

## L. Shawn Matott – Ph.D.

Computational Scientist, University at Buffalo,  
Center for Computational Research,  
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### EDUCATION

2006

**Ph. D. in Civil, Structural and Environmental Engineering**

Dissertation Title: *Application of Heuristic Optimization to Groundwater Management*  
University at Buffalo, Buffalo, NY (advisor: Alan J. Rabideau)

1997

**B.Sci. in Computer Engineering** (Mathematics Concentration)

Clarkson University, Potsdam, NY

### RESEARCH INTERESTS

Numerical modeling of environmental and water resources systems, with an emphasis on:

- model assessment (e.g. uncertainty analysis, sensitivity analysis, parameter estimation, etc.)
- simulation-optimization procedures and parallel computing
- groundwater remediation and containment technologies
- nutrient cycling and loading, sorption processes, chlorinated solvents, pharmaceuticals
- large-scale modeling (i.e. regional or watershed scale) via geographic information systems (GIS)

### PROFESSIONAL EXPERIENCE

2011-present

**Computational Scientist, University at Buffalo** (Buffalo, NY)

Primary duties are to provide outreach and maintenance of the high-performance computing (HPC) resources at the University at Buffalo's Center for Computational Research (UB CCR). Related activities include: updating 3<sup>rd</sup> party HPC software stacks and related libraries and scientific software; porting user-supplied software for use on UB CCR resources; and recruitment and training of new UB CCR users. Research activities include: numerical modeling of groundwater flow and contaminant transport; investigation of non-linear sorption processes in the sub-surface environment; and development of parallel algorithms for simulation-based optimization of groundwater remediation systems.

2009-2011

**Assistant Professor, University of Waterloo** (Waterloo, Ontario, Canada)

Duties included: teaching undergraduate engineering classes; supervising research assistants; pursuing research grants; publishing in peer-reviewed journals; departmental service tasks; and performing research and software development on behalf of Canada's hydropower, pharmaceutical and petroleum industries. Research activities included developing models and modeling tools to support the optimal design, uncertainty analysis and risk assessment of various engineered systems, including hydropower reservoirs, wastewater treatment plants, subsurface barriers, pump-and-treat well-fields, and carbon sequestration.

2006-2008

**Post-doctoral Researcher, U.S. Environmental Protection Agency** (Athens, GA)

Performed multidisciplinary research and development at the U.S. Environmental Protection Agency, Ecosystems Research Division (ERD), in Athens, Georgia. Research activities included: (1) Uncertainty Analysis (UA), Sensitivity Analysis (SA) and Parameter Estimation (PE) for Environmental Models and Multimedia Ecological Exposure Research - Primary duties: implementing UA/SA/PE techniques within an integrated environmental modeling software framework; and studying effects of land use change on ecosystems services. (2) Parallel Cluster Development - A multifaceted Linux-based solution to ERD supercomputing needs; involved integration with existing Windows-based node management software (i.e. Symantec Ghost) via PXE services; also involved deployment of two job scheduling and management solutions: a Java-based solution developed in-house and the industry-standard PBS/MPI solution.

## PROFESSIONAL EXPERIENCE (continued)

2003-2006

### **Research Assistant, University at Buffalo** (Buffalo, NY)

Research assistant duties included: (1) Grant Support - A significant contribution to NSF grant #CBET/BES-0202077, entitled "A regional scale high-performance reactive transport model"; (2) Grant Proposal Development - Assisted Dr. Alan Rabideau with the development of several grant proposals involving large-scale modeling of subsurface reactive transport and associated model evaluation issues; (3) Grid-based Groundwater Model Calibration - Extended parameter estimation software to execute in parallel on a grid of geographically distributed heterogeneous computing nodes; the work involved porting MPI-parallel calibration code to a variety of target operating systems and developing a web-based interface using PHP and Java-scripting; (4) Field-Work in Northern Wisconsin - Visited Wisconsin's Northern Highland Lakes Region (NHLR) and collected water samples and lake elevations for the characterization and calibration of a regional NHLR groundwater model. Data was collected using a combination of GIS software and a real-time kinematic global positioning system (RTK-GPS).

