

Ekaterina Shchetka

Positions

- 2020 – ... **Graduate Student Instructor**, *University of Michigan*, Department of Mathematics.
2019 – 2021 **Junior Researcher**, *Steklov Mathematical Institute of the Russian Academy of Sciences*.
2017 – 2021 **Research Assistant**, *Chebyshev Laboratory*, St. Petersburg State University.

Education

- 2020 – ... **Ph.D. student**, *University of Michigan*, Department of Mathematics.
2015 – 2017 **M.Sc. in Mathematical Physics**, *St. Petersburg State University*, graduated with honours, GPA 4.94.
2011 – 2015 **B.Sc. in Physics**, *St. Petersburg State University*, graduated with honours, GPA 4.97.

Master's Thesis

- 2017 **Quasiclassical limit and analysis of difference equations**, advisor *Prof. Dr. A. Fedotov*.

Research Interests

Spectral Theory of Ergodic and Almost Periodic Schrödinger Operators, Cantor Geometry of the Spectrum of the Almost Mathieu Operator, Semiclassical Analysis, Analytic Theory of Difference Equations on the Complex Plane, Anderson Localization.

Teaching Experience

- 2020 – ... Instructor (MATH115 Calculus I), *University of Michigan*;
2018 – 2020 Assistant to Lecturer (Calculus II, III, Probability I, II), *St. Petersburg State University*;
2018 Introduction to Anderson Localization (mini-course 6×2 hr), *Steklov Mathematical Institute*.

Grants and Scholarships

- 2021 Math Department Summer Scholarship (graduate student award), *University of Michigan*;
2020 President Scholarship in priority areas of technological development of Russia;
2019 Mathematical Progression, "Native Towns" Award of Gazprom for research in mathematics;
2018 Government Scholarship in priority areas of technological development of Russia;
2017 The winner of the competition for students and young researchers «Petropolitan Science (Re)Search»;
• Bocconi Institute of Data Science Award (Milan);
• Deich scholarship for the best master's thesis at the department of Mathematical Physics;
2016 Rokhlin Grant for young mathematicians of St. Petersburg;
• Government Scholarship for high academic achievements;
• St. Petersburg State University Alumni Association Scholarship;
2015 The 2nd place winner of the August Möbius Competition (Moscow);
2013 Government Special Scholarship in the field of mathematics and physics;
• Zarubina Scholarship for high academic achievements.

Publications

- 2020 Fedotov, A., Shchetka, E. The Spectrum and Density of States of the Almost Mathieu Operator with Frequency Represented by a Continued Fraction with Large Elements. *Math Notes* 107, 1040–1045 (2020).

- A. Fedotov, E. Shchetka. Difference equations in the complex plane: quasiclassical asymptotics and Berry phase, published online in *Applicable Analysis*, <https://arxiv.org/abs/1910.09445>.
- 2018 A. Fedotov, E. Shchetka. Semiclassical asymptotics of the spectrum of the subcritical Harper operator. *Mathematical Notes* (2018), 104: 6, 948–952.
- A. Fedotov, E. Shchetka. Monodromy matrices for Harper equation. *Days on Diffraction 2018*, pp. 102-106, St. Petersburg: IEEE.
- A. Fedotov and E. Shchetka. Complex WKB method for a difference Schrödinger equation with the potential being a trigonometric polynomial. *St. Petersburg Math. J.* 29 (2018), 363-381.
- 2017 A.A. Fedotov, E.V. Shchetka. The complex WKB method for difference equations in bounded domains. *Journal of Mathematical Sciences (USA)* 2017, 224:1 157-169.
- A. Fedotov, E. Shchetka. Berry phase for difference equations. *Days on Diffraction 2017*, pp. 113-116, St. Petersburg: IEEE.
- 2016 A. Fedotov, E. Shchetka. Complex WKB method for difference equations in unbounded domains. *Days on Diffraction 2016*, pp. 140-143, St. Petersburg: IEEE.

Conference and Seminar Talks

- 2021 **Workshop “Semiclassical Asymptotics and Nonlocal Elliptic Problems”**, RUDN University, online.
- 2020 **Annual International Conference “Days on Diffraction”**, Steklov Math Institute, online.
 - **Conference on Spectral Theory and Mathematical Physics**, Sirius Mathematics Center, Sochi, Russia.
- 2019 **St. Petersburg Youth Conference in Probability and Mathematical Physics**, Steklov Math Institute.
 - **Conference “Asymptotic Analysis & Spectral Theory”**, University Paris-Sud, Orsay, France.
 - **Department of Mathematical Physics Seminar**, St. Petersburg State University.
 - **School “Randomness in Physics and Mathematics”**, ZiF - Center for Interdisciplinary Research, Bielefeld University, Bielefeld, Germany.
 - **4th Russian-Indian Conference in Statistics and Probability**, Euler Math Institute, St. Petersburg.
 - **Annual International Conference “Days on Diffraction”**, Steklov Math Institute, St. Petersburg.
 - **Dynamical Systems Seminar**, Higher School of Economics, Moscow.
 - **Conference “Nonlinear dynamics and long-time asymptotics”**, Steklov Math Institute, St. Petersburg.
 - **Conference “Stochastic Models II”**, Euler International Math Institute, St. Petersburg.
 - **School “Spectral Function Theory”**, Chebyshev Laboratory, St. Petersburg State University.
 - **Research School “Coulomb Gas, Integrability and Painleve’s Equations” (poster)**, CIRM, Marceille Luminy, France.
- 2018 **St. Petersburg Youth Conference in Probability and Mathematical Physics**, Steklov Institute.
 - **Conférence “Semi-classical and geometric asymptotics in mathematical physics”**, Laboratoire CPT, Université de Toulon, Toulon, France.
 - **Annual International Conference “Days on Diffraction”**, Steklov Math Institute, St. Petersburg.
 - **Department of Mathematical Physics Seminar**, St. Petersburg State University.
- 2017 **St. Petersburg Youth Conference in Probability and Mathematical Physics**, Steklov Institute.
 - **Chebyshev Lab Student Colloquium**, Chebyshev Laboratory, St. Petersburg State University.
 - **International Student Conference “Science and Progress”**, St. Petersburg State University.
 - **Annual International Conference “Days on Diffraction”**, Steklov Math Institute, St. Petersburg.
- 2016 **School “Spectral Theory, Differential Equations, and Probability”**, Johannes Gutenberg Universität, Mainz, Germany.
 - **8th St.Petersburg Conference in Spectral Theory**, Euler International Mathematical Institute.
 - **Annual International Conference “Days on Diffraction”**, Steklov Math Institute, St. Petersburg.
 - **St. Petersburg Seminar on Wave Diffraction and Propagation**, Steklov Mathematical Institute.
 - **Department of Math. Physics Seminar**, St. Petersburg State University.
- 2015 **International Student Conference “Science and Progress”**, St. Petersburg State University.
 - **August Möbius Competition**, Independent University of Moscow.

