

CONTACT INFORMATION

Department of Mathematical Sciences
State University of New York at Binghamton
Binghamton, NY 13902–6000
United States of America

Office: Old Whitney Hall (OW), Room 129
☎: +1 (607) 777-6906
✉: aleksey@binghamton.edu
On the Web: <http://www.math.binghamton.edu/aleksey>

EDUCATION

2009 Doctor of Philosophy in Applied Mathematics

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America
Advisors: Remigijus Mikulevicius and Alexander Tartakovsky*

2009 Master of Science in Mathematical Finance

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America*

2004 Master of Science in Applied Mathematics and Physics

*Institution: Department of Electrical Engineering and Cybernetics
Moscow Institute of Physics and Technology
Moscow, Russia*

2002 Bachelor of Science in Applied Mathematics and Physics

*Institution: Department of Electrical Engineering and Cybernetics
Moscow Institute of Physics and Technology
Moscow, Russia*

EMPLOYMENT

08/2012 – Present Assistant Professor (tenure-track)

*Institution: Department of Mathematical Sciences
State University of New York at Binghamton
Binghamton, NY, United States of America*

08/2010 – 08/2012 Research Associate

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America
Advisor: Alexander Tartakovsky*

08/2009 – 08/2010 Postdoctoral Research Associate

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America
Advisor: Alexander Tartakovsky*

08/2004 – 08/2009 Graduate Research and Teaching Assistant

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America*

08/2003 – 06/2004 Assistant Lecturer

*Institution: Department of Electrical Engineering and Cybernetics
Moscow Institute of Physics and Technology
Moscow, Russia*

AREAS OF PROFESSIONAL INTEREST

- Theoretical and Applied Probability
- Theoretical and Applied Statistics
- Sequential Analysis and Hypothesis Testing
- Sequential Quickest Change-Point Detection Problem
- Numerical Analysis, Methods and Applications
- Stochastic Processes
- Mathematical Finance
- Information Fusion in Multi-Sensor and Distributed Systems
- Information Assurance and Network Security
- Computer Vision
- Video Visual Object Tracking
- Parallel Programming

AWARDS AND HONORS

2014 Dean's Research Semester Award, State University of New York at Binghamton, Harpur College, Office of the Dean (awarded for the Fall semester of 2014)

2013 2013 – 2015 AMS-Simons Travel Grant, American Mathematical Society and Simons Foundation

2011 Laha Travel Award, Institute of Mathematical Statistics

2009 Edward and Delores Blum Graduate Research Prize, University of Southern California, Department of Mathematics

RESEARCH EXPERIENCE

09/2010 – 08/2012 Research Associate

*Institution: Department of Mathematics
Center for Applied Mathematical Sciences
University of Southern California
Los Angeles, CA, United States of America*

Grant Title: Nonlinear Filtering and Changepoint Detection Methods for Course of Action Analysis

Sponsoring Agency: U.S. Defence Threat Reduction Agency

Principal Investigators: Alexander Tartakovsky (USC), Aram Galstyan (USC/ISI), Venugopal Veeravalli (U. of Illinois, Urbana-Champaign)

Duties: Analysis and development of stochastic models for uncertainty quantification.

09/2008 – 08/2012 Research Associate (initially – Research Assistant)

*Institution: Department of Mathematics
Center for Applied Mathematical Sciences
University of Southern California
Los Angeles, CA, United States of America*

Grant Title: Optimal Changepoint Detection and Identification Algorithms with Applications

Sponsoring Agency: U.S. National Science Foundation

Principal Investigator: Alexander Tartakovsky

Duties: Analysis and development of numerical methods for performance evaluation of various quickest change-point detection procedures such as Page's CUSUM chart, Shiryaev-Roberts rule, and their modifications.

