

# TETIANA PARSHAKOVA

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[parshakova.github.io](https://github.com/tetianap)

## OBJECTIVE

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To develop efficient algorithms for computational problems using techniques from optimization, discrete mathematics and statistics, to analyze and to bring theoretical guarantees about these methods.

## EDUCATION

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<b>Stanford University</b>	USA
<i>Ph.D.</i>   Computational Mathematics. Advisor <i>Stephen Boyd</i>	2019 – <i>now</i>
<i>M.Sc.</i>   Computational Mathematics	2022
<b>Korea Advanced Institute of Science and Technology</b>	South Korea
<i>M.Sc.</i>   Electrical Engineering	2019
<i>B.Sc.</i>   Industrial Design	2017

## WORK EXPERIENCE

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<b>Google</b>	2022
<i>Student Researcher</i>   Google Brain Robotics	USA
<ul style="list-style-type: none"><li>Message passing and tree based algorithms for fast graph field integration</li></ul>	
<b>Apple Inc.</b>	2020; 2021
<i>Machine Learning Research Intern</i>   Exploratory Design Group	USA
<ul style="list-style-type: none"><li>Accelerating the training of Neural Networks using Hessian-vector products</li><li>Constructive methods for Neural Networks on elementary functions</li></ul>	
<b>Naver Labs Europe</b>	2019
<i>Machine Learning Researcher</i>   Natural Language Processing Group	France
<ul style="list-style-type: none"><li>Global Autoregressive Models (GAMs), combining an autoregressive component with a log-linear component, allowing the use of global a priori features to compensate for lack of data</li><li>Different approaches for approximating the normalized distribution given by GAMs for fast inference</li></ul>	

## PATENTS

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<b>Interpolation Method and Apparatus for Arithmetic Functions</b>	Apple Inc, 2022
William C. Athas, Zaid M. Nadeem, Tetiana Parshakova.	US 17/085,971
<b>Methods and Systems for Producing Neural Sequential Models</b>	Naver Corp, 2022
Tetiana Parshakova, Marc Dymetman, Jean-marc Andréoli.	US 17/018,754

## PUBLICATIONS

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### JOURNAL

Tetiana Parshakova, Francois Rameau, Andriy Serdega, In So Kweon and Dae-Shik Kim. *Latent Question Interpretation Through Variational Adaptation*. Accepted in IEEE/ACM Transactions on Audio, Speech, and Language Processing. 2019

### CONFERENCE

Tetiana Parshakova, Marc Dymetman and Jean-Marc Andreoli. *Distributional Policies for Energy-Based Sequential Models*. NeurIPS Optimization Foundations of Reinforcement Learning Workshop. 2019

Tetiana Parshakova, Jean-Marc Andreoli and Marc Dymetman . *Global Autoregressive Models for Data-Efficient Sequence Learning*. In Proceedings of the SIGNLL Conference on Computational Natural Language Learning, ACL. 2019

Tetiana Parshakova and Dae-Shik Kim. *Latent Question Interpretation Through Parameter Adaptation Using Stochastic Neuron*. In Proceedings of ICML Workshop, MRC-2018, <http://ceur-ws.org/Vol-2134/#paper07>. 2018

Tetiana Parshakova and Daniel Saakes. *UMorph: Self-Change Tracker to Reflect Yourself to the Future and Past*. In Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems, ACM. 2018

Tetiana Parshakova, Minjoo Cho, Alvaro Cassinelli, and Daniel Saakes. *Furniture that Learns to Move Itself*. In Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems, ACM. 2017

Tetiana Parshakova, Minjoo Cho, Alvaro Cassinelli, and Daniel Saakes. *Ratchair: Furniture learns to move itself with vibration*. In ACM SIGGRAPH 2016 Emerging Technologies, ACM. 2016

## PROJECTS AND RESEARCH

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### Research Rotations

2019 – 2021

Stanford University

USA

- with Prof. Aaron Sidford on hop constrained graph embedding onto a distribution of a dominating trees: minimax principle between probabilistic and distributional distance stretch, randomized algorithms for obtaining embeddings
- with Prof. Stephen Boyd on inverse neighborhood problem: explored different optimization schemes for inverting the operator of geometric random graph.
- with Prof. Tselil Schramm on graph embedding problem: finding minimum dimension of the vertex embedding that preserved information about the existence/absence of an edge.
- with Prof. Amin Saberi on finding optimal strategy for the card guessing game using partially observable Markov decision process.
- with Prof. Andrea Montanari: analysis and comparison of methods that discover causality in linear models using invariance across multiple environments.
- with Prof. Lexing Ying: explored the layerwise Hamiltonian for NNs and Hamilton-Jacobi-Bellman equation to approach the delayed gradient problem to decouple layers during the back propagation.
- with Prof. Eric Darve on deriving bounds for the number of neurons and layers of Relu NN necessary for approximate any analytic function arbitrarily close.

