



**M ARUN KUMAR**  
**Electrical Engineering**  
**Indian Institute of Technology Bombay**  
**Specialization: Communication Engineering**

**173079004**  
**M.Tech.**  
**Male**  
**DOB: 29-04-1994**

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2020	0.00
Undergraduate Specialization : Electronics & Communication Engineering				
Graduation	JNTUH	Aurora's Technological and Research Institute	2015	74.08

### MAJOR PROJECT & SEMINAR

- **An efficient channel estimation scheme in TDD MIMO Systems**  
 Guide: *Prof. Kumar Appaiah, Electrical Engineering, IIT Bombay* (May'19 - Present)
  - o Implemented Multi Cell MMSE based MIMO precoding in multiple antennas systems which used non-orthogonal pilots for channel estimation.
  - o Implemented **covariance** based channel estimation which uses Bayesian Estimation in single cell system and analysed its performance based on rate vs antennas.
  - o Implementation of **Kalman** filter to estimate channel in **coordinated MIMO** systems
  - o Design of **efficient precoding** scheme using channel state information available using **feedback** and channel tracking which reduces the effect of **pilot contamination** on channel estimation..
- **Inter cell interference in Multi Cell MIMO systems [M.Tech Seminar]** (Jul'18 - Nov'18)  
 Guide: *Prof. Kumar Appaiah, Electrical Engineering, IIT Bombay*
  - o Studied the structure and working of **MIMO systems** and impact on BER on using Non-orthogonal pilot sequences for channel estimate.
  - o Simulated **BER vs SNR** for MIMO systems in Interference and Interference free scenarios.

### WORK EXPERIENCE

- **Interview Management Software | Electrical Engineering Department, IITB** (Feb'18 - present)  
 Lead role in building online system that made automatic coordination across interview committees possible through their interfaces this system was used in the last 3 admission sessions with success.
- **Systems Engineer | Infosys Technology Ltd** (Dec'15 - Jul'17)  
 My work included writing SQL queries to fetch data to the module and to develop features using Oracle ERM tool.

### KEY COURSE PROJECTS

- **Scheduling in 4G LTE** (Jan'18 - Apr'18)  
 Guide: *Prof. Abhay Karandikar, Electrical Engineering, IIT Bombay*  
 Implemented **channel aware scheduling** schemes such as Maximum Throughput, Proportional Fairness, Throughput to Average. Compared all three scheduling schemes based on cell **throughput**, **average user throughput**, **Jain Fairness index**.
- **Simulation of Cellular System in OCTAVE** (Jan'18 - Apr'18)  
 Guide: *Prof. Abhay Karandikar, Electrical Engineering, IIT Bombay*
  - o Computed **SIR, blocking probability** for different cluster sizes and **sectoring**. Analyzed **handover** process and **ping-pong** rate for different user mobilities and hysteresis values.
  - o Analyzed BER performance for **space** and **time diversity** in a slow flat fading Rayleigh channel.
  - o Analyzed BER performance for a single-cell and multi-cell scenario in a **CDMA** cellular system.

### OTHER COURSE PROJECTS

- Spam URL classification using Machine Learning | *Course: Network Security* (Jan'19 - Apr'19)
- Image Dehazing using color attenuation prior and dark channel prior | *Course: Image Processing* (Jul'18 - Nov'18)
- Basic Image Editor tool in Python | *Course: Image Processing* (Jul'18 - Nov'18)
- Wavelet based leaders and P leaders in Multi Fractal Analysis | *Course: Wavelets* (Jul'18 - Nov'18)

### TECHNICAL SKILLS

**Languages** : C, C++, Python, Bash scripting, HTML, PHP  
**Tools** : Matlab/Octave, L<sup>A</sup>T<sub>E</sub>X, Git.

### POSITIONS OF RESPONSIBILITY

- **Research Assistant:** System Administrator Laboratory, IIT Bombay (Jul'17 - Present)
  - o Building and maintaining website of EE department, maintaining TA feedback and allotment portals
  - o Designed online portals and coordinated for the **automation** of the activities in department admission process
- **Web Nominee:** Post Graduate Academic Council, IIT Bombay (Jul'18 - Jun'19)
- **Mess Secretary:** Hostel-1, IIT Bombay (Sep'17 - Mar'18)

### CO & EXTRA CURRICULAR ACTIVITIES

- Completed **Machine Learning** course by **Andrew Ng** from Coursera. (2019)
- Conducted a introductory session on **Linux, vim and Git** as a part of Bridge Course. (2019)
- Completed a 100 hrs course on **Chinese** language conducted by International Relations office IIT Bombay. (2019)
- Completed Basic course in **French** Language from Vivekananda Institute of Languages, Hyderabad. (2013)