VADIM SOKOLOV

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APPOINTMENTS

University of Chicago

Lecturer, Master of Science in Analytics Program

(June 2015 - present)

University of Chicago

Fellow, Computation Institute

(Dec 2014-present)

Argonne National Laboratory

Principal Computational Scientist, Transportation Research and Analysis Computing Center, Energy Systems Division

(Sep 2013-present)

Argonne National Laboratory

Computational Scientist, Transportation Research and Analysis Computing Center, Energy Systems Division

(Nov 2008-2013)

EDUCATION

Northern Illinois University

Ph.D. in Computational Mathematics

(Jan 2004 - Oct 2008; advisor: Biswa N. Datta)

Rostov State University, Russia (now Southern Federal University)

Diploma in Applied Mathematics

(Sep 1999 - Jun 2004; Diploma with High Honors)

University of Chicago

Graduate Studies in Statistics

(Sep 2013 - present)

MIT

Professional Education in Modeling and Simulation of Transportation Networks

(June 2010; lead instructor: Moshe Ben-Akiva)

RESEARCH INTERESTS

Complex systems and simulation, bayesian statistics, machine lerning, inverse problems, numerical optimization

SELECTED PUBLICATIONS

N. Polson and V. Sokolov, "Bayesian Particle Tracking of Traffic Flows," *Transportation Research Records* (2014), accepted, available at `http://arxiv.org/abs/1411.5076`

N. Polson and V. Sokolov, "Bayesian Analysis of Traffic Flow on Interstate I-55: The LWR Model," *The Annals of Applied Statistics* (2015), accepted, available at `http://arxiv.org/abs/1409.6034`

J. Auld, M. Hope, H. Ley, V. Sokolov, B. Xu and K. Zhang, "POLARIS: Agent-Based Modeling Framework Development and Implementation for Integrated Travel Demand and Network and Operations Simulations," *Transportation Research Part C* (2015), accepted

N. Polson and V. Sokolov, "Bayesian Particle Tracking of Traffic Flows," *Journal of the American Statistical Association* (2015), submitted

Y. Zha, J. Foster, S. Parker snd V Sokolov, "Urban Housing Market Demand Index with Home Showings Events," *IEEE Transactions on Big Data*, (2015), submitted

N. Polson and V. Sokolov "Particle Learning for Long Short-Term Memory Recurrent Networks", (2015), under preparation

R. Soyer and V. Sokolov "Tracking Travel Time Reliability in Real-Time Using Bayesian Analysis", (2015), under preparation

R. Cont, M. Heidari, N. Polson and V. Sokolov "FORIC: An Approach to Regularization Problems in Machine Learning", (2015), under preparation

N. Polson, V. Sokolov and B. Willard "The Bayesian Square-Root Lasso", (2015), under preparation

N. Polson and V. Sokolov "Efficient Dimension Reduction Approach for Classification Problems", (2015), under preparation

SOFTWARE DEVELOPED

POLARIS

Designer. Developer. Transportation systems simulations framework

`https://github.com/anl-tracc/polaris`

(C++)

GREET

Designer. Lead Developer. An implementation of The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) Model.

`http://greet.es.anl.gov/greet`

(C#, .NET, SQLite; more then 800 unique users within first year of release, 2013)

MATCOM

Contributor. Distributed on CD with Numerical Linear Algebra and Applications, Second Edition book By Biswa Nath Datta, SIAM.

`http://www.siam.org/books/ot116/`

(MATLAB)

TRANSIMS

Contributor. An agent-based forecast software for modeling regional transport systems.

`http://sourceforge.net/projects/transims`

(C++; 22,295 total downloads since 2006)

Advanced Numerical Methods II

Sole Developer. Package for solving large scale control problems.

