US Citizen

KARL ROUSH

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Experience

Senior Component Engineer, Turbomachinery for the RS-25 (Space Shuttle Main Engine) — May 2021 – Present
Aerojet Rocketdyne, L3Harris
- Complete life cycle management linking internal/customers/suppliers. Focus on cost savings projects and non-conformance investigations
- Turbomachinery Additive Mfg. Development Lead, manager for >$1.8M/yr of hardware and 65+ components
- Spearheaded FOD (Foreign Object Debris) reduction effort on $10m part redesign, MRB certified

Graduate Researcher
Aerospace Systems Design Lab (ASDL) — May 2020 – May 2022
- Conducted system level trade-offs for re-fan of Supersonic Transport (SST) aircraft engine core compared to clean sheet design
- Modeled the feasibility of H2 fuel cell light aircraft (Predator drone-sized) and supported subsequent test stand manufacturing efforts
- Creation of MBSE framework for the analysis of a refurbishable hypersonic reconnaissance vehicle and design space exploration

Fabrication Lead
Air Force Research Lab Aerospace Propulsion Outreach Program @ASDL — Aug 2018 – Aug 2020
- Responsible for the fabrication and assembly of all components; including design components, measurement equipment, and test rigs
- Increased the thrust/weight ratio of a small gas turbine engine by 13.67% via 3D metal printed de-swirl exhaust vanes
- Developed a combined gear-based external Inlet Guide Vane (IGV) solution for windmill prevention and 2D thrust vectoring

UTSR Gas Turbine Industrial Fellow — May 2019 – Aug 2019
US Dept. of Energy/Southwest Research Institute
- Created NPSS model of hybrid UAVs for recon mission viability; standardized the NPSS output viewer, now deployed globally
- Designed & built laser PIV system for <10% of quoted industry cost for low-speed turbulence testing
- Streamlined riblet drag testing data collection (65% test time reduction while maintaining initial accuracy)

Education

PhD, Aerospace Engineering	MS, Aerospace Engineering	BS, Aerospace Engineering
Georgia Institute of Technology	*Georgia Institute of Technology*	*Georgia Institute of Technology*
"Adapting the Past for Future Flight: Preliminary Design Framework for Long Duration O&S Aerospace Programs"	"Development of a Modular, Python-Based Architecture for the Environmental Design Space"	Highest Honors

Research and Projects

Aircraft Environmental Design Space Program Re-design — Aug 2021 – Dec 2021
- Derived a functional breakdown of EDS, an industry recognized modeling and simulation environment for aircraft design and evaluation
- Developed a next-generation modular Python-based architecture, preserving functionality while allowing for scalable improvements

Jet Engine Cycle Analysis & Optimization — Jan. 2020 – May 2020
- Off-design cycle design/analysis of a separate flow turbofan in NPSS; Optimized engine for range in a scaled Boeing 737-800

Interactive Analysis of Aviation Emissions Policy Dashboard — Aug 2020 – Oct 2020
- Compiled airliner and aviation stakeholder roadmaps/public commitments for ICAO net-zero 2050 emission targets
- Developed attainability metric for targeted technology development areas based on current budget and timeline projections

Awards

AIAA Abe M. Zarem Graduate Student Award in Aeronautics — October 2021
- "Designing for Security: A Cybersecurity Introduction for Aerospace Education"
- 2022 conference presentations at SciTech and International Council of the Aeronautical Sciences (ICAS) in Stockholm

Wells Fargo Campus Analytics Challenge Winner (x3) — 2018, 2019, 2022
- Machine Learning/AI data challenge; presented at Wells Fargo's internal data analyst summit
- 2018= carbon footprint minimization, 2019= NASA topic generation via Natural Language Processing, 2022= transaction classifier

Eagle Scout Rank Award (Bronze and Gold Palms)

Skills and Certifications

Engineering: Additive manufacturing, Numerical Propulsion System Simulation (NPSS), C++, MATLAB, Python, Windchill, PTC Creo

General: Project Management, Aerospace Manufacturing, Propulsion Systems, Cross-disciplinary Team Leadership, Data Science

Activities and Involvements

American Institute of Aeronautics & Astronautics
Palm Beach chapter, Former GT Student Branch Chair

Learn, Launch, Play (LLP)
Learn lead, L3Harris employee resource group