Yilun Kuang

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Research Interests

Large Language Models, Self-Supervised Representation Learning, Multimodal Learning, Probabilistic Generative Models, AI for Science, Generalization Theory, Distribution Shift

Education

2023–present **Ph.D. in Data Science, New York University**, USA.
- Research Focus: Large Language Models, Self-Supervised Learning, AI for Science
- Advisor: Andrew Gordon Wilson
- Affiliation: CDS, CILVR

2020–2023 : **B.A. in Mathematics with High Honors, Courant Institute, New York University**, USA.
- Latin Honors: Magna Cum Laude; Minor in Computer Science

Publications

Conference Papers

2023 **Non-Vacuous Generalization Bounds for Large Language Models**.
Sanae Lotfi*, Marc Finzi*, **Yilun Kuang***, Tim G. J. Rudner, Micah Goldblum, Andrew Gordon Wilson.
Under Review

2023 **Learning Efficient Coding of Natural Images with Maximum Manifold Capacity Representations**.
Thomas Yerxa, **Yilun Kuang**, Eero Simoncelli, SueYeon Chung.
Neural Information Processing Systems (NeurIPS), 2023

Workshop Papers

2023 **Unsupervised Learning on Spontaneous Retinal Activity Leads to Efficient Neural Representation Geometry**.
Andrew Ligeralde, **Yilun Kuang**, Thomas Edward Yerxa, Miah N Pitcher, Marla Feller, SueYeon Chung.
NeurIPS 2023 Workshop: UniReps: Unifying Representations in Neural Models

2023 **Non-Vacuous Generalization Bounds for Large Language Models**.
Sanae Lotfi*, Marc Finzi*, **Yilun Kuang***, Tim G. J. Rudner, Micah Goldblum, Andrew Gordon Wilson.
NeurIPS 2023 Workshop: Self-Supervised Learning - Theory and Practice

Poster

2023 **Learning a Visual Representation by Maximizing Manifold Capacity**.
Thomas Yerxa, **Yilun Kuang**, Eero Simoncelli, SueYeon Chung.
Computational and Systems Neuroscience (COSYNE)

Work Experience

June – Sep 2022 **Research Intern at Flatiron Institute, Simons Foundation**.
- Mentor: SueYeon Chung
- Develop a state-of-the-art self-supervised learning algorithm for vision.
- 1 publication in NeurIPS and 1 poster presentation in COSYNE.

Jan 2023 **Open Source Contributor at MosaicML**.
- Implement a distributed training pipeline for efficient deep neural network training. Open source contribution available in the Composer Library documentation.

Fellowships & Awards

2023 – 2028 **Center for Data Science Fellowship**.
- Awarded the NYU Center for Data Science Fellowship for five years and the Data Science Supplementary Fellowship Grant

Oct 2023 **Member of the New York Academy of Sciences**.

May 2023 **Nicholas and Andrea Ferrara Research Scholar, Dean's List (2020-2022), DURF Grant Recipient, Best Presenter at NYU Undergraduate Research Conference**.

May 2023 **Meritorious Winner in 2021 Mathematical Contest in Modeling (MCM) (Top 7%)**.

Teaching Assistantship

Fall 2023 **Section Leader & Grader**, DS-GA 1011: Natural Language Processing with Representation Learning, New York University.

Spring 2022 **Grader**, DS-GA 1012: Natural Language Understanding and Computational Semantics, New York University.

Summer School

Summer 2020 **Neuromatch Academy in Computational Neuroscience**, Virtual.

Summer 2020 **Summer Session in Mathematics**, Harvey Mudd College, CA.

Project Report

Dec 2022 **A Survey of Double Descent in High-Dimensional Linear Regression**, [Link].

May 2022 **A Survey of Lazy and Feature Learning Regimes**, [Link].

May 2021 **Scale-Invariant Finetuning for Improved Generalization** , [Link].

Position of Responsibility

Workshop **Reviewer**, NeurIPS 2023 Workshop: Self-Supervised Learning - Theory and Practice.

Computer skills

Programming Languages	Python, C++, C, Java, Matlab, Julia, SQL, Bash, Vim, LaTex
Machine Learning	PyTorch, TensorFlow, Hugging Face, Scikit-Learn, GPyTorch, NumPy, Pandas
Cloud Services/Other	AWS, GCP, Docker, Kubernetes, Vim, Git, MicroService, CUDA, OpenMP, MPI