Konstantin Mishchenko

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Education

2017-2020 KAUST, **PhD** in Computer Science, Adviser: Peter Richtárik
2016–2017 ENS Cachan and Paris-Dauphine, **MSc** in Machine Learning
2012–2016 Moscow Institute of Physics and Technology, **BSc** in Computer Science and Physics

Research interests

- Optimization algorithms
- Minimax problems and GANs
- Deep learning

Internships and summer schools

07-10/2020 Research Intern at Google Brain, working remotely with Montreal team
2019 Frontiers of Deep Learning Workshop at Simons Institute for the Theory of Computing
2018 Applied Scientist Intern at Amazon, Seattle
2017 Pre-Doc Summer School, ETH Zurich
2017 Machine Learning Summer School (Acceptance rate 15%, the only accepted undergrad student), MPI Tübingen
2016 C++ Development Intern, AIM High Tech (High Frequency Trading), Moscow

Achievements and awards

2020 One of 12 **Outstanding Program Committee members** for AAAI 2020, selected from >6000 reviewers, Free registration (**$1075**)
2019 NeurIPS 2019 Travel Award, **$1400**
2019 NeurIPS 2019 **Best Reviewer** Award, Free registration (**$750**)
2017-2019 **PhD progress** marked as "**Outstanding**" twice, in 2018 and 2019
2018 **71st place worldwide** in IEEEXtreme team programming competition
2017-2020 Dean's Award (**$5000** annually for 3 years), given to a few top students accepted to KAUST
2017 **1st place** in the Plume Labs machine learning competition on air pollution prediction
2017 **123rd place worldwide** in IEEEXtreme team programming competition
2016-2017 Paris Graduate School of Mathematics **fellowship** (awarded to 24 people from 12 countries)
2015 **1st prize** in Higher School of Economics Olympiad on Applied Math and Informatics
2014 Abramov-Frolov **scholarship for excellence in study**
2012 **Top-1** (max score) at the National Exam in math (only 54 participants out of >800k scored max)
2012 **1st prize** in Moscow Mathematical Olympiad

Conferences: presenting and organizing

2020 International Conference on Machine Learning, poster
2020 SIAM Conference on Optimization, invited talk, organizer of 2 minisymposia
2020 SIAM Conference on Mathematics of Data Science, session organizer
2019 NeurIPS, co-author of 5 workshop papers, 2 spotlights and 3 posters

2019 International Conference on Continuous Optimization, invited talk, organizer of 3 sessions
2019 International Conference on Machine Learning, Time Series Workshop, poster
2018 Conference on Neural Information Processing Systems, poster
2018 International Conference on Machine Learning, oral presentation
2018 International Symposium on Mathematical Programming, invited talk
2018 Informs Optimization Society Meeting, invited talk, organizer of a session
2017 Google Machine Learning Summit, Zurich, poster
2017 Workshop on Decentralized Machine Learning, Optimization and Privacy, poster

Papers

Conference/workshop papers

1. Y. Malitsky, K. Mishchenko
   Adaptive Gradient Descent Without Descent
   To appear in **ICML**, 2020
2. K. Mishchenko, F. Hanzely, P. Richtárik
   99% of Distributed Optimization is a Waste of Time: The Issue and How to Fix it
   To appear in **UAI**
3. K. Mishchenko, D. Kovalev, E. Shulgin, Y. Malitsky, P. Richtárik
   Revisiting Stochastic Extragradient
   To appear in **AISTATS**, 2020
4. A. Khaled, K. Mishchenko, P. Richtárik
   Tighter Theory for Local SGD on Identical and Heterogeneous Data
   To appear in **AISTATS**, 2020
5. S. Soori, K. Mishchenko, A. Mokhtari, M. Dehnavi, M. Gürbüzbalaban
   DAve-QN: A Distributed Averaged Quasi-Newton Method with Local Superlinear Convergence Rate
   To appear in **AISTATS**, 2020
6. A. Khaled, K. Mishchenko, P. Richtárik
   Better Communication Complexity for Local SGD
   NeurIPS, Oral at Federated Learning for Data Privacy and Confidentiality workshop, 2019
7. D. Kovalev, K. Mishchenko, P. Richtárik
   Stochastic Newton and Cubic Newton Methods with Simple Local Linear-Quadratic Rates
   NeurIPS, Spotlight at Beyond First Order Methods in ML workshop, 2019
8. K. Mishchenko
   Sinkhorn Algorithm as a Special Case of Stochastic Mirror Descent
   NeurIPS, Optimal Transport & Machine learning workshop, 2019
9. A. Khaled, K. Mishchenko, P. Richtárik
   First Analysis of Local GD on Heterogeneous Data
   NeurIPS, Federated Learning for Data Privacy and Confidentiality workshop, 2019
10. K. Mishchenko, M. Montgomery, F. Vaggi
    A Self-supervised Approach to Hierarchical Forecasting with Applications to Groupwise Synthetic Controls
    ICML, Time Series workshop, 2019
11. F. Hanzely, K. Mishchenko, P. Richtárik
    SEGA: Variance Reduction via Gradient Sketching
    NeurIPS, Conference poster, 2018
12. K. Mishchenko, F. Iutzeler, J. Malick, M.-R. Amini
    A Delay-Tolerant Proximal-Gradient Algorithm for Distributed Learning
    ICML, **Oral** and conference poster, 2018

