Andrey Sarantsev

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Department of Mathematics & Statistics
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Research Interests

Probability Theory, Mathematical Statistics, Quantitative Finance

Random particle systems interacting through ranks; long-term stability of stochastic processes; concentration of measure for stochastic equations; systemic financial risk; financial econometrics; retirement planning; risk theory and ruin probability; stochastic portfolio theory; forest dynamics

Employment

University of Nevada, Reno (UNR)
Department of Mathematics and Statistics
Assistant Professor (tenure-track), 2018–now

University of California, Santa Barbara (UCSB)
Department of Statistics and Applied Probability
Visiting Assistant Professor, 2015–2018
Mentor: Jean-Pierre Fouque. Partially supported by his NSF grant DMS 1409434

Education

University of Washington, Seattle
Ph.D. in Mathematics, 2010–2015
Adviser: Soumik Pal. **Thesis:** Competing Brownian Particles

Lomonosov Moscow State University, Moscow, Russia
Specialist (Master's equivalent) with Honors in Mathematics, 2005–2010
Undergraduate Mentor: Vladimir Piterbarg

57th mathematics high school
Top math high school in Moscow, Russia, 2001–2005

Research Advising

Ph.D. students: Abraham Atsiwo, Jihyun Park, Hayden Brown (current);
M.S. students: Kwame Boamah-Addo, Hayden Brown (former)
Undergraduate students: 10 former students

Published Articles

1. Birth and Death Processes in Interactive Random Environments (2022).
   With Guodong Pang and Yuri Suhov. *Queueing Systems* **102** (1–2), 269–307.
   Available at arXiv:2203.10411.
2. Transient Behaviors of Single-Server Queues with Diffusive Rates (2022).
   With Guodong Pang and Yuri Suhov. *Queueing Systems* **100** (3–4), 333–335.
3. Penalty Method for Obliquely Reflected Diffusions (2021).
   Lithuanian Mathematical Journal **61** (4), 518–549. Available at arXiv:1509.01777.
4. Optimal Portfolio with Power Utility for Absolute and Relative Wealth (2021).
   Statistics & Probability Letters **179** 109225. Available at arXiv:2105.0813.

5. A Stock Market Model Based on CAPM and Market Size (2021).
Brandon Flores, Blessing Ofori-Atta. *A*nnals of Finance **17** (3), 405–424.
Available at arXiv:1907.08911.

6. Sub-exponential Rate of Convergence to Equilibrium for Processes on the Half-line (2021).
Stat. Probab. Let. **175** 109115. Available at arXiv:2003.10614.

7. Time Series Analysis of Forest Dynamics at the Ecoregion Level (2020).
With Olga Rumyantseva and Nikolay Strigul. *Forecasting* **2** (3), 364–386.

8. Convergence Rate to Equilibrium in Wasserstein Distance for Reflected Jump–Diffusions (2020).
Stat. Probab. Let. **165** 108860. Available at arXiv:2003.10590.

9. Stationary Distributions and Convergence for M/M/1 Queues in Interactive Random Environment (2020). With Yana Belopolskaya, Guodong Pang, and Yurii Suhov. *Queueing Systems* **94** (3–4), 357–392. Available at arXiv:1902:03941.

10. A Note on Jump Atlas Models (2020).
With Clayton Barnes. *Bernoulli* **34** (4), 844–857. Available at arXiv:1610.04323.

11. Autoregression Modeling of Forest Dynamics (2019).
With Olga Rumyantseva and Nikolay Strigul.
MDPI Forests **10** (12), 1074. Available at arXiv:1911.09182.

12. Exponential Convergence Rate of Ruin Probabilities for Level-Dependent Lévy-Driven Risk Processes (2019). With Pierre-Olivier Goffard. *J. Appl. Probab.* **56** (4), 1244–1268.
Available at arXiv:1710.01845.

13. Talagrand Concentration Inequalities for Stochastic Partial Differential Equations (2019).
With Davar Khoshnevisan. *SPDE Anal. Comp.* **7** (4), 679–698. Available at arXiv:1709.07098.

14. Stationary Distributions and Convergence of Walsh Diffusions (2018).
With Tomoyuki Ichiba. *Bernoulli* **25** (4A), 2439–2478. Available at arXiv:1706.07127.

15. Dynamic Contagion in a Banking System with Births and Defaults (2019).
With Tomoyuki Ichiba and Michael Ludkovski.
Ann. Finance **15** (4), 489–538. Available at arXiv:1807.08987.

16. Comparison Techniques for Competing Brownian Particles (2019).
J. Th. Probab. **32** (2), 545–585. Available at arXiv:1305.1653.

17. Brownian Particles with Rank-Dependent Drifts: Out-of-Equilibrium Behavior (2019).
With Manuel Cabezas, Amir Dembo, Vladas Sidoravicius.
Comm. Pure Appl. Math. **72** (7), 1424–1458. Available at arXiv:1708.01918.

18. Large Rank-Based Models with Common Noise (2019).
With Praveen Kolli. *Stat. Probab. Let.* **151**, 29–35. Available at arXiv:1802.06202

19. A Note on Transportation Cost Inequalities for Diffusions with Reflections (2019).
With Soumik Pal. *Electr. Comm. Probab.* **24** (21), 1–11. Available at arXiv:1808.02164.

20. Modeling Systemic Risk with Interbank Flows, Borrowing, and Investing (2018).
With Aditya Maheshwari. *Risks* **6** (4), 1–26. Available at arXiv:1707.03542.

21. Weak Convergence of Obliquely Reflected Diffusions (2018).
Ann. Inst. H. Poincare **54** (3), 1408-1431. Available at arXiv:1509.01778.

