COLLEGE OF
ENGINEERING, ARCHITECTURE
AND TECHNOLOGY

SENIOR DESIGN *Expo*

FALL 2025

WELCOME!

It is my pleasure to welcome you to this semester's Senior Design Expo. Once again, we gather as a community to celebrate the hard work, collaboration and creative problem-solving by our exceptional students.

There is no better way to showcase our college's steadfast commitment to interdisciplinary learning, hands-on experiences, and impactful innovation than through the Senior Design Expo. With support from our industry sponsors, it is a moment to recognize the transition from classroom knowledge to real-world application and to share the excitement of discovery and progress.

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

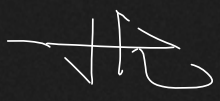
- Architecture and architectural engineering students are envisioning a speculative Engineering East, demonstrating how innovative design can lead us toward a fully electric, zero-energy future.
- Mechanical and aerospace engineering students have partnered with Toyota to develop a thermally controlled camera housing for high-altitude balloons to capture infrared imagery up to 10 kilometers above Earth.
- A team of Fire Protection and Safety Engineering Technology students are investigating how effective standard aircraft fire suppression systems handle lithium-ion battery failures, helping improve passenger safety and guide future Federal Aviation Administration policy.
- Another ambitious group of interdisciplinary students is advancing drone-swarm research by creating a scalable, safe testbed for studying how humans and autonomous drones work together in complex environments.

Each of these projects is a testament to the committed CEAT faculty and staff who have helped instill in our students a passion for innovation, problem-solving and dreaming as big as the sky. These projects reflect the countless hours our students spent planning, building, failing, learning, and ultimately succeeding.

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 transformative and creative solutions to real-world challenges, our graduates continue to amplify the impact of OSU's excellence and answer the call of the Cowboy Code.

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, NOVEMBER 21 | 9AM-4:30PM
ENDEAVOR LAB
OSU STILLWATER

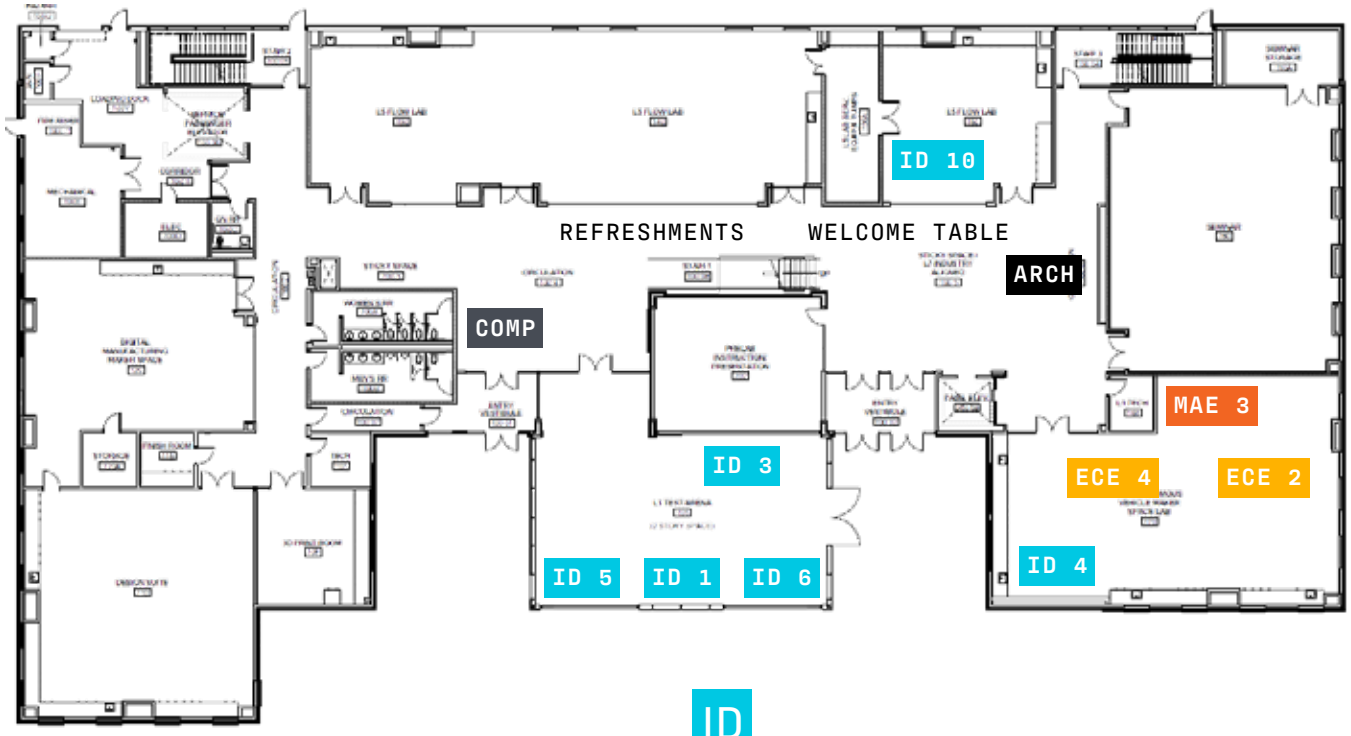
MAE 3153 - ROBOT BATTLE - DESIGN COMPETITION

THIRD FLOOR OF ENDEAVOR, ROOM 310 | 1:30PM-3:30PM.

THE AWARDS SHOW FOR ECE, ID AND MAE TEAMS

CHICKASAW NATION STEM AUDITORIUM IN ENGINEERING SOUTH 140 | 4:30PM.

