# Artavazd Maranjyan

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## Education

**Ph.D. in Computer Science** — **Thuwal, Saudi Arabia**
*King Abdullah University of Science and Technology (KAUST)* — *2023 – Present*
**Advisor:** Peter Richtárik

**M.Sc. in Applied Statistics and Data Science** — **Yerevan, Armenia**
*Yerevan State University* — *2021 – 2023*
**Thesis:** On local training methods
**Co-supervisors:** Peter Richtárik, Mher Safaryan

**B.Sc. in Informatics and Applied Mathematics** — **Yerevan, Armenia**
*Yerevan State University* — *2017 – 2021*
**Thesis:** On the Convergence of Series in Classical Systems
**supervisor:** Martin Grigoryan

## Academic Experiences

**Researcher in the group of Martin Grigoryan** — **Yerevan, Armenia**
*Yerevan State University* — *April 2023 – Aug 2023*
- Studied the existence and properties of universal functions with respect to the Vilenkin and Haar systems across various functional spaces

**Machine Learning Researcher** — **Yerevan, Armenia**
*YerevaNN* — *March 2023 – Aug 2023*
- Worked on the intersection of Federated Learning and Optimization

**Internship in the group of Peter Richtárik** — **Thuwal, Saudi Arabia**
*King Abdullah University of Science and Technology (KAUST)* — *June 2022 – Jan 2023*
- Worked on the "GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity" paper

**Machine Learning Researcher** — **Yerevan, Armenia**
*YerevaNN* — *Jan 2022 – June 2022*
- Worked on the intersection of Federated Learning and Optimization

## Industry Experiences

**Co-Founder** — **Yerevan, Armenia**
*OnePick* — *July 2021 – June 2022*
OnePick is an emerging startup that provides up-to-date and customized social media posts based on page and market data analysis
- Winner idea of InVent 2.0 venture building program organized by FAST

**Backend Developer** — **Yerevan, Armenia**
*EXALT Technologies Ltd* — *July 2021 – Sep 2021*
- Worked for Nutanix.

**Machine Learning Research Engineer** — **Yerevan, Armenia**
*Foundation for Armenian Science and Technology (FAST)* — *June 2021 – July 2021*

- Worked on Fraud detection
- Made data-driven forecasts using machine learning algorithms and statistical models

○ **Software Engineer in Test** — **Yerevan, Armenia**
*Picsart* — *Sep 2019 – Jan 2021*

- Worked with automation team to design and develop automated solutions across several mobile/web applications
- Worked directly with software developers, test engineers, product owners, business analysts to find and resolve issues
- Worked closely with DevOps to suggest improvements in processes and in Jenkins Continuous Integration cycle

## Awards

○ **Dean's Award**
*King Abdullah University of Science and Technology (KAUST)* — *Sep 2023*
Awarded to a few top students accepted to KAUST (6000$ annually for 3 years)

○ **Outstanding Final Project Award**
*Yerevan State University* — *May 2021*
Recognized for the Bachelor's thesis (awarded to 6 students among 250+ students)

## Papers

8. **Ringmaster: Taming Asynchronous SGD for Optimality**
**Artavazd Maranjyan**, Peter Richtárik
Will be submitted to ICML2025

7. **Differentially Private Random Block Coordinate Descent**
**Artavazd Maranjyan**, Abdurakhmon Sadiev, Peter Richtárik
*arXiv:2412.17054*, 2024

6. **MindFlayer: Efficient Asynchronous Parallel SGD in the Presence of Heterogeneous and Random Worker Compute Times**
**Artavazd Maranjyan**, Omar Shaikh Omar, Peter Richtárik
*arXiv:2410.04285*, 2024

5. **LoCoDL: Communication-Efficient Distributed Learning with Local Training and Compression**
Laurent Condat, **Artavazd Maranjyan**, Peter Richtárik
*arXiv:2403.04348*, 2024

4. **Menshov-type theorem for divergence sets of sequences of localized operators**
Martin Grigoryan, Anna Kamont, **Artavazd Maranjyan**
Journal of Contemporary Mathematical Analysis, vol. 58, no. 2, pp. 81–92, 2023

3. **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity**
**Artavazd Maranjyan**, Mher Safaryan, Peter Richtárik
*arXiv:2210.16402*, 2022

2. **On the divergence of Fourier series in the general Haar system**
Martin Grigoryan, **Artavazd Maranjyan**
*Armenian Journal of Mathematics*, vol. 13, p. 1–10, Sep. 2021

1. **On the unconditional convergence of Faber-Schauder series in $L^1$**
   Tigran Grigoryan, **Artavazd Maranjyan**
   *Proceedings of the YSU A: Physical and Mathematical Sciences*, vol. 55, no. 1 (254), pp. 12–19, 2021

