Developed ground-water flow and transport model for determination of travel times to Wilmington, Massachusetts water supply wells.

Served on peer review panel for regional, transient ground-water flow model prepared by South Florida Water Management District. Important issues addressed included calibration indices, methods for calibration of transient models, sensitivity analysis procedures and interpretation, and modeling of surface water – ground water interaction.

Created flow and transport model of regional aquifer at Los Alamos National Laboratory. Prepared impulse response functions for interactive assessment and ranking of health risks from multiple sources.

Prepared assessment of modes of transport through vadose zone at Los Alamos National Laboratory and provided guidance on use of vadose zone characterization strategies.

Provided expert witness testimony in case involving the depletion of water table due to leaking infrastructure. Evaluated multiple causes of water table depletion and timing of impacts.

Constructed models to support site characterization and remedial design at numerous ground-water contamination sites nationwide including regional studies, Superfund sites, capture zone analysis, and pump test assessment.

Lead site characterization and design of ground-water monitoring program for China Petroleum Corporation tank farm in Kaohsiung, Taiwan.

Simulated measures to alleviate saltwater contamination inland of a system of injection wells at West Coast Basin Barrier, Southern California. Modeled operation of Dominguez Gap Barrier injection wells and tested alternative strategies to improve effectiveness of barrier in reducing salt water intrusion in Southern California.

## **Surface Water / Water Supply**

Applied Wilmington, Massachusetts water distribution model to determine spatial dispersion of contaminants that were introduced at water supply wells. Recreated historical system configurations by modification of existing model data and applied to determine change of exposure concentrations over time.

Optimized design and operation of flood gate-reservoir system in Singapore. Involved consideration of both water supply and safety issues, the application of HEC1 and enhancement of in-house FORTRAN code for simulation of receiving basin operation.

Developed network simulation model for long range planning of San Francisco water supply system. Simulations used to assess facilities expansion and siting and improvement of system operations incorporating hydraulic constraints, reservoir operating rules, unit cost functions, and distributed demand.

Assessed spatial distribution of contaminants in water distribution system using University of Kentucky codes for hydraulic modeling and transport, Tucson, Arizona.

Performed river quality simulations of Tiete River in Brazil using QUAL2.

## **Software Development**

Extensive experience in the development and maintenance of C++ and FORTRAN software applications. Developed decision support system for analysis of water quality including database, mapping and model interface (STORM) capabilities. Developed pre/post-processors for water hammer simulation code of US Army Corps of Engineers (WHAMO) and EPA Water Quality Analysis and Simulation Program (WASP).

Responsible for maintenance and development of graphic interface to CDM ground-water numerical models; author of three-dimensional plotting, grid generation, and database query capabilities.

## **Expert Testimony**

Dr. Jacobs has provided deposition testimony regarding ground-water flow and transport in the following:



Charles Dumbaugh v. MDC, BW&SC, MWRA, City of Boston and CR Maguire, Inc. (Mass., Suffolk County)

American Motorists Insurance Co. v. Stewart Warner (U.S. District Court, Northern District of Illinois)

Courtroom testimony was provided in the following cases:

Phyllis Madanian v. Michael Prendergast and Madeleine Prendergast (Mass. Middlesex County, Superior Court Department Civil Action No. MICV2006-00003).

Indian Brook Cranberry Bogs, Inc. and Wanda Jane Warmack v. Board of Appeals of the Town of Plymouth, Peter Conner, William Sims, Patrick Mulvey-Welsh, in their capacity as members of the Plymouth Boards of Appeals, and Sawmill Development Corp. (Mass., Plymouth County, Land Court Department, Misc. Case No. 06-322281).

First Class, LLC, and Perfection Fence Corp. v. Carl Russell, Karen Tepper, Joseph Kelleher, Edwin Parsons, and Michael Harrington as they are members of the Town of Marshfield Zoning Board of Appeals and Town of Marshfield (Mass., Plymouth County, Land Court Department of the Trial Court, Misc. Case No. 333504).

## PUBLICATIONS

Rodriguez-Iturbe, I., Q. Wang, B.L. Jacobs, and P.S. Eagleson, "Spatial Poisson Models of Stationary Rainfall: Theoretical Development," *Ralph M. Parsons Laboratory Technical Report No. 307*, 1987.

Jacobs, B.L., I. Rodriguez-Iturbe, and P. S. Eagleson. "Stochastic Modelling of Precipitation Events in Space and Time: Parameter Estimation and Scales of Fluctuation", *Ralph M. Parsons Laboratory Technical Report No. 314*, 1987.

Jacobs, B.L., I. Rodriguez-Iturbe, and P.S. Eagleson. "Evaluation of a Homogeneous Point Process Description of Arizona Thunderstorm Rainfall," *Water Resources Research*, 24 (7), 1174-1186, 1988.

Jacobs, B.L., D. Agostini, and L. Olivera. "Development of an Integrated Decision Support System for the Guarapiranga Reservoir," presented at ASCE Water Resources Planning Conference, Cambridge, Massachusetts, 1995.

Zhou, Q., L.W. Gelhar and B.L. Jacobs, "Comparison of Field-scale Effective Properties of Two-phase Flow in Heterogeneous Porous Media Obtained by Stochastic Analysis and Numerical Experiments," presented at Bridging the Gap between Measurement and Modeling in Heterogeneous Media, Berkeley, California, March 25-28, 2002.

Surampalli, R. S.K. Ong, E. Seagren, J. Nuno and S. Banerji, editors, *Natural Attenuation of Hazardous Wastes*, American Society of Civil Engineers, 2004. (ISBN 0-7844-0740-1)  
Chapter 3.4, "Modeling of Natural Attenuation" by B. Jacobs, R. Fitzgerald and F. Wilhelm-Miralles.

Jacobs, B.L. and L.W. Gelhar. "Effective Properties of Two-phase Flow in Heterogeneous Aquifers", *Water Resources Research*, 41 (1), 2005.

Novotny, Vladimir and Paul Brown, editors. *Cities of the Future: Towards integrated sustainable water and landscape management*. ISBN 1843391368. IWA Publishing, London, England. September 2007.

"Ground Water and Cities" by Peter Shanahan and Bruce L. Jacobs.

Durant, J.L., B. Jacobs, and P. Shanahan, "Historical Inputs of N-nitrosodimethylamine to the Public Drinking Water Supply in Wilmington, Massachusetts," In: Roger W. Babcock, Jr. and Raymond Walton, editors, Proceedings of The World Environmental & Water Resources Congress, May 12-16, 2008, Honolulu, Hawai'i. American Society of Civil Engineers, Reston, Virginia.

Till, J., H. Grogan, L. Hay-Wilson, J. Rocco, A. Rood, B. Jacobs, and P. Shanahan, "Overview of Environmental Transport Models Contained in the Risk Analysis, Communication, Evaluation, and Reduction (RACER) Software Tools at Los Alamos National Laboratory," WM2009: HLW, TRU, LLW/ILW, Mixed, Hazardous Wastes & Environmental Management, March 1-5, 2009, Phoenix, Arizona (accepted)

Jacobs, B. "Chapter 1: Introduction" in *International Manual on the Hydraulics of Wells*, edited by Ahmed, N., American Society of Civil Engineers, in press.