


# Konstantin Mishchenko

 <http://konstmish.github.io/>  
[konstantin.mishchenko@kaust.edu.sa](mailto:konstantin.mishchenko@kaust.edu.sa)  
Last updated: July 10, 2020

## 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**)
- 2017-2020 **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 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

### Preprints

1. K. Mishchenko, A. Khaled, P. Richtárik  
Random Reshuffling: Simple Analysis with Vast Improvements  
arXiv:2006.05988
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, E. Gorbunov, M. Takáč, P. Richtárik  
Distributed Learning with Compressed Gradient Differences  
arXiv:1901.09269
6. 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

- 2021 International Conference on Learning Representations (**ICLR**), Reviewer
- 2020 Conference on Neural Information Processing Systems (**NeurIPS**), Program Committee Member
- 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 (×2) 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

06/2020 All-Russian Optimization Seminar, Online  
03/2020 Statistics Department of London School of Economics, UK  
02/2020 Imperial College of London Reading Group, UK  
02/2020 Oxford Data Science seminar, UK  
02/2020 Gatsby Unit, University College of London, UK  
02/2020 Google Deepmind London, UK  
02/2020 Facebook Artificial Intelligence Research New York, USA  
01/2020 Sierra team (led by Francis Bach) at Inria, France  
12/2019 LIONS group at EPFL, Switzerland  
10/2019 Boris Polyak's seminar on theory of automatic control, Institute for Control Sciences, Russia  
10/2019 Seminar on applied mathematics, Moscow Institute of Physics and Technology, Russia  
10/2019 Modern optimization methods seminar, Moscow Institute of Physics and Technology, Russia  
06/2019 Numerical Analysis seminar, Bath University, UK  
03/2019 Machine Learning and Optimization Laboratory seminar, EPFL, Switzerland  
11/2018 Microsoft Research Seattle, USA  
10/2017 Optimization at Work, Moscow Institute of Physics and Technology, Russia