Mustafa Omran

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EDUCATION

The University of Texas at Austin — Austin, TX
Bachelor of Science in Electrical and Computer Engineering — Expected May 2028
Focus: Computer Architecture and Embedded Systems
Coursework: Embedded Systems (ARM Cortex-M0+, C/Assembly); Intro to Computing (LC-3 Architecture); Circuits & Power Electronics; Probability & Random Processes; High Performance Computing (MPI, CUDA)

RESEARCH AND ENGINEERING EXPERIENCE

National Institute of Standards and Technology (NIST) - U.S. Department of Commerce — Boulder, CO
5G-NR Systems Intern, Communications Technology Laboratory - Div. 675 — May 2026 - Aug 2026

- Built and published **LINDA**, NIST's live radio-spectrum monitoring tool for 5G interference research, used by its NASCTN team; ∼38k lines, ∼200 automated tests, and support for 8 software-defined radio (SDR) families.
- Designed a multi-threaded Python backend (FastAPI/WebSockets) that streams live spectrograms and power spectral density to multiple users across browser, terminal, kiosk, and CLI interfaces.
- Validated hardware behavior by building a qualification tool that confirms every radio setting through hardware readback; root-caused a 52–103 kHz frequency-axis error and a slow frame rate.
- Cut setup to one command by automating radio detection, drivers, and Linux service deployment on Raspberry Pi and NVIDIA Jetson radios; built with AI coding agents (Claude Code, Codex).

Autonomy Research Institute - Federal Aviation Administration UAS Test Site — Corpus Christi, TX
Engineering Intern, Texas A&M University Autonomy Research Institute — May 2025 - Sep 2025

- Designed a field LiDAR device used by 20 engineers: Raspberry Pi, Arduino, IMU-guided aiming, ∼2,000 lines of Python/C++, calibration, sensor self-tests, and startup fault checks.
- Rebuilt and flight-tested a decommissioned hexacopter with ArduPilot, redundant comms, and safety-focused power management, reaching ∼11 minutes of flight with a 7S camera/gimbal payload.
- Built a three-axis remote gimbal controller over a 900 MHz telemetry link with a physical servo "mirror gimbal" showing commanded orientation in real time.

Texas A&M University–College of Engineering — Corpus Christi, TX
Undergraduate Research Assistant — Sep 2024 - Aug 2025

- Built test fixtures and wiring and ran electrical, charge/discharge, and mechanical tests on conductive cement composites for smart-infrastructure energy storage; co-authored a peer-reviewed paper.

Massachusetts Institute of Technology (MIT) — Cambridge, MA
AI & Health Intern, Abdul Latif Jameel Clinic for Machine Learning in Health — Jul 2023

- Studied ML models for medical imaging (tumor recognition) through data analysis and algorithm development.
- Explained AlphaFold's protein structure prediction with a 5-person team; presented to 50+ attendees.

PROJECTS AND AWARDS

Energy AI Hackathon – Finalist, UT Austin — Jan 2026

- Co-built a Python machine learning workflow in 48 hours predicting three-year oil production for 12 new wells from 71 wells of data, with uncertainty quantification; presented to an industry panel.

PUBLICATIONS AND SOFTWARE

Omran, M. (2026). *Live IQ navigation and display application (LINDA)* (Version 1.0.2) [Computer software]. NIST. https://doi.org/10.18434/mds2-4290

Soliman, N., Ioannidou, K., Divoux, T., Backov, R., **Omran, M.**, Nîrca, T., & Pellenq, R. J.-M. (2025). Nano-carbon black (nCB)-dispersed cement composites: A macro-to-nano investigation revealing trade-offs between electrical conductivity and mechanical strength. *Construction and Building Materials, 489*, 142246.

TECHNICAL SKILLS

Languages: Python, C/C++, ARM Assembly, MATLAB, JavaScript, Julia, Bash, HTML/CSS
Software/AI: FastAPI, WebSockets, REST APIs, pytest, NumPy, CUDA, MPI, Linux, Git, ML, AI coding agents
Hardware/Embedded: ARM Cortex-M0+, ESP32, Raspberry Pi, I2C/SPI/PWM, ADC/DAC, SDR, oscilloscope
Prototyping: Fusion 360, PCB design, 3D printing, CNC, soldering; hardware testing, validation, debugging
Spoken: English, French, Arabic (fluent), Spanish (limited)