

Barbara S. Minsker

Professor

Dept. of Civil & Environmental Engineering
3230D Newmark Laboratory, MC-250
University of Illinois
Urbana, IL 61801

<http://emsa.ncsa.uiuc.edu/>

Office phone: 217-265-5293
Cell phone: 217-417-4198 (university);
217-974-0263 (personal)
E-mail: barbara.minsker@gmail.com

EDUCATION

B.S. with Distinction, Cornell University, Operations Research and Industrial Engineering, 1986
Ph.D., Cornell University, Civil and Environmental Engineering, 1995
Post-doctoral research associate, University of Vermont, Research Center for Groundwater Remediation Design, 1995 – 1996
Future Thinking leadership development program, [Center for Authentic Leadership](#), 2007-2010
[Committee on Institutional Cooperation \(CIC\) Academic Leadership Program](#), 2009-10

HONORS AND AWARDS

1998	National Science Foundation Faculty Early Career Development (CAREER) Award
1999-2000	National Center for Supercomputing Applications (NCSA) Faculty Fellow
2000	Army Young Investigator Award
2000	Presidential Early Career Award for Scientists & Engineers (PECASE)
2001-2002	Center for Advanced Study Fellow
2001-2010	Arthur and Virginia Nauman Faculty Scholar
2003	Fellow, Japan Society for the Promotion of Science Invitation Fellowship Program
2003	American Society of Civil Engineers Walter L. Huber Civil Engineering Research Prize
2005	ASCE Environmental and Water Resources Institute Outstanding Achievement Award
2006	Xerox Award for Faculty Research
2008-2011	University Scholar

RESEARCH INTERESTS

Coupling machine learning with heterogeneous sensor data and advanced information technology to: (1) improve understanding of coupled human and natural systems, and (2) identify innovative and cost-effective management solutions for addressing complex challenges such as sustainability, hypoxia, combined sewer overflows, watershed best management practices, and flooding.

PROFESSIONAL EXPERIENCE

2006-present	Professor , Department of Civil and Environmental Engineering, University of Illinois Urbana-Champaign
1999-present	Faculty Affiliate , National Center for Supercomputing Applications, University of Illinois Urbana-Champaign
2010-present	President , Joyful U, Inc.
2008-2011	Associate Provost Fellow , Office of the Provost, University of Illinois Urbana-Champaign
2005-2007	President , Hazard Management Systems, Inc.
2002-2006	Associate Professor , Department of Civil and Environmental Engineering, University of Illinois Urbana-Champaign
1996-2002	Assistant Professor , Department of Civil and Environmental Engineering, University of Illinois Urbana-Champaign

- 1988-1990 **Environmental Policy Analyst and Work Assignment Manager**, Wade Miller Associates, Arlington, VA
- 1986-1988 **Environmental Policy Analyst**, ICF Incorporated, Fairfax, VA

MAJOR LEADERSHIP ACTIVITIES

- *Department of Civil and Environmental Engineering (CEE):*
 - Founding Co-Coordinator, Sustainable and Resilient Infrastructure Systems Program (2011-present): Creating governance structure to serve as a model for cross-disciplinary programs, new MS and PhD programs, and new courses integrating sustainability and resilience into CEE planning, design, and management.
 - Chair, Global and Multidisciplinary Committee (2010): Created multidisciplinary and global learning outcomes, new multidisciplinary and global faculty awards and fellows, a new program in Sustainable and Resilient Infrastructure Systems, a new primary specialty in Sustainable and Resilient Infrastructure Systems, and three new secondary specialties in Sustainability, CEE in a Global Context, and Custom Multidisciplinary.
- *Campus:*
 - Associate Provost Fellow (2008-11): Led the creation of the University of Illinois Urbana-Champaign Sustainability Initiative vision, implementation plan, and curriculum development program (<http://sustainability.illinois.edu>), 2008-11. Currently leading the development of experiential learning sites to integrate research, education, and engagement in addressing real-world sustainability challenges using advanced technology, 2010-12.
- *National:*
 - Principal Investigator (PI) and co-PI of the National Science Foundation (NSF)-funded WATERS Network Project Office (<http://watersnet.org>), 2005-10. National science plan evaluated by the National Research Council contributed to creation of a new \$16 million/year NSF program on Water Sustainability and Climate.
 - American Society of Civil Engineers:
 - Founding Chair, Task Committee on Performance-Based Sustainable Design of Water Resources Infrastructure (proposed, 2011)
 - Secretary, Environmental Sensing and Cyber-infrastructure: Technologies and Applications (2011-present). Also control group member, 2010-11.
 - Chair, Environmental and Water Resource Systems Committee (2005-6). Also secretary (2003-4), Vice-Chair (2004-5), Past-Chair (2006-7).
 - Founding Chair, Task Committee on Long-Term Groundwater Monitoring (2000-2003). Awarded EWRI Outstanding Achievement Award.
 - Control Group Member, Evolutionary Computation Task Committee (2003-6)
 - Associate Editor, Water Resources Research (2002-4)