FIRST FLOOR ENDEAVOR LAB



ARCH

TRADECRAFT: INTEGRATIVE DESIGN STUDIO

ECE

ECE 2
HORIZONTAL HF SYSTEM DESIGN

ECE 4
MCKEEVER'S HORIZON

COMP

COMP 1
ROCKETWORKS

ID

ID 1
LITTER GITTERS - TRASH BOAT COLLECTOR

ID 3
FSAE RACING - RIDE THE LIGHTNING

ID 4
OSU CENTAURS

ID 5
DYNO-MITE BAJA RACING

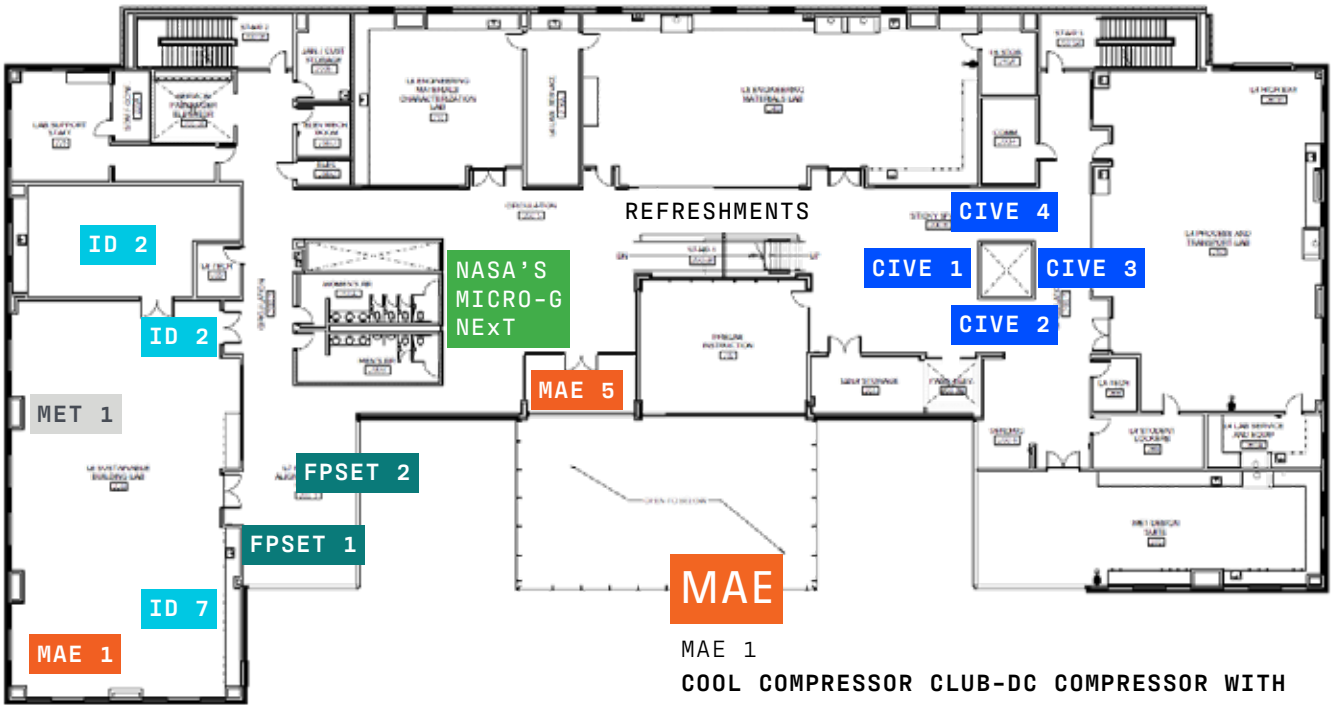
ID 6
CONCRETE COWBOYS

ID 10
DRONE SWARM SIMULATION

MAE

MAE3
CVD ENGINE

SECOND FLOOR ENDEAVOR LAB



CIVE

CIVE 1
OKLAHOMA RIVER ACCESS RAMP DESIGN

CIVE 2
S3 - SUSTAINABLE STORMWATER SOLUTIONS

CIVE 3
HIGHWAY 11 INFRASTRUCTURE PROTECTION AND EROSION CONTROL DESIGN - BLACKWELL, OK

CIVE 4
OKC FARMERS MARKET DISTRICT STREETSCAPE IMPROVEMENT AND INTERSECTION DESIGN

ID

ID 2
CYCLONE COWBOYS

ID 7
REARGEAR 2.0

MAE

MAE 1
COOL COMPRESSOR CLUB-DC COMPRESSOR WITH ALTERNATIVE REFRIGERANTS

MAE 5
OSU BALLOONING-TOYOTA IR IMAGING

MET

MET 1
DESPOOL DYNAMICS-NATIONAL STANDARD

FPSET

FPSET 1
LITHIUM-ION BATTERY FIRES IN PASSENGER AIRCRAFT

FPSET 2
GLENCOE PUBLIC SCHOOLS EMERGENCY ACTION PLAN

TEAM

NASA'S MICRO-G NEXT

THIRD FLOOR ENDEAVOR LAB

CLUB

CLUB 1
CEAT SOLVERS CLUB

CLUB 2
MERCURY ROBOTICS

ECE

ECE 1
AUTONOMOUS FIREFIGHTING VEHICLE

ECE 3
LABSCALE GRIDS

ID

ID 9
SPACECOWBOYS-IEEE ROBOTICS COMPETITIONS

IEM

IEM 1
IMPROVING SAMPLE INTAKE AND DELIVERY PROCEDURES FOR OKLAHOMA ANIMAL DISEASE DIAGNOSTIC LABORATORY

IEM 2
NATIONAL STANDARD

MAE

MAE 3153
ROBOT BATTLE

ARCHITECTURE

ARCH

1

PROJECT TITLE

TRADECRAFT: INTEGRATIVE DESIGN STUDIO

In hopes of achieving an equitable, sustainable and resilient future, the younger generation will have to continue the effort to transform the current fossil-fuel-intensive energy system into a non-polluting sustainable energy system. According to the most recent data published by the Energy Information Administration, buildings consume 74% of U.S. electricity, which represents 29% (21.9 quadrillion Btu) of delivered energy (not counting electrical system energy losses). Indeed, architecture is responsible for a significant portion of U.S. energy consumption.