10/2005 – 09/2008 Research Assistant

*Institution: Department of Mathematics
Center for Applied Mathematical Sciences
University of Southern California
Los Angeles, CA, United States of America*

Grant Title: Bayesian Sensor Networks and Optimal Fusion Techniques in Multi-Sensor Distributed Systems with Applications to Counter Terrorism and Information Assurance

Sponsoring Agency: U.S. Office of Naval Research

Principal Investigator: Alexander Tartakovsky

Duties: Development and performance evaluation of optimal and quasi-optimal change-point detection procedures in distributed sensor networks and applications to rapid intrusion detection in computer networks.

06/2005 – 08/2012 Research Associate (initially – Research Assistant)

*Institution: Department of Mathematics
Center for Applied Mathematical Sciences
University of Southern California
Los Angeles, CA, United States of America*

Grant Title: Spatio-Temporal Nonlinear Filtering with Applications to Information Assurance and Counter Terrorism

Sponsoring Agency: U.S. Army Research Office

Principal Investigator: Boris Rozovsky (Brown University) and Alexander Tartakovsky (USC)

Duties: Development of efficient change-point detection procedures for composite hypotheses with applications to information assurance.

08/2004 – 12/2004 Research Assistant

*Institution: Department of Mathematics
Center for Applied Mathematical Sciences
University of Southern California
Los Angeles, CA, United States of America*

Grant Title: Spatio-Temporal Image Restoration and Scene Stabilization Algorithm for High-Resolution Target Recognition

Sponsoring Agency: U.S. Office of Naval Research

Principal Investigator: Boris Rozovsky (Brown University) and Alexander Tartakovsky (USC)

Duties: Development of an Image Stabilization & Enhancement System incorporating adaptive spatial-temporal processing and an advanced jitter estimation/compensation/stabilization algorithm.

TEACHING EXPERIENCE

08/2013 – 12/2013 Instructor

*Institution: Department of Mathematical Sciences
State University of New York at Binghamton
Binghamton, NY, United States of America*

Course Title: MATH 571 – Advanced Probability Theory

Course Outline: measure-theoretic probability and its axiomatic foundation; Carathéodory extension theorem; Lebesgue integration; random variables; convergence types; law of large numbers; central limit theorem; characteristic functions; infinite divisibility and stable laws; conditional probability and expectation; martingales;

Duties: preparing course plan and materials; lecturing; monitoring progress and attendance; advising students; recording grades and submitting reports; holding office hours; grading homework assignments; preparing and grading quizzes; preparing and grading exams; review sessions;

08/2013 – 12/2013 Instructor

*Institution: Department of Mathematical Sciences
State University of New York at Binghamton
Binghamton, NY, United States of America*

Course Title: MATH 304 – Linear Algebra

Course Outline: systems of linear equations; matrix algebra; vector spaces; linear transformations; change of basis; matrix determinant; dot product; orthogonality;

Duties: preparing course plan and materials; lecturing; monitoring progress and attendance; advising students; recording grades and submitting reports; holding office hours; grading homework assignments; preparing and grading quizzes; preparing and grading exams; review sessions;

01/2013 – 05/2013 Instructor

*Institution: Department of Mathematical Sciences
State University of New York at Binghamton
Binghamton, NY, United States of America*

Course Title: MATH 346 – Introduction to Financial Mathematics

Course Outline: basic interest theory; annuities; bonds; loans; amortization; asset-liability management; basic financial derivatives;

Duties: preparing course plan and materials; lecturing; monitoring progress and attendance; advising students; recording grades and submitting reports; holding office hours; grading homework assignments; preparing and grading quizzes; preparing and grading exams; review sessions;

08/2012 – 12/2012 Instructor

*Institution: Department of Mathematical Sciences
State University of New York at Binghamton
Binghamton, NY, United States of America*

Course Title: MATH 346 – Introduction to Financial Mathematics

Course Outline: basic interest theory; annuities; bonds; loans; amortization; asset-liability management; basic financial derivatives;

