ENGINEERING
PROJECT SHOWCASE
APRIL 27, 2018
HALL OF CHAMPIONS, KYLE FIELD
COLLEGE STATION, TEXAS
A modern, high-tech learning environment for undergraduate engineering education

ZACHRY ENGINEERING EDUCATION COMPLEX (ZACH)

FALL 2018
Howdy!

On behalf of the College of Engineering, I am pleased to welcome you to the 2018 Engineering Project Showcase at Texas A&M University. This annual event is designed to celebrate many of the technical accomplishments of our undergraduates.

More than 200 engineering projects are on display today, representing the hard work and creativity of more than 1,100 engineering students from every engineering discipline within the college.

I am confident that you will be impressed with the innovation and problem solving skills demonstrated by these students. The projects showcased today demonstrate the work going on in research labs, classrooms, and extracurricular environments. I encourage you to engage with the students and discuss their projects. Details about the teams, their projects and how to become involved with our academic programs can be found in your information packet.

Thank you for joining us this year. We look forward to your continued involvement with our program.

M. Katherine Banks, Ph.D., P.E.

Vice Chancellor & Dean of Engineering
Director, Texas A&M Engineering Experiment Station
University Distinguished Professor
Harold J. Haynes Dean’s Chair Professor
## 2018 INDUSTRY REPRESENTATIVE SCHEDULE

<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>LOCATION</th>
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</thead>
<tbody>
<tr>
<td>9:00 a.m.-11:00 a.m.</td>
<td>Student Check-In</td>
<td>Hall of Champions</td>
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<tr>
<td>10:30 a.m.-11:30 a.m.</td>
<td>Judge Check-In</td>
<td>Hall of Champions</td>
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<tr>
<td>11:30 a.m.-2:30 p.m.</td>
<td>Judging</td>
<td>Hall of Champions</td>
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<tr>
<td>Noon-2:00 p.m.</td>
<td>Judges Lunch <em>(Come &amp; Go)</em></td>
<td>Served on Second Floor</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>Awards</td>
<td>Hall of Champions</td>
</tr>
</tbody>
</table>
STUDENT PARTICIPANT DATA

212 PROJECTS

1,160 STUDENTS

ALL ENGINEERING MAJORS

ALL CLASSIFICATIONS
THANK YOU TO OUR SHOWCASE SPONSORS

GOLD SPONSORS

Kubota

TEES

TEXAS A&M ENGINEERING EXPERIMENT STATION

OFFICE OF INDUSTRY RELATIONS
OFFICE OF COMMERCIALIZATION & ENTREPRENEURSHIP
SILVER SPONSORS

Baker Hughes
GE
Boeing
Elbit Systems of America
Emerson
Houston Airports

BRONZE SPONSORSHIP
Peak Nano
The 2019 Engineering Project Showcase will be held April 26, 2019 and will feature more than 200 team projects representing the work of 1,000+ engineering students from across all engineering majors.

**GOLD: $10,000+**
- Two student awards named for sponsor ($1,000 each award)
- Corporate logo prominently displayed at the Showcase event
- Sponsor recognized in the Showcase program
- Sponsor recognized in the Texas A&M Weekly newsletter
- 10 tickets to luncheon

**SILVER: $5,000+**
- One student award named for sponsor ($1,000 award)
- Corporate logo prominently displayed at the Showcase event
- Sponsor recognized in the Showcase program
- Five tickets to luncheon

**BRONZE: $2,500+**
- Corporate logo prominently displayed at the Showcase event
- Sponsor recognized in the Showcase program
- Two tickets to luncheon

Contact Magda Lagoudas (m-lagoudas@tamu.edu) for questions or more information.
SPONSORS OF STUDENT PROJECTS

We would like to thank all the sponsors of our student projects:

ABOVE-UAV
Air Force Research Laboratory
American University of Beirut
American Society of Heating, Refrigerating and Air-Conditioning Engineers
Bailey Tool and Manufacturing
Baylor Scott & White Health
BlastMask LLC
Boeing Co.
BP
Bray International Inc.
Brazos Valley Center for Independent Living
Brooke Army Medical Center
College Station Urology
CorInnova Inc.
Danfoss Turbocor Compressors Inc.
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DrawWorks L.P.
Eagle Sports
Electric Power Research Institute
The Emerson Electric Company
ETAPA and Universidad de Cuenca
Exosphere
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General Motors Company
Goodman Manufacturing Company L.P.
Halliburton
Houston Community ToolBank
IBM
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INEOS
International Cooling Tower Inc.
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Just4Water
KBQ
Knowledge Based Systems Inc.
Lockheed Martin
Los Alamos National Laboratory
Madden’s Market Inc. DBA Mad Taco
McGregor Research Center, Texas A&M
Megahertz Technology Inc.
Mobility Worldwide
Nalco Champion
NASA
NASA-JSC Robotic Systems Technology Branch
National Center for Electron Beam Research, Texas A&M
NOV Grant Prideco
Oceaneering International Inc.
Physicians Centre Hospital
Planting Hope International
Pacific Northwest National Laboratory
Project HERO
Quest Medical Device Manufacturer
Reynolds and Reynolds
San Antonio River Authority
Sandia National Laboratories
Sentient Energy
SES
Shell Global
Siemens AG
Sketch Recognition Laboratory,
Texas A&M
Smart Harness Systems LLC
Sonardyne
South Texas Advancement Resource
SubCtech
T STAR LLC
Talon Controls
Texas A&M Women in Engineering
The Cancer Genome Atlas
Tenaris
TeraVolt Energy
Texas A&M University–Corpus Christi
Small Animal Hospital at Texas A&M
Texas A&M Transportation Institute
Texas A&M University Libraries
Texas A&M University Police Department
Texas Children’s Hospital
Texas Heart Institute
Texas Instruments
Texas Space Grant Consortium
Texas Space Technology Applications and Research
Texas A&M Transportation Services
University of New South Wales
UPS
USDA-ARC
Veretek
VERIPOS
ViaSat Inc.
Zam Zam Water
INDUSTRY JUDGES

We would like to thank all our industry representatives who are serving as judges at the 2018 Engineering Project Showcase:

(The list does not include any judges registered after April 9, 2018)

Advent GX
Atlantic Development & Investments/Regis Construction
B&B Steel Building Solutions LLC
Baker Hughes, a GE Company
Bechtel
Bechtel Equipment Operations Inc
Bechtel Oil, Gas and Chemical Plant Construction
The Bell Company
Black & Veatch
Boeing Company
Bray International Inc
Bryan Research & Engineering LLC
Cameron, a Schlumberger Company
CDI Corporation
City of Amarillo
Houston Airport System
College Station Utilities
Dell
Dell EMC
Elbit Systems of America LLC
Electric Power Research Institute
Emerson Electric Company
Emerson Automation Solutions
Exothermix
FrogSlayer LLC
General Motors
Goldman Sachs Group Inc
Halliburton
HDR inc
Hollinden
Houston Mechatronics Inc.
IBM
Igloo Products Corp
International IP Law Group PLLC
INEOS Olefins & Polymers USA
Integrity Integration Resources (I2R)
Intel Corporation
JNM Technologies Inc.
Kubota Tractor Corporation
L3 Link Training and Simulation
Law Office of William G. Shaw
Leading Edge Management LLC
Logan Industries International Corporation
Maxim Integrated
McCord Engineering Inc
Moeller & Associates
NOMADIC.US
MSC Software Corporation
NASA
NASA Aeronautics
NASA Armstrong Flight Research Center
National Instruments Corporation
National Oilwell Varco
Nokia Corporation
NOV Grant Prideco
OneSubsea, a Schlumberger owned Company
Patterson-UTI Energy
Peak NanoSystems
Philips Medical Systems
PrimmTech Corporation
R&M Global Advisors
R.W. Dirks Petroleum Engineer Inc
R&M Global Advisors
Red Ball Oxygen Co Inc
RPS Klotz Associates
Riviana Foods Inc.
Schlumberger Limited
Schneider Electric Software
Shell
Sexing Technologies Genetics
STAR - South Texas Advancement Resource
Stress Engineering Services Inc
System Studies & Simulation Inc
T STAR LLC
TechnipFMC plc
Tenaris
Texas Children’s Hospital
Texas Instruments Inc
Universal Pressure Pumping Inc
United States Automobile Association
VersaBar Inc
Wood Group
If you are interested to explore sponsoring a capstone senior design project, please see contact information for each department:

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>NAME</th>
<th>EMAIL</th>
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<tbody>
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</tr>
</tbody>
</table>
PROJECT DESCRIPTIONS

CAPSTONE SENIOR DESIGN

Design projects completed by teams of senior engineering students as part of the required course curriculum in their major. Capstone Senior Design projects range from one to two semesters in length depending on the engineering major. These projects provide students an opportunity to work with real world, open ended challenges, apply their engineering skills and are typically sponsored by industry.

AGGIE_CHALLENGE

Multidisciplinary team research projects completed by multidisciplinary teams of undergraduates representing freshman to seniors. Student teams work on faculty research projects, receive course credit and are mentored by faculty and dedicated graduate students. Since 2012, more than 1,000 engineering students have participated in the program.

DESIGN COMPETITIONS

Multidisciplinary teams composed of students representing freshman to seniors who are competing at a regional or national design competition.

OTHER PROJECTS

Projects completed by teams of engineering students as part of other courses, extracurricular activities, or faculty research.

ENGR 112

ENGR 112 is the second semester freshman engineering course required by all engineering students. About 500 freshman engineering teams participate in a class project and the top teams are selected by their faculty to present at Showcase.
AWARD CATEGORIES

Through the generosity of our sponsors we are able to provide cash awards to top teams across all categories. 1st Place Award is awarded to the best team in each subcategory with ten or more teams. In addition, in subcategories with twenty or more teams the second place team is also recognized.

