



# Samuel Horváth

KAUST, 2225 Building 1, 23955 Thuwal, KSA

☎ (+421) 910-493-082 | ✉ [samuel.horvath@kaust.edu.sa](mailto:samuel.horvath@kaust.edu.sa) | 🌐 [samuelhorvath](https://samuelhorvath.com)

## Education

### King Abdullah University of Science & Technology

PHD IN MACHINE LEARNING AND OPTIMIZATION

- Supervised by Peter Richtarik

Thuwal, Saudi Arabia

Jan. 2019 - Present

### King Abdullah University of Science & Technology

MSc IN STATISTICS

- Supervised by Peter Richtarik
- GPA: 3.82/4.00

Thuwal, Saudi Arabia

Aug. 2017 - Dec. 2018

### Comenius University

B.S. IN FINANCIAL MATHEMATICS

- GPA 4.00/4.00 # 1
- Thesis: Visualization of Portfolio Optimization with R Shiny
- [samuelhorvath.shinyapps.io/efficient\\_frontier\\_visualization/](https://samuelhorvath.shinyapps.io/efficient_frontier_visualization/)

Bratislava, Slovakia

Sep. 2014 - Jun. 2017

## Honors & Awards

2019	<b>Progress towards PhD rated as outstanding,</b>	Saudi Arabia
2018	<b>157<sup>th</sup>/4049</b> , IEEEExtreme 24-Hour Programming Competition 12.0 joint with Dmitry Kovalev	Saudi Arabia
2018	<b>The Best Poster 500 Euros Prize</b> , Data Science Summer School, awarded as one of two out of total 170 posters presented	France
2017	<b>131<sup>th</sup>/3350</b> , IEEEExtreme 24-Hour Programming Competition 11.0 joint with Konstantin Mishchenko	Saudi Arabia
2017	<b>KAUST Fellowship</b> , A generous fellowship provided for MSc/PhD students at KAUST	Saudi Arabia
2017	<b>Universities</b> , Accepted to MSc programmes at Imperial College London (Statistics), University College London (Data Science) and University of Edinburgh (Statistical Data Science)	United Kingdom
2017	<b>2<sup>nd</sup> place</b> , CFA Institute Research Challenge hosted by CFA Society Czech Republic	Czech republic
2017	<b>37<sup>th</sup> place</b> , Vojtech Jarnik International Mathematical Competition- Category II	Czech republic
2017	<b>Excellence Scholarship</b> , Scholarship for top 5% students at Comenius University	Slovakia
2016	<b>Third Prize</b> , 23rd International Mathematics Competition for university students	Bulgaria
2016	<b>36<sup>th</sup> place</b> , Vojtech Jarnik International Mathematical Competition- Category I	Czech republic
2016	<b>Excellence Scholarship</b> , Scholarship for top 5% students at Comenius University	Slovakia
2015	<b>Excellence Scholarship</b> , Scholarship for top 5% students at Comenius University	Slovakia
2014	<b>18<sup>th</sup> place</b> , Slovak national round of Mathematical Olympiad for high school students	Slovakia
2014	<b>1<sup>st</sup> place</b> , Region round of Mathematical Olympiad for high school students	Slovakia

## Skills

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

# Extracurricular Courses and Activities

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## Reviewer

ICML '20 '19, AISTATS '20, NIPS '19 '18, OPTIMIZATION METHODS AND SOFTWARE

2018-2020

## Minisymposia organizer

*Berlin, Germany*

ICCOPT

2019

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

## Nanodegree mentor

*Online*

UDACITY

2019

- 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

- The organizer of our 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, which 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

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## ALT 2020

*San Diego, USA*

CATAMARAN RESORT HOTEL

Feb. 2020

- The 31<sup>st</sup> International Conference on Algorithmic Learning Theory
- I gave a 20 minutes talk about our accepted paper: *SVRG and Katyusha are Better Without the Outer Loop*.

## KAUST - Tsinghua Workshop

*KAUST, Saudi Arabia*

KAUST

Nov. 2019

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

## Amazon Research Days

AMAZON

Berlin, Germany

Oct. 2019

- Amazon Conference to promote collaboration with academia.

## EMEA Research Internship Colloquium

AMAZON

Cambridge, United Kingdom

Aug. 2019

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

## ICCOPT

TU BERLIN

Berlin, Germany

Aug. 2019

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

## ICML

LONG BEACH CONVENTION CENTER

Long Beach, USA

Jun. 2019

- 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.

## Deep Learning Boot Camp

SIMONS INSTITUTE FOR THEORY AND COMPUTING

Berkeley, USA

May 2019

- 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-parameterized Neural Networks.

## Data Science Summer School

ÉCOLE POLYTECHNIQUE

Paris, France

Jun. 2018

- 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.

## Optimization and Big Data

KAUST

KAUST, Saudi Arabia

Feb. 2018

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

## Applied Machine Learning Days

EPFL

Lausanne, Switzerland

Jan. 2018

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

# Publications

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## Adaptivity of Stochastic Gradient Methods for Nonconvex Optimization

SAMUEL HORVÁTH, LIHUA LEI, PETER RICHTÁRIK, MICHAEL I. JORDAN

Feb. 2020

- <https://arxiv.org/pdf/2002.05359.pdf>

## Natural Compression for Distributed Deep Learning

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

May. 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 31<sup>st</sup> 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 36<sup>th</sup> International Conference on Machine Learning, Long Beach, California.
- <http://proceedings.mlr.press/v97/horvath19a.html>

## Internships and Research Visits

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### 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 the 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

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ALL KINDS OF SPORTS

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