

# Filip Hanzely

Computer, Electrical and Mathematical Sciences & Engineering, KAUST  
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## EDUCATION

- Ph.D. Applied Mathematics and Computational Science** Aug '17 – present  
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>1</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

## PUBLICATIONS

- Accelerated Relative Gradient Descent**  
Filip Hanzely, Peter Richtárik, Lin Xiao 2018  
*Near completion*
- SEGA: Variance Reduction via Gradient Sketching Descent**  
Filip Hanzely, Konstantin Mishchenko, Peter Richtárik 2018  
*Submitted*
- Accelerated Coordinate Descent with Arbitrary Sampling and Best Rates for Minibatches**  
Filip Hanzely, Peter Richtárik 2018  
*Submitted*
- A Nonconvex Projection Method for Robust PCA**  
Aritra Dutta, Filip Hanzely, Peter Richtárik 2018  
*ArXiv:1805.07962*
- Accelerated stochastic matrix inversion: general theory and speeding up BFGS rules for faster second-order optimization**  
Robert Gower, Filip Hanzely, Sebastian Stich, Peter Richtárik 2018  
*ArXiv:1802.04079*
- Fastest Rates for Stochastic Mirror Descent**  
Filip Hanzely, Peter Richtárik 2018  
*ArXiv:1803.07374*
- Privacy Preserving Randomized Gossip Algorithms**  
Filip Hanzely, Jakub Konečný, Nicolas Loizou, Peter Richtárik, Dmitry Grischenko 2017  
*ArXiv:1706.07636*
- Testing for Causality in Reconstructed State Spaces by Optimized Mixed Prediction Method**  
Anna Krakovská, Filip Hanzely 2016  
*Physical Review E 94 (5), 052203*

## AWARDS

- #3, WEP poster competition** 2018

<sup>1</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

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

**Dean's Award**

2017 – present

Awarded to a few best incoming PhD students at KAUST

**KAUST Fellowship**

2017 – present

A generous fellowship provided for PhD students at KAUST

**EPSRC CASE Award<sup>2</sup>**, £93,333/3.5 years

2016 – 2017

Industrial PhD scholarship funded by EPSRC and Amazon

**AN70 Travel Grant**, CAD\$750

2017

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

**PMPML Travel Grant**, £600

2016

Travel support for attending NIPS conference, Barcelona

**Academic Praise**

2015

A praise awarded by Dean of Comenius University; it is received by 2-3 selected students from each school of Comenius University every year

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

2014

International Mathematics Competition, Blagoevgrad, Bulgaria

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

2014

Vít Jarník International Mathematical Competition, Ostrava, Czech republic

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

2013

International Mathematical Olympiad (IMO), Santa Marta, Colombia

**Acknowledgement**

2013 & 2012

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

**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**

**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

**Informs 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)

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<sup>2</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.

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

**ATTENDANCE  
AT  
CONFERENCES  
& WORKSHOPS**

**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

**PhD TRAINING**

**Deep Learning**

Mar '18 – present

Taking a Udacity Nanodegree course on Deep Learning

**PhD courses - KAUST**

Aug '17 – present

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

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

**Autumn School on Algorithmic Optimization**

Sep '16

Trier, Germany

**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

**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

**TEACHING**

**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 (postgraduate course)

## WORK EXPERIENCE

**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  
*Volunteer educator, manager:* 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, MatLab, Tensorflow, C++/C, R, L<sup>A</sup>T<sub>E</sub>X