# CURRICULUM VITAE

Iryna EGOROVA

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| **Family name** | EGOROVA |
| **First name** | Iryna |
| **Born** | May 18, 1960, Kharkiv, Ukraine |
| **Current positions** | visiting assistant professor,<br>Purdue University, USA<br><br>leading researcher, Mathematical Division,<br>B. Verkin Institute for Low Temperature<br>Physics and Engineering of the National<br>Academy of Sciences of Ukraine (ILTPE) |
| **Office address** | Department of Mathematics,<br>Purdue University,<br>150 N. University Street, Office 811,<br>West Lafayette, IN 47907<br>e-mail: `iegorova@purdue.edu` |
| **Education** | — post-graduate: Kharkiv State University (1982-1985)<br>— graduate: Kharkiv State University (1977-1982) |
| **PhD** | Kharkiv State University, Kharkiv, Ukraine, 1987<br>Thesis title: *Spectral analysis of Dirac operators and Jacobi matrices with limit-periodic coefficients well approximated by the periodic ones*<br>Thesis advisor: Prof. Leonid Pastur |
| **Habilitation** | Institute of Mathematics, Kyiv, Ukraine, 2010<br>Thesis title: *Inverse Scattering Transform and non-decaying solutions of nonlinear evolutionary equations* |
| **Research interests** | Inverse spectral theory<br>Scattering theory<br>Nonlinear evolutionary equations |
| **Employment** | — since 2013 until present time:<br>leading researcher, B. Verkin ILTPE of NASU,Ukraine<br><br>— 2024 - Spring 2026:<br>visiting assistant professor, Purdue University, USA<br><br>— 2022 – 2023:<br>visiting researcher, University of Vienna, Austria<br><br>— Winter 2019, Winter and Spring 2020:<br>visiting researcher, University of Vienna, Austria |

— Spring 2018:
visiting associate professor, Purdue University, USA

— 2016-2017:
professor (part time), Kharkiv National University, Ukraine

— Fall 2013, Winter 2014, Winter 2015, Winter 2016,
visiting researcher, University of Vienna, Austria

— Spring 2013:
visiting professor, Purdue University, USA

— Spring 2007, Winter 2008, Winter 2009:
guest professor, University of Vienna, Austria

— 2000-2013:
senior researcher, ILTPE, Ukraine

— 2004-2007:
associate professor (part time), Kharkiv National University

— 1999-2004:
associate professor, Kharkiv National University, Ukraine

— 1998-1999:
associate professor (part time), Kharkiv Polytechnic Institute, Ukraine

— 1997-1998:
visiting researcher, University Paris 7, France

— 1994-1995:
post-doc, University Paris 7, France

— 1988-1999:
researcher, ILTPE, Kharkiv

**Awards**

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| 2013 | Yu.O. Mitropolskiy Prize of the National Academy of Sciences of Ukraine |
| 2020 | State Prize of Ukraine in Science and Technology |

**Conferences**

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| 2010 | Joint Mathematical Conference CSASC, Prague, Czech Republic |
| 2011 | Completely Integrable Systems and Applications, Vienna, Austria |
| 2012 | Conference in honour of V. A. Marchenko's 90th birthday "Spectral Theory and Differential Equations", Kharkiv, Ukraine |
| 2016 | German-Russian-Ukrainian summer school "Spectral Theory, Differential Equations and Probability", Mainz, Germany |
| 2017 | Reflectionless Operators: The Deift and Simon Conjectures, Oberwolfach, Germany |
| 2019 | Operators, Functions, and Systems of Mathematical Physics, Baku, Azerbaijan |
| 2021 | New horizons in dispersive hydrodynamics, Cambridge, Great Britain |
| 2022 | Complex Analysis, Spectral Theory and Approximation meet in Linz, Linz, Austria |
| 2022 | Programme "Dispersive hydrodynamics: mathematics, simulation and experiments, with applications in nonlinear wave", July-December 2022, Cambridge, Great Britain |
| 2025 | Universality, Nonlinearity, and Integrability, in honour of Percy Deift, KIAS, Seoul, Korea. |

