# Saif Ur Rahman

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## Education

**University of Illinois at Urbana-Champaign** **Jan 2023 – May 2027**

*PhD. in Computer Science — GPA: 3.80/4.00 — Advised by: Elahe Soltanaghaei* *IL, USA*

- **Relevant Coursework:** Deep Generative Models, Advanced Wireless Networks and the Internet of Things, Machine Learning for Signal Processing, Advanced Computer Networks

**Lahore University of Management Sciences (LUMS)** **Sept. 2018 – May 2022**

*Bachelor of Science in Electrical Engineering, Minor in Computer Science — GPA: 3.98/4.00* *Lahore, Pakistan*

- **Relevant Coursework:** Digital Signal Processing, Distributed Systems, Information Theory & ML

## Experience

**Learning Neural Wireless Fields for Predictive Channel Modeling** **Jan 2023 – Present**

*Research Assistant, University of Illinois Urbana-Champaign — Advisor: Prof. Elahe Soltanaghai* *Champaign, IL*

- Developed a novel wireless differentiable rendering technique using **wedge rays**, inspired by volumetric rendering in **Mip-NeRF 360**, to accurately model the 2D Angle of Arrival (AoA) from a Uniform Linear Array (ULA).
- Architected this rendering technique into a physics inspired deep generative model using the **Instant-NGP** framework in **PyTorch** to learn a continuous representation of the wireless propagation field.
- Leveraged the learned model to predict location-specific multipath channel characteristics, enabling proactive link optimization for mobile and mission-critical applications (e.g., AR/VR, robotics).
- Engineered a custom data collection pipeline in **C++** and **ROS** using the **Nexmon-CSI** tool to extract and publish Wi-Fi Channel State Information (CSI) for model training.

**Device-Free RF Sensing for Health and Environmental Monitoring** **Jan 2021 – May 2022**

*Undergraduate Research Assistant, Lahore University of Management Sciences — Advisor: Prof. M. Tahir* *Lahore, Pakistan*

- Developed a non-invasive respiration monitoring system by training an **LSTM** model on phase data from **UHF RFID** backscatter tags, achieving robust breathing rate estimation even during subject motion.
- Designed a soil moisture estimation system using **USRP SDRs** to measure Wi-Fi band RSSI attenuation, correlating signal loss with ground-truth moisture content derived from Topp's Equation.
- Implemented signal processing pipelines in **MATLAB** to filter noise, extract features, and calibrate phase/amplitude data from raw CSI and RSSI measurements collected in dynamic environments.

**Large-Scale Social Media Analysis for Urban Policy** **Aug 2022 – Nov 2022**

*Research Assistant, Center for Urban Informatics, Technology & Policy — Advisor: Prof. M. Uppal* *Lahore, Pakistan*

- Contributed to a **$1.5M World Bank-funded** project by building a data analysis pipeline to process ∼**500K tweets**, providing insights on pressing social issues to city government.
- Fine-tuned a **BERT**-based transformer model for topic modeling and sentiment analysis, and deployed the results in an interactive GUI dashboard for stakeholder use.

## Publications

**WiNeRF: Hardware-Constrained Radiance Fields for Wireless Channel Modeling**

***Saif Ur Rahman**, Elahe Soltanaghai, et al.*

Under review at ACM SenSys 2026

## Technical Skills

**Languages:** Python, C++, MATLAB, Go, C#
**AI & ML Frameworks:** PyTorch, TensorFlow, scikit-learn, Pandas, NumPy
**Wireless & Systems:** NVIDIA Sionna RT, Nexmon CSI Tool, MATLAB (Simulink), Wireless Insite, ROS, Linux Network Programming (TCP/UDP Sockets),
**Hardware:** USRP SDRs, ADALM-PLUTO, TI mmWave Radars
**Developer Tools:** Git, Docker, CMake, SSH, Bash Scripting

## Teaching Experience [Teaching Assistant]

- CS 225: Data Structures & Algorithms (*Undergraduate*) UIUC, Fall 2025
- EE 514 / CS 535: Machine Learning (*Graduate*) LUMS, Spring 2022
- ECE 310: Signals and Systems (*Undergraduate*) LUMS, Spring 2021

## Honors & Awards

- Qualcomm Innovation Fellowship Finalist UIUC, 2025
- Ray Ozzie Computer Science Fellowship UIUC, 2023
- National Management Foundation (NMF) Gold Medal *(Top of EE Batch)* LUMS, 2022