KONSTANTINOS SPILIOPOULOS

Boston University
Department of Mathematics and Statistics
Boston, MA, 02215, USA

kspiliop@math.bu.edu
http://math.bu.edu/people/kspiliop/
phone: +(617) 353-5209

Academic Positions

- Boston University, Department of Mathematics & Statistics — July 2012-present
  Assistant Professor
- Brown University, Division of Applied Mathematics — July 2009-June 2012
  Prager Assistant Professor

Education

- Ph.D in Mathematical Statistics — May 2009
  University of Maryland (UMD), College Park, MD, USA
  Thesis: Asymptotic Problems for Stochastic Processes with Reflection and Related PDE's
  Advisor: Dr. Mark Freidlin
  Cumulative G.P.A.: 4.00/4.00

- MA in Mathematical Statistics — Sep 2004-May 2006
  University of Maryland, College Park, MD, USA
  Advisor: Dr. Mark Freidlin
  Cumulative G.P.A.: 4.00/4.00

- BSc (5 years Diploma with Thesis) in Applied Mathematics — Sep 1999-June 2004
  National Technical University of Athens, Greece
  School of Applied Mathematics and Physical Sciences
  Thesis: Extension of Itô Formulae to Sobolev Spaces and some Applications
  Advisor: Dr. Ioannis Spiliotis
  Cumulative G.P.A.: 9.36/10, *Rank in class*: 1$^{\text{st}}$

Research Interests

- Asymptotic problems for stochastic processes and PDE's including multiple scale problems and large deviations
- Stochastic optimal control
- Mathematical finance: credit risk, systemic risk, risk management, large portfolio asymptotics, stochastic volatility models and option pricing
- Monte Carlo methods and development of rare event simulation methods
- Metastability, transitions between metastable states
- Reaction-diffusion equations (RDE's) and wave front propagation
- Interacting particle systems
- Statistical inference for stochastic differential equations and parameter estimation

Publications

- K. Spiliopoulos, Kay Giesecke and Justin A. Sirignano "Fluctuations Analysis for Loss from Default", 2014, Stochastic Processes and their Applications, to appear.
- Sergio A. Almada and K. Spiliopoulos, "Scaling Limits and Exit Law for Multiscale Diffusions", 2014, Asymptotic Analysis, to appear.
- K. Spiliopoulos, "Fluctuation analysis and short time asymptotics for multiple scales diffusion processes", 2014, Stochastics and Dynamics, Vol. 14, No.3, 1350026.
- K. Spiliopoulos and A. Chronopoulou, "Maximum likelihood estimation for small noise multiscale disffusions", 2013, Statistical Inference for Stochastic Processes, Volume 16, Issue 3, pp. 237-266.

Date: March 5, 2014.

- K. Spiliopoulos, "Large Deviations and Importance Sampling for Systems of Slow-Fast Motion", 2012, Applied Mathematics and Optimization, Vol. 67, pp. 123161.
- K. Giesecke, K. Spiliopoulos, R. Sowers and J. A. Sirignano, "Large Portfolio Asymptotics for Losses from Default", 2012, Mathematical Finance, accepted, to appear in a future issue.
- K. Giesecke, K. Spiliopoulos and R. Sowers, "Default Clustering in Large Portfolios: Typical Events", 2013, Annals of Applied Probability, Vol. 23, No. 1, pp. 348-385.
- P. Dupuis, K. Spiliopoulos and H. Wang, "Importance Sampling for Multiscale Diffusions", 2012, Multiscale Modeling and Simulation, Vol. 12, No. 1, pp. 1-27.
- P. Dupuis and K. Spiliopoulos, "Large Deviations for Multiscale Diffusions via Weak Convergence Methods", 2012, Stochastic Processes and their Applications, Vol. 122, pp. 1947-1987.
- K. Spiliopoulos and R. Sowers, "Recovery Rates in Investment-Grade Pools of Credit Assets: A Large Deviations Analysis", 2011, Stochastic Processes and their Applications, Volume 121, Issue 12, pp. 2861-2898.
- P. Dupuis, K. Spiliopoulos and H. Wang, "Rare Event Simulation in Rough Energy Landscapes", 2011, Winter Simulation Conference, appeared.
- K. Spiliopoulos, "Large Deviations Principle for a Large Class of One-Dimensional Homogeneous Strong Markov Processes", 2011, Journal of Theoretical Probability, to appear.
- K. Spiliopoulos, "Wiener Process with Reflection in non smooth Narrow Tubes", 2009, Electronic Journal of Probability, Vol. 14, Paper no. 69, pp. 2011-2037
- K. Spiliopoulos, "Method of Moments Estimation of Ornstein-Uhlenbeck Processes Driven by General Lévy Process", December 2009, Annales de l'I.S.U.P., Volume 53 - Fascicule 2-3, pp. 3-19.
- M. Freidlin and K. Spiliopoulos, "Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains", 2008, Asymptotic Analysis, Vol. 59, No. 3-4, pp. 227-249.
- K. Spiliopoulos, "A note on the Smoluchowski-Kramers Approximation for the Langevin Equation with Reflection", 2007, Stochastics and Dynamics, Vol. 7, No. 2, pp. 141-153.

