

TETIANA PARSHAKOVA

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OBJECTIVE

To develop efficient algorithms for large-scale problems using techniques from optimization, discrete mathematics and statistics. In particular, my research interests include

- large-scale and distributed convex optimization
- network science, learning and inference for network data
- numerical and randomized linear algebra
- low rank and structured optimization
- machine learning

POSITIONS

Flatiron Institute

Research Fellow | CCM

USA

2025 –

- design and analysis of optimization algorithms for training large language models
- Advisor: Robert Gower

Amazon

Postdoctoral Scientist | SCOT

USA

2024 – 2025

- unified framework for empirically accelerated ADMM
 - experimentation under constraints
- Advisor: Garrett van Ryzin

EDUCATION

Stanford

Ph.D. | Computational Mathematics

USA

2019 – 2024

Advisor: Prof. Stephen Boyd

Thesis: *Multilevel Low Rank Matrices and Applications*

M.Sc. | Computational Mathematics

2019 – 2022

KAIST

M.Sc. | Electrical Engineering

South Korea

2017 – 2019

Thesis: *Latent Question Interpretation: Parameter Adaptation Using Interpretation Policy*

B.Sc. | Industrial Design

2012 – 2017

Thesis: *UMorph: Self-Change Tracker to Reflect Yourself to the Future and Past*

RESEARCH EXPERIENCE

Google Research

Student Researcher | Google Brain Robotics

USA

2022

- message passing and tree-based algorithms for fast graph field integration, towards generalization of fast multipole method to discretized manifolds

Apple

Machine Learning Research Intern | Exploratory Design Group

USA

2020, 2021

- accelerating the training of neural networks using Hessian-vector products
- constructive methods for neural networks on elementary functions

Naver Labs Europe

Machine Learning Researcher | Natural Language Processing Group

France

2019

- data-efficient learning via combining energy-based models with autoregressive models

PATENTS

Methods and systems for producing neural sequential models	Naver Corp, 2024
<u>T. Parshakova</u> , M. Dymetman, J.-M. Andréoli	US12086708B2
Interpolation method and apparatus for arithmetic functions	Apple Inc, 2023
W. C. Athas, Z. M. Nadeem, <u>T. Parshakova</u>	US11636176B2

PUBLICATIONS

- T. Parshakova, T. Hastie, and S. Boyd. *Fitting multilevel factor models*. SIAM Journal on Matrix Analysis and Applications. 2025. Package: github.com/cvxgrp/multilevel_factor_model
- T. Parshakova, Y. Bai, G. van Ryzin, and S. Boyd. *Multiple-response agents: Fast, feasible, approximate primal recovery for dual optimization methods*. arXiv preprint arXiv:2503.12221. 2025. Package: github.com/cvxgrp/mra_precovery
- S. Boyd, T. Parshakova, E. K. Ryu, J. J. Suh. *Optimization algorithm design via electric circuits*. Advances in Neural Information Processing System (Spotlight). 2024. Package: github.com/cvxgrp/optimization_via_circuits
- T. Parshakova. *Multilevel low rank matrices and applications*. PhD thesis, Stanford University. 2024
- T. Parshakova, T. Hastie, E. Darve and S. Boyd. *Factor fitting, rank allocation, and partitioning in multilevel low rank matrices*. Optimization, Discrete Mathematics, and Applications to Data Sciences, Springer Optimization and Its Applications, vol. 220, Springer. 2024. Package: github.com/cvxgrp/mlr_fitting
- K. Choromanski, A. Sehanobish, H. Lin, Y. Zhao, E. Berger, T. Parshakova, et al. *Efficient graph field integrators meet point clouds*. International Conference on Machine Learning. 2023. Package: github.com/topographers/efficient_graph_algorithms
- T. Parshakova, F. Zhang and S. Boyd. *Implementation of an oracle-structured bundle method for distributed optimization*. Optimization and Engineering. 2023. Package: github.com/cvxgrp/OSBD0
- T. Parshakova, M. Dymetman and J.-M. Andreoli. *Distributional policies for energy-based sequential models*. NeurIPS Optimization Foundations of Reinforcement Learning Workshop. 2019
- T. Parshakova, J.-M. Andreoli and M. Dymetman. *Global autoregressive models for data-efficient sequence learning*. Conference on Computational Natural Language Learning, ACL. 2019. Package: github.com/parshakova/GAMS-for-Data-Efficient-Learning
- T. Parshakova, F. Rameau, A. Serdega, I. S. Kweon, and D.-S. Kim. *Latent question interpretation through variational adaptation*. IEEE/ACM Transactions on Audio, Speech, and Language Processing. 2019
- T. Parshakova and D.-S. Kim. *Latent question interpretation through parameter adaptation using stochastic neuron*. In Proceedings of ICML Workshop, MRC-2018. 2018
- T. Parshakova and D. Saakes. *UMorph: Self-change tracker to reflect yourself to the future and past*. Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems, ACM. 2018
- T. Parshakova, M. Cho, A. Cassinelli, and D. Saakes. *Furniture that learns to move itself*. Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems, ACM. 2017
- T. Parshakova, M. Cho, A. Cassinelli, and D. Saakes. *Ratchair: Furniture learns to move itself with vibration*. ACM SIGGRAPH 2016 Emerging Technologies, ACM. 2016

