ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF ENGINEERING AND APPLIED SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2026

PROJECT TITLE: Secure IoT: Low-Power Hardware Solutions for Wireless Vulnerabilities

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Project Description

Why This Project Matters:
Smart sensors are everywhere, powering wearables, medical devices, and industrial IoT systems.
But here's the challenge: when these devices communicate wirelessly with each other or the cloud, they become vulnerable to cybersecurity attacks. A single breach can disrupt communication or compromise sensitive data, with serious consequences in healthcare and mission-critical applications.

What You'll Do:
In this project, you'll dive into the world of IoT security at the hardware level. Your tasks will include:
1) Exploring common vulnerabilities in IoT networks.
2) Developing low-power authentication techniques to distinguish real IoT devices from spoofers.
3) Surveying and analyzing existing circuit topologies for Radio PHY layer security to assess their robustness.

Key Deliverables:
1) Literature review of existing low-power authentication techniques.
2) Transistor-level circuit design based on literature review.
3) A comprehensive report with circuit diagrams, methodology, and simulation results.
4) A working prototype that includes: a) Demonstration of a real-world cybersecurity attack on IoT devices, b) Implementation of the proposed solution using off-the-shelf components.

Physical Requirement:
Light lab work at an electronics bench (optional soldering), light lifting (?15 lb), and occasional short outdoor setups.

Project’s Technical Skills Requirement:
Student should be comfortable with Arduino-style microcontroller programming, basic analog electronics, Python/MATLAB plotting and lab instruments (scope, voltage supplies), experience with SPICE simulations is a plus.

Why Join?
You’ll gain hands-on experience in RF/mixed-signal IC design and hardware security - skills that are in high demand for careers in IoT, embedded systems, and cybersecurity.

Note: This is a living plan. The advisor may adjust scope or milestones to ensure feasibility and safety, with any changes communicated in advance.