Architects and architectural engineers carry a heavy responsibility to design zero-energy buildings that avoid reliance on fossil fuels. This studio proposes meeting this achievable goal with a three-legged strategy that includes (1) energy load reduction, (2) electrification and (3) on-site and/or off-site electric generation from renewable sources.

In the fall 2025 Integrative Design Studio, architecture and architectural engineering students are designing a speculative Engineering East facility for OSU's campus using sustainable design. The 20 submissions demonstrate unique design proposals that implement the strategy above by (1) achieving the lowest energy consumption possible, (2) designing buildings that are 100% electric and (3) exploring the potential of integrating PV systems with building form.

ADVISOR(S)

Dr. Khaled Mansy, Prof. Sara Hanna, Prof. Keith Peiffer, Prof. John Phillips, Prof. Jay Yowell, Madeline Maker

1

(Left to Right) Jo Migis, Andrew Brandenburd, Amanda Fee, Isabel Martinez

2

(Left to Right) Noah Frost, Dylan Tuttle, Savannah Singer

3

(Left to Right) Keenan Bouska, Cole Bass, Alex Corman, Andrea Caudillo

4

(Left to Right) Adilene Gutierrez, Oscar Escamilla, Sophie Sweeny, Tabitha Ellis

5

(Left to Right) Noah Newton, Anna Brummal, Brody Moore, Kaden Wilson

6

(Left to Right) Will Martin, Josue Monterroso, Josh Daly

7

(Left to Right) Keegan Simpson, Lakin Osmus, Trev Golubski, Gracee Cooper

8

(Left to Right) Noah Esk, Robert Peaslee, Jordan McReynolds, Lukas Grillo

9

(Left to Right) Emma Russell, Jacey Gummere, Ethan Briix, Arielle Sumners

10

(Left to Right) Braden McAnear, Marissa Miller, Olivia Arp, Logan Lanphear

11

(Left to Right) Katie Castellano, Hannah Johnson, Jillian Hermes

12

(Left to Right) Charlize Conner, Sultan Cheema, Jonavin Wilkerson

13

(Left to Right) Summer Tate, Bethany Wilmoth, Elyssa Gowriluk

14

(Left to Right) Colton Wilson, Ana Fiacable, Jordan Jones, Seth True

15

(Left to Right) Rebecca Estrada, Daniela Ortiz-Perez, Lily Hill

16

(Left to Right) Cooper Turley, Leonardo Raya Zesatti, Tim McCracken

17

(Left to Right) Drew Nichols, Jai Simpson, Jennifer Nicolae

18

(Left to Right) Alexander Hurteau, Olivia Harris, George Galvan

19

(Left to Right) Taylor Pfannenstiel, Evelyn Pate, Chris Monterroso

20

(Left to Right) Austin Grimes, Grant Harrington, Desi Johnson


CIVIL & ENVIRONMENTAL ENGINEERING
CIVE

1

(Left to Right) Will Jones, Zac Barnett, Lane Loesch, Matthew Mays

PROJECT TITLE

HIGHWAY 11 INFRASTRUCTURE PROTECTION AND EROSION CONTROL DESIGN - BLACKWELL, OK

Our project is the design of erosion prevention for the Chikaskia River near Blackwell, Oklahoma. The river's bank has eroded significantly due to recent rainfall. This erosion has gotten extremely close to Highway 11 and has structurally compromised the only power pole going into Blackwell. ODOT has made this an emergency project since the power pole has already been compromised and the river's bank is only 11 feet away from the highway.

STUDENTS

Will Jones, Zac Barnett, Lane Loesch, Matthew Mays

ADVISOR(S)

Dr. Norb Delatte, Dr. Greg Wilber

PROJECT TITLE

OKC FARMERS MARKET DISTRICT STREETSCAPE IMPROVEMENT AND INTERSECTION DESIGN

We have an intersection redesign along with a streetscape. We plan to improve the Farmers Market District in Oklahoma City to make it desirable for pedestrians and to improve traffic flow. We will also help integrate this district into the surrounding districts.

STUDENTS

Micah Lloyd, Alden Booker, Ethan Grunst, Riley Grimes

ADVISOR(S)

Dr. Norb Delatte, Dr. Gregory Wilbur

2

(Left to Right) Micah Lloyd, Alden Booker, Ethan Grunst, Riley Grimes

3

(Left to Right) Holly Combs, Katie Kellogg, Ryleigh Woody, Rhiannyn Reynolds

PROJECT TITLE

OKLAHOMA RIVER ACCESS RAMP DESIGN

The Oklahoma River has two sediment basins currently impounded by sheet piling that prevents access for the newly purchased dredging boat. The operation of the dredging boat is critical for the river to function as designed.

STUDENTS

Holly Combs, Katie Kellogg, Ryleigh Woody, Rhiannyn Reynolds

ADVISOR(S)

Dr. Norb Delatte, Dr. Greg Wilber

PROJECT TITLE

S3 - SUSTAINABLE STORMWATER SOLUTIONS NATIVE PLAINS RESILIENT INTERSECTION RE-DESIGN

Create a new and hydraulically sufficient drainage design to mitigate flooding and improve long-term functionality of the intersection at Southwest 164th Street and South Pennsylvania Avenue.

