COLLEGE OF
ENGINEERING, ARCHITECTURE
AND TECHNOLOGY

SPRING 2025

SENIOR DESIGN *Expo*

A MESSAGE FROM THE DEAN

WELCOME!

It is my pleasure to welcome you to this semester's Senior Design Expo. Today, we gather as a community of educators, innovators and supporters to celebrate the culmination of months of hard work, collaboration and creative problem-solving by our exceptional students.

Senior Design is more than just a tradition, it is a reflection of our college's unwavering commitment to interdisciplinary learning, hands-on experience, and innovation with impact. With support from our industry sponsors, it is a moment to recognize the transition from classroom knowledge to real-world application—and to share in the excitement of discovery and progress.

This year's projects are truly remarkable in both their ambition and their execution. During today's event, you'll experience:

- Architecture students who have brought new life and meaning to an old classic by redesigning the game Monopoly into a series of tabletop board games that explore urgent and complex urban issues.
- Students who have collaborated across multiple disciplines to continue the development of Dancing Turtle—a six-foot, humanoid animatronic turtle that dances, interacts with an audience, and uses real-time skeleton tracking and user interface control to respond in the moment.
- A team of electrical and computer engineering and mechanical and aerospace engineering students who are developing a wearable prosthetic device capable of playing the guitar—pushing the boundaries of assistive technology and artistic expression.
- And another ambitious group of interdisciplinary students who are designing a cutting-edge weather balloon system. Unlike traditional systems, this one deploys a small autonomous glider that continues collecting atmospheric data during descent. By navigating into, out of and around severe weather phenomena, this project aims to significantly improve the accuracy and diversity of weather modeling and prediction.
- Each of these projects reflects the deep commitment our students have made to innovation, problem solving, and dreaming as big as the sky. They are the result of countless hours of planning, building, failing, learning, and ultimately succeeding—often together, across disciplines and backgrounds.

We are deeply grateful for the unwavering support of OSU's senior leadership, the Oklahoma State Regents for Higher Education, our many corporate partners and donors, industry sponsors, and the dedicated leadership teams within CEAT. Their collective commitment makes it possible for us to prepare our students for the professional world with confidence—knowing they will carry forward OSU's Land-Grant mission. Through their innovative and creative solutions to real-world challenges, our graduates continue to amplify the impact of OSU's excellence for the greater good of society.

Please join me in celebrating the achievements of our graduating seniors. Their work today reminds us of all that's possible when creativity meets collaboration, and when vision is supported by community.

GO POKES!

DEAN HANCHEN HUANG
Donald and Cathey Humphreys Endowed Chair
Professor of Engineering

OSU - DESIGN PROJECTS

FRIDAY, APRIL 25 FROM 9AM-4:30PM IN ENDEAVOR, ENGINEERING SOUTH AND ENGINEERING NORTH

ARCHITECTURE

(Projects located on the *SECOND FLOOR* of *ENDEAVOR*)

- Urban Studio Game Design (2nd Floor)

BIOSYSTEMS AND AGRICULTURAL ENGINEERING

(Projects located on the *FIRST* and *THIRD FLOOR* of *ENDEAVOR*)

- AGSolutions Yield Monitor Simulator (3rd Floor)
- CharTech Innovations (3rd Floor)
- Nutcrackers Engineering: Optimization of a Kincaid Peanut Thresher (1st Floor)
- Scissortail Irrigation Innovators (3rd Floor)
- Scissortail Lake Solutions (3rd Floor)
- Sugar Mommies (3rd Floor)
- Underground Pipe Surveyor (3rd Floor)

CHEMICAL ENGINEERING

(Projects located on the *SECOND FLOOR* of *ENDEAVOR*)

- Blue Hydrogen: Fueling a Sustainable Future (2nd Floor)
- Blue Hydrogen Generation (2nd Floor)
- Blue Hydrogen Production (2nd Floor)
- Blue Hydrogen Production Plant Utilizing an ATR Reactor (2nd Floor)
- Blue Hydrogen Production via Autothermal Reformation (2nd Floor)
- Blue Hydrogen to Improve the Atmosphere: An Overview (2nd Floor)
- Chemical Engineering Design Group (2nd Floor)
- H_2 Blues (2nd Floor)
- H_2 Family Problems (2nd Floor)
- Process Design to Produce Blue Hydrogen to Improve the Atmosphere (BIA) (2nd Floor)
- “The Spider Web” - Preliminary Design of a Blue Hydrogen Plant (2nd Floor)

CIVIL AND ENVIRONMENTAL ENGINEERING

(Projects located on the *SECOND FLOOR* of *ENDEAVOR*)

ELECTRICAL AND COMPUTER ENGINEERING

(Projects located on the *FIRST, SECOND,* and *THIRD FLOOR* of *ENDEAVOR*)

- AI Foosball Table (3rd Floor)
- Autonomous Firefighting Vehicle (1st Floor)
- CymSTAR Digital Synchro Device (1st Floor)
- Hardware-Based Video Controller for a RISC-V Processor (3rd Floor)
- High-Power Bandpass Filter (2nd Floor)
- Q-Tag (3rd Floor)
- Random De-Random Bot (1st Floor)

FIRE PROTECTION AND SAFETY ENGINEERING TECHNOLOGY

(Projects located on the *SECOND FLOOR* of *ENDEAVOR*)

- Boundary Layers During Exiting on Stairs (2nd Floor)
- Campus Pedestrian Safety (2nd Floor)
- Case Study Review of Performance-Based Design in Fire Protection Engineering (2nd Floor)
- Clean & Coat House Fire Protection Improvements (2nd Floor)
- Digital Applications for Online Students Taking FPST 2243: Design and Analysis of Sprinkler Systems (2nd Floor)
- Effectiveness of Low Frequency Alerts Phase 1 (2nd Floor)
- Fire Load Assessment and Fire Behavior Experiments of Polyester and Nylon Carpets (2nd Floor)
- Fire Risk Reduction in Single-Family Homes (2nd Floor)
- Limitations of Fire Modeling Tools (2nd Floor)
- Limited Area Sprinkler Systems (2nd Floor)

INDUSTRIAL ENGINEERING AND MANAGEMENT

(Presentations will be from 1:30PM-3PM in *ENGINEERING NORTH 310*)

- An Investigation into Process Improvement in a Job Shop Setting (EN 310)
- Developing a New Product for Production (EN 310)
- Enhancing the Guest Experience at Our Daily Bread (EN 310)
- Enrollment Variance Analysis (EN 310)
- Layout Design to Improve Warehouse Management (EN 310)

INTERDISCIPLINARY

(Projects located on the *FIRST, SECOND* and *THIRD FLOOR* of *ENDEAVOR*)

- Baja Front Differential (1st Floor)
- Bio-Inspired Guitarist (3rd Floor)
- Bullet's Tow (1st Floor)
- CENTAURS Swarm Through Hole Motors (1st Floor)
- Continuously Variable Displacement Engine (1st Floor)
- Cyclone Cowboys (DOE Collegiate Wind Competition) (2nd Floor)
- Dancing Turtle (3rd Floor)
- Design & Fabrication of JetCAT P100-RX Variable Area Nozzle (ES Lawn)
- FSAE Electric - Current Racing (1st Floor)
- Heatwave 2 (1st Floor)
- High Altitude Balloon Atmospheric Profiler (2nd Floor)
- Hydro Production Through Wave Motion (2nd Floor)
- Mach or Bust 2.0 (1st Floor)
- Naviro 2.0 - IEEE Robotics (3rd Floor)
- Off The Grid - Tiny House (1st Floor)
- Oklahoma Raiders – Pylon Relocation (1st Floor)
- OKSat (1st Floor)
- River Wrangler (1st Floor)
- Rocketworks (1st Floor)
- Solar Powered Landscaping Trailer (1st Floor)
- STRIKE (1st Floor)

MECHANICAL AND AEROSPACE ENGINEERING

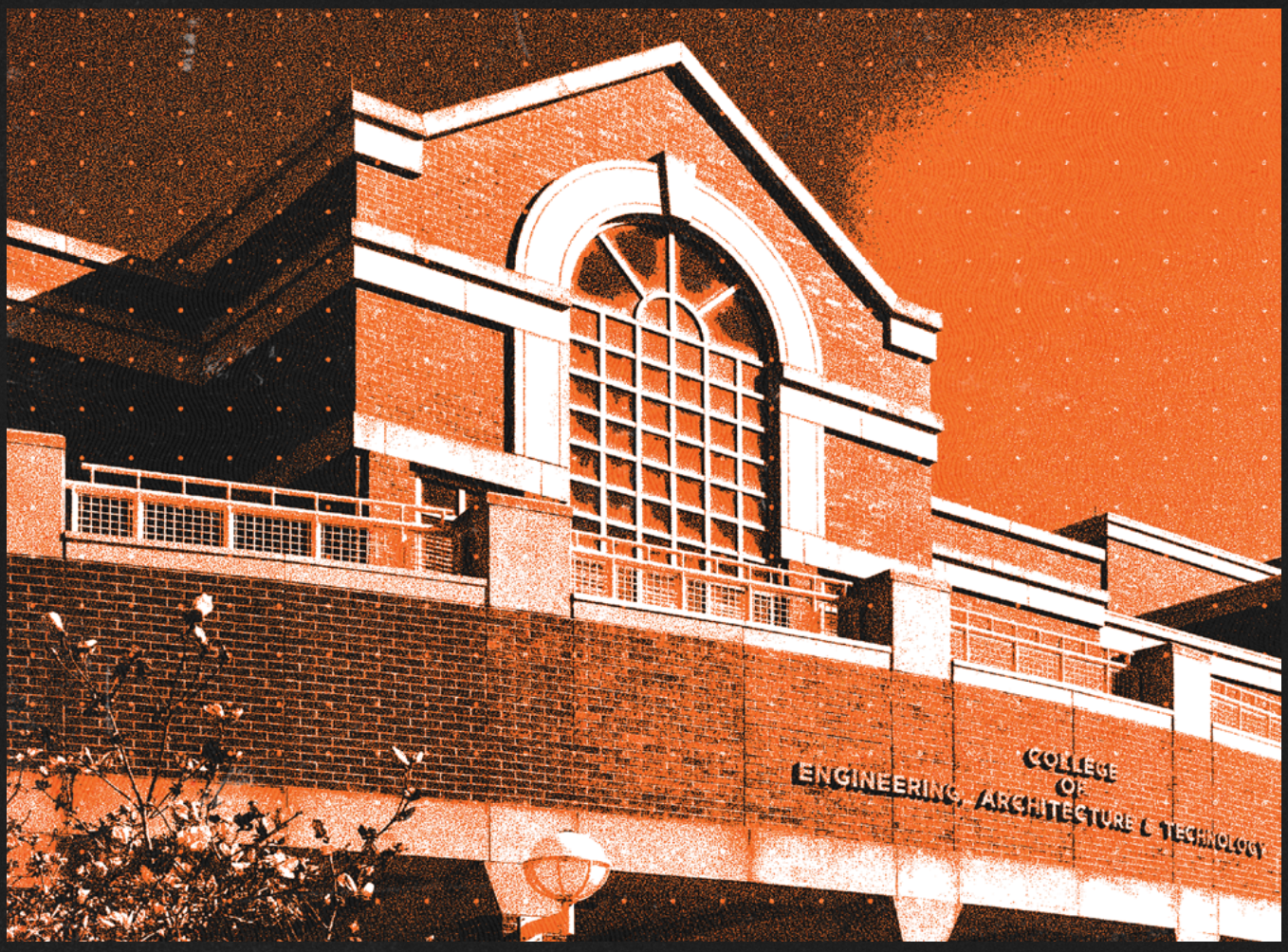
(Projects located on the *FIRST* and *SECOND FLOOR* of *ENDEAVOR* and *ENGINEERING SOUTH LAWN*)

- Contrast Training Rig (2nd Floor)
- High-Speed VTOL Capstone (ES LAWN)
- Human and Drone Swarm Simulation Platform (1st Floor)
- Quiet Reconnaissance and Logistics VTOL Drone (ES LAWN)
- Rocket Assisted Take-Off System for Unmanned Aircraft (ES LAWN)
- Safe Shoe (2nd Floor)
- Transparent Heat Exchanger (2nd Floor)

MAE 3153 – ROBOT BATTLE – DESIGN COMPETITION

Competition will be held on the *THIRD FLOOR* of *ENDEAVOR* from 10:30AM-3:30PM.

