Yulia PETROVA

PERSONAL DATA

DATE OF BIRTH:	29 June 1991
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HOMEPAGE:	https://yulia-petrova.github.io/
CURRENT POSITION:	Instituto de Matematica Pura e Applicada, Rio de Janeiro, Brazil. Postdoc.

RESEARCH INTERESTS

- Hyperbolic conservation laws
- Travelling and shock waves
- Multiphase flow in porous media
- Partial differential equations
- Gaussian processes
- Spectral theory

EDUCATION

NOV 2018	PhD in Mathematics and Physics, St Petersburg State University, Russia. Supervisor: Alexander I. Nazarov PhD thesis: «Exact L_2-small ball asymptotics for finite-dimensional perturbations of Gaussian processes» (in Russian). Short version (in Russian).
JUN 2013	MSc in Mathematics, chair of Mathematical Physics, St Petersburg State University, Russia

PROFESSIONAL EXPERIENCE

2021– PRESENT	Postdoc of excellence at Instituto de Matematica Pura e Applicada (IMPA) Rio de Janeiro, Brazil. Researcher at Center PI, IMPA.
2017–2021	Researcher at Chebyshev laboratory, St Petersburg State University, Russia. Participant of industrial projects with PJSC «Gazprom Neft».
2018–2021	Teaching at Department of Mathematics and Computer Science St Petersburg State University, Russia.
2014–2018	Assistant at Department of Mathematics and Information Technology St Petersburg Academic University, Russia.
2012–2015	Assistant at Institute of Physics, Nanotechnology and Telecommunications St Petersburg Polytecnic University, Russia.

RESEARCH AWARDS

2019	Laureat of the «Young Mathematician» prize of the Saint-Petersburg Mathematical Society
2018–2019	«Gazprom Neft» Scholarship
2018	Winner of 22nd Möbius Contest in nomination «Undergraduates and graduates»
2009	Euler Fellowship for undergraduate students

Research Grants

2021	Co-principal investigator of the Russian Science Foundation grant 21-11-00047: Stochastic processes and fields with application to data analysis
2019–2021	Participant of the Russian Science Foundation grant 19-71-30002: Analysis, geometry, mathematical physics and applications
2019–2020	Participant of the President grant MD-1791.2019.1: Parabolic equations describing displacement of viscous fluids in porous media and systems with hysteresis
2017–2018	Participant of Russian Science Foundation Grant 17-11-01003: Asymptotic spectral analysis: gaps, near-threshold anomalies, "invisibility" and eigenvalues
2016–2018	Participant of RFBR Grant 16-01-00258a: Approximation of stochastic processes and functionals of them
2013–2016	Participant of St Petersburg State University Grant 6.38.670.2013: Partial Differential Equations and applications

Research Papers and Preprints

2022	F. Bakharev, A. Enin, Yu. Petrova, N. Rastegaev, Impact of dissipation ratio on vanishing viscosity solutions of the Riemann problem for chemical flooding model. Preprint arXiv:2111.15001.
2022	F. Bakharev, A. Enin, K. Kalinin, Yu. Petrova, N. Rastegaev, S. Tikhomirov, Optimal polymer slugs injection profiles. Preprint arXiv:2012.03114.
2022	F. Bakharev, A. Enin, A. Groman, A. Kalyuzhnuk, S. Matveenko, Yu. Petrova, I.Starkov, S. Tikhomirov, Velocity of viscous fingers in miscible displacement: Comparison with analytical models. Journal of Computational and Applied Mathematics, March 2022. Link.
2021	S. Tikhomirov; F. Bakharev; A. Groman; A. Kalyuzhnyuk; Yu. Petrova; A. Enin; K. Kalinin; N. Rastegaev, Calculation of graded viscosity banks profile on the rear end of the polymer slug. SPE Russian Petroleum Technology Conference, October 2021.
2021	Yu. Petrova, L_2-small ball asymptotics for a family of finite-dimensional perturbations of Gaussian functions. Zapiski Nauchnykh Seminarov POMI, vol. 501. Nikitin's memorial volume, pp. 236–258. Link (in Russian). For the English version see arXiv:1905.07804.
2020	F. Bakharev, L. Campoli, A. Enin, S. Matveenko, Yu. Petrova, S. Tikhomirov, A. Yakovlev Numerical investigation of viscous fingering phenomenon for raw field data. Transport in Porous Media, 2020, pp. 1–22.
2018	Yu. Petrova, On spectral asymptotics for a family of finite-dimensional perturbations of operators of trace class. Doklady Math., 2018, vol. 98, №1, pp. 367–369.
2017	Yu. Petrova, Exact L_2-small ball asymptotics for some Durbin processes. Zap. nauchn. sem. POMI, 2017, vol. 466, pp. 211–233. (In Russian) Translated: Journal of Mathematical Sciences (USA), 2020, 244(5), pp. 842-857.
2017	Yu. Petrova, Spectral asymptotics for problems with integral constraints. Mat. Zametki, 2017, vol. 102(3), pp. 405–414 (In Russian). Translated: Mathematical Notes, 2017, 102(3-4), pp. 369-377.
2015	A. I. Nazarov, Yu. P. Petrova, The small ball asymptotics in Hilbertian norm for the Kac–Kiefer–Wolfowitz processes. Teor. Veroyatnost. i Primenen., 2015, Volume 60, Issue 3, Pages 482–505. Translated: Theory of Probability and its Applications, 2016, 60(3), pp. 460-480.