HONORS AND AWARDS

<i>ICML Grant Award (declined)</i>	2023
<i>Oliger Memorial Fellowship</i> A stipend during the Ph.D. at Stanford	2019 – 2022
<i>Qualcomm-KAIST innovation awards 2018</i> Paper competition awards for graduate students	2018
<i>Featured at discovery daily planet Canada</i> <i>Ratchair: Furniture that learns to move itself demonstration</i>	2017
<i>KAIST breakthroughs newsletter</i> <i>Furniture that learns to move itself featured in KAIST breakthroughs newsletter</i>	2017
<i>Excellence award for Bachelor's thesis</i> <i>Thesis: UMorph: Self-change tracker to reflect yourself to the past and to the future</i>	2017
<i>First prize in Qualcomm-KAIST innovation awards</i> Embedded systems awards	2016
<i>SIGGRAPH 2016 emerging technologies DC EXPO special prize</i> <i>Project: Ratchair: Furniture that learns to move itself with vibration</i>	2016
<i>Undergraduate research program excellence award</i> For extraordinary efforts and research outcomes	2016
<i>KAIST international student scholarship</i> A stipend during the B.Sc. and M.Sc. at KAIST	2012 – 2016, 2017 – 2019
<i>Kyiv capital olympiads in mathematics</i> Bronze medal	2009, 2012
<i>Regional mathematics olympiad</i> Silver medal	2009
<i>Volyn regional mathematics olympiad</i> Gold medal	2008

TALKS

<i>Optimization Algorithm Design via Electric Circuits, INFORMS, Atlanta</i>	10/2025
<i>Optimization Algorithm Design via Electric Circuits, Princeton Alg-ML Seminar, Princeton</i>	10/2025
<i>Price Directed Distributed Optimization and Primal Recovery, INFORMS, Seattle</i>	10/2024
<i>Multilevel Low Rank Matrices and Applications, Optimization lunch, Stanford</i>	05/2024
<i>Multilevel Low Rank Matrices and Applications, Amazon, SCOT</i>	05/2024
<i>Multilevel Low Rank Matrices and Applications, van Dijk Lab, Yale</i>	01/2024
<i>Multilevel Low Rank Matrices and Applications, Krishnaswamy Lab, Yale</i>	12/2023
<i>Fast Graph Field Integrators for Robotics & Beyond, Google Brain, New York</i>	09/2022
<i>Latent question interpretation: Parameter adaptation using interpretation policy, Naver Labs Europe</i>	01/2019
<i>Latent Question Interpretation Through Parameter Adaptation Using Stochastic Neuron, ICML Workshop</i>	07/2018

SKILLS

Languages: Ukrainian (native), English (fluent), Russian (fluent), Korean (elementary)

Programming: Python, Julia, Matlab, C++, Java, Torch, Tensorflow, PyTorch, Git, LaTeX, OpenCV, Unix

Prototyping: Raspberry Pi, Arduino, Processing-Android, Autodesk Inventor, Rhino 5, Adobe Photoshop, Adobe Illustrator, Adobe After Effects, Adobe Premiere Pro

TEACHING EXPERIENCE

Course assistant at Stanford	2023, 2024
EE364a Convex Optimization	USA

Tutor at KAIST EE Co-op Program	2018
Taught undergraduate students basics of ML, NLP and Tensorflow	South Korea

Tutor in science and English camps	2017, 2018
Prepared schoolchildren for a science competition and taught English	South Korea

Teaching assistant at KAIST	2015 – 2016
Intro to Philosophy, English Short Stories, Philosophy of Mathematics, Logic and AI	South Korea

SERVICE & EXTRA-CURRICULAR

Neurips workshop organizer	
ScaleOPT: GPU-Accelerated and Scalable Optimization	
Co-organized with P. Nobel, F. Zhang, M. Schaller, A. Amice, T. Marcucci, S. Boyd	2025

Reviewer
NeurIPS 2025, IEEE Conference on Decision and Control (CDC 2025),
Energy Based Models Workshop @ ICLR2021

Organizer of KAIST EE promotion in Ukraine	2017
Helped to organize EE Visit Camp, recruited students	Ukraine/South Korea

Candidate Master of Sports	2001 – 2007
Acrobatic gymnastics	Ukraine