THE AWARDS SHOW FOR BAE, ECE, ID AND MAE TEAMS WILL BE HELD IN THE CHICKASAW NATION STEM AUDITORIUM IN ENGINEERING SOUTH 140 AT 4:30PM.



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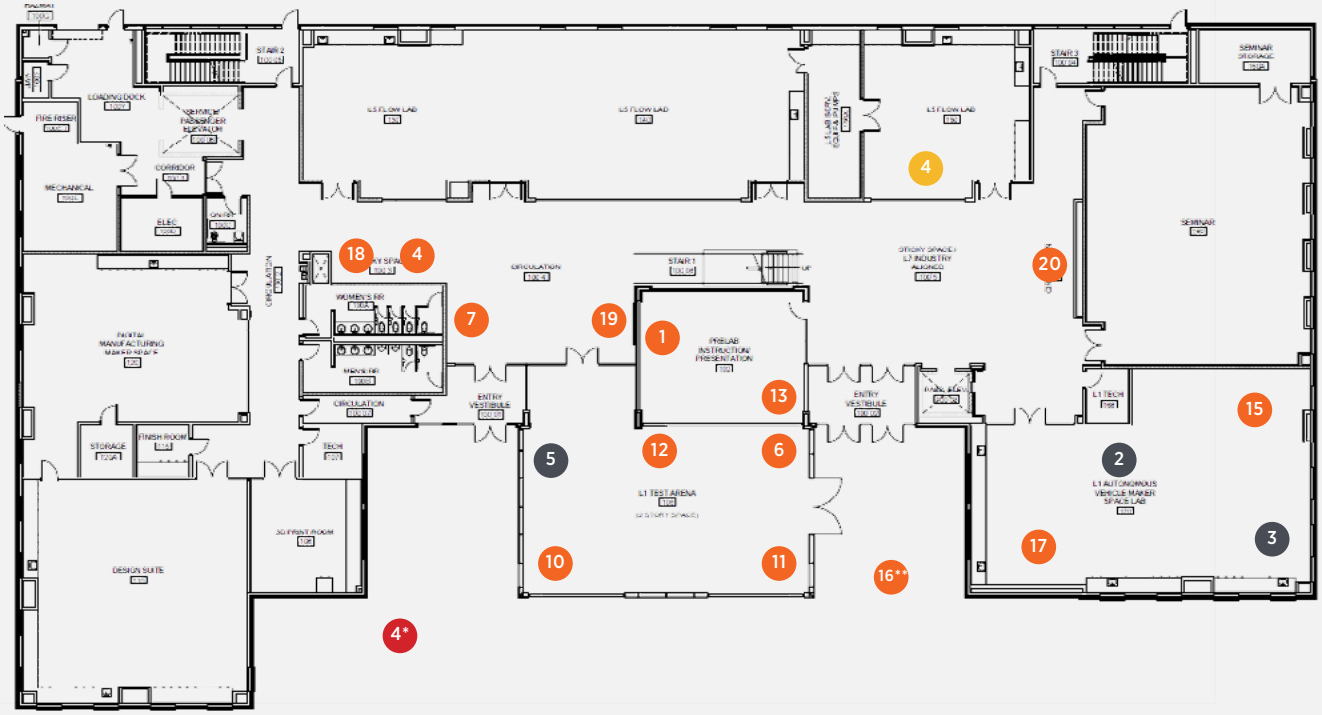
FIRST FLOOR ENDEAVOR



BAE

4. Nutcrackers Engineering: Optimization of a Kincaid Peanut Thresher*

ECE

2. CymSTAR Digital Synchro Device
3. Random De-Random Bot
5. Autonomous Firefighting Vehicle

MAE

4. Human and Drone Swarm Simulation Platform

INTERDISCIPLINARY

1. Heatwave 2
4. Mach or Bust 2.0
6. FSAE Electric - Current Racing
7. CENTAURS Swarm Through Hole Motors
10. Baja Front Differential
11. River Wrangler
12. Rocketworks
13. OKSat
15. STRIKE
16. Solar Powered Landscaping Trailer**
17. Oklahoma Raiders – Pylon Relocation
18. Off The Grid - Tiny House
19. Continuously Variable Displacement Engine
20. Bullet's Tow

*In case of rain, project team will be located on the 3rd floor
**In case of rain, project team will be located outside of END 170

SECOND FLOOR ENDEAVOR

ARCH

1. Urban Studio Game Design

ECE

4. High-Power Bandpass Filter

INTERDISCIPLINARY

2. Cyclone Cowboys

5 . Hydro Production Through Wave Motion

14. High Altitude Balloon Atmospheric Profiler

MAE

1. Safe Shoe

2. Transparent Heat Exchanger

3. Contrast Training Rig

CHE

1. "The Spider Web" - Preliminary Design of a Blue Hydrogen Plant

2. Blue Hydrogen: Fueling a Sustainable Future

3. Blue Hydrogen Generation

4. Blue Hydrogen Production

5. Blue Hydrogen Production Plant Utilizing an ATR Reactor

6. Blue Hydrogen Production via Autothermal Reformation

7. Blue Hydrogen to Improve the Atmosphere: An Overview

8. Chemical Engineering Design Group

9. H_2 Blues

10. H_2 Family Problems

11. Process Design to Produce Blue Hydrogen to Improve the Atmosphere

FPSET

1. Boundary Layers During Exiting on Stairs

2. Campus Pedestrian Safety

3. Case Study Review of Performance-Based Design in Fire Protection Engineering

4. Clean & Coat House Fire Protection Improvements

5. Digital Applications for Online Students Taking FPST 2243: Design and Analysis of Sprinkler Systems

6. Effectiveness of Low Frequency Alerts Phase 1

7. Fire Load Assessment and Fire Behavior Experiments of Polyester and Nylon Carpets

8. Fire Risk Reduction in Single-Family Homes

9. Limitations of Fire Modeling Tools

10. Limited Area Sprinkler Systems

THIRD FLOOR ENDEAVOR

AERO

1.PHASM Dolphin Drone

BAE

1. Scissortail Lake Solutions
2. Scissortail Irrigation Innovators
3. Sugar Mommies
5. AGSolutions Yield Monitor Simulator
6. CharTech Innovations
7. Underground Pipe Surveyor

ECE

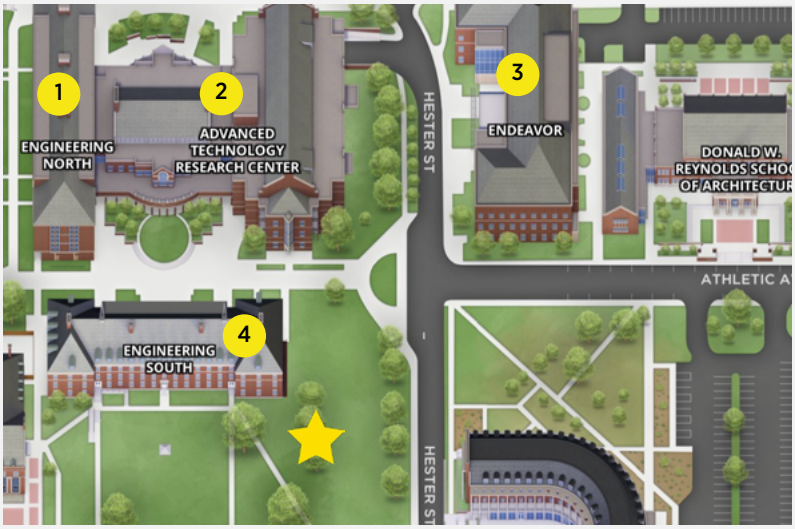
1. Hardware-Based Video Controller for a RISC-V Processor
6. Q-Tag
7. AI Foosball Table

INTERDISCIPLINARY

3. Dancing Turtle
8. Bio-Inspired Guitarist
9. Naviro 2.0 - IEEE Robotics

MISC.

5. MAE 3153 Robot Wars
6. CEAT Solvers
7. Mercury Robotics



1. ENGINEERING NORTH

IEM presentations will be held in Engineering North 310 from 1:30pm - 3pm

2. ADVANCED TECHNOLOGY RESEARCH CENTER

3. ENDEAVOR LAB

Robot Battle will be held on the third floor of ENDEAVOR from 10:30am to 3:30pm.

4. ENGINEERING SOUTH

Awards will be held in the Chickasaw Nation STEM Auditorium in Engineering South at 4:30pm

★ MAE DESIGN PROJECTS

Design & Fabrication of JetCAT P100-RX Variable Area Nozzle
Quiet Reconnaissance and Logistics VTOL Drone
High-Speed VTOL Capstone
Rocket Assisted Take-Off System for Unmanned Aircraft

ARCHITECTURE

ARCH

PROJECT TITLE

URBAN STUDIO GAME DESIGN

The urban studio was tasked to design a tabletop board game exploring important urban issues by reconstituting the game Monopoly. Each team adapted a new Monopoly board game to create the custom games on display here. Students made important choices on which urban issues to prioritize and study, how the gameplay and strategy would operate and what the ultimate objectives for players would include. The fully playable prototype games explored such issues as natural resources, culture, resiliency and social concerns, among others.

ADVISOR(S)

Prof. Nathan Richardson, Prof. Blake Mitchell

IONIC-ICONS
Mattie Farve
Guidi Giacomo
William Patton
Andrew Truong

RED WINGS
Dakota Copenhaver
Benjamin Freet
Justin Lay
Evan McDonald

FT_3
Olivia Bailey
Maggie Carathers
Jesus Fuentes
Caleb Toler

CIVIQUE
Gaby Bernabe
Rylan Flecker
Brook Lyn Jones
Ryan Thompson

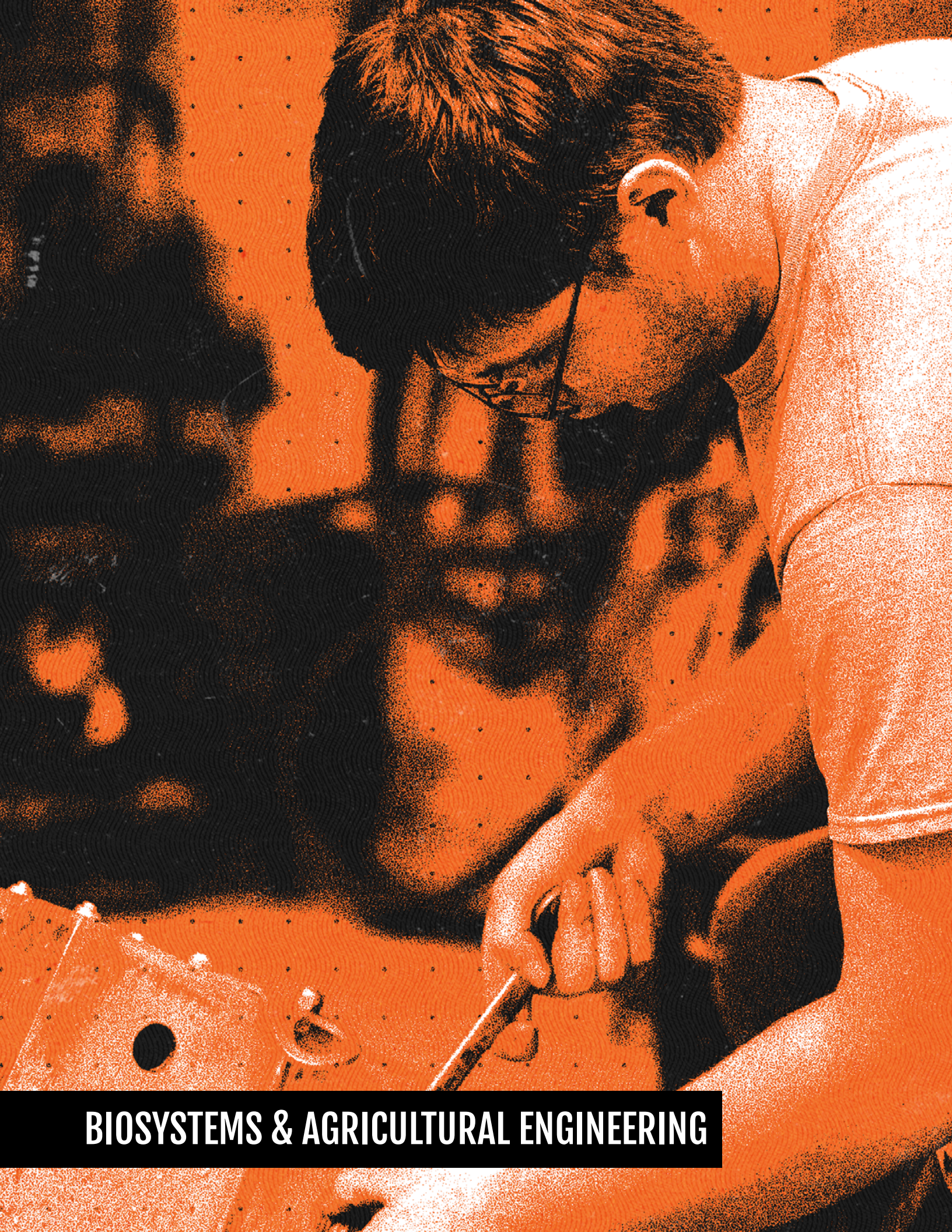
URBAN ODDITIES
Christian Brack
Chris Burchett
Nick Morey
Ian Strickland

