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JESHURUN HORTON

Engineering Portfolio

ABOUT ME

I am a Senior student at the University of Arkansas in Fayetteville, pursuing a major in Mechanical Engineering. My professors and colleagues recognize me as highly motivated with a goal-driven work ethic. Through my career opportunities, research, and honors projects, I have developed a strong interest in the aerospace and mechanical engineering industries, especially in 3D modeling, CAD design, propulsion, and lightweight materials.

One of my best traits is a positive, team-oriented mindset. From my experience leading design projects, I've developed great interpersonal and communication skills. I love working in environments where I can engage with other engineers and help achieve impactful goals.

This portfolio details some of my projects, their impact and success, as well as what I have learned from them. More information can be found on my LinkedIn page or by contacting me from the information shown above.

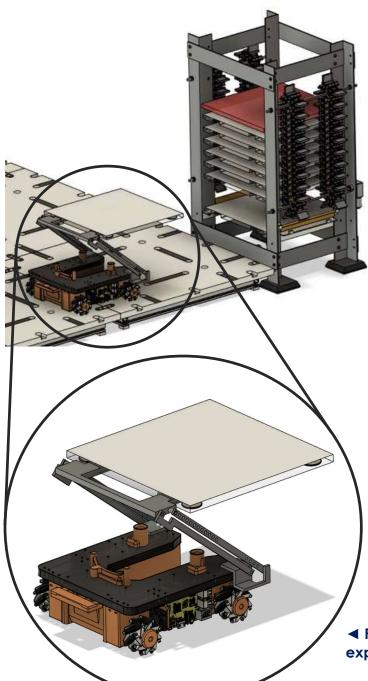
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Jeshurun Horton Jan 2021 – Dec 2021



Automated 3D-Printing System Capstone Project



The AMBOTS goal is to develop a fully autonomous swarm 3-D printing factory. To facilitate this goal, myself and a group of students have been tasked with developing a method to gather and distribute printing plates using a mobile platform and 4-bar mechanism.

As team leader of this project, I am responsible for communicating with the advisor and company sponsors of the project, holding regular meetings, and delegating tasks. I use Gantt charts to set goals for the team, and plan weekly presentations and agendas.

This project has taught me a lot about iterating designs for large assemblies and testing interactions between machine elements. I have also gained knowledge in advanced 3D printing techniques and manufacturing safety requirements.

A working prototype is currently in production, and a large-scale printing test is set to take place by the end of 2021.

■ Full prototype printing system with expanded view of mobile platform.

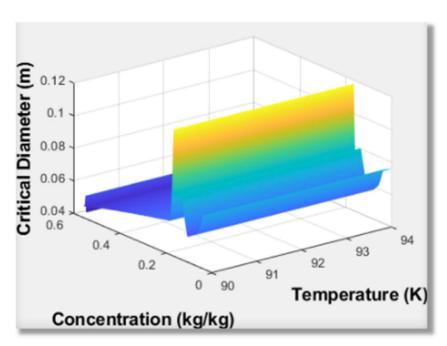
Jeshurun Horton Sep 2020 – Dec 2021

Fluvial Features of Titan Research

The Arkansas Center for Space and Planetary Sciences appointed me as project lead for research on data from the Huygens space probe. Landing on Saturn's moon Titan in 2005, the Huygens probe took pictures and analyzed chemical and atmospheric conditions on Titan.

The project consists of constructing an algorithm to determine the viscosity of liquid methane and organic deposits on Titan's surface by analyzing critical diameters of rocks and boulders. This project will provide valuable data in preparation for NASA's Dragonfly mission, set to launch a rotorcraft to Titan in 2027.

So far, this project has deepened my knowledge in avionics equipment, fluid dynamics, and planetary atmospherics. My project results and thesis are set to publish at the end of 2021.



▲ Relationship between boulder diameter, fluid concentration, and average temperature.



