

EDUCATION

- Ph.D. Applied Mathematics and Computational Science** Aug '17 – Jun '20¹
King Abdullah University of Science and Technology (KAUST), KSA
Topic: Randomized algorithms for big data optimization
Supervisor: Peter Richtárik
- M.Sc. by Research with Distinction, Mathematics and Statistics**² Sep '16 – May '17
University of Edinburgh, UK
Thesis: Randomized algorithms for minimizing relatively smooth functions
1st supervisor: Peter Richtárik, 2nd supervisor: Lukasz Szpruch
- Bc. in Economic and Financial Mathematics** Sep '13 – June '16
Comenius University, Bratislava, Slovakia
Thesis: Analysis of causal relationships in reconstructed phase space
Supervisor: Anna Krakovská

PAPERS

- One Method to Rule Them All: Variance Reduction for Data, Parameters and Many New Methods**
Filip Hanzely, Peter Richtárik 2019
ArXiv:1905.11266
- A Unified Theory of SGD: Variance Reduction, Sampling, Quantization and Coordinate Descent**
Eduard Gorbunov, Filip Hanzely, Peter Richtárik 2019
AISTATS 2020
- Best Pair Formulation & Accelerated Scheme for Non-convex Principal Component Pursuit**
Aritra Dutta, Filip Hanzely, Jingwei Liang, Peter Richtárik 2019
ArXiv:1905.10598
- 99% of Parallel Optimization is Inevitably a Waste of Time**
Konstantin Mishchenko, Filip Hanzely, Peter Richtárik 2019
ArXiv:1901.09437
- Accelerated Coordinate Descent with Arbitrary Sampling and Best Rates for Minibatches**
Filip Hanzely, Peter Richtárik 2018
AISTATS 2019
- A Nonconvex Projection Method for Robust PCA**
Aritra Dutta, Filip Hanzely, Peter Richtárik 2018
AAAI 2019
- A Privacy Preserving Randomized Gossip Algorithm via Controlled Noise Insertion**
Filip Hanzely, Jakub Konečný, Nicolas Loizou, Peter Richtárik, Dmitry Grishchenko 2018
Privacy Preserving Machine Learning workshop (NeurIPS 2018)
- Accelerated Bregman Proximal Gradient Methods for Relatively Smooth Convex Optimization**
Filip Hanzely, Peter Richtárik, Lin Xiao 2018

¹Expected time to graduate

²It started off as PhD. It was changed to M.Sc. as I decided to move to KAUST after the first year with my advisor Peter Richtárik

SEGA: Variance Reduction via Gradient Sketching

Filip Hanzely, Konstantin Mishchenko, Peter Richtárik
NeurIPS 2018

2018

Accelerated Stochastic Matrix Inversion: General Theory and Speeding up BFGS rules for Faster Second-Order Optimization

Robert Gower, Filip Hanzely, Sebastian Stich, Peter Richtárik
NeurIPS 2018

2018

Fastest Rates for Stochastic Mirror Descent

Filip Hanzely, Peter Richtárik
ArXiv:1803.07374

2018

Privacy Preserving Randomized Gossip Algorithms

Filip Hanzely, Jakub Konečný, Nicolas Loizou, Peter Richtárik, Dmitry Grischenko
ArXiv:1706.07636

2017

Testing for Causality in Reconstructed State Spaces by Optimized Mixed Prediction Method

Anna Krakovská, Filip Hanzely
Physical Review E 94 (5)

2016

AWARDS

NeurIPS travel award \$1500

Travel support for attending NIPS 2018 (Montreal)

2018

#3, WEP poster competition

Third place on a poster competition during Winter Enrichment Program (KAUST)

2018

Dean's Award

Awarded to a few best incoming PhD students at KAUST

2017 – present

KAUST Fellowship

A generous fellowship provided for PhD students at KAUST

2017 – present

EPSRC CASE Award³, £93,333/3.5 years

Industrial PhD scholarship funded by EPSRC and Amazon

2016 – 2017

AN70 Travel Grant, CAD\$750

Travel support for attending Workshop on Modern Convex Optimization and Applications: AN70, Toronto

2017

PMPML Travel Grant, £600

Travel support for attending NIPS conference, Barcelona

2016

Academic Praise

Praise awarded by Dean of Comenius University; it is received by 2-3 selected students from each school of Comenius University every year. Awarded for the leadership in Trojsten (educational NGO in Slovakia) and excellent academic results.

2015

Second Prize (102th place out of 324 competitors)

International Mathematics Competition, Blagoevgrad, Bulgaria

2014

9th Place out of 79 competitors

Vít Jarník International Mathematical Competition, Ostrava, Czech republic

2014

Bronze Medal (163rd place)

International Mathematical Olympiad (IMO), Santa Marta, Colombia

2013

Acknowledgement

For the successful representation of Slovakia by *Minister of Education, Science, Research and Sport of the Slovak Republic*.

