

# Deeksha M Shama

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## EDUCATION

- **Johns Hopkins University** Baltimore, MD  
*Ph.D. in Electrical and Computer Engineering* Fall 2021 - Present
- **National Institute of Technology Karnataka** Surathkal, Karnataka  
*B.Tech in Electronics and Communication Engineering; CGPA: 9.74/10* 2017-2021

## EXPERIENCE

- **Neural Systems Analysis lab** Baltimore, MD  
*Independent Research* Fall 2021 - Present
  - **Guide:** Prof Archana Venkataraman
  - **Epileptic seizure detection and onset zone localization from EEG signals:** developing transformer-based deep models to capture spatio-temporal dependencies in EEG signals and predict seizures
  - **Data curation:** created new onset zone annotations for 124 patients in the TUH dataset from clinician's notes
- **Machine Learning and Optimization lab, EPFL** Lausanne, Switzerland  
*Research Intern / [Report](#)* May 2020 - Dec 2020
  - **Guide:** Prof Martin Jaggi and Dr. Mary-Anne Hartley in association with the Geneva University Hospital
  - **Deep learning for COVID-19 diagnosis from digital lung auscultation:** Independently built a CNN-SVM model for COVID-19 diagnosis proving the superiority of lung sounds over clinical features. Exhaustive comparisons of window length, features (MFCC vs STFT), and data augmentation techniques
  - **Missingness-resilient diagnostic pattern recognition:** Developed a BERT-based model using latent representations from a CRNN with improved robustness to missing features
  - **Supervision of course project:** Jointly supervised two groups of post-graduates to extend the model's application to other respiratory diseases
- **Spectrum lab, Indian Institute of Science** Bengaluru, India  
*Summer Research Intern / [Report](#)* May 2019 - July 2019
  - **Guide:** Prof Chandra Shekhara Seelamantula
  - **Image Reconstruction in Fourier Ptychographic Microscopy:** Compared different high-resolution image reconstruction algorithms such as iterative phase retrieval, gradient descent and accelerated Wirtinger flow optimization to stitch the low-resolution images from multiple illumination angles
  - **Reconstruction of in-vitro live cell samples:** Incorporated quantitative differential phase contrast imaging to develop a weak object transfer function and solved using regularized gradient descent
- **Neurospectroscopy and Neuroimaging Lab, National Brain Research Centre** Gurgaon, India  
*Undergraduate Research Assistant* Mar 2020 - Apr 2020
  - **Guide:** Prof Pravat Mandal
  - **Systematic Review of Machine learning for diagnosis of Alzheimer's disease:** Perused over 100 publications between 2000-2020 to collect various machine learning models for diagnosing alzheimers using MRI, fMRI, PET, and MRS

## RESEARCH PUBLICATION

- A Glangetas, M Hartley, A Cantais, D Courvoisier, D Rivollet, **Deeksha M Shama**, A Perez, H Spechbach, V Trombert, S Bourquin, M Jaggi, A Gervais, J N. Siebert. "Deep learning diagnostic and risk-stratification pattern detection for COVID-19 in digital lung auscultations: Clinical protocol for a case-control and prospective cohort study." BMC Pulm Med 21, 103 (2021) <https://doi.org/10.1186/s12890-021-01467-w>

## SELECTED PROJECTS

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- **Brain Age Prediction from 3D-MRI** ECE, JHU  
*Course Project* *Spring 2022*
  - **Summary:** Compared the effectiveness of volumetric features and deep 3D-CNN derived features in predicting the brain age using logistic regression
- **CycleGAN and Diffusion models for art style conversion** ECE, JHU  
*Course Project* *Spring 2023*
  - **Summary:** Developed CycleGAN and Diffusion denoising probabilistic models to transfer the style of input image to Impressionist art style
- **Brain Tumour Segmentation** ECE, NITK Surathkal  
*Winter Course Project* *Dec 2019 - Jan 2020*
  - **Summary:** Adapted MobileNet architecture in Keras for multi-class tumour segmentation of 2D MRI T1-Flair images in BraTS dataset scoring 0.72 IoU
- **Speech Emotion Recognition** IEEE, NITK Surathkal  
*Personal Project* *Aug 2018 - Mar 2019*
  - **Summary:** Developed CRNN model in Keras that used MFCC and its delta, ZCR, Pitch and other features to predict an emotion out of Anger, Sadness, Happiness and Neutral on IEMOCAP dataset achieving 63% accuracy

## SKILLS

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- **Programming:** Python, C, MATLAB, Verilog
- **Technologies:** Keras, Pytorch, Anaconda, Ngspice, FPGA, ARM7, Arduino

## HONORS AND AWARDS

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- **ECE Departmental Fellowship** at JHU for the year 2021-2022
- **Institute Gold Medal** for securing highest CGPA in the ECE batch of 2021
- **Best Outgoing Female Student** in India Council awarded by Hope Foundation and Research Centre 2021
- **Summer@EPFL research fellowship** from the school of Computer and Communication Sciences, EPFL Switzerland 2020
- **Certificate of Merit** awarded by Institute of Engineers NITK for securing highest CGPA in ECE 2018
- Bronze standard in **National Children's Science Congress** at the national level 2014

## VOLUNTEER EXPERIENCE

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- Social Evening chair of Women In Machine Learning at ICML 2022
- Chairperson 2020-21, Treasurer 2019-20, Executive Member 2018-20 at IEEE NITK Student Branch 2020-21
- Executive Member NITK Dance Crew 2017-2021: 10+ years of training in Indian classical forms
- Teaching Assistant 2017-20 at Centre For Advanced Learning, Mangalore
- Volunteer at the national level Women in Technology Summit of IEEE NITK 2018 hosting 100+ delegates