BOOKS AND BOOK CHAPTERS

“Genetic Algorithms,” in *Hydroinformatics: Data Integrative Approaches in Computation, Analysis, and Modeling*, ed. Praveen Kumar, CRC Press, ISBN 0849328942, 2005.

The Joyful Professor: How to Shift From Surviving to Thriving in the Faculty Life, Henschel Haus Publishing Inc., 2010.

JOURNAL PAPERS

- Hill, David J., Yong Liu, Luigi Marini, Rob Kooper, Alejandro Rodriguez, Barbara S. Minsker, James Myers, Terry McLaren, "Using A Virtual Sensor System to Create Real-Time Customized Environmental Data Products," in press, *Environmental Modelling and Software*.
- Babbar-Sebens, Meghna, and B. S. Minsker, "Interactive Genetic Algorithm With Mixed Initiative Interaction For Multi-Criteria Ground Water Monitoring Design," in press, *Applied Soft Computing*.
- Gopalakrishnan, G., B. Minsker, and A. Valocchi, "Monitoring Network Design for Phytoremediation Systems Using Primary and Secondary Data Sources," *Environmental Science and Technology*, 45 (11), 4846–4853, 2011.
- Yan, S., and B. Minsker, "Applying Dynamic Surrogate Models in Noisy Genetic Algorithms to Optimize Groundwater Remediation Designs," *Journal of Water Resources Planning and Management*, 137(3), DOI: 10.1061/(ASCE)WR.1943-5452.0000106, 2011.
- Coopersmith, E. J., B. Minsker, and P. Montagna, "Understanding and Forecasting Hypoxia Using Machine Learning Algorithms," *Journal of Hydroinformatics*, 13(1), 64-80, doi:10.2166/hydro.2010.015, 2011.
- Singh, A., D. D. Walker, B. S. Minsker, and A. J. Valocchi, "Incorporating Subjective and Stochastic Uncertainty in an Interactive Multi-Objective Groundwater Calibration Framework," *Stochastic Environmental Research and Risk Assessment*, 24(6), 881-898, 2010.
- Babbar-Sebens, M., and B. S. Minsker, "Case-Based Micro Interactive Genetic Algorithm (CBMIGA) for Interactive Learning: Methodology and Application to Groundwater Monitoring Design," *Environmental Modelling & Software*, 25 1176e1187, doi:10.1016/j.envsoft.2010.03.027, 2010
- Hill, D. J., and B. S. Minsker, "Anomaly detection in streaming environmental sensor data: A data-driven modeling approach," *Environmental Modelling & Software*, doi:10.1016/j.envsoft.2009.08.010, 2009.
- Hill, D. J., B. S. Minsker, and E. Amir, "Real-Time Bayesian Anomaly Detection in Streaming Environmental Data," *Water Resources Research*, 45, W00D28, doi:10.1029/2008WR006956, 2009.
- Singh, A., B. S. Minsker, and P. Bajcsy, "Image-Based Machine Learning for Reduction of User-Fatigue in an Interactive Model Calibration System," *Journal of Computing in Civil Engineering*, [http://dx.doi.org/10.1061/\(ASCE\)CP.1943-5487.0000026](http://dx.doi.org/10.1061/(ASCE)CP.1943-5487.0000026), 2009.
- Demissie, Yonas K., Albert J. Valocchi, Barbara S. Minsker, Barbara A. Bailey, Integrating a calibrated groundwater flow model with error-correcting data-driven models to improve predictions, *Journal of Hydrology*, 364(3-4), 257-271, ISSN 0022-1694, DOI: 10.1016/j.jhydrol.2008.11.007, 2009.
- Babbar-Sebens, M., and B. S. Minsker, "Standard Interactive Genetic Algorithm - A Comprehensive Optimization Framework for Groundwater Monitoring Design," *J. of Water Resources Planning and Management*, 134(6), 2008.
- Singh, A., B. S. Minsker, A. J. Valocchi, "An Interactive Multi-Objective Optimization Framework for Groundwater Inverse Modeling," *Advances in Water Resources*, 31(10), 1269-1283, 2008.
- Singh, A., and B. S. Minsker, "Uncertainty-Based Multiobjective Optimization of Groundwater Remediation Design," *Water Resources Research*, 44, W02404, doi:10.1029/2005WR004436, 2008.
- Montgomery, J. Haas, C., Minsker, B. Schnoor, J., "The WATERS Network: Transforming our Scientific Understanding of the Nation's Waters," *Water Env. Res.*, 79(4), 339-340, 2007.
- Montgomery, J., T. Harmon, W. Kaiser, A. Sanderson, C. Haas, R. Hooper, B. Minsker, J. Schnoor., N. Clesceri, W. Graham, P. Brezonik, "The WATERS Network: An Integrated Environmental Observatory Network for Water Research," *Environmental Science and Technology*, 6642-6647, 2007.
- Sinha, E., and B. Minsker, "Multiscale island injection genetic algorithms for groundwater remediation," *Advances in Water Resources*, 30(9), 1933-1942, 2007.
- Hill, D., B. Minsker, A. Valocchi, V. Babovic, and M. Keijzer, "Upscaling Models of Solute Transport in Porous Media through Genetic Programming," *Journal of Hydroinformatics*, 9(4), 251-266, 2007.
- Farrell, D. M., B. S. Minsker, D. Tchong, D. Sears Smith, J. Bohn, D. Beckman, "Data Mining To Improve Management And Reduce Costs Of Environmental Remediation," *J. of Hydroinformatics*, 9(2),

