Filip Hanzely

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EDUCATION

Ph.D. Applied Mathematics and Computational Science　　Aug '17 – Jun '20[1]
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
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 Grischenko　　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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[1] Expected time to graduate

[2] It 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

ArXiv:1808.03045

SEGA: Variance Reduction via Gradient Sketching
Filip Hanzely, Konstantin Mishchenko, Peter Richtárik   2018
NeurIPS 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   2018
NeurIPS 2018

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)

AWARDS

NeurIPS travel award $1500   2018
Travel support for attending NIPS 2018 (Montreal)

#3, WEP poster competition   2018
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[3], £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
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.

Second Prize (102th place out of 324 competitors)   2014
International Mathematics Competition, Blagoevgrad, Bulgaria

9th Place out of 79 competitors   2014
Vít Jarník International Mathematical Competition, Ostrava, Czech republic

Bronze Medal (163rd place)   2013
International Mathematical Olympiad (IMO), Santa Marta, Colombia

Acknowledgement   2013 & 2012
For the successful representation of Slovakia by *Minister of Education, Science, Research and Sport of the Slovak Republic.*

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[3]The 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**

Operation Research seminar, UC Louvain (upcoming) 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

Informs 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 Conference 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

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

5th 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 the 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 the 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 LaTeX