Eduard GORBUNOV

PERSONAL DATA

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WORK EXPERIENCE

AUGUST 2025 – JULY 2029	Tenure-Track Assistant Professor of Statistics and Data Science MBZUAI, Abu Dhabi, UAE
APRIL 2024 – JULY 2025	Research Scientist at the **ML department**, MBZUAI, Abu Dhabi, UAE (hosted by Samuel Horváth and Martin Takác)
SEPTEMBER 2022 – MARCH 2024	Postdoctoral Fellow at the **ML department**, MBZUAI, Abu Dhabi, UAE (hosted by Samuel Horváth and Martin Takác)
MAY 2020 – AUGUST 2022	Junior Researcher at **Laboratory of Advanced Combinatorics and Network Applications**, MIPT, Moscow
FEBRUARY 2022 – MAY 2022	Research Consultant at **Mila**, Montreal (in the group of Gauthier Gidel)
SEPTEMBER 2020 – JANUARY 2022	Junior Researcher at **Yandex.Research-MIPT Laboratory**. Moscow
MAY 2020 – DECEMBER 2021	Research Assistant at **International Laboratory of Stochastic Algorithms and High-Dimensional Inference**, HSE, Moscow
FEBRUARY 2020 – DECEMBER 2020	Junior Researcher at **Joint Research Laboratory of Applied Mathematics**, RANEPA-MIPT, Moscow
FEBRUARY 2020 – DECEMBER 2020	Junior Researcher at **Laboratory of Numerical Methods of Applied Structural Optimization**, MIPT, Moscow
AUGUST 2019 – JULY 2020	Researcher at **Huawei–MIPT** group, Moscow (research, Python)
NOVEMBER 2019 – APRIL 2020	Junior Researcher at IITP RAS, Moscow
MAY 2019 – AUGUST 2019	Intern at **Huawei Media Lab,** Moscow (research, C++)
AUGUST 2017 – OCTOBER 2019	Researcher at **Peter Richtárik's Group**, MIPT, Moscow

Education

September 2020 – December 2021	**PhD in Computer Science** Moscow Institute of Physics and Technology, Moscow Thesis: "Distributed and Stochastic Optimization Methods with Gradient Compression and Local Steps" Advisors: Alexander Gasnikov and Peter Richtárik Links: slides and video of the defense
September 2018 – July 2020	**Master of Science in Applied Mathematics and Physics** Moscow Institute of Physics and Technology, Moscow Thesis: "Derivative-free and stochastic optimization methods, decentralized distributed optimization" Advisor: Alexander Gasnikov
September 2014 – July 2018	**Bachelor of Science in Applied Mathematics and Physics** Moscow Institute of Physics and Technology, Moscow Thesis: "Accelerated Directional Searches and Gradient-Free Methods with non-Euclidean prox-structure" Advisor: Alexander Gasnikov

Research Interests

Optimization, Machine Learning, Federated Learning, Variational Inequalities, Derivative-Free Optimization, Randomized Algorithms

Scholarships, Honors and Awards

Selected Awards

- **10 April, 2019.** The Ilya Segalovich Award — Yandex scientific scholarship, **highly selective: 9 winners from Russia, Belarus and Kazakhstan** (350,000 Russian rubles, internship offer at Yandex.Research, travel grant to attend one international conference; news about award: https://nplus1.ru/news/2019/04/10/ya-awards)

- **Outstanding reviewer awards:** NeurIPS (2022, 2021, 2020), ICML (2022, 2021), ICLR (2021)

Other Awards (in the reverse chronological order)

- **September 2021 - January 2021.** A. M. Raigorodskii Scholarship for Contribution to the Development of Numerical Optimization Methods (main scholarship)

- **February 2021 - June 2021.** A. M. Raigorodskii Scholarship for Contribution to the Development of Numerical Optimization Methods (main scholarship)

- **February 2020 - June 2020.** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT for scientific achievements (14,000 Russian rubles per month instead of the regular scholarship)

- **15 January, 2020.** Huawei scholarship for bachelor and master students at MIPT (125,000 Russian rubles)

- **September 2019 - January 2020.** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT for scientific achievements (10,000 Russian rubles per month in addition to the regular scholarship)

- **February 2019 - June 2019.** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT for scientific achievements (10,000 Russian rubles per month in addition to the regular scholarship)

- **September 2018 - January 2019.** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT for scientific achievements (10,000 Russian rubles per month in addition to the regular scholarship)

- **February 2018 - June 2018.** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT for scientific achievements (10,000 Russian rubles per month in addition to the regular scholarship)

- **September 2017 - January 2018.** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT for scientific achievements (10,000 Russian rubles per month in addition to the regular scholarship)

- **November 2017.** Diploma of winner of the Section of Information Transmission Problems, Data Analysis and Optimization at 60th Scientific Conference of MIPT

- **May 2017.** Third Prize at MIPT's Student Olympiad in Mathematics

- **March 2017.** First Prize at MIPT's Team Mathematical Tournament

- **September 2016 - June 2017.** Abramov scholarship for 1-3 year bachelor students with the best grades at MIPT (12,000 Russian rubles per month)

- **December 2015.** Third Prize at MIPT's Student Olympiad in Mathematics

- **February 2015 - June 2015.** Abramov scholarship for 1-3 year bachelor students with the best grades at MIPT (12,000 Russian rubles per month)

- **April 2014.** Participant of Final Round of All-Russian Mathematical Olympiad (scored points: 28 out of 56, 59th place)

Teaching

- **Co-creator and lecturer of the course** "Optimization Methods for Machine Learning" in MADE, Mail.ru Group (Spring 2020, Spring 2021, Spring 2022) and MIPT (Fall 2020)

- **Teaching assistant for the courses**
  - Fall 2022, Spring 2023: ML712: Distributed and Federated Learning (MBZUAI): created and presented lectures on 2 topics (out of 8 topics), replied to the students questions, mentored the projects, checked and created quizes
  - Spring 2019: Algorithms and Models of Computation
  - Fall 2018: Probability Theory
  - Spring 2018: Algorithms and Models of Computation

Supervision & Mentoring

I was supervising/mentoring the work of the following students/interns and research assistants/postdocs on the listed projects (projects are listed in the reverse chronological order).

