Dmitry Kamzolov

Curriculum Vitae

Profile

Dmitry Kamzolov is a researcher working on optimization methods, machine learning, and various applications. His main focus of the research is implementable second-order, higher-order, and Quasi-Newton methods for convex and non-convex optimization. He is also interested in adaptive stochastic methods, distributed optimization, federated learning, and various applications. My last position was a Research Associate at the Mohamed bin Zayed University of Artificial Intelligence (MBZUAI). He was working at the Optimization and Machine Learning Lab (OptML Lab) under the supervision of Prof. Martin Takáč.

Academic Positions

2024 ↑ 2021 — **Research Associate**

MBZUAI, Abu Dhabi, UAE

Optimization and Machine Learning Lab (OptML Lab), Machine Learning Department, Mohamed bin Zayed University of Artificial Intelligence (MBZUAI), Masdar City, Abu Dhabi, United Arab Emirates.
Supervisor: Martin Takáč

2021 ↑ 2020 — **Senior Researcher**

MIPT, Moscow, Russia

Department of Mathematical Basis of Control, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.
Supervisor: Alexander Gasnikov

2020 ↑ 2018 — **Junior Researcher**

MIPT, Moscow, Russia

Laboratory of Numerical Methods of Applied Structural Optimization, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.
Head: Yury Evtushenko

2020 ↑ 2018 — **Teaching Fellow**

MIPT, Moscow, Russia

Department of Mathematical Basis of Control, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.

2019 ↑ 2018 — **Co-Advisor of the Research Group**

MIPT, Moscow, Russia

The Group of Visiting Professor Peter Richtárik on Randomized Algorithms for Distributed Optimization Problems, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.
Supervisor: Peter Richtárik

Contact

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MBZUAI, Masdar City
Abu Dhabi, UAE

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Google Scholar
user=7ezSoS-hLVAC

ORCID
0000-0001-8488-9692

WOS ResearcherID
GQY-6327-2022

ScopusID
57214322063

Citations

- Total Citations: 461
- h-index: 14
- i10-index: 15

Research Interests

- Convex Optimization
- Non-Convex Optimization
- Second/High-order Methods
- Quasi-Newton Methods
- Adaptive Optimization Methods
- Machine Learning
- Stochastic Optimization
- Distributed Optimization
- Federated Learning
- Min-Max Optimization
- Causal Theory

Skills

- PyTorch
- Python
- MatLab

Languages

English — Fluent

Russian — Native

2019 ↑ 2018

Lecturer

MIPT, Moscow, Russia

Department of Applied Mathematics and Informatics, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.

2017 ↑ 2016

Teaching Fellow

MIPT, Moscow, Russia

Department of Mathematical Basis of Control, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.

2017 ↑ 2016

Research Assistant

MIPT, Moscow, Russia

Laboratory of Advanced Combinatorics and Network Applications, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.
Supervisor: Alexander Gasnikov. Head: Andrei Raigorodskii

2016 ↑ 2014

Research Assistant

MIPT, Moscow, Russia

Laboratory of Structural Methods of Data Analysis in Predictive Modeling (PreMoLab), Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.
Supervisor: Alexander Gasnikov. Head: Vladimir Spokoiny

Education

2021 ↑ 2018

Doctor of Philosophy (Ph.D.)

Ph.D. in Mathematical Modelling, Numerical Methods and Program Complexes

Department of Applied Mathematics and Informatics, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

2018 ↑ 2017

Master's Degree

Master of Science in Operations Research, Combinatorics and Optimization (ORCO)

University of Grenoble Alpes (UGA), Grenoble, France

2018 ↑ 2016

Master's Degree

Master of Applied Mathematics and Physics

Department of Control and Applied Mathematics (DCAM), Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

2016 ↑ 2012

Bachelor's Degree

Bachelor of Applied Mathematics and Physics

Department of Control and Applied Mathematics (DCAM), Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

Research Visits and Internships

2020

Research Internship

UGA, Grenoble, France

Laboratory Jean Kuntzmann (LJK), Optimization and Learning for Data Sciences (DAO team), University of Grenoble Alpes (UGA), Grenoble, France. 3 months
Supervisor: Anatoli Juditsky

