Kai Martell

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Education

Tufts University Medford, MA

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

San Francisco University High School San Francisco, CA

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

Inventory Manager | San Francisco Riptide Lacrosse Club | Mar 2019 - Sept 2020
· Managed all inventory for Riptide, San Francisco's largest youth lacrosse club
· Organized storage units, distributed gear and materials to coaches and players, strung lacrosse goals, and coordinated the allocation
   of all items to the several fields across the city

Thermo:
Ideated, designed calibration tooling unit for a microscope
Prototyped mechanical, electrical solutions using different sensors, actuators
Improved current calibration techniques by > 40% accuracy

Conceived and developed a calibration tooling system for precision microscope alignment.
Engineered and prototyped mechanical and electrical components, integrating a range of sensors and actuators to optimize
performance.
Enhanced existing calibration methods, achieving a more than 40% improvement in accuracy.

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

Inventory Manager | San Francisco Riptide Lacrosse Club | Mar 2019 - Sept 2020
· Managed all inventory for Riptide, San Francisco's largest youth lacrosse club
· Organized storage units, distributed gear and materials to coaches and players, strung lacrosse goals, and coordinated the allocation of all items to the several fields across the city
· Collaborated closely with coaches and the head of Riptide

Lacrosse Referee | NorCal Lacrosse Referee Association | Jan 2019 - Mar 2020
· Refereed age groups U7 through U15 during the Spring, Summer and Fall lacrosse seasons

Ski and Aqua Director | Tufts Mountain Club
· Manage and coordinate everything ski and aqua for Tufts' largest student club
· Ikon student representative, event fundraising, gear distribution
· Participate in weekly board meetings, coordinate and direct big weekend events