


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

- 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 IEEEExtreme 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 IEEEExtreme 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 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. K. Mishchenko, D. Kovalev, E. Shulgin, Y. Malitsky, P. Richtárik
Revisiting Stochastic Extragradient
To appear in **AISTATS**, 2020
2. A. Khaled, K. Mishchenko, P. Richtárik
Tighter Theory for Local SGD on Identical and Heterogeneous Data
To appear in **AISTATS**, 2020
3. 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
4. A. Khaled, K. Mishchenko, P. Richtárik
Better Communication Complexity for Local SGD
NeurIPS, Oral at Federated Learning for Data Privacy and Confidentiality workshop, 2019
5. 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
6. K. Mishchenko
Sinkhorn Algorithm as a Special Case of Stochastic Mirror Descent
NeurIPS, Optimal Transport & Machine learning workshop, 2019
7. A. Khaled, K. Mishchenko, P. Richtárik
First Analysis of Local GD on Heterogeneous Data
NeurIPS, Federated Learning for Data Privacy and Confidentiality workshop, 2019
8. K. Mishchenko, M. Montgomery, F. Vaggi
A Self-supervised Approach to Hierarchical Forecasting with Applications to Groupwise Synthetic Controls
ICML, Time Series workshop, 2019
9. F. Hanzely, K. Mishchenko, P. Richtárik
SEGA: Variance Reduction via Gradient Sketching
NeurIPS, Conference poster, 2018
10. 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
To appear in **SIOPT** (SIAM Journal on Optimization)

Preprints

1. Y. Malitsky, K. Mishchenko
Adaptive Gradient Descent Without Descent
arXiv:1910.09529
2. X. Qian, A. Sailanbayev, K. Mishchenko, P. Richtárik
MISO is Making a Comeback With Better Proofs and Rates
arXiv:1906.01474

3. K. Mishchenko, P. Richtárik
A Stochastic Decoupling Method for Minimizing the Sum of Smooth and Non-Smooth Functions
arXiv:1905.11535
4. S. Horváth, D. Kovalev, K. Mishchenko, S. Stich, P. Richtárik
Stochastic Distributed Learning with Gradient Quantization and Variance Reduction
arXiv:1904.05115
5. K. Mishchenko, F. Hanzely, P. Richtárik
99% of Distributed Optimization is a Waste of Time: The Issue and How to Fix it
arXiv:1901.09437
6. K. Mishchenko, E. Gorbunov, M. Takáč, P. Richtárik
Distributed Learning with Compressed Gradient Differences
arXiv:1901.09269
7. 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