## Capstone Senior Design Awards:

- Biological and Agricultural Engineering:
  - 1st Place Award – $1,000 - **Kubota Tractor Corporation Award**

- Biomedical Engineering:
  - 1st Place Award - $1,000

- Electrical and Computer Engineering:
  - 1st Place Award – $1,000 - **Elbit Systems of America Award**

- Engineering Technology and Industrial Distribution:
  - 1st Place Award – $1,000 - **Emerson Award**
  - 2nd Place Award - $500

- Industrial and Systems Engineering:
  - 1st Place Award – $1,000 - **Houston Airport System Award**
  - 2nd Place Award - $500

- Mechanical Engineering:
  - 1st Place Award – $1,000 - **Kubota Tractor Corporation Award**
  - 2nd Place Award - $500

- Other Majors – Includes teams from Computer Science and Engineering and Chemical Engineering:
  - 1st Place Award - $500

## Non-Capstone Category Awards:

- AggiE_Challenge:
  - 1st Place Award – $1,000 – The Boeing Company Award
  - 2nd Place Award - $500

- Design Competitions:
  - 1st Place Award – $1,000 - **Baker Hughes, a GE Company Award**

- Other Projects:
  - 1st Place Award - $500 or $1,000

- ENGR 112:
  - 1st Place Award - $500 or $1,000
  - 2nd Place Award - $300

**TEES Commercialization Award: $1,000**

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1 Indicates the award is sponsored by various sponsors of the Showcase.

2 The team with highest judge scores within Other Projects and ENGR 112 will be awarded the Best Other Projects/ENGR 112 Team - $1,000. No team receives more than one awards.
**Engineering Project Showcase 2018**

**Teams & Project Descriptions**

**Biological & Agricultural Engineering – Capstone Design**

**Controlled Atmosphere Storage**

**Booth Number: D30**
Sponsor: Planting Hope International | Dr. Floyd Dowell
Faculty Advisor: Dr. Elena Castell-Perez | Dr. Janie Moore
Team Members: Jeffrey Demieville, Kevin Jerpseth, Ezekiel McReynolds, Brandon Flores

**Project Summary**
Grain losses due to insect damage post-harvest have a heavy impact on the economic well-being of subsistence farmers in eastern Africa. The objective of this project is to produce carbon dioxide from decomposing material in order to kill off any insect infestation before damage can occur. By reducing these losses, food security can be improved, and the risk of malnutrition, starvation, and adverse economic effects can be mitigated. This design uses fermentation of maize to produce carbon dioxide sufficient to flush 55-gallon steel drums. The group has designed a device which would pneumatically draw contaminants off of the plant and convey them to a central storage location.

**Improvement of the Resiliency of the Houston Water Drainage System**

**Booth Number: R12**
Sponsor: Texas Target Communities | Dr. Jamie Masterson
Faculty Advisor: Dr. Fouad Jaber | Dr. Francisco Olivera
Team Members: Natalie Cronk, Allison Jackson, Kurt Kremitzki

**Project Summary**
The challenge in improving Houston’s flood resiliency comes in part from its diverse land use across a huge area. Although the areas with the heaviest flooding during Harvey were largely focused around the bayous, approximately 40% of buildings damaged were located outside a designated flood zone. The distributed nature of the improvements offered by green infrastructure installations can protect neighborhoods and businesses of Houston in a unique way compared to large-scale engineering projects. By examining land-use patterns and projecting the impact of green infrastructure designs at the watershed level, we hope to show that an integrated approach to green infrastructure can offer economical improvement.

**Plastics Recycling Method for Litter Reduction**

**Booth Number: R04**
Sponsor: Planting Hope International | Floyd Dowell
Faculty Advisor: Dr. Doug Kingman
Team Members: Meenu Pillai, Melwin Matthew, Jordan Groom, Trent Coots

**Project Summary**
Many underdeveloped or economically disadvantaged regions are littered with plastic bags and bottles. There is no market for these used products and thus, no incentive to remove them from the environment. This project can potentially contribute to the livelihood of the community by providing a means to recycle plastic litter, reduce disease and profitable for the community. We develop a method for recycling plastic bags and bottles profitably, providing an incentive for people to collect and recycle the litter: through processing the plastics into new products. The focus is currently on remelting the easily melted/low heat HDPE, LDPE and PET plastics (trash bags and water bottles). This will act as a binder with an aggregate of un-melted plastic and sand.

**Cotton Contamination Removal**

**Booth Number: R02**
Sponsor: USDA-ARS and Texas Cotton Ginners Association | Dr. Greg Holt and Kelley Green
Faculty Advisor: Dr. Ron Lacey
Team Members: Kelton Niehues, Joaquin Cavazos, Zach Matthews

**Project Summary**
Plastic contamination in cotton shipped to textile mills is a growing issue across the globe. If left unresolved this not only has the potential to hurt the reputation of American cotton ginners/ producers, but also could have serious consequences on the U.S. cotton industry as a whole. Due to these circumstances, this team has been tasked with developing a system capable of being mounted to the front of a conventional cotton harvester or picker. This system must be able to collect and store plastic contaminants in the field ranging in size from 9 in² to 2 ft². In addition, it must be able to operate effectively at a harvesting speed of 5 mph. The group has designed a device which would pneumatically draw contaminants off of the plant and convey them to a central storage location.

**Integrates Water Storage Delivery System for Cattle Ranch**

**Booth Number: R09**
Sponsor: TAMU AgriLife McGregor Research Center
Faculty Advisor: Dr. Srini Ale
Team Members: Scott Thompson, Travis Rooney, Austin Arizmendi

**Project Summary**
The McGregor Research Station in McGregor, Texas is in need of a revitalized water distribution system to replace the current system, which is unable to supply the needed capacity of water to the ranch. The goal of this project was to redesign the water distribution system for the McGregor Cattle Research Station from the current, relatively new, pumping system and storage tanks to the rest of the ranch. New watering points were also requested in order to provide access to water in all ranch pastures through the implementation of new pipe routes or ponds. The design solution was expected to be of minimal installation cost for the ranch.

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**Booth Number: R09**
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Faculty Advisor: Dr. Srini Ale
Team Members: Scott Thompson, Travis Rooney, Austin Arizmendi

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Rainwater Harvesting System in Mexico
Booth Number: R05
Sponsor: Texas A&M Corpus Christi | Dr. Luis Cifuentes
Faculty Advisor: Dr. Fouad Jaber
Team Members: Michaela Goff, Irma Gonzalez, Francisco Zapata
Project Summary
This project presents the theoretical design of rainwater harvesting systems at Hacienda Santa Clara San Miguel De Allende in Guanajuato, Mexico. Two separate systems are modeled; one for potable water and another for irrigation. The systems, once built, are intended to be used for educational purposes as well as to partially meet the water needs at the hacienda. The design features locally available and affordable materials so that it may be implemented to the homes of the surrounding areas.

Reduction of Microbial Contamination with Design of Ventilation by Modeling HVAC Based Air Flow Patterns Using Challenge Aerosols in a Stimulated Hospital Room
Booth Number: R06
Sponsor: Department of Biological and Agricultural Engineering
Faculty Advisors: Dr. Maria King | Dr. Gary Riskowski
Team Members: Julia Henry, Alex Zuniga, Alec Pollok
Project Summary
The overall objective of AAM is to model HVAC based air flow patterns using prepared challenge aerosols in a hospital room in order to reduce overall pathogen concentration. The movement of transmissible organisms coupled with the design of medical facilities and their HVAC systems are a relevant issue that need to be addressed. In order to maintain low levels of these airborne organisms, the ventilation system must be designed based on the room’s airflow patterns. AAM modified an existing scale hospital room configuration and used SolidWorks Flow to analyze/simulate results to create a recommended room and HVAC configuration to reduce the pathogen flow. The team created a universal template that would generate less transmittable airflow patterns within any hospital room setting.

San Antonio River Recreational Access
Booth Number: R11
Sponsor: San Antonio River Authority | Dr. Aarin Teague
Faculty Advisor: Dr. Amjad Assi
Team Members: Elizabeth Chilson, Jacob Epps, Brenner Haby
Project Summary
The San Antonio River Authority (SARA) owns and operates several parks along the river which serve as access points for paddling trail users to put in and take out kayaks. At “River Crossing Park” located southeast of San Antonio on Loop 1604, the existing stairway structure leading from the high bank down to the water level was damaged from severe flooding and erosion during a storm in 2013. Now, SARA is seeking a design for a safer, more stable river access structure that will have minimal disturbance to the fragile banks and surrounding habitat, comply with national environmental codes and permits, and be constructed for less than $100,000. Deliverables include design drawings, a report detailing design calculations and specifications, USACE permitting, and a cost estimate.

Sasle, Nicaragua Water Conveyance and Distribution System
Booth Number: R03
Sponsor: Just 4 Water | Victoria Vratil
Faculty Advisor: Dr. Valentini Pappa
Team Members: Jana Peters, Tucker Long, Haden Mattke
Project Summary
The goal of the project is to design multiple options for a water conveyance and distribution system for the town of Sasle, Nicaragua. The water source is a spring five kilometers from Sasle, from which water will be conveyed, stored and distributed throughout the town. The project system will include primary water treatment and disinfection for the water source as well. The project was brought forward to the class by Just 4 Water (http://tamuj4w.wixsite.com/home), who has worked on many other projects to increase water access in Central America. This project has applications in other parts of the world, like Bolivia or Rwanda, that are also in need of water, but lack sufficient access to it and other resources, such as electricity.

Solar Energy Integration to Reduce Distribution System Upgrade Costs
Booth Number: C30
Sponsor: TeraVolt Energy | Mr. Hoss Boyd, LtCol (Ret)
Faculty Advisor: Dr. Greg Stark
Team Members: Ryan Dooley, Peter Dicarlo, Bailey Thomas
Project Summary
This project began as an idea from Mr. Hoss Boyd, CEO of TeraVolt Energy. Initially, he heard of coop’s having trouble supplying enough energy to oil and gas customers using large amounts of energy at the end of electricity distribution lines. His solution was to avoid distribution line upgrades, by installing distributed solar generation near these loads. Our design solution uses common variables related to having a high demand customer on an overloaded electricity distribution line. The spreadsheet tool will take common inputs such as typical KWh demand and max kW demand to find the most economical solution. Design scenarios involve a distribution grid upgrade of single to three phase wire, customer owned solar on the customer’s property, or utility owned solar near the customer site.

