Abdurakhmon SADIEV

Personal Data

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Research Interests

STOCHASTIC OPTIMIZATION, VARIATIONAL INEQUALITIES, MACHINE LEARNING, FEDERATED LEARNING

EDUCATION

Sept. 2022 - Present	PhD in COMPUTER SCIENCE King Abdullah University of Science and Technology, Thuwal, Saudi Arabia Advisor: Peter Richtárik
Sept. 2020 - July 2022	MS in Applied Mathematics and Physics Moscow Institute of Physics and Technology, Moscow, Russia Advisor: Alexander Gasnikov
Sept. 2016 - July 2020	BS in Applied Mathematics and Physics Moscow Institute of Physics and Technology, Moscow, Russia Advisor: Alexander Gasnikov

WORK EXPERIENCE

July 2021 - July 2022	Junior Researcher at the LABORATORY OF ADVANCED COMBINATORICS
	and Network Applications,
	Moscow Institute of Physics and Technology, Russia
September 2020 - July 2022	Teaching assistant at the DEPARTMENT OF ADVANCED MATHEMATICS,
	Moscow Institute of Physics and Technology, Russia
	Duties: teach Functional Analysis, Calculus
September 2020 - July 2022	Teaching assistant at the DEPARTMENT OF MATHEMATICAL
	FUNDAMENTALS OF CONTROL
	Moscow Institute of Physics and Technology, Russia
	Duties: teach Methods of Optimal Control

PUBLICATIONS AND PREPRINTS

- 14. E. Gorbunov, A. Sadiev, M. Danilova, S. Horváth, G. Gidel, P. Dvurechensky, A. Gasnikov and P. Richtárik
 High-Probability Convergence for Composite and Distributed Stochastic
 Minimization and Variational Inequalities with Heavy-Tailed Noise arXiv preprint: arXiv:2310.01860
 Status: Under review
- 13. A. Sadiev, M. Danilova, E. Gorbunov, S. Horváth, G. Gidel, P. Dvurechensky, A. Gasnikov and P. Richtárik
 High-Probability Bounds for Stochastic Optimization and Variational Inequalities: the Case of Unbounded Variance arXiv preprint: arXiv:2302.00999
 Status: Accepted to ICML 2023
- 12. M. Makarenko, E. Gasanov, R. Islamov, A. Sadiev and P. Richtárik Adaptive Compression for Communication-Efficient Distributed Training arXiv preprint: arXiv:2211.00188 Status: Published in TMLR
- 11. A. Sadiev, D. Kovalev and P. Richtárik Communication Acceleration of Local Gradient Methods via an Accelerated

Primal-Dual Algorithm with Inexact Prox arXiv preprint: arXiv:2207.03957 Status: Accepted to NeurIPS 2022

10. A. Sadiev, G. Malinovsky, E. Gorbunov, I. Sokolov, A. Khaled, K. Burlachenko and P. Richtárik

Federated Optimization Algorithms with Random Reshuffling and Gradient Compression arXiv preprint: arXiv:2206.07021

Workshop on Federated Learning and Analytics in Practice: Algorithms, Systems, Applications, and Opportunities (ICML 2023) Status: Under review

- A. Sadiev, A. Beznosikov, A.J. Almansoori, D. Kamzolov, R. Tappenden and M. Takác Stochastic Gradient Methods with Preconditioned Updates arXiv preprint: arXiv:2206.00285 Status: Published in JOTA
- 8. M. Alkousa, A. Gasnikov, P. Dvurechensky, A. Sadiev and L. Razouk An Approach for Non-convex Uniformly Concave Structured Saddle Point Problem arXiv preprint: arXiv:2202.06376 Status: Spell out CRM
- 7. D. Kovalev, A. Beznosikov, A. Sadiev, M. Persiianov, P. Richtárik and A. Gasnikov Optimal Algorithms for Decentralized Stochastic Variational Inequalities arXiv preprint: arXiv:2202.02771 Status: Accepted to NeurIPS 2022
- Z. Shi, A. Sadiev, N. Loizou, P. Richtárik and M. Takác AI-SARAH: Adaptive and Implicit Stochastic Recursive Gradient Methods arXiv preprint: arXiv:2102.09700 Status: Published in TMLR
- 5. A. Sadiev, E. Borodich, A. Beznosikov, D. Dvinskikh, S. Chezhegov, R. Tappenden, M. Takác and A. Gasnikov Decentralized Personalized Federated Learning: Lower Bounds and Optimal Algorithm for All Personalization Modes arXiv preprint: arXiv:2107.07190 Spotlight at Workshop on Optimization for Machine Learning (NeurIPS 2021) Status: Published in EURO Journal on Computational Optimization
- E. Borodich, A. Beznosikov, A. Sadiev, V. Sushko, N. Savelyev, M. Takác and A. Gasnikov Decentralized Personalized Federated Min-Max Problems arXiv preprint: arXiv:2106.07289 Workshop on New Frontiers in Federated Learning: Privacy, Fairness, Robustness, Personalization and Data Ownership (NeurIPS 2021) Status: Under review
- 3. E. Gladin, A. Sadiev, A. Gasnikov, P. Dvurechensky, A. Beznosikov and M. Alkousa Solving Smooth Min-Min and Min-Max Problems by Mixed Oracle Algorithms arXiv preprint: arXiv:2103.00434 Status: Accepted to MOTOR-2021, published in Communications in Computer and Information Science (CCIS) series
- 2. A. Sadiev, A. Beznosikov, P. Dvurechensky and A. Gasnikov Zeroth-Order Algorithms for Smooth Saddle-Point Problems arXiv preprint: arXiv:2009.09908 Status: Accepted to MOTOR-2021, published in Communications in Computer and Information Science (CCIS) series