- Savelii Chezhegov (PhD student). Project on the high-probability analysis of Clipped-SGD under heavy-tailed noise and generalized smoothness assumptions. Led to the preprint: Convergence of Clipped-SGD for Convex (L_0, L_1)-Smooth Optimization with Heavy-Tailed Noise, arXiv:2505.20817

- Rustem Islamov (PhD student). Project on Differentially Private Federated Learning. Led to the preprint: Double Momentum and Error Feedback for Clipping with Fast Rates and Differential Privacy, arXiv:2502.11682

- Yury Demidovich (Postdoc), Petr Ostroukhov (Research assistant), Grigory Malinovsky (PhD student). Project on the convergence analysis of methods with clipping, random reshuffling, and local steps under the generalized smoothness assumption. Led to the paper accepted to ICLR 2025: Methods with Local Steps and Random Reshuffling for Generally Smooth Non-Convex Federated Optimization, arXiv:2412.02781, OpenReview

- Nazarii Tupitsa (Research assistant), Sayantan Choudhury (PhD student), Alen Aliev (Master student). Project on the convergence of different optimization methods under generalized smoothness assumptions. Led to the paper accepted to ICLR 2025: Methods for Convex (L_0, L_1)-Smooth Optimization: Clipping, Acceleration, and Adaptivity, arXiv:2409.14989, OpenReview

- Viktor Moskvoretskii (Master student), Nazarii Tupitsa (Research assistant). Project on a new way of training LLMs for low-resource languages. Led to the paper accepted to EMNLP 2024 (Findings): Low-Resource Machine Translation through the Lens of Personalized Federated Learning, arXiv:2406.12564

- Savelii Chezhegov (PhD student), Yaroslav Klyukin (Bachelor student), Andrei Semenov (Bachelor student). Project on the high-probability convergence of versions of Ada-Grad and Adam with gradient clipping. Led to the paper accepted to ICML 2025: Clipping Improves Adam-Norm and AdaGrad-Norm when the Noise Is Heavy-Tailed, arXiv:2406.04443, OpenReview

- Sayantan Choudhury (PhD student), Nazarii Tupitsa (Research assistant). Project on scale-inavriant version of AdaGrad – led to the paper accepted to NeurIPS 2024: Remove that Square Root: A New Efficient Scale-Invariant Version of AdaGrad, arXiv:2403.02648

- Nazarii Tupitsa (Research assistant). Project on Federated Learning – led to the preprint: Federated Learning Can Find Friends That Are Advantageous, arXiv:2402.05050

- Nickolay Kutuzov (Bachelor student). Supervision of the work on numerical experiments for a project on high-probability convergence under heavy-tailed noise – led to the paper accepted to AISTATS 2024: Breaking the Heavy-Tailed Noise Barrier in Stochastic Optimization Problems, arXiv:2311.04161

- Grigory Malinovsky (PhD student). Project on Byzantine-robust learning with partial participation – led to the paper accepted to NeurIPS 2024: Byzantine Robustness and Partial Participation Can Be Achieved At Once: Just Clip Gradient Differences, arXiv:2311.14127

- Nikita Kornilov (Master student). Project on relative error in gradients – led to the preprint: Intermediate Gradient Methods with Relative Inexactness, arXiv:2310.00506

- Nazarii Tupitsa (Research assistant), Abdulla Jasem Almansoori (PhD student), Yanlin Wu (Master student). Project on Byzantine-robust methods for distributed variational inequalities – led to the paper accepted to NeurIPS 2023: Byzantine-Tolerant Methods for Distributed Variational Inequalities, arXiv:2311.04611

- Nikita Fedin (Master student). Project on Byzantine-robust learning with variance reduction – led to the paper accepted to MOTOR 2023: Byzantine-Robust Loopless Stochastic Variance-Reduced Gradient, arXiv:2303.04560

- Abdurakhmon Sadiev (PhD student)

  1. Project on high-probability convergence without bounded variance assumption – led to the paper accepted to ICML 2023: High-Probability Bounds for Stochas-

tic Optimization and Variational Inequalities: the Case of Unbounded Variance, arXiv:2302.00999

2. Project on high-probability convergence for composite and distributed optimization problems – led to the paper accepted to ICML 2024: High-Probability Convergence for Composite and Distributed Stochastic Minimization and Variational Inequalities with Heavy-Tailed Noise, arXiv:2310.01860

- Konstantin Burlachenko (PhD student). Supervision of the work on numerical experiments for a project on distributed non-convex optimization with unbiased compression – led to the paper accepted to ICML 2021: MARINA: Faster Non-Convex Distributed Learning with Compression, arXiv:2102.07845

