GAVIN LIU

gavinliu06@gmail.com • (480)284-9612 • 693 E Sunburst Ln • Tempe, AZ 85284

Mechanical engineering student aspiring to expand mankind's footprint on the universe.

EXPERIENCE

INTERNSHIPS

Cryogenic Subsystem Design Intern

National Aeronautics and Space Administration • Kennedy Space Center, FL *August 2017 to Present*

- Responsible for design and sizing of cryogenic propellant transfer system for NASA's conceptual single-stage reusable Mars lander, Hercules. Effort includes power, thermal, and structural design.
- Drawing Hercules liquid propellant (LCH4/LO2) gas generator main engine schematic, referencing J-2, F-1, RS-68 and *Design of Liquid Propellant Rocket Engines* (1971) by Huzel and Huang.
- Occasionally working in Restore-L and cryogenics lab to gain background for project.

Structural Dynamics Intern

Aerojet Rocketdyne • Canoga Park, CA *May 2017 to August 2017*

- RS-25 and Orion Jettison Motor (OJM) program support in structural dynamics analysis. Performed various forms of analysis with FEMAP and MSC Nastran including modal, random vibration, 1G static, thermal static, and stiffness matrix. Used SpaceClaim to modify/defeature geometry.
- Made 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 simulate line loads, then integrated into drain line model to acquire one-sigma loads with Miles' equation.
- 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). A test beam model was used to ensure the validity of solid to plate element transition. Performed GRMS random vibration analysis to obtain von Mises stress plots.
- Developed MATLAB code to expedite dynamic environment enveloping process. Previously, enveloping was done by hand.

RESEARCH

Honors Thesis: Mistuning Analysis Using Nonparametric Probabilistic Model

Arizona State University • Tempe, AZ *February 2017 to Present*

- The focus of this thesis is performing dynamic finite element analysis of computational models of blisks (i.e. bladed disks) with variable or unknown material parameters.

Space and Terrestrial Robotic Exploration (SpaceTREx) Laboratory

Arizona State University • Tempe, AZ *May 2016 to May 2017*

- Supporting 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.
- Collaborating with graduate students on their theses by performing chemical experiments and creating CAD models.
- Generated concept models and graphics for professor and graduate students with SolidWorks, KeyShot, and Photoshop.

WORK EXPERIENCE

W.P. Carey School of Business Student Worker

Arizona State University • Tempe, AZ *May 2016 to August 2016*

- Responsible for a variety of tasks including, but not limited to: Excel budgets, Salesforce work, graphic design in Photoshop, making calls, working events. Interpersonal skills and time management important for success.

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.

SKILLS

- MSC Nastran
- ANSYS
- FEMAP
- MATLAB
- SolidWorks
- Microsoft Excel
- Creo Parametric/Schematics
- Manual Machining
- Adobe Photoshop
- Microsoft Office

EDUCATION

Bachelor of Science in Engineering, Mechanical Engineering

Barrett Honors College at Arizona State University • Tempe, AZ

Fall 2014 to Summer 2018

GPA 3.96

PUBLICATIONS

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.