Karl Roush

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Complete Research Repos

Overview

BS/MS Aerospace Engineering graduating with Highest Honors in 3 years; research experience with jet engines, drones, & hands-on shop fabrication. Current work in hypersonics, smart airports, space based ISR, & aircraft emissions. Interests + learning in MBSE, QE, ML/AI, and information security.

Education

Aug 2020 – *Dec 2021*
Georgia Institute of Technology, MS Aerospace Engineering
BS/MS AE Honors program
GPA: 4.00 Propulsion focus

Aug 2017 – May 2020
Georgia Institute of Technology, BS Aerospace Engineering
Summer 2018 Oxford Program, ΣΓT Honor society
Graduated with Highest Honors (GPA= 3.80)

Experience

Graduate Research Assistant May 2020 – Present
Aerospace Systems Design Lab
-Previously Fabrication Lead (Aug 2018-20) under AFRL's Aerospace Propulsion Outreach Program
-Work including increasing the thrust/weight ratio of a small gas turbine engine by 13.67%, windmill prevention

UTSR Gas Turbine Industrial Fellowship May 2019 – Aug 2019
Southwest Research Institute: Department of Energy, Office of Fossil Energy
-Determined viability of hybrid cycle UAVs for surveillance missions & created an NPSS tool for subsequent mission analysis
-Designed and built laser PIV system for <10% of quoted industry cost for low speed turbulence testing
-Standardized NPSS unit conversions for international use, streamlined data collection of drag testing (65% time reduction)

Competitive Innovation Consultant May 2017 – Present
MindSumo: A competitive problem-solving platform; Awarded wins from AAA, Mozilla, NASA, Siemens, GSK, et. al
-Ranked in the top 5 of 350,000+ solvers, Chosen as a winner for 93% of competitions (Mindsumo All-Star average= 20%)

Projects

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

Natural Language Processing Semantris Solver July 2020
Built a solver for the Google experiment *Semantris* using Computer Vision + NLP model built from Google News data

Notable Awards/Certificates

Wells Fargo Campus Analytics Challenge Winner (Two Times) Dec 2018, 2019
Machine learning analytics challenge, 2018= model for minimizing carbon footprint, 2019= Topic generation based on NASA datasets

Eagle Scout Rank Award, Bronze Palm and Gold Palm Mar 2015
Awarded Bronze Palm in October 2015, Gold Palm September 2016

International Best Use of Data- NASA Space Apps Hackathon Sept 2016
First Place Overall (Project: EvaS)- Space Apps Next Gen NYC Hackathon Challenge
Developed a search for Extra-Vehicular Activities via NASA's public data in HTML/CSS and JavaScript over the course of ~14 hours

Skills and Certifications

Programs: NPSS, SolidWorks, MATLAB, Git
Languages: Python, C++, HTML/CSS, JavaScript

Machine shop certified
Mill, lathe, band saw, drill press, sanders

Class 4 Laser Safety Certified
Laser and Lab Safety Training

German, Latin
ILR Level 2 fluency

Clubs and Activities

American Institute of Aeronautics & Astronautics
Chair, GT Student Chapter

GreyHat, Information Security
Vice President

GT Hytech Racing (FSAE)
Aero/Composites sub-team

Relevant Coursework

Propulsion System Design | Adv. Aircraft Propulsion | Optimization Algorithms | Aircraft Design | Flight Dynamics & Controls

Personal Interests

Rapid Prototyping | Metal work & painting | Information security | Machine learning | Service via *Eagles@GT*