

# Aleksandr Beznosikov

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🎓 Scholar

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📄 arXiv

## EDUCATION

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**Moscow Institute of Physics and Technology**

*MSc in Applied Mathematics and Physics*

**Moscow, Russia**

*Sep 2020 – Present*

- GPA – 3.95/4, 4.95/5, 9.48/10

**Moscow Institute of Physics and Technology**

*BSc in Applied Mathematics and Physics*

**Moscow, Russia**

*Sep 2016 – Aug 2020*

- Thesis: "Distributed decentralized gradient-free methods for solving non-smooth stochastic convex optimization problems", Advisor: Alexander Gasnikov
- GPA – 3.99/4, 4.99/5, 9.35/10

## WORK EXPERIENCE

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**Yandex Research**

*Research intern*

**Moscow, Russia**

*Jul 2021 – Present*

**Laboratory of Advanced Combinatorics and Network Applications, MIPT**

*Junior Researcher*

**Moscow, Russia**

*Mar 2021 – Present*

**International Laboratory of SA and HDI, HSE**

*Research assistant*

**Moscow, Russia**

*Feb 2021 – Present*

**MADE: Big Data Academy Mail.Ru group**

*Teaching assistant*

**Moscow, Russia**

*Feb 2021 - Present*

**Moscow Institute of Physics and Technology**

*Teaching assistant at the Department of Mathematical Fundamentals of Control*

**Moscow, Russia**

*Sep 2017 – Present*

## RESEARCH INTERESTS

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- Stochastic Optimization
- Distributed Optimization
- Machine Learning
- Federated Learning

## COMPUTER SKILLS

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- Programming Language: Python, C#, C++, C, SQL
- $\text{\LaTeX}$
- Operating Systems: Mac OSX, Linux, Microsoft Windows

## LANGUAGE

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- **Russian:** [Mothertongue]
- **English:** [Upper Intermediate]

## INTERESTS

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- **Basketball:** Candidate Master of Sports in Russia

## PUBLICATIONS

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- A. Beznosikov, E. Gorbunov, H. Berard, N. Loizou  
Stochastic Gradient Descent-Ascent: Unified Theory and New Efficient Methods  
February 2022, [arxiv.org:2202.07262](https://arxiv.org/abs/2202.07262)
- D. Kovalev, A. Beznosikov, A. Sadiev, M. Pershiyanov, P. Richtárik, A. Gasnikov  
Optimal Algorithms for Decentralized Stochastic Variational Inequalities  
February 2022, [arxiv.org:2202.02771](https://arxiv.org/abs/2202.02771)
- A. Gasnikov, A. Novitskii, V. Novitskii, F. Abdukhakimov, D. Kamzolov, A. Beznosikov, M. Takáč, P. Dvurechensky, B. Gu  
The Power of First-Order Smooth Optimization for Black-Box Non-Smooth Problems  
January 2022, [arxiv.org:2201.12289](https://arxiv.org/abs/2201.12289)
- A. Beznosikov, A. Gasnikov, K. Zainulina, A. Maslovskiy, D. Pasechnyuk  
A Unified Analysis of Variational Inequality Methods: Variance Reduction, Sampling, Quantization and Coordinate Descent  
January 2022, [arxiv.org:2201.12206](https://arxiv.org/abs/2201.12206)
- A. Beznosikov, M. Takac  
Random-reshuffled SARAH does not need a full gradient computations  
November 2021, **NeurIPS 2021**, poster at workshop on Optimization for Machine Learning
- A. Beznosikov, P. Richtárik, M. Diskin, M. Ryabinin, A. Gasnikov  
Distributed Methods with Compressed Communication for Solving Variational Inequalities, with Theoretical Guarantees  
October 2021, [arxiv.org:2110.03313](https://arxiv.org/abs/2110.03313)
- A. Beznosikov, G. Scutari, A. Rogozin, A. Gasnikov  
Distributed Saddle-Point Problems Under Similarity  
July 2021, **NeurIPS 2021**, poster at the main conference
- A. Sadiev, E. Borodich, A. Beznosikov, D. Dvinskikh, M. Takac, A. Gasnikov  
Decentralized and Personalized Federated Learning  
July 2021, **NeurIPS 2021**, spotlight at workshop on Optimization for Machine Learning
- A. Beznosikov, A. Rogozin, D. Kovalev, A. Gasnikov  
Near-Optimal Decentralized Algorithms for Saddle Point Problems over Time-Varying Networks  
July 2021, OPTIMA 2021 (LNCS series)
- I. Stepanov, A. Voronov, A. Beznosikov, A. Gasnikov  
One-Point Gradient-Free Methods for Composite Optimization with Applications to Distributed Optimization  
July 2021, [arXiv:2107.05951](https://arxiv.org/abs/2107.05951)
- A. Beznosikov, P. Dvurechensky, A. Koloskova, V. Samokhin, S. Stich, A. Gasnikov  
Decentralized Local Stochastic Extra-Gradient for Variational Inequalities  
June 2021, [arXiv:2106.08315](https://arxiv.org/abs/2106.08315)
- E. Borodich, A. Beznosikov, A. Sadiev, V. Sushko, N. Savelyev, M. Takac, A. Gasnikov  
Decentralized Personalized Federated Min-Max Problems