Submitted Papers

- P. Dupuis, K. Spiliopoulos and X. Zhou "Escaping from an Attractor: Importance Sampling and Rest Points, Part I", 2013, submitted
- K. Spiliopoulos and Andrew Papanicolaou, "Filtering the Maximum Likelihood for Multiscale Problems", 2013, submitted
- K. Spiliopoulos, "Non-asymptotic performance analysis of importance sampling schemes for small noise diffusions", 2013, submitted
- K. Spiliopoulos and Richard Sowers, "Default Clustering in Large Pools: Large Deviations", 2013, submitted
- K. Spiliopoulos, "Quenched Large Deviations for Multiscale Diffusion Processes in Random Environments", 2013, submitted
- K. Spiliopoulos, "Systemic Risk and Default Clustering for Large Financial Systems", 2014, submitted
- Luc Rey-Bellet and K. Spiliopoulos, "Irreversible Langevin samplers and variance reduction: a large deviations approach", 2014, about to be submitted

Distinctions, Awards and Grants

- Hariri Institute Junior Fellow, 2013-2015
- NSF-DMS 1312124, 2013-2016
- SIAM early career travel grant, 2011-2012
  2012 SIAM Conference on Financial Mathematics Engineering (FM12)
- IATF travel grant, Brown University 2011-2012
- Block travel grant for the 16th INFORMS Applied Probability Conference 2011
- Monroe Martin Talk Award in the presentation competition of the Spotlight on Graduate Research at the University of Maryland 2008-2009
- Awarded Department of Mathematics Dissertation Fellowship, University of Maryland Fall 2008
- Seymour Goldberg Paper Award for paper submitted in Spotlight on Graduate Research at the University of Maryland 2007-2008
- Levermore Foundation Travel Grant, University of Maryland 2007

- Goldhaber Travel Grant, Graduate School, University of Maryland 2006
- Block Grant Fellowship from the Department of Mathematics of the University of Maryland 2004-2006
- Award from Eygenidio Foundation for outstanding Greek students that are pursuing graduate studies 2004-2005
- Three times awarded from the Technical Chamber of Greece for academic excellence at the School of Applied Mathematics and Physical Sciences of the National Technical University of Athens, Greece 2003-2005
- Three times awarded from the Greek State Scholarships Foundation for academic excellence at the School of Applied Mathematics and Physical Sciences of the National Technical University of Athens, Greece 2003-2005