STUDENTS

Malisa Dillon, Gretchen Haymaker, Conner Schmitz, Luz Leal

ADVISOR(S)

Dr. Jaime Schussler

4

(Left to Right) Client Blaine Sheffield, Malisa Dillon, Gretchen Haymaker, Conner Schmitz, Luz Leal

ELECTRICAL & COMPUTER ENGINEERING

ECE

1

(Left to Right) Enrique Rosa-Berrios, Braxton Johnson, Tyris McCormick

PROJECT TITLE

AUTONOMOUS FIREFIGHTING VEHICLE

The project entails developing a vision system for the Autonomous Firefighting Vehicle to detect, localize and track fires and to demonstrate autonomous navigation to a target. Work includes training a deep neural network (e.g., transfer-learned YOLO) for RGB fire recognition, integrating and controlling a FLIR A50 infrared camera on a servo turret to scan/center/track simulated fire sources, and building a Picar-X prototype (Raspberry Pi 5 + AI Hat+) that navigates to a printed fire target in the IEEE arena with basic obstacle avoidance. A documented test plan, code repository and user instructions will be produced; optional tasks explore fusing RGB and IR cues to improve robustness and integrate with a full-sized unit.

STUDENTS

Enrique Rosa-Berrios, Braxton Johnson, Tyris McCormick

ADVISOR(S)

Dr. Joe Conner, Prof. Nate Lannan

PROJECT TITLE

HORIZONTAL HF SYSTEM DESIGN

Naval vessels rely on shipboard electronics that must operate safely in strong HF communication fields. The Naval Surface Warfare Center Dahlgren Division evaluates these systems' electromagnetic compatibility before deployment. Current testing procedures (HERO, EMV) use a vertical whip antenna with missiles suspended vertically; however, this setup is impractical for large missiles due to crane limitations and handling difficulties. This project aims to develop a horizontal, broadband HF antenna capable of producing a uniform electromagnetic field for HERO and EMV testing. The antenna will feature a wide 3 dB beamwidth, reasonable VSWR across the HF band and scalable design for high-power operation. To demonstrate feasibility, the team has assembled a large LPDA antenna for proof-of-concept horizontal testing.

STUDENTS

Juliette Reeder, Forrest Tuschhoff, Jack Hicks

ADVISOR(S)

Dr. Chuck Bunting, Dr. Pavithrakrishnan Radhakrishnan

SPONSOR(S)

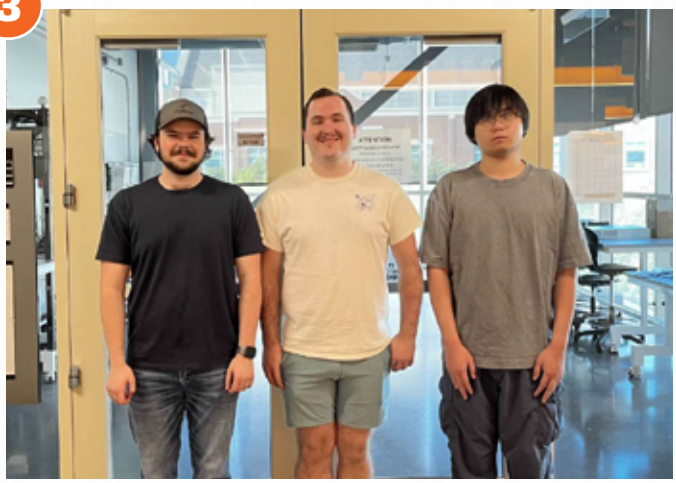
NAVSEA WARFARE CENTERS DAHLGREN

2

(Left to Right) Juliette Reeder, Forrest Tuschhoff, Jack Hicks

VIEW MORE

3



(Left to Right) Tyler Curtis, AJ Duncan, Henry Le

PROJECT TITLE

LABSCALE GRIDS

The goal of this project is to design and demonstrate small-scale solar grid systems for both AC and DC operation using a Solar Array Simulator. The setup enables the controlled study of solar power generation and distribution under different environmental conditions, such as changing sunlight. On the AC side, the system connects to a simulated utility grid through a microinverter that converts the SAS's DC output to AC power. On the DC side, the SAS directly supplies power to a connected DC load. Using a SAS instead of physical solar panels allows for consistent, repeatable testing and easy simulation of different sunlight, temperature and shading conditions. A user interface displays real-time data and lets users adjust the simulated environment to compare AC and DC system performance under various operating conditions.

STUDENTS

Tyler Curtis, AJ Duncan, Henry Le

ADVISOR(S)

Dr. Hamid Pouya, Dr. Weili Zhang

PROJECT TITLE

MCKEEVER'S HORIZON

Emergency response inside schools is often delayed by poor situational awareness. Our project addresses this issue by developing a real-time Ultra-Wideband student tracking and status reporting system. Students carry tags that provide both location data and status indicators (Hiding, Injured, Unresponsive). Anchors are placed in classrooms and hallways to communicate with the tags, and a base station aggregates the data for visualization in a responder-facing GUI.

STUDENTS

Morgan Richards, Ashley Potts

ADVISOR(S)

Dr. Shahriar Shahabuddin, Professor Nate Lannan, Joel Quarnstrom

SPONSOR(S)

Olivia McKeever

4

(Left to Right) Morgan Richards, Ashley Potts

FIRE PROTECTION & SAFETY ENGINEERING TECHNOLOGY

FPSET

1

(Left to Right) Caleb Pierce, Ava Jenkins, Luke Gregoli, Nick Schopfer

PROJECT TITLE

LITHIUM-ION BATTERY FIRES IN PASSENGER AIRCRAFT

Lithium-ion battery fires on aircraft have increased 178% from 2016 to 2024. These batteries presented a critical safety challenge due to the potential for thermal runaway - a chain reaction that could result in fire, explosion and toxic gas release. Current Federal Aviation Administration regulations permit passengers to carry one 300 Wh mobility aid battery and two 160 Wh spares, totaling 620 Wh per person. However, limited data exists regarding the effectiveness of onboard extinguishing systems against such high-energy failures.

