

Samuel Horváth

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Education

King Abdullah University of Science & Technology

Thuwal, Saudi Arabia

PHD IN MACHINE LEARNING AND OPTIMIZATION

Jan. 2019 - Present

- Supervised by Peter Richtárik
- GPA: 4.00/4.00

King Abdullah University of Science & Technology

Thuwal, Saudi Arabia

MSc IN STATISTICS

Aug. 2017 - Dec. 2018

- Supervised by Peter Richtárik
- GPA: 3.82/4.00

Comenius University

Bratislava, Slovakia

B.S. IN FINANCIAL MATHEMATICS

Sep. 2014 - Jun. 2017

- GPA 4.00/4.00 #1
- Thesis: Visualization of Portfolio Optimization with R Shiny
- samuelhorvath.shinyapps.io/efficient_frontier_visualization/

Honors & Awards

2020	The Best Paper Award , (1888 USD) NeurIPS 2020–SpicyFL Workshop	Online
2020	Best Reviewer Award (Top 10%) , NeurIPS 2020	Online
2020	Progress towards PhD rated as outstanding ,	Saudi Arabia
2020	MLSS Acceptance , Machine Learning Summer School (MLSS) 2020, Tuebingen(acceptance rate 180/1300+), also accepted to MLLSS 2020 Indonesia	Germany
2019	Top Reviewer Award , NeurIPS 2019	Canada
2019	Progress towards PhD rated as outstanding ,	Saudi Arabia
2018	157th/4049 , IEEEExtreme 24-Hour Programming Competition 12.0 joint with Dmitry Kovalev	Saudi Arabia
2018	The Best Poster , (500 EUR) Data Science Summer School, awarded as one of two out of total 170 posters presented	France
2017	131th/3350 , IEEEExtreme 24-Hour Programming Competition 11.0 joint with Konstantin Mishchenko	Saudi Arabia
2017	KAUST Fellowship , A generous fellowship provided for MSc/PhD students at KAUST	Saudi Arabia
2017	Universities , Accepted to MSc programmes at Imperial College London (Statistics), University College London (Data Science) and University of Edinburgh (Statistical Data Science)	United Kingdom
2017	2nd place , CFA Institute Research Challenge hosted by CFA Society Czech Republic	Czech republic
2017	37th place , Vojtech Jarnik International Mathematical Competition- Category II	Czech republic
2017	Excellence Scholarship , Scholarship for top 5% students at Comenius University	Slovakia
2016	Third Prize , 23rd International Mathematics Competition for university students	Bulgaria
2016	36th place , Vojtech Jarnik International Mathematical Competition- Category I	Czech republic
2016	Excellence Scholarship , Scholarship for top 5% students at Comenius University	Slovakia
2015	Excellence Scholarship , Scholarship for top 5% students at Comenius University	Slovakia
2014	18th place , Slovak national round of Mathematical Olympiad for high school students	Slovakia
2014	1st place , Region round of Mathematical Olympiad for high school students	Slovakia

Skills

Mathematics	Probability and Statistics, Calculus, Linear Algebra, Statistical Learning, Deep Learning
Programming	Python, PyTorch, MXNet, Tensorflow, Keras, Pandas, Julia, R, R Shiny, Matlab, VBA, SQL
Tools	MS Office, LaTeX, SQL Server, Tableau
Languages	Slovak C2, English C1, German A2

Extracurricular Courses and Activities

Seminar co-organizer

Online

FEDERATED LEARNING ONE WORLD SEMINAR SERIES

2020-

- together with Peter Richtárik, Virginia Smith, Aurelien Bellet and Dan Alistarh, we organize Federated Learning One World (FLOW) seminar, <https://sites.google.com/view/one-world-seminar-series-flow>

Volunteer

Online

ICML 2020

2020

Reviewer

ICML '20 '19, AISTATS '20, NEURIPS '20 '19 '18, DISTRIBUTEDML WORKSHOP CONEXT '20, OPTIMIZATION METHODS AND SOFTWARE

2018-

Minisymposia organizer

Berlin, Germany

ICCOPT

2019

- together with Filip Hanzely, we organized a minisymposia on the topic Large-Scale Stochastic First-Order Optimization consisting of 6 talks.

Nanodegree mentor

Online

UDACITY

2019-2020

- I serve as a mentor providing 1 on 1 meetings, code and project reviews and extra seminars for the students enrolled in Deep Learning Nanodegree

Seminar Organizer

KAUST, Saudi Arabia

ALL HANDS MEETINGS ON BIG DATA OPTIMIZATION

2018

- Organizer of a group seminar, gave 6 talks given the time period

Teaching Assistant

KAUST, Saudi Arabia

SPECIAL TOPICS IN DATA SCIENCE

2018

- I was teaching assistant for PhD level course, which covers a mathematically rigorous introduction to the field of big data optimization.

