

## Qualifications Summary

Driven Aerospace Engineer specializing in propulsion systems, with a proven track record of applying rigorous mechanical engineering principles to develop innovative, practical solutions in engine design. Expertise includes enhancing engine durability and efficiency through novel methods such as carbon fiber reinforcement and optimized thermal protection.

### CFD Analysis

- ◆ Familiar with Computational Fluid Dynamics, using CFD tools to optimize engine designs and improve performance.
- ◆ Skilled in CFD Analysis, applying simulations to address complex fluid dynamics issues in aerospace engineering.

### Propellant Characterization

- ◆ Proficient in Solid Propellant Characterization, optimizing rocket motor propellants for enhanced performance.
- ◆ Skilled in solid propellant assessments, boosting rocket motor development with cost-effective evaluations.

### Thermal Modeling

- ◆ Strong in Thermal Modeling, conducting analyses to devise efficient management solutions.
- ◆ Adept at Thermal Modeling, optimizing thermal systems to enhance reliability and efficiency in aerospace components.

### Mathematical Modeling

- ◆ Experienced in Mathematical Modeling, applying predictive models to improve rocket propulsion.
- ◆ Developing predictive models to refine aerospace design and testing for greater efficiency.

## Education

### Master of Science in Aerospace Engineering

University of Southern California, USC Viterbi, GPA: 3.79, August 2024 – May 2026

### Bachelor of Science in Aerospace Engineering

Universidad Politécnica de Madrid, September 2019 – June 2024

## Professional Experience

### USC Liquid Propulsion Lab – Los Angeles, United States Engine Development Engineer

September 2024 – Present

Engage in the development of an ablative and film-cooled liquid rocket engine as part of The Theseus team. Conduct heat transfer analysis and design innovative engine components, including a novel heat shield and a conical nozzle. Utilize CFD and other modeling tools to ensure effective and cost-efficient engine testing and operation.

- Innovated a cost-effective liner (heat shield) for internal engine protection, diverging from traditional ablative cooling methods to reduce material costs.
- Designed a conical nozzle that decreases manufacturing expenses and facilitates effective engine testing, integrating thermal analysis to optimize function.

### INTA Optoelectronics and Rocketry Department – Madrid, Spain Propulsion Intern

February 2024 – July 2024

Collaborated with a team of industry professionals on the development of solid rocket motors from conceptualization to operation, focusing on double-base and composite propellants. Conducted detailed propellant characterization to support the development of ultra-low-cost solid rocket motors.

- Engineered and tested ultra-low-cost solid rocket motors, achieving precise correlation between experimental tests and predictions.

### Allocatable Rockets, Rocketry Team – Spain Solid Rocket Motor development engineer

October 2020 – August 2024

Led a team of three in the assembly and propulsion systems of rockets, focusing on the design of solid rocket motors. Developed and refined a mathematical model to predict the behavior of these motors under various operational conditions.

- Pioneered the design of solid rocket motors tailored to the team's specific needs, enhancing the predictability and performance of propulsion systems.

## Project Experience

### **0-Dimensional Reciprocating Engine Model (MATLAB)**

Developed a MATLAB-based model to simulate transient effects and chemical equilibrium in engine cylinders, incorporating a knocking model to enhance predictive accuracy.

### **Vortex Lattice Method Simulator (MATLAB)**

Designed a simulator for 3D wing analysis using variable airfoil curvature discretization, achieving results that aligned closely with those from established commercial software.

### **Solid Rocket Motor Non-Stationary Ballistics Simulator (MATLAB)**

Engineered a MATLAB simulation for the internal ballistics of solid rocket motors, optimizing nozzle design and calculating dynamic heat transfer and structural integrity throughout operation phases.

### **Sounding Rocket Trajectory Calculator (MATLAB)**

Created a program to reconstruct flight trajectories of sounding rockets from sensor data, accurately predicting the actual landing zones.

### **Manual Lathe Part Machining**

Machined complex lathe parts including threaded and angular components, enhancing CNC machining skills through practical application and tool positioning techniques.

### **Undergraduate Thesis: Modeling and Testing of Solid Rocket Motors**

Conducted comprehensive testing and modeling of solid rocket motors with double-base and composite propellants during an internship at INTA, contributing significant improvements to motor designs and performance.

### **Heat Transfer Modelling for the LPL Theseus Engine**

Participated in the thermal analysis of the Theseus engine, applying and adapting methodologies from prior projects to successfully model heat transfer processes in an ablatively cooled, liquid-fueled engine.