22. Multiple Collisions in Systems of Competing Brownian Particles (2018).
With Cameron Bruggeman. *Bernoulli* **24** (1), 156-201. Available at arXiv:1309.2621.

23. Infinite Systems of Competing Brownian Particles (2017).
Ann. Inst. H. Poincare **53** (4), 2279-2315. Available at arXiv:1403.4229.

24. Yet Another Condition for Absence of Collisions for Competing Brownian Particles (2017).
With Tomoyuki Ichiba. *Electr. Comm. Probab.* **22** (8), 1-7. Available at arXiv:1608.07220.

25. Stationary Gap Distributions for Infinite Systems of Competing Brownian Particles (2017). With Li-Cheng Tsai. *Electr. J. Probab.* **22** (56), 1-20. Available at arXiv:1608.00628.
26. Reflected Brownian Motion in a Convex Polyhedral Cone: Tail Estimates for the Stationary Distribution (2017). *J. Th. Probab.* **30** (3), 1200-1223. Available at arXiv:1509.01781.
27. Two-Sided Infinite Systems of Competing Brownian Particles (2017). *ESAIM Probab. Stat.* **21**, 317-349. Available at arXiv:1509.01859.
28. Explicit Rates of Exponential Convergence for Reflected Jump-Diffusions on the Half-Line (2016). *ALEA Lat. Am. J. Probab. Math. Stat.* **13** (2), 1069-1093. Available at arXiv:1509.01783.
29. Penalty Method for Reflected Diffusions on the Half-Line (2016). With Cameron Bruggeman. *Stochastics* **89** (2), 485-509. Available at arXiv:1509.01776.
30. Diverse Market Models of Competing Brownian Particles with Splits and Mergers (2016). With Ioannis Karatzas. *Ann. Appl. Probab.* **26** (3), 1329-1361. Available at arXiv:1404.0748.
31. Triple and Simultaneous Collisions of Competing Brownian Particles (2015). *Electr. J. Probab.* **20** (29), 1-28. Available at arXiv:1401.6255.
32. On a Class of Diverse Market Models (2014). *Ann. Finance* **10** (2), 291-314. Available at arXiv:1301.5941.

Other Manuscripts

1. IID Time Series Testing (2022). Available at arXiv:2203.10405.
2. Modified Method of Moments for Generalized Laplace Distributions (2022). With Adrian Fischer and Robert E. Gaunt. Available at arXiv:2203.10775.
3. A New Stock Market Valuation Measure with Applications to Equity-Linked Annuities (2022). Available at arXiv:1905.04603
4. Partisan Lean of States: Electoral College and Popular Vote (2019). With Richard Foote, Grant Schissler. Available at arXiv:1905.04444.
5. Laguerre and Jacobi Analogues of the Warren Process (2017). **Appendix** for the paper by Yi Sun. Available at arXiv:1610.01635.

Fellowships and Awards

2010	Academic Excellence Award, McKibben & Merner Fellowship for passing Preliminary Exams
2010	Top Report Award on the 17th International Conference "Lomonosov-2010"
2005–2010	Academic Fellowship, Lomonosov Moscow State University (7 times)
2002, 2005	Honorable Mention, Moscow Mathematical Olympiad

Teaching Experience

University of Nevada, Reno:
Differential Equations, Statistics & Probability for Engineers, Probability Theory, Stochastic Processes (undergraduate), Probability Theory, Time Series (Ph.D. level)

University of California, Santa Barbara:
Probability Theory, Stochastic Processes (undergraduate)

University of Washington:

Instructor: Multivariable and Vector Calculus (III and IV), Differential Equations, Matrix Algebra, Linear Analysis (PDE, systems of ODE), ProbabilityTheory (undergraduate) **Teaching Assistant:** REU Program in Inverse Problems
Homework Grader: Real Analysis (Ph.D. level)
Quiz Sections Instructor: Multivariable Calculus (Calculus III)

Research Talks

2022	University of Texas, Dallas; University of Utah
2021	Frontier Probability Days (University of Nevada Las Vegas)
2020	University of Montana; Joint Mathematics Meeting; University of Mississippi; Washington State University; Penn State University; European Seminar in Computing; Computational & Methodological Statistics
2019	American Statistical Association Nevada Sectional Meeting; INFORMS Annual Meeting
2018	Florida State University; Cornell University; Carnegie Mellon University; California State University, Los Angeles; University of Nevada, Reno; Frontier Probability Days; University of Minnesota; UCSB; University of Washington; AMS Western and Eastern Fall Sectional Meetings
2017	AMS Western, Southweatern, and Central Fall Sectional Meetings; INFORMS Annual Meeting in Houston; Center for Financial Mathematics & Actuarial Research (UCSB) 10th anniversary conference; University of Utah; UCSB; Boston University; 9th Western Conference in Mathematical Finance; Seminar on Stochastic Processes; University of Maryland, College Park; University of Delaware; AMS Central Spring Sectional Meeting; University of Washington
2016	SIAM Conference in Financial Mathematics; Michigan State University; Carnegie Mellon University; Oregon State University; University of Washington; University of Illinois, Chicago; Princeton University; Columbia University; City University of New York
2015	Southern California Probability Symposium; University of Southern California; UCSB
2014	Columbia University; Seminar on Stochastic Processes; UCSB

Service Duties

- Accessibilityfor visually impaired students
- Department research library
- Graduate-level comprehensive and qualifying exams
- Statistics and Data Science graduate committee
- Graduate committee member of several graduate students
- Recommendation letters for former students: graduate applications
- Python workshops for students Refereeing research manuscripts

Languages and Software

Languages: English (fluent), Russian (native)
Coding: MATLAB, C, Python, R
Editors: LaTeX, HTML

Personal Information

Born October 9, 1989, in Moscow, Russia
Citizenship: Russian
USA Permanent Resident (Green Card)

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