

TETIANA PARSHAKOVA

tetianap@stanford.edu

parshakova.github.io

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

USA

Research Fellow | CCM

2025 –

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

Amazon

USA

Postdoctoral Scientist | SCOT

2024 – 2025

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

EDUCATION

Stanford

USA

Ph.D. | Computational Mathematics

2019 – 2024

Advisor: Prof. Stephen Boyd

Thesis: *Multilevel Low Rank Matrices and Applications*

M.Sc. | Computational Mathematics

2019 – 2022

KAIST

South Korea

M.Sc. | Electrical Engineering

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

USA

Student Researcher | Google Brain Robotics

2022

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

Apple

USA

Machine Learning Research Intern | Exploratory Design Group

2020, 2021

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

Naver Labs Europe

France

Machine Learning Researcher | Natural Language Processing Group

2019

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

PATENTS

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

PUBLICATIONS

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_recovery

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

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

TEACHING EXPERIENCE

Course assistant at Stanford EE364a Convex Optimization	2023, 2024 USA
Tutor at KAIST EE Co-op Program Taught undergraduate students basics of ML, NLP and Tensorflow	2018 South Korea
Tutor in science and English camps Prepared schoolchildren for a science competition and taught English	2017, 2018 South Korea
Teaching assistant at KAIST Intro to Philosophy, English Short Stories, Philosophy of Mathematics, Logic and AI	2015 – 2016 South Korea

SERVICE & EXTRA-CURRICULAR

Neurips workshop organizer ScaleOPT: GPU-Accelerated and Scalable Optimization Co-organizer 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 Helped to organize EE Visit Camp, recruited students	2017 Ukraine/South Korea
Candidate Master of Sports Acrobatic gymnastics	2001 – 2007 Ukraine