Filip Hanzely

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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[1] 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

PUBLICATIONS

One Method to Rule Them All: Variance Reduction for Data, Parameters and Many New Methods
Filip Hanzely, Peter Richtárik 2019
ArXiv

A Unified Theory of SGD: Variance Reduction, Sampling, Quantization and Coordinate Descent
Eduard Gorbunov, Filip Hanzely, Peter Richtárik 2019
ArXiv

Best Pair Formulation & Accelerated Scheme for Non-convex Principal Component Pursuit
Aritra Dutta, Filip Hanzely, Jingwei Liang, Peter Richtárik 2019
ArXiv

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 (NIPS 2018)

Accelerated Bregman Proximal Gradient Methods for Relatively Smooth Convex Optimization
Filip Hanzely, Peter Richtárik, Lin Xiao 2018
ArXiv:1808.03045

[1] 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 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), 052203

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[2], £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^{th} place out of 324 competitors) 2014
International Mathematics Competition, Blagoevgrad, Bulgaria

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

Bronze Medal (163^{rd} 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^{st} Place 2013
Slovak national round of Mathematical Olympiad for high school students, Košice, Slovakia

[2]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.

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

TALKS & POSTERS

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

Informs Annual Meeting Nov '18
Talk: Accelerated Coordinate Descent with Arbitrary Sampling and Best Rates for Minibatches
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

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^{th} 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

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

PhD TRAINING

Deep Learning Mar '18 – present
Passed a Udacity Nanodegree course on Deep Learning (certificate).

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, Stochastic Methods in Engineering

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

Amazon, Berlin (~170h/m) 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
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, MxNet/Gluon, Tensorflow, C++/C, R, LaTeX