Entrepreneurship program

Saudi Arabia

CORNELL UNIVERSITY

2018

- 7-days course covers the basic process of how to move from generating a new business idea to turning that idea into a real business
- taught by Cornell professors Chad Carlos, Wesley Sine, Thomas Kurz

Deep Learning Nanodegree

Online

UDACITY

2018

- Topics covered: Keras and TensorFlow, convolutional and recurrent networks, deep reinforcement learning, and GANs
- taught by authorities such as Sebastian Thrun, Ian Goodfellow, and Andrew Trask

Divide and Conquer, Sorting and Searching, and Randomized Algorithms

Online

COURSERA/STANFORD UNIVERSITY

2018

- taught by great CS Expert Tim Roughgarden
- Passed with Distinction (98% Grade)

Statistical Learning

Online

STANFORD UNIVERSITY

2017

- Topics covered: Linear Regression, Classification, Tree-based Methods, SVM, Unsupervised Learning
- Based on the book "An Introduction to Statistical learning, with Applications in R"
- Passed with Distinction (100% Grade)
- <https://verify.lagunita.stanford.edu/S0A/7e92a12167684ec7ba2fd1313b96fb5d/>

Machine Learning

Online

COURSERA/STANFORD UNIVERSITY

2017

- Topics covered: Linear and Logistic Regression, Neural Networks, SVM, Unsupervised Learning, Recommend Systems, ...
- taught by Machine Learning Expert Andrew Ng
- Passed with Distinction (100% Grade)

Conferences

MLSS 2020

MAX PLANCK INSTITUTE FOR INTELLIGENT SYSTEMS

- The Machine Learning Summer School
- I gave a 10 minutes talk about our paper: **Natural Compression for Distributed Deep Learning**.

Tuebingen (online), Germany

Jul. 2020

KAUST - Tsinghua Workshop

KAUST

- I presented a poster about our work **Natural Compression for Distributed Deep Learning**.

Thuwal, Saudi Arabia

Nov. 2019

Amazon Research Days

AMAZON

- Amazon Conference to promote collaboration with academia.

Berlin, Germany

Oct. 2019

EMEA Research Internship Colloquium

AMAZON

- Amazon Conference for all of its interns from EMEA region.
- I presented a poster about our work **Natural Compression for Distributed Deep Learning**.

Cambridge, United Kingdom

Aug. 2019

ICCOPT

TU BERLIN

- International Conference on Continuous Optimization
- I organized Minisymposia and gave a talk about our work **Stochastic Distributed Learning with Gradient Quantization and Variance Reduction**.

Berlin, Germany

Aug. 2019

ICML

LONG BEACH CONVENTION CENTER

- Thirty-sixth International Conference on Machine Learning
- We had our **Nonconvex Variance Reduced Optimization with Arbitrary Sampling** accepted, which I presented as the 5 min talk as well as the poster

Long Beach, USA

Jun. 2019

Deep Learning Boot Camp

SIMONS INSTITUTE FOR THEORY AND COMPUTING

- The Boot Camp is intended to acquaint program participants with the key themes of the program such as Generalization, Approximation Power, Adversarial Examples and Over-parametrized Neural Networks.

Berkeley, USA

May 2019

Data Science Summer School

ÉCOLE POLYTECHNIQUE

- The primary focus of the event is to provide a series of courses and practical sessions covering the latest advances in the field of data science
- speakers: Cédric VILLANI, Yann LECUN, Suvrit SRA, ...
- I was presenting poster, which was awarded as **the Best Poster** with **500 Euros** cash prize as one of two out of total 170 posters presented

Paris, France

Jun. 2018

Optimization and Big Data

KAUST

- 4 days conference aimed at novel optimization algorithms and distributed systems capable of working in the Big Data setting

KAUST, Saudi Arabia

Feb. 2018

Applied Machine Learning Days

EPFL

- 2 days hands-on workshops on Machine Learning and 2 days conference with speakers such as Christopher Bishop from Microsoft Research

Lausanne, Switzerland

Jan. 2018

Publications

Hyperparameter Transfer Learning with Adaptive Complexity

SAMUEL HORVÁTH, AARON KLEIN, PETER RICHTÁRIK, CEDRIC ARCHAMBEAU

Jan. 2021

- Proceedings of the 24th International Conference on Artificial Intelligence and Statistics, AISTATS 2021

Optimal Client Sampling for Federated Learning

WENLIN CHEN, SAMUEL HORVÁTH, PETER RICHTÁRIK

Oct. 2020

- Privacy Preserving Machine Learning Workshop, NeurIPS 2020
- <https://arxiv.org/pdf/2010.13723.pdf>