February 2005

### **Invited Research Consultant, USGS National Research Program** (Boulder, CO)

Consulted with USGS researchers (Dr.'s Mary Hill and Eileen Poeter, among others) to prepare a research proposal ("Uncertainty analysis for computationally expensive hydrologic models").

Fall 2003 and Spring 2004

### **Coordinator, IGERT Colloquium and Speaker Series** (Buffalo, NY)

Responsible for developing and promoting the weekly colloquium speaker schedule.

Summer 2002

### **Intern, New York State Center for Integrated Waste Management** (Buffalo, NY)

A summer internship; integrated the ERRIN (environmental remediation and restoration information network) database and the ArcGIS software.

1997-2001

### **Senior Software Engineer, Clearwire Technologies** (Buffalo, NY)

Clearwire developed wireless Internet access products operating in the unlicensed 2.4 GHz band. The work provided valuable experience in software design, development, and documentation.

## PEER-REVIEWED PAPERS (22) (\* - undergraduate research assistant, \*\* - graduate research assistant)

Maier HR, Kapelan Z, Kasprzyk J, Kollat J, **Matott LS**, Cunha MC, Dandy GC, Gibbs MS, Keedwell E, Marchi A, Ostfeld A, Savic D, Solomatine D, Vrugt JA, Zecchin AC, Minsker BS, Barbour EJ, Kuczera G, Pasha F. 2014. Evolutionary Algorithms and Other Metaheuristics in Water Resources: Current Status, Research Challenges and Future Directions. *Environmental Modelling & Software*, vol. 62, no. 12, pp. 271-299.

\*\*Haghnegahdar A, Tolson B, Davison B, Seglenieks F, Klyszejko E, Soulis ED, Fortin V, **Matott LS**. 2014. Calibrating Environment Canada's MESH Modelling System over the Great Lakes Basin. *Atmosphere-Ocean*, doi: 10.1080/07055900.2014.939131.

\*\*Shafii M, Tolson B, **Matott LS**. 2014. Uncertainty-based Multi-criteria Calibration of Rainfall-runoff Models: A Comparative Study. *Stochastic Environmental Research and Risk Assessment*. doi: 10.1007/s00477-014-0855-x

**Matott LS**, \*Hymiak B, \*Reslink C, \*Baxter C, \*Aziz S. 2013. Telescoping Strategies for Improved Parameter Estimation of Environmental Simulation Models. *Computers and Geosciences*, vol 60, pg. 156-167, doi: 10.1016/j.cageo.2013.07.023

\*\*Hosseini NA, Parker WJ, **Matott LS**. 2012. Modelling Concentrations of Pharmaceuticals and Personal Care Products in a Canadian Watershed. *Canadian Water Resources Journal.*, vol. 37, no. 3, pg. 191-208, doi: 10.4296/cwrj2012-949

**Matott LS**, Tolson B, \*\*Asadzadeh M. 2012. A Benchmarking Framework for Simulation-Based Optimization of Environmental Models. *Environmental Modelling and Software*, vol. 35, pg. 19-30, doi: 10.1016/j.envsoft.2012.02.002.

PEER-REVIEWED PAPERS (continued)