2019 **Research Internship**
WIAS, Berlin, Germany

Group of Stochastic Algorithms and Nonparametric Statistics, Weierstrass Institute for Applied Analysis and Stochastics (WIAS), Berlin, Germany. 1 month
Supervisor: Pavel Dvurechensky, Head: Vladimir Spokoiny

2019 **Research Internship**
KAUST, Thuval, Saudi Arabia

Visual Computing Center, King Abdullah University of Science and Technology (KAUST), Thuval, Saudi Arabia. 1 month
Supervisor: Peter Richtárik

2018 **Research Internship**
WIAS, Berlin, Germany

Group of Stochastic Algorithms and Nonparametric Statistics, Weierstrass Institute for Applied Analysis and Stochastics (WIAS), Berlin, Germany. 1 month
Supervisor: Pavel Dvurechensky, Head: Vladimir Spokoiny

2018 **Research Internship**
UGA, Grenoble, France

Laboratory Jean Kuntzmann (LJK), Optimization and Learning for Data Sciences (DAO team), University of Grenoble Alpes (UGA), Grenoble, France. 6 months
Supervisor: Anatoli Juditsky

List of Publications and Preprints

The papers are listed in the order they appeared online, starting with the most recent.

27 **OPTAMI: Global Superlinear Convergence of High-order Methods**
D. Kamzolov, *D. Pasechnyuk, A. Agafonov, A. Gasnikov, M. Takáč*
Preprint, under review arXiv:2410.04083

26 **Exploring Jacobian Inexactness in Second-Order Methods for Variational Inequalities: Lower Bounds, Optimal Algorithms and Quasi-Newton Approximations**
A. Agafonov, P. Ostroukhov, R. Mozhaev, K. Yakovlev, E. Gorbunov, M. Takáč, A. Gasnikov, ***D. Kamzolov***
NeurIPS 2024: Advances in Neural Information Processing Systems 37 (Spotlight)
arXiv:2405.15990

25 **AdaBatchGrad: Combining Adaptive Batch Size and Adaptive Step Size**
P. Ostroukhov, A. Zhumabayeva, C. Xiang, A. Gasnikov, M. Takáč, ***D. Kamzolov***
Preprint, under review arXiv:2402.05264

24 **SANIA: Polyak-type Optimization Framework Leads to Scale Invariant Stochastic Algorithms**
F. Abdukhakimov, C. Xiang, ***D. Kamzolov****, R. M. Gower, and M. Takáč*
Preprint, under review arXiv:2312.17369

23 **Stochastic Gradient Descent with Preconditioned Polyak Step-size**
F. Abdukhakimov, C. Xiang, ***D. Kamzolov****, and M. Takáč*
Computational Mathematics and Mathematical Physics
DOI:10.1134/S0965542524700052 arXiv:2310.02093

22 **Advancing the Lower Bounds: an Accelerated, Stochastic, Second-order Method with Optimal Adaptation to Inexactness**
A. Agafonov, ***D. Kamzolov****, A. Gasnikov, A. Kavis, K. Antonakopoulos, V. Cevher, and M. Takáč*
ICLR 2024: The Twelfth International Conference on Learning Representations
ICLR 2024 arXiv:2309.01570

21 **Accelerated Adaptive Cubic Regularized Quasi-Newton Methods**
D. Kamzolov*, K. Ziu, A. Agafonov, and M. Takáč*
Preprint, under review arXiv:2302.04987

20 **A Damped Newton Method Achieves Global $O(\frac{1}{k^2})$ and Local Quadratic Convergence Rate**
S. Hanzely, ***D. Kamzolov****, D. Pasechnyuk, A. Gasnikov, P. Richtárik, and M. Takáč*
NeurIPS 2022: Advances in Neural Information Processing Systems 35
NeurIPS2022 arXiv:2211.00140

19 **Exploiting Higher-Order Derivatives in Convex Optimization Methods**
D. Kamzolov, *A. Gasnikov, P. Dvurechensky, A. Agafonov, and M. Takáč*
Encyclopedia of Optimization. Springer, Cham, 2023
DOI:10.1007/978-3-030-54621-2_858-1 arXiv:2208.13190

