Anastasia Kireeva

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Education

ETH Zurich, PhD May 2022 - May 2027 (expected)

Advisors: Prof. Afonso Bandeira, Institute for Operations Research, and Prof. David Steurer, Theoretical Computer Science
Research interests: computational complexity, high-dimensional statistics, randomized algorithms

Technical university of Munich, Master's degree Apr 2019 - Dec 2021

Mathematics in Data Science, GPA 1.1/1
Master's thesis: Phase Retrieval with Demixing

Lomonosov Moscow State university, Bachelor's degree with honors Sep 2014 - Jun 2018

Applied Mathematics and Computer Science, GPA 5.0/5,
Bachelor's thesis: Queuing systems with group serving

Teaching

Spring 2025	Lecturer — Randomized Matrix Computations
Fall 2024 and Spring 2026	Organizer of student research seminar — Statistical-to-Computational Gaps
Fall 2023	Course Coordinator — Mathematics of Data Science
Spring 2023 and 2024	Teaching assistant — Mathematics of Signals, Networks, and Learning
Fall 2022	Teaching assistant — Mathematics of Data Science
2022 — present	Supervising MSc and BSc theses at ETH
Fall 2016 – Spring 2017	Volunteer tutor — Mentoring high school students (ages 14-15) in preparation to mathematics olympiads and competitions, MSU (Moscow)

Awards and scholarships

Apr 2021 - Nov 2021	Linde/Munich Data Science Institute Master Scholarship
2023	Achievement Award for Master Graduate, Women in Math Science, TUM
2026	KITE Award Nomination for innovative teaching projects, D-MATH news article

Publications

A. Kireeva, A. S. Bandeira, and D. Kunisky, "Computational lower bounds for multi-frequency group synchronization," *Applied and Computational Harmonic Analysis*, p. 101 880, 2026.

A. S. Bandeira, J. Błasiok, D. Dmitriev, U. Faure, A. Kireeva, and D. Kunisky, "The lovász number of random circulant graphs," in *2025 International Conference on Sampling Theory and Applications (SampTA)*, IEEE, 2025, pp. 1–5.

A. S. Bandeira, A. Kireeva, A. Maillard, and A. Rödder, "Randomstrasse101: Open problems of 2024," *arXiv e-prints*, arXiv–2504, 2025.

A. Kireeva and A. S. Bandeira, "Average-case complexity in statistical inference: A puzzle-driven research seminar," *arXiv preprint arXiv:2506.22182*, 2025.

A. Kireeva and J.-C. Mourrat, "Breakdown of a concavity property of mutual information for non-gaussian channels," *Information and Inference: A Journal of the IMA*, vol. 13, no. 2, 2024.

A. Kireeva and J. A. Tropp, "Randomized matrix computations: Themes and variations," *arXiv preprint arXiv:2402.17873*, 2024.

I. Fatkhullin, A. Barakat, A. Kireeva, and N. He, "Stochastic policy gradient methods: Improved sample complexity for fisher-non-degenerate policies," in *International Conference on Machine Learning*, PMLR, 2023, pp. 9827–9869.

Experience

Amazon, Applied Scientist Intern Oct 2025 - Feb 2026
Engineered key algorithmic improvements for transport network optimization, reducing computation times by nearly half and improving target solution quality by over 7%.

Jane Street, Quantitative Research Intern Jun 2025 - Sep 2025
Developed heuristic pattern-detecting algorithms and deep learning models in Python and PyTorch to extract weak signal patterns from high-noise financial time-series data.

TUM, Student Research Assistant Dec 2021 - Mar 2022

Chair Applied and Numerical Analysis and Optimization and Data Analysis
Derived the theoretical guarantees of non-convex optimization methods (Wirtinger Flow Algorithm) for the phase retrieval with demixing.

TUM Data innovation lab & Wellabe GmbH
& Institute for Biological and Medical Imaging, Helmholtz Zentrum Apr 2020 - Aug 2020

Defining Corporate Health Classes
Analyzed a corporate health dataset of more than 60 biomarkers to find relationships between health markers and medical conditions. Applied clustering models to define health classes and developed a predictive 'biological age' score to improve diagnostic accuracy and reduce health-related work disabilities.

Ernst & Young, Data Analysis Intern Nov 2018 - Feb 2019

Financial Services Risk Management
Developed a statistical model for credit score prediction for a major European bank. Contributed to data collection, processing, feature selection, and final model development using Python and machine learning techniques. Performed SAS and Python code audit.

Languages

Russian Native
English Fluent
German Intermediate (B1)