

# Mikhail Krechetov

Skolkovo Innovation Center – SkolTech – 143026 Moscow, Russia

✉ [mkrechetov@gmail.com](mailto:mkrechetov@gmail.com) • [in mikhail-krechetov](https://www.linkedin.com/in/mikhail-krechetov) • [github mkrechetov](https://github.com/mkrechetov)

## Summary

---

I am an applied mathematician with a proven track record in both business and frontier research. I formalize ambiguous business problems and solve them, relying on my strong expertise in graph algorithms, convex optimization, mixed integer programming and AI in general.

## Skills and Interests

---

**Programming:** Python, C++, Matlab, Go

**Solvers:** CPLEX, CVX, Gurobi, OR-Tools, Pyomo, Sat-solvers

**Libraries:** Pandas, Networkx, Graphviz, Tensorflow, Pytorch

**Research:** Optical Networks, Probabilistic modelling, Combinatorial Optimization, Semidefinite Programming, Path Finding Algorithms, Algorithms and Complexity

## Work Experience

---

### Huawei Russian Research Institute

Mathematical Modeling Competence Center

Oct 2019 - Now

*Senior Engineer*

*Moscow, RU*

- Built Multi-Objective Optimization Algorithm for Optical Network Planning
- Investigated Approaches for Optical Cable Planning
- By Means of Constraint Programming Showed 5% Optimality Gap of Spectrum Allocation Algorithm
- Introduced a Modulation Selection Algorithm that Increased the Network Capacity by 15%

### Skolkovo Institute of Science and Technology

Center for Energy Systems

Nov 2017 - Nov 2021

*Graduate Researcher*

*Moscow, RU*

- Introduced Entropy-penalization Approach to Low-rank Semidefinite Programming
- Led Seminars on Advanced Optimization for 20 people
- Developed Graphical Model Approach for Aggregated Pandemy Modelling

### Centrum Wiskunde & Informatica

Algorithms and Complexity Group

Oct 2019

*Visitor*

*Amsterdam, NL*

- Explored Quantum Speedup for Low-rank Semidefinite Programming

### Los Alamos National Laboratory

Physics of Condensed Matter and Complex Systems

Aug 2018

*Visitor*

*Los Alamos, USA*

- Worked on Benchmarking D-Wave Quantum Annealer via Convex Programming Hierarchies

### Los Alamos National Laboratory

Center for Nonlinear Studies

Feb 2018

*Visitor*

*Los Alamos, USA*

- Studied Applications of Stable Polynomials in Counting Problems

### Skolkovo Institute of Science and Technology

Center for Energy Systems

Sep 2016 - Sep 2017

*Research Intern*

*Moscow, RU*

- Developed Low-Rank Convex Relaxations for the Optimal Power Flow Problem
- Led Seminars on the Introduction to Convex Optimization

### The Institute for Information Transmission Problems

Predictive Modelling Lab

Research Intern

- Inspected Applications of Coding Theory in Multiclass Classification

Feb 2016 - Sep 2017

Moscow, RU

## Education

---

### PhD in Engineering (expected)

Skolkovo Institute of Science and Technology

Sep 2022

Moscow, RU

### MSc in Data Science

Skolkovo Institute of Science and Technology

Oct 2017

Moscow, RU

### MA in Applied Mathematics

National Research University - Higher School of Economics

Jun 2017

Moscow, RU

### BA in Mathematics

National Research University - Higher School of Economics

Jun 2015

Moscow, RU

## Papers

---

**Journal paper:** *M. Krechetov, AME Sikaroudi, A. Efrat, V. Polishchuk, M. Chertkov* "Prediction and Prevention of Pandemics via Graphical Model Inference and Convex Programming", Scientific Reports volume 12, Article number: 7599 (2022), <https://www.nature.com/articles/s41598-022-11705-8>

**Journal paper:** *I.Luchnikov, M.Krechetov, S. Filippov* "Riemannian geometry and automatic differentiation for optimization problems of quantum physics and quantum technologies", New Journal of Physics, Vol. 23, Pages 073006, (2021), <https://iopscience.iop.org/article/10.1088/1367-2630/ac0b02>

**Conference proceedings:** *M.Krechetov, D.Deka, Y.Maximov* "Learning for DC-OPF: Sparse Features for Active Constraints." 63rd All-Russia scientific conference in MIPT. 2020

**Conference proceedings:** *M.Krechetov, J.Marechek, M.Takac, Y.Maximov* "Entropy Penalized Semidefinite Programming.", Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence (IJCAI-2019) Main track. Pages 1123-1129. [arxiv.org/abs/1802.04332](https://arxiv.org/abs/1802.04332)

**Conference proceedings:** *R.Pogodin, M.Krechetov, Y.Maximov* "Efficient Rank Minimization to Tighten Semidefinite Programming for Unconstrained Binary Quadratic Optimization." 55th Annual Allerton Conference on Communication, Control, and Computing, pp. 1153-1159. IEEE, (2017) [arxiv.org/abs/1708.01690](https://arxiv.org/abs/1708.01690)

## Languages

---

**English:** Fluent

**Russian:** Native