Teaching Experience

- GRS MA884- Topics in Multiscale Analysis: Theory, Computation and Applications (graduate), Boston University, Spring 2014
- MA115-Statistics I (undergraduate), Boston University, Fall 2013
- MA583-Stochastic Processes (graduate), Boston University, Spring 2013
- MA115-Statistics I (undergraduate), Boston University, Fall 2012
- Operational Research-Probabilistic Methods (undergraduate), Brown University, Spring 2012
- Topics on Multiscale Methods: Theory and Computation (graduate), Brown University, Fall 2011
- Operational Research-Probabilistic Methods (undergraduate), Brown University, Spring 2011
- Topics on Averaging and Metastability with Applications (graduate), Brown University, Fall 2010
- Topics on Survival Analysis (graduate-independent study), Brown University, Summer 2010
- Nonparametric Statistics (undergraduate), Brown University Spring 2010
- Asymptotic Problems for Stochastic Processes and PDE's (graduate), Brown University Fall 2009
- Calculus I (undergraduate), University of Maryland at College Park Summer 2008
- *Discussion leader* for Calculus III, Introduction to Differential Equations, College Algebra, University of Maryland at College Park 2006-2008

Mentoring Experience

- Siragan Gulius: PhD graduate student, Boston University Fall 2013-present
- Do Young Yoon: Undergraduate student, Independent Study on "Stochastic Processes" Summer 2012-Fall 2012
  Brown University
- Abhay Sagar: MSc student, Independent Study on "Survival Analysis" Summer 2010
  Brown University

Academic Service And Seminar Organization

- *Referee* for Stochastic and Dynamics, Applied Mathematics and Optimization, Annals of Probability, SIAM Journal on Mathematical Analysis, External Evaluator for Research Proposals in Greece, Lecture Notes in Mathematics, Asymptotic Analysis, Quarterly Review of Economics and Finance, Physica D, Mathematics of Operations Research, Journal of Theoretical Probability, Annales de l'Institut Henri Poincare (C) -Analyse non lineaire, Journal of Applied Probability, Journal of Risk, Nonlinearity, Physica A, Communications on Pure and Applied Mathematics, Mathematical Finance, Finance and Stochastics, Stohcastic Systems
- *Co-organizer* of the 3rd BU-Keio workshop on Probability and Statistics, 2013
- *University Committees:* Graduate admissions committee for 2013, 2014
- *Student Committees:* Ava J. Mauro(PhD thesis committee, Spring 2014), Zhongkai Cui (PhD Committee Chair, Fall 2012), Nikolas Kim (Undergraduate Honors Committee, Spring 2013)
- *Co-organizer* of the Mathematics Colloquium at Boston University
- *Organizer* of the Probability and Statistics seminar at Boston University
- *Organizer* of the Stochastic and Probability seminar at Brown
- *Co-organizer* of the Graduate Student Statistics and Probability seminar at UMD

- *Judge* for the written Spotlight Competition on Graduate Research at UMD during 2006-2007
- *President/Treasurer* of the Hellenic Graduate Student Organization Digenis at UMD for the period from November 2004 till November 2007

