



Tetiana Parshakova

Research Fellow
Flatiron Institute, Center for Computational Mathematics

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Research Interests

Efficient algorithms for large-scale problems using techniques from optimization, discrete mathematics, and statistics

- large-scale and distributed convex optimization
- optimization for training large language models
- network science; learning and inference on network data
- numerical and randomized linear algebra
- low-rank and structured optimization; machine learning

Education

Stanford University <i>Ph.D., Computational Mathematics. Advisor: Prof. Stephen Boyd</i> Thesis: <i>Multilevel Low Rank Matrices and Applications</i>	USA 2019 – 2024
Stanford University <i>M.Sc., Computational Mathematics. Advisor: Prof. Stephen Boyd</i>	USA 2019 – 2022
KAIST <i>M.Sc., Electrical Engineering</i> Thesis: <i>Latent Question Interpretation: Parameter Adaptation Using Interpretation Policy</i>	South Korea 2017 – 2019
KAIST <i>B.Sc., Industrial Design</i> Thesis: <i>UMorph: Self-Change Tracker to Reflect Yourself to the Future and Past</i>	South Korea 2012 – 2017

Positions

Flatiron Institute, CCM <i>Research Fellow. Advisor: Robert Gower</i>	USA 2025 –
<ul style="list-style-type: none">• design and analysis of optimization algorithms for training large language models	
Amazon, SCOT <i>Postdoctoral Scientist. Advisor: Garrett van Ryzin</i>	USA 2024 – 2025
<ul style="list-style-type: none">• unified framework for empirically accelerated ADMM• experimentation under constraints	
Google Research, Brain Robotics <i>Student Researcher</i>	USA 2022
<ul style="list-style-type: none">• message-passing and tree-based algorithms for fast graph field integration• generalization of the fast multipole method to discretized manifolds	
Apple, XDG <i>Machine Learning Research Intern</i>	USA 2020, 2021
<ul style="list-style-type: none">• accelerating neural-network training using Hessian-vector products• constructive methods for neural networks on elementary functions	
Naver Labs Europe, NLP Group <i>Machine Learning Researcher</i>	France 2019
<ul style="list-style-type: none">• data-efficient learning via energy-based models combined with autoregressive models	

Patents

Naver Corp

2024

Methods and systems for producing neural sequential models

US12086708B2

T. Parshakova, M. Dymetman, J.-M. Andréoli

Apple Inc

2023

Interpolation method and apparatus for arithmetic functions

US11636176B2

W. C. Athas, Z. M. Nadeem, T. Parshakova

Publications

- T. Parshakova, A. Khaled, M. Crawshaw, G. Garrigos, R. M. Gower. *Muon does not converge on convex Lipschitz functions*. arXiv:2605.08980, 2026
- T. Parshakova, Y. Bai, G. van Ryzin, S. Boyd. *Multiple approximate-response agents (MARA): fast near-optimal primal recovery for distributed optimization*. arXiv:2503.12221, 2025
[cvxgrp/mra_precovery](#)
- T. Parshakova, T. Hastie, S. Boyd. *Fitting multilevel factor models*. SIAM Journal on Matrix Analysis and Applications, 2025
[cvxgrp/multilevel_factor_model](#)
- S. Boyd, T. Parshakova, E. K. Ryu, J. J. Suh. *Optimization algorithm design via electric circuits*. NeurIPS (Spotlight), 2024
[cvxgrp/optimization_via_circuits](#)
- T. Parshakova. *Multilevel low rank matrices and applications*. Ph.D. thesis, Stanford University, 2024
- T. Parshakova, T. Hastie, E. Darve, S. Boyd. *Factor fitting, rank allocation, and partitioning in multilevel low rank matrices*. Optimization, Discrete Math., and Applications to Data Sciences, Springer Optimization and Its Applications, vol. 220, 2024
[cvxgrp/mlr_fitting](#)
- K. Choromanski, A. Sehanobish, H. Lin, Y. Zhao, E. Berger, T. Parshakova, et al. *Efficient graph field integrators meet point clouds*. ICML, 2023
[topographers/efficient_graph_algorithms](#)
- T. Parshakova, F. Zhang, S. Boyd. *Implementation of an oracle-structured bundle method for distributed optimization*. Optimization and Engineering, 2023
[cvxgrp/OSBDO](#)
- T. Parshakova, M. Dymetman, J.-M. Andreoli. *Distributional policies for energy-based sequential models*. NeurIPS Optimization Foundations of RL Workshop, 2019
- T. Parshakova, J.-M. Andreoli, M. Dymetman. *Global autoregressive models for data-efficient sequence learning*. CoNLL (ACL), 2019
[parshakova/GAMS-for-Data-Efficient-Learning](#)
- T. Parshakova, F. Rameau, A. Serdega, I. S. Kweon, D.-S. Kim. *Latent question interpretation through variational adaptation*. IEEE/ACM Trans. on Audio, Speech, and Language Processing, 2019
- T. Parshakova, D.-S. Kim. *Latent question interpretation through parameter adaptation using stochastic neuron*. ICML Workshop MRC, 2018
- T. Parshakova, D. Saakes. *UMorph: Self-change tracker to reflect yourself to the future and past*. ACM DIS Companion, 2018
- T. Parshakova, M. Cho, A. Cassinelli, D. Saakes. *Furniture that learns to move itself*. ACM CHI Extended Abstracts, 2017
- T. Parshakova, M. Cho, A. Cassinelli, D. Saakes. *Ratchair: Furniture learns to move itself with vibration*. ACM SIGGRAPH Emerging Technologies, 2016

