

# SHREYAS PADHY

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

<b>University of Cambridge</b> PhD in Engineering Supervised by Dr. José Miguel Hernández-Lobato	<b>October 2021 - present</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>

## RESEARCH EXPERIENCE

**AI Resident, Google Brain, Cambridge** **August 2019 - August 2021**  
*Under mentorship of Balaji Lakshminarayanan and Jasper Snoek, Google Brain*

- Worked on distance-based loss functions for improved uncertainty and robustness in deep learning methods under distribution shift and on out-of-distribution data.
- Worked 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.

**Graduate Research Assistant, Center for Imaging Science** **December 2017 - February 2019**  
*Under supervision of Dr. Michael Miller, Center for Imaging Science, Johns Hopkins University*



- Implemented Siamese networks on the Biocard and ADNI Datasets for the detection of Alzheimer's disease to learn feature embeddings to quantify & detect asymmetry across brain volumes.
- Performed longitudinal shape analysis on sub-cortical structures in the human brain involved with schizophrenia

**Research Assistant, Center for Medical Image Computing, UCL** **June 2016 - August 2016**  
*Under supervision of Dr. Simon Arridge, Director, Centre for Medical Image Computing, University College London*




- Formulated a-posteriori error & adaptive meshing algorithms for 2 and 3-dimensional diffuse optical tomography.
- Developed adaptive meshing and a-posteriori error calculation routines for the TOAST++ software package for diffuse optical tomography.

## PUBLICATIONS

### Conferences



- Jeremiah Zhe Liu, Zi Lin, Shreyas Padhy, Dustin Tran, Tania Bedrax-Weiss, and Balaji Lakshminarayanan, "Simple and principled uncertainty estimation with deterministic deep learning via distance awareness.", *Advances in Neural Information Processing Systems 33 (NeurIPS 2020)*  

### Journals






- Jeremiah Liu\*, Shreyas Padhy\*, Jie Ren\*, Zi Lin, Yeming Wen, Ghassen Jerfel, Zack Nado, Jasper Snoek, Dustin Tran, and Balaji Lakshminarayanan. "A Simple Approach to Improve Single-Model Deep Uncertainty via Distance-Awareness." *submitted to Journal of Machine Learning Research, 2022.* 
- Chin-fu Liu\*, Shreyas Padhy\* et. al, "Using Deep Siamese Neural Networks for Detection of Brain Asymmetries Associated with Alzheimer's Disease and Mild Cognitive Impairment", *Magnetic resonance imaging 64 (2019): 190-199.*, 2019.  

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\* denotes equal contribution

- Uday K. Khankhoje and Shreyas Padhy, “**Stochastic Solutions to Rough Surface Scattering using the finite element method**”, *IEEE Transactions on Antennas and Propagation*, (Vol 65, No 08), 2017. DOI: 10.1109/TAP.2017.2715366  

## Workshops

- Jie Ren, Stanislav Fort, Jeremiah Liu, Abhijit Guha Roy, Shreyas Padhy, and Balaji Lakshminarayanan, “**A Simple Fix to Mahalanobis Distance for Improving Near-OOD Detection.**”, *ICML 2021 Workshop on Uncertainty and Robustness in Deep Learning*. 
- Zachary Nado, Shreyas Padhy, D. Sculley, Alexander D’Amour, Balaji Lakshminarayanan, and Jasper Snoek, “**Evaluating prediction-time batch normalization for robustness under covariate shift.**”, *ICML 2020 Workshop on Uncertainty and Robustness in Deep Learning*. 
- Shreyas Padhy, Zachary Nado, Jie Ren, Jeremiah Liu, Jasper Snoek, and Balaji Lakshminarayanan, “**Revisiting One-vs-All Classifiers for Predictive Uncertainty and Out-of-Distribution Detection in Neural Networks.**”, *ICML 2020 Workshop on Uncertainty and Robustness in Deep Learning*. 
- Zachary Nado et. al., “**Uncertainty Baselines: Benchmarks for Uncertainty & Robustness in Deep Learning**”, *Bayesian Deep Learning Workshop, 2021*.  

## TECHNICAL PROJECTS

**Uncertainty Baselines**   
Core contributor, Google Brain

August. 2020 - August 2021

## 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

**Honorary 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.

Recipient of the **KVPY Scholarship** from the Department of Science, Government of India.

Recipient of the **NTSE Scholarship** from NCERT, Government of India.

## PROFESSIONAL ENGAGEMENTS

### Talks

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

### Reviewing

- Reviewer for NeurIPS (2022, 2021), ICML (2022), AISTATS (2023), AAAI (2023).
- **Outstanding Reviewer Award** at ICML 2022.

## TECHNICAL STRENGTHS

**DL Frameworks**

**Computer Languages**

**Medical Imaging**

Jax (Flax, Optax, Haiku, NumPyro, Blackjax), Tensorflow, PyTorch (Pyro), Keras

Python, C++, Verilog

TOAST++, FSL, SPM, Freesurfer