18 **Suppressing Poisoning Attacks on Federated Learning for Medical Imaging**
N. Alkhunaizi, ***D. Kamzolov****, M. Takáč, and K. Nandakumar*
MICCAI 2022: Conference on Medical Image Computing and Computer Assisted Intervention 2022
DOI:10.1007/978-3-031-16452-1_64 arXiv:2207.10804

17 **FLECS: A Federated Learning Second-Order Framework via Compression and Sketching**
A. Agafonov, ***D. Kamzolov****, R. Tappenden, A. Gasnikov and M. Takáč*
Preprint, under review arXiv:2206.02009

16 **Stochastic Gradient Methods with Preconditioned Updates**
A. Sadiev, A. Beznosikov, A. J. Almansoori, ***D. Kamzolov****, R. Tappenden, and M. Takáč*
Journal of Optimization Theory and Applications (JOTA)
DOI:10.1007/s10957-023-02365-3 arXiv:2206.00285

15 **The Power of First-Order Smooth Optimization for Black-Box Non-Smooth Problems**
A. Gasnikov, A. Novitskii, V. Novitskii, F. Abdukhakimov, ***D. Kamzolov****, A. Beznosikov, M. Takáč, P. Dvurechensky, and B. Gu*
ICML 2022: Proceedings of the 39th International Conference on Machine Learning
PMLR 162:7241-7265 arXiv:2201.12289

14 **Embedded Online Machine Learning**
N. Yudin, ***D. Kamzolov****, V. Sinolits, P. Golovkin, A. Erchenko*
2021 International Conference Engineering and Telecommunication (En&T)
DOI:10.1109/EnT50460.2021.9681738

13 **An Accelerated Second-Order Method for Distributed Stochastic Optimization**
A. Agafonov, P. Dvurechensky, G. Scutari, A. Gasnikov, ***D. Kamzolov****, A. Lukashevich, A. Daneshmand*
2021 60th IEEE Conference on Decision and Control (CDC)
DOI:10.1109/CDC45484.2021.9683400 arXiv:2103.14392

12 **Hyperfast Second-Order Local Solvers for Efficient Statistically Preconditioned Distributed Optimization**
P. Dvurechensky, ***D. Kamzolov****, A. Lukashevich, S. Lee, E. Ordentlich, C. A Uribe, and A. Gasnikov*
EURO Journal on Computational Optimization
DOI:10.1016/j.ejco.2022.100045 arXiv:2102.08246

11 **Inexact Tensor Methods and Their Application to Stochastic Convex Optimization**
A. Agafonov, ***D. Kamzolov****, P. Dvurechensky, A. Gasnikov, and M. Takáč*
Optimization Methods and Software
DOI:10.1080/10556788.2023.2261604 arXiv:2012.15636

10 **Recent Theoretical Advances in Non-Convex Optimization**
M. Danilova, P. Dvurechensky, A. Gasnikov, E. Gorbunov, S. Guminov, ***D. Kamzolov****, and I. Shibaev*
High-Dimensional Optimization and Probability
DOI:10.1007/978-3-031-00832-0_3 arXiv:2012.06188

9 **Accelerated Meta-Algorithm for Convex Optimization Problems**
A. Gasnikov, D. Dvinskikh, P. Dvurechensky, ***D. Kamzolov****, V. Matykhin, D. Pasechnyk, N. Tupitsa, and A. Chernov*
Computational Mathematics and Mathematical Physics
DOI:10.1134/S096554252101005X arXiv:2004.08691

8 **Near-Optimal Hyperfast Second-Order Method for Convex Optimization**
D. Kamzolov *and A. Gasnikov*
Lecture Notes in Computer Science
DOI: 10.1007/978-3-030-58657-7_15 arXiv:2002.09050

7 **Optimal Combination of Tensor Optimization Methods**
D. Kamzolov*, A. Gasnikov, and P. Dvurechensky*
Lecture Notes in Computer Science
DOI:10.1007/978-3-030-62867-3_13 arXiv:2002.01004

6 **Composite Optimization for the Resource Allocation Problem**
A. Ivanova, P. Dvurechensky, A. Gasnikov, and ***D. Kamzolov***
Optimization Methods and Software
DOI:10.1080/10556788.2020.1712599 arXiv:1810.00595

