Atul Bansal

4th Year Doctoral Student
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Education

Carnegie Mellon University — Pittsburgh, PA
- *PhD Candidate in Electrical and Computer Engineering; GPA: 4.00/4.00* — *Aug 2019 – Present*
  Advisors: Prof. Swarun Kumar and Prof. Bob Iannucci

Indian Institute of Technology, Kharagpur — Kharagpur, India
- *M. Tech. and B. Tech.(Honors) in Electronics and Electrical Communication Engineering* — *Jul 2014 – May 2019*
  Advisors: Prof. Gautam Saha

Research Projects:

- **OwLL: Accurate LoRa Localization** — Carnegie Mellon University
  Prof. Swarun Kumar and Prof. Bob Iannucci — *Jul 2020 - Oct 2020*
  - Developed an accurate LoRa based outdoor localization system which performs localization by frequency hopping in ISM and TV whitespace bands
  - Ensured low power consumption by developing a smart frequency selection algorithm to minimize the number of frequencies hopped
  - Obtained an overall 9 m median error in both Line of Sight and Non-Line of Sight situations tested across an area of 66000 sq.m

- **Does Ambient RF Energy Suffice to Power Battery-free IoT?** — Carnegie Mellon University
  Prof. Swarun Kumar and Prof. Bob Iannucci — *May 2020*
  - Performed a simulated study to determine if ambient RF energy is enough to power RF backscatter devices across rural and urban areas
  - Discussed some open challenges in realizing ambient backscatter systems in the real world
  - Observed that more than 95% of the overall area does not receive enough ambient power to power up a backscatter device for both urban and rural areas

- **Relative Localization using Bluetooth Low Energy signals** — University of Alberta
  Prof. Ioanis Nikolaidis — *May 2018 - Jul 2018*
  - Designed a framework with dynamically moving Bluetooth Low Energy based sensor nodes, which only used Advertising packets to transmit information and localize themselves by communicating with one another.

- **IntuWition: WiFi based material sensing** — Carnegie Mellon University
  Prof. Swarun Kumar — *May 2017 - Jul 2017*
  - Used the change in the polarization of WiFi signal on reflection with different objects to classify different materials present in the environment
  - Developed a working localization system on a drone to localize the different objects present in the environment

Internships

- **Office of the CTO** — Microsoft Azure for Operators
  Manikanta Kotaru and Victor Bahl — *Jun 2022 - Aug 2022*
  - Worked on developing a novel system based on 5G ORAN protocol stack with many applications.
  - Performed simulations to confirm validity and then finally created a basic bare bones demo of the whole system on a 5G testbed

Publications

OwLL: Accurate LoRa Localization using the TV Whitespaces, *Atul Bansal, Akshay Gadre, Vaibhav Singh, Anthony Rowe, Bob Iannucci, Swarun Kumar, ACM/IEEE IPSN 2021*

Poster: Does Ambient RF Energy Suffice to power Battery-free IoT?, *Atul Bansal, Swarun Kumar, Bob Iannucci, ACM MobiSys 2020*

Scholastic Achievements

- Awarded the Ben Cook Presidential Graduate Fellowship - 2022-23
- CMU ECE Department Recognition Award for Exemplary Qualifying Exam Performance, Fall 2021
- Awarded CIT Dean Fellowship 2019
- Kishore Vaigyanik Protsahan Yojna (KVPY) 2013-14 scholar

Programming Skills

- **Languages:** C, C++, Python, MATLAB
- **Tools:** EAGLE, LTSpice, Cadence, Visual Studio, Verilog, mbed, Arduino

Teaching Experience

- **Computer Networks** — Carnegie Mellon University
  Teaching Assistant — *Aug 2021 - Dec 2021*
- **Computer Networks** — Carnegie Mellon University
  Teaching Assistant — *Jan 2021 - May 2021*
- **Digital Signal Processing Laboratory** — Indian Institute of Technology Kharagpur
  Teaching Assistant — *Jan 2019 - May 2019*
- **Basic Electronics Laboratory** — Indian Institute of Technology Kharagpur
  Teaching Assistant — *Jul 2018 - Nov 2018*