- Matott LS.** 2012. Screening-Level Sensitivity Analysis for the Design of Pump-and-Treat Systems. *Ground Water Monitoring and Remediation*, vol. 32, no. 2, pg. 66-80.
- Matott LS, \*Leung K, \*Sim J.** 2011. Application of MatLab and Python Optimizers to Two Case-Studies Involving Groundwater Flow and Contaminant Transport Modeling. *Computers and Geosciences*, vol. 37, pg. 1894-1899, doi: 10.1016/j.cageo.2011.03.017.
- \*\*Razavi S, Tolson B, Matott LS, Thomson NR, MacLean A, Seglenieks F.** 2010. Reducing the Computational Cost of Automatic Calibration through Model Pre-Emption. *Water Resources Research*, vol. 46, W11523, doi:10.1029/2009WR008957.
- Matott LS, Bandilla K, Rabideau AJ.** 2009. Incorporating Nonlinear Isotherms into Robust Multilayer Sorptive Barrier Design. *Advances in Water Resources*, vol. 32, no. 11, pg. 1641-1651.
- Matott LS, Rabideau AJ.** 2009. NIGHTHAWK - a program for modeling saturated batch and column experiments incorporating equilibrium and kinetic biogeochemistry. *Computers & Geosciences*, vol. 36, no. 2, pg. 253-256, doi:10.1016/j.cageo.2009.05.004.
- Matott LS, Babendreier JE, Purucker ST.** 2009. Evaluating Integrated Environmental Models: A Survey of Concepts and Tools. *Water Resources Research*, vol. 45, W06421, doi: 10.1029/2008WR007301.
- Matott LS, Rabideau AJ.** 2008. Calibration of Complex Subsurface Reaction Models Using a Surrogate-model Approach. *Advances in Water Resources*, vol. 31, no. 12, pg. 1697-1707.
- Matott LS, Rabideau AJ.** 2008. ISOFIT – A Program for Fitting Sorption Isotherms to Experimental Data. *Environmental Modelling & Software*, vol. 23, no. 5, pg. 670-676.
- Matott LS, Rabideau AJ.** 2008. Calibration of Subsurface Batch and Reactive-Transport Models Involving Complex Biogeochemical Processes. *Advances in Water Resources*, vol. 31, no. 2, pg. 269-286, doi: 10.1016/j.advwatres.2007.08.005.
- Babendreier JE, Matott LS, Hameedi J, Dennis R, Knightes C, Mathur R, Mohamoud Y, Johnston JM, West C, Laniak G, Gaber N, Pascual P, Araujo R.** 2007. Managing Multimedia Pollution for a Multimedia World. *Environmental Management Magazine (AWMA)*, vol. 10, no. 12, pg. 6-11.
- Fredrick KC, Becker MW, Matott LS, Daw A, Bandilla K, Flewelling DM.** 2007. Development of a Numerical Ground Water Flow Model Using SRTM Elevations. *Hydrogeology Journal*, vol. 15, no. 1, pg. 171-181, doi: 10.1007/s10040-006-0115-3.
- Rabideau AJ, Craig JR, Silavisesrith W, Fredrick KC, Flewelling DM, Janković I, Becker MW, Bandilla K, Matott LS.** 2007. Analytic Element Modeling of Supra-Regional Groundwater Flow: Concepts and Tools for Automated Model Configuration. *Journal of Hydrologic Engineering*, vol. 12, no. 1, pg. 83-96, doi: 10.1061/(ASCE)1084-0699(2007)12:1(83).
- Matott LS, Bartelt-Hunt SL, Rabideau AJ, Fowler KR.** 2006. Application of Heuristic Optimization Techniques and Algorithm Tuning to Multi-layered Sorptive Barrier Design. *Environmental Science and Technology*, vol. 40, no. 20, pg. 6354 -6360.
- Matott LS, Rabideau AJ, Craig JR.** 2006. Pump-and-Treat Optimization Using Analytic Element Method Flow Models. *Advances in Water Resources*, vol. 29, no. 5, pg. 760-775.
- Bartelt-Hunt SL, Culver TB, Smith JA, Matott LS, Rabideau AJ.** 2006. Optimal Design of a Compacted Soil Liner Containing Sorptive Amendments. *Journal of Environmental Engineering*, vol. 132, no. 7, pg. 769-776.

### PEER-REVIEWED PAPERS (continued)

Rabideau AJ, **Matott LS**, Jankovic I, Craig JR, Becker MW. 2005. Influence of Numerical Precision on the Calibration of AEM-based Groundwater Flow Models. *Environmental Geology*, vol. 48, no. 1, pg. 57-67, doi:10.1007/s00254-005-1258-6.

### PAPERS SUBMITTED OR IN REVISION (3)

\*\*Shafii M, Tolson B, **Matott LS**. in 2<sup>nd</sup> review. Addressing Subjective Decision-Making Inherent in GLUE-based Multi-Criteria Rainfall-Runoff Model Calibration. Submitted to *Journal of Hydrology*

Babendreier J, **Matott LS**. in revision. Design Patterns for Simulation-based Evolutionary Optimization of Integrated Environmental Models. Submitted to *Environmental Modelling & Software*

Shafii M, Tolson B, **Matott LS**. in 2<sup>nd</sup> review. Improving the Efficiency of Monte Carlo Bayesian Calibration of Hydrologic Models via Model Pre-emption, Submitted to *Journal of Hydroinformatics*.

