

# Polina Kirichenko

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Google Scholar, Semantic Scholar 🎓

## Education

### Ph.D. student in Data Science, New York University

Center for Data Science; supervisor: Professor [Andrew Gordon Wilson](#)

Research interests: uncertainty estimation, probabilistic deep learning, generative models

New York, USA

2019 – current

### Ph.D. student in Operations Research, Cornell University

Operations Research and Information Engineering department; transferred to NYU

Ithaca, USA

2018 – 2019

### B.Sc. in Computer Science, Higher School of Economics

Computer Science department; supervisor: Professor [Dmitry Vetrov](#)

Cumulative GPA: 9.1 (10.0 scale), class rank: top 3%

Moscow, Russia

2014 – 2018

## Work Experience

### Cold Spring Harbor Laboratory

Research Intern; supervisor: Prof. [Anthony Zador](#)

Research topics: meta-learning with compressed neural networks; data analysis of brain transcriptome and connectome data

Cold Spring Harbor, USA

June 2021 – Aug 2021

### Google DeepMind

Research Intern; supervisors: [Mehrdad Farajtabar](#), [Balaji Lakshminarayanan](#), [Razvan Pascanu](#)

Research topic: continual learning with deep generative models

(remotely) Mountain View, USA

June 2020 – Oct 2020

### École Polytechnique Fédérale de Lausanne (EPFL)

Machine Learning and Optimization Lab

Research Intern; supervisors: Prof. [Martin Jaggi](#), Prof. [Dan Alistarh](#)

Research topic: evolution strategies for low precision training of neural networks

[mlo.epfl.ch](http://mlo.epfl.ch), Lausanne, Switzerland

June 2018 – Aug 2018

### Bayesian Methods Research Group

Research Assistant; supervisor: Prof. Dmitry Vetrov

Research topic: structured sparsification of Bayesian neural networks

[bayesgroup.ru](http://bayesgroup.ru), Moscow, Russia

Sep 2016 – Aug 2018

### Google

Software Engineering Intern, Google Cloud Platform Team

Seattle, USA

July 2017 – Sep 2017

### Google

STEP Software Engineering Intern, Piper Team (Google's version control system)

Munich, Germany

July 2016 – Sep 2016

## Publications

\* Equal Contribution

### Task-agnostic Continual Learning with Hybrid Probabilistic Models

[[arXiv](#), [poster](#)]

**Polina Kirichenko**, Mehrdad Farajtabar, Dushyant Rao, Balaji Lakshminarayanan, Nir Levine, Ang Li, Huiyi Hu, Andrew Gordon Wilson, Razvan Pascanu

*ICML Workshop on Invertible Neural Networks and Normalizing Flows (spotlight talk) 2021*

### Does Knowledge Distillation Really Work?

[[arXiv](#)]

Samuel Stanton, Pavel Izmailov, **Polina Kirichenko**, Alexander A. Alemi, Andrew G. Wilson

### Why Normalizing Flows Fail to Detect Out-of-Distribution Data

[[arXiv](#), [code](#)]

**Polina Kirichenko**\*, Pavel Izmailov\*, Andrew G. Wilson

First presented at *Workshop on Invertible Neural Networks and Normalizing Flows at ICML 2020*

*Neural Information Processing Systems (NeurIPS) 2020*

## Semi-Supervised Learning with Normalizing Flows

[[arXiv](#), [poster](#), [code](#)]

Pavel Izmailov\*, **Polina Kirichenko\***, Marc Finzi\*, Andrew G. Wilson

First presented at *Workshop on Invertible Neural Networks and Normalizing Flows at ICML 2019*  
*International Conference on Machine Learning (ICML) 2020*

## Subspace Inference for Bayesian Deep Learning

[[arXiv](#), [poster](#), [slides](#), [code](#)]

Pavel Izmailov\*, Wesley Maddox\*, **Polina Kirichenko\***, Timur Garipov\*, Dmitry Vetrov, Andrew G. Wilson

First presented at *Workshop on Uncertainty & Robustness in Deep Learning at ICML 2019* (contributed talk)  
*Uncertainty in Artificial Intelligence (UAI) 2019*

## SWALP: Stochastic Weight Averaging in Low Precision Training

[[PMLR](#), [code](#)]

Guandao Yang, Tianyi Zhang, **Polina Kirichenko**, Junwen Bai, Andrew G. Wilson, Christopher De Sa

*International Conference on Machine Learning (ICML) 2019*

## Workshop Papers

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### Effective Surrogate Models for Protein Design with Bayesian Optimization

[[workshop pdf](#)]

Nate Gruver, Samuel Stanton, **Polina Kirichenko**, Marc Finzi, Phillip Maffettone, Vivek Myers, Emily Delaney, Peyton Greenside, Andrew Gordon Wilson

*ICML Workshop on Computational Biology 2021*

### Invertible Convolutional Networks

[[workshop pdf](#), [poster](#)]

Marc Finzi\*, Pavel Izmailov\*, Wesley Maddox\*, **Polina Kirichenko\***, Andrew G. Wilson

*Workshop on Invertible Neural Nets and Normalizing Flows at ICML 2019* (spotlight talk)

## Research Projects

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Evolution strategies for training low precision neural networks

2018

Polina Kirichenko, Sebastian Stich, Martin Jaggi, Dan Alistarh

Leveraged lower memory consumption of low-precision networks to increase population sizes in evolution strategies which leads to more efficient gradient-free training.