- doi:10.2166/hydro.2007.004, 107–121, 2007.
- Gopalakrishnan, G., M. C. Negri, B. S. Minsker, C. J. Werth, Monitoring subsurface contamination using tree branches, *Ground Water Monitoring and Remediation*, 27(1), 1-10, 2007.
- Characklis, G. W., P. M. Reed, and B. S. Minsker, "The Role of the Systems Community in the National Science Foundation's Environmental Observatories," *Journal of Water Resources Planning and Management*, 133(1), 1-3, 2007.
- Espinoza, F., and B. S. Minsker, "Effects of local search algorithms on hybrid genetic algorithm performance for groundwater remediation design," *Journal of Computing in Civil Engineering*, 20(6), 420-430, 2006.
- Becker, D., Minsker, B., Greenwald, R., Zhang, Y., Harre, K., Yager, K., Zheng, C., and Peralta, R., "Reducing Long-Term Remedial Costs by Transport Modeling Optimization," *Ground Water*, 44(6), 864-875, 2006.
- Espinoza, F., and B. S. Minsker, "Development of the enhanced self-adaptive hybrid genetic algorithm (e-SAHGA)," *Water Resources Research*, 42, W08501, doi:10.1029/2005WR004221, 2006.
- Dawsey, W., B. S. Minsker, and V. L. VanBlaricum, "Bayesian belief networks to integrate monitoring evidence of water distribution system contamination," *Journal of Water Resources Planning and Management*, 132(4), 234-241, 2006.
- Babbar, M., and B. S. Minsker, "Groundwater Remediation Design Using Multiscale Genetic Algorithms," *J. of Water Resources Planning and Management*, 132(5), 341-350, 2006.
- Yan, S., and B. S. Minsker, "Optimal Groundwater Remediation Design Using An Adaptive Neural Network Genetic Algorithm," *Water Resources Research*, 42, W05407, doi:10.1029/2005WR004303, 2006.
- Ren, X., and B. S. Minsker, "Which Groundwater Remediation Objective is Better, a Realistic One or a Simple One?," *J. of Water Resources Planning and Management*, 131(5), 351-361, 2005.
- Michael, W.J., B. S. Minsker, D. Tchong, and A. J. Valocchi, "Integrating Data Sources to Improve Hydraulic Head Predictions: A Hierarchical Machine Learning Approach," *Water Resources Research*, 41(3), W03020 10.1029/2003WR002802, 2005.
- Espinoza, F., B. S. Minsker, and D. E. Goldberg, "Adaptive hybrid genetic algorithm for groundwater remediation design," *J. of Water Resources Planning and Management*, 131(1), 14-24, 2005.
- Minsker, B., "Long-Term Groundwater Monitoring Optimization: Improving Performance and Reducing Costs Associated with Natural Attenuation and Other In Situ Treatments," *Bioremediation Journal*, 8(no 3-4), 87-88, 2004.
- Reed, P., T.R. Ellsworth, and B.S. Minsker, "Spatial Interpolation Methods for Nonstationary Plume Data." *Ground Water*, 42(2), 190-202, 2004.
- Reed, P. and B. S. Minsker, "Striking the Balance: Long Term Groundwater Monitoring Design for Multiple, Conflicting Objectives." *Journal of Water Resources and Planning Management*, 130(2), 140-149, 2004.
- Liu, Y., and B. S. Minsker, "Full Multiscale Approach For Optimal Control Of In-Situ Bioremediation," *J. of Water Resources Planning and Management*, 130(1), 26-32, 2004.
- Reed, P., B. S. Minsker, and D. E. Goldberg, "Simplifying Multiobjective Optimization: An Automated Design Methodology for the Nondominated Sorted Genetic Algorithm-II." *Water Resources Research*, 39(7), 1196, doi:10.1029/2002WR001483, 2003.
- Gopalakrishnan, G., B. S. Minsker, and D. Goldberg, Optimal sampling in a noisy genetic algorithm for risk-based remediation design, *Journal of Hydroinformatics*, 5(1), 11-25, 2003.
- Liu, Y., and B. S. Minsker, Efficient multiscale methods for optimal in situ bioremediation design, *J. of Water Resources Planning and Management*, 128(3), 227-236, 2002.
- Liu, Y., B. S. Minsker, and F. Saied, A one-way multiscale method for optimal in situ bioremediation design, *J. of Water Resources Planning and Management*, 127(2), 130-139, 2001.
- Reed, P., B. Minsker, and D. Goldberg, A multiobjective approach to cost effective long-term groundwater monitoring using an elitist nondominated sorted genetic algorithm with historical data, Invited paper, *Journal of Hydroinformatics*, 3, 71-89, 2001.