Presentations at Conferences & Schools

Jun 2022	International Conference on Hyperbolic Problems (HYP). Malaga, Spain. "On admissibility criteria for contact discontinuities in Glimm-Isaacson model arising in chemical flooding"	Slides
May 2022	Workshop: Branching systems, reaction-diffusion equations and population models, Centre de recherches matematiques (CRM), Montreal. Online.	
Dec 2021	International conference "Probabilistic methods in analysis", in Sirius, Sochi, Russia. Talk: "Small ball probabilities for Gaussian processes"	Slides
Aug 2021	InterPore2021. Brazilian Chapter.	Slides
Jun 2021	InterPore2021. Online conference. Talk: "Graded viscosity banks on the rear end of the polymer slug"	Slides
Aug 2019	Third ZiF Summer School "Randomness in Physics and Mathematics" From Stochastic Processes to Networks. Bielefeld, Germany. "Exact L_2-small ball asymptotics for detrended Green Gaussian processes"	Poster
May 2019	Stochastic models II. Euler Institute, St Petersburg, Russia. Talk: "Exact L_2-small ball probabilities for Durbin processes"	Slides
Jan 2018	The third Indo-Russian meeting in probability and statistics. Bangalore, India. Talk: "Exact small ball asymptotics in L_2-norm for finite-dimensional perturbations of Gaussian processes: spectral method"	Slides
Dec 2017	St Petersburg winter conference on Probability Theory and Mathematical physics. PDMI-MIAN. Talk: "On exact spectral asymptotics of finite-dimensional perturbations of integral operators of trace class"	Slides
June 2017	Symposium on Probability Theory and Random Processes, St Petersburg "Exact L_2-small ball asymptotics for perturbations of Brownian bridge"	Slides
April 2017	International conference on partial differential equations Silkroad Mathematics Center series international conferences (Beijing, China) "Spectral asymptotics in some problems with integral constraints"	Poster
June 2016	Days of Diffraction-2016, St Petersburg, Russia. Talk: "Spectral asymptotics in some problems with integral constraints"	Slides
May 2016	The 2nd Russian-Indian Joint Conference in Statistics and Probability. Talk: "Small ball asymptotics for detrended Green Gaussian processes"	Slides
Sept 2015	International conference "KROMSH-2015", Batiliman (Laspi) Talk: "Spectral asymptotics for some integro-differential operators"	
Sept 2015	Yu.V.Linnik Centennial Conference. Talk: "The L_2-small ball asymptotics for the Kac-Kiefer-Wolfowitz processes"	
July 2015	7th St.Petersburg Conference in Spectral Theory. Talk: "Asymptotics of eigenvalues for some integro-differential operators"	Slides
July 2014	Students school on Partial Differential Equations and Geometric Measure Theory, CIME, Italy	
July 2010	XIII Diffiety School on Mathematics, Santo Stefano del Sole, Italy	
July 2009	XII Diffiety School on Mathematics, Santo Stefano del Sole, Italy	

Teaching Experience

Spring 2021	Problem solving classes, calculus of variations for mathematicians Faculty of Mathematics and Computer Science St Petersburg State University	Materials (rus)
Fall 2020	Problem solving classes, probability theory for mathematicians Faculty of Mathematics and Computer Science St Petersburg State University	Materials (rus)
Spring 2020	Problem solving classes, complex analysis Faculty of Mathematics and Computer Science St Petersburg State University	Materials (rus)
2018-2019	Problem solving classes, calculus (I, II, III, IV semesters) Faculty of Mathematics and Computer Science St Petersburg State University	Materials (rus)
Jan 2019	Lecturer of the course «Random walks» in Educational Program in mathematics and computer science at «Sirius», Sochi	
Nov 2019	Assistant to the course «Dynamical systems» in COMSATS University Islamabad, Lahore Campus, Pakistan. ICTP-CUI Visiting Scholars Program for Training and Research in Math.	Materials
2014–2018	Problem solving classes, calculus (I, II, III, IV semesters) for physicists. St Petersburg Academic University	III sem IV sem
2012–2014	Problem solving classes, PDEs for physicists St Petersburg Polytecnic University	
2012–2017	Teaching olimpiad mathematics in Formulo de Integreco — International educational center for gifted high-school students. I participated in 7 winter and summer Russian and international camps. Also from 2014 till 2017 taught online courses in olimpiad maths for school students from non-capital regions of Russia.	Materials from the camp

Additional experience

Organizational:	• co-organiser of seminar "Applied and Computational Mathematics" at IMPA. • co-organiser of the seminar «Industrial Mathematics» from Feb 2019 till Feb 2022 at Chebyshev Laboratory, St Petersburg, Russia. See also YouTube.
Industrial:	I finished 6 successful industrial projects on Enhanced Oil Recovery (EOR) methods with petroleum company «Gazprom Neft» in 2018–2021 in St Petersburg, Russia;
Teamwork:	I have an experience working in a team of 13 people (2 professors, 6 mathematicians from students to postdocs, 3 numerical modellists, 1 chemist, 1 physicist) and leading a subproject of 5 people. Usually I am the leader of the group of 1-3 people.
Programming:	COMSOL Multiphysics, Matlab, basics of Python. Among numerical methods I worked with FEM, FVM, FDM.
Adaptivity:	I easily adapt to different countries. I have been to almost all European countries, India, China, Pakistan, Egypt, Mexico. Now I am a postdoc in Brazil.

Languages

Russian:	Native speaker
English:	Fluent
Spanish:	Intermediate
Portuguese:	Intermediate