▲ Model of Huygens probe (nasa.gov)



▲ Image of boulders taken by Huygens probe (nasa.gov)





Dassault Falcon Jet's completion facility is located in Little Rock, AR and is responsible for most of the interior design and installation processes for their business jets. Dassault Falcon is widely recognized as a benchmark in the private jet industry in terms of its product and services, being voted #1 in the world for 3 consecutive years for customer support according to AIN surveys.

This summer, I had the amazing opportunity to work alongside the talented design engineers at Dassault Falcon. As a Weight & Balance Intern, my responsibilities included reporting and approving weight changes for test flight operations, documenting weights for custom flight options, and running companywide reports on aircraft weight estimates that resolved errors by as much as 63%. I also calculated densities for over 40 lightweight materials and solved a 30% error in estimates for an installation in Dassault Falcon's newest production aircraft, the Falcon 6X.

My management recognized me as hardworking, meticulous, and great to be around. I was told by several colleagues that my reports would be continuously referenced after my departure. I am happy to have set the foundation for new flight options and raised the standard for weight estimates at the company. The network I created with employees and other interns will greatly benefit my career.

Jeshurun Horton Nov 2019



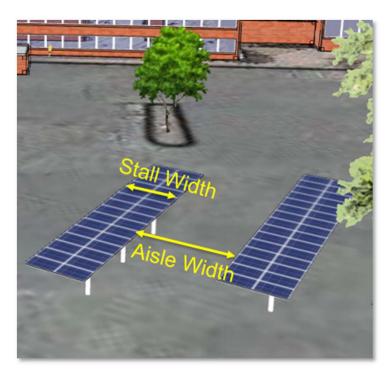




Solar Panel Design Challenge



▲ 3D Simulation of the residence area.



▲ Solar panel placement and constraints.

The SiDi (System Integration & Design Informatics) Lab at the University of Arkansas is interested in decision-making behaviors in systems engineering and design, and aims to advance human-Al collaborative design. Together with the Concord Consortium, a campus-wide competition was held to design the most efficient solar panels for the roof and parking lot of a large residence area on campus.

Energy3D was used to position solar panels and predict annual energy output. Participants were given a set of constraints/requirements including a \$1.9 million dollar budget and a minimum of 1,000,000 kWh of power generated per year. The parking lot also needed to be vehicle accessible, with fixed stall and aisle widths. Design methods were studied for each participant, and after the event the 3 best designs were chosen by judges.

While designs cannot be shown due to confidentiality, my design met nearly all requirements and was considered by judges as an effective candidate to provide clean energy to the university. Optimizing such a large system was a real challenge, and multiple iterations were required to reach maximum efficiency. I learned a lot about power generation, astronomy, and engineering design during this project, as well as the importance of solar energy.

Intro to Flight Competition

As part of the Intro to Flight course at the University of Arkansas, a competition was held to see which 3D-printed aircraft could glide the farthest along a straight line when launched by an elastic rail system. Myself and a group of students designed a small-scale aircraft from the ground up, taking inspiration from modern gliders. Calculations were made to determine the optimal airfoils, attack angle, wing area, chord length, and more. No testing was allowed, meaning the aircraft's success was solely based on the knowledge of the team.

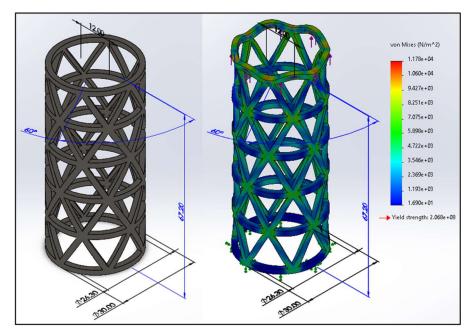
My team's aircraft achieved the largest total flight distance, but due to a 3D-printing error did not fly in a completely straight line. I learned a lot about the mechanics of flight as well as the importance of testing a design for safety and stability. This project helped spark my passion for the field of aerospace, and developed my interpersonal and team coordination skills through the challenges of COVID-19.



