Marina Danilova

Moscow Institute of Physics and Technology (National Research University) (MIPT)
Laboratory of Mathematical Methods of Optimization (MMO)
48, Parkovaya Street, apt. 449, 141702, Dolgoprudny, Moscow Region, Russia
+7-916-468-52-12
danilovamarina15@gmail.com
Google Scholar
marinadanya.github.io

PRINCIPAL INTERESTS

Optimization, machine learning.

ACADEMIC BACKGROUND

Ph.D. Computer Science 2022
Institute of Control Science, RAS, Moscow, Russia

- Ph.D. research in optimization under direction of prof. Boris Polyak.
  Dissertation title: Non-Monotone Behavior and Heavy-Tailed Noise in First-Order Optimization Methods.
- GPA: 5.0/5.0.

M.Sc. Applied Math and Physics 2018
Moscow Institue of Physics and Technology, Moscow, Russia

- Department: Control and Applied Mathematics.
- GPA: 5.0/5.0.
- Thesis: Non-monotone behavior of the Heavy ball method.
- Advisor: Boris Polyak.

M.Sc. Information Technology and Engineering 2018
Skolkovo Institute of Science and Technology, Moscow, Russia

- Department: Energy Systems.
- GPA: 4.6/5.0.
- Thesis: The non-monotonicity effect and exact estimates of the rate of convergence of some optimization methods.
- Advisor: Yury Maximov.

B.Sc. Applied Math and Physics 2016
Moscow Institue of Physics and Technology, Moscow, Russia

- Department: Control and Applied Mathematics.
- GPA: 4.8/5.0.
- Thesis: Research of the method of the iteratively reweighted least squares.
- Advisor: Boris Polyak.

EMPLOYMENT HISTORY

- *Senior Researcher* *2022 - Present*
  Laboratory of Mathematical Methods of Optimization
  MIPT, Moscow
- *Senior Researcher* *2022 - Present*
  Laboratory of Advanced Combinatorics and Network Applications
  MIPT, Moscow

- *Junior Researcher* *2020 - 2022*
  Laboratory of Adaptive and Robust Systems
  ICS RAS, Moscow
- *Researcher* *2019*
  Huawei-MIPT group, Moscow
- *Data scientist* *2019*
  GETCRM, Moscow
- *Junior Researcher* *2018 - 2019*
  Laboratory of Numerical Methods of Applied Structural Optimization
  MIPT, Moscow
- *Intern* *summer, 2017*
  Federal Grid Company of Unified Energy System, Moscow
- *Intern* *summer, 2015*
  Central Bank of the Russian Federation, Moscow
- *Intern* *summer, 2013 - 2014*
  Research Institute of Ecology MNIIEKO TECH, Perm

SPECIAL ACHIEVEMENTS

- Winner of the competition for the best projects of fundamental scientific research carried out by young scientists studying in graduate school (research funding), RFBR, 2020 - 2022
- Scholarship to them. M.V. Ostrogradsky for graduate students, Embassy of France in Moscow, 2020
- Increased academic scholarship for master students with the best grades at Skoltech
- Diplomas with honours, MIPT
- Abramov scholarship for bachelor students with the best grades at MIPT

TEACHING

- *Optimization methods* *2023*
  Teaching assistant, Department of Engineering Center, MIPT
- *Optimization Methods for Machine Learning* *2020 - 2021*
  Co-creator and lecturer, MADE, Mail.ru Group
- *Convex optimization theory* *2019 - 2021*
  Co-creator and lecturer, RANEPA-MIPT
- *Numerical Optimization* *2019 - 2021*
  Co-creator and lecturer, RANEPA-MIPT
- *Optimization methods* *2018 - 2022*
  Teaching assistant, Department of Discrete Mathematics, MIPT
- *Math Olympiad Preparation* *2017 - 2018*
  Teacher, School No.1518
- *Optimization methods* *2016 - 2021*
  Teaching assistant, Department of Mathematical Foundations of Control, MIPT

SUMMER SCHOOLS

- *Member* *2020*
  Machine Learning Summer School, Germany
- *Member* *2016*
  Traditional Summer Youth School "Control, Information and Optimization", Russia
- *Member* *2015*
  The 25th Jyvaskyla Summer School, Finland

RESEARCH VISITS

- *Intern* *2020*
  Laboratoire Jean Kuntzmann, Universite Grenoble Alpes, France
  (worked with J. Malick)

EDITORIAL ACTIVITY

- Program committee member, Organizer, 61,62 All-Russian Scientific Conference at MIPT, section of Mathematical Foundations of Control

JOURNAL ARTICLES

See also my google scholar page.

