# Katrina Drozdov (Evtimova)

kevtimova.github.io | kve216@nyu.edu | kevtimova | d4xi2HIAAAAJ

## Summary

My research interests lie in self-supervised learning and multi-step generation with applications in learning representations and decoding images, videos, and other modalities.

I am actively seeking full-time applied research and MLE opportunities in industry starting in mid-2024.

## Education

**New York University** Sep 2018 - May 2024 (exp.)
*Ph.D. in Data Science. Advised by Yann LeCun.* New York, NY
Research Interests: Self-supervised Learning, Representation Learning, Latent Variable Models.

**New York University** Sep 2015 - May 2017
*M.Sc. in Data Science.* New York, NY
Coursework Highlights: Deep Learning, Inference & Representation, Natural Language Understanding.

**Harvard College** Sep 2009 - May 2013
*B.A. in Mathematics. Secondary concentration in Economics.* Cambridge, MA
Coursework Highlights: Math 55 (Honors Abstract Algebra & Honors Real and Complex Analysis).

## Work Experience

**Facebook** May 2020 - Aug 2020
*Research Intern, Facebook AI Research* New York, NY
Research Project: Using variance regularization to prevent collapse when training sparse image encoders.

**Facebook** May 2019 - Aug 2019
*Research Intern, Facebook AI Research* New York, NY
Research Project: Deep learning methods for learning hierarchical and sparse representations of images.

**eBay** Jul 2017 - Aug 2018
*Research Engineer, Merchandising Team* New York, NY
Developed scalable machine learning algorithms for item recommendations, deployed in production.

**New York University** Oct 2016 - Mar 2017
*Research Assistant, CILVR Lab* New York, NY
Implemented Markov Logic Networks for clinical data. In collaboration w/ Yacine Jernite and David Sontag.

**Comcast** Jun 2016 - Aug 2016
*Data Science Intern* New York, NY
Evaluated performance of TV programs, using Hive to aggregate and analyze user data.

**Columbia Business School** Jul 2013 - Jul 2015
*Research Associate, Finance and Economics Division* New York, NY
Collected and analyzed financial data such as mutual fund performance using Python.

## Publications

**Video Representation Learning with Joint Embedding Predictive Architectures**
**K. Drozdov**, R. Shwartz-Ziv, Y. LeCun. In Progress.
We develop a neural architecture that encodes object trajectories through self-supervised learning from video data. We incorporate variance regularization, which leads to improvements across multiple evaluation metrics.

**Variance-Covariance Regularization Improves Representation Learning**
Zhu, J., **Evtimova, K.**, Chen, Y., Shwartz-Ziv, R. and LeCun, Y. In submission, 2024.
We show that our regularization framework which encourages data representations to have high variance and low covariance enhances transfer learning in both the image and video domains.

**Sparse Coding with Multi-layer Decoders using Variance Regularization**
**K. Evtimova**, Y. LeCun. TMLR 2022.
ISTA is a classic algorithm for extracting sparse representations of data. We extend ISTA to work with deep neural networks, applying variance regularization to avoid collapse. Sparse image representations extracted with our method boost one-shot learning performance.

## Publications (continued)

**Emergent Communication in a Multi-Modal, Multi-Step Referential Game**
**K. Evtimova**, A. Drozdov, D. Kiela, K. Cho. ICLR 2018.
We use reinforcement learning to train a multi-agent neural network architecture where agents cooperate to predict the class of an input image. The architecture is adaptive, using more computation for complex images.

## Teaching

**Teaching Assistant**, New York University — Spring 2020
Introduction to Machine Learning taught by Kyunghyun Cho at the Courant Institute.

**Teaching Assistant**, New York University — Spring 2019
Deep Learning taught by Yann LeCun at the Center for Data Science.

**Teaching Assistant**, Harvard College — Fall 2011
Linear Algebra and Applications taught by Vaibhav Gadre at the Math Department.

## Professional Service

**Conference Reviewing**: ICML '21, '22, '23; NeurIPS '21, '22; ICLR '22, '23, '24. AISTATS '24.

**Additional Reviewing**: WiML Workshop at NeurIPS '17, Energy-based Models Workshop at ICLR '21.

## Student Advising

**New York University**
O. Che. Independent study on non-linear sparse coding. — Fall 2020

## Awards & Distinctions

**Highlighted Reviewer**, International Conference on Learning Representations — Apr 2022

**Best Deep Learning Project Recipient (Jointly with A. Drozdov)** — Feb 2017
NYU Center for Data Science Award Ceremony. Award selected by Yann LeCun.
Project Title: Understanding Mutual Information and its Use in InfoGAN.

**Ena Blyth Scholarship**, Harvard College — Sep 2011 - May 2013
Selected as one of the two recipients of this annual award in the Math Department.

## Activities

**Organiser**, NYU AI School 2022 — Sep 2021 - Jan 2022

**President**, NYU Center for Data Science Leadership Circle — Sep 2018 - May 2019

## Skills & Interests

**Languages**: Bulgarian (fluent), Russian (intermediate).

**Personal Interests**: I enjoy singing and was a member of The Noteables, a Broadway show choir group at Harvard. Another creative outlet that I engage in is designing art installations (my mixed media piece "Junk Mail" was featured at the 4th Annual NYU World Tour Pop-Up Gallery). I also enjoy experimenting with baking. Outside of my creative pursuits, I practice yoga and am fond of outdoor activities such as hiking and cycling.