- June 2021, **NeurIPS 2021**, poster at workshop on New Frontiers in Federated Learning: Privacy, Fairness, Robustness, Personalization and Data Ownership
- E. Gladin, A. Sadiev, A. Gasnikov, P. Dvurechensky, A. Beznosikov, M. Alkousa  
Solving smooth min-min and min-max problems by mixed oracle algorithms  
March 2021, MOTOR 2021 (CCIS series)
  - A. Beznosikov, V. Novitskii, A. Gasnikov  
One-Point Gradient-Free Methods for Smooth and Non-Smooth Saddle-Point Problems  
March 2021, MOTOR 2021 (LNCS series)
  - A. Beznosikov, V. Samokhin, A. Gasnikov  
Distributed Saddle-Point Problems: Lower Bounds, Optimal and Robust Algorithms  
February 2021, Communication Efficient Distributed Optimization Workshop, poster
  - A. Rogozin, A. Beznosikov, D. Dvinskikh, D. Kovalev, P. Dvurechensky, A. Gasnikov  
Decentralized Distributed Optimization for Saddle Point Problems  
February 2021, arXiv:2102.07758
  - E. Gorbunov, A. Rogozin, A. Beznosikov, D. Dvinskikh, A. Gasnikov  
Recent theoretical advances in decentralized distributed convex optimization  
November 2020, High Dimensional Optimization and Probability Journal
  - A. Sadiev, A. Beznosikov, P. Dvurechensky, A. Gasnikov  
Zeroth-Order Algorithms for Smooth Saddle-Point Problems  
September 2020, MOTOR 2021 (CCIS series)
  - A. Bazarova, A. Beznosikov, A. Gasnikov  
Linearly Convergent Gradient-Free Methods for Minimization of Symmetric Parabolic Approximation  
September 2020, arXiv:2009.04906
  - A. Beznosikov, A. Sadiev, A. Gasnikov  
Gradient-Free Methods for Saddle-Point Problem  
May 2020, MOTOR 2020 (CCIS series)
  - A. Beznosikov, S. Horváth, P. Richtárik, M. Safaryan  
On Biased Compression for Distributed Learning  
February 2020, **NeurIPS 2020**, oral talk at workshop on Scalability, Privacy, and Security in Federated Learning
  - A. Beznosikov, E. Gorbunov, A. Gasnikov  
Derivative-Free Method For Composite Optimization With Applications To Decentralized Distributed Optimization  
November 2019, **IFAC World Congress 2020** (IFAC-PapersOnline)

## TALKS

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- December 2021, NeurIPS 2021, workshop on Optimization for Machine Learning, Sydney, Australia (online) – poster
- December 2021, NeurIPS 2021, main conference, Sydney, Australia (online) – poster
- November 2021, Mohamed bin Zayed University of Artificial Intelligence, Abu Dhabi, UAE – 2 hour lecture
- September 2021, International Conference Optimization and Applications (OPTIMA 2021), Petrovac, Montenegro (online) – 15 min oral talk
- July 2021 Modern Methods of Information Theory, Optimization and Control (summer school), Sochi, Russia – 1 hour lecture
- June 2021 All-Russian Optimization Seminar, Moscow, Russia – 45 min oral talk
- June 2021 Control, Information and Optimization Summer School, Moscow, Russia – 1,5 hour lecture