This study aimed to evaluate the performance of standard aircraft fire suppression methods when applied to lithium-ion battery thermal runaway events. Preliminary testing involved inducing mechanical and thermal failures in common personal use and mobility aid batteries to characterize fire behavior and explosion risk. Results showed that large 300 Wh batteries produced 24-inch flame jets and high-velocity shrapnel during thermal runaway, posing severe hazards to passengers, crew and cabin materials.

Building on these findings, a full-scale experiment was conducted to assess how a 300 Wh battery failure affected aircraft components - including luggage, seats, overhead bins, Passenger Service Units and oxygen generators - under controlled conditions. Standard onboard extinguishing procedures using Halon 1211 and water were applied. The outcomes helped determine the sufficiency of current fire mitigation practices and informed both internal safety protocols and future FAA policy regarding allowable lithium-ion battery capacity on commercial flights.

STUDENTS

Caleb Pierce, Nick Schopfer, Ava Jenkins, Luke Gregoli

ADVISOR(S)

Dr. Virginia Charter, Dr. Haejun Park, Dr. Ryan Shen

SPONSOR(S)

Major Commercial Airline

2

(Left to Right) Blake Riley, Sophia Cegielski

PROJECT TITLE

GLENCOE PUBLIC SCHOOLS EMERGENCY ACTION PLAN

This senior design project focused on creating an updated Emergency Action Plan for Glencoe Public Schools in Glencoe, Oklahoma. An EAP is a structured plan that outlines what to do before, during and after an emergency. Glencoe is a small town located northeast of Stillwater with a single campus that includes an elementary, middle and high school. Altogether, these schools serve around 300 students from kindergarten through 12th grade. During evaluations, Payne County Emergency Management saw opportunities for improvement within the school's EAP. Using FEMA resources, a rubric was made with an A-F grading scale. This rubric was provided to faculty and staff who were deemed eligible to provide knowledge within a broad scale of safety, emergency management and fire protection. Round 1 of grading allowed for feedback on both Glencoe's initial EAP and the first improved version (v1). Round 2 provided an opportunity for additional feedback on v1, as well as evaluation of the final updated plan (v2), to ensure it met a higher standard. After grading was conducted, feedback and the updated EAP were provided to the Glencoe Public School superintendent, Jay Reeves. The outcome of this project was to allow greater emergency management scenario scope and plan of action in the future to ensure the safety of Glencoe Public Schools.

STUDENTS

Blake Riley, Sophia Cegielski

ADVISOR(S)

Dr. Diana Rodriguez Coca, Dr. Brian Hoskins

SPONSOR(S)


INTERDISCIPLINARY
ID

1

(Left to Right) Macey Reese, Nathan Ezell, Nathan Alvarez, Colton Rhodes, Eastyn Becker

ME | MET

VIEW MORE

PROJECT TITLE

CONCRETE COWBOYS

Our project focuses on designing and testing a new nozzle for the BAM 1.0 concrete 3D printer developed by Dr. Tyler Ley at Oklahoma State University. The BAM 1.0 can print full-scale concrete structures using a skid steer, but it's currently limited to walls. Our team is expanding the capabilities by creating a nozzle that can print 10" x 10" reinforced concrete columns up to 36 inches tall without formwork. We're working on this project to help move construction toward automation and greater affordability. Traditional methods for casting columns are slow, labor-heavy and inconsistent, while our design aims to produce columns faster with better accuracy and less labor. This project combines design, fabrication and testing to show that 3D printing reinforced concrete columns is a practical step toward accessible, automated construction.

STUDENTS

Macey Reese, Nathan Ezell, Nathan Alvarez, Colton Rhodes, Eastyn Becker

ADVISOR(S)

Dr. Tyler Ley

PROJECT TITLE

CYCLONE COWBOYS

Our team is designing and fabricating a wind turbine to compete in the 2025-2026 Collegiate Wind Energy Competition.

STUDENTS

Jacob Pippin, Nathan Rixmann, Liam Baker, Jonas Swope, James Precure, Cin Sang, David Barton, Andres Benavides, Blake Burton, Julian Fields, Gabriel Reed

ADVISOR(S)

Prof. Nate Lannan

SPONSOR(S)

enel

2

(Left to Right, Front to Back) Jacob Pippin, Nathan Rixmann, Liam Baker | Jonas Swope, James Precure, Cin Sang, David Barton Not pictured: Andres Benavides, Blake Burton, Julian Fields, Gabriel Reed

ECE | IEM | ME | MET

VIEW MORE

3

(Left to Right) Gavin Zlatar, Brendon Kosmala, Matthew Blevins, Colter Holmes

ECE | ME

PROJECT TITLE

DRONE SWARM SIMULATION

SHaSTA (Simulator for Human and Swarm Team Applications) is a drone-swarm research platform that links ROS 2 and Gazebo with Crazyflie hardware and VR visualization. Our goal is reliable multi-drone formation control and human-in-the-loop testing. We're building this to give our lab a scalable, safe testbed for studying human-swarm teaming and evaluating autonomy. The outcome will be a documented pipeline and demo that future teams can reproduce and extend. This can be used in many applications to model in closed settings before being used in the field.

