

YULIA PETROVA

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Born 29 June 1991, Ukhta, Russia · Married, no children



RESEARCH INTERESTS

Nonlinear partial differential equations and their applications: hyperbolic conservation laws (Riemann problem, admissibility of shocks and contact discontinuities, uniqueness), fluid dynamics in porous media (viscous and gravitational fingering, incompressible porous medium equation), reaction–convection–diffusion equations (traveling waves, propagating terraces); spectral theory and L_2 -small ball probabilities of Gaussian processes; applications to enhanced oil recovery and mathematical biology.

POSITIONS

2025–PRESENT	Assistant Professor (Professora Doutora, RDIDP) , Department of Mathematics, IME-USP, São Paulo, Brazil; accredited advisor of the Graduate Program in Mathematics
2023–2025	Assistant Professor , Department of Mathematics, PUC-Rio, Rio de Janeiro, Brazil (“Projeto Paz”)
2021–2023	Postdoctoral fellow (Pós-doutorado de Excelência) , IMPA, Rio de Janeiro, Brazil Mentors: Dan Marchesin, Bradley J. Plohr
2017–2021	Researcher , Chebyshev Laboratory, Saint Petersburg State University, Russia; industrial project on enhanced oil recovery with PJSC Gazprom Neft (patent and registered software)
2012–2021	Lecturer : Saint Petersburg State University (2018–2021), Saint Petersburg Academic University (2014–2018), Saint Petersburg Polytechnic University (2012–2015). Saint Petersburg, Russia

EDUCATION

2018	PhD in Mathematics and Physics , St. Petersburg State University, Russia. Thesis: <i>Exact L_2-small ball asymptotics for finite-dimensional perturbations of Gaussian processes</i> . Supervisor: A. I. Nazarov
2013	MSc in Mathematics , Chair of Mathematical Physics, St. Petersburg State University, Russia

GRANTS AND AWARDS

2026–2029	PI , FAPESP Regular Research Grant 2026/07916-0 (incl. undergraduate, MSc and PhD scholarships) R\$ 600,000 ($\approx$ US\$ 115,000) <i>Wave propagation in conservation laws and reaction–convection–diffusion equations</i>
2025–2027	PI , Programa de Apoio a Novos Docentes, University of São Paulo R\$ 50,000 ($\approx$ US\$ 9,600) <i>Wave propagation in fluid dynamics and mathematical biology</i>
2025	PI , USP Call for Support to Scientific Events – funding for SAnPA, IME-USP R\$ 14,000 ($\approx$ US\$ 2,700)
2024–2025	PI , FAPERJ APQ 1 grant E-26/210.700/2024 R\$ 14,500 ($\approx$ US\$ 2,800) <i>Fluid dynamics in porous media</i>
2013–2028	Team member of two CNPq Universal grants (PI: W. Neves, UFRJ; 2025–2028: R\$ 210,000 ($\approx$ US\$ 40,000); 2024–2025: R\$ 52,500 ($\approx$ US\$ 10,100)), four Russian Science Foundation / RFBR grants and a President of Russia grant; co-PI of RSF grant 21-11-00047 (2021)
2019	“Young Mathematician” Prize of the St. Petersburg Mathematical Society
2018	Winner of the 22nd Möbius Contest (category “Undergraduates and graduates”); Gazprom Neft Scholarship (2018–2019)

SELECTED PUBLICATIONS

15 journal articles, 2 proceedings papers, 1 patent, 1 registered computer program; full list at [yulia-petrova.github.io](https://github.com/yulia-petrova).

- (with S. Tikhomirov, Ya. Efendiev)
Propagating terrace in a two-tubes model of gravitational fingering
SIAM Journal on Mathematical Analysis, 57(1):30–64, 2025 · doi:10.1137/24M1632668 · arXiv:2401.05981
- (with B. Plohr, D. Marchesin)
Vanishing adsorption admissibility criterion for contact discontinuities in the polymer model
Journal of Hyperbolic Differential Equations, 21(2):299–327, 2024 · doi:10.1142/S0219891624500103 · arXiv:2211.10326

- (with F. Bakharev, A. Enin, N. Rastegaev)
Impact of dissipation ratio on vanishing viscosity solutions of the Riemann problem for chemical flooding model
Journal of Hyperbolic Differential Equations, 20(2):407–432, 2023 · doi:10.1142/S0219891623500121 · arXiv:2111.15001
- (with A. I. Nazarov)
 L_2 -small ball asymptotics for Gaussian random functions: a survey
Probability Surveys, 20:608–663, 2023 · doi:10.1214/23-PS20 · arXiv:2305.08927
- (with F. Bakharev, L. Campoli, A. Enin, S. Matveenko, S. Tikhomirov, A. Yakovlev)
Numerical investigation of viscous fingering phenomenon for raw field data
Transport in Porous Media, 132:443–464, 2020 · doi:10.1007/s11242-020-01400-5

