

GAVIN LIU

[Email](#) • [LinkedIn](#) • [Website](#)

EDUCATION

Stanford University

Master of Science, Aeronautics & Astronautics

GPA N/A

Fall 2018 to Present

Arizona State University

Bachelor of Science in Engineering, Mechanical Engineering

GPA 3.94/4.0

Fall 2014 to Summer 2018

Graduated with Honors

PUBLICATIONS

Liu, G. (2017). Long-Term Cryogenic Propellant Storage on Mars with Hercules Propellant Storage Facility. *NASA Technical Reports Server*

Rabade, S., Barba, N., Liu, G., Thangavelautham, J., & Garvie, L. (2016). The Case for Solar Thermal Steam Propulsion System for Interplanetary Travel: Enabling Simplified ISRU Utilizing NEOs and Small Bodies. *International Astronautical Congress 2016, D4, 5, 7 (34659)*

SKILLS & SOFTWARE

- | | | |
|-------------------|--------------------|--------------------|
| • MSC Nastran | • Microsoft Excel | • Manual Machining |
| • ANSYS Workbench | • Creo Parametric | • Creo Schematics |
| • FEMAP | • LaTeX | • SolidWorks |
| • MATLAB | • Adobe Photoshop | • UNIX |
| • SpaceClaim | • Microsoft Office | |

PROFESSIONAL EXPERIENCE

Cryogenic Design Intern

National Aeronautics and Space Administration • Kennedy Space Center, FL

Aug. 2017 to Dec. 2017

- Design and sizing research of cryogenic propellant transfer system for NASA's conceptual single-stage reusable Mars lander, Hercules.
- Independent research required – soft vacuum Mars environment, cryogenic temperatures, and reusability an added challenge.
- Working in Restore-L and Cryogenics Test laboratories to gain hands-on experience, performing various experiments relating to in-space propellant transfer and cryogenic insulation, respectively.
- Published technical report detailing results and implications of research. Presented results and progress to Hercules project lead and team members from varying NASA centers each week. Presented final report to supervisors at division meeting.

Structural Dynamics Intern

Aerojet Rocketdyne • Canoga Park, CA

May 2017 to Aug. 2017

- RS-25 and Orion Jettison Motor (OJM) program support in structural dynamics analysis. Performed various forms of analysis with FEMAP and MSC Nastran. Used SpaceClaim to modify/defeature geometry. Presented results to team and managers.
- Made design decision to stiffen new RS-25 drain line bracket after comparing stress contours and stiffness matrix with heritage SSME bracket. Meshed and analyzed bracket model; applied 6dof unit loads to a control node to obtain stiffness matrices, then integrated into drain line model to acquire one-sigma loads with Miles' equation. Provided loads to designers and stress analysts.
- Fabricated stress and dynamics analysis model for OJM igniter using several meshing techniques, including solid-to-plate element transition and manual mesh sizing to ensure coincident nodes between parts. Two different analysis models were created to account for pressurized hot fire and vibration qualification (no preload). Performed G_{RMS} random vibration analysis.
- Developed MATLAB code to expedite dynamic environment enveloping process. Previously, enveloping was done by hand.

RESEARCH EXPERIENCE

Honors Thesis: Dynamic Analysis of Mistuned Bladed Disks: Coupling Index and Amplification Factor

Arizona State University • Tempe, AZ

Feb. 2017 to Aug. 2018

- The focus of this thesis with Dr. Marc Mignolet was investigating different dynamic models of bladed disks with generically varied properties (e.g., stiffness or mass) and analyzing the effects of mistuning.
- The analysis of the resulting data centered on relating the amplification factor (caused by mistuning) to the coupling index, a measure of blade-disk interaction.
- Gained experience in thesis research and solidifying grasp on fundamentals of structural dynamics.

Space and Terrestrial Robotic Exploration (SpaceTReX) Laboratory

Arizona State University • Tempe, AZ

May 2016 to May 2017

- Supported structural team of Space Weather and Impact Monitoring CubeSat (SWIMSat) project. Established mass/volume budget with Excel/Solidworks, respectively, and performed trade studies to make decision on chassis.
- Collaborated with graduate students on their theses by performing experiments and creating CAD models.
- Created concept models and assisted author with experiments for conference paper.

INVOLVEMENT WORK

NASA Educational Outreach

Emma Jewel Charter Academy • Cocoa, FL

November 2017

- Led 5th graders through various NASA-related activities and excited them about space to inspire future leaders and engineers.

Robotics Camp Instructor

Arizona State University • Tempe, AZ

June 2013 to June 2015

- Led the instruction for approximately 40 middle school or high school students. Leadership and management skills crucial to keep campers on track and excited to learn.

Tutor

Kumon North America • Tempe, AZ

July 2012 to July 2014

- Math and reading tutor for students varying from 3 to 18 years old. Developed ability to adapt teaching style to diverse learning styles and keep students focused.