

# Karl Roush

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Complete GitHub Research Repos

## Overview

Eagle Scout, BS/MS Aerospace Engineering; research experience with jet engine design & drones, hands-on shop experience through various research projects and competitive racing teams. Interest in designing/increasing efficiency of aerospace systems- esp. propulsion. Additional interests in cybersecurity et. al

## Education

Aug 2017 – May 2020

**Georgia Institute of Technology, BS Aerospace Engineering**  
Summer 2018 Oxford Program, ΣΤΤ Honor society  
GPA: 3.80, Graduated with Highest Honors

Aug 2020 – Dec 2021

**Georgia Institute of Technology, MS Aerospace Engineering**  
BS/MS AE Honors program

## Experience

### Fabrication Lead- Aerospace Systems Design Laboratory

Aug 2018 – Present

*Air Force Research Lab:* Aerospace Propulsion Outreach Program

- AFRL engineering design competition: increased the thrust/weight ratio of a small gas turbine engine by 13.67%
- Currently working on solutions to wind-milling and small scale thrust vectoring

### UTSR Gas Turbine Industrial Fellowship

May 2019 – Aug 2019

*Research Fellow:* 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

### Engine Component Preliminary Design

Aug. 2019- Present

Designed & optimized: compressor, combustor, and turbine of a small, single spool turbojet engine; evaluated off-design performance

### Electrical Engineering/CS Student Researcher: Rutgers WINLAB

Sept 2016- Aug 2017

EE/CS robotics-based projects: 3D Spectrum Sensing Map via Drone Mounted Receiver, Drone Gesture Based Control, Smart Electronic Bicycle

## Notable Awards/Certificates

### Eagle Scout Rank Award, Bronze Palm and Gold Palm

Mar 2015

Awarded Bronze Palm in October 2015, Gold Palm September 2016

### 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

### 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*