STUDENTS

Gavin Zlatar, Brendon Kosmala, Matthew Blevins, Colter Holmes

ADVISOR(S)

Dr. Hemanth Manjunatha

VIEW MORE

PROJECT TITLE

DYNO-MITE BAJA RACING

The objective of this senior design project is to develop a Continuously Variable Transmission Tuning Stand tailored for the Baja Racing team to enhance the vehicle's transmission tuning capabilities. The CVT is a vital component in the vehicle's drivetrain, enabling smooth and efficient gear ratio variation to optimize engine performance during varying driving conditions. This project addresses the challenge of tuning the CVT system outside of costly and time-consuming on-track testing by providing a controlled, repeatable environment for transmission calibration.

The CVT Tuning Stand incorporates a Dyno-mite system comprising the YourDyno Ultimate V2 Dynamometer data acquisition unit, a water brake valve and a DTec RPM Adapter. This integration simulates realistic operating loads, allowing the team to observe the effects of tuning changes on engine speed, torque and clutch engagement under controlled resistance. Data acquisition from multiple sensors provides comprehensive performance metrics for fine-tuning the CVT system.

By replicating real-world transmission conditions, the tuning stand empowers the Baja team to optimize power transfer and improve vehicle acceleration, hill climb and overall drivetrain efficiency. Ultimately, this tool enhances the team's ability to make informed tuning decisions, increasing on-track vehicle reliability, improving competitive performance and reducing mechanical wear from trial-and-error tuning methods.

STUDENTS

Ian Walsh, Austin Thurman, Cole Happ, Garrett Johnson, Caemon Gay, Carley Atchley

ADVISOR(S)

Ray Lucas

SPONSOR(S) COWBOY RACING

4

(Left to Right, Back to Front) Ian Walsh, Austin Thurman, Cole Happ, Garrett Johnson, Caemon Gay, Carley Atchley

ME | MET

VIEW MORE

5

(Left to Right, Front to Back) Maddie Hand, Aiden Heffernan, Jack Seiler, Wyatt Showalter, Kurt Sewell, Aidan Rogers, Alex Junkins, Kade Moorman, Aaron Maloney, Rakan Alqattan

ECE | ME | MET

VIEW MORE

PROJECT TITLE

FSAE RACING - RIDE THE LIGHTNING

The goal of this project is to design and build a modular torsion testing stand for OSU's Formula SAE and Baja SAE teams. The stand allows the teams to accurately measure and validate chassis torsional rigidity, providing real data to support design decisions and improve performance in competition. By combining Finite Element Analysis with physical testing, the team compares simulation results to real-world data to verify assumptions and validate the overall design. This project enhances OSU's SAE teams' ability to justify engineering decisions during competition while creating a modular testing system that could benefit other universities and local engineering programs.

STUDENTS

Maddie Hand, Aiden Heffernan, Jack Seiler, Wyatt Showalter, Kurt Sewell, Aidan Rogers, Alex Junkins, Kade Moorman, Aaron Maloney, Rakan Alqattan

ADVISOR(S)

Ray Lucas

PROJECT TITLE

LITTER GITTERS - TRASH BOAT COLLECTOR

The overall objective of the Autonomous Trash Collection Boat senior design project is to develop an effective and sustainable solution for collecting debris from the Oklahoma River using an unmanned surface vessel. This effort supports preparation for the 2028 Olympics and continued long-term operation thereafter. The Fall 2025 design team is focused on improving the existing vessel both electrically and mechanically to enhance its environmental performance, operational efficiency and overall reliability.

STUDENTS

Justin Bachert, Brooke Desai, Abbigayle Vargas, Chloe Wilkins, Orin Phillips, Josh Wilson | Brody Beavers, Drew Taylor, Gabe Cornelius, Rider Rodriguez, Brayden Vest

ADVISOR(S)

Dr. Muwanika Jdiobe, Dr. Weihua Sheng

SONSOR(S)

BOB MOORE AUTO GROUP

6

(Left to Right, Front to Back) Justin Bachert, Brooke Desai, Abbigayle Vargas, Chloe Wilkins, Orin Phillips, Josh Wilson | Brody Beavers, Drew Taylor, Gabe Cornelius, Rider Rodriguez, Brayden Vest

ECE | EET | ME | MERO | MET

VIEW MORE

7

(Left to Right, Front to Back) Iain Sharp, McKenzie Keedy, Mcbrian Miye | Emory Zoellner, Kyle Duckett, Riley Reed

ECE | ME | MET

VIEW MORE

PROJECT TITLE

OSU CENTAURS

Launched Airframe for Unmanned Remote Swarm (CENTAURS) UAV project focuses on pneumatically launching a small lightweight vehicle that can be used for multiple purposes such as agriculture or surveillance. The goal is to be easy to manufacture while maintaining key performance goals such as speeds, weight and assembly times. The goal this semester was to focus on a new motor design, while making the airframe and other components manufacturing friendly. The team focused on materials and manufacturing processes while designing to ensure feasibility and practicality. The new UAV concept consists of an injection-molded airframe, a 3D-printed motor housing and tail and a slotless BLDC outrunner motor. Combined, these elements ensure a safe vehicle that is capable of multiple purposes and is easy to manufacture.

STUDENTS

Iain Sharp, McKenzie Keedy, Mcbrian Miye | Emory Zoellner, Kyle Duckett, Riley Reed

ADVISOR(S)

Dr. Imraan Faruque, Carson Kelly

PROJECT TITLE

REARGEAR 2.0

REARGEAR 2.0 is a fully pneumatic squat rack that will blend multiple forms of strength training. Most notably, our project enables contrast training, a highly effective form of weight training that varies the applied load during the eccentric (muscle extension) and concentric (muscle contraction) phases. The device can also perform isometric training, known commonly as resistance training. The system is controlled by an electronic and pneumatic system.

We are doing this project to offer an exceptionally versatile squat training system that can be utilized in any setting, ranging from physical rehabilitation to professional sports team gyms.