### BOOK CHAPTERS (1)

Purucker ST, Golden H, **Matott LS**, McGarvey D, Wolfe K. 2009. Free and Open Source GIS Tools: Role and Relevance in the Environmental Assessment Community. *Manual of Geographic Information Systems*, pg. 293-311, Madden M, ed., American Society of Photogrammetry and Remote Sensing (ASPRS).

### CONFERENCE PAPERS (1)

Princz D. **Matott LS**. 2010. Calibrating Environmental Models using ParaMESH. *Proceedings of the 2010 International Environmental Modelling and Software Society (iEMSs) Fifth Biennial Meeting*. July 5-8: Ottawa, Canada.

### CONFERENCE PRESENTATIONS (40)

**Matott LS**, Rabideau AJ, Allen-King RM. 2014. Incorporating Non-Linear Sorption into High Fidelity Subsurface Reactive Transport Models. *American Geophysical Union Fall Meeting*, Dec. 15-19, San Francisco, California.

Allen-King RM, Rabideau AJ, Merlo A, Estivill JAS, Barbarosa V, **Matott LS**. 2014. Nonlinear Chlorinated Solvent Sorption Impedes Remediation in Sedimentary Aquifers. *American Geophysical Union Fall Meeting*, Dec. 15-19, San Francisco, California.

**Matott LS**, Reslink C, Baxter C, Hymiak B, Aziz S, Levesque A, Innus M. 2013. High Performance Computing for Designing Groundwater Remediation Systems. *The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC13)*, Nov. 17-22, Denver, Colorado.

**Matott LS**, Reslink C, Baxter C, Hymiak B, Aziz S, Levesque A, Innus M. 2013. High Performance Computing for Designing Groundwater Remediation Systems. *IEEE Cluster 13 Conference*, Sept. 23-27, Indianapolis, Indiana.

Allen-King RM, Munger ZW, Carlone D, Kalinovich I, Salvado JA, Rabideau AJ, **Matott LS**, Singh A, Lambert D. 2013. Nonlinear chlorinated solvent sorption and its impact on remediation in surficial sedimentary aquifers. *Goldschmidt2013 Conference*, August 25-30, Florence, Italy.

**Matott LS**, Reslink C. 2013. Exploiting Expert Knowledge for Enhanced Simulation-based Optimization. *SIAM Conference on Computational Science & Engineering*, Feb. 25 – March 1, Boston, Massachusetts.

Aziz S, **Matott LS**. 2012. Quantifying the Influence of Search Algorithm Uncertainty on the Estimated Parameters of Environmental Models. *American Geophysical Union Fall Meeting*, Dec. 3-7, San Francisco, California.

Reslink C, **Matott LS**. 2012. Exploiting Expert Knowledge to Enhance Simulation-based Optimization of Environmental Remediation Systems. *American Geophysical Union Fall Meeting*, Dec. 3-7, San Francisco, California.

## CONFERENCE PRESENTATIONS (continued)

Baxter C, **Matott LS**. 2012. A Framework for Debugging Geoscience Projects in a High Performance Computing Environment. *American Geophysical Union Fall Meeting*, Dec. 3-7, San Francisco, California.

Hymiak B, **Matott LS**. 2012. Telescoping Strategies for Improved Simulation-based Optimization of Environmental Remediation Systems. *American Geophysical Union Fall Meeting*, Dec. 3-7, San Francisco, California.

**Matott LS**, Hymiak B, Reslink C, Baxter C, Aziz S. 2012. Engaging Undergraduate Math Majors in Geoscience Research using Interactive Simulations and Computer Art. *American Geophysical Union Fall Meeting*, Dec. 3-7, San Francisco, California.

Princz DG, **Matott LS**, Mekonnen MA. 2012. Unifying Modelling Components with the Scientific Workflow: An application of the CRANE Framework. *Canadian Meteorological and Oceanographic Society (CMOS) Congress 2012*, May 29 - June 1, Montreal, Canada.

Shafii M, Tolson BA, **Matott LS**. 2012. Multi-Objective Calibration and Uncertainty Analysis of Hydrologic Models; A Comparative Study between Formal and Informal Methods. *European Geophysical Union (EGU) General Assembly 2012*, April 22-27, Vienna, Austria.

