

# Karla Madrigal

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## EDUCATION

**Cullen College of Engineering, University of Houston, Houston, Texas**

Expected Graduation Date: May 2028

Bachelor of Science in Electrical Engineering; Sophomore

**Texas A&M International University, Laredo, Texas**

Dual Enrollment Program, Systems Engineering Coursework (70 credit hours)

August 2020- May 2024

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## EXPERIENCE

**Create@UH Lab Assistant - Workstudy**

Cullen College of Engineering, Houston, TX

August 2025 – Ongoing

- Maintained safety protocols, emphasizing protective measures such as power tool risk mitigation using PPE during lab safety onboarding training for students.
- Coordinated and executed the first engineering skills workshop within the Create@UH program, collaborating with Cullen College of Engineering Student Organizations to strengthen student engagement.
- Provided mentorship and guidance to incoming students in soldering and troubleshooting embedded projects.

**Amazon Future Engineer Software Engineering Intern,**

May 2025 – August 2025

Amazon Fulfillment Technologies, Bellevue, WA

- Built a full-stack internal web app with React.js, TypeScript, AWS Lambda, CDK, and DynamoDB for warehouse staff to update operational parameters, saving hours of engineering support time.
  - Designed an intuitive, professional UI with robust input validation and user guardrails to ensure safe, non-technical configuration.
  - Refactored frontend code for clarity and maintainability, eliminating duplication and improving readability across the team.
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## PROJECTS

● **Micromouse - Autonomous Maze Solving Robot**

Fall 2024 – May 2025

- Designed a compact, 2-layer, SAMD21-based PCB, integrating a motor driver, IMU, boost converter, and IR sensors, optimizing autorouter performance and minimizing trace length.
- Wrote modular C++ code to integrate IR sensor input and real-time obstacle avoidance.
- Calibrated 7 IR sensors for obstacle avoidance and debugged I2C communication protocols.

● **Light-Up Ripple Tiles - Reactive Modular LED Matrix Tiles**

Jan 2026 – Ongoing

- Interfaced a 4x4 matrix of photodiodes and IR emitters with an ESP32 MCU, using a combination of MUXs, DEMUXs, and transimpedance amplifiers to convert photodiode current output into measurable voltage signals, ensuring signal integrity across the 16-sensor matrix.
  - Contributed to embedded firmware development, sensor calibration, and LED matrix programming using PlatformIO.
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## LEADERSHIP

*Institute of Electrical and Electronics Engineers – University of Houston Student Branch*

Fall 2024 – Present

● **Vice President**

December 2025 – Present

- Established and strengthened our connection with IEEE Houston Section, IEEE Region 5, etc.
- Strengthened existing technical programs, including workshops, internal competitions, external relations, and more by performing onboarding, training, and documentation.
- Improved internal operations by introducing an Infrastructure and Systems Chair to make IEEE-UH programs more accessible to incoming members.

● **Project and Workshops Chair**

August 2025 – December 2025

- Mentored and trained committee members to independently design, debug, and teach analog circuits, enabling a rotating, peer-led workshop model and hands-on learning.
  - Hosted workshops to help over 50 members learn practical skills, (Git, EasyEDA, KiCad, and Soldering).
  - Held weekly office hours to support students across experience levels (freshman-junior) in circuit design, debugging, and programming.
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## SKILLS AND CERTIFICATES

**Embedded & Hardware:** KiCad, LTspice, Sensors, Debugging | **Software:** C/C++, PlatformIO, Git, MATLAB