STUDENTS

Alec Murray, Bruce Smith, Ian Craft, Ronnie Walker, Iris Borunda

ADVISOR(S)

Dr. Singh Harshvardhan, Dr. Jerome Hausselle, Dr. Jason Miller

8

(Left to Right) Alec Murray, Bruce Smith, Ian Craft, Ronnie Walker, Iris Borunda

ME | MET

VIEW MORE

9

(Left to Right) Owen Barragan, Austin Dolan, Colby Unruh, Johnny Houston, Mariia Shevchenko

ECE | ME

VIEW MORE

PROJECT TITLE

SPACE COWBOYS - IEEE ROBOTICS

The Space Cowboys team designed and built an autonomous robot to represent Oklahoma State University in the IEEE Region 5 “Mining Mayhem” robotics competition, in Boulder, Colorado, on March 27-29. The robot autonomously collects magnetic and non-magnetic ores, deposits them into designated containers and places a beacon in a target zone, all within a three-minute match. Integrating mechanical, electrical and software systems, the design features an ore intake mechanism, omnidirectional mobility and advanced computer vision.

STUDENTS

Owen Barragan, Austin Dolan, Colby Unruh, Johnny Houston, Mariia Shevchenko

ADVISOR(S)

Dr. Joe Connor, Dr. Karl Strecker, Prof. Nate Lannan, Mike Gard

INDUSTRIAL ENGINEERING & MANAGEMENT

IEM

1

(Left to Right) Tim Jones, Caden Noakes

PROJECT TITLE

NATIONAL STANDARD

National Standard aims to increase its total workforce by a projected minimum of 15 new employees by the end of next year. To help achieve this goal, they believe their training system and documentation need to be condensed to fewer words and streamlined to a standard procedure. They also hope to improve time efficiency without the loss of employee preparedness. National Standard also needs all new documentation created to comply with ISO 9000.

Our team will limit the scope of this project by looking at just one machine process to improve training on as our measure of success. Our team aims to tailor a training process template that will continue to improve other training processes beyond the duration of the project.

STUDENTS

Tim Jones, Caden Noakes

ADVISOR(S)

Dr. Sri Ramesh

SPONSOR(S)

PROJECT TITLE

IMPROVING SAMPLE INTAKE AND DELIVERY PROCEDURES FOR OKLAHOMA ANIMAL DISEASE DIAGNOSTIC LABORATORY

This senior design project aims to improve the sample intake and internal delivery procedures of the Oklahoma Animal Disease Diagnostic Laboratory. Currently, OADDL processes over 25,000 accessions and 180,000 tests every year and relies heavily on manual operations and physical documentation. These practices lengthen cycle time and limit client scalability, making it difficult to serve a higher volume of clients. The project focuses on evaluating the operations in the receiving department to identify areas of improvement. The team will develop solutions that maintain intake accuracy, streamline internal sample delivery and expand client capacity through data analysis, simulation modeling and external research.

