

# Sharan Ramjee

UNDERGRADUATE STUDENT AT PURDUE UNIVERSITY

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## Research Interests

Computer Vision, Signal Processing, Machine Learning, Deep Learning, and Artificial Intelligence

## Education

### Purdue University

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING WITH MINORS IN MATHEMATICS AND ECONOMICS

- Department of Electrical and Computer Engineering, GPA: 4.00/4.00

West Lafayette, IN

Aug. 2016 - Exp. May. 2020

## Experience

### Google

SOFTWARE ENGINEERING INTERN

- Working with the Google Cloud AI team where I will be using model distillation to create explainable AI

Seattle, WA

Sep. 2019 - Dec. 2019

### Qualcomm

MACHINE LEARNING INTERN

- Worked with the ML Application Analysis Team on using Deep Learning to make Qualcomm Snapdragon chips more power efficient
- Upgraded the automation tool of the QoS logger to run multimedia applications on Android Q and parse log files
- Generated LSTM models using Neural Architecture Search (NAS) to estimate QoS parameters for minimal power consumption

San Diego, CA

May. 2019 - Aug. 2019

### DARPA SC2 Research

RESEARCH ASSISTANT

- Researcher at the Purdue DARPA SC2 Research Team (BAM!) in collaboration with Texas A&M [\[LINK\]](#)
- Qualified for the final round (will take place in Dec 2020) of the DARPA SC2 challenge and won \$750,000 in funding from DARPA for finishing in the top 10 teams in the 1st round and \$375,000 for finishing in the top 5 teams in the 2nd round

West Lafayette, IN

May. 2018 - Present

### SURF 2018

RESEARCH FELLOW

- Designed Deep Learning models for modulation classification with a focus on online training for network tuning using PCA, LDA and Autoencoders aided by selective SNR training for Wireless Signal Modulation Classification using Deep Neural Networks with Prof. Aly El Gamal [\[LINK\]](#)
- Currently hold the record for the highest classification accuracy (99%) with the RML dataset (previous record – 93%)

West Lafayette, IN

May. 2018 - Aug. 2018

### Publicis.Sapient

DATA SCIENCE INTERN

- Rebuilt the “pandas” library in python and converted it into libraries in Apache Spark, Apache Flink, and TensorFlow
- Created clusters in TensorFlow for generating a distributed network that enabled efficient data processing
- Performed big data analytics using Apache Spark, Hadoop and Microsoft Azure

Bengaluru, India

May. 2017 - Jul. 2017

## Publications

### ACCEPTED/PUBLISHED

[C1] Xiwen Zhang, Tolunay Zeyfi, Shengtai Ju, **Sharan Ramjee**, Aly El Gamal, Yonina C. Eldar. “Deep Learning for Interference Identification: Band, Training SNR, and Sample Selection”. IEEE Signal Processing Advances in Wireless Communications (**SPAWC**), 2019 [\[LINK\]](#)

[J1] **Sharan Ramjee**, Shengtai Ju, Diyu Yang, Xiaoyu Liu, Aly El Gamal, Yonina C. Eldar. “Fast Deep Learning for Automatic Modulation Classification”. Submitted to IEEE Journal on Selected Areas in Communications (**JSAC**), 2019 [\[PREPRINT\]](#)

### UNDER REVIEW

[C2] **Sharan Ramjee**, Aly El Gamal. “Efficient Wrapper Feature Selection using Autoencoder and Model Based Elimination”. Submitted to Neural Information Processing Systems (**NIPS**), 2019 [\[PREPRINT\]](#)

[J2] **Sharan Ramjee**, Shengtai Ju, Diyu Yang, Xiaoyu Liu, Aly El Gamal, Yonina C. Eldar. “Data Driven Subsampling for Automatic Modulation Classification”. Submitted to IEEE Transactions on Cognitive Communications and Networking (**TCCN**), 2019

[J3] Xiwen Zhang, **Sharan Ramjee**, Tolunay Seyfi, Shengtai Ju, Aly El Gamal, Yonina C. Eldar. “Band Selection using Deep Learning for Interference Identification”. Submitted to IEEE Transactions on Cognitive Communications and Networking (**TCCN**), 2019

## Talks

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### QoS Optimization with ML

QUALCOMM APPLIED MACHINE LEARNING (QAML) SYMPOSIUM 2019 [\[LINK\]](#)

San Diego, CA

Aug. 2019

### Deep Learning for Interference Identification: Band, Training SNR, and Sample Selection

IEEE SIGNAL PROCESSING ADVANCES IN WIRELESS COMMUNICATIONS (SPAWC) 2019 [\[LINK\]](#)

Cannes, France

Jul. 2019

### Deep Neural Network Architectures for Modulation Classification using PCA

THE SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP (SURF) SYMPOSIUM [\[LINK\]](#)

West Lafayette, IN

Aug. 2018

### A PyTorch Framework for Automatic Modulation Classification

THE SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP (SURF) SYMPOSIUM [\[LINK\]](#)

West Lafayette, IN

Aug. 2018

### An Introduction to Deep Learning for Style Transfer

PURDUE IEEE COMPUTER SOCIETY (CSOCIETY) SYMPOSIUM 2018 [\[LINK\]](#)

West Lafayette, IN

Jan. 2018

## Honors & Awards

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**Eta Kappa Nu (Beta Chapter) Outstanding Junior Scholarship**, Purdue University

