

Nikita Doikov

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Residence: Switzerland, Lausanne

RESEARCH INTERESTS

Optimization (numerical methods, convex optimization, second-order methods, tensor methods, global worst-case bounds, complexity, stochastic methods), Computer Science, Computational Mathematics, Algorithms, Statistics, Machine Learning (theory and practice)

EDUCATION

PhD , UCLouvain , Belgium Thesis: “ New second-order and tensor methods in Convex Optimization ” Supervisor: Yurii Nesterov	2021
MSc , Higher School of Economics , Russia, GPA – 9.3/10.0 Faculty of Computer Science Program: Mathematical Methods of Optimization and Stochastics	2017
BSc , Lomonosov Moscow State University , Russia, GPA – 4.9/5.0 Faculty of Computational Mathematics and Cybernetics Program: Machine Learning	2015

EMPLOYMENT

Postdoctoral Researcher at EPFL , Switzerland (2 years) Machine Learning and Optimization Laboratory	09.2022 – <i>now</i>
Postdoctoral Researcher at UCLouvain , Belgium (1 year) ICTEAM / CORE	09.2021 – 08.2022
Software Engineering Intern at Google , Zürich, Switzerland (4 months)	08.2018 – 11.2018
Research Intern at Skoltech , Moscow, Russia (1 year)	10.2016 – 09.2017
Software Engineering Intern at Google , Zürich, Switzerland (3 months)	07.2016 – 09.2016
Software Engineer at Yandex , Moscow, Russia (9 months)	11.2015 – 07.2016

TEACHING AND MENTORING

Direct supervision of interns, MSc theses, and PhD student projects at [MIPT](#), [HSE](#), and [EPFL](#)

Totally, I have taught approx. 350 students on:

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| ◦ Optimization models and methods II at UCLouvain | 2021 |
| ◦ Bayesian Methods in Machine Learning at HSE | 2017, 2018, 2019 |
| ◦ Optimization Methods at Faculty of Computer Science, HSE | 2017, 2018 |
| ◦ Large-scale Optimization and Applications at Skoltech | 2017 |

TECHNICAL SKILLS

Advanced: Algorithms and Data Structures, Numerical Optimization Methods, Machine Learning

Technologies: C++, Python, Matlab, R, SQL, Intel Assembler, UNIX OS architecture, MapReduce, Flume, TensorFlow, PyTorch, JAX, \LaTeX , Git, SVN

Languages: Russian (native), English (fluent), French (basic)

PUBLICATIONS

Refereed Publications (16 papers in the leading peer-reviewed journals and conferences on Mathematical Optimization, Statistics, and Machine Learning):

- Spectral Preconditioning for Gradient Methods on Graded Non-convex Functions*, 2024
N. Doikov, S.U. Stich, and M. Jaggi, ICML
- On Convergence of Incremental Gradient for Non-Convex Smooth Functions*, 2024
A. Koloskova, N. Doikov, S.U. Stich, and M. Jaggi, ICML
- Super-Universal Regularized Newton Method*, 2024
N. Doikov, K. Mishchenko, and Yu. Nesterov, [SIAM Journal on Optimization](#)
- Linearization Algorithms for Fully Composite Optimization*, 2023
M.L. Vladarean, N. Doikov, M. Jaggi, and N. Flammarion, [COLT](#)
- Polynomial Preconditioning for Gradient Methods*, 2023
N. Doikov, A. Rodomanov, [ICML](#)
- Second-order optimization with lazy Hessians*, 2023
N. Doikov, E.M. Chayti, and M. Jaggi, [ICML \(Oral Presentation\)](#)
- Gradient Regularization of Newton Method with Bregman Distances*, 2023
N. Doikov and Yu. Nesterov, [Mathematical Programming Journal](#)
- High-Order Optimization Methods for Fully Composite Problems*, 2022
N. Doikov and Yu. Nesterov, [SIAM Journal on Optimization](#)
- Affine-invariant contracting-point methods for Convex Optimization*, 2022
N. Doikov and Yu. Nesterov, [Mathematical Programming Journal](#)
- Local Convergence of Tensor Methods*, 2021
N. Doikov and Yu. Nesterov, [Mathematical Programming Journal](#)
- Minimizing Uniformly Convex Functions by Cubic Regularization of Newton Method*, 2021
N. Doikov and Yu. Nesterov, [Journal of Optimization Theory and Applications](#)
- Convex optimization based on global lower second-order models*, 2020
N. Doikov and Yu. Nesterov, [NeurIPS \(Oral Presentation\)](#)
- Contracting Proximal Methods for Smooth Convex Optimization*, 2020
N. Doikov and Yu. Nesterov, [SIAM Journal on Optimization](#)
- Stochastic Subspace Cubic Newton Method*, 2020
F. Hanzely, N. Doikov, P. Richtárik, and Yu. Nesterov, [ICML](#)
- Inexact Tensor Methods with Dynamic Accuracies*, 2020
N. Doikov and Yu. Nesterov, [ICML](#)
- Randomized Block Cubic Newton Method*, 2018
N. Doikov and P. Richtárik, [ICML \(Oral Presentation\)](#)

