

## Research Interests

Self-Supervised Learning, Control and Planning, Vision-Language Models, NeuroAI, ML Systems

## Education

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

○ Research Focus: Self-Supervised Learning, Control and Planning

○ 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

## Publications

### Conference Papers

- 2025 **Customizing the Inductive Biases of Softmax Attention using Structured Matrices.**  
**Yilun Kuang**, Noah Amsel, Sanae Lotfi, Shikai Qiu, Andres Potapczynski, Andrew Gordon Wilson.  
International Conference on Machine Learning (ICML), 2025
- 2024 **Bayesian Optimization of Antibodies Informed by a Generative Model of Evolving Sequences.**  
Alan Nawzad Amin, Nate Gruver\*, **Yilun Kuang\*** (equal contribution), Yucen Lily Li\*, Hunter Elliott, Aniruddh Raghu, Calvin McCarter, Peyton Greenside, Andrew Gordon Wilson.  
International Conference on Learning Representations (ICLR), 2025, **Spotlight**
- 2024 **Unlocking Tokens as Data Points for Generalization Bounds on Larger Language Models.**  
Sanae Lotfi\*, **Yilun Kuang\*** (equal contribution), Brandon Amos, Micah Goldblum, Marc Finzi, Andrew Gordon Wilson.  
Neural Information Processing Systems (NeurIPS), 2024, **Spotlight**
- 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

- 2024 **Bayesian Optimization of Antibodies Informed by a Generative Model of Evolving Sequences.**  
Alan Nawzad Amin, Nate Gruver\*, **Yilun Kuang\*** (equal contribution), Yucen Lily Li\*, Hunter Elliott, Aniruddh Raghu, Calvin McCarter, Peyton Greenside, Andrew Gordon Wilson.  
NeurIPS 2024 Workshop: AI for New Drug Modalities, **Spotlight**
- 2024 **Unlocking Tokens as Data Points for Generalization Bounds on Larger Language Models.**  
Sanae Lotfi\*, **Yilun Kuang\*** (equal contribution), Brandon Amos, Micah Goldblum, Marc Finzi, Andrew Gordon Wilson.  
ICML 2024 Workshop: Theoretical Foundations of Foundation Models, **Best Paper Award**

- 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), 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 2024 **Grader**, CSCI-GA 2565: Machine Learning, New York University.
- 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

Conference **Reviewer**, NeurIPS 2024/2025, ICML 2025, ICLR 2025, AISTATS 2025.

Workshop **Reviewer**, NeurIPS 2023 Workshop: Self-Supervised Learning - Theory and Practice, ICML 2024 Workshop: Theoretical Foundations of Foundation Models (TF2M), NeurIPS 2024 Workshop: Adaptive Foundation Models: Evolving AI for Personalized and Efficient Learning (AFM).

## Media Coverage

June 2024 **Do Large Language Models Really Generalize? This Paper Says Yes** , NYU Center for Data Science.

## 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