Duties: preparing course plan and materials; lecturing; monitoring progress and attendance; advising students; recording grades and submitting reports; holding office hours; grading homework assignments; preparing and grading quizzes; preparing and grading exams; review sessions;

08/2012 – 12/2012 Instructor

*Institution: Department of Mathematical Sciences
State University of New York at Binghamton
Binghamton, NY, United States of America*

Course Title: MATH 304 – Linear Algebra

Course Outline: systems of linear equations; matrix algebra; vector spaces; linear transformations; change of basis; matrix determinant; dot product; orthogonality;

Duties: preparing course plan and materials; lecturing; monitoring progress and attendance; advising students; recording grades and submitting reports; holding office hours; grading homework assignments; preparing and grading quizzes; preparing and grading exams; review sessions;

08/2009 – 05/2010 Lecturer / Postdoctoral Research Associate

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America*

Course Title: MATH 218 – Probability for Business

Course Outline: basic probability; discrete and continuous distributions; expectation and variance; independence; sampling; estimation; confidence intervals; hypothesis testing;

Duties: preparing course plan and materials; lecturing; monitoring progress and attendance; advising students; recording grades and submitting reports; holding office hours; grading homework assignments; preparing and grading quizzes; preparing and grading exams; review sessions;

01/2006 – 05/2006 Teaching Assistant

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America*

Course Title: MATH 117 – Introduction to Mathematics for Business and Economics

Course Outline: functions; graphs; polynomial and rational functions; exponential and logarithmic functions; matrices; systems of linear equations;

Duties: leading discussion sessions; holding office hours; grading homework assignments; preparing and grading quizzes; grading exams; review sessions;

08/2005 – 01/2006 Teaching Assistant

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America*

Course Title: MATH 126 – Calculus II

Course Outline: trigonometric functions; applications of integration; techniques of integration; indeterminate forms; infinite series; Taylor series; polar coordinates;

Duties: leading discussion sessions; holding office hours; grading homework assignments; preparing and grading quizzes; grading exams; review sessions;

01/2005 – 05/2005 Teaching Assistant

*Institution: Department of Mathematics
University of Southern California
Los Angeles, CA, United States of America*

Course Title: MATH 125 – Calculus I

Course Outline: limits; continuity; derivatives and applications; antiderivatives; the fundamental theorem of calculus; exponential and logarithmic functions;

Duties: leading discussion sessions; holding office hours; grading homework assignments; preparing and grading quizzes; grading exams; review sessions;

08/2003 – 06/2004 Assistant Lecturer

*Institution: Department of Electrical Engineering and Cybernetics
Moscow Institute of Physics and Technology
Moscow, Russia*

Course Title: Linear Circuit Design (Lab)

Course Outline: lumped circuit elements; network equations; zero-input and zero-state responses; sinusoidal steady-state analysis; impedance; resonance; network functions; power concepts; transformers; Laplace transforms;

Duties: leading discussion sessions; preparing and grading lab assignments; review sessions; lab equipment maintenance;

PUBLICATIONS

1. Du, W., Sokolov, G., and Polunchenko, A.S., “An Exact Formula for the Average Run Length to False Alarm of the Generalized Shiryaev–Roberts Detection Procedure under Exponential Observations”, *Proceedings of the 12-th German–Polish Workshop on Stochastic Models, Statistics and Their Applications*, 2014, (submitted).
2. Polunchenko, A.S., Sokolov, G., and Tartakovsky, A.G., “Optimal Design and Analysis of the Exponentially Weighted Moving Average Chart for Exponential Data”, *Sri Lankan Journal of Applied Statistics, Special Issue: Contemporary Statistical Science*, 2014 (accepted, in press).
3. Polunchenko, A.S., Sokolov, G., and Du, W., “Efficient Performance Evaluation of the Generalized Shiryaev–Roberts Detection Procedure in a Multi-Cyclic Setup”, *Applied Stochastic Models in Business and Industry*, 2014 (accepted, in press). DOI: 10.1002/asmb.2026. **Invited paper for Special Issue dedicated to the 30-th Quality and Productivity Research Conference (QPRC’2013).**