Invited Talks and Lectures

- Invited lecture at the 10th International Workshop on Rare Event Simulation (RESIM) August 2014
  Amsterdam, Netherlands.
- Invited lecture at the Computational methods for statistical mechanics – At the interface between mathematical statistics and molecular simulation June 2014
  Edinburgh, Scotland.
- Invited lecture at the Probability Seminar May 2014
  CUNY, New York.
- Invited lecture at the SIAM conference on Uncertainty Quantification April 2014
  Savannah, Georgia.
- Invited lecture at the AMS Sectional Meeting on Mathematical Finance March 2014
  University of Maryland, Baltimore County, Baltimore, MD.
- Invited lecture at the Stochastics Seminar March 2014
  Georgia Tech, Atlanta.
- Invited lecture at the Joint Mathematical Meetings January 2014
  Baltimore, MD.
- Invited lecture at Division of Applied Mathematics December 2013
  Brown University, Providence.
- Invited lecture at Hariri Institute November 2013
  Boston University.
- Invited Colloquium lecture at Department of Statistics November 2013
  University of Connecticut, Connecticut.
- Invited lecture at Math Finance Seminar October 2013
  Columbia University, New York.
- Invited lecture at AMS Sectional Meeting Program October 2013
  Temple University, Philadelphia.
- Tutorial lectures on *Monte Carlo Methods for Multiscale Problems* and on *Systemic risk in large financial networks* September 2013
  BU-Keio Probability workshop, Boston University, Boston.
- *Escaping from an attractor: importance sampling and rest points* July 2013
  Session Chair and Speaker at SIAM Annual Meeting, San Diego, California.
- *Monte Carlo Methods for Multiscale Problems* June 2013
  SIAM Conference on Mathematical Aspects of Material Science, Philadelphia, Pennsulvania
- *Maximum Likelihood for Multiscale Diffusions* April 2013
  The 27th New England Statistical Symposium, 27 April 2013
- *Large Deviations and risk in large financial networks* April 2013
  Workshop on Large deviations and asymptotic methods in finance, Imperial College London, England
- *Most Likely Path to Systemic Failure* April 2013
  AMS Sectional Meeting, Boston College, Boston, 6-7 April 2013
- *Large Deviations and Monte Carlo Methods for Problems with Multiple Scales* March 2013
  Stochastics Seminar, Mathematics Department, University of Utah
- *Systemic risk in large financial networks* February 2013
  Stochastics Seminar, Mathematics Department, Worcester Polytechnic Institute
- *Systemic risk in large financial networks* November 2012
  Mathematics Department, University of Michigan, Ann Arbor
- *Escaping from an attractor: importance sampling and rest points* November 2012
  ICERM Workshop "Monte Carlo Methods in the Physical and Biological Sciences",
  Brown University, Providence
- Session Chair for "Systemic Risk" at the 2012 Informs Annual meeting October 2012
  in Phoenix, Arizona,
- *Systemic risk in large financial networks* October 2012
  Department of Mathematics, Rutgers University
- *Large Deviations and Monte Carlo Methods for Problems with Multiple Scales* October 2012
  Department of Mathematics, MIT
- *Large Deviations and Monte Carlo Methods for Problems with Multiple Scales* October 2012

Department of Mathematics and Statistics, UMASS at Amherst

- *Escaping from an attractor: importance sampling and rest points* September 2012
  2012 Data Assimilation Workshop, Oxford-Man Institute, England
- *Most Likely Path to Systemic Failure* July 2012
  SIAM Conference on Financial Mathematics and Engineering, Minnesota, Minneapolis.
- *Large Deviations and Monte Carlo Methods for Problems with Multiple Scales* July 2012
  Department of Mathematics, University of California at San Diego.
- *Large Deviations, Metastability and Monte Carlo Methods for Multiscale Problems* February 2012
  Department of Mathematics and Statistics, Boston University.
- *Large Deviations, Metastability and Monte Carlo Methods for Multiscale Problems* February 2012
  Department of Mathematical Sciences, University of Delaware.
- *Large Deviations, Metastability and Monte Carlo Methods for Multiscale Problems* January 2012
  Department of Mathematics, Virginia Tech.
- *Large Deviations, Metastability and Monte Carlo Methods for Multiscale Problems* January 2012
  Department of Statistics & Operations Research, University of North Carolina.
- *Systemic Risk in Complex Networks & Asymptotic Problems for Stochastic Processes* January 2012
  Department of Mathematical Sciences, Claremont Graduate University.
- *Recent results on systemic risk in large financial networks* January 2012
  Department of Statistics & Applied Probability, University of Santa Barbara.
- *Large deviations for multiscale diffusions and fast simulation* December 2011
  EPSRC Symposium Workshop - Multiscale Systems: Theory and Applications, Warwick, England.
- *Default clustering in large portfolios and most likely path to failure* October 2011
  Department of Operations Research and Financial Engineering, Princeton University.
- *Most likely path to failure* September 2011
  ENUMATH Conference 2011, Leicester, England.
- *Large Deviations, Fast Simulation for Multiscale Diffusions and Rough Energy Landscapes* July 2011
  Applied Probability Society Conference, KTH, Stockholm, Sweden
- *Large Deviations and Importance Sampling for Multiscale Diffusions* April 2011
  Department of Mathematics at Chicago University.
- *Default clustering in large portfolios: typical and atypical events* March 2011
  Department of Mathematics at Stanford University.
- *Large Deviations and Importance Sampling for Multiscale Diffusions* March 2011
  Department of Applied Physics and Applied Mathematics at Columbia University.
- *Large Deviations and Importance Sampling for Multiscale Diffusions* February 2011
  Department of Mathematics and Statistics at Boston University.
- *Large Deviations and Importance Sampling for Multiscale Diffusions* October 2010
  Rare Event Simulation Workshop in Bordeaux, France.
- *Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains and Wave Front Propagation* June 2010
  Department of Mathematics at the University of Minnesota
- *Large Deviations for a Large Class of 1-D Markov Processes and Applications to Reaction Diffusion Equations* September 2009
  Division of Applied Mathematics, Brown University
- *Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains and Wave Front Propagation* April 2009
  Department of Mathematics at the University of Illinois at Urbana-Champaign
- *Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains and Wave Front Propagation* April 2009
  Department of Statistics at Warwick University, England
- *Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains and Wave Front Propagation* January 2009
  Department of Statistics and Applied Probability and the Center for Financial Mathematics and Statistics at the University of Santa Barbara
- *Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains and Wave Front Propagation* October 2008
  Applied Partial Differential Equations Research Interaction Team at UMD