5 **Universal Intermediate Gradient Method for Convex Problems with Inexact Oracle**
D. Kamzolov, *P. Dvurechensky, and A. Gasnikov*
Optimization Methods and Software
DOI:10.1080/10556788.2019.1711079 arXiv:1712.06036

4 **Universal Composite Prox-Method for Strictly Convex Optimization Problems**
A. Gasnikov, ***D. Kamzolov****, and M. Mendel*
Trudy MIPT. in Russian
arXiv:1603.07701

3 **Efficient Numerical Methods to Solve Sparse Linear Equations with Application to PageRank**
A. Anikin, A. Gasnikov, A. Gornov, ***D. Kamzolov****, Y. Maximov, and Y. Nesterov*
Optimization Methods and Software
DOI:10.1080/10556788.2020.1858297 arXiv:1508.07607

2 **Universal Method with Inexact Oracle and its Applications for Searching Equilibriums in Multistage Transport Problems**
A. Gasnikov, P. Dvurechensky, ***D. Kamzolov****, Y. Nesterov, V. Spokoiny, P. Stetsyuk, A. Suvorikova, A. Chernov*
Trudy MIPT. in Russian
arXiv:1506.00292

1 **Gradient and Gradient-Free Methods for Stochastic Convex Optimization with Inexact Oracle**
A. Gasnikov, P. Dvurechensky, and ***D. Kamzolov***
Conference on System Dynamics and Control Processes (SDCP2014)
arXiv:1502.06259

Conference and Seminar Talks

37 **EURO 2024**
Accelerated Adaptive Cubic Regularized Quasi-Newton Methods
33rd European Conference on Operational Research (EURO 2024), Copenhagen, Denmark
Session talk, Offline, Program

36 **EUROPT 2024**
Accelerated Cubic Regularized Quasi-Newton Methods
21st EUROPT Conference on Advances in Continuous Optimization (EUROPT 2024), Lund, Sweden
Session talk, Offline, Program

35 **ICLR 2024**
Advancing the Lower Bounds: an Accelerated, Stochastic, Second-order Method with Optimal Adaptation to Inexactness
International Conference on Learning Representations (ICLR 2024), Vienna, Austria
Poster, Offline, Poster, Video, Paper

34 **NOPTA 2024**
Advancing the lower bounds: An accelerated, stochastic, second-order method with optimal adaptation to inexactness
Workshop on Nonsmooth Optimization and Applications (NOPTA), Antwerpen, Belgium
Poster, Offline, Program

33 **Russian Optimization Seminar, 2023**
Cubic Regularization is the Key! Accelerated Quasi-Newton Methods, Stochastic High-order Methods
Seminar talk, Online, Abstract, Slides, Video

32 **Mathematics in Armenia: Advances and Perspectives, 2023**
Accelerated Adaptive Cubic Regularized Quasi-Newton Methods
Yerevan, Armenia
Session talk, Offline, Program

31 **FoCM 2023**
Accelerated Adaptive Cubic Regularized Quasi-Newton Methods
Foundations of Computational Mathematics 2023, Paris, France
Poster, Offline, Abstract

30 **NeurIPS Workshop HOOML 2022**
Cubic Regularized Quasi-Newton Methods
NeurIPS 2022 Workshop HOOML: Order up! The Benefits of Higher-Order Optimization in Machine Learning, New Orleans LA, USA
Poster and Spotlight, Offline (presented by K.Ziu), Paper, Spotlight

29 **NeurIPS Workshop HOOML 2022**
PSPS: Preconditioned Stochastic Polyak Step-size method for badly scaled data
NeurIPS 2022 Workshop HOOML: Order up! The Benefits of Higher-Order Optimization in Machine Learning, New Orleans LA, USA
Poster, Mixed (presented by F. Abdukhakimov), Paper, Spotlight

28 **NeurIPS 2022**
A Damped Newton Method Achieves Global $O(\frac{1}{k^2})$ and Local Quadratic Convergence Rate
Thirty-six Conference on Neural Information Processing Systems (NeurIPS 2022), New Orleans LA, USA
Poster, Offline (presented by S. Hanzely), Poster, Paper

