Jyotish Robin

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Education

2018-Present   **NYU Wireless, Tandon School of Engineering.**
Ph.D. , Electrical Engineering Department; Advisor: **Dr. Elza Erkip**.
3.92/4.00 CGPA

2014-2016   **Indian Institute of Technology, Madras.**
M.Tech in *Communication systems*, Electrical Engineering Department.
9.44/10 CGPA (**Best** academic performance among the entire batch of regular Masters students)

2010-2014   **College of Engineering ,Trivandrum.**
B.Tech in *Electronics and Communication Engineering*.

Internships

Company   **Qualcomm**   **Summer-2020**
Role   **Modem Systems Engineer Intern.**

- Implemented enhancements to MIMO joint demapper taking the hardware constraints into consideration.
- Studied the impact of these enhancements on 4-layer MIMO performance for various MCS combinations upto 256QAM under different channel correlations.
- Analyzed the improvements in blind modulation order detection caused by the proposed enhancements.

Company   **Qualcomm**   **Summer-2019**
Role   **Modem Systems Engineer Intern.**

- Analyzed the performance of various 32/16/8 Tx FD-MIMO configurations for different grid sizes (N_1 and N_2), oversampling factors (O_1 and O_2) and codebook cfgs 1 and 2.
- Verified that FD-MIMO provides the expected beamforming gain in several channel conditions (Static channel, Fading single cluster, Fading single cluster with mobility tracking) and fading profiles (EPA5, EVA70) .
- Implemented W1 selection method based on beam subsampling which reduces the computational complexity (Reduced cycle counts).

Research Projects

Title   ***Analysis of scattering mechanisms & Modeling for Terahertz Wireless Communication Systems.***
Guide   **Dr. Theodore S. Rappaport**   **Fall 2018**

- Demonstrated how scattering becomes a prominent propagation mechanism as frequencies extend to millimeter- wave (mmWave) and beyond.
- Investigated the effects of scattering on the reflection coefficient for rough surfaces.
- Derived the received power using two popular scattering models - the directive scattering (DS) model and the radar cross section (RCS) model.
- Compared the simulation results over a wide range of frequencies, materials, and orientations for the two models.
- Co-authored a research paper and submitted it towards 53rd IEEE International Conference on Communications (ICC- 2019).

Title   ***Modified low complexity hybrid precoding technique for millimeter wave MIMO systems.*** (**Master's Thesis Project**)
Guide   **Dr. Srikrishna Bashyam**   **Mar 2015 - Jan 2016**

- Surveyed the existing literature on hybrid precoding and beamforming algorithms for mmWave systems.
- Implemented a norm based user selection algorithm and Gram-Schmidt antenna selection scheme using MATLAB software.
- Proposed a low complex solution by eliminating the need of RF adders. A bridging network was designed to adaptively establish connection between the RF chains and phase shifters.
- Analyzed and compared the proposed scheme with conventional schemes using Monte-Carlo simulations.

Academic Projects

Design and analysis of Rayleigh and Rician fading simulators based on Smith's algorithm in MATLAB .   **Fall-2018**

- Demonstrated a software implementation of Smith's multipath fading channel simulator which is based on Clark and Gan's fading model.

Simulation and analysis of Symbol Time Offset (STO), Carrier Frequency Offset (CFO) in OFDM systems and the study of different synchronization techniques. **Fall-2015**

- Studied the effect of CFO and STO on orthogonality of sub-carriers and its impact on communication systems.
- Analyzed various time domain and frequency domain estimation techniques for STO and CFO. (Schmidl-cox method, Moose method, CP based and correlation based techniques.)

Relevant Courseworks

- Wireless Communications
- Machine Learning
- Digital Modulation and Coding
- Multicarrier Communications
- Estimation & Detection Theory
- Probability & Stochastic Processes

Professional Experience

Company **The MathWorks India Private Limited** **July 2016 - May 2018**

Role Application Support Engineer in EDG **(Engineering Development Group)** .

Project-I ***Model Based Design & Analysis of Hybrid beamforming for massive MIMO phased array systems.***

The project involved design and synthesis of complex antenna elements, evaluation of algorithm alternatives, and verifying link-level designs using MATLAB and Simulink.

Project-II ***HDL Implementation and analysis of Filtered OFDM modulator and demodulator using HDL coder and HDL verifier.***

This work focused on implementing Filtered OFDM modulation and detection for HDL code generation. The design was verified using FPGA-in loop simulation using Xilinx ML605 (virtex-6) board.

Honors & Achievements

2018 Received **SOE Fellowship** in the Department of Electrical and Computer Engineering at the **NYU Tandon School of Engineering**.

2018 Received **Melbourne Research Scholarship** from School of Engineering, **University of Melbourne** (declined).

2016 Secured **Silver Medal & Institute Day Prize** for **highest GPA** in M.Tech at **IIT Madras** (2014-2016 batch).

Additional Experience

2017 **Technical Interviewer** at MathWorks India Private Limited for the Engineering Development Group hiring process.

2016 **Teaching Assistant** for **Digital Communication Systems**, Prof. Srikrishna Bhashyam, IIT Madras.

2015 **Teaching Assistant** for **Digital Signal Processing**, Prof. Aravind R, IIT Madras.

Co-Curricular and Extra curricular activities

- Certified Trekker - Successfully completed the **National Himalayan Trekking Expedition** organized by the Youth Hostels Association of India during April-May,2015 & August-2017.
- Active involvement in **Peer Mentoring Programs** at IIT Madras to assist incoming students with their academic and social transition to college.
- A **Math puzzle enthusiast** who enjoys creating and solving unconventional math puzzles.

Technical Skills

Programming MATLAB, C++

Modeling Simulink, Simscape

Toolboxes Communication Systems Toolbox, DSP Systems Toolbox