- Dmitry Makarenko (PhD student). Supervision of the work on numerical experiments for a project on distributed optimization with biased compression – led to the paper accepted as a spotlight to NeurIPS 2020: Linearly Converging Error Compensated SGD, arXiv:2010.12292

- Aleksandr Beznosikov (Bachelor student). Project on zeroth-order composite optimization – led to the paper accepted to IFAC 2020: Derivative-Free Method For Decentralized Distributed Non-Smooth Optimization, arXiv:1911.10645

PUBLICATIONS

Preprints

13. E. M. Compagnoni, R. Islamov, A. Orvieto, E. Gorbunov. **On the Interaction of Noise, Compression Role, and Adaptivity under (L_0, L_1)-Smoothness: An SDE-based Approach**, arXiv:2506.00181

12. S. Chezhegov, A. Beznosikov, S. Horváth, E. Gorbunov. **Convergence of Clipped-SGD for Convex (L_0, L_1)-Smooth Optimization with Heavy-Tailed Noise**, arXiv:2505.20817

11. R. Islamov, S. Horváth, A. Lucchi, P. Richtárik, E. Gorbunov. **Double Momentum and Error Feedback for Clipping with Fast Rates and Differential Privacy**, arXiv:2502.11682

10. A. Lobanov, A. Gasnikov, E. Gorbunov, M. Takác. **Linear Convergence Rate in Convex Setup is Possible! Gradient Descent Method Variants under (L_0, L_1)-Smoothness**, arXiv:2412.17050

9. K. Ponkshe*, R. Singhal*, E. Gorbunov, A. Tumanov, S. Horváth, P. Vepakomma (*equal contribution). **Initialization using Update Approximation is a Silver Bullet for Extremely Efficient Low-Rank Fine-Tuning**, arXiv:2411.19557

8. S. Khirirat, A. Sadiev, A. Riabinin, E. Gorbunov, P. Richtárik. **Error Feedback under (L_0, L_1)-Smoothness: Normalization and Momentum**, arXiv:2410.16871

7. N. Tupitsa, S. Horváth, M. Takác, E. Gorbunov. **Federated Learning Can Find Friends That Are Advantageous**, arXiv:2402.05050

6. N. Kornilov, Y. Dorn, A. Lobanov, N. Kutuzov, I. Shibaev, E. Gorbunov, A. Gasnikov, A. Nazin **Zeroth-order Median Clipping for Non-Smooth Convex Optimization Problems with Heavy-tailed Symmetric Noise**, arXiv:2402.02461

5. N. Kornilov, E. Gorbunov, M. Alkousa, F. Stonyakin, P. Dvurechensky, A. Gasnikov. **Intermediate Gradient Methods with Relative Inexactness**, arXiv:2310.00506

4. S. Khirirat, E. Gorbunov, S. Horváth, R. Islamov, F. Karray, P. Richtárik. **Clip21: Error Feedback for Gradient Clipping**, 2305.18929

3. E. Gorbunov. **Unified analysis of SGD-type methods**, 2303.16502

2. I. Fatkhullin, I. Sokolov, E. Gorbunov, Z. Li, P. Richtárik. **EF21 with Bells & Whistles: Practical Algorithmic Extensions of Modern Error Feedback**, arXiv:2110.03294

1. E. Gorbunov, D. Dvinskikh, A. Gasnikov. **Optimal Decentralized Distributed Algorithms for Stochastic Convex Optimization**, arXiv:1911.07363

Conferences

36. S. Chezhegov, Y. Klyukin, A. Semenov, A. Beznosikov, A. Gasnikov, S. Horváth, M. Takác, E. Gorbunov. **Clipping Improves Adam-Norm and AdaGrad-Norm when the Noise Is Heavy-Tailed**
    ICML 2025, arXiv:2406.04443[1]

35. Y. Demidovich*, P. Ostroukhov*, G. Malinovsky, S. Horváth, M. Takác, P. Richtárik, E. Gorbunov (*equal contribution). **Methods with Local Steps and Random Reshuffling for Generally Smooth Non-Convex Federated Optimization**
    ICLR 2025, arXiv:2412.02781

34. E. Gorbunov*, N. Tupitsa*, S. Choudhury, A. Aliev, P. Richtárik, S. Horváth, M. Takác (*equal contribution). **Methods for Convex (L_0, L_1)-Smooth Optimization: Clipping, Acceleration, and Adaptivity**
    ICLR 2025, arXiv:2409.14989

33. A. Agafonov, P. Ostroukhov, R. Mozhaev, K. Yakovlev, E. Gorbunov, M. Takác, A. Gasnikov, D. Kamzolov. **Exploring Jacobian Inexactness in Second-Order Methods for Variational Inequalities: Lower Bounds, Optimal Algorithms and Quasi-Newton Approximations**
    NeurIPS 2024 (spotlight), arXiv:2405.15990

32. S. Choudhury, N. Tupitsa, N. Loizou, S. Horváth, M. Takác, E. Gorbunov. **Remove that Square Root: A New Efficient Scale-Invariant Version of AdaGrad**
    NeurIPS 2024, arXiv:2403.02648

31. G. Malinovsky, P. Richtárik, S. Horváth, E. Gorbunov. **Byzantine Robustness and Partial Participation Can Be Achieved at Once: Just Clip Gradient Differences**
    NeurIPS 2024, arXiv:2311.14127

