

SHREYAS PADHY

PhD Candidate | Machine Learning Group | University of Cambridge
(sp2058@cam.ac.uk) | (shreyaspadhy.github.io)

EDUCATION

University of Cambridge

October 2021 - present

PhD in Engineering

Supervised by Dr. José Miguel Hernández-Lobato

Johns Hopkins University

August 2017 - May 2019

MSE in Biomedical Engineering

Overall GPA: 4.0/4.0

Indian Institute of Technology Delhi




July 2013 - May 2017

B.Tech in Engineering Physics




Overall GPA: 8.871/10 (Department Rank 4)

PUBLICATIONS

CONFERENCES

- **Sampling from Gaussian Process Posteriors using Stochastic Gradient Descent**
Shreyas Padhy*, Jihao Andreas Lin*, Javier Antoran*, David Janz, José Miguel Hernández-Lobato, Alexander Terenin. (*NeurIPS 2023 (Oral)*) [arXiv](#)
- **Sampling-based inference for large linear models, with application to linearised Laplace.**
Shreyas Padhy*, Javier Antoran*, Riccardo Barbano, Eric Nalisnick, David Janz, and José Miguel Hernández-Lobato. (*ICLR 2023*). [arXiv](#) 
- **Simple & principled uncertainty estimation with deterministic deep learning via distance awareness.**
Jeremiah Zhe Liu, Zi Lin, Shreyas Padhy, Dustin Tran, Tania Bedrax-Weiss, and Balaji Lakshminarayanan. (*NeurIPS 2020*)  


JOURNALS

- **A Simple Approach to Improve Single-Model Deep Uncertainty via Distance-Awareness.**
Jeremiah Liu*, Shreyas Padhy*, Jie Ren*, Zi Lin, Yeming Wen, Ghassen Jerfel, Zack Nado, Jasper Snoek, Dustin Tran, and Balaji Lakshminarayanan. (*JMLR 2023*). [arXiv](#)
- **Using Deep Siamese Neural Networks for Detection of Brain Asymmetries Associated with Alzheimer's Disease and Mild Cognitive Impairment**
Chin-fu Liu*, Shreyas Padhy* et. al. *Magnetic resonance imaging 64 (2019): 190-199.*, 2019. [JMIR](#) 
- **Stochastic Solutions to Rough Surface Scattering using the finite element method**
Uday K. Khankhoje and Shreyas Padhy, *IEEE Transactions on Antennas and Propagation*  

WORKSHOPS

- **Learning Generative Models with Invariance to Symmetries.**
James Allingham, Javier Antoran, Shreyas Padhy, Eric Nalisnick, and José Miguel Hernández-Lobato. *NeurReps Workshop at NeurIPS 2022*.
- **A Simple Fix to Mahalanobis Distance for Improving Near-OOD Detection.**
Jie Ren, Stanislav Fort, Jeremiah Liu, Abhijit Guha Roy, Shreyas Padhy, and Balaji Lakshminarayanan. *ICML 2021 Workshop on Uncertainty and Robustness in Deep Learning*. 
- **Evaluating prediction-time batch normalization for robustness under covariate shift.**
Zachary Nado, Shreyas Padhy, D. Sculley, Alexander D'Amour, Balaji Lakshminarayanan, and Jasper Snoek. *ICML 2020 Workshop on Uncertainty and Robustness in Deep Learning*. 
- **Revisiting One-vs-All Classifiers for Predictive Uncertainty and OOD Detection in Neural Networks.**
Shreyas Padhy, Zachary Nado, Jie Ren, Jeremiah Liu, Jasper Snoek, and Balaji Lakshminarayanan. *ICML 2020 Workshop on Uncertainty and Robustness in Deep Learning*. 

* denotes equal contribution

- **Uncertainty Baselines: Benchmarks for Uncertainty & Robustness in Deep Learning.**
Zachary Nado et. al., *Bayesian Deep Learning Workshop, 2021*. [arXiv](#) 

PREPRINTS

- **Stochastic Gradient Descent for Gaussian Processes Done Right.**
Shreyas Padhy*, Jihao Andreas Lin*, Javier Antoran*, Austin Tripp, Alexander Terenin, Csaba Szepesvari, José Miguel Hernández-Lobato, David Janz. *Submitted to ICLR 2024*.
- **Transport Meets Variational Inference: Controlled Monte Carlo Diffusions.**
Francisco Vargas*, Shreyas Padhy*, Denis Blessing, Nikolas Nüsken. *Submitted to ICLR 2024*.
- **Kernel Regression with Infinite-Width Neural Networks on Millions of Examples.**
Ben Adlam, Jaehoon Lee, Shreyas Padhy, Zachary Nado, Jasper Snoek. [arXiv](#).

EMPLOYMENT

Research Intern, Microsoft Research, Cambridge, UK

May 2023 - August 2023

Under mentorship of James Hensman and John Winn

- Developed time-series Gaussian Process models for sparse, discrete count data using negative binomial likelihoods.
- Developed temporal models of source information for large-scale, distributed knowledge graph databases using INFER.net and Bayesian linear models.

AI Resident, Google Brain, Cambridge, MA

August 2019 - August 2021


Under mentorship of Balaji Lakshminarayanan and Jasper Snoek, Google Brain

- Published research in *NeurIPS 2020* and *JMLR 2023* on Spectral-normalized Neural Gaussian Process (SNGP), a competitive single-model approach on prediction, calibration and out-of-domain detection that encodes input distance awareness.
- Core contributor for the Uncertainty Baselines, Uncertainty Metrics and Robustness Metrics open-source libraries in Python, Jax, and Tensorflow.
- Published multiple topics of research in *ICML Workshops* on one-vs-all losses, Mahalanobis distance for OOD detection, and batch normalisation for improved predictive uncertainty.

TECHNICAL PROJECTS

Uncertainty Baselines 

Core contributor, Google Brain

UNet-Zoo 

Maintainer and developer

AWARDS AND ACHIEVEMENTS

Qualcomm Innovation Fellowship 2023: Among 11 finalists invited for the online finals.

Qualcomm Innovation Fellowship 2022: Among 12 finalists invited to Amsterdam.

Trinity-Henry Barlow Scholarship 2021: Awarded by Trinity College, University of Cambridge.

Harding Distinguished Postgraduate Scholars Programme (HDPSP) 2021: Awarded full overseas funding for the duration of the PhD Program at the University of Cambridge.

Summer Undergraduate Research Award 2015: For undergraduate research in microwave imaging.

Top 7% GPA Merit Scholarship: In 2013, 2014, 2015, and 2016 Fall Semesters for exceptional performance at the Indian Institute of Technology Delhi.

PROFESSIONAL ENGAGEMENTS

Invited Talk on **Stochastic Gradient Descent for GPs** at Microsoft Research Cambridge, *October 2023*.

SDEs and Schrodinger Bridges, presented at the Cambridge MLG Reading Group, *July 2023*.

Invited Talk on **Sampling-Based Inference**, at NeurIPS @ Cambridge, *December 2022*.

Out-of-Distribution Generalisation, presented at the Cambridge MLG Reading Group, *October 2022*.

Optimal Transport Metrics, presented at the Cambridge MLG Reading Group, *February 2022*. 

Reviewer for NeurIPS (2023, 2022, 2021), ICML (2023, 2022), ICLR (2023), AISTATS (2023), AAAI (2023).

Outstanding Reviewer Award at ICML 2022.