

# SHREYAS PADHY

AI Resident | Google Brain  
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## EDUCATION

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**Johns Hopkins University**  
MSE in Biomedical Engineering  
Overall GPA: 4.0

August 2017 - May 2019

**Indian Institute of Technology Delhi**  
B.Tech in Engineering Physics  
Overall GPA: 8.871/10 (Department Rank 4)

July 2013 - May 2017

## RESEARCH EXPERIENCE

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**AI Resident, Google Brain, Cambridge**

August 2019 - present

*Under mentorship of Balaji Lakshminarayanan and Jasper Snoek, Google Brain*

- Worked on one-vs-all, 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.
- Working on large scale kernel methods in the infinite-width limit.

**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
- Used the Large Deformation Diffeomorphic Metric Mapping algorithm to generate time-dependent flows of surfaces of various sub-cortical structures to study the rate of atrophy of neuronal tissue.

**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

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### 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.**”, to appear in *Advances in Neural Information Processing Systems 2020*. 

### Journals

- 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  
- 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.  

### Workshops

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\* denotes equal contribution

- **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, **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*. 📄

### Graduate Thesis

- **Shreyas Padhy**, “**Analyzing shape and residual pose of subcortical structures in brains of subjects with schizophrenia**”, *Masters Thesis, Master of Science in Engineering, Department of Biomedical Engineering, Johns Hopkins University*. 📄

## TECHNICAL PROJECTS

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- **Uncertainty Baselines and Uncertainty Metrics** 🤖🤖 August. 2020 - current  
*Core contributor, Google Brain*
- **Convolutional Networks with Recurrent Encoding for Segmentation** 🤖 Sept. 2017 - Dec. 2017  
*Course Project, Under supervision of Dr. Najim Dehak, Johns Hopkins University*

## RESEARCH EXPOSURE

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- **Neurohackademy Summer Institute 2018** July - August 2018  
*University of Washington, Seattle eScience Institute*
- Created **easyhcp** 🤖, an open-source software package for easy and efficient querying of data from the Human Connectome Project using AWS Buckets and Boto.
- Attended a two week course on open and reproducible practises in neuroscience.
- **UCL Medical Image Computing Summer School** July 2016  
*Conducted by Centre for Medical Image Computing, University College London*
- Worked on image segmentation of brain MRI samples using global and local voting techniques under the supervision of Dr. Jorge Cardoso, CMIC.
- Attended a five day course on Image Acquisition, Reconstruction, Modelling, Optimizations, and Pipelines.

## TEACHING ASSISTANTSHIPS

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- **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

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- **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.

## TECHNICAL STRENGTHS

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- **DL Frameworks** Jax, Tensorflow, PyTorch, Keras
- **Computer Languages** Python, C++, Verilog
- **Medical Imaging** TOAST++, FSL, SPM, Freesurfer