

Rustem Islamov

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EDUCATION

PhD in Computer Science

[University of Basel](#)

Oct. 2023 – Pres.

Basel, Switzerland

Master of Science in Applied Mathematics

[Institut Polytechnique de Paris](#)

Sept. 2021 – Aug. 2023

Palaiseau, France

GPA: 17.65/20, [transcript of records](#)

Bachelor of Science in Applied Mathematics and Physics

[Moscow Institute of Physics and Technology](#)

Sept. 2017 – July 2021

Dolgoprudny, Russia

GPA: 4.95/5 (9.27/10), Top 3 at the department, [transcript of records](#)

RESEARCH INTERESTS

Machine Learning, Optimization, Distributed Optimization

RECENT RESEARCH PROJECTS

Error-Feedback for SGD

[CISPA](#), Supervisor: [Sebastian Stich](#)

Oct. 2022 – Oct. 2023

Saarbrücken, Germany

Brief description: develop a theory for SGD with biased compression which recovers optimal rates in all possible scenarios.

Analysis of Gradient-type methods over directed graphs

[EPFL](#), Supervisor: [Hadrien Hendrikx](#), Links: [technical report](#)

Apr. 2022 – Aug. 2022

Lausanne, Switzerland

Brief description: development of a theory for gradient-type methods over directed graphs. The goal is to create a method which supports stochastic updates, variance reduction and acceleration and whose convergence rates match optimal rates in undirected case.

Adaptive stepsize selection for PDHG algorithm

[IP Paris](#), Supervisor: [Olivier Fercoq](#), Links: [technical report](#)

Sept. 2021 – Mar. 2021

Palaiseau, France

Brief description: the goal is to develop a mechanism for adaptive stepsize selection for PDHG. The idea is based on checking in each iteration the Quadratic Error Bound inequality introduced in [\[Fercoq, 2021\]](#).

Second Order Methods for Distributed Optimization

[KAUST](#), Supervisor: [Peter Richtárik](#)

Jul. 2020 – Dec. 2020

Thuwal, Saudi Arabia

Brief description: development of a theory for Newton-type methods for distributed optimization. The goal is to create the first communication-efficient Newton-type method that inherits its local superlinear convergence. As a part of internship, I attended the course on modern analysis of a family SGD algorithms by Prof. Richtárik.

PUBLICATIONS

9. [Y. Gao*](#), [R. Islamov*](#), [S. Stich](#). **EControl: Fast Distributed Optimization with Compression and Error Control**, [arXiv preprint arXiv: 2311.05645](#), accepted to International Conference on Learning Representations, 2023.
8. [R. Islamov](#), [M. Safaryan](#), [D. Alistarh](#). **AsGrad: A Sharp Unified Analysis of Asynchronous-SGD Algorithms**, [arXiv preprint arXiv: 2310.20452](#), 2023.
7. [K. Mishchenko](#), [R. Islamov](#), [E. Gorbunov](#), [S. Horváth](#). **Partially Personalized Federated Learning: Breaking the Curse of Data Heterogeneity**, [arXiv preprint arXiv: 2305.18285](#), 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.

* denotes equal contributions

RESEARCH VISITS AND INTERNSHIPS

Internship at Distributed Algorithms and Systems Lab IST Austria , Supervisors: Mher Safaryan , Dan Alistarh	Apr. 2023 – Oct. 2023 Klosterneuburg, Austria
Internship at Machine Learning and Optimization Lab EPFL , Supervisors: Hadrien Hendrikx , Martin Jaggi	Apr. 2022 – Aug. 2022 Lausanne, Switzerland
Internship at Optimization and Machine Learning Lab KAUST , Supervisor: Peter Richtárik	Mar. 2021 – Aug. 2021 Jul. 2020 – Dec. 2020 Thuwal, Saudi Arabia

SCHOLARSHIPS, HONORS AND AWARDS

French Embassy Scholarship Given to students enrolled to French universities with high academic achievements; 700 Euro per month	Sept. 2022 – May. 2023
PhD Track Excellence Scholarship IP Paris awards merit-based excellence scholarships for students enrolled in PhD tracks; 1000 Euro per month	Sept. 2021 – Mar. 2022 Sept. 2022 – Mar. 2023
Increased State Academic Scholarship Given to 4 year Bachelor and Master students at MIPT with scientific achievements; 16,000 Russian roubles per month	Feb. 2021 – June 2021 Sept. 2020 – Jan. 2021
Prizewinner of Student Olympiad in Maths “I am professional” Student Olympiad organized by Yandex and MIPT	Apr. 2020
Abramov scholarship Given to 1-3 year Bachelor students with the best grades at MIPT; 12,000 Russian rubles per month	Sept. 2017 – June 2020
Prizewinner of Final Round of All-Russian Physics Olympiad	Apr. 2016
Participant of Final Round of All-Russian Physics Olympiad	2015, 2017

TALKS AND POSTERS

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
Poster at NeurIPS workshop: Order up! The Benefits of Higher-Order Optimization in Machine Learning , Links: poster , paper	2 December, 2022
Poster at International Conference on Artificial Intelligence and Statistics , Links: poster , paper	29 March, 2022
Prerecorded Talk at Beyond first-order methods in ML systems workshop, Links: video , paper	24 July, 2021
Poster at International Workshop on Federated Learning for User Privacy and Data Confidentiality , Links: poster , paper	24 July, 2021
Poster and Prerecorded Talk at International Conference on Machine Learning , Links: video , poster , paper	22 July, 2021
Poster at PRAIRIE/MAI AI Summer School , Links: poster , paper	6 July, 2021
Talk at Maths & AI: MIPT-UGA young researchers workshop, Links: video , slides , paper	1 July, 2021
Prerecorded Talk at KAUST Conference on Artificial Intelligence , Links: video , paper	28 April, 2021
Poster at NSF-TRIPODS Workshop on Communication Efficient Distributed Optimization , Links: poster , paper	9 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

LANGUAGES

Russian: Native

English: [Advanced \(C1\)](#)

French: Elementary (A1)

HOBBIES AND INTERESTS

Football, former member of student football team

Travelling, hiking, photo shooting

Last updated on January 17th 2024