## Academic and Professional Involvement

**Reviewer**
SIAM Journal on Mathematics of Data Science (SIMODS) 2024
Transactions on Machine Learning Research (TMLR) 2024
The Journal of Machine Learning Research (JMLR) 2024

**Mentorship**
Co-mentored a group of schoolgirls from diverse backgrounds and grades on a STEM project. The students conducted chemical experiments and developed an educational website to document and share their findings. I primarily supported the website's creation. View the website [certificate]

**Organized weekly group seminars** — **KAUST, Saudi Arabia**
*KAUST* — *Sep 2023 - Dec 2023*

## Talks and Poster Presentations

### 2024 Talks and Poster Presentations

15. **Workshop on Optimization for Machine Learning (NeurIPS 2024)** — **Vancouver, Canada**
    *Vancouver Convention Center* — *December 15, 2024*
    Presenting
    - **MindFlayer: Efficient Asynchronous Parallel SGD in the Presence of Heterogeneous and Random Worker Compute Times** (**Oral, Top 5%**)
    - **Differentially Private Random Block Coordinate Descent**
    - **LoCoDL: Communication-Efficient Distributed Learning with Local Training and Compression**

14. **MLR Weekly Seminar** — **Online**
    *Machine Learning Research at Apple* — *November 21, 2024*
    Invited by **Samy Bengio** to give a talk on **MindFlayer: Efficient Asynchronous Parallel SGD in the Presence of Heterogeneous and Random Worker Compute Times** [slides]

13. **Interntional Conference on Algebra, Logic, and their Applications** — **Online**
    *Yerevan State University* — *October 18, 2024*
    Delivered a talk on **MindFlayer: Efficient Asynchronous Parallel SGD in the Presence of Heterogeneous and Random Worker Compute Times**

12. **CEMSE E-Poster Competition** — **KAUST, Saudi Arabia**
    *KAUST* — *October 10, 2024*
    Awarded 3rd place for presenting a poster on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity**.

11. **Analysis, PDEs and Applications** — **Yerevan, Armenia**
    *Yerevan State University* — *July 6, 2024*
    Delivered a talk on **MindFlayer: Efficient Asynchronous Parallel SGD in the Presence of Heterogeneous and Random Worker Compute Times** [abstract]

10. **Stochastic Numerics and Statistical Learning** — **KAUST, Saudi Arabia**
*KAUST* — *May 27, 2024*
Presented a poster on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity** [poster]

9. **CS 331: Stochastic Gradient Descent Methods** — **KAUST, Saudi Arabia**
*KAUST* — *May 5, 2024*
Delivered a guest lecture on **MindFlayer: Efficient Asynchronous Parallel SGD in the Presence of Heterogeneous and Random Worker Compute Times**

8. **The Machine Learning Summer School in Okinawa 2024** — **Okinawa, Japan**
*Okinawa Institute of Science and Technology (OIST)* — *March 13, 2024*
Presented a poster on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity** [poster]

7. **KAUST Rising Stars in AI Symposium 2024** — **KAUST, Saudi Arabia**
*KAUST* — *February 21, 2024*
Presented a poster on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity** [poster]

### 2023 Talks and Poster Presentations

6. **Group Seminar** — **KAUST, Saudi Arabia**
*KAUST* — *November 16, 2023*
Delivered a talk on **Differentially Private Coordinate Descent for Composite Empirical Risk Minimization**

5. **Algorithms & Computationally Intensive Inference seminars** — **Coventry, England**
*University of Warwick* — *October 6, 2023*
Delivered a talk on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity** [slides]

4. **Mathematics in Armenia: Advances and Perspectives** — **Yerevan, Armenia**
*Yerevan State University* — *July 5, 2023*
Delivered a talk on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity** [abstract]

3. **Machine Learning Reading Group Yerevan** — **Yerevan, Armenia**
*Yerevan State University* — *March 10, 2023*
Delivered a talk on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity** [video (Armenian)]

### 2022 Talks and Poster Presentations

2. **Federated Learning One World Seminar (FLOW)** — **Online**
*Online* — *December 7, 2022*
Delivered a talk on **GradSkip: Communication-Accelerated Local Gradient Methods with Better Computational Complexity** [video]

1. **Machine Learning Reading Group Yerevan** — **Yerevan, Armenia**
*Yerevan State University* — *April 10, 2022*
Delivered a talk on **ProxSkip: Yes! Local Gradient Steps Provably Lead to Communication Acceleration! Finally!**

## Hobbies

Ultimate Frisbee, Dancing (bachata, salsa), Board Games, Table Football (Foosball)