

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF ENGINEERING AND APPLIED SCIENCE

RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

APPLICATION DEADLINE: April 29, 2024

PROJECT TITLE: Deep Learning Radio Fingerprinting in Wireless Networks

Physical Requirement : No physical requirement

Project's Technical Skills Requirement : machine learning, software defined radio, signal processing

Project's Available Positions : 1

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Project Description

Radio fingerprinting can authenticate wireless devices over Radio Frequency (RF) signals at the physical layer. It is a critical component for the security and trust of wireless networks. It can complement the wireless device authentication when traditional security methods, such as cryptography, are not available or difficult to deploy. Radio fingerprinting is feasible as RF signals carry non-linear hardware imperfections of radio frequency circuitry due to manufacturing variations.

The goal of this project is to develop neural networks to identify wireless devices for the purpose of radio fingerprinting. The students will (1) study machine learning, software-defined radio, and signal processing techniques; (2) leverage and extend existing neural networks that our group has developed to enhance the robustness and resilience of neural networks in the context of radio fingerprinting; (3) write code and conduct experiments over large-scale RF signals to demonstrate the accuracy of radio fingerprinting in various scenarios. Students with background or experience in deep learning, signal processing, or software defined radio are strongly encouraged to apply. Undergraduate researchers who previously worked with Dr. Wang have received UC undergrad research fellowship awards and have published multiple research papers.