2013 & 2012

³The fellowship was awarded for 3,5 years. It was canceled since I decided to move to KAUST after the first year of my PhD in Edinburgh. The Amazon part of the funding is still in place.

1st Place 2013
Slovak national round of Mathematical Olympiad for high school students, Košice, Slovakia

Bronze Medal (13th place) 2012
Middle European Mathematical Olympiad, Solothurn, Switzerland

**TALKS
& POSTERS**

SIERRA seminar, INRIA Jan '20
Talk: One Method to Rule Them All: Variance Reduction for Data, Parameters and Many New Methods
Paris, France

MLO seminar, EPFL Dec '19
Talk: One Method to Rule Them All: Variance Reduction for Data, Parameters and Many New Methods
Lausanne, Switzerland

KAUST NeurIPS meetup Dec '19
Talk: Better Optimization for Deep Learning
KAUST, Saudi Arabia

Operation Research seminar, UC Louvain Nov '19
Talk: One Method to Rule Them All: Variance Reduction for Data, Parameters and Many New Methods
Louvain la Neuve, Belgium

Google Research Aug '19
Talk and Poster: One Method to Rule Them All: Variance Reduction for Data, Parameters and Many New Methods
Talk: Better Optimization for Deep Learning and the Reason why LARS Works
New York

AISTATS Apr '19
Poster: Accelerated Coordinate Descent with Arbitrary Sampling and Best Rates for Minibatches
Okinawa, Japan

AAAI Jan '19
Poster: A Nonconvex Projection Method for Robust PCA
Honolulu, Hawaii

NeurIPS Dec '18
2 Posters (main venue): SEGA: Variance Reduction via Gradient Sketching, Accelerated Stochastic Matrix Inversion: General Theory and Speeding up BFGS rules for Faster Second-Order Optimization
Poster (PPML workshop): A Privacy Preserving Randomized Gossip Algorithm via Controlled Noise Insertion
Montreal, Canada

Microsoft Research Nov '18
Talk: Accelerated Stochastic Matrix Inversion: General Theory and Speeding up BFGS rules for Faster Second-Order Optimization, during a month-long visit of Lin Xiao
Seattle, Washington

Inform's Annual Meeting Nov '18
Talk: Accelerated Coordinate Descent with Arbitrary Sampling and Best Rates for Minibatches
Phoenix, Arizona

Amazon Jun '18 – Sep'18
Talk: Accelerated Stochastic Matrix Inversion: General Theory and Speeding up BFGS rules for Faster Second-Order Optimization
Talk: Better optimization of log-likelihood for ABLR model
Berlin, Germany

Optimization Seminar	Sep '17 – Jun '18
Organizer of a group seminar, gave 5 talks given the time period KAUST, Saudi Arabia	
Microsoft Research	Mar '18
Talk: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions, followed by week-long research visit of Lin Xiao Seattle, Washington	
Informs Optimization	Mar '18
Talk: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions Denver, Colorado	
Optimization and Big Data	Feb '18
Spotlight Talk and Poster: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions KAUST, Saudi Arabia	
4th Conference on Optimization Methods and Software	Dec '17
Talk: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions Havana, Cuba	
Workshop on Modern Convex Optimization and Applications: AN70	July '17
Poster: Randomized Algorithms for Minimizing Relatively Smooth Functions Toronto, Canada	
Google Machine Learning Summit	June '17
Poster: Randomized Algorithms for Minimizing Relatively Smooth Functions Zurich, Switzerland	
SIAM Conference on Optimization	May '17
Talk: Randomized Methods for Minimizing Relatively Smooth Functions Vancouver, Canada	
All Hands Meeting on Big Data Optimization	Nov '16 – May '17
3 talks at local group seminar Edinburgh, UK	
Visual Computing - Modeling and Reconstruction	Apr '17
Poster: Randomized Algorithms for Minimizing Relatively Smooth Functions KAUST, Saudi Arabia	

ACADEMIC SERVICE

Journal reviews: Numerical Linear Algebra with Applications, Informs Journal on Optimization, Operations Research Letters, SIAM Journal on Mathematics of Data Science, Journal of Machine Learning Research, SIAM Journal on Optimization

Conference reviews: AAAI 2018 (1), ICML 2019 (7), NeurIPS 2019 (6), AAAI 2020 (5)

Session/minisymposium organizer

2017: Optimization Methods and Software (1)

2018: Informs Optimization, Informs Annual Meeting (1)

2019: International Conference on Continuous Optimization (ICCOPT) (1)

2020: SIAM MDS (1), SIAM OPT (5)

