

KARL ROUSH

US Citizen

706-873-1987

karlroush.com

karl.roush@gmail.com



EDUCATION

MS Aerospace Engineering

Georgia Institute of Technology

BS/MS AE Honors Program

GPA: 4.00, 2020- 2021

BS Aerospace Engineering

Georgia Institute of Technology

Highest Honors (2017- 20)

ΣΤΤ Honor society

SKILLS

Engineer:

NPSS	MATLAB
SolidWorks	Git

Program:

Python	JavaScript
C++	HTML/CSS

Design:

Photoshop	Blender
Premier	GIMP

Build:

Class 4 laser	Water jet
Drill press	Sanders
Mill	Lathe

Languages:

German	ILR 2
Latin	ILR 2

ORGANIZATIONS

American Institute of
Aeronautics and Astronautics
Graduate Liaison, 2020-present
Chair, 2019-20

GreyHat, Information Security
Vice President, 2019-20
Public Relations Chair, 2018-19

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

COURSEWORK

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

INTERESTS

Machine Learning
Additive Manufacturing
Information Security
Special Effects
Service via *Eagles@GT*

EXPERIENCE

Aerospace Systems Design Lab

Graduate Research Assistant

May 2020 – Present

- Designing space-based ISR architectures to support military operations in polar regions
- Analysis of a refurbishable hypersonic reconnaissance vehicle and associated design space exploration
- Review of aviation stakeholder emissions policies & technologies targeting a carbon neutral 2050
- Compilation and analysis of numerous smart airport technologies for FAA prioritization

Fabrication Lead, AFRL APOP

May 2020 – Present

- Yearly AFRL engineering design competition
- Responsible for the fabrication and assembly of all components for both testing and final design
- Increased the thrust/weight ratio of a small gas turbine engine by 13.67% using 3D printed deswirl vanes
- Developed a combined IGV solution for windmill prevention and 2D thrust vectoring

Southwest Research Institute/Dept. of Energy

May 2020 – Present

UTSR Gas Turbine Industrial Fellow

- Determined viability of hybrid cycle UAVs for ISR missions created NPSS tool for mission analysis
- Designed & built laser PIV system for <10% of quoted industry cost for low speed turbulence testing
- Standardized NPSS unit conversions and conventions for international use
- Streamlined riblet drag testing data collection (65% time reduction)

MindSumo

May 2017– Present

Competitive Innovation Consultant

- Ranked in the top five of 350,000+ solvers across over 3,000 universities and 50+ countries
- Chosen as a winner for 93% of competitions (MindSumo All-Star average= 20%)
- Awarded wins from AAA, Mozilla, NASA, Siemens, DoD, NSIN, GSK, Swanson et. al

Rutgers Wireless Information Network Lab

Sept 2016- Aug 2017

Electrical Engineering/CS Student Researcher

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

RESEACH

Analysis of Aviation Emissions Policies

Aug 2020 – Oct 2020

- Compiled stakeholder roadmaps (organizations, airlines) to hit 2050 emissions targets
- Developed attainability metric for influential technologies

Jet Engine Cycle Analysis & Optimization

Aug 2020 – Oct 2020

- Off-design cycle design + analysis of a separate flow turbofan in NPSS
- Optimized engine for range in a scaled 737-800

Natural Language Processing Based Game Solver

July 2020

- Built a solver for the Google experiment Semantris
- Utilized Computer Vision + NLP model built from Google News data

AWARDS

Wells Fargo Campus Analytics Challenge Winner (x2)

Dec 2018, 2019

- Machine learning challenge, winners present their solutions to Wells Fargo's top data analysts
- 2018= model minimizing carbon footprint, 2019= NASA dataset topic generation

Eagle Scout Rank Award, Bronze Palm and Gold Palm

March 2015

- Awarded Bronze Palm in October 2015, Gold Palm September 2016

International Best Use of Data- NASA Space Apps Hackathon

Sept 2016

- Developed Extra-Vehicular Activity search engine in JavaScript over the course of ~14 hours

SPARE TIME SPONGES

RTX On Contest, Thermal Management Systems

- Utilized Blender's Cycles rendering engine to demonstrate the importance of Thermal Management Systems

Titanfall Smart Pistol MK5

- Designed, modeled, and constructed a replicate Titanfall Smart Pistol MK5 (1820 print hours)

Image Compositing & Facial Recognition Cloaking

- Deployed image cloaking to thwart facial recognition algorithms via Fawkes