Rustem Islamov

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Education

PhD in Computer Science — Oct. 2023 – Pres.
University of Basel, Supervisor: Aurelien Lucchi — Basel, Switzerland

Master of Science in Applied Mathematics — Sept. 2021 – Aug. 2023
Institut Polytechnique de Paris — Palaiseau, France
Supervisor: Olivier Fercoq, Thesis supervisor: Dan Alistarh
GPA: 17.65/20, transcript of records

Bachelor of Science in Applied Mathematics and Physics — Sept. 2017 – July 2021
Moscow Institute of Physics and Technology — Dolgoprudny, Russia
Supervisor: Peter Richtárik,
GPA: 4.95/5 (9.27/10), Top 3 at the department, transcript of records

Research Interests

Deep Learning (loss landscape of neural networks), Optimization (adaptive algorithms, optimization for deep learning, differential privacy, distributed optimization, bilevel optimization)

Publications

16. R. Islamov, Y. As, I. Fatkhullin. **Safe-EF: Error Feedback for Non-smooth Constrained Optimization**, arXiv preprint arXiv: 2505.06053, accepted to ICML 2025, 2025.
15. R. Islamov, S. Horváth, A. Lucchi, P. Richtárik, E. Gorbunov. **Double Momentum and Error Feedback for Clipping with Fast Rates and Differential Privacy**, arXiv preprint arXiv: 2502.11682, under submission, 2025.
14. E. M. Compagnoni, R. Islamov, F. N. Proske, A. Lucchi. **Unbiased and Sign Compression in Distributed Learning: Comparing Noise Resilience via SDEs**, in Proc. of the 28th International Conference on Artificial Intelligence and Statistics, **(Oral)**, 2025.
13. R. Islamov, N. Ajroldi, A. Orvieto, A. Lucchi. **Enhancing Optimizer Stability: Momentum Adaptation of NGN Step-size**, under submission, 2024.
12. E. M. Compagnoni, T. Liu, R. Islamov, F. N. Proske, A. Orvieto, A. Lucchi. **Adaptive Methods through the Lens of SDEs: Theoretical Insights on the Role of Noise**, in Proc. of the 13th International Conference on Learning Representations, 2024.
11. R. Islamov, N. Ajroldi, A. Orvieto, A. Lucchi. **Loss Landscape Characterization of Neural Networks without Over-Parametrization**, in Advances in Neural Information Processing Systems, 2024.
10. R. Islamov*, Y. Gao*, S. Stich (*equal contribution). **Towards Faster Decentralized Stochastic Optimization with Communication Compression**, in Proc. of the 13th International Conference on Learning Representations, 2024.
9. Y. Gao*, R. Islamov*, S. Stich (*equal contribution). **EControl: Fast Distributed Optimization with Compression and Error Control**, in Proc. of the 12th International Conference on Learning Representations, 2023.
8. R. Islamov, M. Safaryan, D. Alistarh. **AsGrad: A Sharp Unified Analysis of Asynchronous-SGD Algorithms**, in Proc. of the 27th International Conference on Artificial Intelligence and Statistics, 2023.
7. K. Mishchenko, R. Islamov, E. Gorbunov, S. Horváth. **Partially Personalized Federated Learning: Breaking the Curse of Data Heterogeneity**, Transactions on Machine Learning Research, 2023.
6. S. Khirirat, E. Gorbunov, S. Horváth, R. Islamov, F. Karray, P. Richtárik. **Clip21: Error Feedback for Gradient Clipping**, arXiv preprint arXiv: 2305.18929, 2023.
5. M. Makarenko, E. Gasanov, R. Islamov, A. Sadiev, P. Richtárik. **Adaptive Compression for Communication-Efficient Distributed Training**, Transactions on Machine Learning Research, 2022.
4. R. Islamov, X. Qian, S. Hanzely, M. Safaryan, P. Richtárik. **Distributed Newton-Type Methods with Communication Compression and Bernoulli Aggregation**, Transactions on Machine Learning Research, 2022.

3. X. Qian, R. Islamov, M. Safaryan, P. Richtárik. **Basis Matters: Better Communication-Efficient Second Order Methods for Federated Learning**, in Proc. of the 25th International Conference on Artificial Intelligence and Statistics, 2022.
2. M. Safaryan, R. Islamov, X. Qian, P. Richtárik. **FedNL: Making Newton-Type Methods Applicable to Federated Learning**, In Proc. of 39th International Conference on Machine Learning, 2022.
1. R. Islamov, X. Qian, P. Richtárik. **Distributed Second Order Methods with Fast Rates and Compressed Communication**, In Proc. of 38th International Conference on Machine Learning, 2021.