San Antonio River Recreational Access
Booth Number: R11
Sponsor: San Antonio River Authority | Dr. Aarin Teague
Faculty Advisor: Dr. Amjad Assi
Team Members: Elizabeth Chilson, Jacob Epps, Brenner Haby
Project Summary
The San Antonio River Authority (SARA) owns and operates several parks along the river which serve as access points for paddling trail users to put in and take out kayaks. At “River Crossing Park” located southeast of San Antonio on Loop 1604, the existing stairway structure leading from the high bank down to the water level was damaged from severe flooding and erosion during a storm in 2013. Now, SARA is seeking a design for a safer, more stable river access structure that will have minimal disturbance to the fragile banks and surrounding habitat, comply with national environmental codes and permits, and be constructed for less than $100,000. Deliverables include design drawings, a report detailing design calculations and specifications, USACE permitting, and a cost estimate.

Sasle, Nicaragua Water Conveyance and Distribution System
Booth Number: R03
Sponsor: Just 4 Water | Victoria Vratil
Faculty Advisor: Dr. Valentini Pappa
Team Members: Jana Peters, Tucker Long, Haden Mattke
Project Summary
The goal of the project is to design multiple options for a water conveyance and distribution system for the town of Sasle, Nicaragua. The water source is a spring five kilometers from Sasle, from which water will be conveyed, stored and distributed throughout the town. The project system will include primary water treatment and disinfection for the water source as well. The project was brought forward to the class by Just 4 Water (http://tamuj4w.wixsite.com/home), who has worked on many other projects to increase water access in Central America. This project has applications in other parts of the world, like Bolivia or Rwanda, that are also in need of water, but lack sufficient access to it and other resources, such as electricity.

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Wastewater Treatment System for a Remote School in Costa Rica
Booth Number: R13
Sponsor: TAMU Soltis Center | Dr.Eugenio Gonzalez
Faculty Advisor: Dr. R. Karthikeyan
Team Members: Emmanuel Guerrero, Mason Jones, Shannon Strong
Project Summary
We are designing a functional wastewater treatment system for the elementary and high school of San Juan de Peñas Blancas, San Ramon County, Costa Rica, including training and a maintenance plan with that the local education committees and students will be able to secure the well-functioning of the system. Currently, wastewater from the elementary and high schools is discharged directly into the natural drainage ditch without treatment. The impact of the wastewater on local streams and associated wildlife is unknown; but proper treatment before disposal would improve both human and environmental conditions by preventing the spread of bacteria and potential polluting contaminants. Due to not having a budget or funding designing a cost-effective system will be a challenge.

Water & Food Sustainability in Bugasera, Rwanda
Booth Number: R14
Sponsor: Zam Zam Water | Yusuf Nessary
Faculty Advisor: Dr. Patricia Smith
Team Members: Monica Zuniga, Erica Ryan, Naveen Menon, Kathryn Bickley
Project Summary
Zam Zam Water is a non-profit organization dedicated to providing access to clean water and opportunities for education in developing countries. They have recently developed a primary school with a small vegetable crop in Bugasera, Rwanda. Additionally, a rainwater catchment system and 35,000 L collection tank have been implemented as a means of providing drinking water and irrigating the crops. Unfortunately, the water collected is not at a clean standard, and there is no nearby electricity or plumbing. Our goal is to design a system to achieve potable water for the students and teachers at school, design
an efficient irrigation system for the garden, and create a year-round cropping system.

Water- Energy- Crop Analysis for Land Management and Irrigation

Booth Number: R10
Sponsor: South Texas Advancement Resource (STAR) | Bill Raney
Faculty Advisor: Dr. Charles Hillyer
Team Members: Kevin Rose, Rachael Landry, John Crump

Project Summary
The goal of this project is to develop a sustainable agricultural model for a 100-acre plot of land in South Texas- a location that traditionally only grazes cattle. The pasture is in a challenging environment with a low average annual rainfall rate, variable temperatures, and very poor ground water quality. Our group has been tasked with determining the best options of crops to grow for profit on the condition of likelihood of success. We will be giving three different options of choices ranging from low to high initial investment. These three options will have different combinations of crops, water sources and energy sources. Our sponsor will then be able to decide which system to implement.

Wastewater, Irrigation and Urban Garden System

Booth Number: R07
Sponsor: American University of Beirut | Dr. Hadi Jaafar
Faculty Advisor: Dr. Anish Jantrania
Team Members: Alexandra Balcomb, Haylee Thompson, Ricardo Caballero

Project Summary
Design a portable wastewater treatment system for a Syrian Refugee camp located in Lebanon capable of treating wastewater to quality that is acceptable quality that it can be used for irrigation of an urban garden on the refugee campsites. The treatment facility should be portable to be able to be transported to other temporary communities including areas affected by natural disasters. The system should be able to run almost exclusively on renewable energy in order to be able to be implemented in areas with little or no power.

BIOMEDICAL ENGINEERING – CAPSTONE DESIGN

A Thorough Renal Calculi Extraction System

Booth Number: E27
Sponsor: Texas Children’s Hospital | Dr. Nicolette Janzen
Faculty Advisor: Dr. Alan Brewer
Team Members: Buford Slay, Misty Cowdlin, James Gentry, Jay Garza, Scot Welborn

Project Summary
Renal stones that are too large to pass through the urinary tract have to be broken apart by laser. The laser fragments the stones into smaller calculi which can then be removed. However, ordinary extraction methods are unable to remove all fragments. In sedentary patients especially, the smaller fragments have the potential to serve as niduses for future clinically significant stones. Therefore, it is ideal to extract as much calculi mass as possible. Our team’s aim is to engineer a system capable of injecting a material into the renal tract. The material is able to gel in situ and enmesh stone dust, and afterwards the gelled material can be removed with a basket or grasper. The assurance of greater calculi mass extraction will reduce the probability of repeat stone removal procedures.

Automated Bifurcated Antegrade Cardiopulmonary Catheter (ABACC)

Booth Number: D28
Sponsor: Quest Medical, Inc. | Chris Harton
Faculty Advisor: Dr. Alan Brewer
Team Members: Chandler Lyle, Jayachandrika Jayavasudevan, Catherine McProuty, Hannah Smith, Francois Kenmogne

Project Summary
During open-heart surgery, a bifurcated catheter is used to intermittently deliver cardiopulmonary solution used to facilitate cardiac arrest to the heart and evacuate fluid buildup from the heart. Currently, perfusionists manually control the operations of these two systems, allowing for possible human error and potential diversion of cardiopulmonary solution away from the heart. A device is presented that will automate the delivery and vent systems to eliminate this possibility through the use of a spring-loaded piston that moves in response to delivery pressure, or lack thereof, to open and close each line as needed. This device will also possess the capability to sense aortic root pressure and will perform all functions in one compact device so as not to occlude the surgeon’s view.

BlastMask HEAT: Physiological Sensors for BlastMask LLC

Booth Number: C25
Sponsor: BlastMask LLC | Justin C. Dickstein
Faculty Advisor: Dr. Alan Brewer
Team Members: Steven Jokster, Katy Renfro, Ali Eldouh, Connor Blake, John Vaught

Project Summary
24% of line-of-duty deaths for firefighters are caused by overexertion, stress, or medical reasons. Our team has collaborated with BlastMask, LLC, to design the non-invasive and low-cost device to be worn by firefighters to monitor physiological parameters that can indicate potential cardiac arrest due to overexertion. This device, titled BlastMask HEAT, will specifically target hydration, temperature, heart rate and oxygenation. The data provided by these measurements will hopefully prevent many of these firefighter deaths by enabling users to seek medical attention at the first signs of a potential cardiac event.

CAL-Trap (Pediatric Kidney Stone Encapsulation Device)

Booth Number: E26
Sponsor: Texas Children’s Hospital | Dr. Kunj Sheth
Faculty Advisor: Dr. Alan Brewer
Team Members: Savannah Bryce, Amanda Bass, Austin Lu, Nathanael Marshall, Jordan Hall

Project Summary
CAL-Trap is a kidney stone encapsulation device that will be used during laser lithotripsy and ureteroscopy. When kidney stone dust remains in the kidney after surgery, there is a higher probability of recurrence. This device completely encapsulates kidney stones found in the kidneys of pediatric patients while allowing access to its contents such that the captured stones can be fragmented and dusted with little to no escaped byproducts. The device contains all of the dust and stone fragments and allows them to be pulled out during one pass. This drastically raises the efficiency of the laser lithotripsy procedure, lowers the recurrence rate, and reduces time in the operating room.

Catheter System for Alcohol Ablation of the Left Atrial Appendage

Booth Number: D29
Sponsor: Texas Heart Institute | Dr. Mehdi Razavi
Faculty Advisor: Dr. Alan Brewer
Team Members: Charlene Morrison, Elaine Chinn, Ryan Oatman, Blake Smith, Ashley Rook

Project Summary
Atrial fibrillation (Afib) is a type of arrhythmia that can lead to clot formation, stroke, and other complications. The left atrial appendage (LAA) is especially at risk for thrombus formation and is known to be a source of electrical misfiring. Current treatments focus on reducing complications rather than the underlying cause of Afib. Thus, there is a need for a device capable of ablating the LAA tissue to eliminate conduction defects. The proposed solution is a dual-catheter system capable of delivering concentrated alcohol to electrically isolate the LAA. After an ablation window is created, alcohol and saline will be delivered through radially spaced holes and suctioned through a vacuum. An initial prototype has been fabricated and is currently in preliminary testing stages.