Honors & Awards

2023	ICML Grant Award (declined)
2019 – 2022	Oliger Memorial Fellowship — Ph.D. stipend at Stanford
2018	Qualcomm-KAIST Innovation Awards — graduate paper competition
2017	Featured on Discovery Daily Planet Canada — <i>Ratchair</i> demonstration
2017	KAIST Breakthroughs Newsletter — <i>Furniture that learns to move itself</i>
2017	Excellence Award for Bachelor's Thesis — <i>UMorph</i>
2016	First Prize, Qualcomm-KAIST Innovation Awards — embedded systems competition
2016	SIGGRAPH Emerging Technologies, DC EXPO Special Prize — <i>Ratchair</i>
2016	Undergraduate Research Program Excellence Award
2017 – 2019	International Student Scholarship — M.Sc. stipend at KAIST
2012 – 2016	International Student Scholarship — B.Sc. stipend at KAIST
2009, 2012	Kyiv Capital Mathematics Olympiad — Bronze
2009	Regional Mathematics Olympiad — Silver
2008	Volyn Regional Mathematics Olympiad — Gold

Invited Talks

04/2026	<i>Muon Does Not Converge on Convex Lipschitz Functions</i>	ISL Colloquium	Stanford
04/2026	<i>Muon Does Not Converge on Convex Lipschitz Functions</i>	Apple XDG	Cupertino
10/2025	<i>Optimization Algorithm Design via Electric Circuits</i>	INFORMS	Atlanta
10/2025	<i>Optimization Algorithm Design via Electric Circuits</i>	Alg-ML Seminar	Princeton
10/2024	<i>Price Directed Distributed Optimization and Primal Recovery</i>	INFORMS	Seattle
05/2024	<i>Multilevel Low Rank Matrices and Applications</i>	Optimization Lunch	Stanford
05/2024	<i>Multilevel Low Rank Matrices and Applications</i>	Amazon SCOT	New York
01/2024	<i>Multilevel Low Rank Matrices and Applications</i>	van Dijk Lab	Yale
12/2023	<i>Multilevel Low Rank Matrices and Applications</i>	Krishnaswamy Lab	Yale
09/2022	<i>Fast Graph Field Integrators for Robotics & Beyond</i>	Google Brain	New York
01/2019	<i>Latent Question Interpretation</i>	Naver Labs Europe	Meylan
07/2018	<i>Latent Question Interpretation Through Parameter Adaptation</i>	ICML Workshop	Stockholm

Teaching

Course Assistant, Stanford University	USA
<i>EE364a — Convex Optimization</i>	2023, 2024
Tutor, KAIST EE Co-op Program	South Korea
<i>Undergraduate ML, NLP, and TensorFlow</i>	2018
Tutor, Science and English Camps	South Korea
<i>Science-competition preparation; English</i>	2017, 2018
Teaching Assistant, KAIST	South Korea
<i>Intro to Philosophy; English Short Stories; Philosophy of Math.; Logic & AI</i>	2015 – 2016

Community

NeurIPS Workshop Organizer	USA
<i>ScaleOPT: GPU-Accelerated and Scalable Optimization</i>	2025
With P. Nobel, F. Zhang, M. Schaller, A. Amice, T. Marcucci, S. Boyd	
Reviewer	
Optimization and Engineering 2026; NeurIPS 2025; IEEE Conference on Decision and Control (CDC 2025); Energy-Based Models Workshop @ ICLR 2021	
Organizer of KAIST EE Promotion in Ukraine	Ukraine / South Korea
<i>Organized EE Visit Camp; recruited students</i>	2017