

Dilara Caglar

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EDUCATION

Carnegie Mellon University

Anticipated Graduation - **May 2028**

B.S. Electrical and Computer Engineering (ECE)

Additional Major: Engineering Design, Innovation & Entrepreneurship (EDIE)

Relevant Coursework: Computer Systems, Digital Systems Design, Analog Circuits, Signals & Systems, Data Structures, Linear Algebra, Differential Equations, Robotics, Computer Architecture, PCB Design

RELEVANT EXPERIENCE

ASIC & AI Accelerator Design Undergraduate Researcher | Nexus Research Group | Carnegie Mellon University

Advisor: Tathagata Srimani

January 2026 - Present

- Built pre/post-silicon validation workflows using JTAG and BIST to verify functionality of integrated ASIC systems
- Debugged hardware test failures across signal integrity and power delivery, identifying timing and stability issues
- Conducted system-level validation of 3D-stacked architectures, analyzing performance bottlenecks and interconnect behavior
- Designed high-speed PCBs with controlled impedance and signal integrity constraints, validating using lab instrumentation
- Characterized system behavior under real-world conditions and documented performance/reliability tradeoffs

Hardware Architecture Research Intern | SAFARI Research Group | ETH Zürich

May 2025 - December 2025

Advisor: Prof. Onur Mutlu

(Onsite Summer 2025, Remote thereafter)

- Designed DRAM-based architectures for real-time signal processing (FFT/INTT pipelines) with memory and bandwidth constraints aligned with parallel compute workloads
- Mapped compute pipelines onto memory subarrays to enable parallel, low-latency data processing for structured workloads
- Extended Python-based frameworks (Ramulator 2.0, CipherMatch) for system-level performance evaluation
- Analyzed latency, throughput, and bandwidth tradeoffs relevant to real-time sensing and instrumentation-style workloads
- Identified and mitigated memory access bottlenecks through optimized data placement and scheduling strategies

Teaching Assistant | Intro to Electrical & Computer Engineering | Carnegie Mellon University

August 2025 - December 2025

- Guided 200+ students in hardware testing, debugging methodologies, and validation techniques in analog circuit labs

PROJECT EXPERIENCE

Printed Circuit Board Fabrication

Spring 2026

- Designed and laid out custom PCBs using industry-standard CAD tools, translating schematics into manufacturable designs
- Built and validated fully assembled PCBAs using lab instrumentation ensuring functionality and design reliability

Embedded Systems: Cyber-Physical Systems Design

Spring 2026

- Implemented parallel ray-casting kernels for LiDAR simulation, enabling scalable multi-modal evaluation
- Developed ML pipelines (autoencoders, CNNs, diffusion models) for robot state reconstruction and sensor simulation
- Solved GNN-based optimization problems for robotic control and state representation

Computer Systems

Fall 2025

- Improved system performance by 3× through cache optimization, SIMD vectorization, and multithreading
- Developed concurrent systems in C/C++, including memory allocators and synchronization primitives

Electronic Devices and Analog Circuits

Fall 2025

- Designed and tested CMOS and mixed-signal circuits, validating performance using oscilloscopes and lab instrumentation
- Debugged circuit behavior and identified primary causes of signal anomalies through iterative testing

Wearable Motion Tracking & Rep Counting System (TartanHacks)

January 2026

- Developed an embedded sensing system using IMU sensors to track motion and classify exercise form in real time
- Processed accelerometer and gyroscope data to detect repetitions and evaluate movement quality
- Mapped real-time sensor data onto a 3D model in Unity, visualizing motion through a user-facing application
- Implemented data acquisition and filtering pipelines to improve signal reliability in dynamic condition

Arduino-Based Fan System (Build18 Hackathon)

January 2025

- Developed a real-time embedded vision system using Arduino and PyTorch with closed-loop PID control
- Prototyped mechanical components using 3D printing and integrated with embedded electronics

LEADERSHIP, ACTIVITIES & HONORS

CMU College of Engineering Student Council | *Secretary*

August 2025 - Present

CMU College of Engineering: First Year Advisory Board | *Head of Marketing*

August 2024 - May 2025

SKILLS

Hardware: DRAM/PIM Architecture, Mixed-Signal Circuits, Signal Integrity, PCB Design, FPGA Development, ASIC/SoC Design Flows, RTL Design (Verilog/SystemVerilog), Digital Logic, 3D printing

Software: Python, C/C++, Linux Systems Programming, NumPy, PyTorch, JAX, Verilog/SystemVerilog, VHDL, Assembly, Java

Tools: Oscilloscope, Function Generator, Altium, LTspice, GDB, Valgrind, Autodesk Fusion, Github, NVIDIA IsaacSim