27 **ICML 2022**
The Power of First-order Smooth Optimization for Black-Box Non-Smooth Problems
The Thirty-ninth International Conference on Machine Learning (ICML 2022), Baltimore MD, USA
Poster and Spotlight, Offline (presented by M. Takáč), Poster, Spotlight

26 **Russian Optimization Seminar, 2022**
A Damped Newton Method Achieves Global $O(\frac{1}{k^2})$
Seminar talk, Online, Abstract, Video

25 **QIPA 2021**
Hyperfast Second-order Method and its Applications
International Conference "Quasilinear Equations, Inverse Problems, and their Applications" 2021 (QIPA 2021), Sochi, Russia
Section talk, Online, Program, Video

24 **Optimization without Borders 2021**
High-Order Tensor Method for Distributed Convex Optimization
Sochi, Russia
Section talk, Offline, Video

23 **Moscow Conference on Combinatorics and Applications, 2021**
Hyperfast Second-order Local Solvers for Efficient Statistically Preconditioned Distributed Optimization
Invited talk, Online, Program, Video

22 **Russian Optimization Seminar, 2020**
Acceleration of Tensor Methods and Their Optimal Combination
Seminar talk, Online, Abstract

21 **MOTOR 2020**
Near-Optimal Super-Fast Second-Order Method
International Conference "Mathematical Optimization Theory and Operations Research" (MOTOR 2020), Novosibirsk, Russia
Section talk, Online, Program

20 **QIPA 2019**
Composite High-order Method for Convex Optimization
International Conference "Quasilinear Equations, Inverse Problems, and their Applications" 2019 (QIPA 2019), Moscow, Russia
Section talk, Offline, Program

19 **ICCOPT 2019**
Composite High-Order Method for Convex Optimization
The Sixth International Conference on Continuous Optimization (ICCOPT), Berlin, Germany.
Session talk, Offline, Program, Abstract

18 **OPTIMA 2018**
Universal Intermediate Gradient Method for Convex Problems with Inexact Oracle
The IX International Conference "Optimization and Applications" (OPTIMA), Petrovac, Montenegro.
Session talk, Offline, Program

17 **23rd ISMP 2018**
Universal Intermediate Gradient Method for Convex Problems with Inexact Oracle
23rd International Symposium on Mathematical Programming (ISMP), Bordeaux, France.
Session talk, Offline, Program, Abstract

16 **9th Traditional Youth School "Control, Information and Optimization", 2017**
Intermediate Gradient Methods with One Prox-mapping
Moscow, Russia
Poster, Offline

15 **Workshop "Three Oracles", 2016**
Universal Intermediate Gradient Method for Strong Convex Functions
Workshop "Three Oracles" (Boris T. Polyak, Arkadi S. Nemirovski, and Yuri E. Nesterov), Moscow, Russia
Section talk, Offline, Slides, Video

14 **59th MIPT Conference, 2016**
Universal Intermediate Gradient Method
59^{th} Conference of Moscow Institute of Physics and Technology, Moscow, Russia
Section talk, Offline

13 **ORM 2016**
Universal Intermediate Gradient Method with Inexact Oracle
VIII Moscow International Conference on Operations Research 2016, Moscow, Russia
Section talk, Offline

12 **ORM 2016**
Nesterov – De-Palma Problem
VIII Moscow International Conference on Operations Research 2016, Moscow, Russia
Section talk, Offline

11 **8th Traditional Youth School "Control, Information and Optimization", 2016**
Universal Fast Gradient Methods
Saint-Petersburg, Russia
Poster, Offline

10 **QIPA 2015**
Fast computation Wasserstein Barycenters
International Conference "Quasilinear Equations, Inverse Problems, and their Applications" 2015, Moscow, Russia
Section talk, Offline, Program

9 **QIPA 2015**
Effective Numerical Methods for Huge-scale Linear Systems with Double-sparsity and Applications to PageRank
International Conference "Quasilinear Equations, Inverse Problems, and their Applications" 2015, Moscow, Russia
Section talk, Offline, Program

8 **58th MIPT Conference, 2015**
Effective Computation Wasserstein Barycenters
58^{th} Conference of Moscow Institute of Physics and Technology, Moscow, Russia
Section talk, Offline

