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 hardware and presenting 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 systems.
- 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 performance 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 engine test stand with 3-DOF thrust measurement system, 1500psi pressure fed liquid-liquid feed system and 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_2O pressure fed propulsion systems.
- Designed a KNO_3 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 led multiple rugby skills camps for local middle and elementary schoolers with 50+ attendees.

Skills

Software: SolidWorks (CSWP), SolidWorks Routing, ANSYS Mechanical, Open Rocket, AutoCAD, JIRA
Programming: MATLAB, Python, ABB Robot Studio, Cantera, NASA CEA, Shock and Detonation Toolbox
Hardware: P&ID**,** Compression Fittings, GD&T, Power Tools, MIG Welding (Basic), L1 HPR