

# KARL ROUSH

US Citizen

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## EDUCATION

### MS Aerospace Engineering

*Georgia Institute of Technology*

BS/MS AE Honors Program

GPA: 3.72, 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

- Test stand design and feasibility study of H2 fuel cell light aircraft
- Designing space-based ISR architectures to support military operations in polar regions
- Analysis of a refurbishable hypersonic reconnaissance vehicle and associated design space exploration
- Compilation and analysis of numerous smart airport technologies for FAA prioritization

*Fabrication Lead, AFRL APOP*

Aug 2018 – Aug 2020

- 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

### Aerojet Rocketdyne

May 2021 – Aug 2021

*Project Component Engineering, Rotating Machinery*

- Lead investigations of non-conforming components
- Pioneered multiple cost savings efforts on the RL-10 engine saving >\$20,000 per build
- Assisted with internal investigations to mitigate delivery delays

### Southwest Research Institute/Dept. of Energy

May 2019 – Aug 2019

*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

## RESEARCH

### 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 for 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

### AIAA Abe M. Zarem Graduate Student Award in Aeronautics

October 2021

- “Designing for Security: A Cybersecurity Introduction for Aerospace Education”
- Presented at SciTech 2022, International Council of the Aeronautical Sciences (ICAS 2022) in Stockholm

### Wells Fargo Campus Analytics Challenge Winner (x2)

March 2015

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

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

March 2015

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

## PROJECTS

### 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