- Reed, P., B. Minsker, and A. J. Valocchi, Cost effective long-term monitoring design using a genetic algorithm and global mass interpolation, *Water Resources Research*, 36(12), 3731-3741, 2000.
- Reed, P., B. S. Minsker, and D. E. Goldberg, Designing a competent simple genetic algorithm for search and optimization, *Water Resources Research*, 36(12), 3757-3761, 2000.
- Smalley, J. B., B. S. Minsker, and D. E. Goldberg, Risk-based in situ bioremediation design using a noisy genetic algorithm, *Water Resources Research*, 36(20), 3043-3052, 2000.
- Kosegi, J. M., B. S. Minsker, and D. E. Dougherty, A feasibility study of thermal in situ bioremediation of dense nonaqueous phase liquids, *Journal of Environmental Engineering*, 126(7), 601-610, 2000.
- Minsker, B. S., and C. A. Shoemaker, Quantifying the effects of uncertainty on optimal groundwater bioremediation policies, *Water Resources Research*, 124(12), 3615-3625, 1998.
- Minsker, B. S., and C. A. Shoemaker, Dynamic optimal control of in situ bioremediation, *Journal of Water Resources Planning and Management*, 124(3), 149-161, 1998.
- Minsker, B.S., and C.A. Shoemaker, Computational issues associated with optimal design of in situ bioremediation, *Journal of Water Resources Planning and Management*, 124(1), 39-46, 1998.
- Minsker, B.S., and C.A. Shoemaker, "Differentiating a finite element biodegradation model for optimal control," *Water Resources Research*, 32(1), 187-192, 1996.

RECENT CONFERENCE PAPERS

(full list & downloads available at <http://emsa.ncsa.illinois.edu/publications.shtml>)