 A. Beznosikov, A. Sadiev and A. Gasnikov Gradient-Free Methods for Saddle-Point Problem arXiv preprint: arXiv:2005.05913 Status: Accepted to MOTOR-2020, published in Communications in Computer and Information Science (CCIS) series

Research Visiting

- April 2022: MBZUAI, Abu Dhabi, United Arab Emirates (worked with Martin Takác)
- February July 2022: KAUST, Thuwal, Kingdom of Saudi Arabia (worked with Peter Richtárik)
- October November 2021: MBZUAI, Abu Dhabi, United Arab Emirates (worked with Martin Takác)

CONFERENCE PRESENTATIONS

- July 2-8, 2023: Third international conference "Mathematics in Armenia: Advances and Perspectives", Yerevan, Armenia Talk: High-Probability Bounds for Stochastic Optimization and Variational Inequalities: the Case of Unbounded Variance
- December 13-14, 2021: Iternational OPT Workshop on Optimization for Machine Learning, NeurIPS 2021
 Talk & December December Jack Strangelized Federated Learning, Lewer Bounds and Optimal

 Talk & Poster: Decentralized Personalized Federated Learning: Lower Bounds and Optimal

 Algorithm for All Personalization Modes

- July 12-18, 2021: Conference "Optimization without Borders" Poster: Zeroth-Order Algorithms for Smooth Saddle-Point Problems, Sochi, Russia
- July 5-10, 2021: International conference on "Mathematical Optimization Theory and Operations Research" MOTOR-2021, Irkutsk, Russia Talk: Zeroth-Order Algorithms for Smooth Saddle-Point Problems
- July 6-11, 2020: International conference on "Mathematical Optimization Theory and Operations Research" MOTOR-2020, Novosibirsk, Russia Talk: Gradient-Free Methods for Saddle-Point Problem

AWARDS & SCHOLARSHIPS

- August 2023: Dean's List Award, KAUST
- September 2022 September 2025: KAUST Discovery Doctoral Fellowship (KDDF), KAUST
- September 2022 September 2025: Dean's Award, KAUST
- July 2022: Outstanding Reviewer Award at ICML 2022
- September December 2021: Increased State Academic Scholarship for 4th year bachelor and master students at MIPT
- **September December 2021**: 2nd degree prof. Andrei Raigorodskii personal scholarship for contributions to the development of numerical optimization methods
- February June 2021: 3rd degree prof. Andrei Raigorodskii personal scholarship for contributions to the development of numerical optimization methods
- September December 2020: Increased State Academic Scholarship for 4th year bachelor and master students at MIPT
- September December 2018: Abramov scholarship for 1-3 year bachelor students with the best grades at MIPT

• February - June 2018: Abramov scholarship for 1-3 year bachelor students with the best grades at MIPT

SUMMER SCHOOLS

- July 2023: Summer School on Statistics and Learning Theory, Tsaghkadzor, Armenia
- July-August 2021: Summer School on "Modern Methods of Information Theory, Optimization and Control Theory", *Sirius University of Science and Technology*, Sochi, Russia
- June 2021: Summer School on "Control, Information and Optimization", Voronovo, Russia
- August 2020: Summer School on "Control, Information and Optimization", Sirius University of Science and Technology, Sochi, Russia
- August 2020: Summer School on "Modern Methods of Information Theory, Optimization and Control Theory", *Sirius University of Science and Technology*, Sochi, Russia

COMPUTER SKILLS

OPERATING SYSTEMS:	Mac OSX, Microsoft Windows, Linux
PROGRAMMING LANGUAGES:	Python, LaTeX, C, C++
Python Libraries:	Pandas, NumPy, Matplotlib, Scikit-Learn, SciPy,
	Pytorch, CVXPY

REVIEWING

- NeurIPS 2023: 6 papers
- NeurIPS 2022: 2 papers
- ICML 2022: 2 papers

LANGUAGES

RUSSIAN: Native speaker ENGLISH: Advanced

OTHER INTERESTS

Chess: 5 years in chess school in Moscow, Russia. Now I am playing chess online. Theater: 4 years in school theater.