GRIGORY MALINOVSKY

grigorii.malinovskii@kaust.edu.sa
grigory-malinovsky.github.io
Thuwal, Saudi Arabia

EDUCATION

King Abdullah University of Science and Technology (KAUST) *December 2021 – Present*
PhD in Applied Mathematics and Computational Sciences Thuwal, Saudi Arabia
Advisor: Peter Richtárik

King Abdullah University of Science and Technology (KAUST) *August 2020 – December 2021*
MS in Applied Mathematics and Computational Sciences Thuwal, Saudi Arabia
Advisor: Peter Richtárik **GPA:** 3.82/4.0

Moscow Institute of Physics and Technology (MIPT) *September 2019 – July 2021*
MS in Applied Mathematics and Physics Dolgoprudny, Russia
Advisor: Vadim Strijov **GPA:** 4.96/5.0
Thesis: Local Methods in Federated Learning
Graduated with Distinction

Moscow Institute of Physics and Technology (MIPT) *September 2014 – July 2019*
BS in Applied Mathematics and Physics Dolgoprudny, Russia
Advisor: Boris Polyak **GPA:** 4.73/5.0
Thesis: Averaged Heavy Ball Method

RESEARCH INTERESTS

Stochastic Optimization, Distributed Optimization, Machine Learning, Federated Learning

PAPERS

- **Federated Optimization Algorithms with Random Reshuffling and Gradient Compression**
  Abdurakhmon Sadiev, **Grigory Malinovsky**, Eduard Gorbunov, Igor Sokolov, Ahmed Khaled, Konstantin Burlachenko, Peter Richtárik
  arXiv preprint arXiv:2206.07021, 2022

- **ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!**
  Konstantin Mishchenko, **Grigory Malinovsky**, Sebastian Stich, Peter Richtárik
  International Conference on Machine Learning, ICML 2022
  arXiv preprint arXiv:2202.09357, 2022

- **Averaged Heavy-Ball Method**
  Marina Danilova, **Grigory Malinovsky**
  Computer Research and Modeling, Article 2022
  arXiv preprint arXiv:2111.05430, 2021

- **Server-Side Stepsizes and Sampling Without Replacement Provably Help in Federated Optimization**
  Grigory Malinovsky, Konstantin Mishchenko, Peter Richtárik
  NeurIPS Workshop on Optimization for Machine Learning, NeurIPS 2021
  arXiv preprint arXiv:2201.11066, 2022

- **Federated Random Reshuffling with Compression and Variance Reduction**
  Grigory Malinovsky, Peter Richtárik
  International Workshop on Federated Learning for User Privacy and Data Confidentiality, ICML 2021
  arXiv preprint arXiv:2205.03914, 2022

- **Random Reshuffling with Variance Reduction: New Analysis and Better Rates**
  Grigory Malinovsky, Alibek Sailanbayev, Peter Richtárik
  Spotlight at NeurIPS Workshop on Optimization for Machine Learning, NeurIPS 2021
  arXiv preprint arXiv:2104.09342, 2021

- **Distributed Proximal Splitting Algorithms with Rates and Acceleration**
  Laurent Condat, **Grigory Malinovsky**, Peter Richtárik
  Spotlight at NeurIPS Workshop on Optimization for Machine Learning, NeurIPS 2020
  Frontiers in Signal Processing, Section Signal Processing for Communications, Article 2022

- **From Local SGD to Local Fixed-Point Methods for Federated Learning**
  Grigory Malinovsky, Dmitry Kovalev, Elnur Gasanov, Laurent Condat, Peter Richtárik
  International Conference on Machine Learning, ICML 2020
  arXiv preprint arXiv:2004.01442, 2020

POSTERS AND TALKS

- **Talk,"ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!"**
  WIAS Stochastic Algorithms and Nonparametric Statistics group seminar
  Online, June 21, 2022

- **Talk,"ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!"**
  CISPA Helmholtz Center for Information Security seminar
  Saarbrücken, Germany, June 21, 2022

- **Talk,"ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!"**
  UCL CORE (Yurii Nesterov's group) Optimization Seminar
  Louvain-la-Neuve, Belgium, June 1, 2022

- **Talk, "ProxSkip: Breaking the Communication Complexity Barrier of Local Gradient Methods"**
  All-Russian Optimization Seminar
  online, April 20, 2022 [Video]

- **Talk, "Server-Side Stepsizes and Sampling Without Replacement Provably Help in Federated Optimization "**
  Federated Learning One World Seminar (FLOW)
  Online, April 6, 2022 [Video]

- **Talk, "ProxSkip: Breaking the Communication Complexity Barrier of Local Gradient Methods"**
  Rising Stars in AI Symposium 2022 at KAUST
  Thuwal, Saudi Arabia, March 13–15, 2022

- **Poster and Talk, "Better Linear Rates for SGD with Data Shuffling"**
  International OPT Workshop on Optimization for Machine Learning, NeurIPS 2021
  Online, December 13, 2021

- **Poster, "On Server-Side Stepsizes in Federated Optimization: Theory Explaining the Heuristics"**
  International OPT Workshop on Optimization for Machine Learning, NeurIPS 2021
  Online, December 13, 2021

- **Poster, "Federated Random Reshuffling with Compression and Variance Reduction"**
  International Workshop on Federated Learning for User Privacy and Data Confidentiality, ICML 2021
  Online, July 24, 2021