7 **58th MIPT Conference, 2015**
Effective Computation Wasserstein Barycenters
58^{th} Conference of Moscow Institute of Physics and Technology, Moscow, Russia
Section talk, Offline

6 **58th MIPT Conference, 2015**
Effective Numerical Methods for PageRank Problem
58^{th} Conference of Moscow Institute of Physics and Technology, Moscow, Russia
Session talk, Offline

5 **Information Technology and Systems(ITaS) 2015**
Ranking Web-Pages on Sparse Graphs
Sochi, Russia
Poster, Offline, Abstract

4 **7th Traditional Youth School "Control, Information and Optimization", 2015**
Efficient PageRank algorithm with double sparsity
Solnechnogorsk, Moscow Region, Russia
Poster, Offline

3 **EURO 2015**
Sparsity PageRank Problem without Spectral Gap Condition
27^{th} European Conference on Operational Research, Glasgow, United Kingdom
Section talk, Offline, Program

2 **5th International Conference on Network Analysis, 2015**
Computationally Efficient PageRank Algorithm Exploiting Graph Sparsity
Nizhny Novgorod, Russia
Section talk, Offline, Slides

1 **57th MIPT Conference, 2014**
Population Games and Evolutionary Dynamics: Nesterov-De-Palma Problem
57^{th} Conference of Moscow Institute of Physics and Technology, Moscow, Russia
Section talk, Offline

Grants and Prizes

2021 **Grant for Research Centers in the Field of Artificial Intelligence**
provided by the Analytical Center for the Government of the Russian Federation in accordance with the subsidy agreement (agreement identifier 000000D730321P5Q0002) and the agreement with the Moscow Institute of Physics and Technology dated November 1, 2021 No. 70-2021-00138
Investigator

2021 **RSF grant 21-71-30005 "Development of numerical optimization methods in applications to control problems, inverse problems and learning"**
Investigator, Lead: Andrei Raigorodskii

2020 **"Ostrogradski" scholarship, 3000€**
Mobility Grant from French Goverment for PhD students
Supervisor: Anatoli Juditsky

2021 ↑ 2019 **RFBR grant 19-31-90170/19 "Search for equilibria in transport networks with primal-dual accelerated methods with auxiliary one-dimensional optimization", 1.2m rubles / 15k€**
Primal Investigator, Lead: Alexander Gasnikov

2019 ↑ 2017 **RSF grant 17-11-01027 "Algorithmic optimization for huge scale problem"**
Investigator, Lead: Yuri Nesterov

2018 ↑ 2017 **Erasmus+ grant, 4300€**
Mobility Grant for Master of Science in Operations Research, Combinatorics and Optimization (ORCO) program in University of Grenoble Alpes (UGA)

2016 **Prague Summer School on Discrete Mathematics 2016, Travel Grant, 310€**
Participation Grant

2015 **ADFOCS 2015, Travel Grant, 350€**
16th Max Planck Advanced Course on the Foundations of Computer Science (ADFOCS)
Participation Grant

Industry Collaboration

2021 **Yahoo! Research**
Joint research project on distributed high-order optimizers for convex optimization. Some of the results are published in the joint paper Hyperfast Second-Order Local Solvers for Efficient Statistically Preconditioned Distributed Optimization
Researcher

2021 **Huawei**
Joint MIPT-Huawei project
Researcher

2019 **Huawei**
Joint MIPT-Huawei project
Researcher

2018 **BIOCAD**
Joint MIPT-BIOCAD project
Researcher

Teaching

Optimization, Teacher Assistant: Fall 2021
Department of Machine Learning (ML), Mohamed bin Zayed University of Artificial Intelligence (MBZUAI), Abu Dhabi, UAE

Optimization Methods, Lecturer: Fall 2018
Department of Applied Mathematics and Informatics: Innovations and High Technology (DAMI DIHT), Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

Optimization Methods, Teaching Fellow: Fall 2018, Fall 2019
Department of Applied Mathematics and Informatics: Innovations and High Technology (DAMI DIHT), Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

Optimization Methods, Teaching Fellow: Fall 2018, Spring 2019, Fall 2019, Spring 2019, Fall 2020, Spring 2020
Department of Applied Mathematics and Informatics: Control and Applied Mathematics (DAMI DCAM), Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

