Cedar Rose D. Leach

cdleach@usc.edu | (310) 938-7235 | linkedin.com/in/cedar-rose-leach

Education

University of Southern California **3.85 GPA**

B.S. and M.S. in Electrical and Computer Engineering *Aug. 2023 – May 2027*

- Relevant Coursework: Computer Architecture, VLSI Design, ML Accelerators, System Architecture, Embedded Systems, Digital Circuits, Software Design

Publications / Abstracts

N. D. Barrera, D. Nguyen, E. Ramirez, C. Leach, N. Abbasi, A. Molisch, C. Sideris, E. Meng, **"Implantable Flexible GHz Waveguide for High Data Throughput Neural Recording Interfaces"**. Neural Interfaces, 2025. Arlington, VA, USA, June 2025.

Islam, M.S., Cha, S., Hassan, M.F., Cai, W., Saniat, T.S., Leach, C., & Khan, Y. **"Printed Wearable Sweat Rate Sensor for Continuous In Situ Perspiration Measurement".** *Advanced Intelligent Systems*, 2025. DOI: 10.1002/aisy.202400927

Experience

Arm, *Power Analysis and Architecture Intern* *June 2026 – August 2026*

- Modeled gate-level power for NPU interconnect blocks using PrimePower and workload-replay FSDB activity.
- Analyzed mesh-fabric power, bandwidth, and traffic across block- and tile-level designs using workload waveforms.
- Built AI agents and Python/Linux workflows to automate batch execution, run-health triage, waveform inspection, power extraction, and traffic visualization.
- Integrated a new HSPICE-based glitch power characterization, validated it against transistor-level simulations and debugged activity-propagation issues.

Northrop Grumman, *Microelectronics Intern* *June 2025 – August 2025*

- Validated wafer dischargers for e-beam lithography via 40+ resistivity and transistor gate-alignment experiments.
- Optimized coating procedures and analyzed failures across test lots, yielding $26,000 in savings.

Biomedical Microsystems Lab @ USC, *USC Provost Research Fellow* *June 2024 – May 2025*

- Developed and verified a PCB in Altium to test inductive coupling efficiency in RF low-amplitude systems.
- Characterized and fabricated silicon-polymer neural recording probe shaft for high-fidelity, long-term implantability.
- Modeled magnetic fields, inductance, Q-factor, and resonance frequency in COMSOL to evaluate coil design.

Wearable Sensors, Khan Lab @ USC, *CURVE Research Fellow* *January 2024 – May 2024*

- Designed PCB and firmware for the analog front-end of a mixed-signal electrochemical sensing system with EAGLE.
- Programmed Arduino firmware to acquire and process mixed-signals of an electrochemical sensing system.
- Modeled a printed wearable sweat rate sensor in Fusion 360; figures were published in Advanced Intelligent Systems.

Selected Projects

FPGA Piano Game on Xilinx Artix-7, *Verilog* *December 2024*

- Created an interactive piano game in Verilog using FPGA switches as keys and VGA output for real-time visuals.
- Implemented a state machine for difficulty levels and validated switch-to-key mapping, chord progression logic, and VGA rendering.

Accessible Photo Library App for the Blind, *Co-Founder of Memoir Photos* *September 2024 – Present*

- Founded an audio-based photo library for visually impaired users to relive memories using React Native and Python.
- Deployed a full-stack mobile app with scalable database, authentication, and LLM APIs for image captioning.
- Won $6K+ in funding, reached 50+ blind users, and earned 1st place in Trojan Tank Pitch Competition.

USC Makers, *Robotics, Embedded Systems, Control Systems* *September 2023 – Present*

- Developed C++ microcontroller firmware to translate brain-computer interface signals into drone commands
- Developed and tested the sensor-to-control data path: signal acquisition, command mapping, wireless communication.

Technical Skills

Skills: Power-Bandwidth Analysis, RTL, Performance Analysis, NPU Interconnects, Computer Architecture, Validation
Tools: C++, Python, Verilog, PrimePower, HSPICE, Verdi, Vivado, Linux, Git, Altium Designer