SHREYAS PADHY

PhD Student | Machine Learning Group | University of Cambridge
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EDUCATION

University of Cambridge **October 2021 - present**
PhD in Engineering
Supervised by Dr. Jośe 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-based inference for large linear models, with application to linearised Laplace**.
Javier Antoran*, Shreyas Padhy*, Riccardo Barbano, Eric Nalisnick, David Janz, and José Miguel Hernández-Lobato. ***(ICLR 2023)*** *(to appear).* 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. JMRI
- **Stochastic Solutions to Rough Surface Scattering using the finite element method**
Uday K. Khankhoje and Shreyas Padhy, *IEEE Transactions on Antennas and Propagation*.IEEE

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.* arXiv

* denotes equal contribution

UNDER SUBMISSION

- **Confidence intervals for neural network predictions through likelihood ratio-constrained optimisation.**
  Shreyas Padhy, David Janz, Ilja Kuzborskij, Csaba Szepesvari. *submitted to* ***ICML 2023***.
- **Kernel Regression with Infinite-Width Neural Networks on Millions of Examples.**
  Ben Adlam, Jaehoon Lee, Shreyas Padhy, Zachary Nado, Jasper Snoek. *submitted to* ***ICML 2023***.

EMPLOYMENT

AI Resident, Google Brain, Cambridge **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

TEACHING ASSISTANTSHIPS

Machine Learning for Signal Processing, Fall 2018 : *Graduate Course, by Dr. Najim Dehak, JHU*
Developing weekly assignments and homeworks, and grading for 50+ students.
Intro. to Computational Medicine, Fall 2018 : *Graduate Course, by Dr. Michael Miller, JHU*
Developing homeworks and course notes, extended codebase to Python, and grading for 60+ students.
Gateway Computing: Python, Spring 2019 : *Undergraduate Course, by Dr. Kwame Kutten, JHU*
Developing homeworks, weekly assignments and programming assignments in Python.

AWARDS AND ACHIEVEMENTS

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 adaptive meshing techniques for 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 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 (2022, 2021), ICML (2022), AISTATS (2023), AAAI (2023).
Outstanding Reviewer Award at ICML 2022.

TECHNICAL STRENGTHS

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