

# GRIGORY MALINOVSKY

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[grigory-malinovsky.github.io](https://github.com/grigory-malinovsky)

Thuwal, Saudi Arabia

## EDUCATION

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**King Abdullah University of Science and Technology (KAUST)**  
PhD in Applied Mathematics and Computational Sciences  
Advisor: [Peter Richtárik](#)

*January 2022 – Present*  
Thuwal, Saudi Arabia

**King Abdullah University of Science and Technology (KAUST)**  
MS in Applied Mathematics and Computational Sciences  
Advisor: [Peter Richtárik](#)

*August 2020 – December 2021*  
Thuwal, Saudi Arabia  
**GPA: 3.83/4.0**

**Moscow Institute of Physics and Technology (MIPT)**  
BS in Applied Mathematics and Physics  
Advisor: [Boris Polyak](#)  
Thesis: Averaged Heavy Ball Method

*September 2014 – July 2019*  
Dolgoprudny, Russia  
**GPA: 4.73/5.0**

## RESEARCH INTERESTS

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Federated Learning, Distributed Optimization, Stochastic Optimization, Machine Learning

## WORK EXPERIENCE

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**Samsung R&D Institute UK**  
Research Intern Engineer  
Optimization Theory for LLMs

*April 2024 – October 2024*  
Staines, United Kingdom

**Huawei–MIPT Research Group**  
Junior Researcher  
Non-Convex Optimization in Digital Pre-Distorter Development

*January – July 2020*  
Moscow, Russia

**Tinkoff Summer Internship**  
Data Analyst  
Customer Classification

*July 2017*  
Moscow, Russia

## RESEARCH VISITS

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**Mohamed bin Zayed University of Artificial Intelligence**  
Department of Machine Learning  
I worked with [Samuel Horvath](#) and [Eduard Gorbunov](#)

*October 2023*  
Abu Dhabi, UAE

**CISPA Helmholtz Center for Information Security**  
Saarland University  
Internship in the group of [Sebastian Stich](#)

*June 2022*  
Saarbrücken, Germany

**Moscow Institute of Physics and Technology**  
Machine Intelligence Laboratory  
I worked with [Ilya Zhariikov](#)

*June – August 2021*  
Dolgoprudny, Russia

**King Abdullah University of Science and Technology**  
Visual Computing Center  
Internship in the group of [Peter Richtárik](#)

*January – February 2020*  
Thuwal, Saudi Arabia

## SCHOLARSHIPS, HONORS AND AWARDS

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- **Nomination** for a membership in the American Mathematical Society (AMS)
- **Progress Towards PhD** Rated as “**Outstanding**” for the 2023-2024 academic year at KAUST.
- **Best Reviewer Award** at ICML 2024
- **CEMSE Dean’s List Award** for high results at KAUST (\$2,500 cash prize)  
*Thuwal, Saudi Arabia, 2024*
- One of three KAUST nominees for the **Apple Scholars** in AI/ML PhD fellowship.  
*Thuwal, Saudi Arabia, 2023*
- **Progress Towards PhD** Rated as “**Outstanding**” for the 2022-2023 academic year at KAUST.
- **Summer of Reproducibility 2023 Award** for completing the following baseline:  
TAMUNA: Doubly Accelerated Federated Learning with Local Training, Compression, and Partial Participation (jointly with Ivan Agarsky, \$ 2000 cash prize)
- **CEMSE Dean’s List Award** for high results at KAUST (\$2,500 cash prize)  
*Thuwal, Saudi Arabia, 2023*
- **Outstanding Reviewer Award** at NeurIPS 2022 (free registration)
- **Progress Towards PhD** Rated as “**Outstanding**” for the 2021-2022 academic year at KAUST.
- **CEMSE Academic Excellence Award** for high academic results at KAUST (\$2,500 cash prize)  
*Thuwal, Saudi Arabia, 2022*
- **Progress Towards PhD** Rated as “**Outstanding**” for the 2020-2021 academic year at KAUST.
- **CEMSE Research Excellence Award** for high research results at KAUST (\$1,000 cash prize)  
*Thuwal, Saudi Arabia, 2021*
- **Dean’s Award** for a few top students accepted to KAUST (\$6,000 annually during 3 years)  
*Thuwal, Saudi Arabia, 2021*
- **Best Talk Award** at 62th Scientific Conference at MIPT, Section “Data Analysis, Recognition and Prediction”  
*Dolgoprudny, Russia, November 18–23, 2019*
- **Best Poster Award** at Traditional Youth School “Control, Information and Optimization”  
*Voronovo, Russia, June 17–22, 2019*
- **Abramov’s Fund Scholarship** for top students at MIPT (\$180 monthly during 5 months)  
*Moscow, Russia, September 2016 – January 2017*
- **Bronze Medal** at International Zhautykov Physics Olympiad  
*Almaty, Kazakhstan, 2014*
- **Prizewinner** at All-Russian School Physics Olympiad, Region Round  
*Kazan, Russia, 2014*
- **Prizewinner** at All-Russian Physics Olympiad, Final Round  
*Vladivostok, Russia, 2013*
- **Winner** at All-Russian Astronomy Olympiad, Region Round  
*Kazan, Russia, 2013*
- **Prizewinner** at All-Russian School Physics Olympiad, Region Round  
*Kazan, Russia, 2012*

