

# Max Kim

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## Technical Skills

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**Programming:** C/C++, Python, MATLAB/Simulink, TypeScript

**Controls & Robotics:** Feedback Control, PID Control, State Estimation, Sensor Fusion, Real-Time Control Systems

**Systems:** Linux, Embedded Systems, Microcontrollers, Hardware Interfaces

**Software Engineering:** Git, CMake, Docker, Bash, Microcontrollers, CI/CD

## Experience

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**Control Engineer,** Applied Control Engineering, Inc. – Baltimore, MD Jan 2025 – Present

- Designed and implemented closed-loop feedback control logic governing pumps, valves, and industrial actuators, ensuring stable operation and deterministic control behavior in real-world systems.
- Tested and validated distributed control logic integrating Ethernet/IP and Modbus TCP communication layers in live industrial environments, emphasizing deterministic execution and fault isolation
- Led delivery of a \$134K industrial controls project; owned PLC control logic and HMI development through deployment

**Graduate Researcher,** University of Maryland – College Park, MD Apr 2022 – Dec 2024

- Designed and implemented control-oriented digital twin models for abdominal aortic aneurysm (AAA) assessment using MATLAB, supporting simulation, estimation, and system validation
- Curated and processed a 600+ patient dataset in Python, filtering to  $N < 80$  matched cohorts; performed rigorous quantitative validation achieving 50–68% sensitivity at 75% specificity (comparable to trained experts), demonstrating structured problem solving and technical rigor.
- Developed end-to-end control software modules, including algorithm design, simulation, and performance validation.

## Projects

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**Embedded UAV Flight Control Stack** [github.com/khyeonn/pico-drone](https://github.com/khyeonn/pico-drone)

- Architecting a modular UAV flight control stack on the RP2350 (Raspberry Pi Pico 2) in modern C++ with hardware abstraction
- Developed a multiplicative extended Kalman filter (MEKF) for real-time attitude estimation, fusing 9-axis IMU measurements using a quaternion state representation
- Built deterministic real-time sensor acquisition and control loops for embedded flight software
- Developing a physics-based 6DOF simulation incorporating vehicle dynamics, actuator dynamics, and disturbance modeling to enable controller tuning, trajectory tracking validation, and Sim2Real testing prior to hardware deployment

### Auto Repair Shop Management System

- Built and deployed a production software system in Typescript for local auto repair shop billing 480+ invoices and \$98,000+ total gross revenue in the first 2 months, managing 20+ customers daily
- Increased daily service throughput from 10 vehicles/day to 20+ vehicles/day by redesigning job intake, invoicing, and workflow visibility
- Designed RESTful APIs and structured JSON-based data interfaces to manage job, invoice, and customer records
- Executed live CI/CD deployments during active operations; tested workflows and resolved a major outage overnight

## Education

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**University of Maryland, College Park** – M.S. in Mechanical Engineering (GPA: 3.77) Dec 2024

**University of Maryland, College Park** – B.S. in Mechanical Engineering (GPA: 3.70) May 2023