Determination of Muscle Mass Through Analyzing Computed Tomography (CT) Images in MATLAB Based Software

Booth Number: C22
Sponsor: Department of Biomedical Engineering Faculty Advisor: Dr. Alan Brewer
Team Members: Mary Julian, Ashley Tucker, Kyle Goebel, Travis Frankum, John Paul Hernandez Alcala

Project Summary
Chronic Kidney Disease (CKD) affects over 30 million individuals in the United States. Equations that are used to determine kidney function have limited accuracy due to lack of knowledge of the patient’s muscle mass. Our team designed a MATLAB based program that would analyze computed tomography (CT) slices to determine muscle mass. The distinct patterns of large bone structures in the body, such as the ribs, can determine the position of vital organs within the body. Functions were built to recognize these bone patterns, so organs which have a similar intensity to muscle could be removed and not confound our
muscle mass calculations. Once all organs were removed from the images, muscle mass could be determined for a variety of patients.

Development of a Non-Blood Contacting Pediatric Heart Augmentation Device

**Booth Number: E25**

Sponsor: CorInnova Inc. | Erica Hord
Faculty Advisor: Dr. Alan Brewer
Team Members: Kendal Ezell, Brandon Knight, Jenny Hong, Christina Sheldon, Jordan Verner

**Project Summary**

Congenital defects and cardiomyopathies requiring early surgical intervention often lead to heart failure (HF) in the pediatric population which requires a heart transplant. However, with limited availability of donor hearts, they must be supported using blood pump therapy which is high-risk, invasive, and has many contraindications. Thus, pediatric patients suffering from HF need a safer and less invasive heart augmentation device as a bridge-to-transplant therapy. The proposed solution is a pediatric version of CorInnova’s EpicHeart: a less invasive, non-blood-contacting epicardial cardiac assist device. Students in the Department of Biomedical Engineering have partnered with CorInnova to develop a design for the pediatric heart size, morphology, physiology, and heartbeat patterns.

Finger Phantom for Pulse Oximetry Testing

**Booth Number: C26**

Sponsor: Department of Biomedical Engineering | Dr. Lee Hudson
Faculty Advisor: Dr. Alan Brewer
Team Members: Adelina Ramirez, Reagan Tompkins, Kelly Henry, Shawn Erwin, Michael Zimmerman

**Project Summary**

As wearable devices become more prominent, users are looking for more information about their health, and more accurate measures on aspects such as blood oxygen levels. In order to develop these wearables with working pulse oximeters, there must be a useful way to test them that does not involve the requirements of testing in a clinical environment. A simulated finger needs to be developed for use in the testing of these wearable pulse oximeters. This finger phantom needed must mimic the light properties, elastic properties, and arterial blood flow of a live human finger, and our project focuses on doing just that. The finger phantom we have developed is an initial step toward creating a phantom that completely mimics, in all aspects, a human index finger.

Improvements in Nasogastric (NG)/Orogastric (OG) Tube Placement

**Booth Number: C27**

Sponsor: Texas Heart Institute | Anand Ganapathy
Faculty Advisor: Dr. Alan Brewer
Team Members: Jackson Buenger, Brian Prince, Mallory Taylor, Bristine Rustenbeck, Michael Deprest

**Project Summary**

Nasogastric and orogastric tubes, used in a variety of medical situations, are often misplaced (e.g., into the lungs or the stomach) or move out of proper position, potentially causing significant harm to the patient, or even death. To combat this issue, X-ray imaging is typically used to confirm tube placement, exposing the patient to repeated doses of harmful radiation in addition to prolonging clinical time. Our proposed design eliminates the need for repeated x-ray exposure to confirm the tube location by utilizing a combination of two radiation-free modalities to guide and confirm tube placement. Ultimately, this solution will provide a precise method to confirm proper tube placement, prevent the consequences of incorrect tube placement and substantially reduce repeated x-ray confirmation requirements.

Indwelling Vesical Pressure and Volume Monitor

**Booth Number: C21**

Sponsor: Texas Children's Hospital | Dr. Jeffrey White
Faculty Advisor: Dr. Alan Brewer
Team Members: Taylor Dillard, Liana Polikatis, Sarah Jacobson, Cole Nipper, Ian Sequiera

**Project Summary**

Urodynamic testing is performed to assess bladder function for multiple conditions including incontinence, painful/difficult urination, and neurogenic bladder dysfunction. Due to the discomfort associated with the current standard of care, as well as a lack of generalizability to everyday life, there is a need for a less invasive and more accurate method for collecting continuous urinary pressure and volume data. As such, a pill-shaped indwelling vesical pressure-volume monitor has been developed using novel time-of-flight technology to measure bladder volume, Bluetooth radio for data telemetry, inductive charging for power delivery, and a MEMS pressure transducer to measure bladder pressure. Urthral catheterization will be used for insertion; magnetic removal will occur 24 hours later.

Low-Cost Field-Use Nystagmus Recorder

**Booth Number: C28**

Sponsor: Department of Biomedical Engineering
Faculty Advisor: Dr. Alan Brewer
Team Members: Lauren Whitney, Christopher Vega, Brian Hickner, Keenan Middleton, Hannah Silverberg

**Project Summary**

Current law enforcement protocol mandates that a standard field sobriety test (SFST) be performed when a police officer has cause to believe a driver is under the influence of alcohol. During an SFST, the officer will perform a horizontal gaze nystagmus (HGN) test by slowly directing the driver’s vision with a stimulus to detect involuntary rapid eye movement, or nystagmus. Scientific data supports that the driver has a BAC above 0.08 if nystagmus is exhibited in four of six exercises, yet no sufficient method exists for verifying HGN results in court. In response, our team, Foresight, has fabricated goggles capable of recording eye motion during HGN testing and transmitting this footage to officer vehicles, improving quality of evidence for court use.

Online Hearing Assessment

**Booth Number: D27**

Sponsor: Physicians Centre Hospital | Dr. Nolan Shipman
Faculty Advisor: Dr. Alan Brewer
Team Members: Carlos Malave, Nathan Constance, Luajin Elnihum, Samantha Hoepner, Jacob Hardin

**Project Summary**

Our project is an online hearing assessment intended to help individuals concerned about hearing loss determine the need for a professional consultation. The test is comprised of three parts: a pure-tone test, a speech reception threshold (SRT) test, and a conversational speech discrimination test. The test is designed to assess the results of each section to inform the user of areas of concern, if any indications are present. The test is not intended to act as an official diagnosis, but rather as a tool to assist in the initial decision-making process and a source of information regarding the form of hearing loss they may be experiencing.

Safer Urinary Catheter

**Booth Number: D26**

Sponsor: College Station Urology | Dr. Evan Lacefield
Faculty Advisor: Dr. Alan Brewer
Team Members: Evon Looper, Justin Nguyen, Hector Perez, Quinn Woelffer, Diego Garcia

**Project Summary**

Each year, approximately 30 million patients require the use of a Foley urinary catheter during their hospital stay. Unfortunately, some will experience urinary tract trauma when a catheter is unexpectedly removed either during transport or by the patient’s own attempts. Such events may lead to severe pain, physician intervention, and even costly surgeries. The standard catheter currently used in the clinical field lacks a safe measure to prevent these instances of trauma from occurring. Therefore, the development of a safer urinary catheter that will reduce injury or completely prevent traumatic removal is greatly needed. Dr. Evan Lacefield, our project sponsor and local urologist, has entrusted us with this task in hopes of minimizing the risk to his patients.

SecUrine: A Noninvasive Urinary Sphincter

**Booth Number: C24**

Sponsor: Texas Children's Hospital | Dr. Kunj Sheth
Faculty Advisor: Dr. Alan Brewer
Team Members: Brian DeSalme, William Stewart, Hector Perez, Quinn Wollf, Diego Garcia

**Project Summary**

Urinary incontinence is often the result of spina bifida in pediatric patients. Current treatments include a combination of catheterization and surgical or pharmaceutical interventions to drain the bladder and maintain urinary continence respectively. These treatments can be invasive and inconvenient for patients. Our team has been working with the Texas Children’s Hospital to develop an artificial sphincter that can be inserted into the urethra non-invasively. This device aims to improve the quality of life of these children by eliminating urine leakage while providing a novel and convenient means for controlled bladder drainage via catheterization.
**Smart Sight**  
**Booth Number: C23**  
Sponsor: Department of Biomedical Engineering | Dr. Roozbeh Jafari  
Faculty Advisor: Dr. Alan Brewer  
Team Members: Paisley Bunker, Grady Burnett, Connor Kaiser, Thomas Tigner, Connor Tobias  
**Project Summary**  
There are currently 5.8 million people in the United States that suffer from Coronary Heart Disease (CHD). Treatment of the disease often involves the application of an exercise regimen for cardiac rehabilitation. However, because many who suffer from CHD are elderly and/or overweight, they are at risk of falling and sustaining joint damage during typical cardiovascular exercises. Hydrotherapy has become a popular form of rehabilitation for these patients. There is a need for a non-invasive device which can monitor critical cardiovascular parameters in these patients in real time during aquatic exercise. Our design seeks to address the need for a device that can non-invasively and reliably monitor physiological parameters, such as heart rate and blood pressure, in an aquatic environment.

**Software for Automating Transfer of Image Data for Model Production**  
**Booth Number: C29**  
Sponsor: Baylor Scott & White | Dr. Andrew Altman  
Faculty Advisor: Dr. Alan Brewer  
Team Members: Jose Caballero, James Griffith, Kevin Tracy, Carolyn Van Zandt  
**Project Summary**  
Deep inferior epigastric perforator (DIEP) flap harvesting is a time-consuming procedure used for breast reconstruction and head/neck reconstruction following surgery. The vasculature is very small and complex, and the risk of severing a wrong vessel is present. 3-D printed models of patient’s CT scans are becoming a more common tool for physicians to use and study prior to surgery to reduce risk of error and time spent in the operating room. In order to convert CT scans to a file able to be printed by a 3-D printer, the .dicom files must be segmented and converted to .stl files. ITK-Snap is a program that enables users to do this by automatically selecting the area of the scan they want to print for each slice of the CT scan.