30. A. Sadiev, G. Malinovsky, E. Gorbunov, I. Sokolov, A. Khaled, K. Burlachenko, P. Richtárik. **Federated Optimization Algorithms with Random Reshuffling and Gradient Compression**
    NeurIPS 2024, arXiv:2206.07021

29. V. Moskvoretskii, N. Tupitsa, C. Biemann, S. Horváth, E. Gorbunov, I. Nikishina. **Low-Resource Machine Translation through the Lens of Personalized Federated Learning**
    EMNLP 2024 (Findings), arXiv:2406.12564

28. E. Gorbunov, A. Sadiev, M. Danilova, S. Horváth, G. Gidel, P. Dvurechensky, A. Gasnikov, P. Richtárik. **High-Probability Convergence for Composite and Distributed Stochastic Minimization and Variational Inequalities with Heavy-Tailed Noise**
    ICML 2024 (oral), arXiv:2310.01860

27. N. Puchkin*, E. Gorbunov*, N. Kutuzov, A. Gasnikov (*equal contribution). **Breaking the Heavy-Tailed Noise Barrier in Stochastic Optimization Problems**
    AISTATS 2024, arXiv:2311.04161

26. A. Rammal, K. Gruntkowska, N. Fedin, E. Gorbunov, P. Richtárik. **Communication Compression for Byzantine Robust Learning: New Efficient Algorithms and Improved Rates**
    AISTATS 2024, arXiv:2310.09804

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[1]The link to arXiv versions are provided for convenience.

25. N. Tupitsa, A. J. Almansoori, Y. Wu, M. Takác, K. Nandakumar, S. Horváth, E. Gorbunov. **Byzantine-Tolerant Methods for Distributed Variational Inequalities** NeurIPS 2023, arXiv:2311.04611

24. N. Kornilov, O. Shamir, A. Lobanov, D. Dvinskikh, A. Gasnikov, I. Shibaev, E. Gorbunov, S. Horváth. **Accelerated Zeroth-order Method for Non-Smooth Stochastic Convex Optimization Problem with Infinite Variance** NeurIPS 2023, arXiv:2310.18763

23. S. Choudhury, E. Gorbunov, N. Loizou. **Single-Call Stochastic Extragradient Methods for Structured Non-monotone Variational Inequalities: Improved Analysis under Weaker Conditions** NeurIPS 2023, arXiv:2302.14043

22. A. Sadiev, M. Danilova, E. Gorbunov, S. Horváth, G. Gidel, P. Dvurechensky, A. Gasnikov, P. Richtárik. **High-Probability Bounds for Stochastic Optimization and Variational Inequalities: the Case of Unbounded Variance** ICML 2023, arXiv:2302.00999

21. E. Gorbunov, A. Taylor, S. Horváth, G. Gidel. **Convergence of Proximal Point and Extragradient-Based Methods Beyond Monotonicity: the Case of Negative Comonotonicity** ICML 2023, arXiv:2210.13831

20. N. Fedin, E. Gorbunov. **Byzantine-Robust Loopless Stochastic Variance-Reduced Gradient** MOTOR 2023, 2303.04560

19. E. Gorbunov, S. Horváth, P. Richtárik, G. Gidel. **Variance Reduction is an Antidote to Byzantines: Better Rates, Weaker Assumptions and Communication Compression as a Cherry on the Top** ICLR 2023, arXiv:2206.00529

18. A. Beznosikov*, E. Gorbunov*, H. Berard*, N. Loizou (*equal contribution). **Stochastic Gradient Descent-Ascent: Unified Theory and New Efficient Methods** AISTATS 2023, arXiv:2202.07262

17. E. Gorbunov*, M. Danilova*, D. Dobre*, P. Dvurechensky, A. Gasnikov, G. Gidel (*equal contribution). **Clipped Stochastic Methods for Variational Inequalities with Heavy-Tailed Noise** NeurIPS 2022, arXiv:2206.01095

16. E. Gorbunov, A. Taylor, G. Gidel. **Last-Iterate Convergence of Optimistic Gradient Method for Monotone Variational Inequalities** NeurIPS 2022, arXiv:2205.08446

15. P. Richtárik, I. Sokolov, I. Fatkhullin, E. Gasanov, Z. Li, E. Gorbunov. **3PC: Three Point Compressors for Communication-Efficient Distributed Training and a Better Theory for Lazy Aggregation** ICML 2022, 2202.00998

14. E. Gorbunov*, A. Borzunov*, M. Diskin, M. Ryabinin (*equal contribution). **Secure Distributed Training at Scale** ICML 2022, arXiv:2106.11257

13. M. Danilova, E. Gorbunov. **Distributed Methods with Absolute Compression and Error Compensation** MOTOR 2022, arXiv:2203.02383

12. E. Gorbunov, H. Berard, G. Gidel, N. Loizou. **Stochastic Extragradient: General Analysis and Improved Rates**

AISTATS 2022, arXiv:2111.08611

11. E. Gorbunov, N. Loizou, G. Gidel. **Extragradient Method:** $\mathcal{O}(1/K)$ **Last-Iterate Convergence for Monotone Variational Inequalities and Connections With Cocoercivity**
AISTATS 2022, arXiv:2110.04261

10. M. Ryabinin*, E. Gorbunov*, V. Plokhotnyuk, G. Pekhimenko (*equal contribution). **Moshpit SGD: Communication-Efficient Decentralized Training on Heterogeneous Unreliable Devices**
NeurIPS 2021, arXiv:2103.03239