THE TEA PARTY
Emily Nikkel
Thomas Raber
Abigail Richardson
Emily Smith

4 EVER GREEN
Christina Chahalis
Emily Henderson
Jaidyn Hess
Amber Johnson

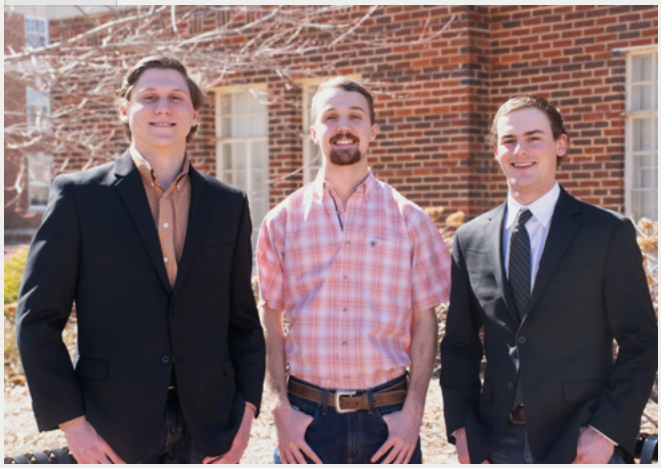
THE UNKNOWN
Jacob Gore
Addison Hunt
Blake Portell
Hailey Schmidt

DOT DOT DOT
Kasey Fuquay
Hannah Hembree
Jenkins Peek
Whitney Waitsman



BIOSYSTEMS & AGRICULTURAL ENGINEERING

BAE



(From Left to Right) Cael Gostomky, Gunnar Aune, Lukas Steinert

PROJECT TITLE

AGSOLUTIONS YIELD MONITOR SIMULATOR

AGSolutions has been assigned to develop a grain yield monitor simulator for classroom use, incorporating a clean grain elevator, grain tanks and an Ag Leader yield monitoring system. This initiative builds on a prior project, with combine harvester components being repurposed to reduce costs. In a modern combine harvester, yield monitoring occurs during the clean grain conveyance process after the grain is separated from the chaff. The system relies on an impact sensor, moisture sensor and more to accurately measure grain mass flow as well as GPS-simulated coordinates and ground speed data to calculate and map yield in bushels per acre. The simulator must include clear and accessible instructions for uploading GPS data and operating the system, ensuring usability for individuals of all education and experience levels in grain handling.

ADVISOR(S)

Dr. John Long, Dr. Kevin Moore

BAE

(From Left to Right) Brody Bouher, Clara Buckmaster, Logan Morris

PROJECT TITLE

CHARTECH INNOVATIONS

This senior design project entails making a larger-scale biochar reactor for the Department of Horticulture at Oklahoma State University. Our sponsor, Dr. Bruce Dunn, has a reactor that does not meet his production capacity needs. The project looks to double the amount of char produced on an hourly basis by focusing on the efficiency of the system. Our design looks to improve the ease of operability, associated maintenance and production optimization of a newly developed system. Prior to speaking with subject matter experts, research was done on general categories of batch and continuous reactors to decide what would best suit our sponsor's needs. In speaking to experts, it was determined that the goal will be to design a process rather than a system. This will allow the team to prioritize operation optimization. Ultimately, our design reflects the compiled knowledge of these sources and the needs of the sponsor. Several evaluation criteria will be utilized to ensure our reactor reaches the design specifications needed for our sponsor. These evaluations include production capacity testing, efficiency evaluations, safety assessments, feedstock variability testing, heat retention analysis and usability testing. Our project will also have a standard operating procedure to ensure ease of operation. The total budget for the project is $6,500 including the cost of the kiln, all associated fabrication costs and testing.

ADVISOR(S)

Dr. Kevin Moore

SPONSOR(S)

DEPARTMENT OF HORTICULTURE AND LANDSCAPE ARCHITECTURE

BAE

(From Left to Right) Kiersten Franklin, Kali Ware, James Lee

PROJECT TITLE

EVALUATION AND REMEDIATION OF IRRIGATION WATER AND SOIL AT SCISSORTAIL PARK

This project tackles water and soil quality challenges at Scissortail Park, a reclaimed brownfield in Oklahoma City. The park's irrigation source — a high-salinity, high-bicarbonate lake—hardens soil, limiting permeability and plant growth. This study aims to lower irrigation water's pH, salt and bicarbonate levels while improving soil texture for better water absorption and plant root penetration. Water trials will test three alternative irrigation sources — sulfuric acid treated lake water, Oklahoma City water and SeacureCal treated water — against the existing lake water, using plant growth trials that use Scissortail Park soil in a controlled setting from February 1 to April 1, 2025. After this time, the plant growth trials will be relocated to the park and the water trials will begin. Over two months, soil trials will evaluate six remediation treatments, including organic matter applications and gypsum, across four park zones. By addressing these water and soil issues, this project seeks scalable, site-specific solutions to enhance soil health, water infiltration and plant resilience, ensuring long-term sustainability at Scissortail Park.

ADVISOR(S)

Dr. Kevin Moore

SPONSOR(S)

SCISSORTAIL PARK For Everyone

BAE

(From Left to Right) Elizabeth Casey, Samantha Burkhart

PROJECT TITLE

HAND PIE SUGAR TOPPING OPTIMIZATION (SUGAR MOMMIES)

This study addresses the sugar topping adhesion challenges faced by the manufacturer, which is a large-scale producer of dough-based food products, particularly in the production of their popular frozen sweet hand pies. This sugar topping results in a sweet, crunchy layer after the pie is finished baking, making it vital for the texture profile of the hand pie. Inconsistent sugar topping adherence to the outside of the pies has the potential to lead to customer dissatisfaction due to an unfulfilled sugar texture and taste profile on the final product. Currently, the average sugar topping retention on each pie falls below the desired target of 4.9 grams, despite sugar application equipment meeting weight specifications during testing. This discrepancy indicates an adhesion issue, rather than an application issue. The proposed solutions aim to optimize sugar topping adherence by testing various application techniques utilizing both single and double sequences of water and sugar at specific temperatures applied through a miniature prototype conveyor model. The testing method includes tray testing for sugar topping weight distribution and applying successful methods to hand pies. Evaluation criteria focus on achieving target sugar and water weights while maintaining total product weight. Successful outcomes will enable the manufacturer to implement an improved sugar application system, achieving product consistency and consumer satisfaction.

ADVISOR(S)

Dr. Kevin Moore

SPONSOR(S)

Bama Companies

BAE

(From Left to Right) Camryn Grabeal, Scott Davis, Randi Laverty

PROJECT TITLE

NUTCRACKERS ENGINEERING: OPTIMIZATION OF A KINCAID PEANUT THRESHER

The USDA Agricultural Research Service Peanut and Small Grains Research Unit requested a redesign of their Kincaid peanut thresher trailer to improve efficiency and safety during research plot harvesting. Our redesign features a new chassis and conveyor system, enabling continuous operation and reducing labor requirements. These improvements streamline the harvesting process, making it more efficient, safer and less labor-intensive. By optimizing the equipment for agricultural research, this project supports innovation in peanut harvesting and processing, ensuring a faster, safer and more effective workflow.

ADVISOR(S)

Dr. Scott Frazier, Dr. John Long, Dr. Kevin Moore

SPONSOR(S)

USDA ARS

KINCAID

LINK(S)

Presentation

BAE

(From Left to Right) Emma Kistler, Kirin Stewart, Sierra Josselyn

PROJECT TITLE

SCISSORTAIL LAKE SOLUTIONS

Scissortail Lake, located in Scissortail Park in Oklahoma City, suffers from harmful algal blooms and poor water quality due to excess nutrients and low biodiversity. This project aims to enhance the lake's ecological health and visual appeal by implementing a wetland restoration. Through research and field assessments, key recommendations include increase biodiversity by introducing native aquatic plants, animals and insects; enhance water circulation by improving aeration and flow through the weir system; introduce a data collection plan; and create a best practice management plan. These solutions address eutrophication by promoting nutrient balance, increasing dissolved oxygen levels and reducing algal blooms. These interventions will create a more resilient, self-sustaining ecosystem while improving the lake's recreational and aesthetic value for the community.

ADVISOR(S)

Dr. Kevin Moore

SPONSOR(S)

SCISSORTAIL PARK For Everyone

BAE

(From Left to Right) Gus Cowan, Connor Colby, Tanner Robinson

PROJECT TITLE

UNDERGROUND PIPE SURVEYOR

The purpose of this project is to develop a proof of concept for a subsurface autonomous rover that maps underground utility pipe paths. A lack of documentation of some utility pipes can pose threats to workers and make installing new pipes difficult. Our rover is intended to operate within a 6–16-inch pipe by actuating arms to keep it centered within the pipe. As it traverses the pipe, a series of instruments collect orientation, distance and pipe diameter data for use in interpreting the pipe's path after a pipe traversal has been completed.

ADVISOR(S)

Dr. John Long, Dr. Kevin Moore, Dr. Ning Wang

SPONSOR(S)

UP NEXT

CHE

CHEMICAL ENGINEERING

CHE

(From Left to Right) Kenna Lam, Blakely Smith, Nikole Salas, Brandi Head

PROJECT TITLE

BLUE HYDROGEN: FUELING A SUSTAINABLE FUTURE

With the increasing demand for clean energy along the United States gulf coast, a blue hydrogen auto-thermal reforming process coupled with CO_2 capture has been developed. This commercial-scale process provides shareholder value by supporting low-emission investments. To enhance efficiency and minimize both operating costs and capital expenditures, heat integration was incorporated into the design. An economic analysis evaluated over a 15-year project life determined a net present value of $540 million. Key safety considerations included a HAZOP analysis, P&ID and controls, pressure relief systems, TNT equivalency assessments, and personnel exposure risks. Process optimization reduced carbon intensity below the required threshold, qualifying the design for the 45V hydrogen tax credit.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

SPONSOR(S)

AIChE
The Global Home of Chemical Engineers

CHE

(From Left to Right) Jaden Ard, Cameron Major, Matthew Schmill, John Mark Steichen

PROJECT TITLE

BLUE HYDROGEN GENERATION

The aim of the project is to design a blue hydrogen plant. This is a process where natural gas is converted into hydrogen and CO_2, with the CO_2 being captured, processed and sequestered to lower emissions. The target design of the plant was to produce 250 million standard cubic feet per day of hydrogen, capturing CO_2 in the process to help protect the environment by limiting emissions.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

CHE

Jacob Freeman

PROJECT TITLE

BLUE HYDROGEN PRODUCTION

My project is to design a system to produce blue hydrogen. This is the assignment given from American Institute of Chemical Engineers. Blue hydrogen is comparable to effective alternative fuel production and use.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

CHE

Bailey Roberts

PROJECT TITLE

BLUE HYDROGEN PRODUCTION PLANT UTILIZING AN ATR REACTOR

This project is for the Chemical Engineering Senior Design II class. The project statement was provided by a third party who is interested in developing a chemical process plant to meet certain criteria they have come up with. The project competition is on a national level, and our instructors will submit our project to the committee to review and decide a winner out of hundreds of designs. It is a very neat opportunity to potentially be recognized for the design we come up with.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