**Publications in the last five years**

- Asymptotics of KdV shock waves via the Riemann–Hilbert approach (with M. Piorkowski and G. Teschl), *Indiana Univ. Math. J.*, 73 (2024), no. 2, 645-690.
- Soliton asymptotics for the KdV shock problem of low regularity (with J. Michor and G. Teschl), in "From Complex Analysis to Operator Theory: A Panorama In Memory of Sergey Naboko, M. Brown (ed.) et al., *Oper. Theory Adv. Appl.*, 291 (2023), 475-500.
- Long-time asymptotics for Toda shock waves in the modulation region (with J. Michor, A. Pryimak and G. Teschl), *J. Math. Phys. Anal. Geom.* 19 (2023) 396-442.
- Soliton asymptotics for KdV shock waves via classical inverse scattering (with J. Michor and G. Teschl), *J. Math. Anal. Appl.* 514 (2022), no. 1, Paper No. 126251, 24 pp.
- How discrete spectrum and resonances influence the asymptotics of the Toda shock wave (with J. Michor), *SIGMA* 17 (2021), 045, 32 pages.
- Rarefaction waves for Toda equation via nonlinear steepest descent (with J. Michor and G. Teschl), *Discrete Contin. Dyn. Syst.* 38 (2018) 2007 - 2028.

**List of 10 most important publications**

1. The Cauchy problem for the KdV equation with almost periodic initial data whose spectrum is nowhere dense, *Spectral operator theory and related topics, Adv. Soviet Math.*, 19, Amer. Math. Soc., Providence, RI, 1994, 181 - 208.
2. Soliton asymptotics of the Cauchy problem solution for the Toda lattice (with A. Boutet - de Monvel and E. Khruslov), *Inverse Problems* 13, no. 2 (1997) 223 - 237.
3. On solutions of nonlinear Schrödinger equations with Cantor-type spectrum (with A. Boutet - de Monvel), *J. Anal. Math.*, 72 (1997) 1 - 20.
4. Scattering theory for Jacobi operators with quasi-periodic background (with J. Michor and G. Teschl), *Comm. Math. Phys.* 264, no. 3 (2006) 811 - 842.
5. Scattering theory for Jacobi operators with general step-like quasiperiodic background (with J. Michor and G. Teschl), *Zh. Mat. Fiz. Anal. Geom.*, 4, no. 1 (2008) 33 - 62.
6. Inverse scattering theory for one-dimensional Schrödinger operators with steplike finite-gap potentials (with A. Boutet - de Monvel and G. Teschl), *J. Anal. Math.*, 106 (2008) 271 - 316.
7. On the Cauchy problem for the Korteweg-de Vries equation with steplike finite-gap initial data. I. Schwartz-type perturbations (with K. Grunert and G. Teschl), *Nonlinearity*, 22, no. 6 (2009) 1431 - 1457.
8. On the Cauchy problem for the Korteweg-de Vries equation with steplike finite-gap initial data II. Perturbations with finite moments (with G. Teschl), *J. d'Analyse Math.*, 115 (2011) 71 - 101.
9. Long-time asymptotics for the Korteweg-de Vries equation with steplike initial data (with G. Teschl, Z. Gladka, and V. Kotlyarov), *Nonlinearity* 26 (2013) 1839 - 1864.
10. Rarefaction waves of the Korteweg-de Vries equation via nonlinear steepest descent (with K. Andreiev, T.-L. Lange and G. Teschl), *J. Differential Equations* 261 (2016) 5371 - 5410.

**Teaching experience**

— Calculus I, Calculus II,
Kharkiv Polytechnic Institute
( academic year 1998-1999)

— Calculus I, Calculus II, Linear Algebra,
Kharkiv National University
(academic years 1999-2006)

— Introduction to inverse spectral problems,
graduate level course, Faculty of Mathematics,
University of Vienna (Spring 2007)

— Introduction to inverse scattering theory and application,
graduate level course, Faculty of Mathematics,
University of Vienna (Winter 2009)

— Riemann surfaces and nonlinear equations,
graduate level course,
Kharkiv National University (Fall 2009)

— Applied asymptotic analysis,
seminar for graduate students, Faculty of Mathematics,
University of Vienna (Winter 2010)

— Asymptotic evaluation of integrals,
graduate level course,
Kharkiv National University (Spring 2011)

— Inverse scattering transform,
graduate level course,
Kharkiv National University (Spring 2012 and Spring 2017)

— Topics In Vector Calculus,
Purdue University (Spring 2013 and Spring 2018)

— Partial Differential Equations
Kharkiv National University (Fall 2016 and Spring 2017)

— Asymptotical Methods in Mathematical Physics,
graduate level courses,
B. Verkin ILTPE of NASU (Spring 2019 and Spring 2021)

— Linear Algebra,
Purdue University (Spring 2024)

— Ordinary Differential Equations,
Purdue University (Fall 2024 and Spring 2025)

To date, 2 PhD students ( Gladka Zoya, 2016; Andreyev Kyrylo, 2018) and 14 Diploma students successfully defended their thesis under my supervision. I currently supervise 1 doctoral student.