Algorithms and Complexity, Teaching Fellow: Spring 2017
Department of Control and Applied Mathematics, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

Optimization Methods, Teaching Fellow: Spring 2017
Department of Control and Applied Mathematics, Moscow Institute of Physics and Technology (MIPT), Moscow, Russia

Supervising

Present ↑ 2019

Artem Agafonov
I started to work and co-supervise Artem in the group of Alexander Gasnikov in MIPT in 2019 on projects on second and high order optimization methods. Later, the co-supervision continued in MBZUAI in the group of Martin Takáč. Next, I list our joint papers:
[**27**] OPTAMI: Global Superlinear Convergence of High-order Methods
[**26**] Exploring Jacobian Inexactness in Second-Order Methods for Variational Inequalities: Lower Bounds, Optimal Algorithms and Quasi-Newton Approximations
[**22**] Advancing the Lower Bounds: an Accelerated, Stochastic, Second-order Method with Optimal Adaptation to Inexactness
[**21**] Accelerated Adaptive Cubic Regularized Quasi-Newton Methods
[**19**] Exploiting Higher-Order Derivatives in Convex Optimization Methods
[**17**] FLECS: A Federated Learning Second-Order Framework via Compression and Sketching
[**13**] An Accelerated Second-Order Method for Distributed Stochastic Optimization
[**11**] Inexact Tensor Methods and Their Application to Stochastic Convex Optimization

Present ↑ 2024

Konstantin Yakovlev
I was leading the project, where Konstantin Yakovlev was working on experiments under my mentorship
[**26**] Exploring Jacobian Inexactness in Second-Order Methods for Variational Inequalities: Lower Bounds, Optimal Algorithms and Quasi-Newton Approximations

Present ↑ 2023

Roman Mozhaev
I was leading the project, where Roman Mozhaev was working on experiments under my mentorship
[**26**] Exploring Jacobian Inexactness in Second-Order Methods for Variational Inequalities: Lower Bounds, Optimal Algorithms and Quasi-Newton Approximations

Present ↑ 2022

Petr Ostroukhov
I was leading two projects, where Petr Ostroukhov was working primarly on theoretical results under my mentorship:
- [**26**] Exploring Jacobian Inexactness in Second-Order Methods for Variational Inequalities: Lower Bounds, Optimal Algorithms and Quasi-Newton Approximations
- [**25**] AdaBatchGrad: Combining Adaptive Batch Size and Adaptive Step Size

Present ↑ 2022

Farshed Abdukhakimov
I was co-leading 2 projects on adaptive stochastic Polyak methods and experiments for a 1 project on zero-order methods, where Farshed Abdukhakimov was working under my mentorship:
[**24**] SANIA: Polyak-type Optimization Framework Leads to Scale Invariant Stochastic Algorithms
[**23**] Stochastic Gradient Descent with Preconditioned Polyak Step-size
[**15**] The Power of First-Order Smooth Optimization for Black-Box Non-Smooth Problems

Present ↑ 2022

Klea Ziu
I was leading the project on Quasi-Newton methods, where Klea Ziu was working on experiments under my mentorship
[**21**] Accelerated Adaptive Cubic Regularized Quasi-Newton Methods

2024 ↑ 2022 **Chulu Xiang**
I was co-leading 3 projects on adaptive stochastic methods, where Chulu Xiang was working mostly on theoretical results under my mentorship:
[25] AdaBatchGrad: Combining Adaptive Batch Size and Adaptive Step Size
[24] SANIA: Polyak-type Optimization Framework Leads to Scale Invariant Stochastic Algorithms
[23] Stochastic Gradient Descent with Preconditioned Polyak Step-size

Present ↑ 2022 **Dmitry Vilensky (Pasechnyuk)**
I was co-leading the project, where Dmitry Vilensky (Pasechnyuk) was working on experiments under my mentorship
[27] OPTAMI: Global Superlinear Convergence of High-order Methods
[20] A Damped Newton Method Achieves Global $O(\frac{1}{k^2})$ and Local Quadratic Convergence Rate

