L. Shawn Matott – Ph.D.

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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

1997

B.S. in Computer Engineering (Mathematics Concentration)
Clarkson University, Potsdam, NY

RESEARCH INTERESTS

Numerical modeling of subsurface flow and contaminant transport, with an emphasis on:

- model evaluation (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
- 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 3rd 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.

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 weekly colloquium speaker schedule; involved contacting potential speakers, coordinating their travel and lodging, and e-mailing reminders and posting flyers.

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.

TEACHING EXPERIENCE

– a complete list of teaching experience is available on request

FELLOWSHIPS / CERTIFICATES / AWARDS

Coalition for Academic Scientific Computation (CASC) Cover Art Competition (2012)
Short-Course Certificate in Calibration and Uncertainty Analysis for Environmental Models (2009)
US EPA Office of Research and Development Science Communications Award (2008)
US EPA 'S' Award – Superior Accomplishment Recognition Award (2008)
Advanced Graduate Certificate: Concentration in Geographic Information Science (2006)
NSF IGERT Fellowship in Geographic Information Science – award # DGE-9870668 (2001-2005)
CSEE Departmental Chair's Recognition Award (2005)

PUBLICATIONS

– 22 peer-reviewed publications. A complete list is available on request.

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 toolkit 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