Bayesian regularization of deep neural networks with weight normalization

2018

Polina Kirichenko, Alexander Fritsler, Ekaterina Lobacheva, Dmitry Vetrov

[[report](#)]

Studied the effect of applying noise to direction and magnitude of weight vectors of neurons in deep networks to achieve regularization and structural sparsity.

Vanishing and exploding gradients in recurrent neural networks

2017

Polina Kirichenko, Ekaterina Lobacheva, Dmitry Vetrov

[[report](#)]

Studied constraints on weight matrices of recurrent layers that improve training stability and alleviate vanishing and exploding gradients in RNNs.

## Awards

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DeepMind Fellowship

2019

New York University Center for Data Science Graduate Fellowship

2019

Golden HSE Award (Alumni Success category)

[[link](#)], 2019

HSE Alumni Academic Fellowship

[[link](#)], 2019

NeurIPS Travel Award

2019

ICML Travel Award

2019

Cornell Operations Research and Information Engineering Graduate Fellowship

2018

Travel Grant for Women in Data Science Conference

[[link](#)], 2018, 2019

Ilya Segalovich Scholarship (Yandex)

[[link](#)], 2016, 2017

Google Anita Borg Memorial Scholarship (Women Techmakers Scholarship)

[[link](#)], 2015

Google Travel Grant for the Grace Hopper Celebration of Women in Computing

2015

## Talks

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“Applications of normalizing flow”, **keynote talk** at ICML Workshop on Finance Applications [\[video\]](#), 2021  
“Task-agnostic Continual Learning with Hybrid Probabilistic Models”, ICML INN+ 2021 [\[video\]](#), 2021  
“Continual Learning in Neural Networks” [in Russian], Bayesian Methods Research Group seminar [\[video\]](#), 2021  
“Understanding Semantic Anomaly Detection with Generative Networks”, ML Collective 2021 [\[slides\]](#), 2021  
“Anomaly detection via Generative Models”, ODS DafaFest 2020, Uncertainty in ML Workshop [\[video\]](#), 2020  
“Normalizing flows for anomaly detection”, CogSys Talks, Technical University of Denmark [\[video\]](#), 2020  
“Normalizing flows for anomaly detection”, Capital One, Machine Learning seminar 2020  
“Why Normalizing Flows Fail to Detect Out-of-Distribution Data”, NeurIPS 2020 [\[video\]](#), 2020  
“Why Normalizing Flows Fail to Detect Out-of-Distribution Data”, INN+ workshop at ICML [\[video\]](#), 2020  
“Uncertainty Estimation in Bayesian Deep Learning”, WiML Un-Workshop at ICML 2020  
“Scalable Bayesian Inference in Low-Dimensional Subspaces”, Higher School of Economics [\[video\]](#), 2019  
“How do we build neural networks we can trust?”, Broad Institute of MIT and Harvard [\[video\]](#), 2019  
“Subspace Inference”, Uncertainty & Robustness in Deep Learning workshop at ICML [\[video\]](#), 2019

## Reviewing

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Conferences: NeurIPS 2019 (top 400 highest-scoring reviewers), ICLR 2020, ICML 2020 (top 33% reviewer), UAI 2020, NeurIPS 2020, AISTATS 2021  
Workshops: NeurIPS 2019 WiML, NeurIPS 2019 BDL, ICML 2020 UDL, NeurIPS 2020 HAMLETS, ICML 2021 INN+, ICML 2021 UDL

## Technical Skills

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Languages: Python, C++  
Neural network libraries: PyTorch, TensorFlow, Keras, Theano, Lasagne

## Teaching

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Cornell University Ithaca, USA  
Teaching Assistant for “Data Science for All” course Jan 2019 – May 2019  
Bayesian Methods for Machine Learning on Coursera [\[course link\]](#), Moscow, Russia  
Teaching Assistant; helped prepare assignments and quizzes Sep 2017 – Aug 2018  
The specialization of the course received Coursera [Outstanding Educator Award](#)  
National Research University Higher School of Economics Moscow, Russia  
Teaching Assistant for “Probability Theory and Statistics” (Sep 2016 – June 2017),  
“Introduction to Data Analysis” (Jan 2016 – June 2016), “Introduction to Programming” (Sep 2015 – Dec 2015)

## Summer Schools

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Machine Learning Summer School (London, UK) 2019  
Deep Learning & Reinforcement Learning Summer School (Edmonton, Canada) 2019