4. Polunchenko, A.S., Sokolov, G., and Du, W., “An Accurate Method for Determining the Pre-Change Run-Length Distribution of the Generalized Shiryaev–Roberts Detection Procedure”, *Sequential Analysis*, **33**:(1), pp. 112–134, 2014; DOI: 10.1080/07474946.2014.856642. **Invited paper for Special Issue dedicated to the 4-th International Workshop in Sequential Methodologies (IWSM’2013)**.
5. Polunchenko, A.S., Sokolov, G., and Du, W., “On Efficient and Reliable Performance Evaluation of the Generalized Shiryaev–Roberts Change-Point Detection Procedure”, *Proceedings of the 56-th Moscow Institute of Physics and Technology Annual Scientific Conference*, Moscow Institute of Physics and Technology, Moscow, Russia, 25–30 November 2013.
6. Polunchenko, A.S., Sokolov, G., and Du, W., “Quickest Change-Point Detection: A Bird’s Eye View”, *Proceedings of the 2013 Joint Statistical Meetings (JSM-2013)*, Montréal, Québec, Canada, 3–8 August 2013.
7. Tartakovsky, A.G., Polunchenko, A.S., and Sokolov, G., “Efficient Computer Network Anomaly Detection by Changepoint Detection Methods”, *IEEE Journal of Selected Topics in Signal Processing*, **7**:(1), pp. 4–11, February 2013; DOI: 10.1109/JSTSP.2012.2233713.
8. Polunchenko, A.S., Tartakovsky, A.G., and Mukhopadhyay, N., “Nearly Optimal Change-Point Detection with an Application to Cybersecurity”, *Sequential Analysis*, **31**:(3), pp. 409–435, 2012; DOI: 10.1080/07474946.2012.694351.
9. Polunchenko, A.S. and Tartakovsky, A.G., “State-of-the-Art in Sequential Change-Point Detection”, *Methodology and Computing in Applied Probability*, **14**:(3), pp. 649–684, 2012; DOI: 10.1007/s11009-011-9256-5.
10. Tartakovsky, A.G., Pollak, M., and Polunchenko A.S., “Third-Order Asymptotic Optimality of the Generalized Shiryaev–Roberts Changepoint Detection Procedures”, *Theory of Probability and Its Applications*, **56**:(3), pp. 534–565, 2011; DOI: 10.4213/tvp4406. English version published in *Theory of Probability and Its Applications*, **56**:(3), pp. 457–484, 2012; DOI: 10.1137/S0040585X97985534.
11. Moustakides, G.V., Polunchenko, A.S., and Tartakovsky, A.G., “A Numerical Approach to Performance Analysis of Quickest Change-Point Detection Procedures”, *Statistica Sinica*, **21**:(2), pp. 571–596, 2011.
12. Tartakovsky, A.G. and Polunchenko, A.S., “Minimax Optimality the Shiryaev–Roberts Procedure”, *Proceedings of the 5-th International Workshop in Applied Probability*, Universidad Carlos III de Madrid, Colmenarejo Campus, Spain, 5–8 July 2010.
13. Polunchenko, A.S. and Tartakovsky, A.G., “On Optimality of the Shiryaev–Roberts Procedure for Detecting a Change in Distribution”, *Annals of Statistics*, **38**:(6), pp. 3445–3457, December 2010; DOI: 10.1214/09-AOS775.
14. Tartakovsky, A.G., Polunchenko, A.S., and Moustakides, G.V., “Design and Comparison of Shiryaev–Roberts- and CUSUM-Type Change-Point Detection Procedures”, *Proceedings of the 2-nd International Workshop in Sequential Methodologies*, University of Technology of Troyes, Troyes, France, 15–17 June 2009.
15. Moustakides, G.V., Polunchenko, A.S., and Tartakovsky, A.G., “Numerical Comparison of CUSUM and Shiryaev–Roberts Procedures for Detecting Changes in Distributions”, *Communications in Statistics—Theory and Methods*, **38**:(16 & 17), pp. 3225–3239, 2009; DOI: 10.1080/03610920902947774.
16. Tartakovsky, A.G. and Polunchenko, A.S., “Quickest Changepoint Detection in Distributed Multisensor Systems under Unknown Parameters”, *Proceedings of the 11-th IEEE International Conference on Information Fusion*, Hyatt Regency Hotel, Cologne, Germany, 30 June–3 July 2008.

