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	09/2025 –

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

Amazon	USA
Postdoctoral Scientist	SCOT	07/2024 – 09/2025

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

EDUCATION

Stanford	USA
Ph.D.	Computational Mathematics	09/2019 – 06/2024

  Advisor: Prof. Stephen Boyd
  Thesis: *Multilevel Low Rank Matrices and Applications*

M.Sc.	Computational Mathematics	09/2019 – 09/2022

KAIST	South Korea
M.Sc.	Electrical Engineering	02/2017 – 02/2019

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

B.Sc.	Industrial Design	09/2012 – 02/2017

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

RESEARCH EXPERIENCE

Google Research	USA
Student Researcher	Google Brain Robotics	06 – 09/2022

- 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	06 – 09/2020, 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	03 – 07/2019

- 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

<u>T. Parshakova</u>, T. Hastie, and S. Boyd. *Fitting multilevel factor models.* SIAM Journal on Matrix Analysis and Applications. 2025. Package: `github.com/cvxgrp/multilevel_factor_model`

<u>T. Parshakova</u>, 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, <u>T. Parshakova</u>, 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`

<u>T. Parshakova</u>. *Multilevel low rank matrices and applications.* PhD thesis, Stanford University. 2024

<u>T. Parshakova</u>, 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, <u>T. Parshakova</u>, et al. *Efficient graph field integrators meet point clouds.* International Conference on Machine Learning. 2023. Package: `github.com/topographers/efficient_graph_algorithms`

<u>T. Parshakova</u>, F. Zhang and S. Boyd. *Implementation of an oracle-structured bundle method for distributed optimization.* Optimization and Engineering. 2023. Package: `github.com/cvxgrp/OSBDO`

<u>T. Parshakova</u>, M. Dymetman and J.-M. Andreoli. *Distributional policies for energy-based sequential models.* NeurIPS Optimization Foundations of Reinforcement Learning Workshop. 2019

<u>T. Parshakova</u>, 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`

<u>T. Parshakova</u>, 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

<u>T. Parshakova</u> and D.-S. Kim. *Latent question interpretation through parameter adaptation using stochastic neuron.* In Proceedings of ICML Workshop, MRC-2018. 2018

<u>T. Parshakova</u> 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

<u>T. Parshakova</u>, 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

<u>T. Parshakova</u>, 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

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

TALKS

Design and Analysis of Efficient Algorithms for Large-Scale Problems, Flatiron Institute	1/2025
Price Directed Distributed Optimization and Primal Recovery, INFORMS, Seattle	10/2024
Multilevel Low Rank Matrices and Applications, Optimization lunch, Stanford	05/2024
Multilevel Low Rank Matrices and Applications, Amazon, SCOT	05/2024
Multilevel Low Rank Matrices and Applications, van Dijk Lab, Yale	01/2024
Multilevel Low Rank Matrices and Applications, Krishnaswamy Lab, Yale	12/2023
Fast Graph Field Integrators for Robotics & Beyond, Google Brain, New York	09/2022
Latent question interpretation: Parameter adaptation using interpretation policy, Naver Labs Europe	01/2019
Latent Question Interpretation Through Parameter Adaptation Using Stochastic Neuron, ICML Workshop	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, 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