**ENGINEERING PROJECT SHOWCASE 2018**

**Weizmann**  
**Computer Science & Engineering – Capstone Design**  
**Automatic Exercise Recognition with Machine Learning**  
**Booth Number: C06**  
Sponsor: Department of Computer Science & Engineering  
Faculty Advisor: Dr. Tracy Hammond  
Team Members: Will Adams, Abnob Doss, Kristof Williann, Jose Ramos, Matthew Bruns, Victor Mendiola  
**Project Summary**  
In 2008, physical inactivity resulted in 5.3 million deaths worldwide, which was 300,000 more than smoking. With 80% of Americans not receiving enough physical activity, there is a desperate need to make exercise more accessible and enjoyable. Without a source of motivation or simplification, these problems will continue to get worse. Therefore, we propose a fitness app that will automatically track user exercises to simplify self-monitoring, motivate users, and improve proper exercise form. We will collect data from user studies to train our system and enact formative user studies to determine what features encourage exercise. By providing users with recommended workouts and automatically tracking their progress, we will reduce the amount of effort required for people to begin exercising.

**CommBo: Modernizing Augmentative and Alternative Communication**  
**Booth Number: C05**  
Sponsor: Department of Computer Science & Engineering  
Faculty Advisor: Dr. Tracy Hammond  
Team Members: Christopher Wilcoxon, Cory Avra, Kaveet Laxmidas, Reed Spivey, Christopher Tsao, Michael Wallace  
**Project Summary**  
For every 100,000 people, there are 536 speech-impaired individuals who can benefit from the use of Augmentative and Alternative Communication devices. AAC devices currently available are either difficult to adjust or prohibitively expensive to own. We aim to create CommBo, a web-based, speech-generating picture communication board that alleviates the major pain points of AAC users. CommBo offers customizability far beyond that of a physical picture board and leverages machine learning to provide intelligent suggestions. This enables heightened communication that can be brought to any internet-connected device. CommBo is designed for those patients suffering from stroke induced aphasia, autistic spectrum disorder, or any trauma that impacts the person’s ability to communicate effectively.

**Dineamite**  
**Booth Number: C03**  
Sponsor: Department of Computer Science & Engineering  
Faculty Advisor: Dr. Tracy Hammond  
Team Members: Jonathan Grimes, Camila Barney, Morgan Monzingo, Nicole Ahles, Matthew Kihnhe  
**Project Summary**  
The current word-of-mouth process of planning dinner parties doesn’t include attention to guests’ dietary restrictions or preferences. Dineamite is a web application that simplifies the planning process for group meals by suggesting and managing recipes that everyone can enjoy. We are going to test the effectiveness of the new solution in several ways. Primarily we will have groups of users plan and organize a sample event with user personas that have dietary restrictions, both using the application and without, to observe differences that might occur. We hope that this product becomes useful for planning any type of get-together that requires coordinating, even beyond food.

**Meal Mentor**  
**Booth Number: C01**  
Sponsor: Department of Computer Science & Engineering  
Faculty Advisor: Dr. Tracy Hammond  
Team Members: Jacqueline Gonzalez, Cameron Amos, Neil Marklund, Dominic Nguyen, Huai Wu  
**Project Summary**  
Meal Mentor is a cooking application meant to aid the user in the kitchen environment. Our application is an immersive educational tool that teaches fundamental cooking techniques through video gifs and divides the recipe into concise steps that the user can traverse at their own pace. Our goal is to ensure an overall satisfactory experience of learning a recipe from start to end with the tools provided in our application such as built-in timers, unit conversion, recipe overview, cookware overview and food allergy warnings. We aim to provide an interactive experience via hand gesture recognition to accommodate the dynamic environment of the kitchen.

**Mulenerva**  
**Booth Number: C02**  
Sponsor: Department of Computer Science & Engineering  
Faculty Advisor: Mahima Agumbe Suresh  
Team Members: Patrick Shane McClintock, Randall Dolifka, Alex Phelan, Peter Yung, Chau Ngo  
**Project Summary**  
According to an extensive study done by McKinsey & Company, there were an estimated 4.2 billion people without access to internet in 2014; roughly 55% of this unconnected population is located within just six countries. Cities and towns within these unconnected areas are often impoverished...
and have very limited educational resources. Mulenerva has been designed to promote education across these unconnected populations. Mulenerva is a prototype for a device that delivers educational materials desired by people in cities that are disconnected from the internet, who would otherwise not have access to such material.

**Pathfinder Challenge**

**Booth Number: C04**

Sponsor: Department of Electrical & Computer Engineering  
Faculty Advisor: Dr. Tracy Hammond  
Team Members: Kevin Connally, Nathan Manickavasagam, Bryce Schumacher, Spencer Harder, Dillon Garner, Nahyian Khandker

**Project Summary**

This phone app serves as a cooperative, running game for a small to large number of players. Users follow a trail, including a number of dead ends. Phone vibrations, as well as sporadic indicators on the phone's map, would display potential paths. Users are encouraged to work together; once the correct path has been found, an indicator guides other players to the next area. This is designed with team-building in mind; players can create custom tracks and private lobbies allowing for them to only play with friends. Events could be scheduled to meet new running partners and play with large groups of strangers. Ideally, runners could use this to supplement their existing exercise routines; with custom tracks, distances could be variable to meet the skill of the runner and the group.

**ELECTRICAL & COMPUTER ENGINEERING – CAPSTONE DESIGN**

**AFRL Drone Defense**

**Booth Number: D11**

Sponsor: Air Force Research Lab | Brendan Poland  
Faculty Advisor: Dr. Stravos Kalafatis  
Team Members: Austin Lord, Conor Counts, James Vollmer

**Project Summary**

The Air Force Research Lab is leading the development of an electronic defense system to provide security from the ever-expanding envelope of threats posed by today's drone market. This project aims to develop the algorithms to allow ground or air-based units to detect and identify a drone-based threat, decode its GUID (Globally Unique Identifier), and transmit a signal to the drone that would effectively override the original signal and facilitate the safe disconnection of the drone. The chosen protocol to be “hacked” is the Spektrum protocol known as “DSMX,” a relatively complex and popular protocol in the hobby market.

**Autonomous Soil Analyzer**

**Booth Number: D04**

Sponsor: Department of Electrical & Computer Engineering  
Faculty Advisor: Dr. Stravos Kalafatis  
Team Members: Francisco Araiza, Gilberto Arizpe

**Project Summary**

Even with the ongoing research that this field exhibits, there is still a lack of a fully automated process to collect the required information about soil mineral contents, moisture, and pH, which is essentially the main goal of this project. The Autonomous Soil Analyzer will have the ability to independently traverse a piece of land and make on-the-go measurements of moisture (water content), electric conductivity, and pH. The ASA will then be able to return to a solar charging hub station, at which not only will it charge by utilizing solar energy, but also it would wirelessly transmit the analysis of the land to the user.

**Biotronik MRI RF-Induced Energy Loop Recorder**

**Booth Number: D02**

Sponsor Name: Biotronik  
Faculty Advisor: Dr. Stravos Kalafatis  
Team Members: Marilyn Castaneda, Sefan Manoharan, Rami Mooti

**Project Summary**

RF fields can cause interference in Active Implantable Medical Devices (like pacemakers). Sponsored by Biotronik, the Energy Loop Recorder aims to measure the energy induced by RF fields as a step towards developing reverse transfer functions. It consists of an electronic system which will be miniaturized to fit into an AIMD. By placing the Energy Loop Recorder into the can directly, the need for external testing probes which are also affected by the RF fields, is alleviated. This system consists of Analog-RF circuitry to condition the signals, a microcontroller for analog/digital conversion, and a GUI for post-processing and analytics.

**Crowd Analytics**

**Booth Number: D05**

Sponsor: University of New South Wales | Dr. Beena Ahmed  
Faculty Advisor: Dr. Stravos Kalafatis  
Team Members: William O’Rosky, Daniel Miller

**Project Summary**

In today's world, enclosed, public areas can present a variety of logistical issues, such as store owners attempting to track customer interests or EMS teams looking to aid people trapped in a building during an emergency. These problems all share a common, root cause: it is difficult to accurately measure the movement of individuals within such spaces. Our crowd analytics project addresses this issue by monitoring the entry and exit of people as well their foot traffic within the area, before making the information readily available to the necessary party through a web application. This is done so through a combination of laser and camera array subsystems which gather data regarding the entry, exit and positions of people in a given area.

**East Texas Climate Tracking**

**Booth Number: C07**

Project Sponsor: STAR Programs

**Project Summary**

The purpose of the Climate Tracking Network is to provide a simple, affordable way to help farmers optimize crop performance by gathering long-term agricultural data in regions of interest. It consists of stations which record air temperature, soil moisture and temperature, wind speed, rain fall, solar irradiance, and the depth of water in stock ponds. The units record this data at regular time intervals and relay the information to a network coordinator, which uploads the information to a web-hosted database. Information from the database is presented to the user graphically through a website, where csv files of the data are also available for download. This data can be used to optimize crop selection and yield in regions that are specific to the user's area of interest.

**Ecohub Utility Monitor**

**Booth Number: D09**

Sponsor: Department of Electrical & Computer Engineering  
Faculty Advisor: Dr. Stravos Kalafatis  
Team Members: Preston Percival, Ray Santana, Clarissa Tovias, Lauren Sparkes

**Project Summary**

In today's society, one of the largest issues at hand is environmental sustainability. Ecohub is an efficient solution for any user who would like to change their home behavior to be less wasteful. The Ecohub will monitor a home's electricity, water, and waste usage with wireless sensors and transmit the data to a central hub where it will be displayed on a touchscreen and also onto a website the consumer can view on the go to see their daily or monthly usage from any device with a web browser. The system also provides a financial benefit by allowing the user to view the associated cost based on their habits. Our goal is to provide a consumer's data in a format that is powerful enough to relevant data needed in order to make a positive change and accessible enough for anyone to use.

