

# Jack Koller

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University of Central Florida, Burnett Honors College, Orlando, FL

GPA: 3.876

Bachelor of Science, Mechanical Engineering

Expected Graduation: Spring 2026

## Publications

1. **J. Koller**, S. Smith, M. Rosolen, A. Kotler, K. Ahmed  
“Thermomechanical Modeling of Actively Cooled Nozzles for Ground Test” (*Presenting: 2026 AIAA SciTech*)
2. **J. Koller**, A. Shack, A. Kotler, S. Smith, Y. Fuentes, G. Gonzales, P. DeHart, K. Ahmed  
“MXOD Flight 1: Feed System, Electronics, and Instrumentation Architecture” (*Presenting: 2026 AIAA SciTech*)
3. S. Smith, A. Kotler, J. Sprunger, S. Keene, A. Shack, **J. Koller**, K. Ahmed  
“MXOD Flight 1: Program & Experiment Overview” (*Publishing: 2026 AIAA SciTech*)

## Experience

### Propulsion and Energy Research Lab (PERL)

Orlando, FL

Plumbing Subsystem Lead | Mach 10 Oblique Detonation Flight Program

May 2024 – Present

- Developing 1-D supersonic oblique rotating detonation engine performance model and operability map in Python.
- Modeling optimized regenerative cooling channels for a vitiator nozzle in a high-enthalpy test facility.
- Utilizing SolidWorks Routing to design a payload fluid feed system for a hypersonic flight experiment.
- Designing instrumentation housing and CTAPs for capturing high-resolution pressure profiles in oblique detonations.
- Mentoring 5 students to develop novel sounding rocket flight hardware and presented subsystem progress to AFOSR.

### MathWorks

Orlando, FL

MATLAB Student Ambassador

February 2025 – Present

- Developing propellant blowdown script to analyze pressure, and volume dynamics across feed system.
- Creating workshops to model thermodynamic state properties using chemical kinetic software plugins.
- Improving MathWorks’s university outreach by 170% through various social media platforms and workshops.

### Mitsubishi Power Americas

Orlando, FL

Manufacturing Engineering Associate

February 2024 – August 2024

- Tested and modified ABB robot grit blast code to ensure uniform bond coat layering on blades/vanes.
- Designed guided polishing fixtures for the turbine blade vibratory feeder to reduce process time by 70%.
- Produced engineering drawings for coating equipment using GD&T per ASME.Y.14.5-2018.

## Extracurriculars

### Regeneratively Cooled Liquid Bi-Propellant Rocket Engine

Orlando, FL

Personal Project

July 2025 – Present

- Creating script to predict engine thrust and regenerative cooling efficiency given propellant flow rates.
- Performing trade studies of injector hole size and count vs jet velocity and turbulence for conventional machining.
- Designing integrated engine assembly using SolidWorks.

### Knights Experimental Rocketry (KXR)

Orlando, FL

Chief Engineer & Combustion Lead | Liquid Bi-Propellant Development

August 2023 – Present

- Leading design of a 2000lbf liquid bi-propellant test stand with 3-DOF thrust measurement system and 1500psi pressure fed liquid-liquid feed system with full instrumentation suite.
- Leveraged NASA CEA calculations and Rocket Propulsion Analysis simulations to conduct nozzle contour and combustor thrust verification for ground and flight Ethanol/N<sub>2</sub>O pressure fed propulsion systems.
- Designed a KNO<sub>3</sub> pyrotechnic nozzle-attached breakaway ignition system with ABS housing.
- Utilized ANSYS structural to verify an AL 6061 pressure vessel for an epoxy resin composite ablative liner test.

### Electric Longboard

Orlando, FL

Personal Project

July 2025 – Present

- Fabricating motor mount brackets using Metal Inert Gas (MIG) welding techniques and stationary power tools.
- Creating performance calculator for torque, speed, power draw, and battery capacity for component trade studies.
- Utilizing SolidWorks to design electronics housing enclosure, drivetrain housing, and resin-cast urethan wheels.

### UCF Men’s Rugby Team

Orlando, FL

Captain, Vice President

September 2022 – Present

- Won 2023-24 Sport Club of the Year Award for excellence in fundraising, volunteering, and professionalism.
- Managed \$31,497 in club finances and 70+ members achieving an all-time high in club membership.
- Coordinated and leading multiple rugby skills camps for local middle and elementary schoolers with 50+ attendees.

## Skills

**Software:** SolidWorks (CSWP), SolidWorks Routing, ANSYS Mechanical, NASA CEA, Open Rocket, AutoCAD, JIRA

**Programming:** MATLAB, Python, ABB Robot Studio, Cantera, Shock and Detonation Toolbox

**Hardware:** P&ID, Compression Fittings, GD&T, Power Tools, MIG Welding (Basic), L1 HPR