**Matott LS**, Gray Genetha. 2011. The Influence of Pump-and-Treat Problem Formulation on the Performance of a Hybrid Global-Local Optimizer. *American Geophysical Union Fall 2011 Meeting*, Talk# H21H-05, Dec. 5-9: San Francisco, CA.

Haghnegahdar A, **Matott LS**, Tolson BA. 2011. Pre-emption-based Regional Sensitivity Analysis (PeRSA) to increase watershed model calibration efficiency. *American Geophysical Union Fall 2011 Meeting*, Talk# H21H-06, Dec. 5-9: San Francisco, CA.

Hosseini N, Parker W, **Matott LS**. 2011. Seasonal Prediction of Pharmaceuticals in a Canadian Watershed. *ASCE World Environmental & Water Resources Congress*, Talk# XIV-405: May 22-26: Palm Springs, California.

Sheffield P, **Matott LS**. 2011. Influence of Alternative Calibration Methods on Pump-and-Treat System Design. *SIAM Conference on Optimization*, Talk#MS4-01, May 16-19: Darmstadt, Germany.

Mahyar Shafii Hassanabadi MS, Tolson B, **Matott LS**, Vrugt JA, De Smedt F. 2010. Application of a MCMC sampler (DREAM) for calibration and uncertainty analysis of a distributed rainfall-runoff model (WetSpa). *Water 2010 Conference*, July 5-7: Quebec City, Canada.

**Matott LS**, Leung K, Tolson B. 2009. Interfacing MATLAB and Python Optimizers to Black-Box Environmental Simulation Models. *American Geophysical Union Fall 2009 Meeting*, Poster# H41A-0870, Dec. 14-18: San Francisco, CA.

Shafii M, Vrugt JA, Tolson B, **Matott LS**. 2009. Enhancing Multi-Objective Evolutionary Algorithm Performance with Markov Chain Monte Carlo. *American Geophysical Union Fall 2009 Meeting*, Poster# H41A-0871, Dec. 14-18: San Francisco, CA.

Tolson B, Razavi S, **Matott LS**, Asadzadeh M, Seglenieks F. 2009. A Simple Non-Invasive Efficiency Improvement for Hydrologic Model Calibration. *American Geophysical Union Fall 2009 Meeting*, Poster# H41A-0872, Dec. 14-18: San Francisco, CA.

Purucker ST, **Matott LS**, Babendreier JE. 2009. Methods and Tools for Evaluating Ecological Models: A Survey. *Ecological Society of America Annual Meeting*, Poster#15-128, August 2-7: Albuquerque, NM.

**Matott LS**, Tolson BA, Razavi S. 2009. Forecasting Subsurface Model Performance During Simulation-based Optimization. *SIAM Conference on Mathematical & Computational Issues in the Geosciences*, Talk#MS17-01, June 14-19: Leipzig, Germany.