STUDENTS

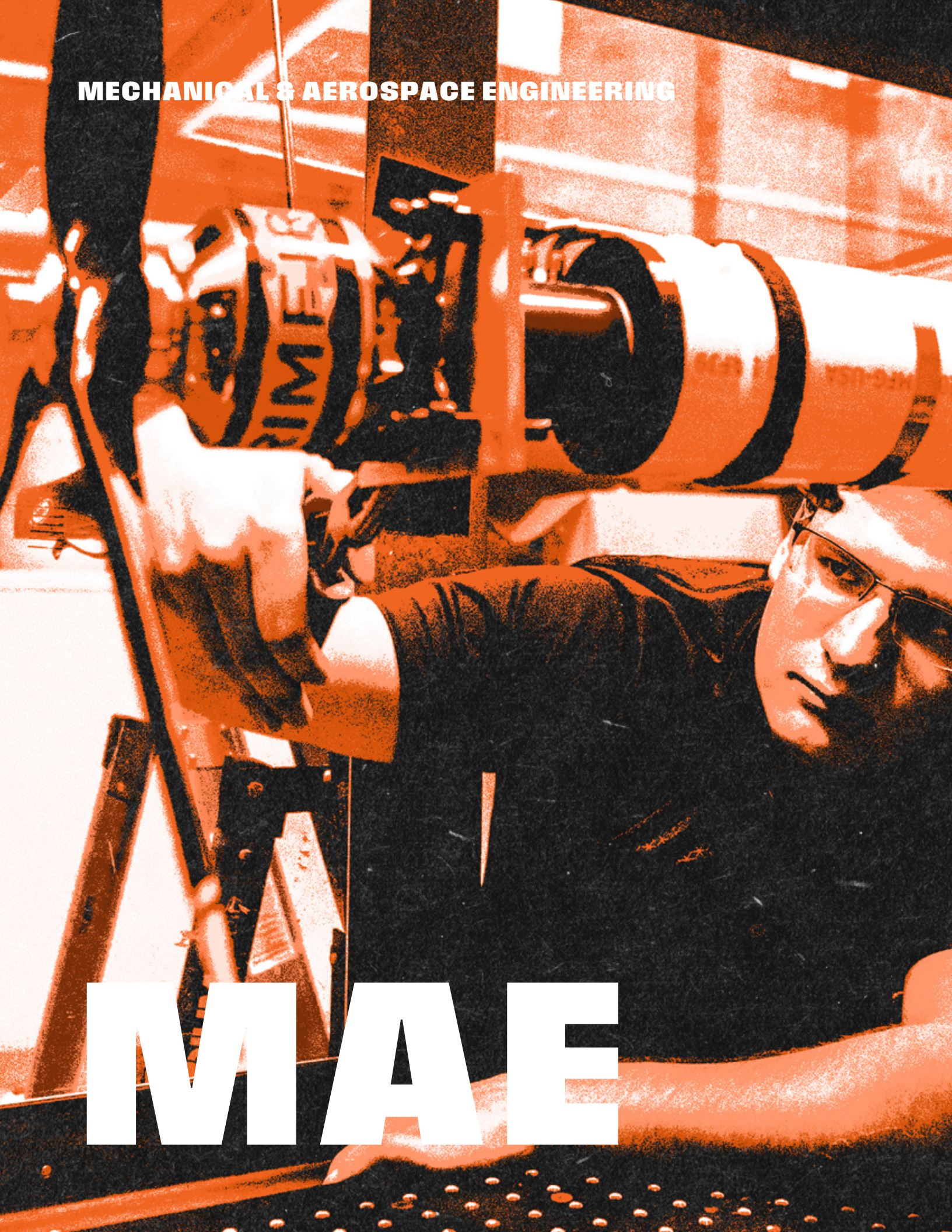
Emma Linsenmeyer, Sloan French

ADVISOR(S)

Dr. Paritosh Ramanan, Dallas Rehberg

2

(Left to Right) Emma Linsenmeyer, Sloan French


MECHANICAL & AEROSPACE ENGINEERING
MAE

1

(Left to Right) Drake Clark, Will Reynolds, Colby Magee, Antonio Cardona Velazquez

VIEW MORE

PROJECT TITLE

COOL COMPRESSOR CLUB-DC COMPRESSOR WITH ALTERNATIVE REFRIGERANTS

This project will model, analyze and fabricate an air-to-water heat pump that utilizes a DC compressor and an alternative refrigerant for use in the Tiny House Project. The goal is to have a fully functional heat pump capable of providing 9000k Btu/hr in heating and cooling, as well as simplify the existing control system for ease of use, stable performance and consistent activation.

STUDENTS

Drake Clark, Will Reynolds, Colby Magee, Antonio Cardona Velazquez

ADVISOR(S)

Dr. Christian Bach, Dr. Haotian Liu

SPONSOR(S)

CENTER FOR INTEGRATED BUILDING SYSTEMS
College of Engineering, Architecture and Technology

PROJECT TITLE

CVD ENGINE

This project is an optimization and proof of concept for the Fully Hydraulic Variable Valve design for the seven-cylinder Continuously Variable Displacement engine. Hydraulic valve actuation theoretically increases efficiency as the friction forces within a pipe are significantly less than that of a mechanical system. Hydraulically actuated valves are easier to manufacture since the system will have fewer mechanical parts used in the assembly. The model engine will be using engine oil as its hydraulic fluid for future design integration with the lubrication system. The optimization was completed through creative solutions, engineering analysis using key engineering principles and finite element analysis. The proof of concept will be shown with a physical 1:1 model to allow for further testing and presentation of the hydraulic actuation system.

STUDENTS

Hayden Hembree, Nathan Friscic, Noah Opela, Michael Merrill

ADVISOR(S)

Ray Lucas

SPONSOR(S)

CVD COWBOYS

2

(Left to Right) Hayden Hembree, Nathan Friscic, Noah Opela, Michael Merrill

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3

(Left to Right) Ibrahima Savadogo, Cole Wartchow, Zayn Nimer, Fatima Rojo Vargas

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PROJECT TITLE

OSU BALLOONING - TOYOTA IR IMAGING

Toyota has tasked the Oklahoma State University Ballooning Team with designing and fabricating a thermally controlled housing for infrared cameras intended for high-altitude data collection. The system will capture infrared imagery up to an altitude of 10km using a helium- or solar-powered balloon platform. The payload must ensure stable imaging performance and maintain an internal temperature above 0°C to protect sensitive electronics. To achieve controlled image acquisition, the design includes a roll and pitch articulation mechanism that enables the IR sensor pod to adjust its orientation during flight. Toyota specified desired articulation ranges of ±60° (preferred) and ±45° (minimum). Toyota will later use this housing in kite flights and use the images collected for their data.

STUDENTS

Ibrahima Savadogo, Cole Wartchow, Zayn Nimer, Fatima Rojo Vargas

ADVISOR(S)

Kathleen McNamara

SPONSOR(S)


MECHANICAL ENGINEERING TECHNOLOGY
MET

1

(Left to Right) Manuel A. Lopez Betancourt, Kaitlin Jolliff, Kade Fiegener, Brandon Bergman

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PROJECT TITLE

DESPOOL DYNAMICS-NATIONAL STANDARD

We are working with National Standard to create a safer and easier to use wire payoff system. This machine reduces the physical strain of loading and unloading wire spools as well as reduces the safety hazards during operation.

STUDENTS

Manuel A. Lopez Betancourt, Kaitlin Jolliff, Kade Fiegener, Brandon Bergman

ADVISOR(S)

Dr. Joe Conner, Dr. Warren Lewis

SPONSOR(S)

NATIONAL STANDARD

NASA MICRO-G NEXT TEAMS

PROJECT DESCRIPTION

OSU's NASA MICRO-G NEXT Design Teams work with NASA engineers to design, build, and test prototypes to contribute to engineering problems in Lunar and Low Earth Orbit operations. The designs will be developed and built during the spring semester and tested in NASA's Neutral Buoyancy Lab with NASA's trained divers.

TEAMS

Passive Capture Tool Dock: Molly Dolan, Abby Fonseca, Cooper Hopkins, Dylan Ingram, Jaycie Jester, Reagan Liles, Marilyn McNulty, Elijah Nunoo, Gustavo Rivera, Jessi Varela, Drenzel Garrido Vieyra, Jacob Witthuhn, Liam Workman

Adjustable Tool Cart Handle: Carter Hood, Joseph Neves, Corey Paulson, Maggie Sapp, Ian Thompson, Austin Wheeler

ADVISOR(S)

Dr. Alyssa Avery

SPONSOR(S)

NASA