SPONSOR(S)

AIChE
The Global Home of Chemical Engineers

CHE

(From Left to Right) Sam Crabtree, Stone Gardiner, Tristian Liles

PROJECT TITLE

BLUE HYDROGEN PRODUCTION VIA AUTOTHERMAL REFORMATION

Our Chemical Engineering Senior Design II class required us to enter the American Institute of Chemical Engineers' design competition. This competition gave groups 60 days to come up with a preliminary design for a process that would refine natural gas into blue hydrogen, the method of doing so being outlined in a project statement.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

CHE

(From Left to Right) Logan Girvan, Declan Simmons, DM York, Abdulelah Alahmadi

PROJECT TITLE

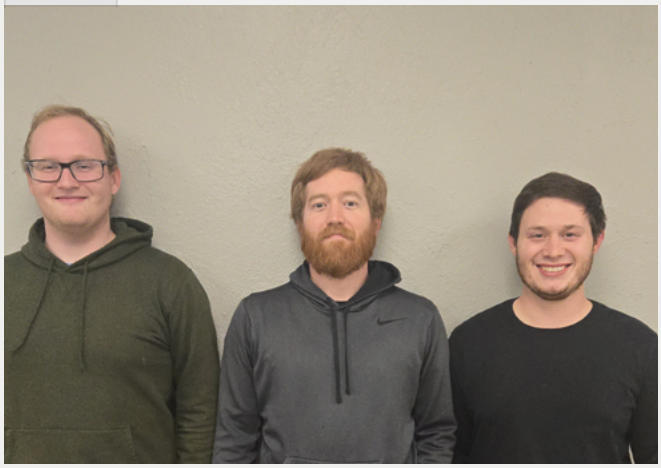
BLUE HYDROGEN TO IMPROVE THE ATMOSPHERE: AN OVERVIEW

This project focuses on blue hydrogen production which involves steam-methane reformation paired with a carbon capturing system. The goal of this project is to design the largest-known process plant to produce hydrogen at 250 million SCF annually. This process displays the initial work that must be done to further the shift from fossil fuels as a global fuel source to hydrogen, which is a highly efficient and clean fuel source. While blue hydrogen indicates that fossil fuels were the precursor necessary for its production, the harmful effects of methane, carbon dioxide and carbon monoxide are mitigated by the carbon capture system. This system recycles carbon dioxide into the industry and can be distributed to manufacturers that require carbon dioxide. Ultimately, there must be a push toward cleaner fuel, and this process shows that large-scale industrial operations are not only feasible, but also profitable.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

CHE



(From Left to Right) Michael Kipley, Kenneth Everette, Jacob Bruner

PROJECT TITLE

CHEMICAL ENGINEERING DESIGN GROUP

We have designed a blue hydrogen plant that produces a product of 250 MMSCFD of hydrogen gas. The plant includes a MEAmine CO_2 capture system that recovers 73% of the carbon dioxide created throughout the process.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

SPONSOR(S)

AIChE
The Global Home of Chemical Engineers

SPONSOR(S)

CHE

(From Left to Right) Tylee Kareck, Cory Campbell, Keshawn Wallace, Margaret Cook

PROJECT TITLE

H_2 BLUES

Hydrogen is currently considered a potential alternative fuel solution to greenhouse gas emitting natural gas. Most of today's hydrogen is produced from fossil fuels through "gray" processes, which also produce GHG emissions that primarily consist of CO_2. However, these emissions can be captured and processed to reduce the environmental impact of the process, which is labeled as "blue" when incorporating carbon capture and storage. The proposed process annually produces 250 MMSCFD of blue hydrogen from natural gas via autothermal reforming and captures approximately 99% of the emissions using monoethanolamine vent gas stripping. The plant is recommended to be located in Killona, Louisiana, and should use nuclear power to reduce the product's lifecycle emissions and environmental impact. The expected capital cost, operating costs, annual revenue, net present value and growth rate of return were determined. The inherent safety, potential explosive capacity, pressure relief requirement, and hazards and operability of the process were also considered. Pursuit of the project is recommended due to its economic attractiveness and inherently safe design.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

AIChE
The Global Home of Chemical Engineers

CHE

(From Left to Right) Wyatt Miller, Jack Wolf, Kaitlyn Luster, Tariq Tariq

PROJECT TITLE

H_2 FAMILY PROBLEMS

Our team looked at the possibility of creating a new blue hydrogen plant located near the Texas Gulf Shore. The purpose of these hydrogen plants is to reduce greenhouse gas emissions, particularly CO_2, and to store CO_2 in an environmentally friendly manner. The design we have proposed is as follows: a pre-treating unit with a ZnO bed to remove H_2S from the natural gas feed; a pre-reformer to convert most ethane into hydrogen; a steam reforming unit using a tubular, isothermal design followed by a low-temperature shift reactor; a monoethanolamine scrubber to remove as much CO_2 from the product; and lastly, a pressure swing absorber to get pure H_2 product from fuel gas.

A scope of the project was outlined by the American Institute of Chemical Engineers. Company A's initial feed conditions of natural gas were supplied and its composition, with trace amounts of H_2S to be treated. Reactions for each step of treatment were also provided in the scope.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

CHE

(From Left to Right) Farah Abuzoor, Nawaf Alzahrani, Mohsen Almunaifi, Abdullah Alshamaa

PROJECT TITLE

PROCESS DESIGN TO PRODUCE BLUE HYDROGEN TO IMPROVE THE ATMOSPHERE (BIA)

Processing natural gas into a clean, pure source of energy that is mainly hydrogen, which is called blue hydrogen. The purpose of this project is to improve the atmosphere by using green energy instead of pollutant energy that could cause global warming.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

CHE

(From Left to Right) Hannah Beets, Jacob Wolford, Mary Dunbar

PROJECT TITLE

“THE SPIDER WEB” - PRELIMINARY DESIGN OF A BLUE HYDROGEN PLANT

For this project, the American Institute of Chemical Engineers has challenged us to generate a preliminary design for a blue hydrogen production facility that utilizes carbon capture techniques. This project aims to validate the economic attractiveness of a hydrogen plant of this size and magnitude. This process includes auto thermal reforming, pressure swing adsorption and a monoethanolamine scrubber. This project will require a fixed capital investment of $2.4 billion and will return a present-day profit of $1.4 billion with a return on investment of 23%.

ADVISOR(S)

Dr. Clint Aichele, Dr. Josh Ramsey

UP NEXT

ECE

ELECTRICAL & COMPUTER ENGINEERING

ECE

(From Left to Right) Cory Thrutchley, Gavin McKee, Zach Oyer, Evan Burk

PROJECT TITLE

AI FOOSBALL TABLE

The AI Foosbots project is a Foosball table that uses deep reinforcement learning to create an autonomous foosball-playing machine. The goal of the project is to teach AI to play foosball strategically by using real-world robotics with a brain trained through Unity simulation.

ADVISOR(S)

Dr. Joe Conner, Dr. Hritom Das, Prof. Nate Lannan

ECE

(From Left to Right) Brendan Bovenschen, Jesse Galloway, Landon Fox, Collin Bovenschen

PROJECT TITLE

AUTONOMOUS FIREFIGHTING VEHICLE

The Autonomous Firefighting Vehicle (AFV) is intended to be a fully autonomous vehicle capable of pathing, locating and extinguishing a fire source without any human intervention. The AFV's place alongside other fire suppression methods is as a first responder, allowing manned firefighting crews to arrive after the vehicle has begun extinguishing the fire source. The AFV's other intended usage is as a safety measure to protect these manned operations, where sending in firefighters would be dangerous to their health or safety. This protocol could be enacted if a landed airplane caught on fire, potentially causing an explosion, letting the AFV complete its duty without fear of human safety. This might also be deployable at the site of petroleum plants, where escaped gases could prove toxic.

ADVISOR(S)

Dr. Joe Conner, Dr. Shahriar Shahabuddin, Prof. Nate Lannan

ECE

(From Left to Right) Evelyn Wilson, Jake Witcher, Hagen Patterson, Richard Powers

PROJECT TITLE

CYMSTAR DIGITAL SYNCHRO DEVICE

The goal of our project is to simulate a synchro transmitter that sends electrical signals to drive a synchro receiver that converts the signals into angular shaft positions. Similar devices are currently used in flight simulation but are often poorly documented and expensive. Our goal is to develop a device the CymStar team can effectively implement at a more reasonable price. Our device is a combination of hardware and software. The software component displays the GUI, receives user input, sends data between the host PC and the device, and processes the user input for use in the device. The hardware component produces a signal from this input and sends it to the receiver.

ADVISOR(S)

Dr. Pejman Ghasemzadeh

SPONSOR(S)

CymSTAR

ECE

(From Left to Right) Nathan Fant, Sivan Auerbach, Brandon Collings

PROJECT TITLE

HARDWARE-BASED VIDEO CONTROLLER FOR A RISC-V PROCESSOR

Wally is an open-source, configurable RISC-V processor under development by a team of professors and researchers at Oklahoma State University and Harvey Mudd College. The purpose of this senior design project is to develop a dedicated video controller for Wally that can connect to external displays using an HDMI connector and the open-source Digital Visual Interface protocol. To ensure that the Linux operating system can properly interface with our video controller, a device driver also needed to be developed. A round-robin Advanced High-Performance Bus multi-manager system was also designed and integrated to help streamline future additions to the Wally platform, namely a Graphics Processing Unit.

ADVISOR(S)

Dr. James Stine, Jacob Pease

ECE

(From Left to Right) Bryan Struble, Philip Strachan, Nathan Johnson

PROJECT TITLE

HIGH-POWER BANDPASS FILTER

This project addresses the issue of high-power broadband amplifier noise and harmonic content that interfere with the equipment under test (EUT), especially when the EUT is equipped with an RF receiver. The solution is to develop a switchable band-pass filter for the 1 GHz – 2.5 GHz range (Range 3) used in the Mobile Electromagnetic Spectrum Simulator at the Naval Surface Warfare Center Dahlgren Division. This project aims to design and implement a switchable band-pass filter solution for Range 3, allowing for greater testing adaptability while maintaining the necessary attenuation of out-of-band noise.

ADVISOR(S)

Dr. Daching Piao

SPONSOR(S)

NAVSEA WARFARE CENTERS DAHLGREN

ECE

(From Left to Right) Reid Wilson, Dylan Saltos, Karsen Madole

PROJECT TITLE

Q-TAG

We want to reinvent the traditional nametag. Our goal is to engineer a nametag that will consist of an e-ink display, have a microphone for recording audio, have a camera for taking snapshots, include a mobile application for interacting with the tag and have at least a 40-hour battery life.

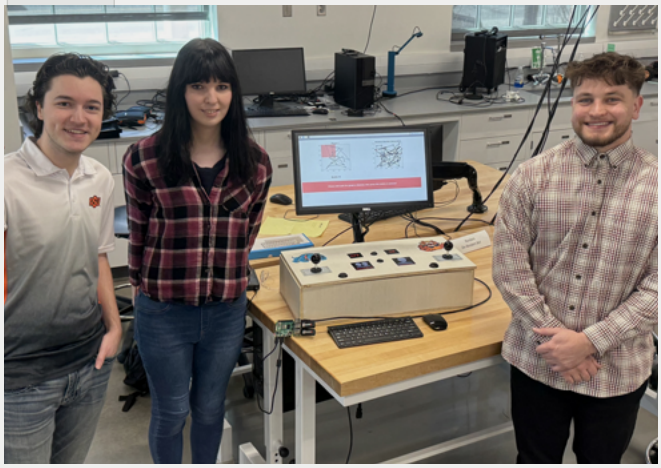
ADVISOR(S)

Prof. Nate Lannan, Joel Quarnstrom

SPONSOR(S)

OSU ZINK CENTER

ECE



(From Left to Right) Benjamin Page, Amelia Neumeyer, Connor Collins

PROJECT TITLE

RANDOM DE-RANDOM BOT

The Random De-Random Bot is a computer game project based on two identical random number generators to explore the possible effect of human consciousness on extremely weak, statistically random and electronically registerable events. The project has been created in the form of a digital game in order to make the concept interactive and appealing to a wider demographic. The game is intended to introduce users to the concept of the human mind's possible de-randomization effect on random number generation. Comparing the scores over different demographic groups may suggest if the effect varies over human factors, such as age or belief.