**IBM Senior Assistant**

**Booth Number: D12**

Sponsor: IBM | Christopher Durham  
Faculty Advisor: Dr. Stravos Kalafatis  
Team Members: Samuel Flanagan, Shelby Unger, Derek Richards, Dustin Martin, Samuel Flanagan

**Project Summary**

The IBM Senior Assistant is a small, approachable robot that helps elderly users mitigate the risks of independent living. Elderly individuals often make the decision to move into assisted living not because they want to but because they, and often their loved ones, are concerned about the risks of living at home. The IBM Senior Assistant makes independent living safer with its two main features: medication scheduling and fall detection. The robot will provide timed reminders to keep users on top of their medications as well as detect if they fall, and if necessary, send for help. With these two main features, the IBM Senior Assistant helps make independent living possible for elderly users who wish to stay at home.
KBQ Pit Upgrade  
**Booth Number:** Outside  
**Sponsor:** KBQ  |  Bill Karau  
**Faculty Advisor:** Dr. Stravos Kalafatis  
**Team Members:** Charles Sticksel, Connor Landrum, Gustavo Lopez  
**Project Summary**  
For our project, we have teamed up with KBQ to improve the current design of their barbeque. The current design, while effective, lacks many of the functions currently available on competing models. Overall, we have taken an already excellent product and made it more precise and user-friendly. Our contribution to the KBQ focuses on two main components, temperature control of the pit and a new UI. With our finished design we have a product that is ready to go to market that will be more competitive with other high-end barbecue already available. Plus, you get to play with fire when you use it, which is awesome.

Lake Bryan Thermal Security System  
**Booth Number:** D07  
**Sponsor:** Department of Electrical & Computer Engineering  
**Faculty Advisor:** Dr. Stravos Kalafatis  
**Team Members:** John Deisher, James Thibodeaux, Kenneth Payne, Rylan Bashinski  
**Project Summary**  
Controlling access to public water areas is important for public safety. Rather than police or security officers remaining on site for surveillance, our aim is to provide an autonomous system that will detect and identify trespassers. The Lake Bryan Thermal Security System will address this issue with a solar-powered long-wave infrared camera that will notify system owners when people are swimming in a targeted area. The LBTTSS will provide more accurate data about human locations in large bodies of water to narrow the area security officers have to investigate. We also will limit the number of false notifications via rigorous image processing and thermal imaging over conventional surveillance systems. This will drastically limit the manpower and infrastructure needed on site for security.

License Plate Analytics and User Interface  
**Booth Number:** D10  
**Sponsor:** Texas &M University Police Department  |  Todd Van Dresar  
**Faculty Advisor:** Dr. Stravos Kalafatis  
**Team Members:** Grayson Eiland, Marcus Overzet  
**Project Summary**  
Our project is a continuation of a previous capstone project which created the Theft ID Assist Unit. The Theft ID Assist Unit is a camera system which captures and scans license plates. Our project implements a permanent and portable hosting solution for the unit along with a website to browse and interact with the license plate data. The system will be used by the Texas &M Police to monitor parking lot activity and aid in vehicle theft investigations. Our system uses WiFi to transfer the images captured by the Theft ID Assist Unit to a server. The server is run on an Intel NUC, which is a small portable mini-PC. The NUC also hosts the web server, for our website which can be accessed anywhere.

Medical Assistant Robot  
**Booth Number:** D08  
**Sponsor:** Department of Electrical & Computer Engineering  
**Faculty Advisor:** Dr. Stravos Kalafatis  
**Team Members:** Casey Clarke, Christian Rodriguez, Lorenzo Delcroix, Cameron Rozean  
**Project Summary**  
The Medical Assistant Robot is capable of saving physicians time while helping support consistent diagnoses. This machine will record conversations between patients and medical professionals and parse these conversations to retrieve important patient data. It will then compare this information to thousands of historical cases and the physician’s previous tendencies to compute a recommendation. This recommendation will then be sent to the doctor via an Android application. The doctor will then be able to provide feedback based on the given results. Additionally, the medical assistant bot will have a tracking method to keep track of the previous decisions made by the doctor as additional weights on the machine learning algorithm.

Safe Driving System  
**Booth Number:** D03  
**Sponsor:** Department of Electrical & Computer Engineering  
**Faculty Advisor:** Dr. Stravos Kalafatis  
**Team Members:** Kyle Flaherty, Leonel Alvarez, Caleb French, Cristian Maldonado  
**Project Summary**  
Poor driving habits introduce unneeded liability to many businesses. Often times these poor driving habits include cell phone use, aggressive behavior, and disregarding needed maintenance. The Safe Driving System provides managers with the data they need to address trouble before it strikes. Additionally, the Safe Driving System prevents cell phone use by physically securing the device. As an effort to reduce unnecessary burden on the driver, the Safe Driving System is designed to allow hands free operation and provide a charging interface. The Safe Driving System promotes great habits without standing in the user’s way.

SafeTiBaby  
**Booth Number:** D06  
**Sponsor:** Texas Instruments  |  JuneChul Roh  
**Faculty Advisor:** Dr. Stravos Kalafatis  
**Team Members:** Zainul Abedin Abbas, Blake Hill, Lance Ta, Cristian Soltero  
**Project Summary**  
On average, 37 children die from heat-related deaths every year after being trapped or left inside a vehicle. The SafeTiBaby’s system is designed as a precautionary device to ensure the safety of a child under three years old trapped within a rapidly heating vehicle. The system will be implemented as a stand-alone product installed within the vehicle and shall be placed at a designated position for optimal detection of a child. The detection system will be able to detect a child by sensing breathing patterns and seat/pace occupancy using an mmWave radar. The system will send an emergency message upon detecting rising car temperatures, while the child is detected within the car in the absence of an adult. The system also has an accompanying application that users will use with the radar.

Texas Instruments deerTrack  
**Booth Number:** D01  
**Sponsor:** Texas Instruments  |  Clive Bittlestone  
**Faculty Advisor:** Dr. Stravos Kalafatis  
**Team Members:** Camille Pham, Cameron Dekohary, Jasada Limtrakul, Blake Denney  
**Project Summary**  
Texas Instruments deerTrack is an integrated deer blind and deer feeder system aimed at improving wildlife surveillance and hunting. The system is equipped with multiple sensors, a 360-degree camera coverage, and a sub 1 GHz antenna network. The system monitors wildlife population near the deer feeder and communicates the information to user friendly screen interfaces at the deer blind and another location. Hunting and animal surveillance are time-consuming and sometimes unrewarding activities. We need a way to make these processes more efficient. By integrating sensors and control panels to the deer blind and feeder system to monitor animal trends, this will ensure a higher rate of success for hunters and environmental enthusiasts.

**Engineering Technology & Industrial Distribution–Capstone Design**

1:4 Scale Advanced IoT Model Home  
**Booth Number:** B08  
**Sponsor:** Department of Engineering Technology and Industrial Distribution  |  Dr. Joseph Morgan  
**Faculty Advisor:** Dr. Jay Porter  
**Team Members:** Luke Kindelin, Abigail Morris, Ninno Marrocci, Avery Tijerina  
**Project Summary**  
“The ETID department has a need for an advanced Model Home for the purposes of remote outreach and applied research in the field of IoT” “This will include capability as a piece of high end lab equipment for HS STEM outreach and as a training tool for additive manufacturing, IoT and energy management techniques.” Because existing laboratory equipment does not fill this need, LANA Advanced Systems will address this by Designing, Documenting and Delivering a fully-functioning prototype that will meet all of the functional requirements listed below: 1:4 scale advanced multi-room model homeModular design, with IoT backbone to the cloud where all decisions are made, Advanced zone and proportional HVAC control, Humidity, barometric pressure, light intensity reporting and more.

Automated Weld Finishing  
**Booth Number:** B04  
**Sponsor:** Tenaris  |  Luis Reyes  
**Faculty Advisor:** Dr. Michael Johnson  
**Team Members:** Adam Horton, Evan Loehr.

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BeagleBone Intelligence Layer (BIL)  
Booth Number: B05  
Sponsor: Texas Space Technology Applications and Research  
Faculty Advisor: Dr. Michael Johnson  
Team Members: Colin Bartlett, Marc Garcia, Prabhjot Singh, Alejandro Rengel, Taylor Wallace, Blake Greene  
Project Summary  
This project is sponsored by Tenaris, who has been facing difficulty tracking defects in their coiled tubing production systems. The primary objective of this project is to develop an innovative automated solution for marking the location of indications found in the production line. The secondary objective of this project is to improve the existing method of marking defect indications. The current defect tracking method requires an operator to paint the defect after each heat treat process to maintain visibility. The design prepared to satisfy the primary objective utilizes wire wheel polishing, to create more durable defect indications. The alternative design for the secondary objective utilizes automation and improved paint compounds.

Eddy Current Traceability  
Booth Number: B06  
Sponsor: Tenaris | Michael W Pearce  
Faculty Advisor: Dr. Michael Johnson  
Team Members: Colin Bartlett, Marc Garcia, Prabhjot Singh, Alejandro Rengel, Taylor Wallace, Blake Greene  
Project Summary  
This project is sponsored by Tenaris, who has been facing difficulty tracking defects in their coiled tubing production systems. The primary objective of this project is to develop an innovative automated solution for marking the location of indications found in the production line. The secondary objective of this project is to improve the existing method of marking defect indications. The current defect tracking method requires an operator to paint the defect after each heat treat process to maintain visibility. The design prepared to satisfy the primary objective utilizes wire wheel polishing, to create more durable defect indications. The alternative design for the secondary objective utilizes automation and improved paint compounds.

Exosphere Power Trainer  
Booth Number: B07  
Sponsor: Exosphere | Connor Pogue  
Faculty Advisor: Dr. Michael Johnson  
Team Members: Andrew Smith, Alex Knitch, Andrew Rogers, Matthew Hood, Tom Ayers, Paul Baker  
Project Summary  
The team is working on the design of a lightweight, portable and affordable home gym system. The system is designed for dozens of common exercises and has multiple resistance settings and attachments. The design is aimed for the commercial market and is meant for any level of fitness from beginner to professional. The gym's resistance is powered by an adjustable rubber band powered chassis system. The user can attach additional bands for additional resistance as well as use a variety of different handles or attachments for different exercises. The Gym is portable and may be easily transported to for exercising anywhere.

