Ahmet Erdem

+1 437 339 6435 | ahmet.erdem@mail.utoronto.ca | ahmetrifaterdem | ahmetrerdem.com

Education

University of Toronto — Expected May 2028
BASc. in Electrical Engineering — *Toronto, ON*

- **Coursework:** Analog Electronics, Fields and Waves, Communication Systems, Digital Electronics, Control Systems

Experience

Inertial Sensors Engineering Intern — June 2026 - August 2026
ROKETSAN — *Ankara, Turkiye*

- Characterized deterministic and stochastic IMU errors by Allan variance in MATLAB, on both the development sensor and higher-grade units, to set the process noise matrix
- Implemented a **10-state EKF** over position, velocity and quaternion with a hand-derived specific-force Jacobian, cutting 320 s dead-reckoning drift from **114 km to under 4 m**
- Collected the dataset first-hand and aligned attitude by **TRIAD** from gravity and magnetic vectors, after quantifying that gyrocompassing fell below the sensor noise floor

RF and Antenna Design Engineer — January 2026 - April 2026
University of Toronto Aerospace Team — *Toronto, ON*

- Sized a **2.4 GHz** inset-fed patch by hand from the transmission-line model and tuned it in HFSS, a **38 x 29.4 mm** patch on 1.6 mm FR-4 reaching **-21.4 dB** S11
- Matched it with a **9.4 mm inset** for the 50 ohm feed rather than a transformer, then took it into Altium as a 2-layer board with the stackup pinned to **Dk 4.4**

Projects

Discrete Gilbert-Cell Quadrature Mixer | *SPICE, Altium, PyVISA*

- Designed quadrature Gilbert-cell mixers from **16 discrete BJTs**, each cell with its own current-mirror tail, sized for conversion gain off a single **5 V** supply
- Built the HF receive chain around it: LC input filter, baluns turning the single-ended RF and LO inputs into the differential pairs the cells need, buffered bias rails, and a Sallen-Key low-pass at **96.5 kHz**
- Ran operating-point, AC and transient analysis on the full chain in SPICE, then laid out a 2-layer board in **Altium**, hand-assembled all SMD parts and brought it up stage by stage
- Automated characterization in Python over PyVISA: **37.5 dB conversion gain**, I/Q balance inside **0.65 dB**, quadrature within **10 degrees** against a 12.5 degree spec

137 MHz Satellite Receiver Front-End | *SPICE, scikit-rf, Altium*

- Stabilized a **K = 0.03** device with shunt feedback, holding the geometric stability factor above unity from **1 MHz to 6 GHz**, verified in both SPICE and scikit-rf
- Placed a SAW filter after 18.4 dB of gain so Friis divides its 4.3 dB insertion loss, giving **1.89 dB cascaded noise figure** instead of 4.3 dB at the input
- Split the system across two boards to keep **60 dB** of FM rejection away from **32 dB** of gain, verifying 32 dB gain and **1.1 dB** filter insertion loss on a VNA

Wi-Fi CSI Indoor Localization | *ESP-IDF, Python, scikit-learn*

- Modified ESP-IDF firmware on a three-node ESP32 mesh with ESP-NOW beacons and UDP streaming for a stable nine-link channel-state feed at **50 Hz**
- Corrected carrier frequency and timing offset per packet, then trained RandomForest and CNN models with Kalman tracking for **0.79 m median error** under leave-location-out CV

Technical Skills

Analog and Mixed-Signal: transistor-level design, filters, loop stability, noise analysis, impedance matching, S-parameters
EDA and Simulation: LTspice (SPICE), Cadence Virtuoso, Ansys HFSS, Altium Designer, scikit-rf, MATLAB
Test and Automation: oscilloscope, VNA, function generator, spectrum analyzer, PyVISA, Keysight IO Libraries
Programming: Python, C, C++, MATLAB, Verilog, ESP-IDF