Kai Martell

San Francisco, CA & Boston, MA | 415-715-4856 | martell.kai@gmail.com | martellkai.com

Education

Tufts University Medford, MA
- Master of Science in Mechanical Engineering C/O 2026
- Bachelor of Science in Biomedical Engineering, GPA: 3.58, Magna Cum Laude, Dean's List All Semesters 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 hardware
- 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 - Aug 2022 & May - 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 Invitational 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, 153(2), AB241 https://doi.org/10.1016/j.jaci.2023.11.775

Anti-CD-117 Antibody and Low Dose Total Body Radiation enables Allogeneic Hematopoietic Stem Cell Engraftment and Reverses Autoimmune Disease in Systemic Lupus Erythematosus (SLE) Mouse Models
 Bone Marrow Transplant 58 (Suppl 1), 20–152 (2023) https://doi.org/10.1038/s41409-023-02055-8

Skills & Abilities

Software: C++, Python, JS, MATLAB, Stata, Git   **Protocols:** I2C, ESP-Now, UART, MQTT, BLE, REST APIs, ROS2
Mechanical: 3D Printing, Woodworking, Metalworking, Laser Cutting   **Programs:** Solidworks, Onshape, Adobe, Graphpad Prism, FIJI

Activities & Interests

Staff | Nolop FAST Facility at Tufts
- Supervising Tufts' student maker space and assisting students with their engineering projects

Interior Technical Lead | Tufts Engineers Without Borders
- Led interior design for EWB's greenhouse, overseeing design workflows and mentoring engineers in CAD and woodworking