SELECTED TALKS

31 talks and 6 posters at conferences and workshops in Brazil, Germany, Russia, the USA, Greece, Spain, Sweden, Singapore, India and China; 28 seminar and colloquium talks (IME-USP, ICMC-USP, IMPA, PUC-Rio, UFRJ, FU Berlin, WIAS Berlin, TU Darmstadt, TU Dortmund, LMU and TU Munich, Moscow State University, St. Petersburg State University, PDMI RAS, UC Davis).

JUL 2027	TALK	(planned) 36° Colóquio Brasileiro de Matemática, IMPA, Rio de Janeiro (thematic session in honour of the 80th birthday of Dan Marchesin)
OCT 2026	PLENARY	(planned) VII Workshop on Fluids and PDE, Recife, Brazil
AUG 2026	PLENARY	Congress <i>60 years of the Department of Mathematics of PUC-Rio</i> , Rio de Janeiro, Brazil
JUL 2026	TALK	AIMS Conference on Dynamical Systems, Differential Equations and Applications, Athens, Greece (two special-session talks)
JUL 2025	TALK	Mathematical Congress of the Americas, Miami, USA (session “New developments in mathematical fluid dynamics”)
JUN 2024	TALK	Equadiff 2024, Karlstad, Sweden (mini-symposium “Mathematics of porous media”)
FEB 2024	TALK	Oberwolfach workshop <i>Hyperbolic balance laws: interplay between scales and randomness</i> , Germany
FEB 2023	TALK	Workshop <i>Multiscale analysis and methods for quantum and kinetic problems</i> , IMS, National University of Singapore
JUN 2022	TALK	HYP 2022 – International Conference on Hyperbolic Problems, Málaga, Spain
DEC 2021	PLENARY	International conference <i>Probabilistic methods in analysis</i> , Sirius, Sochi, Russia

SUPERVISION AND TEACHING

STUDENTS	PhD: Rayssa Oliveira (IME-USP, FAPESP scholarship, from January 2027); MSc: Maria Luisa Pasinato (PUC-Rio, co-supervised with B. Sirakov, 2025); undergraduate research (IC): Caio Furtado, João Pedro Alves de Lima, Lucas Costa Teles, Fernando Martins (IME-USP, 2025–2026; PUB, PICME, PIBIC and FAPESP scholarships). Member of 2 PhD, 2 MSc and 2 BSc thesis committees
IME-USP	Calculus I, Analytic Geometry, Differential Equations I, Differentiable Functions and Series, Calculus II for Economics (classes of 45–95 students); graduate course Measure and Integration
PUC-RIO	Graduate courses <i>Shock waves in conservation laws and reaction–diffusion equations</i> , <i>Introduction to Fourier analysis</i> , <i>Semigroups for linear evolution equations</i> , <i>Proofs from THE BOOK</i>
EARLIER	Tutorials in calculus, PDEs, complex analysis, probability and calculus of variations in St. Petersburg (2012–2021); olympiad mathematics for gifted high-school students (Formulo de Integreco, 2012–2017)

ORGANISATION AND SERVICE

EVENTS	Local organising committee of the 7th BRICS Conference in Mathematics (IME-USP, Aug 2026; organiser of the session “Mathematical and Computational Modelling”); co-organiser of SANPA – Symposium on Analysis, PDEs and Applications (IME-USP, 2025), of the mini-symposium “Modelling of complex phenomena in fluid dynamics” at CNMAC 2026, of CRANED (Rio de Janeiro, 2024) and of the Q.T.P. seminar (PUC-Rio, 2024); co-founder of the seminar “Industrial Mathematics” (Chebyshev Laboratory, 2019–2022)
SERVICE	Member of the Council of the Department of Mathematics, IME-USP (2025–); referee for Acta Applicandae Mathematicae, Physics of Fluids, Journal of Dynamics and Differential Equations, Nonlinearity; member of the Brazilian and St. Petersburg Mathematical Societies
VISITORS	Hosted at IME-USP: Y. Efendiev (Texas A&M University), C. Campolina (Scuola Normale Superiore, Pisa)
LANGUAGES	Russian (native), English (fluent), Portuguese (fluent; Celpe-Bras Avançado, 2024), Spanish (intermediate)