

Research Interests

Large Language Models, Diffusion Models, Self-Supervised Learning, Vision-Language Models, Probabilistic Generative Models, AI for Science, Generalization Theory, Numerical Methods

Education

2023–present **Ph.D. in Data Science, New York University, USA.**

- Research Focus: Large Language Models, Diffusion Models, AI for Science, SSL
- 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 with Minor in Computer Science; 8 PhD-Level Courses in ML

Publications

Conference Papers

2024 **Token-Level Generalization Bounds for Large Language Models.**

Sanae Lotfi*, **Yilun Kuang*** (equal contribution), Marc Finzi*, Brandon Amos, Micah Goldblum, Andrew Gordon Wilson.

Under Review

2023 **Non-Vacuous Generalization Bounds for Large Language Models.**

Sanae Lotfi*, Marc Finzi*, **Yilun Kuang*** (equal contribution), Tim G. J. Rudner, Micah Goldblum, Andrew Gordon Wilson.

International Conference on Machine Learning (ICML), 2024

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*** (equal contribution), Thomas Edward Yerxa, Miah N Pitcher, Marla Feller, SueYeon Chung.

NeurIPS 2023 Workshop: Unifying Representations in Neural Models (UniReps)

2023 **Non-Vacuous Generalization Bounds for Large Language Models.**

Sanae Lotfi*, Marc Finzi*, **Yilun Kuang*** (equal contribution), Tim G. J. Rudner, Micah Goldblum, Andrew Gordon Wilson.

NeurIPS 2023 Workshop: Self-Supervised Learning & Mathematics of Modern Machine Learning (M3L)

Poster

2023 **Learning a Visual Representation by Maximizing Manifold Capacity.**

Thomas Yerxa, **Yilun Kuang**, Eero Simoncelli, SueYeon Chung.

Computational and Systems Neuroscience (COSYNE), 2023

Work Experience

- June – Sep 2022 **Research Intern at Flatiron Institute, Simons Foundation.**
- o Mentor: [SueYeon Chung](#)
 - o Develop a state-of-the-art self-supervised learning algorithm for vision.
 - o 1 publication in NeurIPS and 1 poster presentation in COSYNE.
- Jan 2023 **Open Source Contributor at MosaicML.**
- o 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.**
- o Awarded the NYU Center for Data Science Fellowship for five years and the Data Science Supplementary Fellowship Grant
- May 2023 **Nicholas and Andrea Ferrara Research Scholar, Dean's List (2020-2022), DURE Grant Recipient, Best Presenter at NYU Undergraduate Research Conference.**
- May 2023 **Meritorious Winner in 2021 Mathematical Contest in Modeling (MCM) (Top 7%).**

Teaching Assistantship

- Spring 2024 **Grader, DS-GA 1003: Machine Learning, New York University.**
- 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, Jax, Hugging Face, TensorFlow, Scikit-Learn, GPyTorch, NumPy, Pandas
- Cloud Services/Other AWS, GCP, Docker, Kubernetes, Vim, Git, MicroService, CUDA, OpenMP, MPI