17. Tartakovsky, A.G., Pollak, M., and Polunchenko, A.S., “Asymptotic Exponentiality of First Exit Times for Recurrent Markov Processes and Applications to Changepoint Detection”, *Proceedings of the 2008 International Workshop on Applied Probability*, Compiègne, France, 7–10 July 2008.
18. Tartakovsky, A.G. and Polunchenko, A.S., “Decentralized Quickest Change Detection in Distributed Sensor Systems with Applications to Information Assurance and Counter Terrorism”, *Proceedings of the 13-th Annual Army Conference on Applied Statistics*, Rice University, Houston, TX, USA, 17–19 October 2007.

TALKS

- 06/19/2014 The 6-th International Workshop on Applied Probability (IWAP’2014), Antalya, Turkey (Invited by Prof. Nitis Mukhopadhyay)
- 04/26/2014 The 7-th New England Statistics Symposium (NESS’2014), Harvard University, School of Public Health (2 Talks)
- 03/24/2014 California State University, Long Beach (Invited by Prof. Alan Safer)
- 03/24/2014 Center for Applied Mathematical Sciences (CAMS) Seminar, University of Southern California, Department of Mathematics (Invited by Prof. Susan Friedlander)
- 03/18/2014 Corning, Inc. Headquarters, Corning, NY
- 11/30/2013 The 56-th Moscow Institute of Physics and Technology Annual Scientific Conference, Moscow, Russia (**Best talk award**)
- 10/24/2013 Statistics Colloquium, Virginia Polytechnic Institute (Virginia Tech), Department of Statistics (Invited by Prof. William H. Woodall)
- 10/03/2013 Statistics Seminar, State University of New York at Binghamton, Department of Mathematical Sciences
- 08/05/2013 The 2013 Joint Statistical Meetings (JSM’2013), Palais des Congrès de Montréal, Montréal, Québec, Canada (Invited by Prof. Subha Chakraborti)
- 07/19/2013 The 4-th International Workshop in Sequential Methodologies (IWSM’2013), University of Georgia, Athens, GA (2 Talks)
- 06/05/2013 The 30-th Quality and Productivity Research Conference (QPRC’2013), GE Global Research, Niskayuna, NY (2 Talks)
- 05/09/2013 Statistics Seminar, State University of New York at Binghamton, Department of Mathematical Sciences
- 02/20/2013 The 11-th Workshop on Stochastic Models and Their Applications, Helmut Schmidt University, Hamburg, Germany (Invited by Prof. Sven Knoth)
- 01/24/2013 Probability Seminar, University of California at San Diego (Invited by Prof. Ery Arias-Castro)
- 01/22/2013 Statistics Department Seminar, University of California at Riverside (Invited by Prof. Daniel Jeske)
- 10/25/2012 Statistics Seminar, State University of New York at Binghamton, Department of Mathematical Sciences

