Oleg Butkovsky

`www.wias-berlin.de/people/butkovsky`
oleg.butkovskiy@gmail.com
phone: +49 17677735715

CURRENT POSITION

Researcher, from 10/2019
Weierstrass Institute for Analysis and Stochastics (WIAS), Germany

PREVIOUS POSITIONS

Postdoctoral fellow, 01/2017–09/2019
Technische Universität Berlin, Germany
Host Professor: Michael Scheutzow

Visiting postdoc member, 08/2015–12/2015
Mathematical Sciences Research Institute, Berkeley, California
Member of a special MSRI program: Deterministic Dynamics and Randomness in High and Infinite Dimensional Systems.
Host Professor: Fraydon Rezakhanlou

Postdoctoral fellow, 10/2013–12/2016
Technion — Israel Institute of Technology, Israel
Host Professor: Leonid Mytnik

EDUCATION

Ph.D. in Probability and Statistics, 10/2009–07/2013
Department of Probability Theory, Moscow State University
Scientific Advisors: Alexander Veretennikov & Alexander Bulinski

B.Sc.+M.Sc. in Mathematics, 09/2004–07/2009, *First Class Honours*
Department of Probability Theory, Moscow State University
GPA 5.0/5.0

PUBLICATIONS

1. Strong rate of convergence of the Euler scheme for SDEs with irregular drift driven by Levy noise (with K. Dareiotis, M. Gerencsér)
   To appear in *Annales de l'Institut Henri Poincaré*, 2025+, arXiv:2204.12926.

2. Stochastic equations with singular drift driven by fractional Brownian motion (with K. Lê, L. Mytnik)
   To appear in *Probability and Mathematical Physics*, 2025+, arXiv:2302.11937, 2023

3. A reproducing kernel Hilbert space approach to singular local stochastic volatility McKean-Vlasov models (with C. Bayer, D. Belomestny, J. Schoenmakers)
   Finance and Stochastics, **28**, 1147–1178, 2024.

4. Well-posedness of stochastic heat equation with distributional drift and skew stochastic heat equation (with S. Athreya, K. Lê, L. Mytnik)
   Communications on Pure and Applied Mathematics, **77**, 2708–2777, 2024.

5. Optimal rate of convergence for approximations of SPDEs with non-regular drift (with K. Dareiotis, M. Gerencsér)
   SIAM Journal on Numerical Analysis, **61**(2), 1103–1137, 2023.

6. Law of the SLE tip (with V. Margarint, Y. Yuan)
   Electronic Journal of Probability, **28**, 1–25, 2023.

7. Approximation of SDEs – a stochastic sewing approach (with K. Dareiotis, M. Gerencsér)
   Probability Theory and Related Fields, 181(4), 975–1034, 2021.

8. Couplings via comparison principle and exponential ergodicity of SPDEs in the hypoelliptic setting (with M. Scheutzow)
   Communications in Mathematical Physics, **379**(3), 1001-1034, 2020.

9. Generalized couplings and ergodic rates for SPDEs and other Markov models (with A. Kulik, M. Scheutzow)
   Annals of Applied Probability, **30**(1), 1-39, 2020.

10. Strong existence and uniqueness for stable stochastic differential equations with distributional drift (with S. Athreya, L. Mytnik)
    Annals of Probability, **48**(1), 178-210, 2020.

11. Regularization by noise and flows of solutions for a stochastic heat equation (with L. Mytnik)
    Annals of Probability, **47**(1), 165–212, 2019.

12. Invariant measures for stochastic functional differential equations (with M. Scheutzow)
    Electronic Journal of Probability, **22**(98), 1-23, 2017.

13. Subgeometric rates of convergence of Markov processes in the Wasserstein metric
    Annals of Applied Probability, **24**(2): 526–552, 2014.

14. On ergodic properties of stochastic McKean-Vlasov equations
    Theory of Probability and Its Applications, **58**(4), 661–674, 2014.

15. On asymptotics for Wasserstein coupling of a Markov chain (with A.Yu. Veretennikov)
    Stochastic Processes and their Applications, **123**(9): 3518–3541, 2013.

16. On the convergence of nonlinear Markov chains
Doklady Mathematics, **86**(3): 824-826, 2012.

PREPRINTS

1. Weak uniqueness for singular stochastic equations (with L. Mytnik)
arXiv preprint arXiv:2405.13780, 2024

2. Analytically weak and mild solutions to stochastic heat equation with irregular drift (with S. Athreya, K. Lê, L. Mytnik)
arXiv preprint arXiv:2410.06599, 2024.