## CONFERENCE PRESENTATIONS (continued)

- Razavi S, Tolson BA, **Matott LS**, MacLean A. 2009. Forecasting Hydrologic Model Prediction Errors During Calibration. *American Geophysical Union Spring 2009 Joint Assembly*, Poster# CG21A-32, May 24-27: Toronto, Ontario, Canada.
- Becker MW, Fredrick KC, **Matott LS**, Bandilla K, Babonis G. 2007. Calibration of a Numerical Ground-Water Flow Model Using Shuttle Radar Topography Mission (SRTM) Elevations. *XXIV IUGG General Assembly*, Talk# HW2005-31, July 2-13: Perugia, Italy.
- Matott LS**, Bartelt-Hunt SL, Rabideau AJ, Fowler KR. 2007. Heuristic Optimization and Algorithm Tuning Applied to Sorptive Barrier Design. *SIAM Conference on Computational Science and Engineering*, Talk# MS58-04, Feb. 19-23: Costa Mesa, CA.
- Matott LS**. 2007. Calibration of Subsurface Reactive Transport Models Involving Complex Biogeochemical Processes. *Council for Regulatory Environmental Modeling (CREM) Workshop on Integrated Modeling*, Poster Session, Jan. 30- Feb. 1: Research Triangle Park, NC.
- Matott LS**, Rabideau AJ. 2006. Selection and Calibration of Subsurface Reactive Transport Models Using a Surrogate-model Approach. *American Geophysical Union Fall 2006 Meeting*, Poster# H43B-0504, Dec. 11-15: San Francisco, CA.
- Jiang Z, **Matott LS**, Rabideau AJ. 2006. Incorporating Dual-mode Sorption Into Groundwater Contaminant Transport Models. *American Geophysical Union Fall 2006 Meeting*, Paper# H41G-03, Dec. 11-15: San Francisco, CA.
- Matott LS**, Rabideau AJ. 2006. Calibration of Regional-Scale Subsurface Nitrogen Transport Models to Support the Analysis of Impaired Watersheds. *American Geophysical Union Spring 2006 Joint Assembly*, Paper# H33B-02, May 23-26: Baltimore, MD.
- Becker MW, Flewelling DM, **Matott LS**, Rabideau AJ. 2006. Calibration of Analytic Element Models in a Geographic Information System Environment. *Fifth International Conference on the Analytic Element Method*, Kansas State University, May 15: Manhattan, KS.
- Matott LS**, Rabideau AJ. 2006. Calibration of Regional-Scale Subsurface Nitrogen Transport Models to Support the Analysis of Impaired Watersheds in the Great Lakes Basin. *16th Annual Great Lakes Research Consortium Conference*, March 17-18, 2006: Syracuse, NY.
- Craig JR, Rabideau AJ, Becker MW, Bandilla K, Flewelling DM, Fredrick KC, Jankovic I, **Matott LS**, Silaviserith W. 2005. Development of a Regional-Scale Groundwater Modeling System for Research, Education, and Outreach. *2005 AEESP Research and Education Conference*, July 24-27: Potsdam, NY.
- Matott LS**, Rabideau AJ, Becker MW. 2005. Large-Scale Regional Groundwater Modeling Using GIS and the Analytic Element Method. *NSF 2005 IGERT Project Meeting*, Poster#41, May 19-20: Washington, DC.
- Matott LS**, Fredrick KC, Rabideau AJ, Becker MW. 2004. Calibration of the Geometry of Hydraulic Conductivity Zones in Groundwater Flow Models. *American Geophysical Union Fall 2004 Meeting*, Poster# H11C-0318, December 13-17: San Francisco, CA.
- Fredrick KC, **Matott LS**, Rabideau AJ, Becker MW. 2004. High-Accuracy Lake Level Measurements as Calibration Observations in Regional Ground-Water Modeling. *American Geophysical Union Fall 2004 Meeting*, Poster# H11C-0317, December 13-17: San Francisco, CA.
- Craig JR, Rabideau AJ, **Matott LS**. 2004. Optimal Mesh Generation for AEM-Based Eulerian Transport Simulators. *American Geophysical Union Fall 2004 Meeting*, Poster# H33F-0533, December 13-17: San Francisco, CA.

## CONFERENCE PRESENTATIONS (continued)

**Matott LS**, Rabideau AJ. 2004. Ostrich: A Model-Independent, Multi-Algorithm, Optimization Software Tool. *Computational Methods in Water Resources XV International Conference*, June 13-17, University of North Carolina: Chapel Hill, NC.

**Matott LS**, Winslow J. 2003. Recycling in Cheektowaga, New York: A Public Policy Analysis using GIS. *2nd Annual Public Participation GIS Conference*, July 20-22, Portland State University: Portland, OR.

Buckley MF, Chauncey D, **Matott LS**. 2001. Hardware and Software Considerations in Wireless Metropolitan Area Network Design. *WCA 7<sup>th</sup> Annual Technical Symposium*, January 17-19: San Jose, CA.

## INVITED PRESENTATIONS (11)

**Matott LS**. 2014. Improving Water Resources Optimization with the Help of Undergraduate Researchers. *Clarkson University Arts and Sciences Seminar Series*, October 10: Potsdam, NY.

**Matott LS**. 2014. Bridging the Gap between Mathematical Optimization and Water Resources Management. *University at Buffalo Environmental Science and Engineering Seminar*, March 6: Buffalo, NY.

**Matott LS**. 2011. High Performance Computing for Environmental Modeling and Analysis. *University at Buffalo Center for Computational Research*, February 28: Buffalo, New York.

