Kushagra **Pandey**

Irvine, California, 92617

pandeyk1@uci.edu | kpandey008.github.io | kpandey008 | kushagra-pandey-008 | GScholar

Education

University of California, Irvine — *Irvine, California*
PhD in Computer Science | 3.98/4.0 — *Sep. 2022 - May, 2027 (Expected)*

Indian Institute of Technology (IIT), Kanpur — *Kanpur, India*
Masters in Computer Science and Engineering | 10.0 / 10.0 — *Sept. 2020 - May. 2022*

Indian Institute of Technology (IIT), Bhubaneswar — *Bhubaneswar, India*
Bachelors in Electrical Engineering | 8.87 / 10.0 — *July. 2012 - May. 2016*

Research Publications

Heavy-Tailed Diffusion Models
Kushagra Pandey, Jaideep Pathak, Yilun Xu, Stephan Mandt, Mike Pritchard, Arash Vahdat, Morteza Mardani
Preprint. Under Review
https://arxiv.org/abs/2410.14171

Fast Samplers for Inverse Problems in Iterative Refinement Models
Kushagra Pandey*, Ruihan Yang*, Stephan Mandt
NeurIPS'24
https://arxiv.org/abs/2405.17673

On the Challenges and Opportunities in Generative AI
Laura Manduchi*, Kushagra Pandey*, et al.
Preprint. Under Review
https://arxiv.org/abs/2403.00025

Efficient Integrators for Diffusion Generative Models
Kushagra Pandey, Maja Rudolph, Stephan Mandt
International Conference on Learning Representations
https://openreview.net/forum?id=qA4foxO5Gf

Towards Fast Stochastic Sampling in Diffusion Generative Models
Kushagra Pandey, Maja Rudolph, Stephan Mandt
NeurIPS 2023 Workshop on Diffusion Models
https://arxiv.org/abs/2402.07211

A Complete Recipe for Diffusion Generative Models
Kushagra Pandey, Stephan Mandt
International Conference on Computer Vision (ICCV'23),
Oral Presentation (1.6% acceptance rate)
https://arxiv.org/abs/2303.01748

DiffuseVAE: Efficient, Controllable and High-Fidelity Generation from Low-Dimensional Latents
Kushagra Pandey, Avideep Mukherjee, Piyush Rai, Abhishek Kumar
Transactions on Machine Learning Research
https://arxiv.org/abs/2201.00308

Inference of cell state transitions and cell fate plasticity from single-cell with MARGARET
Kushagra Pandey, Hamim Zafar
Nucleic Acids Research (IF: 16.6)
https://academic.oup.com/nar/article/50/15/e86/6593121

VAEs meet Diffusion Models: Efficient and High-Fidelity Generation
Kushagra Pandey, Avideep Mukherjee, Piyush Rai, Abhishek Kumar
NeurIPS 2021 Workshop on Deep Generative Models and Downstream Applications
Oral Presentation (Top 5 of accepted papers)
https://openreview.net/forum?id=-J8dM4ed_92

Broad Research Interests

Deep Generative Models and their applications, Unsupervised Representation Learning.

Research Experience

PhD Student — *UC Irvine*
Graduate Student Researcher | Supervisor: Prof. Stephan Mandt — *Sep 2022 - Present*
- Exploring theoretical and practical aspects of continuous-time score-based generative models and related families.

Efficient, Controllable and High-Fidelity Generation from Low-Dimensional Latents — *IIT Kanpur*
Masters Thesis | Supervisor: Prof. Piyush Rai — *Jul 2021 - May 2022*
- Worked on improving the sample quality of VAE's by hybrid generative modelling approaches for image synthesis.
- Worked on understanding the fundamental problems underlying the poor reconstruction quality of non-hierarchical or standard VAE's in general.

Elucidating cellular dynamics using Unsupervised Representation Learning in single-cell RNA-seq data — *IIT Kanpur*
Research Assistant | Supervisor: Prof. Hamim Zafar — *Dec 2020 - May 2022*
- Working on developing Deep Latent Variable Models for multi-omic data integration
- Developed MARGARET: a deep unsupervised metric learning-based algorithm for trajectory inference in fundamental biological processes like cell differentiation using single-cell RNA-seq data.

Industry Experience

Heavy-Tailed Diffusion Models — *NVIDIA Research*
Research Intern | Supervisor(s): Mike Pritchard, Morteza Mardani, Arash Vahdat — *Jun 2024 - Sep 2024*
- Worked on designing diffusion/flow matching models for modeling extreme weather events.

Efficient Samplers for Diffusion Generative Models — *Bosch AI Research*
Research Intern | Supervisor: Maja Rudolph — *Jun 2023 - Sep 2023*
- Worked on improving the sampling efficiency of diffusion models by developing efficient frameworks amenable to numerical integration for diffusion model sampling.

Lexent Bio Inc. (Now acquired by Foundation Medicine) — *Hyderabad, India*
Machine Learning Engineer — *Jun. 2018 - May. 2020*
- Co-developed a scalable platform to run data science pipelines for analysis of DNA sequencing data and extracting relevant features like Copy Number Aberration(CNA) and Methylation levels in cfDNA.
- Developed and maintained a data warehouse-like framework for integrating and storing clinical data from multiple data sources like Airtable and OpenClinica.

Technical Skills

Programming Python, LaTex
Frameworks PyTorch, PyTorch Lightning

Academic achievements

- HPI Fellowship Recipient at UCI.
- Received the Dean's Award at UCI for excellent research potential among incoming graduate students.
- Ranked 1st in a cohort of 100 students in the CSE department at IITK. Received the Academic Excellence Award for 2020-2021 and 2021-2022 for the same (Awarded to top 10% students).