## SUPERVISION & MENTORING

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I was supervising/mentoring the work of the following students/interns on the listed projects:

3. **Michał Grudzień**. Project on compression and importance sampling in accelerated Federated Learning. Led to the paper accepted to [FL-ICML 2023 Workshop: Improving Accelerated Federated Learning with Compression and Importance Sampling](#), [arXiv:2306.03240](#), 2023
2. **Michał Grudzień**. Project on partial participation in accelerated Federated Learning. Led to the paper accepted to [AISTATS 2023: Can 5th Generation Local Training Methods Support Client Sampling? Yes!](#) [arXiv:2212.14370](#), 2022
1. **Abdurakhmon Sadiev**. Project on compression and Random Reshuffling in Federated Learning. Led to the paper accepted to [FL-ICML 2023 Workshop](#) and *38th Conference on Neural Information Processing Systems*, [NeurIPS 2024: Don't Compress Gradients in Random Reshuffling: Compress Gradient Differences](#), [arXiv:2202.09357](#), 2022

## TEACHING

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### Teaching Assistant

- Stochastic Gradient Descent Methods (CS 331) *KAUST Spring 2024*
- TAHAKOM Federated Learning course *KAUST Fall 2023*
- Graduate Seminar (CS 398) *KAUST Spring 2023*
- Introduction to Optimization Aramco Master course *Saudi Aramco Fall 2022*
- Stochastic Gradient Descent Methods (CS 331) *KAUST Fall 2022*
- Graduate Seminar (CS 398) *KAUST Fall 2022*
- Stochastic Gradient Descent Methods (CS 331) *KAUST Fall 2021*
- Convex Optimization *OZON Masters Spring 2020*
- Optimization Methods (DIHT) *MIPT Fall 2019*
- Machine Learning (DCAM) *MIPT Spring 2019*

### Tutor

Training of 7–11th grade students for high-school physics Olympiads

*2014 – 2020*

## PAPERS

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21. **Randomized Asymmetric Chain of LoRA: The First Meaningful Theoretical Framework for Low-Rank Adaptation**  
**Grigory Malinovsky**, Umberto Michieli, Hasan Abed Al Kader Hammoud, Taha Ceritli, Hayder Elesedy, Mete Ozay, Peter Richtárik  
[arXiv:2410.08305](#), 2024
20. **MicroAdam: Accurate Adaptive Optimization with Low Space Overhead and Provable Convergence**  
Ionut-Vlad Modoranu, Mher Safaryan, **Grigory Malinovsky**, Eldar Kurtic, Thomas Robert, Peter Richtárik, Dan Alistarh  
*38th Conference on Neural Information Processing Systems*, [NeurIPS 2024](#)  
[arXiv:2405.15593](#), 2024

