Konstantin Mishchenko

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Education

2017-2020	KAUST, **PhD** in Computer Science, Adviser: <u>Peter Richtárik</u>
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

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
2019	NeurIPS 2019 Travel Award, **$1400**
2019	NeurIPS 2019 **Best Reviewer** Award
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	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

Research interests

- Optimization algorithms
- Games, minimax problems and GANs
- Deep learning

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   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**), 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 Seattle, 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, Grenoble University, France

Research seminar talks

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