

# Arsenii Ashukha

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I'm a Research Scientist at Samsung AI Center Moscow. I (almost) received a PhD in Machine Learning. The results of my PhD were published at ICLR / ICML / NeurIPS and contributed to sparsification, uncertainty estimation, ensembling, computer vision, and fundamentals of Bayesian deep learning. Prior to that, I was a part of Yandex Research in collaboration with University of Amsterdam, where I worked on Bayesian deep learning with Dmitry Vetrov and Max Welling. I did ML engineering internships at Yandex (deep learning for music), Rambler (recommendation systems), and worked on NLP at Research Computing Center MSU with Natalia Loukachevitch.

## EDUCATION

- **PhD in Machine Learning (2017-2021), National Research University Higher School of Economics**
  - **PhD Thesis:** Prior Knowledge for Deep Learning
  - **Advisor:** [Dmitry Vetrov](#)
- **MSc in Computer Science (2015-2017), Moscow Institute of Physics and Technology (with distinction)**
- **BSc in Computer Science (2011-2015), Bauman Moscow State Technical University**

## PROFESSIONAL EXPERIENCE

- **Research Scientist, Samsung AI Center Moscow (2018 - Now):**

I'm working on the development of deep learning algorithms. Specifically, my work is focused on uncertainty estimation, robustness, and fundamentals of Bayesian deep learning. I also contributed to computer vision research e.g., image inpainting.
- **Research Scientist, Yandex.Research & University of Amsterdam (2016 - 2018):**

Created *sparse variational dropout*, a method for sparsification of DNNs that, for the first time, allowed to achieve over 250x compression ratio (results published at ICML'17). The modified version of SparseVD with neuron-level sparsity allowed to accelerate inference of a CNN by 2-5 times and was involved in acceleration of the feature extraction for real image retrieval system (published at NeurIPS).
- **Machine Learning Engineer Intern, Yandex.Music (summer of 2016):**

I worked on feature extraction techniques for music data with convolutional neural networks. I also developed an evaluation of learned representations. The representations were used in the content-based recommendation system for yandex music.
- **Machine Learning Engineer Intern, Rambler&Co (May - Oct 2015):**

Worked on recommendation systems. My responsibility included improving the quality and performance of automatic feature extraction algorithms, and recommendation algorithms. The project was heavily based on MapReduce.

## PUBLICATIONS

Google Scholar: [scholar.google.com/citations?user=IU-kuP8AAAAJ](https://scholar.google.com/citations?user=IU-kuP8AAAAJ)

\* denotes joint first co-authorship

- **Resolution-robust Large Mask Inpainting with Fourier Convolutions**, arXiv 2021 [arXiv]  
Roman Suvorov, Elizaveta Logacheva, Anton Mashikhin, Anastasia Remizova, **Arsenii Ashukha**, Aleksei Silvestrov, Naejin Kong, Harshith Goka, Kiwoong Park, Victor Lempitsky
- **Pitfalls of In-Domain Uncertainty Estimation and Ensembling in Deep Learning**, ICLR 2020 [arXiv]  
**Arsenii Ashukha**\*, Alexander Lyzhov\*, Dmitry Molchanov\*, Dmitry Vetrov
- **Greedy Policy Search: A Simple Baseline for Learnable Test-Time Augmentation**, UAI 2020 [arXiv]  
Dmitry Molchanov\*, Alexander Lyzhov\*, Yuliya Molchanova\*, **Arsenii Ashukha**\*, Dmitry Vetrov
- **The Deep Weight Prior**, ICLR 2019 [arXiv]  
Andrei Atanov\*, **Arsenii Ashukha**\*, Kirill Struminsky, Dmitry Vetrov, Max Welling
- **Variance Networks: When Expectation Does Not Meet Your Expectations**, ICLR 2019 [arXiv]  
Kirill Neklyudov\*, Dmitry Molchanov\*, **Arsenii Ashukha**\*, Dmitry Vetrov
- **Structured Bayesian Pruning via Log-Normal Multiplicative Noise**, NeurIPS 2017 [arXiv]  
Kirill Neklyudov, Dmitry Molchanov, **Arsenii Ashukha**, Dmitry Vetrov
- **Variational Dropout Sparsifies Deep Neural Networks**, ICML 2017 [arXiv]  
Dmitry Molchanov\*, **Arsenii Ashukha**\*, Dmitry Vetrov

## CODE

- Simple MVP implementations of ML algorithms:
  - [Real NVP normalizing flows](#)
  - [Quantile Regression DQN \(Distributional RL\)](#)
- Research-ready implementations:
  - [Multi-GPU SimCLRv1](#) closely reproduced results on both CIFAR-10 and ImageNet
  - [Ensembles \(Deep ensembles, Snapshot ensembles, cSGLD, FGE, etc.\)](#)

## FRAMEWORKS & PROGRAMMING LANGUAGES

- I'm fluent in Python and I use to code in C/C++, Go, language is not a problem after all.
- I'm also fluent with common data science tools such as numpy, matplotlib, scikit-learn, pandas.
- I'm comfortable with the common data science environment e.g., bash, git, linux.
- My primary deep learning framework is PyTorch. Prior to that, I had a decent experience with Theano+Lagange and TensorFlow.
- Comfortable with GPU clusters and distributed training.
- I have experience with MapReduce, Hadoop, Hive, and Spark.

## REVIEWING

- Conferences:
  - International Conference on Machine Learning, ICML (2019, 2020 top-33% highest-scored reviewers)
  - Neural Information Processing Systems, NeurIPS 2019 (top-50% highest-scored reviewers)
  - International Conference on Learning Representations, ICLR (2020, 2021)

- Workshops:
  - ICML Workshop on Invertible Neural Networks (2019, 2021, [invertibleworkshop.github.io](https://invertibleworkshop.github.io))
  - Bayesian Deep Learning Workshop (since 2017, [bayesiandeeplearning.org](https://bayesiandeeplearning.org))

## TEACHING

- Supervisor of reading clubs on machine learning at HSE and Yandex school of data analysis (since 2017)
- A talk & a practical session on NFs at **Deep | Bayes** Summer School on Bayesian Deep Learning (since 2017)
- Lecturer, Moscow Institute of Physics and Technology: I was a lecturer and manager of the deep learning brunch of a faculty-wide machine learning course ~60 students ([ml-mipt.github.io](https://ml-mipt.github.io)). Also, I taught deep learning and practical sessions on cutting-edge ML algorithms on a facultative course "Data Mining in Action" ~ 200 students ([bit.ly/3eRLGYp](https://bit.ly/3eRLGYp)). The goal of this course is to make ML education available for everyone for free.

## SUPERVISION

- Alexander Lyzhov (moved to NYU, PhD student), Deep Neural Network Ensembles: Analysis and Approaches to Diversification (MSc, 2020)
- Andrei Atanov (moved to EPFL, PhD student), Effective Learning of Deep Neural Networks Ensembles (BSc, 2018), Learning Deep Models with Small Data (MSc, 2020)
- Evgenii Nikishin (moved to Mila, PhD student), Stability Improvement and Knowledge Transfer in Deep Reinforcement Learning (MSc, 2019)