19. **Streamlining in the Riemannian Realm:  
Efficient Riemannian Optimization with Loopless Variance Reduction**  
Yury Demidovich, **Grigory Malinovsky**, Peter Richtárik  
[arXiv:2403.06677](#), 2024
18. **MAST: Model-Agnostic Sparsified Training**  
Yury Demidovich, **Grigory Malinovsky**, Egor Shulgin, Peter Richtárik  
*Workshop on Nonsmooth Optimization and Applications, NOPTA 2024*  
[arXiv:2311.16086](#), 2023
17. **Byzantine Robustness and Partial Participation Can Be Achieved Simultaneously:  
Just Clip Gradient Differences**  
**Grigory Malinovsky**, Peter Richtárik, Samuel Horváth, Eduard Gorbunov  
*Privacy Regulation and Protection in Machine Learning Workshop at ICLR 2024*  
*38th Conference on Neural Information Processing Systems, NeurIPS 2024*  
[arXiv:2311.14127](#), 2023
16. **Improving Accelerated Federated Learning with Compression and Importance Sampling**  
Michał Grudzień, **Grigory Malinovsky**, Peter Richtárik  
*Federated Learning and Analytics in Practice: Algorithms, Systems, Applications, and Opportunities  
Workshop at ICML 2023*  
[arXiv:2306.03240](#), 2023
15. **A Guide Through the Zoo of Biased SGD**  
Yury Demidovich, **Grigory Malinovsky**, Igor Sokolov, Peter Richtárik  
*37th Conference on Neural Information Processing Systems, NeurIPS 2023*  
[arXiv:2305.16296](#), 2023
14. **TAMUNA: Doubly Accelerated Federated Learning with Local Training, Compression, and  
Partial Participation**  
Laurent Condat, Ivan Agarský, **Grigory Malinovsky**, Peter Richtárik  
*International Workshop on Federated Learning in the Age of Foundation Models in Conjunction with  
NeurIPS 2023, FL@FM-NeurIPS'23*  
[arXiv:2302.09832](#), 2023
13. **Federated Learning with Regularized Client Participation**  
**Grigory Malinovsky**, Samuel Horváth, Konstantin Burlachenko, Peter Richtárik  
*Federated Learning and Analytics in Practice: Algorithms, Systems, Applications, and Opportunities  
Workshop at ICML 2023*  
[arXiv:2302.03662](#), 2023
12. **An Optimal Algorithm for Strongly Convex Min-min Optimization**  
Dmitry Kovalev, Alexander Gasnikov, **Grigory Malinovsky**  
[arXiv:2212.14439](#), 2022
11. **Can 5th Generation Local Training Methods Support Client Sampling? Yes!**  
Michał Grudzień, **Grigory Malinovsky**, Peter Richtárik  
*26th International Conference on Artificial Intelligence and Statistics, AISTATS 2023*  
[arXiv:2212.14370](#), 2022
10. **Minibatch Stochastic Three Points Method for Unconstrained Smooth Minimization**  
Soumia Boucherouite, **Grigory Malinovsky**, Peter Richtárik, El Houcine Bergou  
*The 38th AAAI Conference on Artificial Intelligence, AAAI 2024*  
[arXiv:2209.07883](#), 2022

9. **Variance Reduced ProxSkip: Algorithm, Theory and Application to Federated Learning**  
Grigory Malinovsky, Kai Yi, Peter Richtárik  
*36th Conference on Neural Information Processing Systems, NeurIPS 2022*  
[arXiv:2207.04338](#), 2022
8. **Federated Optimization Algorithms with Random Reshuffling and Gradient Compression**  
Abdurakhmon Sadiev, Grigory Malinovsky, Eduard Gorbunov, Igor Sokolov, Ahmed Khaled, Konstantin Burlachenko, Peter Richtárik  
*Federated Learning and Analytics in Practice: Algorithms, Systems, Applications, and Opportunities Workshop at ICML 2023*  
*38th Conference on Neural Information Processing Systems, NeurIPS 2024*  
[arXiv:2206.07021](#), 2022
7. **ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!**  
Konstantin Mishchenko, Grigory Malinovsky, Sebastian Stich, Peter Richtárik  
*39th International Conference on Machine Learning, ICML 2022*  
[arXiv:2202.09357](#), 2022
6. **Server-Side Stepsizes and Sampling Without Replacement Provably Help in Federated Optimization**  
Grigory Malinovsky, Konstantin Mishchenko, Peter Richtárik  
*4th International Workshop on Distributed Machine Learning, DistributedML 2023*  
*NeurIPS 13th Annual Workshop on Optimization for Machine Learning, NeurIPS 2021*  
[arXiv:2201.11066](#), 2022
5. **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:2205.03914](#), 2022
4. **Averaged Heavy-Ball Method**  
Marina Danilova, Grigory Malinovsky  
*Computer Research and Modeling, 2022, vol. 14, no. 2, pp. 277–308, Article*  
[arXiv:2111.05430](#), 2021
3. **Random Reshuffling with Variance Reduction: New Analysis and Better Rates**  
Grigory Malinovsky, Alibek Sailanbayev, Peter Richtárik  
*39th Conference on Uncertainty in Artificial Intelligence, UAI 2023*  
*Spotlight at NeurIPS 13th Annual Workshop on Optimization for Machine Learning, NeurIPS 2021*  
[arXiv:2104.09342](#), 2021
2. **Distributed Proximal Splitting Algorithms with Rates and Acceleration**  
Laurent Condat, Grigory Malinovsky, Peter Richtárik  
*Spotlight at NeurIPS 12th Annual Workshop on Optimization for Machine Learning, NeurIPS 2020*  
*Frontiers in Signal Processing, Section Signal Processing for Communications 2022, Article*  
[arXiv:2010.00952](#), 2020
1. **From Local SGD to Local Fixed-Point Methods for Federated Learning**  
Grigory Malinovsky, Dmitry Kovalev, Elnur Gasanov, Laurent Condat, Peter Richtárik  
*37th International Conference on Machine Learning, ICML 2020*  
[arXiv:2004.01442](#), 2020

