

# GAURAV DUGGAL

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Blacksburg, VA, USA

## RESEARCH EXPERIENCE

### Graduate Intern

#### Hertzwel

Dec 2018 – Feb 2019 Singapore

- Responsible for the simulation of the complete FMCW MIMO Automotive radar scenario including waveform design, ground clutter modelling, automotive target modelling, receiver modelling and signal processing for point cloud generation.

### Master's Thesis

#### Guide: Dr. Shobha Sunder Ram, Assoc. Prof, IIITD

May 2018 – June 2019 Delhi, India

- Designed a hyper resolution automotive joint radar communication system by integrating the radar in V2X 802.11ad framework.
- Modelled automotive targets as extended target model and generated relevant radar signatures.

### Visiting Research Intern

#### Cranfield University

May 2012 – July 2012 Shrivenham, United Kingdom

- Designed an Inertial Navigation System for an unmanned Ground Vehicle
- The Inertial Navigation system data was fused with GPS data using a Kalman Filter.

## INDUSTRIAL EXPERIENCE

### Engineer

#### Qualcomm

July 2019 – August 2021 Hyderabad, India

- Worked as an embedded software developer in the RF Software in the physical layer of the software stack

### Member of Technical Staff

#### Tonbo Imaging

May 2015 – June 2016 Bangalore, India

- Working as an embedded software engineer to develop thermal imaging camera system for defence related purposes.

### Embedded Electronics Engineer

#### Ducere Technologies

July 2013 – April 2015 Hyderabad, India

- Made working prototypes of Wearable technology based design ideas using basic physics and electronics.

## TECHNICAL COURSEWORK AND SKILLS

- Statistical Signal Processing, Radar Systems, Probability and Random Processes, Principles of Digital Communication systems, Reinforcement Learning, Principles of Global Positioning Systems, MU-MIMO, Massive MIMO and OFDM Technologies for 5G Networks.
- C, OOP programming in Python, Java, MATLAB.

## EDUCATION

### PhD, ECE department

#### Virginia Tech

2021-present Blacksburg

- GTA: Applied Electrical Theory

### Mtech. (Communications & Signal Processing)

#### IIIT Delhi

2017-2019 Delhi

- CGPA: 9.04/10

### B.E. hons. (Electrical and Electronics)

#### BITS Hyderabad

2009-2013 Hyderabad

- CGPA: 7.07/10

## RECENT PROJECTS

### ADSB receiver & Antenna design, Dr. S.S. Ram, Assoc Prof, IIITD

- Constructed a portable ADSB receiver using a Software Defined Radio and an embedded computer.
- Implemented a Matched Filter in the preamble detection stage of the ADSB receiver code and corrected for 1 bit errors
- Designed a phased array antenna for the system to improve aircraft tracking up to horizon (400km).

### Reinforcement Learning Agent for Atari game Catch, Dr. S Kaul, IIITD

- Implemented Policy Gradient based methods (2018 research papers) and compared it with Deep-Q learning to learn the optimal policy for Atari game Catch.

## PUBLICATIONS

- G. Duggal, S. S. Ram, and K. V. Mishra, "Micro-Doppler and micro-range detection via Doppler-resilient 802.11ad-based vehicle-to-pedestrian radar," in IEEE Radar Conference, 2019,
- N. Pandey, G. Duggal, S.S Ram, Database Of Simulated Inverse Synthetic Aperture Radar Images For Short Range Automotive Radar in IEEE Radar Conference 2020
- G. Duggal, S. Vishwakarma, K. V. Mishra and S. S. Ram, "Doppler-Resilient 802.11ad-Based Ultra-Short Range Automotive Joint Radar-Communications System," in IEEE Transactions on Aerospace and Electronic Systems, doi: 10.1109/TAES.2020.2990393.