- Chinta, I., and B. Minsker, "Forecasting Hypoxia in Corpus Christi Bay, Texas, by Model Fusion," in *Proceedings of the World Environmental & Water Resources Congress 2011: Bearing Knowledge for Sustainability*, May 22-26, 2011, Palm Springs, CA.
- Jha, S., B. Bailey, B. Minsker, and Y. Liu, "A Geospatial Analytics Approach to Updating Flood Information," *Proceedings of the World Environmental & Water Resources Congress 2011: Bearing Knowledge for Sustainability*, May 22-26, 2011, Palm Springs, CA.
- Payne, B., and B. Minsker, "Improving the Sustainability of Highly-modified Watersheds: A Modeling Approach," *Proceedings of the World Environmental & Water Resources Congress 2011: Bearing Knowledge for Sustainability*, May 22-26, 2011, Palm Springs, CA.
- Zimmer, A., B. Minsker, A. Schmidt, and A. Ostfeld, "Benefits of Meta-model Validation for Real-time Sewer System Decision Support," *Proceedings of the World Environmental & Water Resources Congress 2011: Bearing Knowledge for Sustainability*, May 22-26, 2011, Palm Springs, CA.
- Liu, Y., D. Hill, J. Myers and B. Minsker, "Integrated Real Time Geospatial Sensor Web and Visual Analytics for Environmental Decision Support," in *Proceedings of the 2010 World Environmental & Water Resources Congress*, May 16-20, 2010, Providence, RI.
- Zimmer, Andrea, Barbara Minsker, Arthur Schmidt, and Avi Ostfeld, "Evolutionary Algorithm Memory Enhancement for Dynamic Hydraulics," in *Proceedings of the 2010 World Environmental & Water Resources Congress*, May 16-20, 2010, Providence, RI.
- Chinta, I., and B. Minsker, "Forecasting Hypoxia in Corpus Christi Bay, Texas, by Model Fusion, in *Proceedings of the 2010 World Environmental & Water Resources Congress*, May 16-20, 2010, Providence, RI.
- Hill, D.J., Minsker, B.S., and Schmidt, A. (2009). [Predicting CSOs for Real Time Decision Support](#). In *Proceedings of the 2009 World Environmental & Water Resources Congress*, May 17-21, 2010, Kansas City, MO.
- Dawsey, W. J., B. S. Minsker, and E. Amir, "Real Time Assessment of Drinking Water Systems Using a Dynamic Bayesian Network. In *Proceedings of the 2009 World Environmental & Water Resources Congress*, May 17-21, 2009, Kansas City, MO.
- Zimmer, A., D. Hill, B. Minsker, A. Ostfeld, and A. Schmidt, "Evolutionary Optimization of Combined Sewer Overflow." In *Proceedings of the 2009 World Environmental & Water Resources Congress*, May 17-21, 2009, Kansas City, MO.
- Hill, D, Minsker, B, Amir, E, and Choi, J (2009). "Real-time anomaly detection in precipitation sensors." In:

- Proceedings of the 8th International Conference on Hydroinformatics, Concepción, Chile, January 12–16, 2009.
- Minsker, BS and Coopersmith, E (2009). “Harnessing the power of sensor and cyberinfrastructure towards environmental sustainability: The WATERS Network vision and testbedding research.” In: Proceedings of the 8th International Conference on Hydroinformatics, Concepción, Chile, January 12–16, 2009. HIC 2009.
- Liu, Yong, X. Wu, D. Hill, A. Rodrigues, L. Marini, R. Kooper, J. Myers, B. Minsker (2009). "A New Framework for On-Demand Virtualization, Repurposing and Fusion of Heterogeneous Sensors," Sensor Web Enablement workshop 2009, The 2009 International Symposium on Collaborative Technologies and Systems, May 18-22, 2009, Baltimore, MD
- Liu, Y., Hill, D.J., Abdelzaher, T., Heo, J., Choi, J., Minsker, B., & Fazio, D. (2008). [Virtual sensor-powered spatiotemporal aggregation and transformation: A case study analyzing near-real-time NEXRAD and precipitation gauge data in a digital watershed](#). In *Proceedings of the Environmental Information Management Conference 2008 (EIM-2008)*, Albuquerque, NM, September 10–11, 2008.
- Liu, Y., Hill, D., Rodriguez, A., Marini, L., Kooper, R., Futrelle, J., Minsker, B., & Myers, J. (2008). [Near-real time spatiotemporal precipitation virtual sensor creation based on NEXRAD Level II Data in a semantically-enhanced digital watershed](#). In *Proceedings of the 16th ACM SIGSPATIAL International Conference*, Irvine, CA, November 5–7, 2008.
- Liu, Yong, Luigi Marini, Rob Kooper, Alenjandro Rodriguez, David Hill, James Myers, Barbara Minsker. (2008). "Virtual Sensors in a Web 2.0 Virtual Watershed." The 4th IEEE International Conference on e-Science. Indianapolis, IN. December 7-12, 2008.
- Hill, DJ, Barbara, M, Liu, Y, and Myers, J (2008). "End-to-end cyberinfrastructure for real-time environmental decision support." In: Proceedings of the 4th IEEE International Conference on eScience, Indianapolis, IN, December 10–12, 2008.
- Demissie, Y., Valocchi, A., Minsker, B. & Bailey, B. "Bias-Corrected Groundwater Model Prediction Uncertainty Analysis." In: K. Kovar (Editor), ModelCARE2007 Calibration and Reliability in Groundwater Modeling: Credibility in Modeling, Copenhagen, Denmark. IAHS Publ. 320, 2008.

