

## EDUCATION

- Ph.D. Applied Mathematics and Computational Science** Aug '17 – Jun '20<sup>1</sup>  
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**<sup>2</sup> Sep '16 – May '17  
University of Edinburgh, UK  
Thesis: Randomized algorithms for minimizing relatively smooth functions  
1<sup>st</sup> supervisor: Peter Richtárik, 2<sup>nd</sup> 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  
*ArXiv:1905.11261*
- 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

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<sup>1</sup>Expected time to graduate

<sup>2</sup>It started off as PhD, however it was changed to M.Sc. as I decided to move to KAUST after 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 Award<sup>3</sup>, £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**

A 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 (102<sup>th</sup> place out of 324 competitors)**

International Mathematics Competition, Blagoevgrad, Bulgaria

2014

**9<sup>th</sup> Place out of 79 competitors**

Vít Jarník International Mathematical Competition, Ostrava, Czech republic

2014

**Bronze Medal (163<sup>rd</sup> place)**

International Mathematical Olympiad (IMO), Santa Marta, Colombia

2013

**Acknowledgement**

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

2013 & 2012

<sup>3</sup>The fellowship was awarded for 3,5 years, however it was cancelled since I decided to move to KAUST after first year of my PhD in Edinburgh. The Amazon part of funding is still in place.

**1<sup>st</sup> Place** 2013  
Slovak national round of Mathematical Olympiad for high school students, Košice, Slovakia

**Bronze Medal** (13<sup>th</sup> place) 2012  
Middle European Mathematical Olympiad, Solothurn, Switzerland

## TALKS & POSTERS

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

**Google Research** Aug '19  
Talk and Poster: One Method to Rule Them All: Variance Reduction for Data, Parameters and Many New Methods  
New York, NY

**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, CA

**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, WA

**Informatics Annual Meeting** Nov '18  
Talk: Accelerated Coordinate Descent with Arbitrary Sampling and Best Rates for Minibatches (session organizer)  
Phoenix, AR

**Optimization Seminar** Sep '17 - Jun '18  
Organizer of a group seminar, gave 5 talks given the time period  
KAUST, KSA

**Microsoft Research** Mar '18  
Talk: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions, followed by week-long research visit of Lin Xiao  
Seattle, WA

**Informatics Optimization Conference** Mar '18  
Talk: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions (session organizer)  
Denver, CO

**Optimization and Big Data** Feb '18  
Short talk/Poster: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions  
KAUST, KSA

**4<sup>th</sup> Conference on Optimization Methods and Software** Dec '17

Talk: Randomized and Accelerated Algorithms for Minimizing Relatively Smooth Functions  
(minisymposium organizer)  
Havana, Cuba

**All Hands Meeting on Big Data Optimization** Aug '17 – Nov '17  
3 talks at local group seminar (organizer)  
KAUST, Saudi Arabia

**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

## TEACHING

**KAUST**, Saudi Arabia Feb '19  
*Guest Lecturer* (1 lecture), Contemporary Topics in Data Sciences (PhD course)

**KAUST**, Saudi Arabia Aug '17 – Dec '17  
*Teaching Assistant*, Special Topics in Data Sciences (PhD course)

**University of Edinburgh**, UK Feb '17 – Apr '17  
*Tutor* of Engineering Mathematics (undergraduate course) and Modern Optimization Methods for Big Data Problems (graduate course)

## 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  
2018: INFORMS Optimization, INFORMS Annual Meeting  
2019: International Conference on Continuous Optimization (ICCOPT)  
2020: SIAM MDS, SIAM OPT

## 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

**5<sup>th</sup> IMA Conference of Numerical Linear Algebra and Optimization** Sep '16  
Birmingham, UK

## RESEARCH VISITS

UC Louvain/**Yurii Nesterov** (4 days) (upcoming) 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

## 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 University of Edinburgh and held in Bratislava, Slovakia

## WORK EXPERIENCE

**Google**, New York (~40h/w) Jul – Oct '18  
*Research intern*: 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  
*Applied science intern*: 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  
*Research assistant*: Designing new methods for causality detection in reconstructed phase space; continued as my Bachelor thesis.  
**FinViz**, Slovakia (~70h/m) Oct '14 – June '15  
*Part-time C# developer*: building automatic detector of stock chart patterns, backtesting trading strategies based on the patterns.  
**Trojsten NGO**, Slovakia (~30h/m) May '13 – Aug '16  
*Teacher, manager (volunteer)*: 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 math division of Trojsten (approx. 30 volunteers in the division).  
**Slovak Mathematical Olympiad** Dec '13 – Jun '16  
*Coordinator* 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).  
*Lecturer* 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  
*VBA developer*: building Excel macros in order to simplify the routine at the project management department.  
**Gymnázium J. Hronca**, Slovakia (~8h/m) Sep '13 – Jun '14  
*Teacher*: preparing talented high school students for Mathematical Olympiad (approx. 8 students).

## SKILLS

**Languages:** Slovak (native), English (fluent)

**Computer skills** Julia, Python, MxNet/Gluon, Tensorflow, PyTorch, R, MatLab  $\text{\LaTeX}$