**Matott LS**, Babendreier JB, Purucker ST. 2009. An EPA/ERD Website for Cataloging Model Evaluation Tools. *2009 Annual Public Meeting and Workshop of the Interagency Steering Committee on Multimedia Environmental Models (ISCMEM)*, Oct. 13 – 15, Rockville, MD.

**Matott LS**. 2009. Evaluating Uncertainty in Integrated Environmental Models. *Interagency Steering Committee on Multimedia Environmental Modeling – Working Group #2*, July 9.

**Matott LS**. 2008. Simulating Ecosystem Response to Environmental Stressors at the Regional Scale: Strategies for Model Evaluation. *University of Waterloo*, July 17: Waterloo, Ontario, Canada.

**Matott LS**. 2007. Uncertainty and Sensitivity Analysis Needs of the US EPA Ecological Research Program. *Gund Institute for Ecological Economics*, November 14: Burlington, VT.

**Matott LS**. 2005. Application of Heuristic Optimization to Environmental Engineering. *Clarkson University, Department of Math and Computer Science*, April 21: Potsdam, NY.

**Matott LS**. 2005. Optimization and Calibration using Ostrich Software and Parallel Processing. *USEPA Ecosystems Research Division*, March 17: Athens, GA.

**Matott LS**. 2005. Application of Heuristic Optimization to Environmental Engineering. *University at Buffalo Environmental Science and Engineering Seminar*, March 11: Buffalo, NY.

Craig JR (primary instructor), Rabideau AJ, Jankovic I, **Matott LS**. 2004. Modeling Regional Groundwater Flow with the Analytic Element Method: Source Water Assessment and GIS. *Short course for professional engineers/hydrologists* (1.6 CEUs), University at Buffalo, June 29: Buffalo, NY. (Taught ~3 hours)

## RESEARCH GRANTS

Startup Grant, University of Waterloo, **\$45000**, 2009

Dean's Award, University of Waterloo, **\$40000**, 2010

Discovery Grant<sup>\*\*</sup>, Natural Sciences and Engineering Research Council, **\$90000**, 2011-2015

<sup>\*\*</sup> - the award was forfeited when I left Canada for my current position in the United States

## GRADUATE STUDENT SUPERVISION

**Mahyar Shafii.** University of Waterloo, Civil and Environmental Engineering (Ph.D., 2009-2014).  
*Developments in Informal Multi-Criteria Calibration and Uncertainty Estimation in Hydrological Modelling* (co-advisor: Dr. B. Tolson)

**Nasim Hosseini.** University of Waterloo, Civil and Environmental Engineering (MASc., 2009-2011).  
*Modelling Temporal and Spatial Transportation of Pharmaceuticals, Personal Care Products, and Endocrine Disrupting Compounds in a Canadian Watershed* (co-advisor: Dr. W. Parker)

## TEACHING EXPERIENCE

Spring 2014

Instructor, **GIS Applications in Civil Engineering**  
University at Buffalo, Buffalo, NY  
Graduate course (CIE 507) with an enrollment of 9 students.

Winter 2011

Instructor, **Engineering for Solid Waste Management**  
University at Waterloo, Waterloo, ON, Canada  
Undergraduate course (ENVE 577) with an enrollment of 60 students.

Winter 2010, Winter 2011

Instructor, **Advanced Mathematics in Civil Engineering**  
University at Waterloo, Waterloo, ON, Canada  
Undergraduate course (CIVE 331) with an enrollment of 94 (W2010) and 97 (W2011) students.

Spring 2009, Spring 2011

Instructor, **Advanced Mathematics in Environmental and Geological Engineering**  
University at Waterloo, Waterloo, ON, Canada  
Undergraduate course (ENVE 321) with an enrollment of 43 (S2009) and 60 (S2011) students.

Spring 2006

Instructor, **Civil Engineering Applications of GIS**  
University at Buffalo, Buffalo, NY  
Graduate course (CIE 507) with an enrollment of 9 students.

Fall 2004 and Fall 2005

Guest Lecturer, **Hydrologic Engineering and Statistical Methods in Civil Engineering**  
University at Buffalo, Buffalo, NY  
Graduate/undergraduate courses with enrollment of 10-13; taught units on atmospheric water and methods of regression.

Fall 1996 and Spring 1997

Recitation Instructor, **Differential Equations**  
Clarkson University, Potsdam, NY  
Assisted ~20 undergraduates with homework and exam preparation; administered quizzes.