Interference Welding Experiment  
Booth Number: A07  
Sponsor: Department of Engineering Technology & Industrial Distribution  
Faculty Advisor: Dr. Jyhwen Wang  
Team Members: Edward Alexander, Roder Cardona, Aaron Chumchal, Travis Walker, Stephen Mayfield, Samantha Jaggers  
Project Summary  
Our project is to experiment with interference friction welding. We are attempting to use an interference fit from a pipe and plate to generate enough friction and heat to weld the two items together with complete fusion. The entire process involved fabricating a vice that is attached to a dynamometer, a device that measures the forces exerted on it, fabricating test specimens, and then running the experiment itself. The experiment consisted of inserting a plate into the vice and using a mill to drill a hole in the plate. Without moving the specimen, a pipe is then inserted into the mill chuck and spun into the hole, attempting the interference friction weld. The data that was collected was force exerted in the z direction and the torque from the mill.

Lab Scale Directional Drilling Rig  
Booth Number: A06  
Sponsor: Department of Engineering Technology & Industrial Distribution  
Faculty Advisor: Dr. Xingyong Song  
Team Members: Jack Long, Peter Forastiere, Bao Tran, Jonathan Gidley, Jacob Bishop, Kelvin Johnson  
Project Summary  
The purpose of this project is to demonstrate down-hole directional drilling in real world practices at a lab scale. The team was given a task to design and fabricate a lab-scale robotic system that will be used to demonstrate real world directional drilling. This project is sponsored by Dr. Xingyong Song, an assistant professor in the Department of Engineering Technology and Industrial Distribution at Texas A&M University. Real world scale of the art directional drilling behaves like a flexible robot traveling through a three-dimensional space controlled by many advanced automation systems. The objective is to build a compact structure to use in a lab and still be able to directionally drill and track all pertinent types of data in real time such as Weight on Bit and Torque measurements.

MMET HVAC Mini  
Booth Number: A04  
Sponsor: Department of Engineering Technology & Industrial Distribution  
Faculty Advisor: Dr. Michael Johnson  
Team Members: Kyle Beckman, Taylor Messinger, Adam Schultz, Kyle Marks, William Hohlt, Sydney Mcdonald  
Project Summary  
Our project focuses on the design and implementation of miniaturized houses with automated HVAC and lighting systems. The goal...
is to help junior high and high school students to understand engineering systems and gain more interest in the STEM field of study.

Mobility Worldwide
Booth Number: A10
Sponsor: Mobility Worldwide, Inc. | Floyd Kaigler
Faculty Advisor: Dr. Michael Johnson
Team Members: Emily Wilson, Drake Semien, Jonathan Kappelmann, Mason Dunn, Joseph Keon

Project Summary
Mobility Worldwide, Inc. is experiencing problems with their inconveniently sized and expensive product, the mobility cart. This cart is difficult to maneuver and in need of size, weight, and cost reduction, along with an increase in maneuverability and performance. These carts are being assembled and shipped, to this day, to allow handicapped individuals in impoverished countries to have the ability to move around as they please. The redesign of these carts is needed in order for the company to provide an easier yet lasting source of mobility for these people in need. The expected outcomes of the project are to produce a lighter, more efficient cart that further adheres to the needs of those disabled while being less burdensome to the pockets of those who produce it.

NASA Class-1E Facility Monitoring and Control System
Booth Number: C15
Sponsor: T STAR LLC Texas Space Technology Applications and Research | Matt Leonard
Faculty Advisor: Mr. Harley Willey
Team Members: Colby Ryan, Alexis Crandall, Mitchell Martinez, David Kennedy, Kristian Ecolango

Project Summary
Microgravity Automated Research Systems (MARS), sponsored by Texas Space, Technology, Applications, and Research (T STAR), will research and develop the electronics to run a Class 1-E facility on the International Space Station capable of hosting up to four experiments at a time that can be changed out for new experiments throughout the facility’s lifetime. Hosting experiments will include monitoring and controlling power to each experiment as well as providing a means for science teams to down-link files from their experiments and to up-link commands to change experiment parameters. Creation of this facility will provide the ability for researchers to streamline the development timeline, and thereby decrease the cost, of their experiments.

Portable Underwater Probe System (PUPS)
Booth Number: A09
Sponsor: Department of Engineering Technology & Industrial Distribution
Faculty Advisor: Dr. Byul Hur
Team Members: Rogelio Casas Jr., David Cervantes, Justin Comer, Brielle De Anda, Andres Fly, Landon Ledbetter

Project Summary
Submersible Exploration Aquatic Labs, or SEAL, will design a prototype underwater environmental sensor system that consists of a Remotely Operated Underwater Vehicle (ROV) and a communications buoy that will be used to transmit data to a command center. The communication buoy allows the user to control the ROV, with assistance of the on-board camera, without being directly connected via a tether. The ROV will be able to collect water samples for further lab testing and contain a sensor package that has an array of sensors, such as temperature, pH, dissolved oxygen, pressure, and salinity that are used to take measurements at different depths and collect water samples for further lab testing. The ROV system will also allow for further expansion of sensors in the foreseeable future.

Project Mango
Booth Number: B03
Sponsor: The National Center for Electron Beam Research at Texas A&M University | Dr. Suresh Pillai
Faculty Advisor: Dr. Jorge Alvarado
Team Members: Andrew Listi, Jason Zissa, Travis Cotton, Conner Hutcherson, Anish Tharappel, Rachel Branyon

Project Summary
This project is focused on the reduction of manual labor and increasing procedural efficiency for the electron beam irradiation facility at Texas A&M University. The biggest problem that needs to be solved is the reduction of manual strain when moving mango boxes to and from the conveyor system. The current system requires workers to pick up and manually lift as much as fifty pounds from heights ranging from the floor to above their heads. This movement has been identified as the primary cause of fatigue and has the biggest need for a solution. The secondary problem is based on the improvement of efficiency with the system. The secondary solution goal of the team was to figure out which parts of the process could feasibly be modified to fit the needs of the customer.

ROV with Floating Communications Access Point
Booth Number: B10
Sponsor: Department of Engineering Technology & Industrial Distribution | Dr. Byul Hur
Faculty Advisor: Dr. Joseph Morgan
Team Members: Jennifer Jordan, David James, Caleb Stewart, Brian Malbec

Project Summary
At [NT]^2, our project is developing a wireless communication aspect for an ROV platform. Our goal is to implement a system solution with the PocketBeagle as the intelligence platform and ZigBee for the wireless protocol. A floating communications access point (FCAP) connects to the robot via a tether and communicates with the user wirelessly. This FCAP will receive the user data and send it down to the ROV and send back temperature data and a video feed taken from the ROV. Our four person team has designed three custom printed circuit boards and built all our systems in house. We have also chosen to implement ROS to make our system more robust.

Sentinel
Booth Number: A05
Sponsor: Department of Engineering Technology & Industrial Distribution | Dr. Rainer Fink
Faculty Advisor: Mr. Harley Willey
Team Members: Ray Chavez, Kevin Vazquez, Gi Soo Kim, Ryan Wallace

Project Summary
BraveBird LTD is a small wireless communication engineering capstone design team in the Electronic and Systems Engineering Program at Texas A&M University. The team is working to develop and design a drone signal repeating system known as Sentinel for the DJI Phantom 2 Vision + drone. The purpose of Sentinel is to extend the effective range of the DJI Phantom 2 Vision + drone which will be able to handle all real time video transmission, telemetry and controller signals. Sentinel will operate as a series of nodes configured in a wireless network that will relay data between nodes and back to the user device. Each Sentinel node will individually be solar power rechargeable, and the placement of each node will be dependent on its predefined range.

Server Cooling
Booth Number: D14
Sponsor: Department of Engineering Technology & Industrial Distribution
Faculty Advisor: Dr. Jorge Alvarado
Team Members: HaoRan Sun, Preston Eiller, Ryan Springer, Amalia Castillo, Zachary Zaruba, Isaac Renteria, Raquel Pearson

Project Summary
The objective of this project is to research, develop, and test a custom liquid microjet cooling system. The microjet system will be integrated into a server to effectively remove the heat generated by a high-performance CPU. This system sprays the fluid from pressurized jets onto the surface of our heatsink. The copper heatsink that attaches to the cooler is also custom made to interface properly with the microjet enclosure, as well as ensure that the components will seal tightly and prevent any leaks of the liquid out of the system. With a reliable system fabricated, our design can be easily modified to increase pressure, distance from jet to heatsink, type of fluid in the system, and other minor aspects that can be fine-tuned to deliver the best and most efficient system possible.

Smart Home Assembly Kit (SHAK)
Booth Number: C14
Sponsor: Department of Engineering Technology & Industrial Distribution | Dr. Joseph Morgan
Faculty Advisor: Dr. Jay Porter
Team Members: Jonathan Campion, Shane Midkiff, Tim Lenig, Brigg Bond

Project Summary
Functional Technology Systems, also known as FTS, will be integrating the use of Internet of Things to create a scaled model home to demonstrate the use of the Internet of Things within a building automation system. The Smart Home Assembly Kit (SHAK) will use several devices to simulate human occupancy, alter the lighting inside of the unit, and adjusting the temperature elements inside each of the rooms, which will be activated via the Internet by using a Cayenne dashboard. The Cayenne dashboard will allow the user to view various sensor readings
located inside of the SHAK, as well as allowing the user to activate peripheral devices on and off or giving them the option of using a slide bar to increase or decrease the intensity of power being sent to a device. The purpose of the SHAK is to educate students from grade levels K-12 on the Internet of Things as well as gaining their interest in engineering.