Past Internships

Internship at Distributed Algorithms and Systems Lab — Apr. 2023 – Oct. 2023
IST Austria, Supervisors: Mher Safaryan, Dan Alistarh — Klosterneuburg, Austria

Internship at Machine Learning and Optimization Lab — Apr. 2022 – Aug. 2022
EPFL, Supervisors: Hadrien Hendrikx, Martin Jaggi — Lausanne, Switzerland

Internship at Optimization and Machine Learning Lab — Mar. 2021 – Aug. 2021
KAUST, Supervisor: Peter Richtárik — Jul. 2020 – Dec. 2020
Thuwal, Saudi Arabia

Scholarships, Honors and Awards

ICLR 2025 Financial Assistance — Apr. 2025
425 US Dollars to cover registration fee; merit based

NeurIPS@Paris Workshop Travel Grant — Dec. 2024
450 Euros to cover the travel expenses during the workshop; merit based

PhD Track Excellence Scholarship — Sept. 2021 – Mar. 2022
IP Paris awards merit-based excellence scholarships for students enrolled in PhD tracks; 1000 Euro per month — Sept. 2022 – Mar. 2023

French Embassy Scholarship — Sept. 2022 – May. 2023
Given to students enrolled to French universities with high academic achievements; 700 Euro per month

PhD Track Excellence Scholarship — Sept. 2021 – Mar. 2022
IP Paris awards merit-based excellence scholarships for students enrolled in PhD tracks; 1000 Euro per month — Sept. 2022 – Mar. 2023

Increased State Academic Scholarship — Feb. 2021 – June 2021
Given to 4 year Bachelor and Master students at MIPT with scientific achievements; 16,000 Russian roubles per month — Sept. 2020 – Jan. 2021

Prizewinner of Student Olympiad in Maths — Apr. 2020
"I am professional" Student Olympiad organized by Yandex and MIPT

Abramov scholarship — Sept. 2017 – June 2020
Given to 1-3 year Bachelor students with the best grades at MIPT; 12,000 Russian rubles per month

Prizewinner of Final Round of All-Russian Physics Olympiad — Apr. 2016

Participant of Final Round of All-Russian Physics Olympiad — 2015, 2017

Reviewing and Teaching

Teaching Assistant for Continuous Optimization course — Spring Semester 2024

Reviewer for Transactions on Machine Learning Research — 2023-2024

Reviewer for Conference on Neural Information Processing Systems — 2024

Reviewer for International Conference on Machine Learning (ICML) — 2024-2025

Reviewer for Journal on Machine Learning Research (JMLR) — 2024

Reviewer for Journal of Parallel and Distributed Computing (JPDC) — 2024

Reviewer for Journal of Optimization Theory and Applications (JOTA) — 2023

Reviewer for Artificial Intelligence and Statistics Conference (AISTATS) — 2023-2025

Reviewer for Neural Information Processing Systems (NeurIPS) — 2024

Reviewer for International Conference on Learning Representations (ICLR) — 2024-2025

Talks and Posters

Invited Talk at EUROPT Conference, Links: paper — 29 June-2 July, 2025
Invited Talk at Rising Stars in AI Symposium at KAUST workshop, Links: paper, slides — 21 February, 2024
Talk at NTDS workshop, Links: paper — 24 October, 2023
Talk at CISPA for the group of Prof. Sebastian Stich, Links: paper — 16 March, 2023
Talk at ETH AI Center Symposium for PhD fellows, Links: paper — 9-10 February, 2023
Prerecorded Talk at KAUST Conference on Artificial Intelligence, Links: video, paper — 28 April, 2021

Summer Schools

PRAIRIE/MIAI AI Summer School, Links: certificate — 5-9 July, 2021

Technical skills

Programming Languages: Python (NumPy, Matplotlib, PyTorch, Pandas), C++, LaTeX
Mathematics: Calculus, Linear Algebra, Probability Theory, Convex Analysis, Deep Learning

Languages

Russian: Native
English: Advanced (C1)
French: Elementary (A2)

Hobbies and Interests

Football, former member of student football team
Travelling, hiking, photo shooting