ADVISOR(S)

Dr. Daching Piao

UP NEXT

FPSET

FIRE PROTECTION & SAFETY ENGINEERING TECHNOLOGY

FPSET

(From Left to Right) Yunze Song, Banruoni Zhang, Jiayi Tang, Aiyan Shen

PROJECT TITLE

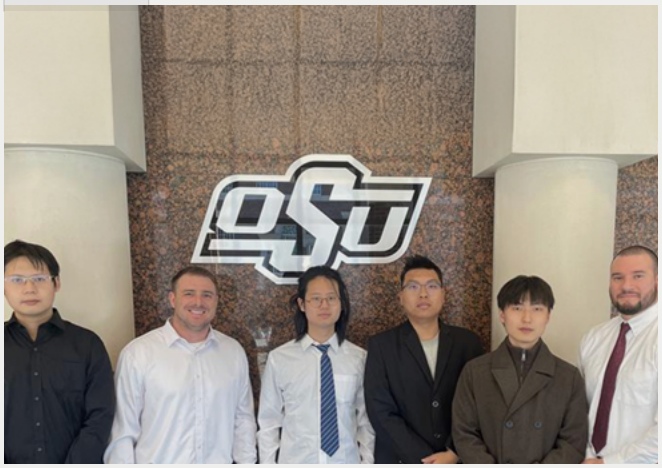
BOUNDARY LAYERS DURING EXITING ON STAIRS

This project investigates pedestrian boundary layers in staircases, focusing on how individuals maintain space between each other and their surroundings under different density conditions. The study is conducted at the dog-leg staircase in Agriculture Hall, which has a 44-inch single-lane width, meeting the minimum stair width requirements for new buildings. Our research aims to analyze the effects of pedestrian density on movement behavior by comparing low-density (3 participants) and high-density (7 participants) scenarios. Using a dual-camera setup, we capture horizontal distances (between individuals) and vertical distances (between pedestrians and walls/handrails) at three key points: the 4th step, 7th step and landing area. By conducting video-based movement analysis and statistical evaluation, we aim to identify patterns in pedestrian behavior that can contribute to improving stairway design, enhancing evacuation efficiency and ensuring pedestrian safety in crowded environments. This research provides valuable insights for architects, urban planners and safety engineers in optimizing public space navigation and emergency exit strategies.

ADVISOR(S)

Dr. Bryan Hoskins

FPSET



(From Left to Right) Lelouchlan Zhang, Oliver Mitchell, Juping Liu, Yifan Liu, Xenon Xu, Christopher Gutierrez

PROJECT TITLE

CAMPUS PEDESTRIAN SAFETY

Pedestrian and scooter rider safety on college campuses is a significant concern for students, faculty and visitors, particularly with the increasing use of micro-mobility devices. This study aims to analyze the safe and risky behaviors of pedestrians and scooter riders at Oklahoma State University, Stillwater, and to identify the most important motivations behind these behaviors. This study mainly uses machine learning methods. Through deductive coding, we designed a questionnaire for students, faculty, staff and visitors of OSU, extracted training features and output classification for training, and finally observed the internal weights of the model after training to determine the results and provide improvement measures. Findings are compared with peer-reviewed studies on pedestrian and micro-mobility safety across the United States to identify common trends and unique influencing factors. Key variables considered include time constraints, weather conditions and individual risk perceptions. The primary research question investigates the factors that influence pedestrian and scooter rider safety decisions and how these motivations align with similar national research. While individual risk tolerances vary, the overarching determinant of pedestrian and scooter rider interactions with their environment remains to be the current prevailing societal safety culture.

ADVISOR(S)

Dr. Bryan Hoskins, Dr. Leslie Stockel

FPSET

(From Left to Right) Jason Smelser, Joshua Hensley, Jordan Iin

PROJECT TITLE

CASE STUDY REVIEW OF PERFORMANCE-BASED DESIGN IN FIRE PROTECTION ENGINEERING

When developing and engineering buildings in the United States, using performance-based design (PBD) varies widely in both application and acceptance, particularly in the field of fire protection. While formal definitions differ between countries and organizations based on application, PBD can be broadly defined as using engineering judgments to achieve set objectives with the intent to protect life and property rather than following strictly prescriptive requirements in model building codes. The use of PBD to engineer all aspects of fire protection within a building is not commonplace within the U.S. or even throughout the world and is a rarity with few exceptions. The overall extent of how PBD is used on a global scale is not clear. Additionally, a full performance-based design project – one that separates itself from prescriptive codes to the greatest extent possible – appears to be unheard of within the U.S., making the process appear daunting and unfamiliar. Our research examined literature reviews and compared them to several case studies about the extent and process of using PBD both in the U.S. and globally. Our results found that PBD is becoming used more often, especially where prescriptive designs do not address special features or hazards of a building. A well-defined process exists for using a PBD, which must be followed to have the highest probability of success. It was concluded from the research that a complete PBD design can be achieved, provided that some cultural and organizational norms will need to change to facilitate this practice in the U.S.

ADVISOR(S)

Dr. Virginia Charter, Dr. Bryan Hoskins, Dr. Leslie Stockel

SPONSOR(S)

Sandia National Laboratories

FPSET

(From Left to Right) Hanya Fu, Yidan Zhang, Lixiang Zhou, Xingtong Zhu, Boston Bayless

PROJECT TITLE

CLEAN & COAT HOUSE FIRE PROTECTION IMPROVEMENTS

Corrosion on fire suppression systems is normal, but in extremely corrosive environments corrosion can be so aggressive that the pipes can be eaten away entirely. The facility our team is looking at has an extremely corrosive environment in the building with their hydrochloric dip tanks. The corrosion is so bad in this building due to a process called dew point corrosion. The team was tasked with finding solutions to improve the lifespan of the fire suppression system. The solution ranges from improving the environment around the system to improving the corrosion resistance of the sprinkler system.

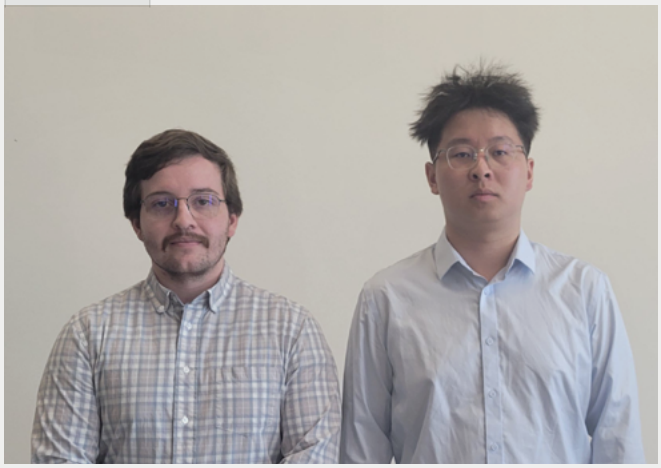
ADVISOR(S)

Dr. Ryan Shen, Dr. Leslie Stockel

SPONSOR(S)

NS NATIONAL STANDARD

FPSET



(From Left to Right) Benjamin Chapman, Zijie Zhao

PROJECT TITLE

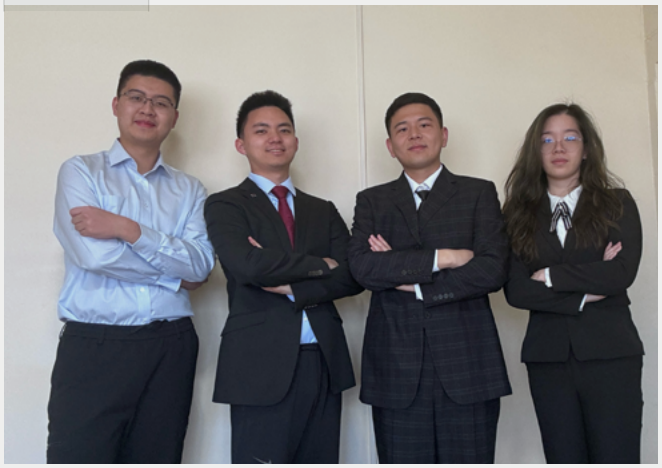
DIGITAL APPLICATIONS FOR ONLINE STUDENTS TAKING FPST 2243: DESIGN AND ANALYSIS OF SPRINKLER SYSTEMS

The OSU Fire Protection and Safety Engineering Technology program is exploring innovative methods to enhance online education through interactive digital applications. This study evaluates the effectiveness of virtual reality, augmented reality and computer-based applications in replicating hands-on laboratory experiences for online students enrolled in FPST 2243: Design and Analysis of Sprinkler Systems. Using qualitative research methods, the study assesses student engagement and perceived learning outcomes compared to the current lab format, which consists of recorded videos and worksheets. Participants will interact with digital applications, providing feedback through structured surveys. The study prioritizes accessibility and engagement by allowing participants to complete activities on personal devices or at designated research stations.

ADVISOR(S)

Dr. Virginia Charter, Dr. Diana Rodriguez Coca

FPSET



(From Left to Right) Zhengwei Zhou, Rui Li, Jinyang Li, Siying Li

PROJECT TITLE

EFFECTIVENESS OF LOW FREQUENCY ALERTS PHASE 1

The 520 Hz frequency is the standard tone for smoke alarms outside of sleeping areas, but generating this tone presents several challenges. This phase of the project aims to identify alternative tones that could be equally effective at waking people. Additionally, we will develop a methodology for testing these alternative tones. The primary objective is to find alternative tones to the 520 Hz frequency that are effective at waking individuals, thereby enhancing the overall efficacy of smoke alarms in various environments.

ADVISOR(S)

Dr. Bryan Hoskins

FPSET

(From Left to Right) Alfred Teng, Aixi Xu, Yuchen Gong, Junbin Wang

PROJECT TITLE

FIRE LOAD ASSESSMENT AND FIRE BEHAVIOR EXPERIMENTS OF POLYESTER AND NYLON CARPETS

This project will conduct burning experiments that are performed on nylon and polyester carpets, widely used residential materials, to link static fire load with dynamic fire behavior. Six parameters—peak temperature, time to peak temperature, temperature rise rate, flame height, flame duration and flame size—are measured via thermocouples and video analysis. The data aims to correlate static fire load with combustion dynamics, translating theoretical energy potential into actionable risk profiles. Results are expected to quantify hazard severity through temperature metrics and spatiotemporal impact through flame characteristics.

ADVISOR(S)

Dr. Ryan Shen

FPSET

(From Left to Right) Chase Brown, Trey Snellings, Dylan Ward, Yi Zhang

PROJECT TITLE

FIRE RISK REDUCTION IN SINGLE-FAMILY HOMES

Despite accounting for only 18% of annual fires, one- and two-family house fires are responsible for 68% of fire-related deaths. This project explores three key factors that may contribute to the disproportionate fatality rate in these residential fires. First, we will examine how modern synthetic building materials accelerate flashover, increase burn rates and produce more toxic smoke, thereby reducing occupants' time to escape. Second, we will assess public fire safety knowledge through a survey to identify critical knowledge gaps that may heighten fire risks. Finally, we will conduct a cost-benefit analysis of residential fire sprinkler systems, evaluating their effectiveness in reducing fatalities versus their installation costs. By addressing both material and human factors, our research aims to provide valuable insights into fire safety improvements and potential strategies to reduce fatalities in single-family house fires.

ADVISOR(S)

Dr. Ryan Shen

FPSET

(From Left to Right) Lio Fan, Jirong Zhang, Zheng Du, Zheng Zou

PROJECT TITLE

LIMITATIONS OF FIRE MODELING TOOLS

The primary objective of this research is to identify the limitations of fire modeling tools, specifically CFAST (Consolidate Fire and Smoke Transport Model). The study aims to achieve this through literature review and experimental analysis: addressing the challenges in explaining CFAST, finding limitations through equations and verifying these limitations using experimental data.

The research follows a two-fold methodology. Literature research involves exploring scholarly sources related to fire plume behavior, ventilation dynamics and heat transfer. Experimental research consists of conducting fire modeling simulations and comparing them with real life scenarios to determine discrepancies and limitations.