2024 ↑ 2022 **Aigerim Zhumabayeva**
I was leading the projects, where Aigerim Zhumabayeva was the working on experimental part under my mentorship
[25] AdaBatchGrad: Combining Adaptive Batch Size and Adaptive Step Size

2023 ↑ 2022 **Slavomír Hanzely**
I was co-leading the project, where Slavomír Hanzely was working on theoretical results under my mentorship
[20] A Damped Newton Method Achieves Global $O(\frac{1}{k^2})$ and Local Quadratic Convergence Rate

2022 ↑ 2021 **Naif Alkhunaizi**
I was co-supervising Naif Alkunaizi for the project on
[18] Suppressing Poisoning Attacks on Federated Learning for Medical Imaging

2022 ↑ 2021 **Abdulla Jasem Almansoori**
I was leading experimental section of the project, serving as a mentor to Abdulla Jasem Almansoori, who was the main author for the experimental part
[16] Stochastic Gradient Methods with Preconditioned Updates

2022 ↑ 2020 **Aleksandr Lukashevich**
I was leading experimental section and methods implementation in the projects, where Aleksandr Lukashevich was the working on experiments under my mentorship:
[13] An Accelerated Second-Order Method for Distributed Stochastic Optimization
[12] Hyperfast Second-Order Local Solvers for Efficient Statistically Preconditioned Distributed Optimization

2021 ↑ 2020 **Tatiana Golubeva**
I was supervising Tatiana Golubeva for the Master's Diploma on "Numerical Analysis of Accelerated High-order Methods for Convex Optimization and their Applications", MIPT.

2021 ↑ 2020 **Yakub Sharafutdinov**
I was supervising Yakub Sharafutdinov for the Master's Diploma on "Stochastic High-order Methods for Non-Convex Optimization and its Acceleration", MIPT.

2019 ↑ 2018 **Alevtina Shakirova**
I was co-supervising Alevtina Shakirova for the Bachelor's Diploma on "Stochastic Optimization Methods for Resource Allocation Problem", MIPT.

Academic Service: Reviewing

- International Conference on Learning Representation (ICLR): 2024
- Conference on Neural Information Processing Systems (NeurIPS): 2024 2023, 2022
- International Conference on Machine Learning (ICML): 2024,, 2023, 2022
- Mathematical Programming (MP)
- Journal of Optimization Theory and Applications (JOTA)
- Optimization Methods and Software (OMS)
- IMA Journal of Numerical Analysis (IMA JNA)
- IEEE Transactions on Signal Processing (IEEE TSP)
- Transactions on Machine Learning Research (TMLR)

Academic Service: Conference, Session, Workshop, and Seminar organization

EURO 2024, Session on "Beyond First-Order Optimization Methods", Offline, Organizer, 2024

EURO 2024, Session on "Adaptive and Polyak step-size methods", Offline, Organizer, 2024

Russian Optimization Seminar, Online, Co-Organizer, 2020 – 2023

Seminar "Mathematical Seminar", MIPT, Moscow, Co-organizer, 2014 – 2016

International Conference "Quasilinear Equations, Inverse Problems, and their Applications" (QIPA 2015), MIPT, Moscow, Co-organizer, 2015

Seminar "Modern Problems of Applied Mathematics", MIPT, Moscow, Secretary, 2014 – 2016

Schools and Olympiads

2018 **Journeys SMAI-MODE 2018**, Participant

2016 **Prague Summer School on Discrete Mathematics 2016**, Participant

2015 **16th Max Planck Advanced Course on the Foundations of Computer Science (ADFOCS)**, Participant

2015 **Summer School "Modern Mathematics" 2014**, Participant

2014 **Summer School "Modern Mathematics" 2014**, Participant

2013 **Summer School "Modern Mathematics" 2013**, Participant

2012 **Summer School "Modern Mathematics" 2012**, Participant

2012 **Saint-Petersburg Mathematical Olympiad**, 2^{nd} Diploma

2012 **Moscow Mathematical Olympiad**, 2^{nd} Diploma

2011 **Saint-Petersburg Mathematical Olympiad**, 2^{nd} Diploma

2011 **Moscow Mathematical Olympiad**, 2^{nd} Diploma

2010 **All-Russian Mathematical Olympiad**, Final stage, Participant

Research Traveling

CV updated on: 22.10.2024