9. E. Gorbunov, K. Burlachenko, Z. Li, P. Richtárik. **MARINA: Faster Non-Convex Distributed Learning with Compression**
ICML 2021, arXiv:2102.07845

8. E. Gorbunov, F. Hanzely, P. Richtárik. **Local SGD: Unified Theory and New Efficient Methods**
AISTATS 2021, arXiv:2011.02828

7. E. Gorbunov, D. Kovalev, D. Makarenko, P. Richtárik. **Linearly Converging Error Compensated SGD**
NeurIPS 2020 (spotlight), arXiv:2010.12292

6. E. Gorbunov, M. Danilova, A. Gasnikov. **Stochastic Optimization with Heavy-Tailed Noise via Accelerated Gradient Clipping**
NeurIPS 2020, arXiv:2005.10785

5. E. Gorbunov, F. Hanzely, P. Richtárik. **A unified theory of SGD: variance reduction, sampling, quantization and coordinate descent**
AISTATS 2020, arXiv:1905.11261

4. A. Beznosikov, E. Gorbunov, A. Gasnikov. **Derivative-Free Method For Decentralized Distributed Non-Smooth Optimization**
IFAC 2020, arXiv:1911.10645

3. E. Gorbunov, A. Bibi, O. Sener, E. Bergou, P. Richtárik. **A Stochastic Derivative Free Optimization Method with Momentum**
ICLR 2020, arXiv:1905.13278

2. D. Dvinskikh, E. Gorbunov, A. Gasnikov, P. Dvurechensky, César A. Uribe. **On Dual Approach for Distributed Stochastic Convex Optimization over Networks**
CDC 2019, arXiv:1903.09844

1. D. Kovalev, E. Gorbunov, E. Gasanov, P. Richtárik **Stochastic Spectral and Conjugate Descent Methods**
NeurIPS 2018, arXiv:1802.03703

Journals

16. K. Mishchenko, R. Islamov, E. Gorbunov, S. Horváth. **Partially Personalized Federated Learning: Breaking the Curse of Data Heterogeneity**
Transactions on Machine Learning Research (TMLR) 2025, 2305.18285

15. E. Gorbunov, M. Danilova, I. Shibaev, P. Dvurechensky, A. Gasnikov. **High-Probability Complexity Bounds for Non-smooth Stochastic Convex Optimization with Heavy-Tailed Noise**
Journal of Optimization Theory and Applications (JOTA) 2024, arXiv:2106.05958

14. K. Mishchenko, E. Gorbunov, M. Takác, P. Richtárik. **Distributed Learning with Compressed Gradient Differences**
Optimization Methods and Software (OMS) 2024, arXiv:1901.09269

13. Y. Dorn, N. Kornilov, N. Kutuzov, A. Nazin, E. Gorbunov, A. Gasnikov. **Implicitly normalized forecaster with clipping for linear and non-linear heavy-tailed multi-armed bandits**
Computational Management Science 2024

12. A. Gasnikov, D. Dvinskikh, P. Dvurechensky, E. Gorbunov, A. Beznosikov, A. Lobanov. **Randomized gradient-free methods in convex optimization**
Encyclopedia of Optimization 2023, arXiv:2211.13566

11. A. Beznosikov, B. Polyak, E. Gorbunov, D. Kovalev, A. Gasnikov. **Smooth Monotone Stochastic Variational Inequalities and Saddle Point Problems – Survey**
European Mathematical Society Magazine 2023, arXiv:2208.13592

10. M. Danilova, P. Dvurechensky, A. Gasnikov, E. Gorbunov, S. Guminov, D. Kamzolov, I. Shibaev. **Recent Theoretical Advances in Non-Convex Optimization**
High-Dimensional Optimization and Probability 2022, arXiv:2012.06188

9. E. Gorbunov, A. Rogozin, A. Beznosikov, D. Dvinskikh, A. Gasnikov. **Recent theoretical advances in decentralized distributed convex optimization**
High-Dimensional Optimization and Probability 2022, arXiv:2011.13259

8. E. Gorbunov, P. Dvurechensky, A. Gasnikov. **An Accelerated Method for Derivative-Free Smooth Stochastic Convex Optimization**
SIAM Journal on Optimization (SIOPT) 2022, arXiv:1802.09022

7. A. Gasnikov, E. Gorbunov, S. Guz, E. Chernousova, M. Shirobokov, E. Shulgin. **Lecture Notes on Stochastic Processes (book, in Russian)**, ISBN 978-5-9710-9658-0, Moscow MIPT 2022, (available at arXiv:1907.01060)

6. E. Bergou, E. Gorbunov, P. Richtárik. **Stochastic Three Points Method for Unconstrained Smooth Minimization**
SIAM Journal on Optimization (SIOPT) 2020, arXiv:1902.03591

5. P. Dvurechensky, E. Gorbunov, A. Gasnikov. **An Accelerated Directional Derivative Method for Smooth Stochastic Convex Optimization**
European Journal of Operational Research (EJOR) 2020, arXiv:1804.02394

4. E. Vorontsova, A. Gasnikov, E. Gorbunov, P. Dvurechensky. **Accelerated Gradient-Free Optimization Methods with a Non-Euclidean Proximal Operator**, Automation and Remote Control
Automation and Remote Control 2019

3. E. Vorontsova, A. Gasnikov, E. Gorbunov. **Accelerated Directional Search with non-Euclidean prox-structure**
Automation and Remote Control 2019, arXiv:1710.00162