9. Sadiev, A., **Danilova, M.**, Gorbunov, E., Horváth, S., Gidel, G., Dvurechensky, P., Gasnikov, A. and Richtárik, P., 2023. High-probability bounds for stochastic optimization and variational inequalities: the case of unbounded variance, **accepted to ICML 2023**.
8. Gorbunov*, E., **Danilova*, M.**, Dobre*, D., Dvurechenskii, P., Gasnikov, A. and Gidel, G., 2022. Clipped stochastic methods for variational inequalities with heavy-tailed noise, **accepted to NeurIPS 2022**.
7. **Danilova, M.** and Gorbunov, E., 2022. Distributed methods with absolute compression and error compensation, accepted to MOTOR 2022.
6. **Danilova, M.**, 2022. On the Convergence Analysis of Aggregated Heavy-Ball Method, accepted to MOTOR 2022.
5. **Danilova, M.**, Dvurechensky, P., Gasnikov, A., Gorbunov, E., Guminov, S., Kamzolov, D. and Shibaev, I., 2022. Recent theoretical advances in non-convex optimization. In High-Dimensional Optimization and Probability: With a View Towards Data Science.
4. **Danilova, M.** and Malinovsky, G., 2021. Averaged heavy-ball method. Computer Research and Modeling.
3. Gorbunov, E., **Danilova, M.**, Shibaev, I., Dvurechensky, P. and Gasnikov, A., 2021. Near-optimal high probability complexity bounds for non-smooth stochastic optimization with heavy-tailed noise.
2. Gorbunov, E., **Danilova, M.** and Gasnikov, A., 2020. Stochastic optimization with heavy-tailed noise via accelerated gradient clipping, **accepted to NeurIPS 2020**.
1. **Danilova, M.**, Kulakova, A. and Polyak, B., 2020. Non-monotone behavior of the heavy ball method, accepted to the 24th ICDEA.

CONFERENCES WORKSHOPS

10. **NeurIPS 2022**, New Orleans, USA.
Poster: "Clipped Stochastic Methods for Variational Inequalities with Heavy-Tailed Noise" (presented by E. Gorbunov). Links: poster.
9. AI Journey 2022, Moscow, Russia.
Poster: "Clipped Stochastic Methods for Variational Inequalities with Heavy-Tailed Noise".
8. MOTOR 2022, Petrozavodsk, Russia.
Talk: "On the Convergence Analysis of Aggregated Heavy-Ball Method".
7. MOTOR 2022, Petrozavodsk, Russia.
Talk: "Distributed methods with absolute compression and error compensation"(presented by E. Gorbunov).
6. The 64th International MIPT Scientific Conference 2021, Moscow, Russia.
Talk: "Aggregated Momentum Gradient Method".
5. QIPA 2021, Sochi, Russia.
Talk: "Averaged Heavy-Ball method".
4. Optimization without Borders 2021, Sochi, Russia.
Poster: "Stochastic optimization with heavy-tailed noise via accelerated gradient clipping".
3. **NeurIPS 2020**, online.
Poster: "Stochastic Optimization with HeavyTailed Noise via Accelerated Gradient Clipping". Links: video, poster.
2. The 24th ICDEA, Dresden, Germany.
Talk: "Non-monotone behavior of the heavy ball method" (presented by A.Kulakova).
1. Workshop "Optimization algorithms and applications in statistical learning", Grenoble, France.
Talk: "The non-monotonocity effect of accelerated optimization methods".

LANGUAGES

- English (C1)
- French (B1)

COMPUTER SKILLS

- Operating Systems: Microsoft Windows, Linux, Mac OSX
- Programming Language: Python, R, MATLAB, Pl SQL, LATEX

INTERESTS

- Snowboarding, Yachting, Tennis
- Psychology: a professional retraining certificate, MIP, Moscow.

SOCIAL WORKS

- *Member of the aerobics team of the MIPT* *2012 - 2016*
- *Volunteer of organization the Gift of Life Foundation* *2016 - Present*