Erik H. Kramer

1-310-780-7076 | ehkramer@ucla.edu | ehkramer.github.io | ehkramer

Education

University of California, Los Angeles (UCLA) - Ph.D. and M.S. in Mechanical Engineering *Dec 2024*

- Dissertation: ***Robotic Physical Emulation of Virtual Dynamic Environments: Applications in Full Body Haptics and Spacecraft Development***

University of California, Berkeley - B.A. in Physics and B.S. in Mechanical Engineering *May 2015*

Hardware & Robotic Systems Experience

NASA Jet Propulsion Laboratory - Mechanical Engineering Postdoctoral Fellow *Mar. 2025 - Present*

- Developed and maintained electromechanical and software systems as the cognizant engineer for a mobile manipulation robotic testbed
- Engineered autonomous robotic arm sequencing for TRL-4 demos of flight-like satellite servicing, multi-rover cargo transfer, and telescope assembly
- Redesigned rover steering actuators to triple torque output, enhancing mobility without impacting existing subsystems
- Troubleshot and repaired faulty actuators by disassembling and reassembling hardware, restoring functionality and documenting findings
- Formulated and implemented driving algorithms for a robotic mobility system, continually improving performance through iterative field testing

NASA Jet Propulsion Laboratory - Robotics Mechanical Engineer Intern *Mar. 2024 - Dec. 2024*

- Developed and delivered a single DoF central structure for a mine exploration rover, performing design, structural analysis, and procurement
- Drove full-cycle development of a robotic in-space servicing, assembly, and manufacturing testbed, from conceptual design through system bring-up
- Designed a robotic arm using MATLAB and SolidWorks to optimize kinematics for digging while ensuring compatibility with heritage hardware
- Applied rapid design philosophies and techniques to quickly develop test rigs and robot hardware components for rover field testing campaigns

NASA Jet Propulsion Laboratory - Robotics Technologist Intern *Mar. 2022 - Mar. 2024*

- Architected features for a robot arm & lander testbed using C++, such as sampling sequences and a ROS interface for an autonomy subsystem
- Received Notable Organizational Value Added Award for outstanding development of a low-gravity dynamics motion controller for a physical testbed
- Improved reliability of a motion planning optimizer for a 7-DOF arm using inverse kinematics and increased solving speed by approximately 30%
- Analyzed large data sets of robot telemetry to understand the root cause of unexpected hardware faults during operation and implement code fixes

UCLA Bionics Lab - Graduate Research Engineer *Sept. 2015 - Dec. 2024*

- Led a team in the end-to-end development of a robotic exoskeleton, providing hands-on work for design, fabrication, assembly, testing, and software
- Translated high level requirements into hardware configurations via kinematic model analysis in MATLAB, achieving >96% user coverage
- Utilized CAD to design small connectors and large structures for manufacturability with traditional processes such as CNC and welding
- Collaborated with analysts to perform hand calculations and conduct stress FEA, ensuring safety factors of structural weldments met requirements
- Converted CAD models into ASME Y14.5 GD&T standard drawings and interfaced with vendors to facilitate production and acquire COTS parts
- Integrated FT sensors with 5 industrial robotic arms by developing real-time C++ software, resulting in multi-robot coordinated admittance control

Science Experience

Physics & Astronomy Department at UCLA - Lead Teaching Fellow *Sept. 2016 - Mar. 2022*

- Managed multiple small teams teaching space science, circuit design, microcontrollers, E&M, Python, data analysis, technical writing, and mechanics
- Co-led re-design of physics labs for remote learning, including developing online resources and creating lecture material

Super Cryogenic Dark Matter Search - Undergraduate Research Engineer *Feb. 2013 - June 2015*

- Designed metallic and composite cryogenic instrument thermal standoffs and drafted part drawings using ASME Y14.5 GD&T standards
- Conducted stress and thermal simulations via FEA and custom MATLAB scripts on 3 potential designs to support trade studies
- Delivered mechanical test support equipment and used it to qualify standoff designs through strength and cryogenic thermal V&V testing

Berkeley Particle Cosmology Group - Undergraduate Research Scientist *Feb. 2013 - June 2015*

- Translated rough ideas from scientific experts into functional mechanical hardware, such as cold plates, for sub-kelvin high-vacuum environments
- Assembled hardware in a cleanroom and maintained low-temp experiments in bath cryostat vacuum chambers and a dilution refrigerator
- Created procedures and documented build and test instructions for experiments determining low-temp properties of engineering materials

Mechanical Design Projects (selected)

Spacecraft Design for Mock Europa Plume Sample Return Mission *Apr. 2023 - June 2023*

- Employed SolidWorks to design and model 100+ conceptual flight hardware components and perform FEM modal analysis for launch load survival
- Collaborated to define level 1-3 requirements, do risk assessment, design subsystems, and perform trade studies under the guidance of a JPL fellow

Costume and Mechatronic Prop Design *July. 2006 - Present*

- Built replicas and wearables including a Mars 2020 RC rover and an animatronic tail by utilizing mechanical, electrical, and software design processes

Skills

Technical	Mechanical design, Data analysis, Experiment design, Prototyping, Geometric dimensioning & tolerancing, FEA, Cleanroom assembly
Hardware	Robotic arms, Additive manufacturing/3D printers, Sensors, Material testing systems, Soldering/Wire bonder, Basic machine shop tools
Software	SolidWorks, Slicing software, Git, Robot Operating System (ROS), Bluehill Universal, Photoshop, Excel/MS Office/G Suite, Linux
Coding	MATLAB, C/C++, Python, LaTeX