

# Alec Perkins

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PORTFOLIO WEBSITE: [alec-perkins.github.io/portfolio](https://alec-perkins.github.io/portfolio)

## EDUCATION

**The University of California, Santa Barbara** — IP: Bachelor of Science (B.S.), Mechanical Engineering Expected *June 2026*  
Cumulative GPA: 3.63 — UCSB C.O.E. Honors Program

## WORK EXPERIENCE

**Undergraduate Research Collaborator - Materials & Manufacturing for Aerospace Extremes Lab** *October 2024 - Present*  
*College of Engineering — UC Santa Barbara, CA*

- Practice and document the operation of Tethon's Bison 1000 DLP 3D Printer with polymer burn-off and sintering postprocessing to test material properties of High Alumina Ceramic-Resin prints
- Troubleshoot solutions for multi-variable print failures in order to perfect the repeatability of the manufacturing process
- Conduct experiments with sintering of ceramic-resin green prints to overcome challenges in post processing of additive manufacturing parts and improve production quality
- Analyze impact of environmental variations on printing outcomes to reduce errors in material data collection
- Perform three point and four point bending tests to determine the strongest application methods for sintered High Alumina in Aerospace environments and industry
- Processessing JPL's aluminum thin wall tensile test data with MATLAB to conclude and write comparative results for publication

**Undergraduate Research Assistant - Begley Research Group** *May 2024 - Present*  
*College of Engineering — UC Santa Barbara, CA*

- Utilize FEA tool ABAQUS to conceptualize, develop, and analyze three-dimensional models of 3D-printed lattice (meta) materials
- Create detailed project documentation with presentations overseen by M.E. Professor Matthew Begley and Dr. Patrick Ziemke
- Develop structural analyses that enable repeatability, replication, and expansion of research findings on lattice application.

## PROJECTS

**Engineers Without Borders - Solar Table Project with Local Team** *October 2023 - Present*

- Coordinated and lead multiple 5 - 10 person teams through the process of planning and construction
- Model Solar Table prototype using SolidWorks and ABAQUS to test for safety and structural integrity
- Analyze wind force impacts to determine maximum deflection and resultant forces on the structure
- Designed and redlined part drawings in SolidWorks to be machined in different shops on and off campus
- Learned how to TIG weld custom-fit components together that were too difficult to get machined

**Automatic Baseball Collecting Rover with Camera Vision and Control Guided Navigation** *April 2025 - June 2025*

- Designed and manufactured a fully autonomous rover using computer vision (OpenCV), Arduino microcontrollers, and PID control systems to detect, navigate to, and collect baseballs across multiple terrain types with around a 90% success rate
- Implemented iterative prototyping methodology through 5 design cycles, conducting failure analysis on electrical systems, redesigning mechanical collection mechanisms, and optimizing performance based on real-world testing data
- Led cross-functional team integration of hardware and software systems, troubleshooting critical wiring failures, implementing proper grounding protocols, and establishing autonomous state machine with 4 operational modes
- Executed comprehensive testing and validation across concrete, grass, and turf surfaces, tuning PID controller gains for each environment and documenting performance metrics for manufacturing scalability

**Spring-Mass System Simulation - MATLAB** *October 2023 - November 2023*

- Modeled a system of two masses and three springs connected in alternating series using MATLAB
- Applied eigenvalue and eigenvector analysis to create equations for motion simulation
- Plotted system dynamics to visualize real-world physical behaviors under arbitrary displacement conditions

## PUBLICATIONS IN PROGRESS

- Characterization and comparison of thin wall aluminum powder bed fusion A.M. with water jetted thin wall manufacturing  
*UC Santa Barbara's MMAX Lab, California Institute of Technology's JPL*
- Additive manufacturing of ceramic high alumina octet lattice structures by DLP 3D printing  
*UCSB's MMAX Lab, UCSB's Begley Research Group*

## RELEVANT SKILLS

FEA - ABAQUS | Material Research | MATLAB | CAD - SolidWorks | Machining | Python | Control System Design & Tuning

\*More information about recent projects and coursework featured on my website: [alec-perkins.github.io/portfolio](https://alec-perkins.github.io/portfolio)