

# SHREYAS PADHY

PhD Candidate | Machine Learning Group | University of Cambridge  
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## EDUCATION

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<b>University of Cambridge</b> PhD in Engineering Supervised by Dr. José Miguel Hernández-Lobato	<b>October 2021 - September 2025 (expected)</b>
<b>Johns Hopkins University</b> MSE in Biomedical Engineering Overall GPA: 4.0/4.0	<b>August 2017 - May 2019</b>
<b>Indian Institute of Technology Delhi</b> B.Tech in Engineering Physics Overall GPA: 8.871/10 (Department Rank 4)	<b>July 2013 - May 2017</b>

## EMPLOYMENT




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<b>Research Intern, Microsoft Research, Cambridge, UK</b> <i>Under mentorship of James Hensman and John Winn</i> <ul style="list-style-type: none"><li>Developed time-series Gaussian Process models for sparse, discrete count data using negative binomial likelihoods.</li><li>Developed temporal models of source information for large-scale, distributed knowledge graph databases using INFER.net and Bayesian linear models.</li></ul>	<b>May 2023 - August 2023</b>
<b>AI Resident, Google Brain, Cambridge, MA</b> <i>Under mentorship of Balaji Lakshminarayanan and Jasper Snoek, Google Brain</i> <ul style="list-style-type: none"><li>Published research in <i>NeurIPS 2020</i> and <i>JMLR 2023</i> 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.</li><li>Core contributor for the Uncertainty Baselines, Uncertainty Metrics and Robustness Metrics open-source libraries in Python, Jax, and Tensorflow.</li><li>Published multiple topics of research in <i>ICML Workshops</i> on one-vs-all losses, Mahalanobis distance for OOD detection, and batch normalisation for improved predictive uncertainty.</li></ul>	<b>August 2019 - August 2021</b>

## PUBLICATIONS

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### 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*)  [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. [arXiv](#).
- Transport Meets Variational Inference: Controlled Monte Carlo Diffusions.**  
Francisco Vargas\*, Shreyas Padhy\*, Denis Blessing, Nikolas Nüsken. [arXiv](#).
- Kernel Regression with Infinite-Width Neural Networks on Millions of Examples.**  
Ben Adlam, Jaehoon Lee, Shreyas Padhy, Zachary Nado, Jasper Snoek. [arXiv](#).

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


## AWARDS AND ACHIEVEMENTS

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**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

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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.

## TECHNICAL STRENGTHS

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<b>DL Frameworks</b>	Jax (Flax, Optax, Haiku, NumPyro, Blackjax), Tensorflow, PyTorch (Pyro), Keras
<b>Computer Languages</b>	Python, C++, Verilog
<b>Medical Imaging</b>	TOAST++, FSL, SPM, Freesurfer

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\* denotes equal contribution