### Graduate Researcher

2017 – 2018

Brain Reverse Engineering and Imaging Lab, KAIST

South Korea

- “Latent Question Interpretation Through Variational Adaptation”, a model that learns multiple interpretations of a given question.
- “Visual Question Answering” model with bottom-up, top-down attention and policy gradient to obtain image-aware question representation.
- “Abstractive Text Summarizer”, combining Pointer generator with Seq2seq attention, by constructing a hybrid distribution over the vocabulary from which it generates the summary.
- “DDPG with Attention-based LSTM State Encoder”, a sequential decision making agent for solving “Angry Birds” using Deep Deterministic Policy Gradient with Attention-based LSTM for state encoding.
- “Opinion Generator”, a model for capturing a global “pathway” of an opinion as a response to other statement.

### Undergraduate Researcher

2016

Brain Reverse Engineering and Imaging Lab, KAIST

South Korea

- Machine Learning and Reinforcement Learning basics
- Worked on “Comic style generation using Neural Networks” using Lua and Torch

<b>Undergraduate Researcher</b>	2015 – 2016
My Design Lab, KAIST	South Korea
<ul style="list-style-type: none"> <li>• “Ratchair” is a strategy for displacing objects utilizing vibrations, <a href="http://mid.kaist.ac.kr/projects/ratchair/">http://mid.kaist.ac.kr/projects/ratchair/</a>. Used: Python, Java, Android, OpenCV, Arduino, Inventor, Processing-Android, Myo Armband, hardware.</li> <li>• “UMorph” is an unobtrusive self-image capturing system for tracking self changes over time. Used: PyQt, Dragon Board 410c, OpenCV, Dlib, hardware.</li> </ul>	

## HONORS AND AWARDS

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<b>The Oliger Memorial Fellowship</b>	2019 – 2022
A stipend during the Ph.D. at Stanford	
<b>Qualcomm-KAIST Innovation Awards 2018</b>	2018
Paper Competition Awards for Graduate Students	
<b>Featured at Discovery Daily Planet Canada</b>	2017
“Ratchair: Furniture That Learns to Move Itself” demonstration for Discovery Daily Planet Canada	
<b>KAIST Breakthroughs Newsletter</b>	2017
“Furniture That Learns to Move Itself” featured in KAIST Breakthroughs Newsletter	
<b>Excellence Award for Bachelor’s thesis</b>	2017
Thesis “UMorph: Self-Change Tracker to Reflect Yourself to the Past and to the Future”	
<b>First prize in Qualcomm-KAIST Innovation Awards</b>	2016
Embedded Systems Awards	
<b>SIGGRAPH 2016 Emerging Technologies DC EXPO Special Prize</b>	2016
For “Ratchair: Furniture That Learns to Move Itself With Vibration”	
<b>Undergraduate Research Program Excellence Award</b>	2016
For Extraordinary Efforts and Research Outcomes	
<b>KAIST International Student Scholarship</b>	2012 – 2016; 2017 – 2019
A stipend during the B.Sc. and M.Sc. at KAIST	
<b>Kyiv Capital Olympiads in Mathematics</b>	2009; 2012
Bronze medal	
<b>Regional Mathematics Olympiad</b>	2009
Silver medal	
<b>Volyn Regional Mathematics Olympiad</b>	2008
Gold medal	

## SKILLS

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**Languages:** Ukrainian (native), Russian (native), English (fluent), Korean (elementary)  
**Programming:** Python, Matlab, 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.

## SERVICE & EXTRA-CURRICULAR

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<b>Reviewer</b>	2021
Energy Based Models Workshop @ ICLR2021	
<b>Tutor at KAIST EE Co-op Program</b>	2018
Taught undergraduate students basics of ML, NLP and Tensorflow.	
	South Korea
<b>Tutor in Science Camp and English Camp</b>	2017; 2018
Prepared schoolchildren for a science competition; taught schoolchildren English.	
	South Korea

**Organizer of KAIST EE Promotion in Ukraine**

Helped to organize EE Visit Camp, recruited students.

2017

South Korea; Ukraine

**Teaching Assistant at KAIST**

Intro to Philosophy; English Short Stories; Philosophy of Mathematics; Logic and AI.

2015 – 2016

South Korea

**Volunteer at UEFA Euro 2012**

Participated in closing ceremony dance performance in Kyiv.

2012

Ukraine

**Candidate Master of Sports**

Acrobatic gymnastics.

2001 – 2007

Ukraine