Journal papers

1. K. Mishchenko, F. Iutzeler, J. Malick

A Distributed Flexible Delay-tolerant Proximal Gradient Algorithm
SIAM Journal on Optimization (**SIOPT**)

Preprints

1. X. Qian, A. Sailanbayev, K. Mishchenko, P. Richtárik
   MISO is Making a Comeback With Better Proofs and Rates
   arXiv:1906.01474
2. K. Mishchenko, P. Richtárik
   A Stochastic Decoupling Method for Minimizing the Sum of Smooth and Non-Smooth Functions
   arXiv:1905.11535
3. S. Horváth, D. Kovalev, K. Mishchenko, S. Stich, P. Richtárik
   Stochastic Distributed Learning with Gradient Quantization and Variance Reduction
   arXiv:1904.05115
4. K. Mishchenko, E. Gorbunov, M. Takáč, P. Richtárik
   Distributed Learning with Compressed Gradient Differences
   arXiv:1901.09269
5. K. Mishchenko, P. Richtárik
   A Stochastic Penalty Model for Convex and Nonconvex Optimization with Big Constraints
   arXiv:1810.13387

Reviewing and serving as Program Committee Member

2020 Conference on Neural Information Processing Systems (**NeurIPS**), Program Committee Member, Best Reviewer Award

2020 Conference on Uncertainty in Artificial Intelligence (**UAI**), Program Committee Member

2020 **IJCAI-PRICAI**, **Workshop** on Federated Learning for User Privacy and Data Confidentiality, Program Committee member

2020 Journal of Machine Learning Research (**JMLR**), Reviewer

2020 International Conference on Machine Learning (**ICML**), Program Committee Member

2020 International Joint Conference on Artificial Intelligence (**IJCAI-PRICAI**), Program Committee Member

2020 NeurIPS 2019 **Reproducibility Challenge**, Reviewer

2019 Journal of Optimization Theory and Applications (**JOTA**), Reviewer

2019 Bridging Game Theory and Deep Learning (**NeurIPS Workshop**), Reviewer

2019 AAAI Conference on Artificial Intelligence (**AAAI**), Program Committee Member, One of 12 outstanding PC members

2019 Conference on Neural Information Processing Systems (**NeurIPS**), Program Committee Member, Best Reviewer Award

2019 Mathematical Programming Journal, Reviewer

2019 Conference on Uncertainty in Artificial Intelligence (**UAI**), Program Committee Member

2019 International Conference on Machine Learning (**ICML**), Program Committee Member

People I visited for collaboration

2019 Alexander Gasnikov, Moscow Institute of Physics and Technology, Russia

2019 Stephen Boyd, Stanford, USA

2019 Matthias Ehrhardt, Bath University, UK

2019 Martin Jaggi, EPFL, Switzerland

2018 Lin Xiao, Microsoft Research Redmond, USA

2018 Dmitriy Drusvyatskiy, Washington University, USA

2018 Aryan Mokhtari, MIT, USA

2018 Mert Gürbüzbalaban, Rutgers University, USA
2017 Carola-Bibiane Schönlieb, Cambridge, UK
2017 Jérôme Malick, Université Grenoble Alpes, France

Talks

2020 Imperial College of London, UK
2020 Oxford Data Science seminar, UK
2020 Gatsby Unit, University College of London, UK
2020 Google Deepmind London, UK
2020 Facebook Artificial Intelligence Research New York, USA
2020 Sierra team (led by Francis Bach) at Inria, France
2019 Boris Polyak's seminar on theory of automatic control, Institute for Control Sciences, Russia
2019 Seminar on applied mathematics, Moscow Institute of Physics and Technology, Russia
2019 Modern optimization methods seminar, Moscow Institute of Physics and Technology, Russia
2019 Numerical Analysis seminar, Bath University, UK
2019 Machine Learning and Optimization Laboratory seminar, EPFL, Switzerland
2018 Microsoft Research Seattle, USA
2018 Optimization at Work, Moscow Institute of Physics and Technology, Russia