## POSTERS AND TALKS

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- **Talk: “Introduction to Federated Optimization”**  
Samsung AI Reading Club  
*Staines, July 30, 2024*
- **Talk: “Byzantine Robustness and Partial Participation Can Be Achieved Simultaneously: Just Clip Gradient Differences”**  
Federated Learning One World Seminar (FLOW)  
*Online, March 27, 2024*
- **Poster: “Byzantine Robustness and Partial Participation Can Be Achieved Simultaneously: Just Clip Gradient Differences”**  
Rising Stars in AI Symposium 2024 at KAUST  
*Thuwal, Saudi Arabia, February 21, 2024*
- **Talk: “Server-side stepsizes and sampling without replacement provably help in federated optimization”**  
4th International Workshop on Distributed Machine Learning  
*Paris, France, December 8, 2023*
- **Poster: Random reshuffling with variance reduction: New analysis and better rates**  
39th Conference on Uncertainty in Artificial Intelligence  
*Online, July 31 - August 4, 2023,*
- **Talk: “Can 5th Generation Local Training Methods Support Client Sampling? Yes!”**  
Third International Conference Mathematics in Armenia: Advances and Perspectives  
*Yerevan, Armenia, July 2-8, 2023*
- **Talk: “ProxSkip and its Variations: 5th Generation of Local Training Methods in Federated Learning”**  
Google Research Seminar (invited by [Zachary Charles](#))  
*Online, June 8, 2023*
- **Poster: “Can 5th Generation Local Training Methods Support Client Sampling? Yes!”**  
26th International Conference on Artificial Intelligence and Statistics  
*Valencia, Spain, April 25-27, 2023*
- **Poster: “Can 5th Generation Local Training Methods Support Client Sampling? Yes!”**  
Rising Stars in AI Symposium 2023 at KAUST  
*Thuwal, Saudi Arabia, February 19, 2023*
- **Talk: “On 5th Generation of Local Training Methods in Federated Learning”**  
MIPT Intelligent Systems Seminar  
*Online, February 9, 2023*
- **Talk: “ProxSkip: Breaking the Communication Complexity Barrier of Local Gradient Methods”**  
15th Viennese Conference on Optimal Control and Dynamic Games 2022  
*Vienna, Austria, July 12-15, 2022*
- **Talk: “ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!”**  
EPFL Machine Learning and Optimization Laboratory Seminar  
*Lausanne, Switzerland, July 3, 2022*

- **Talk: “ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!”**  
Weierstrass Institute for Applied Analysis and Stochastics  
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”**  
62nd 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*

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## 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

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## ACADEMIC SERVICE

### Reviewer

- 38th Conference on Neural Information Processing Systems, NeurIPS 2024
- Transactions on Machine Learning Research
- 41th International Conference on Machine Learning (Best Reviewer Award), ICML 2024
- 12th International Conference on Learning Representations, ICLR 2024
- 27th International Conference on Artificial Intelligence and Statistics, AISTATS 2024
- IEEE Transactions on Automatic Control
- 40th International Conference on Machine Learning, ICML 2023
- 11th International Conference on Learning Representations, ICLR 2023
- 26th International Conference on Artificial Intelligence and Statistics, AISTATS 2023
- 36th Conference on Neural Information Processing Systems (Top Reviewer Award), NeurIPS 2022
- 39th International Conference on Machine Learning, ICML 2022
- 25th International Conference on Artificial Intelligence and Statistics, AISTATS 2022
- 10th International Conference on Learning Representations, ICLR 2022
- 38th International Conference on Machine Learning, ICML 2021
- 35th Conference on Neural Information Processing Systems, NeurIPS 2021

### Program Committee Member

- 2nd IEEE International Conference on Federated Learning Technologies and Applications, FLTA 2024
- International Workshop on Federated Learning and Analytics in Practice: Algorithms, Systems, Applications, and Opportunities Workshop, ICML 2023
- International Workshop on Federated Learning: Recent Advances and New Challenges, NeurIPS 2022
- International Workshop on Trustworthy Federated Learning, IJCAI 2022
- International Workshop on Trustable, Verifiable and Auditable Federated Learning, AAAI 2022
- International Workshop on Federated Learning for User Privacy and Data Confidentiality, ICML 2021



## SUMMER SCHOOLS

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**Participant** of Summer School “Statistics and Learning Theory”

*Tsaghkadzor, Armenia, July 9–15, 2023*

**Participant** of Traditional Youth School “Control, Information and Optimization”

*Voronovo, Russia, June 10–17, 2021*

**Participant** of Traditional Youth School “Control, Information and Optimization”

*Voronovo, Russia, June 17–22, 2019*

## EXTRACURRICULAR ACTIVITIES

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- Organizer of the OPT ML group Seminar *January 2022 – December 2022*
- Activist of academic department in Student Council  
Processing students’ feedback on courses *January 2019 – January 2020*
- Organizer of high-school Olympiads in mathematics and physics *February 2016*

## HOBBIES

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fitness, martial arts, football, basketball, drums