3. Weak existence for SDEs with singular drifts and fractional Brownian or Levy noise beyond the subcritical regime (with S. Gallay)
arXiv preprint arXiv:2311.12013, 2023

GRANTS AND AWARDS

Grant from MFO — Oberwolfach Research Institute for Mathematics to organize a workshop “Regularization by Noise: Theoretical Foundations, Numerical Methods and Applications” (together with M. Gerencsér and A. Djurdjevac), 2022.

MSRI grant for postdocs to spend Fall 2015 Semester at MSRI, UC Berkeley.

Special award from the jury for an outstanding Ph.D. thesis, 2013.

SERVICE FOR THE COMMUNITY

Conference organizer:

Workshop “Regularization by Noise: Theoretical Foundations, Numerical Methods and Applications” held at Oberwolfach Research Institute for Mathematics (2022);

Workshop “SPDEs and their friends” (2021), online;

13th Annual ERC Berlin-Oxford Meeting on Applied Stochastic Analysis (2020), WIAS.

Referee for the journals: Communications on Pure and Applied Mathematics, Annals of Probability, Annals of Applied Probability, Probability Theory and Related Fields, Journal of Functional Analysis, Annales de l’Institut Henri Poincare, Electronic Journal of Probability, Stochastic Processes and their Applications, Bernoulli.

INVITED CONFERENCE TALKS (SELECTED)

Optimal weak uniqueness for SDEs driven by fractional Brownian motion and for stochastic heat equation with distributional drift
Workshop: Stochastic Dynamics and Stochastic Equations, Bernoulli Center, École Polytechnique Fédérale de Lausanne, March 2024

Stochastic sewing, John–Nirenberg inequality, and taming singularities for regularization by noise
Conference: Mean field interactions with singular kernels and their approximations, Institut Henri Poincaré, Paris, France, December 2023

Weak and mild solutions of SPDEs with distributional drift
Bernoulli 42nd conference on Stochastic Processes and their Applications, Wuhan, China (virtually), August 2022.

Regularization by noise via stochastic sewing with random controls
German Probability and Statistics Days, Germany, Mannheim (virtually), September 2021.

Regularization by noise for SPDEs and SDEs: a stochastic sewing approach
Bernoulli-IMS 10th World Congress in Probability and Statistics, South Korea, Seoul (virtually), July 2021.

Regularization by noise for SDEs and related systems: a tale of two approaches
Eighth Bielefeld-Korean joint Workshop in Mathematics, Germany, Bielefeld, February 2020.

Stochastic sewing lemma with propagators and uniqueness of solutions of stochastic heat equation with distributional drift
Berlin-Leipzig workshop in Analysis and Stochastics, Leipzig, Germany, January 2019.

Generalized couplings and exponential ergodicity of nonlinear SPDEs
Banff workshop on Interacting Particle Systems and Parabolic PDEs, Banff, Canada, August 2018.

INVITED SEMINAR TALKS (SELECTED)

Approximation of SDEs with irregular drift: stochastic sewing approach
Freie Universität Berlin, Numerical Analysis seminar, June 2023

New coupling methods for proving ergodicity of SPDEs
University of Bonn, Probability Theory and Stochastic Analysis seminar, Bonn, Germany, November 2019.

New coupling techniques for exponential ergodicity of SPDEs in the hypoelliptic and effectively elliptic settings
New York University, Courant Institute Probability and Mathematical Physics seminar, New York, USA, February 2019.

Generalized couplings and rate of convergence of SPDEs to the invariant measure
Imperial College London, Probability Seminar, London, UK, March 2018.

Regularization by noise and path-by-path uniqueness for SDEs and SPDEs
Oxford University, Stochastic Analysis seminar, Oxford, UK, February 2018.

Regularization by noise and path-by-path uniqueness for SDEs and SPDEs
Max-Planck-Institut fur Mathematik, Probability seminar, Leipzig, Germany, February 2018.

Path-by-path uniqueness for stochastic heat equation
MSRI Probability Seminar, UC Berkeley, California, USA, October 2015.

On ergodic properties of stochastic McKean-Vlasov equations
University of Edinburgh, North British Probability Seminar, Edinburgh, UK, January 2013.