ALEXEY MIROSHNIKOV

CURRICULUM VITAE

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Education

- **UNIVERSITY OF MARYLAND – COLLEGE PARK**
  Ph.D. Mathematics, 2012
  Advisors: Athanasios Tzavaras and Konstantina Trivisa.

- **VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY**
  M.Sc. Mathematics, 2004

- **MOSCOW STATE TECHNOLOGICAL UNIVERSITY "STANKIN"**
  M.Sc. Computer Science, Honors, 2002
  B.Sc. Mechanical Engineering, Honors, 2000

Academic Positions

- **UNIVERSITY OF CALIFORNIA, LOS ANGELES,** Los Angeles, California
  Assistant Adjunct Professor. Department of Mathematics, 2016 – Present

- **UNIVERSITY OF MASSACHUSETTS AMHERST**, Amherst, Massachusetts
  Postdoctoral Research Associate. Department of Biostatistics and Epidemiology, 2015 – 2016

- **UNIVERSITY OF MASSACHUSETTS AMHERST**, Amherst, Massachusetts
  Visiting Assistant Professor. Department of Mathematics and Statistics, 2012 – 2015

- **INSTITUTE OF APPLIED AND COMPUTATIONAL MATHEMATICS – FORTH**, Crete, Greece
  Marie Curie Early Stage Researcher. 2008 – 2010

- **ARGONNE NATIONAL LABORATORY,** Chicago, Illinois
  Visiting Position. Mathematics and Computer Science Division, Summer 2004

Research Interests

- Computational and Mathematical Biology
  - Population genomics, including stochastic modeling and inference
  - Population dynamics, including structured populations
- Partial Differential Equations with applications to:
  - Materials science, including elastodynamics and gas dynamics
  - Singularity formations: vacuums, cavities and fractures
  - Hyperbolic balance laws, including shocks
- Statistics with applications to data science

Immigration Status

- U.S. Lawful Permanent Resident.

Publications

Submitted Papers and Preprints

1. A. Miroshnikov, K. Kotsiopoulos, E. Conlon, Asymptotic Properties and Approximation of Parallel Bayesian Logspline Density Estimators. Preprint (2017). arXiv:1710.09071.

Accepted and Published Papers

2. A. Miroshnikov, E. Savelev, Asymptotic Properties of Parallel Bayesian Kernel Density Estimators. **Annals of the Institute of Statistical Mathematics**. Accepted. (2018). arXiv:1611.02874.

3. A. Miroshnikov, M. Steinrücken, Computing the Joint Distribution of the Total Tree Length across Loci in Populations with Variable Size. **Theoretical Population Biology** (2017), Vol. 118, 1-19.

4. A. Miroshnikov, P.-E. Jabin, R. Young, Cellulose Biodegradation Models; an Example of Cooperative Interactions in Structured Populations, **ESAIM: Mathematical Modelling and Numerical Analysis** (2017), 51-6, 2289-2318.

5. A. Miroshnikov, R. Young, Weak* Solutions II: The Vacuum in Lagrangian Gas Dynamics, **SIAM Journal on Mathematical Analysis** (2017), 49(3), 1810-1843.

6. A. Miroshnikov, R. Young, Weak* Solutions I: A New Perspective on Solutions to Systems of Conservation Laws, **Methods and Applications of Analysis** (2017). Vol. 24-3, 351-382.

7. A. Miroshnikov, K. Trivisa, Stability and Convergence of Relaxation Schemes to Hyperbolic Balance Laws via a Wave Operator, **Journal of Hyperbolic Differential Equations** (2015), Vol. 12, No. 1, 189-219.

8. A. Miroshnikov, Z. Wei, E. Conlon, Parallel Markov Chain Monte Carlo for Non-Gaussian Posterior Distributions, **Stat** (2015), Vol. 4, Issue 1, 304-319. DOI: 10.1002/sta4.97.

9. A. Miroshnikov, A. Tzavaras, On the Construction and Properties of Weak Solutions Describing Dynamic Cavitation, **Journal of Elasticity** (2015), 118-2, 141-185.

10. J. Philips, A. Miroshnikov, P.-J. Haest, D. Springael, and E. Smolders, Motile Geobacter Dechlorinators Migrate into a Model Source Zone of Trichloroethene Dense Non-aqueous Phase Liquid: Experimental Evaluation and Modeling, **Journal of Contaminant Hydrology** (2014), 170, 28-38.