- **Poster and Talk, "Random Reshuffling with Variance Reduction New Analysis and Better Rates"**
  Conference "Optimization Without Borders"
  Sochi, Russia, July 12–18, 2021
- **Poster, "Random Reshuffling with Variance Reduction New Analysis and Better Rates"**
  Traditional Youth School "Control, Information and Optimization"
  Voronovo, Russia, June 10–17, 2021
- **Talk, "Random Reshuffling with Variance Reduction New Analysis and Better Rates"**
  KAUST Conference on Artificial Intelligence 2021
  Thuwal, Saudi Arabia, April 28–29, 2021 [Video]
- **Talk, "Determination of Data Complexity Using a Universal Approximating Model"**
  Mathematical Methods for Pattern Recognition: the 19th Russian National Conference with International Participation
  Moscow, Russia, November 26–29, 2019 [Book of abstracts]
- **Talk, "Averaged Heavy Ball Method"**
  62th Scientific Conference at MIPT, Section "Data Analysis, Recognition and Prediction"
  Dolgoprudny, Russia, November 18–23, 2019
- **Poster, "Averaged Heavy Ball Method"**
  Traditional Youth School "Control, Information and Optimization"
  Voronovo, Russia, June 17–22, 2019

SCHOLARSHIPS, HONORS AND AWARDS

- **CEMSE Research Excellence Award** for high research results at KAUST (1000$ cash prize)
  Thuwal, Saudi Arabia, 2021
- **Dean's Award** for a few top students accepted to KAUST (6000$ annually for 3 years)
  Thuwal, Saudi Arabia, 2021
- **Best Talk Award**, 62th Scientific Conference at MIPT, Section "Data Analysis, Recognition and Prediction"
  Dolgoprudny, Russia, November 18–23, 2019
- **Best Poster Award**, Traditional Youth School "Control, Information and Optimization"
  Voronovo, Russia, June 17–22, 2019
- **Top 25%**, Changellenge Cup Russia 2017, Russian Section, Case Competition
  Moscow, Russia, March 2017
- **Abramov's Fund Scholarship**, for top students at MIPT (12000 Russian rubles for 5 months)
  Moscow, Russia, September 2016 – January 2017
- **Bronze Medal**, International Zhautykov Physics Olympiad
  Almaty, Kazakhstan, 2014
- **Prizewinner**, All-Russian School Physics Olympiad, Region Round
  Kazan, Russia, 2014
- **Prizewinner**, All-Russian Physics Olympiad, Final Round
  Vladivostok, Russia, 2013
- **Winner**, All-Russian Astronomy Olympiad, Region Round
  Kazan, Russia, 2013
- **Prizewinner**, All-Russian School Physics Olympiad, Region Round
  Kazan, Russia, 2012

RESEARCH VISITS

CISPA Helmholtz Center for Information Security *June 2022*
Saarland University Saarbrücken, Germany
I worked with Sebastian Stich

Moscow Institute of Physics and Technology *June – August 2021*
Machine Intelligence Laboratory Dolgoprugny, Russia
I worked with Ilya Zharikov

King Abdullah University of Science and Technology *January – February 2020*
Visual Computing Center Thuwal, Saudi Arabia
Internship in the group of Peter Richtárik

INDUSTRIAL EXPERIENCE

MIPT Research Project *January – July 2020*
Junior Researcher Moscow, Russia
Non-Convex Optimization in Digital Pre-Distorter Development

Tinkoff Summer Internship *July 2017*
Data Analyst Moscow, Russia
Customer Classification

TEACHING

Teaching Assistant

- Stochastic Gradient Descent Methods (CS 331) *KAUST Fall 2021*
- Optimization and Applications 3 (Robust and Stochastic Optimization) *OZON Masters Spring 2021*
- Optimization and Applications 2 (Online Optimization) *OZON Masters Fall 2020*
- Optimization and Applications 1 (Convex Optimization) *OZON Masters Spring 2020*
- Optimization Methods (DIHT) *MIPT Fall 2019*
- Machine Learning (DCAM) *MIPT Spring 2019*

Tutor *2014 – 2020*
Training of 7–11th grade students for high-school physics olympiads

SKILLS

- Languages: Russian (native), English (fluent)
- Programming: Python, C, SQL Server, MATLAB (basic), R (basic)
- Python libraries: NumPy, SciPy, PyTorch, Matplotlib, SciKit-Learn, Pandas
- Software: Git, LaTeX, Microsoft Office

ACADEMIC SERVICE

Reviewer

- Conference on Neural Information Processing Systems, NeurIPS 2022
- International Conference on Machine Learning, ICML 2022
- International Conference on Artificial Intelligence and Statistics, AISTATS 2022

- International Conference on Learning Representations, ICLR 2022
- International Conference on Machine Learning, ICML 2021
- Conference on Neural Information Processing Systems, NeurIPS 2021

Program Committee Member

- International Workshop on Trustworthy Federated Learning, IJCAI 2022
- International Workshop on Federated Learning for User Privacy and Data Confidentiality, ICML 2021
- International Workshop on Trustable, Verifiable and Auditable Federated Learning, AAAI 2022

EXTRACURRICULAR ACTIVITIES

- Activist of academic department in Student Council *January 2019 – January 2020*
  Processing students' feedback on courses
- Organizer of high-school Olympiads in mathematics and physics *February 2016*

HOBBIES

fitness, martial arts, football, basketball