2. E. Gorbunov, E. Vorontsova, A. Gasnikov. **On the upper bound for the mathematical expectation of the norm of a vector uniformly distributed on the sphere and the phenomenon of concentration of uniform measure on the sphere**
Mathematical Notes 2019, arXiv:1804.03722

1. A. Gasnikov, E. Gorbunov, D. Kovalev, A. Mohammed, E. Chernousova. **The global rate of convergence for optimal tensor methods in smooth convex optimization**
Computer Research and Modeling 2018, arXiv:1809.00382

TALKS AND POSTERS

64. 30 June, 2025. EUROPT 2025, Southampton, UK. Talk: 'Methods for Convex (L_0, L_1)-Smooth Optimization: Clipping, Acceleration, and Adaptivity". Links: slides

63. 26 April, 2025. ICLR 2025, Singapore. Poster "Methods with Local Steps and Random Reshuffling for Generally Smooth Non-Convex Federated Optimization". Links: poster

62. 25 April, 2025. ICLR 2025, Singapore. Poster "Methods for Convex (L_0, L_1)-Smooth Optimization: Clipping, Acceleration, and Adaptivity". Links: poster

61. 13 December, 2024. NeurIPS 2024, New Orleans, USA. Poster "Byzantine Robustness and Partial Participation Can Be Achieved at Once: Just Clip Gradient Differences". Links: poster

60. 13 December, 2024. NeurIPS 2024, New Orleans, USA. Poster "Federated Optimization Algorithms with Random Reshuffling and Gradient Compression". Links: poster

59. 11 December, 2024. NeurIPS 2024, New Orleans, USA. Poster "Exploring Jacobian Inexactness in Second-Order Methods for Variational Inequalities: Lower Bounds, Optimal Algorithms and Quasi-Newton Approximations". Links: poster

58. 11 December, 2024. NeurIPS 2024, New Orleans, USA. Poster "Remove that Square Root: A New Efficient Scale-Invariant Version of AdaGrad". Links: poster

57. 16 October, 2024. Federated Learning One-World Seminar, online. Talk "Federated Learning Can Find Friends That Are Advantageous and Help with Low-Recourse Machine Translation". Links: slides, video

56. 25 July, 2024. ICML 2024, Vienna, Austria. Oral Talk and Poster: "High-Probability Convergence for Composite and Distributed Stochastic Minimization and Variational Inequalities with Heavy-Tailed Noise". Links: slides, poster

55. 3 July, 2024. EURO 2024, Copenhagen, Denmark. Talk: "Byzantine Robustness and Partial Participation Can Be Achieved Simultaneously: Just Clip Gradient Differences". Links: slides

54. 26 June, 2024. EUROPT 2024, Lund, Sweden. Talk: "Last-Iterate Convergence of Extragradient-Based Methods". Links: slides

53. 24 June, 2024. Invited talk at INSAIT: "Byzantine Robustness and Partial Participation Can Be Achieved Simultaneously: Just Clip Gradient Differences". Links: slides

52. 21 June, 2024. Principles of Distributed Learning, Nantes, France. Talk: "Byzantine Robustness and Partial Participation Can Be Achieved Simultaneously: Just Clip Gradient Differences". Links: slides

51. 29 May, 2024. NETYS 2024, online. **Keynote talk** "Byzantine Robustness and Partial Participation Can Be Achieved Simultaneously: Just Clip Gradient Differences". Links: slides

50. 3 May, 2024. AISTATS 2024, Valencia, Spain. Poster: "Communication Compression for Byzantine Robust Learning: New Efficient Algorithms and Improved Rates". Links: poster

49. 3 May, 2024. AISTATS 2024, Valencia, Spain. Poster: "Breaking the Heavy-Tailed Noise Barrier in Stochastic Optimization Problems". Links: poster

48. 7 February, 2024. Federated Learning One-World Seminar, online. Talk "Variance Reduction is an Antidote to Byzantines: Better Rates, Weaker Assumptions and Communication Compression as a Cherry on the Top". Links: slides, video

47. 10 December - 16 December, 2023. NeurIPS 2023, New Orleans, USA. Poster: "Single-Call Stochastic Extragradient Methods for Structured Non-monotone Variational Inequalities: Improved Analysis under Weaker Conditions". Links: poster

46. 10 December - 16 December, 2023. NeurIPS 2023, New Orleans, USA. Poster: "Accelerated Zeroth-order Method for Non-Smooth Stochastic Convex Optimization Problem with Infinite Variance". Links: poster

45. 10 December - 16 December, 2023. NeurIPS 2023, New Orleans, USA. Poster: "Byzantine-Tolerant Methods for Distributed Variational Inequalities". Links: poster

44. 15 September, 2023. TES Conference on Mathematical Optimization for Machine Learning, Berlin, Germany. Talk: "Clipped Methods for Stochastic Optimization with Heavy-Tailed Noise". Links: slides

43. 27 July, 2023. ICML 2023, Honolulu, USA. Poster: "High-Probability Bounds for Stochastic Optimization and Variational Inequalities: the Case of Unbounded Variance". Links: poster

42. 25 July, 2023. ICML 2023, Honolulu, USA. Poster: "Convergence of Proximal Point and Extragradient-Based Methods Beyond Monotonicity: the Case of Negative Comonotonicity". Links: poster

41. 6 June, 2023. Oberseminar at LT Group, University of Hamburg, Hamburg, Germany. Talk: "Algorithms for Stochastic Optimization with Heavy-Tailed Noise and Connections with the Training of Large Language Models". Links: slides