▲ Isometric drawing of aircraft design.

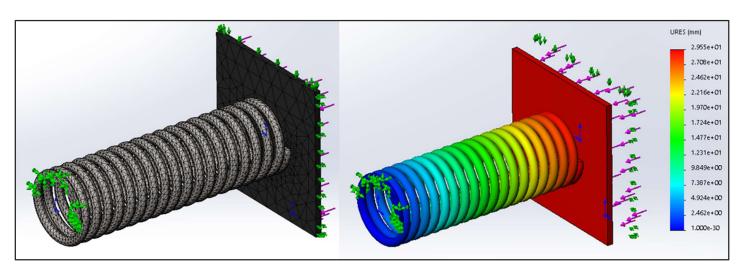
▲ Aircraft being prepared for launch.

FEA Analysis Projects



FEA Analysis is one of my proficient skills, with experience in Fusion 360, SolidWorks, and CATIA. From simple spring systems to more complex structures, I have performed multiple FEA simulations on parts and provided valuable information to my teams such as displacement and von Mises stress. Some of my FEA projects include spring stabilization, a transmission shaft, "isogrid" structures, a chain and sprocket system, and cantilever beam vibrations.

▲ Stress analysis of an "isogrid" structure.



▲ Displacement analysis of a fixed spring.

CSWA Certification

As part of the CAD Design course at the University of Arkansas, students are required to take the CSWA exam. Although certification is not required to pass the course, I succeeded in passing the exam with a perfect score and receiving my SolidWorks Associate certification from Dassault Systèmes. Dassault Systèmes is a subsidiary company of Dassault Aviation, and develops internationally recognized software such as SolidWorks and CATIA.



Materials Engineering Teaching Assistant

I am employed as a Teaching Assistant at the University of Arkansas prior to graduation. I have assisted professors in Intro to Materials and Mechanics of Materials courses, teaching students critical engineering concepts such as stress/strain, FEA analysis, failure, safety, and more. I am required to teach drill sessions, grade assignments/tests, answer student questions, and communicate with professors. This job has taught me professionalism, public speaking, course management, and leadership, and has given me the passion and skillset to help my colleagues succeed.

ÖAIAA Student Organization

The American Institute of Aeronautics and Astronautics is the largest technical aerospace organization in the world and aims to ignite and celebrate aerospace ingenuity and collaboration. I helped re-found the University of Arkansas AIAA chapter with this goal in mind. As Secretary, my responsibilities include recording meetings, writing agendas, and informing members of aerospace-related advancements and opportunities. The organization now has over 100 members and is continuously growing.

Co-founding this organization taught me vital skills about team leadership, communication, and professional engineering conduct. I have learned how to begin an organization from the ground up, such as writing a constitution and recruiting members. Through collaborative events and discussion groups, I have forged long-lasting connections with other members. I am proud to have greatly expanded the network between students and faculty with a passion for aerospace.

CEA Volunteer Work

In coordination with the University of Arkansas Center for Educational Access, I completed 50 community service hours for students with learning disabilities.

Volunteering with the CEA was a great experience. I found myself expanding my communication skills on a weekly basis by taking and compiling notes for other students in my courses. I was able to ensure that all students had an equal opportunity to learn the course material, which was very rewarding.



Division of Student Affairs Center for Educational Access

April 28, 2020

To Whom It May Concern:

I am pleased to write this letter of commendation for Jeshurun Horton for a total of 50 community service hours for note-taking services during the spring 2020 term.

The skills exhibited by Jeshurun include sensitivity to students with disabilities, planning, flexibility, teamwork and interpersonal communication at a professional level with instructors, fellow students and University staff. Jeshurun has contributed beyond expectation and, in so doing, has made the University a better place to work and learn.

Sincerely,

Michael Madakasira Program Coordinator Center for Educational Access