Kai Martell

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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

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
- Designed and executed chemically induced colitis mouse models to evaluate anti-c-kit antibody efficacy, optimizing disease pathways and colon anatomy parameters
- Led experimental analysis for a lupus mouse model, overseeing serum collection, ELISA-based autoantibody assays, and comparative blood chimerism data integration
- Performed comprehensive in vivo procedures, IP/RO injections, rectal administrations, anesthesia, euthanasia, dissection
- Data analysis and visualization (FIJI/ImageJ, GraphPad Prism) and managed histology sampling and SpectraMax iD3

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
- Implemented and maintained a documentation system detailing protocol technicalities and production records

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
Mechanical: 3D Printing, Woodworking, Metalworking, Laser Cutting
Protocols: I2C, ESP-Now, UART, MQTT, BLE, REST APIs, ROS2
Programs: Solidworks, Onshape, Adobe, Graphpad Prism, FIJI

Activities & Interests

Interior Technical Lead | Tufts Engineers Without Borders
- Led interior design for EWB's greenhouse, conducting QFDs, design matrices, prototyping, and managing timelines and budgets
- Mentored engineers in CAD modeling and advanced woodworking techniques to fabricate functional furniture and structures