11. A. Miroshnikov, E. Conlon, ParallelMCMCcombine: An R Package for Bayesian Methods for Big Data and Analytics, **PLoS ONE** (2014), 9(9):e108425. DOI:10.1371/journal.pone.0108425.

12. A. Miroshnikov, K. Trivisa, Relative Entropy in Hyperbolic Relaxation for Balance Laws, **Communications in Mathematical Sciences** (2014), 12-6, 1017-1043.

13. A. Miroshnikov, A. Tzavaras, Convergence of Variational Approximation Schemes for Elastodynamics with Polyconvex Energy, **Journal of Analysis and its Applications (ZAA)** (2014), 33-1, 43-64.

14. J. Giesselmann, A. Miroshnikov, A. Tzavaras, The problem of Dynamic Cavitation in Nonlinear Elasticity, **Séminaire Laurent Schwartz - EDP et applications (2012-2013)**, Exp. 14, 1-17. DOI: 10.5802/slsedp.41.

15. A. Miroshnikov, A. Tzavaras, A Variational Approximation Scheme for Radial Polyconvex Elasticity That Preserves the Positivity of Jacobians, **Communications in Mathematical Sciences** (2012), 10-1, 87-115.

Papers in Preparation

1. A. Miroshnikov, M. Steinrücken, Computing transition functions for Piecewise Deterministic Markov Processes and Applications in Computational Genomics.
2. A. Miroshnikov, M. Steinrücken, Accurate and Efficient Inference of Population Size History from Genomic Sequence Data of Multiple Individuals.
3. A. Miroshnikov, R. Young, Weak* Solutions III: a Convergent Front Tracking Scheme.
4. A. Miroshnikov, E. Savelev, M. Lindstrom, Stability and Convergence of Fully-discrete, Entropic Variational Schemes for One-dimensional Equations of Elastodynamics.

Software Publications

1. A. Miroshnikov, E. Conlon, R-package `parallelMCMCcombine`: Methods for combining subset MCMC posterior samples to estimate a posterior density given the full data set (2015).
2. E. Savel'ev, A. Miroshnikov, E. Conlon, R-package `BayesSummaryStatLM`: methods for generating MCMC posterior samples of Bayesian linear regression model parameters that require only summary statistics of data as input (2015).

Grants and Awards

- Tenure-track Assistant Professorship in Data Science, Iowa State University, 2018. (Declined).
- MSP Research Support Funds, University of Massachusetts Amherst, 2014.
- MSP Research Support Funds, University of Massachusetts Amherst, 2013.
- Research Support Funds awarded by Marie Curie Initial Training Network. EU EST-project DEASE: MEST-CT-2005-021122. IACM – FORTH, Crete, Greece, 2009 – 2010.
- Research Support Funds awarded by Marie Curie Initial Training Network. EU EST-project DEASE: MEST-CT-2005-021122. IACM – FORTH, Crete, Greece, 2008.
- Michael Brin Fellowship, University of Maryland – College Park, 2006 – 2010.
- Kaplan Travel Grant, University of Maryland – College Park, 2011 – 2012.
- AMS Grad Student Travel Grant awarded by AMS, 2011.
- Fellowship of the President of Russian Federation, MSTU Stankin, 2000 and 1998.
- Fellowship of the Government of Russian Federation, MSTU Stankin, 1999.
- Fellowship of the President of Russian Federation, MSTU Stankin, 1998.

Teaching Experience

- **UNIVERSITY OF CALIFORNIA, LOS ANGELES**, Los Angeles, California, 2016 – Present
  Instructor for:
  - Introductory and Intermediate Programming in C++
  - Mathematical Finance
  - Multivariable Calculus
  - Probability Theory I and II
  - Mathematical Modeling

- **UNIVERSITY OF MASSACHUSETTS AMHERST**, Amherst, Massachusetts, 2012 – 2015
  Instructor for:
  - Calculus I, II and III, and Calculus I Honors
  - Advanced Multivariable Calculus
  - ODEs for Scientists and Engineers
- **UNIVERSITY OF MARYLAND – COLLEGE PARK**, College Park, Maryland, 2006 – 2012
  - ODEs for Scientists and Engineers (instructor)
  - College Algebra and Trigonometry (discussion leader)
  - Elementary Calculus I and II (discussion leader)
- **VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY**, Blacksburg, Virginia, 2002 – 2006
  - Vector Geometry (discussion leader)
  - Tutoring Lab at Math Emporium (post-class mentoring)
- **MOSCOW STATE TECHNOLOGICAL UNIVERSITY STANKIN**, Moscow, Russia, 2001 – 2002
  - Linear Algebra (discussion leader)

Mentoring

- Konstandinos Kotsiopoulos, Ph.D. student, UMass Amherst, 2015 – 2018.