`http://library.wolfram.com/infocenter/Conferences/5787/`

(Mathematica; an experimental library that was not published)

SPONSORED RESEARCH

Federal Transit Authority

Coordinated Transit Response Planning and Operations Support Tools for Mitigating Impacts of All-Hazard Emergency Events

(Co-PI; amount awarded $2,800,000; 2015-2018)

Argonne National Laboratory

Modeling Energy Consumption and Electricity Demand of a Transportation System using Behavioral Travel Demand and Vehicle Models

(Co-PI with D. Karbowski; amount awarded $200,000; 2013-2015)

Federal Emergency Management Agency and the U.S. Department of the Army

The Chemical Stockpile Emergency Preparedness Program - U.S. Army Pueblo Chemical Depot

(Sub-Award with W. Metz (PI); amount awarded $130,000, 2013-2014)

McCaffery Interests and University of Chicago

Computation-Enabled Design for the Chicago Lakeside Development

(Sub-Award with C. Catlett and Leah Guzowski (PI); 2013-2016)

Federal Emergency Managment Agency

Analysis of Evacuation Induced Demand for Transit Services

(PI; amount awarded $30,000; 2013)

U.S. Department of Transportation Federal Highway Administration

TRANSIMS Research and Deployment

(Lead Investigator with H. Ley (PI); amount awarded: $3,500,000; 2011-2014)

Federal Emergency Management Agency Regional Catastrophic Preparedness Grant Program
Regional Transportation Simulation Tool for Evacuation Planning
(PI; amount awarded: $2,000,000; 2010-2011)

U.S. Department of Energy Office of Energy Efficiency and Renewable Energy
The New GREET Model Development
(Lead Developer with A. Elgowainy, M. Wang (PI); 2008-2014)

Illinois Department of Transportation
Chicago Metropolitan Evacuation Simulation Project
(Team Member; with D. Weber (PI); 2008-2010)

U.S. Department of Transportation Research and Innovative Technology Administration
National User Facility to Meet US DOT Advanced Computation Needs
(Team Member; with D. Weber (PI); 2007-2011)

National Science Foundation
Quadratic Inverse Eigenvalue Problems for Model Updating in Science and Engineering: Theory and Computations
(Research Assistant with B. Datta (Co-PI), M. Chu (Co-PI); 2005-2008)

TEACHING EXPERIENCE

University of Chicago
Lecturer
(Summer 2015: Time Series Analysis; Fall 2015: Optimization and Simulation)

Northern Illinois University
Grader/Recitation Instructor, Department of Mathematical Sciences
(Spring 2004: Math 232 Calculus III; Fall 2004/Spring 2005: Math 211 Business Calculus)

Northern Illinois University
Course Assistant/Recitation Instructor, Department of Mathematical Sciences
(Fall 2005: Math 434 Numerical Linear Algebra; Sprint 2006: Math 435 Numerical Analysis)

Argonne National Laboratory
Student supervision
(3 master's students from Northern Illinois University Engineering working on Illinois Department of Transportation project; 1 master's and 1 doctorate student from Illinois Institute of Technology Engineering working on Regional Catastrophic Preparedness Grant Program project)

TRANSIMS Training Course
Three day course. Designed and taught sections on transportation networks modeling
(Apr 2008, Nov 2008, Dec 2009 and Jan 2011: Argonne National Laboratory; Jun 2008: Georgia Institute of Technology; Jan 2009: City of Moreno Valley; Jun 2009: University of Houston; Sep 2010: Turner Fairbank Highway Research Center; Apr 2011: South Carolina State University)

GREET Workshop
One day training-workshop. Designed and taught sections on mathematical models for life-cycle analyses
(Dec 2011 and Sep 2012: Argonne National Laboratory)

TALKS

Invited seminar & colloquium talks
2015 University of California, Los Angeles: IPAM Traffic Program

