Ahmed Mohamed Amin

Electrical Engineer – RF/Microwave, Signal Processing

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Electrical engineer specializing in RF/microwave systems and radar signal processing, with hands-on experience in SDR-based FMCW design, multilayer PCB development, and sensor fusion techniques.

PROFESSIONAL EXPERIENCE

SOUTHERN UTAH UNIVERSITY **Cedar City, UT**

AI/ML Lab - Research Assistant **May 2025 – Current**

- Developed a multi-sensor fusion framework for planetary rover localization using GPR (Mars LGPR dataset), IMU, and wheel encoders under GPS-denied conditions.
- Implemented Extended Kalman filtering for nonlinear state estimation, abstract submitted to **EMI 2026.**
- Redesigned 4-layer control PCBs with optimized stack-up, ground plane continuity, and decoupling network layout to reduce switching noise and improve signal integrity.

Undergraduate Teaching Assistant **Aug 2024 – Dec 2025**

- Modernized Microprocessors (EE-3780) labs to make ARM assembly experiments more hands-on and repeatable using STM32 Nucleo boards, CPUlator, and Keil µVision.
- Updated Communication Circuits labs to include experimental small-signal transfer function extraction of LM386 amplifier stages and LC/RC filters.
- Graded Programming for Engineers + Robotics labs, helping students debug embedded control code.

Electronics Laboratory Assistant **Aug 2024 – May 2025**

- Assisted in establishing a PCB fabrication lab using the Voltera Nova printer and CNC cutting machine to support rapid PCB projects and research.
- Assisted in solving the mismatch alignment issue between the Voltera printer and the CNC cutting machine by designing KiCAD templates.
- Calibrated and verified measurement accuracy of oscilloscopes, multimeters, and power supplies.

GAF **Cedar City, UT**

R&D Internship – Industry Challenge Lab **Mar 2025 – May 2025**

- Designed embedded control architecture for combustion and emission monitoring using ESP32 microcontrollers with feedback from temperature and gas sensors.
- Evaluated power and energy efficiency of the system (target 5–6 kWh/kg) and contributed to documentation for control-loop optimization and scalability.

VIVINT **Dallas, TX**

Embedded Systems Intern **Apr 2024 – Aug 2024**

- Debugged custom PCBs and firmware for IoT devices
- Learned how to fix mixed-signal issues, USB differential pair length mismatches, and grounding problems
- Implemented low-level drivers (I^2C, UART, SPI).

EDUCATION

SOUTHERN UTAH UNIVERSITY **Cedar City, UT**

Bachelor of Science, Major in Electrical Engineering; Minor in Mathematics **2023-2025**

(SUU GPA: 3.80, Cumulative GPA: 3.33)

HIGHER TECHNOLOGICAL INSTITUTE **10th of Ramadan, Egypt**
Uncompleted Degree, Electrical Eng. Electronics and Communications Diploma **2017-2022**
(HTI GPA & Cumulative GPA: 2.33)

PROJECTS

Capstone Project: Low-Cost Dual-Band Radar System for Drone Detection and Tracking

- Designed, implemented, and experimentally validated a bistatic 5.8 GHz SDR-based FMCW radar and a 24 GHz Doppler radar within a $1,000 budget, introducing the feasibility of 3D localization through dual-receiver TDoA/AoA processing in the future.
- Conducted controlled measurements on a 24 GHz K-LC7 front-end, mitigating LO leakage, showed that it is reliable for Human motion sensing but SNR-limited for FMCW ranging on small-RCS drones.

Capstone Conferences Attended

- **Utah Conference on Undergraduate Research** (**UCUR**)**, 2025**: Presented *"Radar System for Drone Detection"*, introducing the system concept, research motivation, and design architecture integrating 5.8 GHz SDR-based FMCW radar and 24 GHz radar modules.
- **Utah Academy of Sciences, Arts & Letters** (**UASAL**)**, 2025**: Presented *"Low-Cost Dual-Band Radar System for Drone Detection and Tracking"*, demonstrating experimental validation of bistatic 5.8 GHz FMCW radar using log-periodic antennas and showing the feasibility of TDoA/AoA-based localization.
- **Festival of Excellence** (**FOE**)**, 2025:** Presented final capstone poster *"Low-Cost Dual-Band Radar System for Drone Detection and Tracking"*, summarizing the integrated dual-band.

RESEARCH ACHIEVEMENTS

Undergraduate Research

5G Self-Interference Cancellation Antenna (Spring 2025)

- Dual-fed microstrip (2.45 GHz) + quadrature coupler methodology: −43 dB isolation ***[I-ETC 2026 submission]***

Publications

- Ahmed M. Amin, Gandhiraj R., and Rajagopalan Thiruvengadathan, "Integration of Balanced Fed Antenna Approach for SIC in beyond 5G of mobile networks", manuscript in preparation.

Upcoming Conferences 2026

- **EMI Machine Learning in Mechanics 2026**: Submitted the abstract of "GPR Sensor Fusion for Robust Rover Localization in planetary rovers", waiting for an acceptance notice.
- **I-ETC 2026:** in process of submitting the manuscript of "Integration of Balanced Fed Antenna Approach for SIC in beyond 5G of mobile networks".

Honors & Awards

- CONNECT Grant — Undergraduate Research Funding Award ($1,000). Link
- Dean's List — Recognition of Academic Excellence (4 semesters). Link