Preprints / under review:

- Complexity of Minimizing Regularized Convex Quadratic Functions*, 2024
D. Berg Thomsen and N. Doikov [arXiv:2404.17543](#)
- First and zeroth-order implementations of the regularized Newton method with lazy approximated Hessians*, N. Doikov and G. N. Grapiglia [arXiv:2309.02412](#) 2023
- Minimizing Quasi-Self-Concordant Functions by Gradient Regularization of Newton Method*, N. Doikov [arXiv:2308.14742](#) 2023
- Unified Convergence Theory of Stochastic and Variance-Reduced Cubic Newton Methods*, E.M. Chayti, N. Doikov, and M. Jaggi [arXiv:2302.11962](#) 2023
- Lower Complexity Bounds for Minimizing Regularized Functions*, N. Doikov [arXiv:2202.04545](#) 2022

ACADEMIC SERVICE

Conference reviews: COLT, NeurIPS, ICML

Journal reviews: Mathematical Programming, SIAM Journal on Optimization, Journal of Optimization Theory and Applications, Journal of Global Optimization, IMA Journal of Numerical Analysis, Computational Optimization and Applications, Optimization Methods and Software, IEEE Transactions on Information Theory

Symposium organization: *Optimization Methods with Worst-Case Complexity Guarantees* at FGS-2024 conference in Spain with [Geovani Nunes Grapiglia](#)

INVITED TALKS, CONFERENCES, AND SCHOOLS

- Workshop on Nonsmooth Optimization and Applications ([NOPTA](#)), Antwerp, 2024
- 20th Workshop on Advances in Continuous Optimization ([EUROPT](#)), Budapest, 2023
- International Conference on Machine Learning ([ICML](#)), Hawaii, 2023
- SIAM Conference on Optimization ([OP23](#)), Seattle, 2023
- Workshop on Advances in Continuous Optimization ([EUROPT](#)), Lisbon, 2022
- French-German-Portuguese conference on Optimization ([FGP](#)), Porto, 2022
- Workshop on Advances in Continuous Optimization ([EUROPT](#)), online, 2021
- [Symposium on Numerical Analysis and Optimization](#), UFPR, online, 2021
- Conference on Neural Information Processing Systems ([NeurIPS](#)), online, 2020
- International Conference on Machine Learning ([ICML](#)), online, 2020
- French-German-Swiss conference on Optimization ([FGS](#)), Nice, 2019
- International Conference on Continuous Optimization ([ICCOPT](#)), Berlin, 2019
- Workshop on Advances in Continuous Optimization ([EUROPT](#)), Glasgow, 2019
- Summer School on [Optimization, Big Data and Applications](#) in Veroli, 2019
- Traditional School [Control, Information and Optimization](#) in Moscow, 2018 – 2019
- International Conference on Machine Learning ([ICML](#)), Stockholm, 2018
- [Recent Advances in Algorithms](#) in St. Petersburg, 2017
- [Deep Hack](#) Artificial Intelligence competition and lecture series at [MIPT](#), 2016
- Participant of the [MIPT fall programming training](#), 2014
- Winter and Summer [Programming Training Camps](#) in Petrozavodsk, 2012 – 2014
- [Winter Programming School](#) on Advanced Algorithms in Kharkiv, 2012

ACHIEVEMENTS AND AWARDS

- 2023 [ICML](#) Oral Presentation
- 2020 [ICML](#) Top Reviewer
[NeurIPS](#) Oral Presentation
- 2019 Best Paper Presentation Award at [OBA School](#)
[NeurIPS](#) Top Reviewers Award
- 2018 Best Talk Award at [Control, Information and Optimization School](#)
[ICML](#) travel award
- 2015 – 2016 Participant of [Challenge24](#) Finals – International 24-hour Programming Contest
- 2015 Top-200 in [Facebook Hacker Cup](#)
[Moscow festival of sport programming](#) – First degree diploma
- 2012 – 2015 University Advanced Scholarship
- 2014 [Moscow festival of sport programming](#) – Second degree diploma
[All Siberian open programming contest](#) – Second degree diploma
Participant of [ACM ICPC NEERC](#) – Third degree diploma
- 2013 Top-600 in [Russian Code Cup](#)
- 2011 Prizewinner of ROI (Russian National Olympiad in Informatics among high school students) – 26th place
Gold medal for extraordinary successes in study
- 2010 Prizewinner of ROI – 90th place