COURSES TAUGHT

CEE 201: Planning, Design, and Management of Civil Engineering Systems. Introduction to the formulation and solution of civil engineering systems problems. Major topics are engineering economics, mathematical modeling, and optimization. (Fall 1996, 1997, 1998, 2001, 2002, 2004, 2006, 2008; Spring 2012)

CEE 434: Environmental Systems Analysis I. Examination of principles of environmental engineering design: applications to mathematical methods, including single and multi-objective programming, to environmental systems; economic analysis, including benefit-cost; and policy and management strategies. (Fall 1999)

CEE 498 BSM: Environmental Risk Assessment and Management. Risk assessment methods are introduced and issues associated with managing risk are discussed. The course is taught in a case study format, focusing on a variety of environmental case studies such as air pollution, climate change, drinking water, hazardous waste storage, transport and disposal, and Superfund remediation. (Fall 2000, Spring 2003 online and in-person)

CEE 535: Environmental Systems Analysis II, Risk and Uncertainty in Environmental and Water Resources Decision Making. Exploration of the fundamental concepts of uncertainty, risk, and reliability as applied to environmental and water resources systems. (Spring 1997, 1999, 2001, 2011)

CEE 598 OS: Optimization Methods for Engineering Design. Optimization models have been shown to be useful tools for aiding engineering design in many fields. This course focuses on methods for applying nonlinear optimization to engineering design, with a practical, applications-oriented perspective. The course is intended to serve students from all areas of engineering and does not assume prior knowledge in any particular application area. Students complete a project applying one of the methods to a problem in their own field. (Spring 2000, 2002)

CEE 598 SUS: Sustainable Urban Systems. This course explores fundamental concepts of sustainability and resilience as applied to urban infrastructure systems, including the complex interactions among human, engineered, and natural systems. The course is taught from a project-based format; focusing on a CEE-related infrastructure issue. The first offering focuses on proposed stormwater ordinances for Champaign and Urbana, examining alternative policy and design options to reduce stormwater problems while improving (or at least not worsening) other sustainability issues. (Fall 2011)

RESEARCH FUNDING

Years (Inclusive)	Brief Title or Description	Source of Funds	Total Funding	# of PI's & Lead PI if not Minsker
1997-1998	Computationally-Efficient Management Tools for Groundwater Remediation Design	University of Illinois Campus Research Board	\$13,973	1
1998-2004	Research and Educational Advances in Optimal Groundwater Remediation Design	National Science Foundation CAREER Program	\$246,868	1
1998-2000	Cost-Effective Monitoring Design for Intrinsic Bioremediation	Illinois Water Resources Center and the United States Geological Survey	\$52,152	2
1998-1999	Survey of Models Relevant to Sediment Contamination in Water Bodies	E.I. DuPont de Nemours and Company	\$15,000	5
1999-2002	Cost-Effective Risk Based Corrective Action Design for Contaminated Groundwater	National Science Foundation	\$212,977	1
1999-2000	Efficient Parallelization of a Risk Management Model on the NT Supercluster	National Center for Supercomputing Applications UIUC Faculty Fellows Program	\$25,805	1
2000-2001	Cost-Effective Risk Management of Groundwater Contamination	U.S. Army Research Office Young Investigator Program	\$50,000	1
2000-2003	Cost-Effective Risk Management of Groundwater Contamination	State Matching Funds Program	\$28,302	1
2000-2005	Cost-Effect Risk Management of Groundwater Contamination	Presidential Early Career Award for Scientists and Engineers (PECASE)	\$500,000	1
2001-2002	Knowledge Integration for Long-Term Monitoring, Operations, and Stewardship	Argonne National Laboratory	\$27,639	2

