

# Anshuk Uppal

AI Researcher | Deep Learning & Generative Models

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## Professional Summary

PhD candidate in Machine Learning with 6+ years of research experience in deep generative models, uncertainty quantification, and Bayesian inference. Proven track record of publishing at top-tier venues (NeurIPS, ICML) and delivering impactful research across academia and industry. Currently developing novel techniques in diffusion models and continuous normalizing flows with applications to computer vision and life sciences data.

## Education

### PhD in Computer Science

Technical University of Denmark

2021 - Present

Copenhagen, Denmark

- **Focus:** Uncertainty and Robustness in Deep Learning
- **Advisors:** Prof. Wouter Boomsma (DIKU), Prof. Jes Frellsen (DTU)
- **Funding:** Center for Basic Machine Learning Research in Life Sciences (MLLS)

### Master of Technology in Electronics & Communication

IIIT Bangalore

2020

India

- **CGPA:** 3.3/4.0
- **Thesis:** Multimodal Posterior Estimation using Natural Gradients

## Industry Experience

### Research Scientist Intern

Microsoft Research

June 2025 - September 2025

Reading, UK

- Developing novel generative models for images and video using diffusion models and continuous normalizing flows
- Collaborating with the Applied Sciences Group on cutting-edge computer vision applications

### Research Scientist Intern

Sony AI

June 2024 - October 2024

Tokyo, Japan

- Led research on disentanglement and controllable generation in novel non-linear Latent Diffusion Models.
- Investigated advanced generative models including GANs, continuous normalizing flows, and non-linear diffusion models
- **Output:** Manuscript under peer review with preprint available

### Visiting Research Scholar

New York University

October 2024 - March 2025

New York, USA

- Extended research collaboration with Prof. Rajesh Ranganath's group at CILVR
- Advanced research on modern generative models: Diffusion Models, Continuous Normalizing Flows, and Stochastic Interpolants
- **Output:** Manuscript in preparation.

### Research Scientist Intern

RIKEN-AIP

June 2019 - December 2019

Tokyo, Japan

- Scaled Natural Gradient Variational Inference for mixture of exponential family approximations
- Developed techniques for approximating Deep Neural Networks with Gaussian Processes

- Implemented Bayesian Neural Network pruning using learned posterior approximations

## Key Publications

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### **Implicit Variational Inference for High-Dimensional Posteriors** ([NeurIPS 2023 Spotlight](#))

*A. Uppal, K. Stensbo-Smidt, W. Boomsma & J. Frellsen*

Spotlight presentation at top-tier ML conference (acceptance rate <3%)

### **Bounded Implicit Variational Inference** ([ICML 2022 Workshop](#))

*A. Uppal, W. Boomsma & J. Frellsen*

Presented at premier machine learning conference workshop

## Technical Skills

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**Programming** Python, C, BASH

**ML Frameworks** PyTorch, JAX, Pyro, NumPyro

**Specializations** Deep Generative Models (Diffusion Models, VAEs, GANs, Normalizing Flows)  
Bayesian Deep Learning & Uncertainty Quantification  
Natural Gradients & Higher-Order Optimization  
Computer Vision & Video Generation

## Awards & Grants

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- **Otto Mørnsted's Travel Grant** - NeurIPS 2023
- **Otto Mørnsted's External Visit Grant** - October 2024 to April 2025
- **Thomas B Thriges External Visit Grant** - October 2024 to April 2025
- **William DeMant External Visit Grant** - October 2025 to April 2025

## Teaching & Mentoring

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### **Teaching Assistant** | *Technical University of Denmark*

- Deep Learning (02456) - Fall 2022, Fall 2023
- Deep Learning for Industry (Special Course) - December 2021

### **Organizer** | *Generative Modelling Summer School* | Copenhagen 2023

Teaching support and event organization for international summer school

## Research Interests

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- **Deep Generative Modeling:** Diffusion models, continuous normalizing flows, stochastic interpolants
- **Uncertainty Quantification:** Bayesian neural networks, variational inference, robustness
- **Optimization:** Natural gradients, higher-order methods, gradient estimation
- **Applications:** Computer vision, music generation, life sciences