

Hi! I know this is a bit archaic, but out of all the possible online platforms I could think of which could handle the relatively diverse types of projects I worked on while in college, GitHub immediately jumped to the top of the list. The following are the things I generally filled up my time with while at Georgia Tech, organized by year, then by significance. Each entry in this README appears as a separate folder in this repository. While there are a few other projects that I completed while at school, unfortunately I am not allowed to place those here as they belong to a club/internal organization.

2022 (as of September)

Senior Design (Capstone Design): Project Morpheus

This is a fixed-wing transport/passenger aircraft designed to fly at supersonic speeds ($M_{cruise} = 2$), as a successor to the BAC/Aerospatiale Concorde and drawing heavy inspiration from the Boom Overture. As a team, we performed trade studies, sizing, aerodynamic analysis, structural analysis, propulsion system design, and interior cabin design. While the design process used by our professors may not necessarily be the same as those used in industry, nevertheless it was a more-than-adequate first experience in fully designing an aircraft, and I am more than proud to call it my overarching college project.

Abnormality Detection in the NFT Marketplace (CX 4242)

A data visualization/data analysis project for a class I took for my minor, this project details the use of numerical algorithms (some previously defined, some self-defined) for determining potentially fraudulent transactions on the NFT marketplace. Since the market is relatively new and thus susceptible to widespread fraud, the tool we developed scrapes data from OpenSea, the largest NFT marketplace (which also tracks all transactions, regardless of whether or not they occur on its platform), and presents it in easily readable/usable visual representations. D3.js (Javascript D3 library) was used to create our visualizations.

Investigations in Advanced Aerodynamics (AE 6015)

A series of assignments/mini-projects I completed for this graduate-level course, these generally deal with modeling wings/airfoils in open-source aerodynamics software. The first assignment involved analyzing various NACA airfoils in XFOIL and comparing the results to laboratory data. The second involves swept wings in incompressible flow modeled using self-written MATLAB code. The third is a similar experiment, except the wing is now being modeled in AVL (Athena Vortex Lattice). The final assignment exposed me to hypersonic flow over a wedge, first under the assumption that air at such speeds is an ideal gas, second under the Bose-Einstein model.

Area Change in a Shock Tube Investigation

A CFD analysis/exercise to verify the effect described in 'Shock wave interaction with an abrupt area change' (M.D. Salas, NASA Langley Research Center, 1993), where a prescribed shock wave striking a

sudden area change in the region of flow produces either a rapidly collapsing compression wave or expansion wave in the opposite direction, all of the properties of which depend on the Mach number of the shock wave and the precise ratio of the area change. Performed for a research lab, with a possible direct application of the results to one of the lab's major research projects - a rotating detonation engine.

2021 (Hiatus year due to COVID & Internships)

2020

Database Design for Tracking COVID-19 Testing At Georgia Tech (CS 4400)

An SQL-driven project where my team and I designed and created a database in MySQL to store, track, and query data from our school's COVID-19 testing during the height of the pandemic.

Turbofan Engine Design (AE 4451)

This is an engine designed for an RFP given by the professor of a course. The engine's performance was modeled in MATLAB and the numerical calculations were cross verified by hand. Engineering design decisions were defined and justified in the report. The MATLAB code is included.

Aerospace Environmental Design Tool Investigation

An ASCENT project requested by the FAA, this investigation was conducted by a team at Aerospace Systems Design Laboratory where FAA's environmental impact tool, the Aerospace Environmental Design Tool (AEDT), was being tested for plausibility. My research in particular focused on generating flight profiles for aircraft, generally the Boeing 737-300 series and the Airbus A320-200 series, with notable, intentional anomalies (such as a 'landing' step occurring before the 'cruise' step' with no subsequent 'takeoff' step). The program's generated flight dynamics data was cross-referenced with the lab's own developed programs. Some of my notes from this project are included here.

2019 Light Attack Aircraft Design Proposal

A systems engineering approach to an aircraft design given a pre-existing RFP.

2018 Engineering Graphics (CAD) Final Project (Group)

A large-scale CAD project where my team and I put together a design for a flying car. Realism, as you can probably guess, was not important to the overall result of this project.

Engineering Graphics (CAD) Final Project (Individual) A quick and short CAD project to design a creative souvenir that could be sold at the Georgia Tech bookstore. I designed a mug with satellite wings (to make it look like a satellite).