2019-2020

**Eli Shay Scholarship**, (3 times) Purdue University

2017-2019

**Wolfram Alpha Award**, MadHacks (University of Wisconsin-Madison)

Nov 2018

**Dean's List**, (6 times) Purdue University

2016-2019

**Engineering Design Excellence Award**, Purdue University

Dec. 2016

**12<sup>th</sup> Board Exam Scholarship**, DRDO

2016

**OpenMRS Award**, Google Code-In

Dec. 2014

**10<sup>th</sup> Board Exam Scholarship**, DRDO

2014

## Activities

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### Purdue IEEE Computer Society (CSociety)

West Lafayette, IN

PRESIDENT [\[LINK\]](#)

Aug. 2017 - Aug. 2019

- Led several teams in the completion of projects for the Purdue Spark Challenge that is held every semester
- Served as the product manager for the 'Neural Style Transfer using Hardware Convolution' project (Spring 2019) and served as the head of the data analysis team for the 'QUEVIHN: Biomedical Robot' project (Fall 2018) [\[LINK\]](#)

### Autonomous Motorsports Purdue (AMP)

West Lafayette, IN

SOFTWARE TEAM LEAD [\[LINK\]](#)

Nov. 2018 - Aug 2019

- Led the software team for the development of SLAM algorithms in preparation for the autonomous racing competition held every May [\[LINK\]](#)
- Successfully developed computer vision software using the YOLOv2 for the Velodyne LiDAR [\[LINK\]](#)
- Created on-boarding documents to get new recruits up to speed with the Robot Operating System (ROS) framework

### Undergraduate Research Society of Purdue (UGRSP)

West Lafayette, IN

FOUNDING AMBASSADOR [\[LINK\]](#)

Oct. 2018 - Aug. 2019

- Served as the founding ambassador for the College of Engineering to help guide students with research
- Taught students how to present their research, conduct literature reviews, write journal/conference papers
- Engaged in outreach and spreading awareness to recruit a diverse group of students that were passionate about research

## Teaching Assistant

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### Microprocessor Systems and Interfacing

ECE 362

West Lafayette, IN

Spring 2019

### ASIC Design Laboratory

ECE 337

West Lafayette, IN

Spring 2019

### Advanced C Programming

ECE 264

West Lafayette, IN

Spring 2019

### Electronic Measurement Techniques

ECE 207

West Lafayette, IN

Fall 2018

### Programming Applications For Engineers

CS 159

West Lafayette, IN

Spring 2018

## Skills

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<b>Languages</b>	Python, C, Java, Shell Scripting, MATLAB
<b>Hardware</b>	System Verilog, Embedded C, Assembly
<b>Libraries</b>	Keras, TensorFlow, scikit-learn, OpenCV
<b>Other</b>	Git, $\text{\LaTeX}$
<b>OS</b>	Android, ROS, Linux (Ubuntu)

## Projects

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### StrataGem | Fintech Android App

Madison, WI

MADHACKS 2018 – UNIVERSITY OF WISCONSIN-MADISON [\[LINK\]](#)

Nov. 2018

- StrataGem is an integrated platform to take care of all your finances - Personal Banking to Investment Advisory
- Won the “Wolfram Alpha Award” sponsored by Wolfram Alpha and the “Best Payment Solution” award sponsored by Authorize.net
- Written in Java and XML for Android with ML merger prediction and sentiment analysis algorithms written in Python

### Vitamin.AI | Health & Fitness Android App

West Lafayette, IN

BOILERMAKE VI – PURDUE UNIVERSITY [\[LINK\]](#)

Oct. 2018

- Vitamin.AI is a Computer Vision driven health & fitness tracking Android App that is an upgrade to FitScan, another android app I made in 2017 [\[LINK\]](#)
- Uses Google Cloud Vision API to classify brand names and AR to detect the size/calories of the products consumed
- Automatically schedules a run for the user using Google Maps APIs so that the user burns the calories that were consumed on that day

### USB AHB-Lite | ASIC SoC Module

West Lafayette, IN

SoC TEAM

Dec. 2018

- USB Full-Speed Bulk-Transfer Endpoint AHB-Lite SoC Module facilitates bulk transfers of data from a USB Endpoint to a Host
- Coded in SystemVerilog with an emphasis on the ASIC design aspects with regards to the AHB-Lite Slave Interface, Data Buffer, Protocol Controller, USB RX, and USB TX that consist of the submodules for the SoC top-level module

### QUEVIHN | Biomedical Robot

West Lafayette, IN

PURDUE IEEE COMPUTER SOCIETY

Nov. 2017 - Jan. 2018

- QUEVIHN is a Biomedical Robot that utilizes several sensors (Interfaced using an STM32F0DISCOVERY board) and deep learning classification algorithms to accurately diagnose a disease ailing a patient
- Lead a team of IEEE members that enabled the data collected from the robot’s frontend and hardware to communicate with the backend servers

## Relevant Coursework

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<b>ECE 496</b>	Deep Learning and Neural Networks
<b>ECE 404</b>	Computer Security
<b>ECE 368</b>	Data Structures and Algorithms
<b>ECE 362</b>	Microprocessor Systems and Interfacing
<b>ECE 337</b>	ASIC Design Laboratory
<b>ECE 296</b>	Deep Learning for Wireless Communications
<b>ECE 295</b>	Introduction to Data Science

## Certifications

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### Machine Learning

COURSERA [\[LINK\]](#)

Stanford University

Sep. 2017

### Introduction to Python

COGNITIVE CLASS [\[LINK\]](#)

IBM

May. 2017