Mustafa Alp Ekici

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Ankara, Turkey |

Education

Middle East Technical University, BS in Electrical and Electronics Engineering — Sept 2022 – June 2026

- GPA: 3.58/4.0 (Transcript)
- **Specialization:** Electronics

Middle East Technical University, BS in Computer Engineering — Sept 2020 – June 2022

- Transferred to Electrical and Electronics Engineering Department

Experience

Research Intern, TU Delft – Delft, Netherlands — July 2025 – Sept 2025

- Designed and simulated Love-mode SAW biosensors in COMSOL, analyzed the effect of guiding layer thickness on acoustic wave propagation through eigenfrequency studies.
- Developed MATLAB algorithms to simulate biofilm formation and established a LiveLink connection with COMSOL for automated 3D biofilm generation and integration into sensor models.
- Optimized sensor geometry and materials in COMSOL and analyzed phase shifts after integrating bacteria, correlating phase variations with bacterial quantity to evaluate sensor performance.

Part-time Engineer, METU MEMS Center – Ankara, Turkey — Sept 2024 – April 2025

- Conducted research on delta-sigma ADC architectures, readout circuitry for micro-g MEMS accelerometers, and sensor production methods within the scope of the project.

Engineering Intern, Avionics Systems Engineering Department, Roketsan – Ankara, Turkey — August 2024 – Sept 2024

- Gained in-depth knowledge of avionics systems and systems engineering principles, with a focus on their application in avionics.
- Conducted power processing analysis using LTspice, designing and simulating DC-DC converters and Pi filters while developing practical skills in electronic circuit simulation and analysis.

Research Intern, UMRAM – Ankara, Turkey — July 2024

- Designed and implemented RF Bias Tee circuits and Low Noise Amplifiers for 3T MRI systems using Altium Designer and Proteus, gaining hands-on experience in PCB design, soldering, and testing with network analyzers, while collaborating with Prof. Dr. Ergin Atalar and a team of engineers to optimize RF circuit designs in a leading MRI research center.

Full internship report available [here].

Projects

Review on Silicon-Germanium (SiGe) Technology

- Wrote a detailed technical review discussing the bandgap engineering and strain physics pertaining to SiGe Heterojunction Bipolar Transistors (HBTs).
- Analyzed cutting-edge fabrication methods such as UHV/CVD and deep-trench isolation for devices operating at sub-THz frequencies.
- Investigated the reliability of SiGe devices in extreme environments and assessed future trends in sub-THz applications and monolithic optoelectronics.

Full report available at: [here].

Neural-Network MAC Tile Accelerator Design (VLSI)

- Designed a Neural Network Accelerator on XFAB 180nm completing the RTL to Physical Layout flow with Cadence Genus & Innovus.

- Developed a Dual-MAC architecture achieving 2x throughput and 44% energy reduction compared to the Single-MAC design.
- Achieved timing closure at 50 MHz and completed physical verification (DRC/LVS).

Full report available at: [here].

X-Ray CT Simulation & Image Reconstruction

- Developed from scratch in MATLAB the Forward Projection and Inverse Reconstruction algorithms.
- Developed the Ray-Driven Exact Path Length method for accurate sinogram creation and performed sensitivity analysis on sampling parameters.
- Demonstrated that Filtered Backprojection decreased reconstruction error by around 80% when compared to Unfiltered Backprojection.

Full report available at: [here].

Micro Air Conditioner Designing

- Designed and implemented an analog micro air conditioner by integrating sensing, control unit, operation unit and RGB LED display; performed LTspice simulations and breadboard prototyping to realize the design.
- Conducted simulations and experimental tests to achieve autonomous temperature regulation with less than $\pm 0.8°$C error, including validation of heating and cooling performance
- Programs Used: LTspice

Full report available at: [here].

Power Cable Selection Interface Design

- Designed and developed a Python-based GUI tool to automate power cable selection by integrating electrical engineering calculations with an intuitive interface.
- Implemented algorithms to calculate current rating, voltage drop, line losses, voltage regulation, and applied temperature and trench correction factors based on international standards.
- Performed a 10-year economic analysis combining installation costs with long-term energy loss expenses to optimize cost efficiency.
- Programs Used: Python (PyQt5, Pandas)

Full report available at: [here].

Skills

Programming & Software: Sentaurus TCAD, Cadence, Python (PyQt5, Pandas), MATLAB, COMSOL Multiphysics (LiveLink), LTspice, Altium Designer, Proteus, KiCad

Languages

Turkish: Native

English: C2

German: A2

Certifications

Cleanroom Training Certificate — METU MEMS Center
Trained and certified for cleanroom work, gaining practical experience with entry procedures, safety rules, and proper dressing

Honors and Awards

Departmental Academic Merit Award (BKA), METU Electrical and Electronics Engineering — Feb 2026

- Recognized by the department for outstanding academic performance during the 2025-2026 Fall semester.