Yamini Shankar

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RESEARCH SUMMARY

- Doctoral Focus (IIT Madras, 2022 – Present): Investigating implications of Wi-Fi sensing on device battery, network performance, and privacy. Focused on adversarial use cases of wireless sensing and mitigation strategies for resource-constrained IoT devices. Exploring efficient, privacy-preserving sensing frameworks and interference-aware designs for Integrated Sensing and Communication (ISAC).(2 Publications, 3 under review)
- Industry Research (Samsung R&D Institute, 6-month Internship, 2025): Designed a battery-oriented, coarse-grained Wi-Fi localization framework for smartphones. Worked on generalizing Wi-Fi sensing for multi-room setups, addressing robustness and scalability challenges.
- Master's Thesis (JNU, 2020–22): Developed optimization algorithms for computation offloading and service placement in Fog/Edge networks (1 journal publication).
- Research Internship (MNNIT Allahabad, 2020): Hands-on expertise in network simulators and real systems.

EDUCATION

- Indian Institute of Technology, Madras – Ph.D. (Computer Science & Engineering), 2022 – Ongoing
- Jawaharlal Nehru University, New Delhi – M.Tech (CS & IT), 2020 – 2022
- Central University of Haryana – MCA, 2017 – 2020
- St. Anthony's College, NEHU, Shillong – B.Sc. (CS), 2014 – 2017

PROJECTS & RESEARCH EXPERIENCE

- **PhD Research** (IIT Madras): Leveraging Wi-Fi channel state information (CSI) for human sensing and localization, focusing on implications of wireless sensing: battery impact, network scalability, and privacy.

○ Built a **software-defined radio (SDR) based Wi-Fi testbed** running a customizable open-source 802.11 stack, enabling real-time CSI collection and sensing experiments.

○ Investigated **energy implications** of Wi-Fi sensing on smartphones and IoT devices, quantifying and optimizing battery drain under different sensing configurations.

○ Analyzed **network-level scalability** by studying how multiple sensing nodes impact bandwidth, throughput, and latency.

○ Explored **privacy concerns** and adversarial aspects of Wi-Fi sensing, developing defense mechanisms against unauthorized sensing.

○ Published results in IEEE ANTS 2024 and MobiHoc 2024, proposing methods to defend against adversarial sensing and optimize network resource utilization for distributed wireless sensing.

- **Samsung R&D Institute India** – Bangalore (Internship, Jan–Jul 2025):

  ○ Battery-efficient Wi-Fi Localization: Developed coarse-grained smartphone localization techniques with reduced energy consumption.

  ○ Multi-room Wi-Fi Sensing: Generalized sensing approaches for multiple environments, ensuring scalability and robustness.

- **Service Placement in Fog Computing** (M.Tech Thesis, JNU): Investigated Service Placement Problem (SPP) with multi-objective Particle Swarm Optimization. Improved service spread, energy efficiency, and resource utilization under constraints. Publication: World Wide Web Journal, 2022.

TECHNICAL SKILLS

- Programming/Scripting: C, C++, Python, MATLAB
- Wireless Systems: Wi-Fi CSI, SDRs, FPGAs, Microcontrollers, Sionna RT
- Tools/Frameworks: NS-3, MATLAB, PyTorch, TensorFlow

PUBLICATIONS

- Practical Defense Against Adversarial WiFi Sensing. **IEEE ANTS 2024.**
- Improving Network Resource Utilization for Distributed Wireless Sensing Applications. **AIoT @ MobiHoc 2024.**
- A survey on nature-inspired techniques for computation offloading and service placement in emerging edge technologies. **World Wide Web (2022): 1-59.**

EXTRACURRICULARS & VOLUNTEERING

- Debating: National Youth Parliament (UNDP, 2018); Red Cross Society (2019)
- Music: Guitar & Ukulele enthusiast
- Volunteering: NPTEL GATE CSE SME; Rural IT outreach, Shillong (2015–16)