RESEARCH VISITS

SIERRA, INRIA/ Alex D'Aspremont (1 week)	Jan '20
EPFL/ Martin Jaggi (1 week)	Dec '19
UC Louvain/ Yurii Nesterov (4 days)	Nov '19
UC Berkeley/ Michael Mahoney (3 weeks)	Jun '19
Microsoft Research/ Lin Xiao (4 weeks)	Oct '18 – Nov '18
Microsoft Research/ Lin Xiao (1 week)	Mar '18

ATTENDANCE AT CONFERENCES & WORKSHOPS	Deep Learning Boot Camp May '19 Simons Institute, Berkeley, CA
	Challenges in Optimization for Machine Learning Mar '17 A technical meeting focused on research in optimization for machine learning . Alan Turing Institute, London, UK
	Neural Information Processing Systems (NIPS) Dec '16 Barcelona, Spain
	5th IMA Conference of Numerical Linear Algebra and Optimization Sep '16 Birmingham, UK
TEACHING	KAUST , Saudi Arabia Feb '19 <i>Guest Lecturer</i> (1 lecture), Contemporary Topics in Data Sciences (PhD course)
	KAUST , Saudi Arabia Aug '17 – Dec '17 <i>Teaching Assistant</i> , Special Topics in Data Sciences (PhD course)
	University of Edinburgh , UK Feb '17 – Apr '17 <i>Tutor</i> of Engineering Mathematics (undergraduate course) and Modern Optimization Methods for Big Data Problems (graduate course)
WORK EXPERIENCE	Google , New York (~40h/w) Jul – Oct '18 <i>Research intern</i> : Improving/understanding optimization and normalization in neural networks. Gave 1 talk and 1 poster presentation during the internship. Manager: Sashank Reddi
	Amazon , Berlin (~40h/w) Jun – Sep '18 <i>Applied science intern</i> : Speeding up negative log-likelihood minimization for ABLR model (Bayesian optimization). Gave 3 talks on various topics during the internship. Manager/mentor: Rodolphe Jenatton
	Slovak Academy of Sciences , Slovakia (~30h/m) Jul – Aug '15, Feb – Jun '16 <i>Research assistant</i> : Designing new methods for causality detection in reconstructed phase space; continued as my Bachelor thesis.
	FinViz , Slovakia (~70h/m) Oct '14 – June '15 <i>Part-time C# developer</i> : building automatic detector of stock chart patterns, backtesting trading strategies based on the patterns.
	Trojsten NGO , Slovakia (~30h/m) May '13 – Aug '16 <i>Teacher, manager (volunteer)</i> : Co-organize competitions and camps (9 one week camps, approx. 35 participants) for talented high school students in mathematics in Slovakia and Czech republic. Gave approx. 45 lectures on different topics, proposed approx. 80 problems and marked 560 solutions. In 2014 and 2015 I was one of 3 leading organizers of the math division of Trojsten (approx. 30 volunteers in the division).
	Slovak Mathematical Olympiad Dec '13 – Jun '16 <i>Coordinator</i> of regional (3 times, approx. 90 solutions marked), national round (2 times, approx 80 solutions marked) and team selection camp (3 times, approx. 60 solutions marked). <i>Lecturer</i> at preparation camp for IMO and MEMO (5 times 3,5 hour lecture for 12 students).
	Tatra Banka , Slovakia (~70h/m) Jun '14 – Oct '14 <i>VBA developer</i> : building Excel macros in order to simplify the routine at the project management department.
	Gymnázium J. Hronca , Slovakia (~8h/m) Sep '13 – Jun '14 <i>Teacher</i> : preparing talented high school students for Mathematical Olympiad (approx. 8 students).

PhD TRAINING

PhD courses - KAUST

Aug '17 – Jun '19

Qualifying Exams (passed): Numerical Linear Algebra, Probability and Statistics, Partial Differential Equations

Other: Data Mining, Numerical Optimization, Contemporary topics in Machine Learning, Stochastic Methods in Engineering

Deep Learning

Mar '18 – Aug '18

Passed a Udacity Nanodegree course on Deep Learning ([certificate](#)).

PhD courses - Edinburgh

Sep '16 – May '17

Convex Analysis and Convex Optimization, Matrix Theory, Modern Optimization Methods for Big Data Problems, Research Seminar on Big Data Optimization

Autumn School on Algorithmic Optimization

Sep '16

Trier, Germany

Mathematics of Machine Learning

Apr '16

One week intensive course focused mostly on optimization taught by a guest from the University of Edinburgh and held in Bratislava, Slovakia

SKILLS

Languages: Slovak (native), English (fluent)

Computer skills Julia, Python, MxNet/Gluon, Tensorflow, PyTorch, R, MatLab \LaTeX