40. 2 May, 2023. ICLR 2023, Kigali, Rwanda. Poster: "Variance Reduction is an Antidote to Byzantines: Better Rates, Weaker Assumptions and Communication Compression as a Cherry on the Top". Links: poster

39. 27 April, 2023. AISTATS 2023, Valencia, Spain. Poster: "Stochastic Gradient Descent-Ascent: Unified Theory and New Efficient Methods". Links: poster

38. 13 February, 2023. PEP talks, UCLouvain, Belgium. Talk "Convergence of Proximal Point and Extragradient-Based Methods Beyond Monotonicity: the Case of Negative Comonotonicity". Links: video, slides

37. 28 November - 9 December, 2022. NeurIPS 2022, New Orleans, USA. Poster: "Clipped Stochastic Methods for Variational Inequalities with Heavy-Tailed Noise". Links: poster

36. 28 November - 9 December, 2022. NeurIPS 2022, New Orleans, USA. Poster: "Last-Iterate Convergence of Optimistic Gradient Method for Monotone Variational Inequalities". Links: poster

35. 8 October, 2022. MBZUAI Workshop on Collaborative Learning: From Theory to Practice, Abu Dhabi, UAE. Talk "Variance Reduction is an Antidote to Byzantines: Better Rates, Weaker Assumptions and Communication Compression as a Cherry on the Top". Links: slides

34. 9 September, 2022. All-Russian Optimization Seminar, online. Talk "Methods with Clipping for Stochastic Optimization and Variational Inequalities with Heavy-Tailed Noise" (in Russian). Links: video, slides

33. 21 July, 2022. ICML 2022, Baltimore, USA. Poster: "Secure Distributed Training at Scale". Links: poster

32. 21 July, 2022. ICML 2022, Baltimore, USA. Poster: "3PC: Three Point Compressors for Communication-Efficient Distributed Training and a Better Theory for Lazy Aggregation". Links: poster

31. 3 July, 2022. MOTOR 2022, Petrozavodsk, Russia. Talk: "Distributed Methods with Absolute Compression and Error Compensation". Links: slides

30. 25 April, 2022. Lagrange Workshop on Federated Learning, online. Talk: "Secure Distributed Training at Scale". Links: slides

29. 29 March, 2022. AISTATS 2022, online. Poster "Extragradient Method: $\mathcal{O}(1/K)$ Last-Iterate Convergence for Monotone Variational Inequalities and Connections With Cocoercivity". Links: poster

28. 28 March, 2022. AISTATS 2022, online. Poster "Stochastic Extragradient: General Analysis and Improved Rates". Links: poster

27. 13 March, 2022. Rising Stars in AI Symposium 2022, KAUST, Saudi Arabia. Talk "Extragradient Method: $\mathcal{O}(1/K)$ Last-Iterate Convergence for Monotone Variational Inequalities and Connections With Cocoercivity". Links: slides

26. 16 February, 2022. Vector Institute Endless Summer School session "NeurIPS 2021 Highlights", online. Talk "Moshpit SGD: Communication-Efficient Decentralized Training on Heterogeneous Unreliable Devices" (jointly with Max Ryabinin). Links: slides

25. 20 December, 2021. MLO EPFL internal seminar, online. Talk "Moshpit SGD: Communication-Efficient Decentralized Training on Heterogeneous Unreliable Devices". Links: slides

24. 10 December, 2021. NeurIPS 2021, online. Poster "Moshpit SGD: Communication-Efficient Decentralized Training on Heterogeneous Unreliable Devices". Links: poster

23. 1 December, 2021. MTL MLOpt (internal seminar), online. Talk "Extragradient Method: $\mathcal{O}(1/K)$ Last-Iterate Convergence for Monotone Variational Inequalities and Connections With Cocoercivity". Links: slides

22. 17 November, 2021. All-Russian Optimization Seminar, online. Talk "Extragradient Method: $\mathcal{O}(1/K)$ Last-Iterate Convergence for Monotone Variational Inequalities and Connections With Cocoercivity" (in Russian). Links: video, slides

21. 3 November, 2021. Federated Learning One-World Seminar, online. Talk "Secure Distributed Training at Scale". Links: video, slides

20. 21 July, 2021. ICML 2021, online. Poster "MARINA: Faster Non-Convex Distributed Learning with Compression". Links: poster

19. 14 April, 2021. AISTATS 2021, online. Poster "Local SGD: Unified Theory and New Efficient Methods". Links: poster

18. 10 March, 2021, Federated Learning One-World Seminar, online. Talk "MARINA: Faster Non-Convex Distributed Learning with Compression". Links: video, slides

17. 19 January, 2021. NeurIPS New Year AfterParty at Yandex. Talk "Linearly Converging Error Compensated SGD". Links: video

16. 9 December, 2020. NeurIPS 2020, online. Poster "Stochastic Optimization with Heavy-Tailed Noise via Accelerated Gradient Clipping" (presented by M. Danilova). Links: video, poster

15. 9 December, 2020. NeurIPS 2020, online. Poster "Linearly Converging Error Compensated SGD". Links: video, poster

14. 7 October, 2020, Federated Learning One-World Seminar and Russian Optimization Seminar, online. Talk "Linearly Converging Error Compensated SGD". Links: video, slides

13. 26 – 28 August, 2020, 23rd International Conference on Artificial Intelligence and Statistics (AISTATS 2020), online. I have presented our joint work with Filip Hanzely and Peter Richtárik called "A Unified Theory of SGD: Variance Reduction, Sampling, Quantization and Coordinate Descent". Links: video