## FELLOWSHIPS / CERTIFICATES / AWARDS

2012

**Coalition for Academic Scientific Computation (CASC) Cover Art Competition**  
The winning entry "*High Performance Computing for Designing Groundwater Remediation Systems*" appeared on the cover of the 2012 CASC brochure.

2009

**Calibration and Predictive Uncertainty Analysis for Complex Environmental Models**  
A 3-day short course given by Dr. John Doherty and covering advanced features of the PEST parameter estimation package, including Tikhonov regularization, SVD-assist, and null-space Monte Carlo.

2008

**US EPA Office of Research and Development Science Communications Award**  
Recognizing outstanding contributions in publishing peer-reviewed articles focused on current and emerging issues in water resources engineering and management.



## FELLOWSHIPS / CERTIFICATES / AWARDS (continued)

2008

### **US EPA 'S' Award – Superior Accomplishment Recognition Award**

Recognizing key contributions to the development of modeling technologies within the Multimedia Ecosystem Exposure Research Team.

2006

### **Advanced Graduate Certificate: Concentration in Geographic Information Science**

Certification administered by the SUNY at Buffalo Department of Geography for completion of coursework related to geographic information science.

2001-2006

### **IGERT Fellowship in Geographic Information Science**

Interdisciplinary NSF-sponsored Integrative Graduate Education and Research Training fellowship in the field of geographic information science under the supervision of University at Buffalo's National Center for Geographic Information and Analysis (award # DGE-9870668)

2005

### **CSEE Departmental Chair's Recognition Award**

The award is given in recognition of high scholastic achievement and outstanding service to the department of Civil, Structural and Environmental Engineering at the University at Buffalo.

## COMPUTER SKILLS

**Programming Experience:** Fortran, C/C++, PHP, Python, MatLab, Java/Java Scripts, bash, csh, perl, R

**Operating Systems:** Windows, Linux (RedHat, CentOS), VxWorks, Windows CE

**Software Packages:** MS Office, Source Safe, SVN, GIT, ArcGIS, MODFLOW/MT3DMS, PHREEQC, Ghost

**Standards/Libraries:** TCP/IP, Sockets, SQL, PBS/Torque, SLURM, MPI, OpenMP, CUDA, OpenCL

**Parallel Computing:** Grid Computing, Beowulf Clusters, SHARCNET, SUPERMUSE, UB CCR

**Numerical Modeling:** Finite Differences & Elements, Analytic Elements, Streamlines, Operator Splitting

## SOFTWARE DEVELOPMENT

**STUBL** – A collection of supplemental tools and utility scripts for SLURM.

**OSTRICH** – A model-independent multi-algorithm tool for model calibration and simulation-optimization.

**NIGHTHAWK** – Models the fate and transport of biogeochemically sensitive materials in the subsurface.

**PIGEON** – A program for interfacing models with MatLab and Python optimization routines.

**ISOFIT** – A software code for fitting a variety of isotherms to laboratory data.

## PROFESSIONAL AFFILIATIONS

American Geophysical Union (AGU), National Ground Water Association (NGWA), American Society for Engineering Education (ASEE), Society for Industrial and Applied Mathematics (SIAM)

## PROFESSIONAL SERVICE

### **Manuscript Peer-Review**

I have reviewed manuscripts on behalf of Ground Water Monitoring & Remediation, Water Resources Research, Journal of Contaminant Hydrology, Journal of Hydrology, Advances in Water Resources, Journal of Environmental Engineering, Water Research, Environmental Modeling & Software, and IEEE Transactions on Evolutionary Computation. I have also performed several internal peer reviews on behalf of EPA colleagues.

### **Software Peer-Review**

Hsieh PA, Matott LS. 2004. SVFlux and ChemFlux: Software for Two-Dimensional/Three-Dimensional Finite Element Variably Saturated Flow and Transport Modeling. *Ground Water*, vol. 42, no. 6, pg. 804-808, doi:10.1111/j.1745-6584.2004.tb02738.x -- a review of the SVFlux and ChemFlux software

### **Software Distribution and Support**

Executables and user-manuals for all software listed in 'SOFTWARE DEVELOPMENT' are freely available for download. I also provide e-mail technical support on request and as schedule permits.