Revised September 1, 2011

2002-2007	A New Framework for Adaptive Sampling and Analysis During Long-Term Monitoring and Remedial Action Management	U. S. Department of Energy	\$540,000	3
2002-2003	Upscaling of Flows in Heterogeneous Porous Media Using Machine Learning	University of Illinois Research Board	\$8,597	3
2003-2004	Technology Transfer of Evolutionary Multiobjective Optimization Software, with Demonstration for Optimizing Long-Term Groundwater Monitoring	Office of Naval Research through Technology, Research, Education, and Commercialization Center	\$60,334	1
2003	Gift	BP Group Environmental Management Company	\$2,500	1
2004-2005	A Collaborative Framework for Integrated Hazard Management	Office of Naval Research through Technology, Research, Education, and Commercialization Center	\$173,802	1
2004-2007	Cyberinfrastructure to Support Collaborative Knowledge Synthesis, with Environmental Test Beds	National Center for Supercomputing Applications	\$555,171	1
2004-2006	Cyberinfrastructure and Management System Development for a National CLEANER Network	National Science Foundation	\$89,958	3, Wayland Eheart
2005-2006	A Collaborative Framework for Integrated Hazard Management	Office of Naval Research through Technology, Research, Education, and Commercialization Center	\$135,643	1
2005-2010	Coalition for Creation of CLEANER/WATERS Network Project Office	National Science Foundation	\$3,000,000	5
2005-2006	Computational Cluster for On-Demand and Interactive Environmental and Water Resources Engineering Computing	University of Illinois Campus Research Board	\$25,000	5
2005-2010	An Environmental Information System for Hypoxia in Corpus Christi Bay: A WATERS Network Testbed	National Science Foundation	\$400,000	3
2006-2007	Collaboration Support for Observation and Model-based Decisions	Office of Naval Research through Technology, Research, Education, and Commercialization Center	\$122,285	1
2008-2012	Virtual Observatory for Sustainability of Intensively Managed Environmental Systems	Institute for Advanced Computing Applications and Technologies	\$734,546	3
2008-2010	Science Plan of the WATer and Environmental Research	National Science Foundation	\$750,000	5, Jeff Dozier,

	Systems Network (WATERS Network)			UCSB
2010-11	Demonstrating the Feasibility of Agronomic Decision Support Using a Field Readiness Virtual Sensor	John Deere Inc.	\$120,010	3
2010-11	NSF Workshop on Creating Scientific Software Innovation Institutes for Sustained Cyberinfrastructure Achievement and Excellence	National Science Foundation	\$50,000	2, Stanley Ahalt, UNC
2010-11	Project Catfish	ADM Inc.	\$374,911	3
2010-12	Digital Urban Informatics: Computational Innovation for Sustainable and Optimal Urban Stormwater Management	Microsoft Research, Inc.	\$400,000	2, Yong Liu, NCSA
2011-12	EAGER: Launch of a Water Science Software Institute (WSSI)	National Science Foundation	\$300,000	4, Stanley Ahalt, UNC

STUDENTS

PhD Thesis Students	Year Granted/ Expected	Thesis Title	Source of Support	Current Employment
Erhu Du	2015		Fellowship	
Tristan Wietsma	2014	Real-Time Adaptive Observation	Institute for Advanced Computation Applications and Technologies (IACAT)	Graduate research assistant
Evan Coopersmith	2013	Virtual Sensors for Real-Time Agricultural Decision Making	John Deere Inc.	Graduate research assistant
Xiaowen Wu	2012	Data Integration Approaches for Real-Time Environmental Observation	Institute for Advanced Computation Applications and Technologies (IACAT)	On leave
Andrea Zimmer	2012	Adaptive Real-time Management of Combined Sewer Overflows	Fellowships and Metropolitan Water Reclamation District of Greater Chicago	Graduate research assistant, IBM Fellow

PhD Thesis Students	Year Granted/ Expected	Thesis Title	Source of Support	Current Employment
Gayathri Gopalakrishnan	2007	Subsurface Monitoring With Trees	Department of Energy	Research Scientist, Argonne National Laboratory
Abhishek Singh	2007	Inverse Groundwater Modeling Using Interactive Evolutionary Optimization	Department of Energy	INTERA Inc.
David Hill	2007	Machine Learning for Environmental Monitoring and Modeling	National Science Foundation, Office of Naval Research	Assistant Professor, Rutgers University
Meghna Babbar	2006	Interactive Genetic Algorithm: A Human-Computer Framework for Improving Groundwater Monitoring Designs	Department of Energy	Assistant Professor, Indiana University-Purdue University Indianapolis
Shenquan Yan	2006	An Adaptive Meta-Model Approach to Optimizing Groundwater Remediation Design with Genetic Algorithms	Army Research Office	Developer, Microsoft Inc.
Felipe Espinoza	2003	A Self-Adaptive Hybrid Genetic Algorithm For Optimal Groundwater Remediation Design	National Science Foundation, Army Research Office	Completed National Research Council post-doctoral fellow, US EPA, now consulting in Chile
Patrick Reed	2002	Striking the Balance: Long-Term Groundwater Monitoring Design for Multiple Conflicting Objectives	US EPA STAR fellowship	Associate Professor, Pennsylvania State University
Yong Liu	2001	Multiscale Approach to Optimal Control of In-Situ Bioremediation of Groundwater	National Science Foundation	Senior Research Scientist, National Center for Supercomputing Applications