- 10/09/2012 Sequential Analysis Seminar, State University of New York at Binghamton, Department of Mathematical Sciences
- 06/05/2012 The 29-th Quality and Productivity Research Conference (QPRC'2012), California State University, Long Beach (2 Talks)
- 02/22/2012 University of California at Santa Barbara, Department of Statistics and Applied Probability (Invited by Prof. Michael Ludkovski)
- 02/20/2012 Institute of Mathematical Statistics, Helmut Schmidt University, Hamburg, Germany (Invited by Prof. Sven Knoth)
- 12/02/2011 Colloquium, State University of New York at Binghamton, Department of Mathematical Sciences
- 10/24/2011 California State University, Long Beach (Invited by Prof. Alan Safer)
- 06/15/2011 The 3-rd International Workshop in Sequential Methodologies (IWSM'2011), Stanford University
- 04/01/2011 Washington State University at Pullman, Department of Mathematics
- 03/31/2011 Washington State University at Tri-Cities
- 09/10/2010 University of Southern California, Department of Mathematics
- 02/12/2010 Clemson University, Department of Mathematical Sciences
- 02/02/2010 Lehigh University, Department of Mathematics
- 10/01/2009 Brown University, Division of Applied Mathematics
- 01/17/2009 University of Texas at Brownsville & Texas Southmost College, Department of Mathematics
- 11/08/2007 University of Southern California, Department of Mathematics
- 05/17/2007 University of California at Los Angeles, Department of Mathematics

STUDENT SUPERVISION

- Ms. Wenyu Du, Ph.D. student (admission to candidacy: 03/20/2014)

JOURNAL REFEREEING

- Communications in Statistics—Simulation and Computation
- Annals of Operations Research
- IEEE Automatic Control
- IEEE Signal Processing
- IEEE Transactions on Information Theory
- IEEE Journal of Selected Topics in Signal Processing
- Sequential Analysis
- Mathematical Problems in Engineering
- Statistical Methodology

- ESAIM: Probability and Statistics
- Probability in the Engineering and Informational Sciences
- Computational Statistics and Data Analysis

OTHER PROFESSIONAL ACTIVITIES

- Co-organizer of the session titled “Sequential Statistical Analysis for Large Networks and Big Data” at the 2014 New England Statistics Symposium (NESS’2014), School of Public Health, Harvard University, Boston, Massachusetts, USA, 25–26 April, 2014.
- Organizer of the session titled “Latest Advances in Sequential Analysis with Applications” at the 2014 New England Statistics Symposium (NESS’2014), School of Public Health, Harvard University, Boston, Massachusetts, USA, 25–26 April, 2014.
- Co-organizer of the session titled “Information Systems” at the 56-th Moscow Institute of Physics and Technology Annual Scientific Conference, Moscow, Russia, 25–30 November, 2013.
- Co-organizer of the session titled “Recent Results in Sequential Analysis and Change-Point Analysis” at the 4-th International Workshop on Sequential Methodologies (IWSM’2013), University of Georgia, Athens, Georgia, USA, 18–21 July, 2013.
- Technical assistance with organizing the Spatio-Temporal Image Processing and Visual Surveillance one-day workshop. More info can be found on the Web at <http://cams.usc.edu/workshop08/>
- Technical assistance with organizing the Sensor Networks and Future Internet Security one-day workshop. More info can be found on the Web at <http://cams.usc.edu/workshop07/>
- Technical assistance with organizing the 5-th Southern California Applied Mathematics Symposium (SoCAMS). More info can be found on the Web at <http://cams.usc.edu/SoCAMS/>

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- American Mathematical Society
- Institute of Mathematical Statistics
- American Statistical Association

CERTIFICATIONS

- Microsoft Certified Professional
- Microsoft Certified Systems Administrator (Microsoft Server 2003)
- Microsoft Certified Application Developer (Microsoft .NET)
- Microsoft Certified Technology Specialist (SQL Server 2005)
- SAS Certified Base Programmer

COMPUTER/PROGRAMMING SKILLS

- C/C++, Assembler (x86)
- MPI, Condor
- HTML, CSS, PHP, Perl, Javascript
- S-Plus/R, SAS
- ScaLAPACK, MATLAB
- \LaTeX (MikTeX)

- Microsoft Windows, (U)NIX
- Microsoft Office
- Microsoft Direct X

LANGUAGES

- Russian – native
- English – proficient