ADVISOR(S)

Dr. Haejun Park, Prof. Muhammad Jujuly

FPSET

(From Left to Right) Dr. Virginia Charter, Daniel Long, Bingheng Chen, Chuhan Huang, Junxuan Huang, Saud Alqahtani, Clay Ivey, Randolph Pedroso, Michael Wang, Cooper Garden, Randall Pruitt, Dr. Haejun Park

PROJECT TITLE

LIMITED AREA SPRINKLER SYSTEMS

The purpose of our experiment over Limited Area Sprinkler Systems is to compare performance between a 20-minute rated fire door and a sprinkler head over a door frame. This experiment was a code that was proposed to the NFPA 13 public input but did not get implemented into the code. NFPA 101, Life Safety Code, in the chapter of existing low-rise apartment buildings, allows the option to temporarily install a limited area sprinkler system. A limited area sprinkler system consists of a sprinkler system in the corridor, and every doorway leading into the corridor had the option to install a single sprinkler over the doorway or install a 20-minute rated fire door. The hypothesis for the experiment is that the sprinkler head above the door frame will keep the corridor at a tenable temperature, more so than the 20-minute rated fire door. This experiment would be a design, build, burn experiment-performing a live scale burn. The simple format for the construction of the experiment will be a corridor with two dwelling units that would be attached to the corridor. Both dwelling units will have a door leading into the corridor. One of the doors will be a 20-minute rated door and the other will have one sprinkler head above a solid core door. There will be an automatic sprinkler system throughout the corridor for both experiments. Trained firefighters will enter one of the dwelling units and ignite the fire in the sprinklered dwelling unit first. The ignited fire will burn for 20 minutes, and extinguishment will start in the 20th minute. The second burn will be in the non-sprinklered dwelling unit. Trained firefighters will ignite the burn and the flame will burn for 20 minutes, then extinguishment will occur. To collect data, thermocouples, heat flux gauges and cameras will be spaced throughout the dwelling units and the corridor. After conducting the two burns, the data will be compared and show the difference between the two dwelling units and the temperature that would influence the tenability in the corridor. From this experiment, we hope to prove that a fire sprinkler head should be the only option in the code when installing a limited area sprinkler system.

ADVISOR(S)

Dr. Haejun Park, Dr. Virginia Charter, Michael Wang

INTERDISCIPLINARY

ECE | MAE

(From Left to Right) John Terzian, John Sturgill, John Musshafen, Sam Myers, Fawaz Alroumi, Megan Merrill, Sam Jares, Johnah Rodgers, Ian Mason

PROJECT TITLE

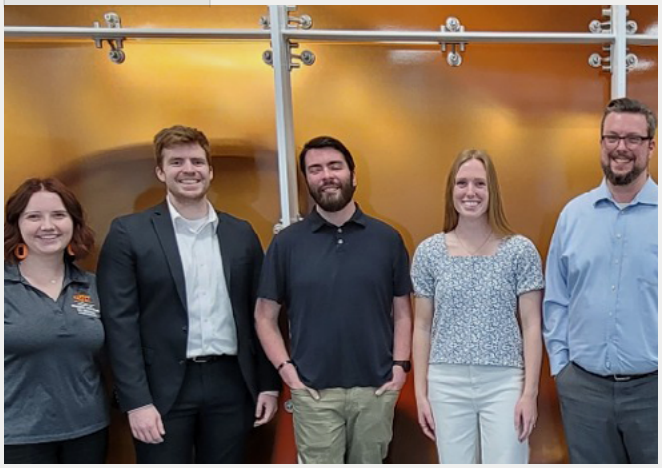
BAJA FRONT DIFFERENTIAL

This project looks to develop front differential for 2024-2025 SAE Baja Car by providing a locking differential that is lighter and fits within the confines of the current frame. It cannot conflict with the suspension and drivetrain design. This will be a prototype differential with the ability to shift between 4-wheel drive and open and closed states as well as lock/unlock while vehicle is in motion. This helps with the maneuverability dynamic event as well as overall acceleration in suspension/traction dynamic event.

ADVISOR(S)

Ray Lucas

ECE | MAE



(From Left to Right) Ashley Holland, Kyle Bowser, Connor Lovejoy, Paige Twiehaus, Jarett Woodard

PROJECT TITLE

BIO-INSPIRED GUITARIST

The overall goal of our project is to create a wearable prosthetic device that enables the user to play an unmodified, standard guitar. Our target for this semester is to create a prosthetic hand with an index finger dexterous enough to complete the movements necessary to play a note on a guitar. This design, and the accompanying control software, will serve as a base module that can be duplicated to create an entire hand. The end product will allow people who face limb difference or limb loss to regain their ability to create and play music on guitar-like instruments. The index finger, and eventually all fingers, need to have independent flexion and extension movement at all three joints, and abduction and adduction motion at the bottom joint. This will allow the hand to mimic a real hand more accurately than many prosthetic hands on the market and will allow the hand to have more control when playing the guitar. The final iteration of this design will enable users to play any music imaginable with an experience as natural as a biological hand.

ADVISOR(S)

Dr. Scott Mattison

LINKS(S)

Video

MAE | MET

(From Left to Right) Mollie Burchel, Magnus McKee , Aaron Haskell , Ethan Berzas

PROJECT TITLE

BULLET'S TOW

The Safety Tow Company has contracted OSU Senior Design students to design and optimize a safety tow apparatus which prevents trailers from decoupling from the trailer hitch. The project's scale is to deliver a complete design to the Safety Tow company for mass manufacturing before the senior design expo. This will include a 1-to-1 scale constructed prototype. The goal for this semester is to develop a product that embodies the purpose of the original Safety Tow device but implemented for use on a traditional drop hitch. These hitches are some of the most used, least expensive, widely available and their design has been unchanged for decades. The project aims to build a fully functional device that meets the teams given design criteria by the end of the semester.

ADVISOR(S)

Dr. Jahan Bayat, Prof. Laura Southard, Joel Quarnstrom

LINK(S)

Video

SPONSOR(S)

SAFETY TOW

ECE | MAE

(From Left to Right) Sean Wheeler, Levi Brice, Jake Diaz, Connor Jordan, Curtis Fodor, Cody Myers, Martin Cole

PROJECT TITLE

CENTAURS SWARM THROUGH HOLE MOTORS

CENTAURS Swarm focuses on small, pneumatically launched drones capable of quick assembly, launch and swarming capabilities while in the air. Our goal this semester is to design an easily scalable through hole motor and propeller design capable of providing high RPM, allowing for sufficient thrust to overcome drag during flight, as well as a relatively low constant torque, allowing the motor to turn the propeller without stalling at the desired RPM. We are working on this because currently there are few through hole motors on the market and those that require high voltages and larger continuous torque which are not ideal for a light, battery powered drone.

ADVISOR(S)

Dr. Imraan Faruque, Carson Kelly

ME | MET

(From Left to Right) Ian Gresley, Jack Chartier, Jayden Wall, Jacob Schindall, Dax Yosten, Austin Landrum

PROJECT TITLE

CONTINUOUSLY VARIABLE DISPLACEMENT ENGINE

This project aimed to design the top end of a 7-cylinder continuously variable displacement engine, which includes the cylinder head and valve system. Utilizing design sketches and models of the engine body, the dimensions and placements of the cylinders were replicated on the cylinder head face. Through research and consultations with the client, the design started to take form. Looking back to last semester, the first subsystem design was the planetary gear and cam assembly that features a 4:1 ratio and a cam lobe with a fixed duration. Following this, the worm gear was designed, along with a method for its actuation. The third component was the cylinder head body itself, designed with a hemispherical combustion chamber and a side-by-side valve layout. This semester, the head design was improved by the addition of cooling and oiling passages, spark plugs, and connection points. Additionally, the valve actuation was changed from a pushrod and rocker arm assembly to a hydraulic system due to complicated geometry and space constraints. These designs were developed in SolidWorks and the engine head will soon be 3-D printed for demonstration and to serve as the base for a working model.

ADVISOR(S)

Ray Lucas, Mike Pastusek

SPONSOR(S)

AmeriBand LLC

ECE | EET | IEM | MAE | ME | MET

(Left to Right, Front to Back) Fidel Ramirez, Josiah Kernell, Kali Henry, Anne Shay, Mohammed Alamri | Gaurav Das, Brian Pavel, Isley Hunter, Kaden Bush | Evan Quinton, Hunter Moeller, Kris Barton, Ethan Brown, Sam Shuster | Mason Quinton, Chris Dyke, Cody Thomas, Ryan Roberts | Not Pictured: Corbin Smith, Pedro Carbajal

PROJECT TITLE

CYCLONE COWBOYS (DOE COLLEGIATE WIND COMPETITION)

The DOE Collegiate Wind Competition was created in 2014 to help college students make connections within the wind and renewable energy industry. This is the 3rd year of the Cyclone Cowboys participating in the competition. As part of the competition, we have designed and fabricated a fully functioning wind turbine as well as hosting numerous outreach events. We also made various improvements to our wind tunnel to help future teams have the resources needed to compete amongst the top universities in the country.

ADVISOR(S)

Prof. Nate Lannan

LINK(S)

Video

SPONSOR(S)

NEXTera ENERGY RESOURCES enel

ECE | ME

(From Left to Right) Mohammed Alsalem, Torrie Shufeldt, Karson Younger, Dylan Hetzel, Kaci Anderson, Brenna Stewart

PROJECT TITLE

DANCING TURTLE

Dancing Turtle refers to a 6-foot humanoid dancing animatronic turtle. Its main purpose is to interact with an audience through dancing. Additional opportunities include communication ability, user interface control and real-time skeleton tracking. Dancing Turtle will be used to showcase emerging technologies at The Dancing Turtle Arts Festival, an annual interactive three-day festival put on by the Stillwater Community Center Foundation. The festival showcases music, art, theatre and learning events that bring in local families.

ADVISOR(S)

Dr. Joe Conner, Dr. Guoliang Fan, Prof. Nate Lannan

SPONSOR(S)

Dancing Turtle Robot

MAE | MET

(Left to Right, Front to Back) Sue Ellyn Corbett, Ryan Berzas, Tyler Rogalski | Andrew Knotts, Alexandra Boyko, Noah Greeson

PROJECT TITLE

DESIGN & FABRICATION OF JETCAT P100-RX VARIABLE AREA NOZZLE

This project involves the design, analysis and fabrication of a variable area nozzle retrofitted onto the existing mounting bolts of the JetCAT P100-RX. The motivation for this study includes the ability to optimize a nozzle area for all throttle settings, as well as spoiling thrust for rapid deceleration applications. This project aims to create a nozzle that is capable of generating a thrust range independent from throttle control. Utilizing engine cycle analysis and thermal expansion analysis, an analytical model was developed to determine the flow areas and design the nozzle exit areas. These results were then verified using computational fluid dynamics. The final design is a square duct nozzle with two actuating flaps. This design is set to provide a thrust range of 8 lbf at 80% engine speed while minimizing weight and overall nozzle dimensions. Observation from this study can be utilized for reconnaissance, surveillance mission or aviation hobbyists.

ADVISOR(S)

Dr. Kurt Rouser

SPONSOR(S)

AFRL

ECE | EET | IEM | MAE

(From Left to Right) Angel Trujillo, Andre Washington, Dustin Jones, Jordan Kristopher Andrews, Andrew Ratterman, Kellen Driever, Justin Rogers, John Muths, Jacob Riley, Aidan Hamm, Gabe Saliba, Jason King, Layton Moore, Joshua Wendel, Nathan Drywater, Jacob Moehle, Daniel Kinard, Marcial Nye, Alex Stitt, Clayton Carter, Kade Welcher

PROJECT TITLE

FSAE ELECTRIC - CURRENT RACING

The primary objective of this project is to establish Oklahoma State University's competitive Formula SAE Electric (FSAE EV) team and lay a strong foundation for future participation in the competition. This semester's tasks include conducting extensive research, conceptualizing, designing, fabricating and testing a fully functional FSAE electric vehicle. The project involves integrating all necessary electrical systems into an existing Bullet Racing chassis to streamline development while ensuring compliance with FSAE EV regulations. Formula SAE is a global competition that tasks student teams with designing, building and racing formula-style vehicles. Within FSAE, the electric class highlights the industry's growing focus on sustainable transportation. This team is comprised of 21 talented members, reflecting a multidisciplinary approach for tackling the challenges of an electric race car. The team includes students majoring in mechanical engineering, aerospace engineering, electrical and computer engineering, electrical engineering technology and industrial engineering and management.

