

# Katrina Drozdov (Evtimova)

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## SUMMARY

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My research focuses on self-supervised learning for extracting useful data representations, including regularization that prevents collapse during model pre-training. I am seeking full-time research opportunities in industry to advance AI through building robust and effective multi-modal generative systems and LLMs.

## EDUCATION

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**New York University** Sep 2018 - Sep 2024  
*Ph.D. in Data Science. Advised by Yann LeCun.*  
Thesis: "Representation Learning with Regularized Energy-Based Models".  
New York, NY

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

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

## WORK EXPERIENCE

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

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

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

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

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

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

## PUBLICATIONS

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### [Video Representation Learning with Joint-Embedding Predictive Architectures](#)

**K. Drozdov**, R. Schwartz-Ziv, Y. LeCun. Preprint, 2024.

We develop a neural architecture that encodes object dynamics 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., Schwartz-Ziv, R. and LeCun, Y. Preprint, 2023.

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)

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### 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.

## SELECTED INVITED TALKS

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“Towards Building Intelligent Systems”. Apple MLR, Oct 2024.

“Deep Leaning”. Leif Weatherby’s course “Theory of the Digital”, Jan 2023.

“Self-supervised Learning & Sparse Overcomplete Representations of Visual Data”. CILVR at NYU, Jan 2020.

## MEDIA MENTIONS

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### “From Academia to Industry: How a 2018 Paper Foreshadowed OpenAI’s Latest Innovation”

Medium, Oct 2024. Discusses my research on emergent communication and its connection to OpenAI’s o1 model.

## TEACHING

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**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

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

**Additional Reviewing**: WiML Workshop at NeurIPS '17, TMLR.

## STUDENT ADVISING

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

## AWARDS & DISTINCTIONS

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**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

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

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

## SKILLS & INTERESTS

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

**Personal Interests**: I enjoy singing and was a member of The Noteables, a Broadway show choir at Harvard. I also experiment with art and baking. My mixed media piece “Junk Mail” was featured at NYU’s 4th Annual World Tour Pop-Up Gallery. Outside of my creative pursuits, I practice yoga and enjoy outdoor activities such as hiking and cycling.