

# VARUN MANNAM

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## PROFESSIONAL SUMMARY

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Graduate student in electrical engineering from the University of Notre Dame and working on image enhancements of the low power/exposure time images using **deep learning** and volumetric imaging using compressive sensing for fast and accurate real-time imaging. I am also working on machine learning/computer vision research, design on massive complex datasets for real-time image processing. 4.8 years of work experience in wireless communications physical layer research, including software development for WIFI applications (802.11ax) and Bluetooth protocols at National Instruments R&D Austin & India.

## TECHNICAL SKILLS

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**Computer Skills:** Python, Java, C/C++, Data Structures, R, MATLAB, LabVIEW, SQL, Java Script

**ML tools:** Pytorch, TensorFlow, Keras (for deep learning using large-scale datasets and computer vision), statistics.

## EDUCATION

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### University of Notre Dame

Ph.D., Department of Electrical Engineering

Overcoming fundamental limits of 3D *in vivo* fluorescence imaging using machine learning.

Notre Dame, IN

August 2017-Present

### Indian Institute of Technology, Kharagpur, India

M. Tech, Major in electrical engineering

Design of bandpass filter using stripline configuration for space applications.

IIT KGP, WB, India

May 2012

## PROFESSIONAL EXPERIENCE

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### Graduate Student, University of Notre Dame

Department of Electrical Engineering

South Bend, IN

August 2017 – Present

- Biomedical Image processing using Convolutional Neural Networks (CNNs): Designed an algorithm for denoising fluorescence microscopy images and improved the average PSNR by 8.1 dB using a large/complex dataset.
- Compressive Sensing (CS): Designed a compressive sensing algorithm for 3D volume reconstruction where the sample was **imaged with a limited exposure time**.
- Convolutional Neural Networks (CNNs) using The Hadamard Method-An Energy-Efficient Approach: Designed a fast and efficient neural network framework with limited resource availability (**memory and ALU operations**).

### Graduate Research Intern – Summer, Feinstein Institute for Medical Research (FIMR)

Summer graduate research intern, Neural & Data Science Lab, North Well Hospitals

Manhasset, NY

May 2021 – August 2021

### Graduate Research Intern – Summer, IBM T.J. Watson Research Center

Summer graduate research intern, Efficient and Resilient Systems, IBM Research AI

Yorktown Heights, NY

May 2019 – August 2019

- Designed an algorithm for real-time 3D Point-Cloud (**Segmentation of objects present in different depths**) using machine learning in Autonomous driving with the team led by Dr. Pradip Bose in the EPOCHS Reference Application (ERA) project.

### National Instruments (Research & Development)

Staff Software Engineer, Connectivity (WIFI and Bluetooth) research team

Bangalore, KA, India

December 2012 – August 2017

- Designed the transmitter and receiver blocks for **802.11ax WIFI** and **Bluetooth** protocols, algorithms to verify Wireless Chips for connectivity, and cellular protocols (**WIFI, Bluetooth, LTE, 5G-IoT, and GSM**).
- Designed a new synchronization algorithm based on the limited Preamble in **Bluetooth** that performed better than the Correlation method and extended this idea for **Automatic Packet Detection** in the receiver.

### Indian Institute of Technology, Kharagpur

Graduate Research Student

Kharagpur, WB, India

July 201 – May 2012

- Designed a narrow-band bandpass filter for communication between moon-rover and satellite for **space ISRO**.

## AWARDS

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- SPIE BIOS 3-Minute Poster session, 3<sup>rd</sup> prize, sponsored by SPIE JBO & Neurophotonics editors.
- Outstanding graduate student teaching award, Massey student travel grant in 2020 - University of Notre Dame
- Spotlight award in 2014 and 2015 - National Instruments R&D Bangalore, India
- Graduate merit scholarship in 2012 & Gold Medal in Undergraduate for the batch 2010