- June 2021 Moscow Conference on Combinatorics and Applications, Moscow, Russia (online) – 30 min oral talk
- April 2021, MADE: Big Data Academy Mail.Ru group, Moscow, Russia (online) – 3 hour lecture
- April 2021, Communication Efficient Distributed Optimization Workshop, (online) – poster session
- July 2020, Mathematical Optimization Theory and Operations Research (MOTOR 2020), Novosibirsk, Russia (online) – 15 min oral talk
- July 2020, 21st IFAC World Congress 2020, Berlin, Germany (online) – video and poster
- December 2019, Quasilinear Equations, Inverse Problems and Their Applications 2019, Moscow, Russia – 15 min oral talk
- November 2019, The 62th MIPT Conference – 15 min oral talk, **winner**
- November 2017, The 60th MIPT Conference, Moscow, Russia – 15 min oral talk, **winner**

## RESEARCH VISITS

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- October – November 2021, MBZUAI, Abu Dhabi, United Arab Emirates (worked with Martin Takac)
- July – August 2021, Sirius University of Science and Technology, Sochi, Russia
- August – August 2020, Sirius University of Science and Technology, Sochi, Russia
- January – February 2020, Visual Computing Center, KAUST, Thuwal, Saudi Arabia (worked with Peter Richtárik)

## SCHOLARSHIPS, HONORS AND AWARDS

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### University

*2016 - Present*

- **Fall 2021-2022** 1st degree personal scholarship for contributions to the development of numerical optimization methods
- **Fall 2021-2022** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT
- **Spring 2020-2021** 1st degree personal scholarship for contributions to the development of numerical optimization methods
- **Spring 2020-2021** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT
- **Fall 2020-2021** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT
- **2020** Gazprom Bank personal scholarship
- **2020** Moscow region government scholarship
- **2020** Personal merit scholarship at MIPT
- **Spring 2019-2020** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT
- **Fall 2019-2020** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT
- **Spring 2018-2019** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT
- **Fall 2018-2019** Author of problems and organizer of the student olympiad in discrete mathematics
- **2017**: First Prize at MIPT's Team Mathematical Tournament
- **2017-2019**: Abramov scholarship for 1-3 year bachelor students with the best grades at MIPT

### School

*2016 and earlier*

- **2015**: Silver medal in IEPHO (International Experimental Physics Olympiad)
- **2014-2015**: Russian President's Scholarship, for high school student
- **2015**: Prize-Winner, All-Russian School Physics Olympiad, Final Round
- **2014**: Prize-Winner, All-Russian School Physics Olympiad, Final Round
- **2014-2015**: Russian President's Scholarship, for high school student
- **2015-2016**: Winner, All-Russian School Programming Olympiad, Region Round
- **2014-2016**: Winner, All-Russian School Physics Olympiad, Region Round
- **2014-2016**: Winner, All-Russian School Maths Olympiad, Region Round

## TEACHING

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### **MADE: Big Data Academy Mail.Ru group**

*Teaching assistant*

**Moscow, Russia**

*Feb 2021 - Present*

- Spring 2022: Optimization in Machine Learning
- Spring 2021: Optimization in Machine Learning

### **Moscow Institute of Physics and Technology**

*Teaching assistant at the Department of Mathematical Fundamentals of Control*

**Moscow, Russia**

*Sep 2017 - Present*

- Spring 2022: Stochastic process
- Fall 2021: Probability theory
- Spring 2021: Stochastic process
- Fall 2020: Probability theory
- Fall 2020: Discrete analysis
- Spring 2020: Stochastic process
- Fall 2019: Probability theory
- Fall 2019: Discrete analysis
- Fall 2018: Discrete analysis
- Fall 2018: Databases
- Fall 2017: Databases

### **Summer school in Physics and Mathematics Lyceum**

*Director, Head of teaching staff*

**Syktyvkar, Russia**

*Aug 2018, Aug 2019*

- Summer school for gifted children from provincial towns and villages

## REVIEWING

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- Automatica: 1 paper in 2021.
- IEEE Transactions on Information Theory: 1 paper in 2021.
- AISTATS: 3 papers in 2022
- SIOPT: 1 paper in 2022.