Research Visits

2020 March 1-24, STEPS Program, *Prof. Hosho Katsura*, Department of Physics, University of Tokyo, Japan.

Research Projects

- 2019 Analysis, geometry, mathematical physics and its applications (supervisor A. Baranov), RSF 19-71-30002.
- 2017 – 2021 Developing of asymptotic and spectral investigation methods for periodic and almost periodic differential operators (T. Suslina), RSF 17-11-01069.
- 2017 – 2019 Spectral and scattering theory methods in quantum physics and wave propagation theory (A. Fedotov), RFBR 17-01-00668;
- 2017 – 2019 Asymptotic and spectral analysis of quantum systems with underlying periodicity (A. Fedotov), RFBR 17-51-150008-a;
- 2017 – 2018 Analysis and algebra in applications and interaction (S. Smirnov), RSF 14-21-00035.

Mathematical Schools and Programs

- 2021 **Spring school on asymptotic methods and applications**, *Isaac Newton Institute for Mathematical Sciences*, online.
- **School on Moduli Spaces, Combinatorics and Integrable Systems**, *Euler International Mathematical Institute*, online.
 - **Spectral Theory and Mathematical Physics**, *Euler International Mathematical Institute*, St. Petersburg.
 - **RAW (Random Schrödinger operators Arising in the study of random Walks) Graduate School**, online.
- 2019 **Zimmer's Conjecture (Arbeitsgemeinschaft)**, *MFO, Oberwolfach Research Institute for Mathematics*, Oberwolfach, Germany.
- **Lectures on Statistical and Condensed Matter Field Theory**, *Institut Henri Poincaré*, Paris, France.
 - **Randomness in Physics and Mathematics**, *ZiF Center for Interdisciplinary Research, Bielefeld University*, Bielefeld, Germany.
 - **Coulomb Gas, Integrability and Painleve's Equations**, *CIRM*, Marceille Luminy, France.
- 2018 **Rigidity of Stationary Measure (Arbeitsgemeinschaft)**, *MFO, Oberwolfach Research Institute for Mathematics*, Oberwolfach, Germany.
- **Spectral theory of Quasi-Periodic and Random operators (Workshop)**, *CRM, Université de Montréal*, Montreal, Canada.
 - **Current Topics in Mathematical Physics**, *The Fields Institute for Research in Mathematical Sciences*, Toronto, Canada.
- 2017 **Discrete Models in Geometry and Mathematical Physics**, *Berlin Mathematical School: Technische Universität Berlin*, Berlin, Germany.
- **Advanced Statistics and Probability: Statistical Causal Learning**, *Lake Como School of Advanced Studies*, Como, Italy.
- 2016 **Spectral Theory, Differential Equations, and Probability**, *Johannes Gutenberg Universität*, Mainz, Germany.
- **Various Aspects of Mathematical Physics**, *Euler International Mathematical Institute*, St. Petersburg.

Professional Training

- 2021 **COVID-19: Working Safely**.
- **UM/AMiBL 2021 Inquiry-Based Learning Workshop**, *3 days intensive workshop*.
- 2020 **ELI 584 Graduate Student Instructor Seminar and Practicum**, *semester-length course*.
- **Responsible Conduct of Research and Scholarship Training**.
 - **Cultivating a Culture of Respect: Sexual Harassment and Misconduct Awareness**.
 - **ELI 994 College Teaching in the US: Pedagogy, Culture and Language**, *3-week intensive course*.

Languages

Russian (native), English (fluent), French (intermediate), Chinese (basic).

Organising Activity

- 2021 **St. Petersburg Conference “Asymptotic Methods in Mathematical Physics”**, *Euler Math Institute*.
- 2020 **Annual International Conference “Days on Diffraction”**, *Steklov Institute*, St. Petersburg, moderating Asymptotic Methods session.
- 2019 **Conference “Nonlinear dynamics and long-time asymptotics”**, *Steklov Math Institute*, St. Petersburg.

Miscellaneous

2021 **Donate STEM magazine (OYLA) subscription for Suleya village Library, Russia.**

- I participate in the Dep. of Mathematical Physics Seminar (T. Suslina, St. Petersburg State University), Probability Theory and Mathematical Statistics Seminar (I. Ibragimov, Steklov Institute), Random Matrices Seminar (N. Smorodina, Steklov Institute), Analysis Seminar (D. Stolyarov, Chev. Lab.), Chebyshev Lab Colloquium (P. Zograf, A. Baranov), Spectral Theory Seminar (R. Bessonov, Euler Institute).