Raghav Singhal

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Education

New York University, PhD Candidate in Computer Science — August 2019 – May 2025

- **Advisers:** Rajesh Ranganath, Sumit Chopra
- **Research Topics:** Diffusion models, Generative modeling, ML for healthcare

New York University, BA/MS in Mathematics — August 2012 – May 2018

- **Thesis Advisers:** Joan Bruna, Carlos Fernandez-Granda
- **Research Topics:** Optimization, stochastic processes

Work and Research Experience

Machine Learning Research Intern, RadAI – San Francisco — June 2022 - August 2022

- Built a retrieval-based language model for abstractive summarization with zero-shot and personalized-style generation capabilities. Decreased on-boarding time for new radiologists with zero-shot capabilities.

Researcher, NYU Langone – New York City — June 2021 – Present

- MR scanning in clinical settings generally has several correlated data available such as prior scans, simultaneously collected scans, etc. We show that building diffusion-based reconstruction models that use such extra side-information can accelerate scan times by $8\times$ while maintaining fidelity.
- Showed that MR screenings can be accelerated by a factor of 10 by directly predicting the presence/absence of a disease from under-sampled MR data, without requiring image reconstruction.

Teaching Assistant, New York University – New York City — August 2020 – Dec 2023

- Taught diffusion models for Yann LeCun's deep learning course (2022)
- TA for ML for health (2021), Machine learning (2022), Machine Learning (2023)

Machine Learning Research Scientist, Autonomous Therapeutics – New York City — July 2018 - February 2019

- Built a feedback control system for a Bio-Reactor for automating in vitro experiments for highly virulent viruses to monitor resistance to drugs
- Developed a scientific discovery platform for identifying mutations to build therapeutics interfering particles

Student Researcher, NYU Courant – New York City — May 2015 - September 2017

- Proved exit time laws for jump processes, with applications to hyperbolic PDEs
- Developed martingale-based proofs for phase transitions in random graphs

Publications and Preprints

Raghav Singhal, Mark Goldstein, Rajesh Ranganath. **What's the score? Automated Denoising Score Matching for Nonlinear Diffusions**. ICML 2024

Chen-YU Yen, Raghav Singhal, Umang Sharma, Rajesh Ranganath, Sumit Chopra, Lerrel Pinto. **Adaptive Sampling of k-Space in Magnetic Resonance for Rapid Pathology Prediction** . ICML 2024

Raghav Singhal, Mark Goldstein, Rajesh Ranganath. **Where to diffuse, how to diffuse, and how to get back: Automated learning for multivariate diffusions** . ICLR 2023

Raghav Singhal, Mukund Sudarshan, Hersh Chandarana, Daniel K. Sodickson, Rajesh Ranganath, Sumit Chopra. **On the feasibility of machine learning augmented magnetic resonance for point-of-care identification of disease** . ArXiv 2023

Raghav Singhal, Mukund Sudarshan, Luke Ginocchio, Angela Tong, Hersh Chandarana, Daniel Sodickson, Rajesh Ranganath, Sumit Chopra. **Accelerated MR screenings with direct k-space classification** . ISMRM 2022

Raghav Singhal, Xintian Han, Saad Lahlou, Rajesh Ranganath. **Kernelized complete conditional Stein discrepancy** . Arxiv 2020

Skills and Awards

- **Languages:** Python, PyTorch, Tensorflow, C++
- **Awards:** MacCracken Fellowship, BA/MS Scholarship, SURE scholarship