Referee for Journals

- SIAM Journal on Mathematical Analysis

Invited and Contributed Talks

- Broad Institute of MIT and Harvard, Cambridge, Massachusetts, 2017.
- PDE Seminar, University of Southern California, Los Angeles, California, 2017
- PDE and Applied Mathematics Seminar, University of California, Davis, California, 2016
- 11-th AIMS International Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida, 2016.
- British Applied Mathematics Colloquium, University of Oxford, Oxford, UK, 2016.
- SIAM-SEAS Conference. University of Alabama Birmingham, Alabama. 2015.
- SAND Lab seminar, Massachusetts Institute of Technology, Cambridge, Massachusetts. 2014.
- AMS Spring Western Section Meeting, Albuquerque, University of New Mexico. 2014.
- SIAM Conference on Analysis of Partial Differential Equations, Orlando, Florida. 2013.
- PDE seminar, University of Connecticut, Storrs, Connecticut, 2013.
- PDE seminar, Brown University, Providence, Rhode Island. 2013.
- SIAM Conference on Analysis of PDEs, San Diego, California. Contributed talk. 2011.
- AMS Fall Western Section Meeting, University of Utah. 2011.
- The 3rd Annual Meeting of Marie Curie Initial Training Network DEASE, Institute of Applied and Computational Mathematics, FORTH, Crete, Greece. Contributed talk. 2009.

- PDE Seminar, Virginia Polytechnic Institute and State University, Blacksburg, Virginia. 2008.
- Computational Aeroacoustics Seminar, Institute of Mathematical Modeling, Russian Academy of Science, Moscow, Russia. 2005.
- SIAM Conference on Computational Science & Engineering, Orlando, Florida. 2005.
- Mathematical Modeling Seminar, Institute of Mathematical Modeling, Russian Academy of Science, Moscow, Russia. 2002.
- The 2nd International Conference of the Young Scientists and Students: Actual Problems of Modern Science. Samara, Russia. Contributed talk. 2001.
- Annual Conference, Moscow State Technological University Stankin, Moscow, Russia. 2000.

Additional Conferences and Workshops Attended

- Participant of IdeaLab 2014: Program for Early Career Researchers: Toward a more realistic model of ciliated and flagellated organisms, ICERM, Brown University, Providence, Rhode Island, 2014.
- Research Workshop: Hyperbolic Conservation Laws and Infinite-Dimensional Dynamical Systems. Department of Mathematics, University of Pittsburgh, Pittsburgh, Pennsylvania. 2012.
- IMA Workshop: Mathematics at the Interface of Partial Differential Equations, the Calculus of Variations, and Materials Science, IMA, University of Minnesota, 2014.
- SIAM Conference on Mathematical Aspects of Material Science, Philadelphia, Pennsylvania. 2013.
- Conference on Hyperbolic Conservation Laws and Continuum Mechanics in Honor of Constantine Dafermos' 70-th Birthday, Brown University, Providence, Rhode Island. 2011.
- Kinetic Description of Multiscale Phenomena: Modeling, Theory, and Computation. Annual Kinetic FRG meeting, University of Wisconsin-Madison, Madison, Wisconsin. 2011.
- Workshop: Hyperbolic Conservation Laws and Fluid Dynamics, University of Parma, Italy. 2010.

Affiliations

- American Mathematical Society (AMS)
- Society for Industrial and Applied Mathematics (SIAM)

Technical Proficiencies

- C++ (intermediate), Python (intermediate), R (basic), MATLAB (intermediate).
- PETSc, ADIC, WinBUGS
- LaTeX, Eclipse, Sublime Text, Cygwin, Git, Excel, HTML

Languages

- Russian (native), English (fluent), Greek (basic knowledge)