Lower Bounds and Optimal Algorithms for Personalized Federated Learning

FILIP HANZELY, SAMUEL HORVÁTH, SLAVOMÍR HANZELY, PETER RICHTÁRIK

Sep. 2020

- Proceedings of the 34th Thirty-fourth Conference on Neural Information Processing Systems
- <https://arxiv.org/pdf/2010.02372.pdf>

A Better Alternative to Error Feedback for Communication-Efficient Distributed Learning

SAMUEL HORVÁTH, PETER RICHTÁRIK

Jun. 2020

- **The Best Paper Award** at NeurIPS 2020 Workshop on Scalability, Privacy, and Security in Federated Learning
- Proceedings of the 9th International Conference on Learning Representations
- Federated Learning One World Online Seminar, one hour talk: <https://www.youtube.com/watch?v=AAxcjq80LVU>
- <https://openreview.net/pdf?id=vYVI1CHPaQg>

Adaptivity of Stochastic Gradient Methods for Nonconvex Optimization

SAMUEL HORVÁTH, LIHUA LEI, PETER RICHTÁRIK, MICHAEL JORDAN

Feb. 2020

- **Spotlight** at Optimization for Machine Learning workshop, NeurIPS 2020
- <https://arxiv.org/pdf/2002.05359.pdf>

On Biased Compression for Distributed Learning

ALEKSANDR BEZNOSEKOV, SAMUEL HORVÁTH, PETER RICHTÁRIK, MHER SAFARYAN

Feb. 2020

- **Oral** at NeurIPS 2020 Workshop on Scalability, Privacy, and Security in Federated Learning
- <https://arxiv.org/pdf/2002.12410.pdf>

Natural Compression for Distributed Deep Learning

SAMUEL HORVÁTH, CHEN-YU HO, LUDOVÍK HORVÁTH, ATAL SAHU, MARCO CANINI, PETER RICHTÁRIK

May. 2019

- Workshop on AI Systems at Symposium on Operating Systems Principles 2019
- <https://arxiv.org/pdf/1905.10988.pdf>

Stochastic Distributed Learning with Gradient Quantization and Variance Reduction

SAMUEL HORVÁTH, DMITRY KOVALEV, KONSTANTIN MISHCHENKO, SEBASTIAN STICH, PETER RICHTÁRIK

Apr. 2019

- A poster based on the results of this paper won **the Best Poster** at Control, Information and Optimization Summer School in Voronovo, Moscow, presented by Dmitry Kovalev
- <https://arxiv.org/pdf/1904.05115.pdf>

Don't Jump Through Hoops and Remove Those Loops: SVRG and Katyusha are Better Without the Outer Loop

DMITRY KOVALEV, SAMUEL HORVÁTH, PETER RICHTÁRIK

Jan. 2019

- Proceedings of the 31st International Conference on Algorithmic Learning Theory, San Diego, California
- <https://arxiv.org/pdf/1901.08689.pdf>

Nonconvex Variance Reduced Optimization with Arbitrary Sampling

SAMUEL HORVÁTH, PETER RICHTÁRIK

Sep. 2018

- A poster based on the results of this paper won **the Best Poster** at Data Science Summer School in Paris, 2018
- Proceedings of the 36th International Conference on Machine Learning, Long Beach, California
- <http://proceedings.mlr.press/v97/horvath19a.html>

Internships and Research Visits

Samsung AI Center

Cambridge, UK

RESEARCH INTERN

Sept. 2020 - Feb. 2021

- Intern at Embedded AI Team with focus on Federated Learning under supervision Nicholas Lane, Stefanos Laskaridis, and Ilias Leontiadis.
- While on the internship, I was invited to give a talk at the Machine Learning Systems lab at the University of Cambridge led by Nicholas Lane.

Amazon

Berlin, Germany

APPLIED SCIENTIST INTERN

Summer 2019

- Intern at AI Core Team with focus on Hyperparameters Optimization supervised by Cedric Archambeau and Matthias Seeger.

University of California, Berkeley

Berkeley, California

VISITING PHD STUDENT

Spring 2019

- Research visit of Prof. Michael I. Jordan. As part of the visit, I attended Deep Learning Foundations Workshop in Simons Institute.

Exponea

Bratislava, Slovakia

AI INTERN

Summer 2018

- I joined Exponea as AI Intern for Summer 2018. I was an intern at their Recommendation Team, where I worked on Sorting and Ranking Project for a personalized recommendation for e-commerce.

Hobbies

ALL KINDS OF SPORTS

- Football - used to play the regional league (over 200 matches), now just a hobby
- Fitness, Volleyball, Badminton