Kai Martell

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Education

Tufts University Medford, MA

- Masters of Science in Mechanical Engineering GPA: 3.92, C/O 2026
- Bachelors of Science in Biomedical Engineering, Magna Cum Laude, Dean's List All Semesters GPA: 3.58, C/O 2025
- Relevant Coursework: Biomechanics, Circuits, Engineering Design, Biophotonics, Biothermodynamics, Robotics, Design for Fabrication, Design Capstone, Dynamics and Controls

Experience

Masters Thesis Project *Tufts Center for Engineering Education and Outreach* | Sept 2025 – Current

- Developed ROS2 packages for a Pi5 based robotic car, integrating LiDAR, OpenCV camera, and LEGO Spike Prime
- Designing educational ROS2 modules, lowering the barrier to entry for learning sensing, control, and robotics integration

Systems Engineering Intern *Thermo Fisher Scientific* | May 2024 – Aug 2024

- Ideated and developed calibration tooling system for precise microscope motor alignment
- Engineered and prototyped mechanical and electrical models, integrating a range of sensors and encoders
- Developed with python and CircuitPython for sensor integration, data collection, and automation processes
- Improved existing calibration methods, achieving more than 40% improvement in accuracy

Biology Research Intern *Jasper Therapeutics* | May 2022 – Aug 2022 & May 2023 – Aug 2023

- Developed and executed chemically induced colitis and lupus mouse models, performing analyses such as serum collection, ELISA autoantibody assays, and chimerism evaluation
- Coordinated in vivo procedures and data interpretation to assess therapeutic antibody efficacy across model systems

R&D Engineering Intern *Encellin* | Aug 2020 – Aug 2021

- Operated a multi-step production line for Encellin's soft cell encapsulation device
- Refined and innovated the cell encapsulation device for structure and optimal cell growth

Publications & Projects

Liver Perfusion Cannula *In collaboration with Paragonix | BME Senior Capstone*

- Designed and modeled a portal-vein cannula in CAD, prototyped with 3D printing and molding/casting workflows
- Validated performance on a pump perfusion system and through histological analysis
- Conducted ex vivo validation on porcine livers and portal veins to confirm biocompatibility and sealing integrity

Big Wheel *Design for Fabrication Final Project*

- Designed and fabricated a wooden big wheel bike using CAD and wood working techniques to race around a track

XRP Relay *Advanced Robotics Final Project*

- Developed firmware for coordinated multi-robot relay using AprilTag vision, MQTT messaging, Wifi, and line following
- Integrated bang-bang and PID controllers for precise line following and virtual "baton" handoff synchronization

Amelioration of Mrgprb2-Mediated Anaphylactoid Drug Reactions With Briquilimab, an Anti-CD117 Antibody, Through Mast Cell Depletion in Mice Expressing Chimeric Human and Mouse CD117

Journal of Allergy and Clinical Immunology · 2023 · DOI

Anti-CD-117 Antibody and Low Dose Total Body Radiation Enables Allogeneic Hematopoietic Stem Cell Engraftment and Reverses Autoimmune Disease in Systemic Lupus Erythematosus Mouse Models

Bone Marrow Transplant · 2023 · DOI

Skills & Abilities

Mechanical: Rapid Prototype, Woodwork, Metalwork

Programs: SolidWorks, Onshape, Adobe

Protocols: I2C, ESP-Now, UART, BLE, REST APIs

Software: C++, Python, JS, MATLAB, Stata, Git, ROS2

Activities & Interests

Staff *Nolop FAST Facility at Tufts*

- Supervising Tufts' student maker space and assisting students with their engineering projects

Interior Tech Lead *Tufts Engineers Without Borders*

- Led interior design for EWB's greenhouse, overseeing design strategy and mentoring engineers in CAD and woodworking