2015 University of Chicago: Graham School

2014 George Washington University: Decision Sciences

2014 University of Chicago: Computation Institute

2014 Argonne National Laboratory: Material Science Division

2012 University of California, Berkeley: Civil Engineering

2012 University of California, Davis: Institute for Transportation Studies

2011 California Air Resources Board: Life-Cycle Assessment

2010 Turner-Fairbank Highway Research Center

2009 University of Illinois at Urbana-Champaign: Short course on *Transportaion Networks Simulation (4 lectures)*

Conferences

2015 ITS World Congress

2015 ITS America Meeting

2015 TRB Annual Meeting

2014 ITS World Congress

2014 TRB Automated Vehicles Symposium

2014 TRB Innovations in Travel Modeling Conference

2013 International Symposium for Next Generation Infrastructure

2012 Council of Energy Research & Education Leaders Annual Meeting (*invited*)

2010 American Mathematical Society Spring Southern Section Meeting (*invited*)

2010 TRANSIMS Applications and Development Workshop

2009 Linear Algebra and Numerical Linear Algebra: Theory, Methods, and Application Conference

2008 XIXth International Workshop on Operator Theory

2008 Gene Golub Symposium at University of Illinois at Urbana-Champaign (*invited*)

2008 Conference on the Occasion of Richard Varga's 80th Birthday

2007 2nd International Conference on Matrix Methods and Operator Equations

2007 Numerical Linear Algebra in Signal, Systems, and Control Workshop (*invited*)

2006 X Mathematical Modeling in Industry - A Workshop for Graduate Students at University of Minnesota

2005 Wolfram Technology Conference

2003 Workshop on contemporary problems in mathematical modeling

2003 Conference on Numerical methods for solving linear and non-linear boundary problems

2002 Turkish-German Summer Academy in Izmir

2002 International Summer School on *Iterative Methods and Matrix computations*

AWARDS

ITS World Congress

Best Scientific Paper Award

(2015; given to three papers from three regions of the world, out of several thousand)

Northern Illinois University

Outstanding Graduate Student Award

(2007; nominated by faculty; awarded to an individual "who is distinguished in the area of scholarship")

Northern Illinois University

Dissertation Completion Award

(2007; awarded to 8 graduate students every year, out of more then a hundred)

Travel Awards

NIU Graduate School (2007), *NIU Department of Mathematical Sciences* (2007), *NIU Department of Mathematical Sciences* (2006), *NIU School of Arts and Sciences* (2006), *Institute for Mathematics and its Applications* (2006), *DAAD and SIEMENS* (2002)

OTHER APPOINTMENTS

Argonne National Laboratory

Research Assistant

(Sep 2007 - Oct 2008; adviser: H. Ley)

Norhtern Illinois University

Research Assistant

(Sep 2006 - Sep 2007; adviser: B. N. Datta)

Wolfram Research
Summer Intern, Software Technologies Department
(May 2005 - Aug 2005; developed a Mathematic package for solution of large scale control problems; selectivity 6 offers out of 160 applicants)

Northern Illinois University
Teaching Assistant, Department of Mathematical Sciences
(Jan 2004 - Sep 2006)

Rostov State University
Lab Assistant, High Performance Computing Center
(Dec 2002 - Dec 2003; responsible for installing and testing software, helped writing tutorials on linear algebra packages such as LAPACK, ScaLAPACK, ARPACK)

PROFESSIONAL SERVICE

Meetings Organized

2013 Special session on Transport Network Modeling at International Symposium for Next Generation Infrastructure

2012 Integrated Transportation Models Workshop at Conference on Innovations in Travel Modeling (with J. Auld)

2010 Workshop on TRANSIMS: Applications and Development, Argonne National Laboratory (with H. Ley and B. Gardner)

2009 Linear Algebra and Numerical Linear Algebra: Theory, Methods, and Application, Northern Illinois University (with B. Datta, G. Ammar, K. Datta, S. Deng, Y. Hong, L. Reichel, V. Olshevsky, B. Shader and Q. Ye)

Referee

SIMULATION: Transactions of The Society for Modeling and Simulation International

Lecture Notes in Electrical Engineering

Applied Mathematics and Computation

Mechanical Systems and Signal Processing

GeoInformatica

TRB Annual Meeting

ITRB Innovations in Travel Modeling Conference

TRB Innovations in Travel Modeling Conference

Grant Proposals Reviewer for Argonne LDRD Grants 2012, 2014, 2015

Grant Proposal Reviewer for DTRA, 2015

SKILLS

Languages
English (fluent), Russian (fluent), German (basic)

Programming
C/C++ (VC and gcc), Python, C#, Java, Fortran, Ruby, HTML, PHP, JavaScript, SQL, MPI, OpenMP, .NET, QT, WinForms, CMake

Data Analysis
SQLite, PostgreSQL, MongoDB, Hadoop, Gephi

Spatial Analysis
PostGIS, Spatialite, ArcGIS, QuantumGIS

Mathematical
Maple, Mathematica, MATLAB, LaTeX, R, Coin-OR SYMPHONY

Complex Systems
Repast, NetLogo, NodeXL for .NET

Soft Skills
Student supervision, project management, collaboration, proposal writing