Ilyas Fatkhullin

Address: Department of Computer Science, Andreasstrasse 5, 8050 Zürich, Switzerland
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Research interests: large-scale optimization, reinforcement learning, theoretical foundations of ML.

Education

ETH Zürich, Switzerland
Ph.D. in Computer Science, ETH AI Center Fellow 12/2021 – 08/2026
Advisor: Prof. Niao He (expected)
Dissertation Topic: Non-convex Stochastic Optimization and Reinforcement Learning

Technical University of Munich, Germany
M.Sc. in Mathematics Grade: 1.1/1.0 09/2020 – 11/2021
Advisor: Prof. Peter Richtárik
Formal Reviewer: Prof. Michael Ulbrich
Thesis Topic: Error Compensation Method for Compressed Distributed Training

Moscow Institute of Physics and Technology, Russia
B.Sc. in Mathematics and Informatics Grade: 4.9/5.0 09/2016 – 08/2020
Advisor: Prof. Boris Polyak
Thesis Topic: Optimization Landscape of Linear Quadratic Regulator Problem with Output Feedback

Selected Publications

For the full and most up-to-date publication record, see my Google Scholar profile (h-index: 11, 650+ citations as of Aug 2025). To date: 4 journal papers (SIOPT, SICON, JMLR) and 10 machine learning conference papers (NeurIPS, ICML, AISTATS).

[1] **I. Fatkhullin**, N. He, Y. Hu. *Stochastic Optimization under Hidden Convexity.* SIAM Journal on Optimization (to appear), 2025.

[2] F. Hübler*, **I. Fatkhullin***, N. He. *From Gradient Clipping to Normalization for Heavy-Tailed SGD.* AISTATS, 2025. *Equal contribution.

[3] **I. Fatkhullin**, A. Barakat, A. Kireeva, N. He. *Stochastic Policy Gradient Methods: Improved Sample Complexity for Fisher-non-degenerate Policies.* ICML, 2023.

[4] P. Richtárik, I. Sokolov, **I. Fatkhullin**. *EF21: A New, Simpler, Theoretically Better, and Practically Faster Error Feedback.* NeurIPS (Oral Presentation, top 1%), 2021.

[5] **I. Fatkhullin**, B. Polyak. *Optimizing Static Linear Feedback: Gradient Method.* SIAM Journal on Control and Optimization, 2021.

Teaching

Lecturer, "Data Analysis and Machine Learning", Ashesi University, Ghana 05/2025
As part of the Ashesi-ETH Master in Mechatronic Engineering program.
Designed and prepared a graduate-level course independently, including syllabus, lecture slides, assignments, and exam (3-week intensive module, concluding with a coding project and final exam).

Teaching Assistant, "Optimization for Data Science", ETH Zürich Spring 2023, 2024
Led weekly tutorials for 100+ students; co-designed and graded exams and homework assignments.

Instructor, Seminar "Advanced Topics in Machine Learning", ETH Zürich Fall 2023, 2024
Guided paper discussions, advised on research topics, and graded final presentations.

Supervision and Mentoring

Supervised three Master's theses, one research internship, and two semester project (2022–2025), resulting in top-tier ML conference and journal publications. Alumni have progressed to Ph.D. programs at ETH Zürich, Caltech, and the Max Planck Institute.

Fellowships and Awards

Rising Star in AI Award, KAUST 02/2023

Spotlight Presentation Award at ICML (< 5% submissions) 07/2022

Oral Presentation Award at NeurIPS (< 1% submissions) 12/2021

ETH AI Center Doctoral Fellowship (< 1% acceptance rate) 02/2021

German Academic Exchange Service (DAAD) Scholarship for MSc in Germany 04/2020

PreDoc Program Fellowship in Mathematics, Technical University of Munich 03/2020

Prizewinner of Russian National Student Olympiad in Physics 03/2018, 03/2019

Prizewinner of Russian National Olympiad in Physics among high school students–11th place 04/2015

Research Internships and Short-term Visits

Georgia Institute of Science and Technology, Atlanta, USA, with Prof. G. Lan 03–09/2025
Studied properties of heavy-tailed SGD.

King Abdullah University of Science and Technology, with Prof. P. Richtárik 03–09/2021
Worked on federated learning algorithms with momentum and quantization.

École Polytechnique Fédérale de Lausanne, with Prof. S. Stich and Prof. M. Jaggi 06–10/2020
Studied accelerated methods for convex optimization.

German Electron Synchrotron (DESY), Hamburg, with Prof. J. Katzy 07–09/2019
Applied adversarial learning methods to the detection of events in high-energy physics.

Helmholtz-Zentrum Berlin, with Prof. Ji Li 07–08/2018
Developed numerical solvers for physical simulations in materials science.

Professional Activities

Conference Reviewer: ICML 2022, 2024; AISTATS 2022; NeurIPS 2023,2024,2025; ICLR 2024.
Journal Reviewer: Mathematical Programming; Operations Research; SIAM Journal on Optimization; SIAM Journal on Control and Optimization; Journal of Machine Learning Research; IEEE Transactions on Automatic Control; Transactions on Machine Learning Research.

Session Organizer, INFORMS Optimization Society Conference 07/2024
Location: Rice University, Houston, USA
Cluster and Session Title: "Optimization in Data Science"; "Recent Advances in Min-Max Optimization"

Session Organizer, International Conference on Continuous Optimization 07/2025
Location: University of Southern California, Los Angeles, USA
Cluster and Session Title: "Optimization for Data Science"; "Adaptive Methods in Optimization"

References

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Prof. Guanghui (George) Lan
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Prof. Sebastian U. Stich
Tenured Faculty, CISPA Helmholtz Center for Information Security
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