- *Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains and Wave Front Propagation* — September 2008
  School of Applied Mathematics and Physics, National Technical University of Athens, Greece
- *Lectures in Homogenization with Probabilistic Methods* — May 2007-2008
  Invited lectures in Advanced Analytic Methods with Applications
  (Graduate course at UMD)
- *Reaction-Diffusion Equations with Non-Linear Boundary Conditions in Narrow Domains*, Invited talk, Graduation Conference, Dept. Of Math, UMD — May 2008
- *Wave Front Propagation In Narrow Domains* — April 2008
  Invited talk, Graduate Research Interaction Day, UMD
- *Log Prices following General Lévy Driven Ornstein- Uhlenbeck Processes* — November 2007
  Talk, Mathematical Finance Research Interaction Team, UMD
- *Probabilistic Approach in Homogenization: An Introduction* — September 2007
  Talk, Graduate Students Statistics and Probability Seminar, UMD
- *Wave Propagation In Narrow Tubes* — September 2007
  Talk, Summer School "De Ludo Aleae" on Probability,
  Universita' "La Sapienza" Roma, Italy
- *The Smoluchowski-Kramers Approximation for the Langevin Equation with Reflection* — June 2006
  Talk, Large Scale Stochastic Dynamics and Interaction with Kinetic Theory
  Foundation for Research and Technology, Heraklion Crete, Greece

Memberships in Professional Organizations

- American Mathematical Society — September 2004-present
- Institute of Mathematical Statistics — February 2007-present

Professional Experience

- *Internship in Risk Management* — July-Aug 2003
  Athens Derivative Clearing House, Athens, Greece
  (i) Exchange-traded derivative products
  (ii) Development of a C application that reads all investor positions and margin parameters and produces their margin requirements (It is being used for intraday margin calculations and analysis of what-if margin scenarios)
- *Internship in Mathematical Theory of Control and it's Applications to Economics* — May 2003
  Moscow State Aviation Institute, Moscow, Russia
  (i) Mathematical Optimal Control
- *Internship in P2P Networks* — June-Aug 2002
  University of Rostock, Rostock, Germany
  (i) Software simulations for information search in a P2P community
  (ii) Analysis of the results of two approaches for information search (random search and information related search)
- *Assistant in Computer Laboratories* — Sep-Dec 2000
  National Technical University of Athens, Athens, Greece
  (i) Supervision and organization of laboratory exercises

Skills

- *Languages:* Greek (native), English (fluent), German (intermediate), French (basic knowledge)
- *Computer Skills:* C, C++, Html, Splus, R, SAS, Matlab, Mathematica, Latex, Microsoft Office, Windows XP, Linux