MS Thesis Students	Year Granted/ Expected	Thesis Title	Source of Support	Current Employment
Ankit Rai	2012		National Science Foundation	Graduate research assistant
Samuel Rivera	2012		Fellowship	
Wesley Dawsey	2011	Bayesian Belief Networks for Water Security	Office of Naval Research, EPA Midwestern Technical Assistance Center, Illinois State Water Survey	Consultant
Indu Chinta	2010	Model Fusion for Improving Hypoxia Forecasts: A Study of Boosting and Historical Scenario Modeling	National Science Foundation	Employer in India
Brian Payne	2011	Assessing and Improving Watershed Sustainability: A Model-Based Approach	National Science Foundation, University of Illinois	Consultant
Andrew Collier	2008	Real-Time Environmental Visualization for Diverse User Communities	Office of Naval Research	Consultant
Evan Coopersmith	2008	Statistical and Machine Learning Approaches to Understanding Hypoxia in Corpus Christi Bay	National Science Foundation	Graduate research assistant
Aniruddha Bhagwat	2005	Preliminary Cyberinfrastructure Needs Assessment and Technology Review for CLEANER	National Science Foundation	Consultant, Corollo Engineers
Matthew Zavislak	2005	Constraint Handling in Groundwater Remediation Design with Genetic Algorithms	Army Research Office	Software engineer, Hazard Management Systems Inc.
Marcia Hayes	2005	Evaluation of Advanced Genetic Algorithms Applied to Groundwater Remediation Design	Army Research Office	Visiting Program Manager, University of Illinois Urbana-Champaign

MS Thesis Students	Year Granted/ Expected	Thesis Title	Source of Support	Current Employment
Dara Farrell	2004	Data Mining to Improve Management and Reduce Costs Associated with Environmental Remediation	Fulbright Fellowship	Graduate student, University of Washington
Eva Sinha	2004	Multiscale Island Injection Genetic Algorithms for Groundwater Remediation	Army Research Office	Consultant, Black and Veatch
Xiaolin Ren	2003	Which Groundwater Remediation Objective Is Better, A Realistic One Or A Simple One?	Army Research Office	Unknown
Abhishek Singh	2003	Uncertainty Based Multi-Objective Optimization Of Groundwater Remediation Design	Army Research Office	INTERA, Inc.
Rachel Arst	2002	Which are Better, Probabilistic Model-Building Genetic Algorithms (PMBGAs) or Simple Genetic Algorithms (SGAs)? A Comparison for an Optimal Groundwater Remediation Design Problem	Army Research Office	Unknown
Meghna Babbar	2002	Multiscale Parallel Genetic Algorithms for Optimal Groundwater Remediation Design	National Science Foundation	Assistant Professor, Indiana University-Purdue University Indianapolis
William Michael	2002	Integrating Data Sources to Improve Long-Term Monitoring and Management: A Hierarchical Machine Learning Approach	Fellowships and Argonne National Lab	Caterpillar Inc.
Gayathri Gopalakrishnan	2001	Optimal Sampling in a Noisy Genetic Algorithm for Risk-Based Remediation Design	National Science Foundation	Post-doctoral research associate, Argonne National Laboratory
Patrick Reed (co-advisor Albert Valocchi)	1999	Cost Effective Long-Term Groundwater Monitoring Design Using a Genetic Algorithm and Global Mass Interpolation	US EPA STAR Fellowship	Associate Professor, Pennsylvania State University

MS Thesis Students	Year Granted/ Expected	Thesis Title	Source of Support	Current Employment
J. Bryan Smalley	1998	Risk-Based In Situ Bioremediation Design Using a Noisy Genetic Algorithm	UIUC Research Board	Unknown
Jeremy Kosegi	1998	A Feasibility Study of Thermal In Situ Bioremediation of Dense Nonaqueous Phase Liquids	UIUC Research Board	Consultant, Roux Associates