

Abdurakhmon SADIEV

PERSONAL DATA

EMAIL: abdurakhmon.sadiev@kaust.edu.sa
WEBSITE: sadiev.netlify.app

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

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|----------------------------|--|
| 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](https://arxiv.org/abs/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](https://arxiv.org/abs/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](https://arxiv.org/abs/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](https://arxiv.org/abs/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](https://arxiv.org/abs/2206.07021)
[ICML 2023](#), poster at workshop on Federated Learning and Analytics in Practice: Algorithms, Systems, Applications, and Opportunities
Status: Published in TMLR
9. [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](https://arxiv.org/abs/2206.00285)
Status: Under review
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](https://arxiv.org/abs/2202.06376)
Status: Spell out CRM
7. [D. Kovalev](#), [A. Beznosikov](#), [A. Sadiev](#), [M. Pershianov](#), [P. Richtárik](#) and [A. Gasnikov](#)
Optimal Algorithms for Decentralized Stochastic Variational Inequalities
arXiv preprint: [arXiv:2202.02771](https://arxiv.org/abs/2202.02771)
Status: Accepted to [NeurIPS 2022](#)
6. [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](https://arxiv.org/abs/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](https://arxiv.org/abs/2107.07190)
[NeurIPS 2021](#), spotlight at workshop on Optimization for Machine Learning
Status: Published in EURO Journal on Computational Optimization
4. [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](https://arxiv.org/abs/2106.07289)
[NeurIPS 2021](#), poster at workshop on New Frontiers in Federated Learning: Privacy, Fairness, Robustness, Personalization and Data Ownership
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](https://arxiv.org/abs/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](https://arxiv.org/abs/2009.09908)
Status: Accepted to [MOTOR-2021](#), published in Communications in Computer and Information Science (CCIS) series

1. [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

- **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 Takáč](#))

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:** [International OPT Workshop on Optimization for Machine Learning, NeurIPS 2021](#)
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.