ADVISOR(S)

Dr. Daniel Fisher, Dr. Ying Zhang, Ray Lucas

SPONSOR(S)

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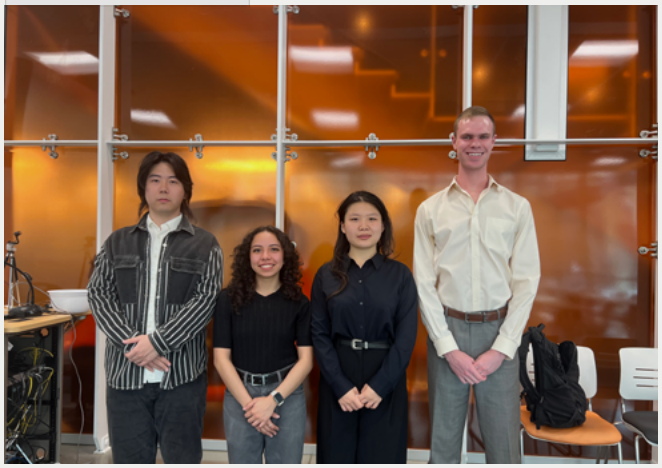
FPSET | MAE



(From Left to Right) Tianhao Wu, Roselyn Ybarra, Shuyi Zhang, Sam Glenn

PROJECT TITLE

HEATWAVE 2

The growing threat of wildfires to infrastructure highlights the need to study how materials behave under extreme heat flux conditions. The Fire Flux Heat Generator is specifically designed to replicate these conditions, enabling researchers to analyze and measure the impact of heat flux on various materials. This project focuses on improving the system's precision, structural stability, and usability to ensure reliable deployment in experimental settings, ultimately enhancing the accuracy and consistency of research outcomes.

ADVISOR(S)

Dr. Haejun Park

LINKS(S)

Video

ECE | MAE

(From Left to Right) Helen Wright, Caleb Cade Birkenfield, Wes Boeckman, Gabe Gosney, Brayan Leija Flores, Not pictured: Titue Teague

PROJECT TITLE

HIGH ALTITUDE BALLOON ATMOSPHERIC PROFILER

We're developing a weather balloon system that carries a small, autonomous glider into the atmosphere. Like a traditional weather balloon, it will ascend to 80,000-100,000 feet while collecting data and transmitting it back to a ground station. However, unlike a traditional weather balloon, we will continue to collect data on the way down as the glider autonomously flies into, out of and around serious weather phenomena. This also allows us to make sure that the glider and sensitive electronics land in an area that we are confident we can retrieve them from. The primary purpose of the project is to collect a more diverse set of weather data from one balloon, while also giving us more control over where that data is collected from. This could help improve weather predictions and weather modeling. Additionally, by designing the radiosonde apparatus in such a way that we can be sure of its landing location, we can make sure that it is always recovered. This helps make the collection of weather data both cheaper and less wasteful.

ADVISOR(S)

Dr. Jamey Jacob, Emalee Hough

LINK(S)

Video

ECE | MAE

(From Left to Right) Tyler Bushyhead, Tyler Klein, Johnny Williamson, Nicholas Smith, Carsten Logan, Preston Frederiksen

PROJECT TITLE

HYDROGEN PRODUCTION THROUGH WAVE MOTION

As global energy demands rise, innovative technologies are needed to generate sustainable power. Wave Energy Technologies aims to address this challenge by harnessing ocean waves to generate electricity near offshore oil platforms in the Gulf of Mexico. This electricity will power hydrolyzers that produce clean-burning hydrogen gas for transport to the mainland. The project is designed to operate entirely on renewable resources, eliminating the need for traditional fuels in hydrogen production.

This multi-semester project launched in Spring 2025, with the first phase focusing on prototype development. Students are tasked with designing a device that converts ocean wave motion at the base of offshore oil rigs into electricity. The prototype must be scalable, commercially manufacturable and compliant with safety standards. Additionally, students will analyze Gulf wave patterns to inform future design improvements. Collaboration between mechanical and electrical engineering students in this phase will lay the foundation for future semesters to harness the electricity produced to generate the necessary hydrogen.

ADVISOR(S)

Dr. Scott Mattison, Prof. Nate Lannan, Prof. Laura Southard

SPONSOR(S)

WAVE ENERGY WET TECHNOLOGY

ECE | MAE | MET

(From Left to Right) Mason Belflower, William Smith, Jacob Mobley, Matthew Shell, Patrick Osborn, Colby Wilson, and Tyler Tarver

PROJECT TITLE

MACH OR BUST 2.0

This project has two goals this semester for modification of a sub-scale jet engine test cell that was built last semester. The first goal is to modify the test cell to extract energy from the exhaust flow from the engine. This is done by introducing a turbine behind the engine. The second goal of this project is to reduce the acoustic footprint of the test cell as the original unmodified design made the engine louder. These goals align with the overall project objective of providing a solution for low-cost, low-risk, research and development of test cell technology, and training of test cell operators for the engine maintenance, repair and overhauls industry.

ADVISOR(S)

Dr. Aaron Alexander, Dr. Kurt Rouser, Prof. Laura Southard

LINK(S)

Presentation

SPONSOR(S)

TINKER AIR FORCE BASE

StandardAero

JETS JET ENGINE TEST SOLUTIONS

ECE | MET

(From Left to Right) Katilynn Mar, Brent Bertaux, Ben Pons, Quetz Lujan, Cauy Brooks

PROJECT TITLE

NAVIRO 2.0 - IEEE ROBOTICS

The Institute of Electrical and Electronics Engineers hosts an annual student conference featuring student competitions. Our project competed in the robotics competition, which took place March 28-30 at Wichita State University.

The theme for this year's competition was an autonomous firefighting robot. There are three rounds, each involving the robot navigating a field with obstacles. In the first round, the robot must successfully navigate the field and detect a fire (simulated with a heat map and heat gun), then return to the starting position. In the second round, the robot must return to the fire's location from round one with terrain challenges like sand, gravel and sandpaper added. In the final round, the robot must locate a latch in the game field, attach a spool to it and navigate to the fire's location once more.

We were scored on time, obstacle avoidance and proximity to the fire's location. Our project incorporates engineering principles from electrical, computer and mechanical disciplines.

ADVISOR(S)

Dr. John Hu, Prof. Nate Lannan

LINK(S)

Video

SPONSOR(S)

OSU | ZINK CENTER

EET | MAE | MET

(From Left to Right) Dr. Jeffrey Spitler, DJ McArthur, Adam Mason, Thomas Nye, Connor Winn, Brian Douglas, Garon Kourt, Gabriel Parker

PROJECT TITLE

OFF THE GRID - TINY HOUSE

The Tiny House project's goal is to create a system that simulates a zero-energy tiny house that can utilize TES tanks to store thermal energy for heating and cooling to condition a space. The system should operate a heat pump that can heat or cool water powered by solar panels or batteries that can be charged with solar energy during the day. When solar energy is no longer available to charge the batteries, the system should be able to condition the space with the hot or cold water stored in the tanks.

ADVISOR(S)

Dr. Jeffrey Spitler, Gabriel Parker, Pouria MoghimiGhadikolaei

LINK(S)

Video

MAE | MERO | MET

(From Left to Right) Lenard Sabio, Leo Fagge, Carter Israelson, Braven Hargrave, Parker Taggart, Chase Skokos, Daniel Windle, Landon Thompson

PROJECT TITLE

OKLAHOMA RAIDERS – PYLON RELOCATION

Boeing and OSU have tasked our team with designing a complete pylon relocation robot for the Boeing 747. In addition to the conceptual design, we will build a functioning prototype to serve as inspiration for Boeing.

A pylon is a critical aircraft component that connects the engine to the wing. Pylons must be removed during maintenance and relocated aft of the wings due to space and onsite policy constraints. Current storage under the wings interferes with other operations. A solution is needed to safely and efficiently move pylons, ideally using a single cart.

ADVISOR(S)

Dr. Jahan Bayat, Dr. Lingfeng Tao, Dr. Shuodao Wang

SPONSOR(S)

BOEING

ECE | MAE

(From Left to Right) Mike Arledge, Logan Sharp, Brice Prince, Soren Petersen, Joshua Ingram, Trenton Strawderman

PROJECT TITLE

OKSAT

The Oklahoma CubeSat Initiative is based at Oklahoma State University. The initiative's mission is to design and develop a functional CubeSat that can determine the state of a tumbling, tethered object in low earth orbit and to measure debris flux of the orbit. This semester's senior design project scope is to redevelop the CubeSat from prior design concepts to better suit the primary and secondary missions. This initiative's vessel is a 3U CubeSat that maintains a single "U" of space for its payload. A "U" has standard dimensions of 10x10x10cm. This makes a CubeSat and its standards a robust and user-friendly form factor for space missions. The scope of work has been defined into two separate areas which indicated the need for two disciplines of engineering students. The mechanical engineering students are tasked with designing, developing, proving, fabricating and testing the new mission satisfactory payloads. They will work on orbit selection, atmospheric factors, deployable strategies, retraction strategies and material selection. Once defined, their scope pivots to the novelty of fabricating a prototype of their deployable structures. The electrical engineering students are tasked with developing a number of subsystems. Power budgeting is modeled over the course of the mission to determine the optimal method to create and store energy. The communication methods are examined to create a link budget to validate downlink capability of the orbit and data transmission speeds.

ADVISOR(S)

Dr. Imraan Faruque, Dr. John O'Hara

ECE | EE | MAE | MET

(From Left to Right) Jace Brownlee, Antonio Valencia, Sabrina Fairchild, Nicolas Jolin, Colin Rockholt, Phillip Farris, Nina Parvin, Yosep Lazar

PROJECT TITLE

RIVER WRANGLER

In anticipation for the 2028 Olympics, a private group wants to sponsor OSU to design and build an autonomous trash boat to clean up the Oklahoma River in Oklahoma City. This semester we are finalizing the mechanical aspect of the boat, starting the integration of autonomy and working on a proof-of-concept for a docking station. Our team has the opportunity to lower the amount of trash in the main river and lower the need for human interaction to clean up the surface of the river.

ADVISOR(S)

Dr. Aaron Alexander, Dr. Mark Krzmarzick, Dr. Weihua Sheng

ECE | MAE

(From Left to Right) Anthony Migyanka, Greg Shildt, Emmy Pummill, Ana Gonzalez, Grayson Campbell, Miguel Vergara

PROJECT TITLE

SOLAR POWERED LANDSCAPING TRAILER

The OSU Landscaping team uses electric tools and transports their equipment in a small trailer. For this project, the team was tasked with designing and implementing a solar system that would provide and store power for the equipment in that trailer. The team's design integrates a photovoltaic system, battery storage, a powerful inverter and a friendly user interface to provide a reliable power source for the landscaping team's daily needs.

In addition, the team was asked to demonstrate sun-tracking capabilities with a small-scale design. This design will adjust a solar panel for maximum power generation, following the sun or a UV lamp.

ADVISOR(S)

Dr. Hamid Nazari Pouya, Wendy Hall

LINKS(S)

Video

ECE | MAE

(From Left to Right) Koby Goree, Dan Roarty, Martin Samwel, Drew Peters, Mason Rollow

PROJECT TITLE

STRIKE

STRIKE - Smart Target Recognition and Identification for Kinetic Engagement. The STRIKE team was tasked with designing and building an Unmanned Aerial Vehicle. This UAV will be tasked to perform autonomous, long-range flights for reconnaissance, tracking and as a proof of concept for kinetic engagement. Primarily, our UAV will be able to take off from a single point and sweep a predesignated area while searching for targets. If a target is spotted, the system will be able to identify and follow. This project serves as a proof-of-concept design that can be easily scalable into a product for military-like contracts. As a team, we must plan, design, build and test the product without sacrificing safety or security while keeping budget factors in mind.