12. 8 July, 2020, Russian Optimization Seminar, online. Talk "On the convergence of SGD-like methods for convex and non-convex optimization problems" (in Russian). Links: video, slides

11. 28 June – 10 July, 2020, Machine Learning Summer School, online. I have presented our joint work with Dmitry Kovalev, Dmitry Makarenko and Peter Richtárik called "Linearly Converging Error Compensated SGD". Links: video, slides

10. 27 – 30 April, 2020, 8-th International Conference on Learning Representations (ICLR 2020), online. I have presented our joint work with Adel Bibi, Ozan Sener, El Houcine Bergou and Peter Richtárik called "A Stochastic Derivative Free Optimization Method with Momentum". Links: video

9. 14 December, 2019, NeurIPS 2019 workshop "Optimization Foundations for Reinforcement Learning", Vancouver, Canada. Poster "A Stochastic Derivative Free Optimization Method with Momentum"

8. 13 December, 2019, NeurIPS 2019 workshop "Beyond First Order Methods in ML", Vancouver, Canada. Poster "An Accelerated Method for Derivative-Free Smooth Stochastic Convex Optimization"

7. 18 October, 2019, SIERRA research seminar, INRIA. Talk "A Unified Theory of SGD: Variance Reduction, Sampling, Quantization and Coordinate Descent". Links: slides

6. 1-6 July 2018, 23rd International Symposium on Mathematical Programming, Bordeaux, France. Talk "An Accelerated Directional Derivative Method for Smooth Stochastic Convex Optimization"

5. 10-15 June 2018, Traditional Youth School "Control, Information and Optimization" organized by Boris Polyak and Elena Gryazina, Voronovo, Russia. Poster and Talk "An Accelerated Directional Derivative Method for Smooth Stochastic Convex Optimization"

4. 14 April 2018, Workshop "Optimization at Work", MIPT, Dolgoprudny, Russia. Talk "An Accelerated Method for Derivative-Free Smooth Stochastic Convex Optimization"

3. 5-7 February 2018, KAUST Research Workshop on Optimization and Big Data, KAUST, Thuwal, Saudi Arabia. Joint Poster "Stochastic Spectral Descent Methods" with D. Kovalev and E. Gasanov

2. 25 November 2017, 60th Scientific Conference of MIPT, Section of Information Transmission Problems, Data Analysis and Optimization, IITP, Moscow, Russia. Talk "About accelerated Directional Search with non-Euclidean prox-structure"

1. 27 October 2017, Workshop "Optimization at Work", MIPT, Dolgoprudny, Russia. Talk "Accelerated Directional Search with non-Euclidean prox-structure"

REVIEWING

- Journals: Journal of Machine Learning Research (JMLR) (2020, 2023, 2024), Mathematical Programming (2024), Transactions on Machine Learning Research (2022, 2024), Journal Numerische Mathematik (2023), SIAM Journal on Mathematics of Data Science (SIMODS) (2023), Science China Mathematics (2021), SIAM Journal on Optimization (SIOPT) (2020, 2021), Optimization Methods and Software (2019)

- Conferences: AISTATS (2022, 2023, 2025), ICLR (2021, 2022, 2023, 2024, 2025), ICML: (2019, 2021, 2022, 2024), NETYS (2024, 2025)

Organization

- Area Chair: NeurIPS (2025)
- Action Editor: TMLR (July 2024 – Now)
- **Organizer of Russian Optimization Seminar**: May 2020 – August 2022
- **Organizer of research seminar on Optimization at MIPT**: March 2020 – June 2020

Research Visits and Internships

- **8 June 2021 – 30 September 2021**, Mila, Université de Montréal. Internship in the group of Gauthier Gidel
- **1 September 2020 – 28 February 2021**, Visual Computing Center, KAUST, Thuwal, Saudi Arabia. I remotely worked in the group of P. Richtárik
- **2 February – 31 March 2020**, Visual Computing Center, KAUST, Thuwal, Saudi Arabia (worked with P. Richtárik)
- **6 October – 26 October 2019**, SIERRA, INRIA, Paris, France (worked with A. Taylor)
- **13 January – 24 February 2019**, Visual Computing Center, KAUST, Thuwal, Saudi Arabia (worked with P. Richtárik)
- **14 January – 8 February 2018**, Visual Computing Center, KAUST, Thuwal, Saudi Arabia (worked with P. Richtárik)

Summer Schools

- **28 June - 10 July 2020.** Participant of Machine Learning Summer School. I have presented our joint work with Dmitry Kovalev, Dmitry Makarenko and Peter Richtárik called "Linearly Converging Error Compensated SGD". Links: video, slides
- **June 2018.** Participant of Traditional Youth School "Control, Information and Optimization"
- **June 2017.** Participant of Traditional Youth School "Control, Information and Optimization"
- **July 2015.** Participant of Summer School "Contemporary Mathematics" in Dubna
- **July 2014.** Participant of Summer School "Contemporary Mathematics" in Dubna

Languages

Russian: Mothertongue
English: Advanced

Computer Skills

Operating Systems: Microsoft Windows, Linux, Mac OS
Programming Languages: Python, LaTeX, C, C++

Hobbies

- Wakesurfing, Fitness, Hiking
- Football: 9 years in football school in Rybinsk, Russia. I was also playing for an amateur team

Last Updated on June 29, 2025