ADVISOR(S)

Dr. Jamey Jacob, Peter Ramsdale

INDUSTRIAL ENGINEERING & MANAGEMENT

IEM

(From Left to Right) Zoe Ward, Ashton Parkey, Andrew Bunting

PROJECT TITLE

AN INVESTIGATION INTO PROCESS IMPROVEMENT IN A JOB SHOP SETTING

The project is concerned with investigating and recommending solutions inside a job shop manufacturing setting. A major goal is to determine specific prioritization indices for deciding order of jobs. We aim to improve efficiency and visibility of work within specific areas of the job shop.

ADVISOR(S)

Dr. Baski Balasundaram

IEM

(From Left to Right) Hadi Ubeidat, Alex Leon-Uscanga, Dawson Reed

PROJECT TITLE

DEVELOPING A NEW PRODUCT FOR PRODUCTION

The purpose of this project is to analyze, optimize and document the assembly process of a prototype to improve efficiency, reduce errors and source cost-effective manufacturing solutions. This will involve evaluating the current assembly process, developing a comprehensive assembly manual and identifying suitable manufacturers for outsourced materials. Our ultimate goal is to streamline production so that the prototype can be assembled quickly and accurately by any operator with minimal training.

ADVISOR(S)

Dr. Akash Deep

IEM

(From Left to Right) Talal Almuwaine, Grace Hendrix, Colleen Stegmann, Seth Thibodeau

PROJECT TITLE

ENHANCING THE GUEST EXPERIENCE AT OUR DAILY BREAD

This project supports Our Daily Bread in Stillwater, which is a non-profit organization established in 2017 with a mission to "feed our community collaboratively and provide connections that enable lasting change." ODB uses a guest choice shopping model where guests get to select their own groceries, providing them dignity and respect. The organization initially served 200-300 households monthly and now serves approximately 1,400 households per month, creating challenges such as long guest wait times of up to two hours. These delays can compromise the guests' dignity and accessibility ODB seeks to provide. The project's primary objective is to reduce guest wait times to 30 minutes or less by applying engineering methods and statistical techniques to optimize facility layout and process flow. Efforts focus on redesigning the shopping floor, office locations, guest and volunteer areas, and auxiliary spaces such as the test kitchen and salon. Plans may also incorporate additional space from an adjacent building if acquired. This project not only addresses immediate challenges but also identifies future areas of improvement, ensuring ODB's continued growth and success. By implementing these changes, the project seeks to enhance guest experiences, uphold guest dignity and sustain a community-driven support system.

ADVISOR(S)

Pratima Saravanan

IEM

(From Left to Right) Bryce Bullard, Ethan Frazier, Darby Guinn

PROJECT TITLE

ENROLLMENT VARIANCE ANALYSIS

The objective of this project is to analyze enrollment variance in the School of Industrial Engineering and Management at OSU by identifying key factors influencing enrollment trends. The senior design team will collect and analyze enrollment data, conduct student surveys at OSU and interview faculty from both OSU and peer institutions to gain a broader perspective of enrollment in the South-Central region predetermined by the Institute of Industrial and Systems Engineers. This project will provide insights and strategies to support sustainable enrollment while exploring short-term solutions to enhance student engagement and recruitment efforts.

ADVISOR(S)

Dr. Katie Jurewicz

IEM

(From Left to Right) Austin McDaniel, Aaron McKinstry, Rachel Hutcherson, Ethan O'Connor

PROJECT TITLE

LAYOUT DESIGN TO IMPROVE WAREHOUSE MANAGEMENT

This project aims to increase the capacity of the client's warehouse to accommodate additional inventory. Primary objectives include redesigning the facility's layout, defining an improved storage system and analyzing the benefits of the proposed changes.

ADVISOR(S)

Dr. Manjunath Kamath

UP NEXT

MAE

MECHANICAL & AEROSPACE ENGINEERING

MAE

(From Left to Right) Gabe Klein, Jacob Kalberer, Abigail Cooper

PROJECT TITLE

CONTRAST TRAINING RIG

While performing any type of weight training, there are two phases to a lift – the eccentric and concentric phase. The concentric phase is where you are shortening your muscles to move a load and the eccentric portion is where you lengthen your muscles to move a load. For example, during a bicep curl, the concentric portion of the lift would be where you are moving the weight upward and the eccentric portion of the lift would be letting the weight down. One important note is that your muscles can handle more load eccentrically than concentrically - contrast training seeks to exploit this principle to provide a more optimal training stimulus. Current market solutions only allow for a single repetition of the exercise with contrast stimulus before needing to be set down and reset. Our Senior Design project implores us to design a system that will provide this contrast training stimulus through repeated repetitions of a lift.

ADVISOR(S)

Dr. Jerome Hausselle, Dr. Jason Miller

LINK(S)

Video

SPONSOR(S)

COLLEGE OF EDUCATION AND HUMAN SCIENCES

MAE

(From Left to Right) Serge Amangoua, Peyton Bailey, Cade Patterson, Vedang Tawade

PROJECT TITLE

HIGH-SPEED VTOL CAPSTONE

The high-speed VTOL capstone project is centered around designing, manufacturing and testing a drone capable of vertical take-off and landing while also achieving a cruise speed of 160 mph. VTOL, or vertical takeoff and landing, is a type of drone that enables rapid deployment, making this drone ideal for various applications. This project aims to demonstrate the possibility of developing a high-speed VTOL drone while also showcasing its manufacturability and design potential for future use.

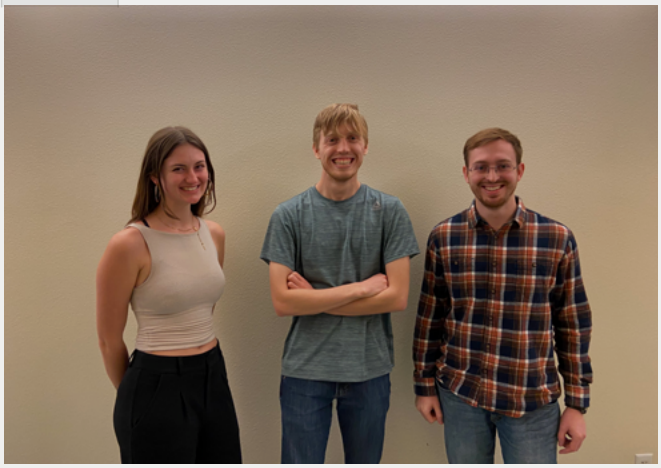
ADVISOR(S)

Dr. Atanu Halder, Dr. Sicheng Kevin Li

LINK(S)

Presentation

MAE



(From Left to Right) Olivia Fulkerson, Cody Schlather, Corbin Roy

PROJECT TITLE

HUMAN AND DRONE SWARM SIMULATION PLATFORM

Advancements in swarm robotics can revolutionize fields such as disaster recovery, agriculture and autonomous exploration. Perhaps the biggest challenge to implementing swarms is understanding how humans and robots can collaborate effectively in dynamic environments. The Simulator for Human and Swarm Team Applications (SHaSTA) was designed as an experimental system to study human-swarm interaction. The initial version is not realistic enough for intricate investigations. This capstone aims to enhance SHaSTA with VR, Robot Operating System (ROS 2), a more user-friendly interface and eventually include a Lab Streaming Layer to capture physiological signals. These enhancements will render the simulation environment more immersive, flexible and interactive.

ADVISOR(S)

Dr. Hemanth Manjunatha

MAE

(From Left to Right) Angel Diaz Santana, Ethan King, Joshua Levick, Jonathan Lowinski

PROJECT TITLE

QUIET RECONNAISSANCE AND LOGISTICS VTOL DRONE

We are using the intrinsically quieter system of cycloidal rotors to develop a stealth reconnaissance and logistics drone. This allows the aircraft to operate with a smaller sound signature than a traditional propeller drone of the same size. If successful, it could prove useful both in military and civilian applications with design focused on both payload transportation and long-range observation tasks. Still early in development, the use of cycloidal rotors in aircraft is not very well explored and could result in new methods of unmanned vehicle transportation and logistics.

ADVISOR(S)

Dr. Atanu Halder, Dr. Sicheng Kevin Li

MAE

(From Left to Right) Zack Osborne, Riley Barnes, Jacob Close, Trenton Ratts

PROJECT TITLE

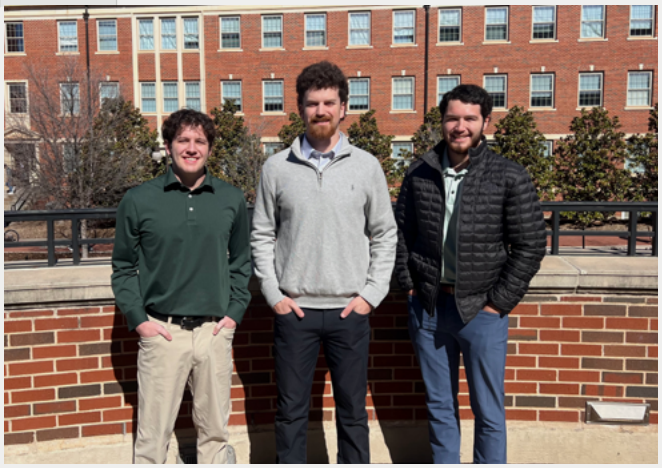
ROCKET ASSISTED TAKE-OFF SYSTEM FOR UNMANNED AIRCRAFT

This capstone entails the design, analysis and evaluation of a rocket-assisted take-off launch kit that can be retrofitted to small high-speed unmanned aircraft. The launch kit includes a frame with a built-in parachute and solid rocket motor. The frame is manufactured using commercial off-the-shelf products that are cost-effective and can be modified for different aircraft configurations.

ADVISOR(S)

Dr. Kurt Rouser, Carson McLain

MAE



(From Left to Right) Jacob Bale, Nate Gill, Sam Vogler

PROJECT TITLE

SAFE SHOE

The Safe Shoe Project is an innovative footwear solution designed to prevent vertical collapse and improve postural stability by actively helping with greater activation of lower limb muscles such as the gastrocnemius, hamstrings, gluteus maximus and quadriceps femoris which help in postural recovery. Unlike traditional footwear, which primarily supports the ankle, our Safe Shoe incorporates a spring-assisted mechanism that utilizes the forces generated during the muscle lengthening phase (vertical collapse) to enhance eventual force generated during the muscle shortening phase (vertical recovery) to optimize postural recovery. This project was developed to address the needs of athletes and non-athletes, such as older adults, to recover from postural imbalance. Overall, our long-term goal is to create a user-friendly, low-cost, long-lasting and biomechanically advanced shoe that could enhance movement efficiency and reduce fall injury risks.

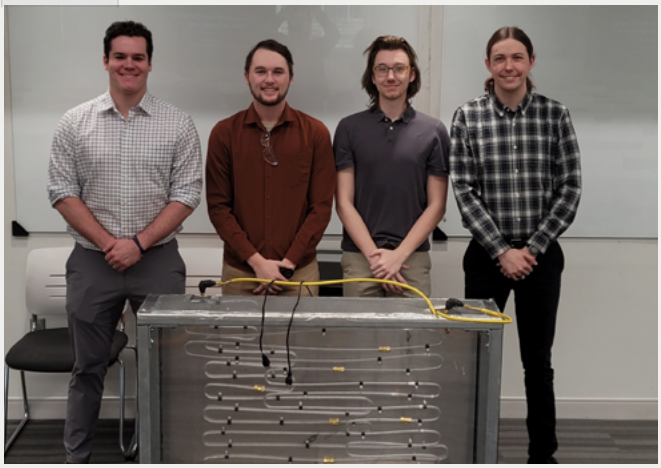
ADVISOR(S)

Dr. Jerome Hausselle, Dr. Harshvardhan Singh

SPONSOR (S)

HUMAN PERFORMANCE AND NUTRITION RESEARCH INSTITUTE

MAE



(From Left to Right) Ryan Graham, Tyler Lay, Caleb Gottlob, Forrest Mendenhall

PROJECT TITLE

TRANSPARENT HEAT EXCHANGER

Transparent Heat Exchanger is a project requested by Dr. Christian Bach to improve a design for a transparent heat exchanger that is used for demonstrations. Some of the main issues of the previous project were noise intensity, aesthetics and data acquisition. The previous team's design had a noise output of 70dB and had quite a few aesthetic issues, both of which we aim to fix. Another issue was the presentability of the project, while one could see the transparent refrigerant two-phase flow, you would have to squat down to even see it. By attaching the heat exchanger to a cart, we can fix this issue.

LINKS(S)

Video

SPONSOR(S)

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