Superior Shrimp Solutions

Booth Number: A08
Sponsor: Department of Engineering Technology & Industrial Distribution | Dr. Rainer Fink
Faculty Advisor: Dr. Jyhwen Wang
Team Members: Tyler Lew, Darren Droll, Corbin Davis, Ryan Long, Charles Hrncir, Melghi Arasu

Project Summary
This project will focus on creating a control board and graphical user interface for an automated prawn farm that will measure water levels and control mechanical aspects of the system. The levels will be measured by probes set in the water that are connected to an intelligence that will be able to compile the data and use wireless communication to transmit the data to a central computer. The central computer will then record and filter the data to determine what will be needed to do to keep the levels of the system within healthy parameters and re-transmit the data in order to control the system. Through this process, we will be able to monitor and control a re-circulation system to keep the prawns healthy and alive until ready for harvest.

Test Engineer Solution Technologies

Booth Number: B09
Sponsor: Knowledge Based Systems, INC. | Michael Shawn Reynolds
Faculty Advisor: Dr. Ana Goulart
Team Members: David Resendez, Kyle Reynolds, Jake Pape, Steven Kronk

Project Summary
“Test Engineering Solution Technologies, sponsored by Knowledge Based Systems, INC. has been tasked to research and design a prototype that will be used to further develop their network solution that can autonomously manage tester data logs and collect their environmental conditions.” We will focus on creating a prototype that meets the requirement of using encrypted IEEE communications protocols to send data over RJ45 to ensure the security of the network. Additionally, environmental conditions will be monitored via on-board temperature and humidity sensor, a compact optical dust and smoke sensor and a current sensor for Automated Test Equipment power monitoring.

UHF Hub

Booth Number: D13
Sponsor: Megahertz Technology | Jim Hopper
Faculty Advisor: Mr. Harley Willey
Team Members: Jordan Roiko, Marcos Lima, Jack Hunt, Zachary Pina, Yolisma Magana

Project Summary
Wave Technologies is partnering with Jim Hopper of Megahertz Technology to design an SDR system capable of continuous data acquisition. While Mr. Hopper owns many frequencies in the UHF band he does not have a time effective way of viewing these frequencies. The UHF (Ultra High Frequency) Hub will provide a spectral power density graph that displays multiple graphs of the power accumulated from the different frequencies within the frequency range selected. With the UHF Hub from Wave Technologies Mr. Hopper will be able to monitor and manage his frequencies over time and assist him in looking for new frequencies he can purchase.

VIA Tech’s Navigational & Object Visual Assistant (NOVA)

Booth Number: D22/23
Sponsor: Department of Engineering Technology & Industrial Distribution
Faculty Advisor: Dr. Ana Goulart
Team Members: Lathan Moore, Garrett Friedricks, Jason Belmares, Hunter Schwedler, Brady Langston, Latham Moore

Project Summary
The Navigational & Object Visual Assistant (NOVA) is an attachment that will connect to an existing white cane to enhance its current functionality while adding new techniques to help users navigate to desired locations. The NOVA will assist by providing object detection and turn-by-turn navigation assistance via haptic feedback. Using an ultrasonic sensor and vibration motors, the NOVA will alert the user of any obstacles above the waist with specific vibration patterns. To provide global positioning system (GPS) navigation, a phone application will be created that will interact with the NOVA to signal the user of chronological directions. It will provide helpful and in some cases life-saving instructions so that the user can focus on learning how to get to their intended destination.

INDUSTRIAL AND SYSTEMS ENGINEERING

An Expansion of ToolBank Operations to Benefit the Houston Community

Booth Number: L15
Sponsor: Houston Community ToolBank | Erika Hornsey
Faculty Advisor: Dr. Lewis Ntaimo
Team Members: Aliza Hasnain, Claire Clayton, Edith Rodriguez Alvarez, Jaysen Butler

Project Summary
The Houston Community ToolBank loans tools to individuals and non-profit organizations in the Houston area. The ToolBank would like to extend it offerings to the Houston Rodeo. But, there is no precedent or procedure in place at the Houston ToolBank to support a loan of this magnitude. New processes and procedures will be researched to expand upon current operations. These procedures include tracking the location of each tool during the event and receiving the tools after the rodeo ends. A goal of this project is to develop a system prototype by the end of the Spring 2018 semester.

Autonomy as a Service: The Optimal Experience

Booth Number: E02
Sponsor: Texas A&M Transportation Institute (TTI) | Dr. Swaminathan Gopalaswamy
Faculty Advisor: Dr. Erick Moreno-Centeno
Team Members: Elizabeth Connelly, Jasmine Bertram, Cole Labhart, Joshua Roberts, William Olyslager

Project Summary
Dr. Swaminathan Gopalaswamy and Tyler Marr are leading the way in a proof-of-concept with Infrastructure Enabled Autonomy (IEA) involving Roadside Units (RSUs) that reduce the need for vehicles to navigate the roadway entirely by themselves. This concept involves sharing ownership of driving functionality to move a significant portion of the responsibility from vehicles to sensors. In order to determine the feasibility of this concept, the parameters associated with RSUs, existing infrastructure, road conditions, and traffic density will have to be explored. Exploring these parameters will include research of traffic data, standards for roadway infrastructure, and typical commuter routes.

Brazos Church Pantry Project

Booth Number: L06
Sponsor: Department of Industrial and Systems Engineering
Faculty Advisor: Dr. Wilbert Wilhelm
Team Members: Jeffrey Dietz, Alexandria House, Carey Desselles, Kenneth Griffin

Project Summary
The Brazos Church Pantry is a non-profit organization that has been serving the Brazos County community for 30 years. It distributes groceries to those in need and works with the Brazos Food Bank and gets support from 30 local churches. The pantry is run completely by volunteers who give their time and serve over 1,200 families each month. Once approved, a client receives food items selected by volunteers. The current building layout imposes numerous constraints that lead to congestion and inefficiency when order fulfillment is being done by the volunteers. By considering space management, process flow, and human factors, this project aims to propose alternative designs for the storage and bagging areas in order to allow the volunteers to work more comfortably and effectively.

Cycle Time Reduction in Bus Bar Insulation

Booth Number: L01
Sponsor: Siemens Industry | Sidra Maryam
Faculty Advisor: Dr. Natarajan Gautam
Team Members: Nathaniel Byrd, Diana Luna, John Brennan, Nathan Lortz

Project Summary
The purpose of this project is to improve the process of insulating bus bars, a sub-component of the commercial switchboards that Siemens produces for customers. Currently, the process is very time intensive and is done manually by skilled technicians. Since all switchboards are custom made to order, there is a high degree of variability in the shape, size, length, thickness,
and configuration of the bus bars which makes it challenging to develop a single solution that works for all possibilities. The aim of this project is to cut cycle time for this operation. The effort includes research on applying different materials or methods as a means of reducing the time involved in applying the insulation material.

**Eagle Sports**

**Booth Number: E03**

Sponsor: Eagle Sports | Larry Solomon  
Faculty Advisor: Dr. Andrew Johnson  
Team Members: Austin Kolodejacak, Morgan Sula, Jessica Miller, Bryan Shelnutt, Alex Wilsher  

**Project Summary**

Eagle Sports is a Houston-based manufacturing facility that produces neoprene products such as wet-suits and life jackets for competitive water-sports. Eagle separates themselves from their competition by using the highest quality neoprene on the market, along with their unique graphics printing process called sublimation. While Eagle has been in business for 35 years, it has never had an assessment of their facility layout or manufacturing processes done to determine where opportunities exist to pursue more efficient processes. This project looks at how effectively current procedure address demand for neoprene and flotation foam and optimize the use of these two raw materials.

**Efficiency Driven by Cost Performance**

**Booth Number: A01**

Sponsor: UPS | Samantha Danna  
Faculty Advisor: Dr. Sergiy Butenko  
Team Members: Mostofa Hoderi, Fermin Calderon, Christian Eikner, Ross Fickessen, Trevor Hennington  

**Project Summary**

During peak demand season (fall holidays), UPS and its competitors hire workers to handle the workload increase. During last year’s peak season, UPS noticed workforce shortages as competitors such as FedEx, Walmart, and Amazon acquired most of the available workforce. This prompted UPS to gather prior peak season data to produce a performance vs. cost analysis and identify key efficiency drivers, workforce forecasting, and form techniques used to reduce cost across the three service providers in specific U.S. regions. This comparison aims to create a 5 - 10% increase in efficiency for UPS and is based on metrics such as Stops Per On Road Hour (SPORH), net delivered, Stops Per Car (SPC), total stops, driver function time, over-allowed time, and packages and deliveries.

**Electric Vehicle Charging Network**

**Booth Number: C09**

Sponsor: Industrial Distribution | Dr. Ismail Capar  
Faculty Advisor: Dr. Sergiy Butenko  
Team Members: Tyler Trandai, Joseph Clegg, Walker Raines, Morgan Shay, Brandon Caine  

**Project Summary**

If electric cars are to become a viable option for the average American, then the technology must be able to travel longer distances. This project looks at establishing an electric vehicle recharging network in Texas as a means of addressing one of the primary concerns: where to place recharging stations.

**FITS International Weld Shop Improvement**

**Booth Number: L12**

Sponsor: Department of Industrial and Systems Engineering  
Faculty Advisor: Dr. Dinakar Sagapuram  
Team Members: Jared Twomey, Bryce Elkins, Garrett Remmert, Hugo Renteria, Mark Banigan  

**Project Summary**

FITS International is one of the largest welding companies in North America. At their 89,522 square foot manufacturing facility they manufacture high pressure pumps and replacement parts in their weld shop and machine shop. This project looks at implementing lean manufacturing tools and techniques to decrease the welding processing times and increase the welding facility’s efficiency. This includes considering welding automation, redesigning component parts to allow for quicker setup times, and standardizing the welding process procedures. The project focuses on these three issues but provides recommendations for other problems noted in the process for future consideration.

**Houston Toolbank Warehouse Redesign**

**Booth Number: L11**

Sponsor: Houston Community ToolBank | Erica Hornsey  
Faculty Advisor: Dr. Mike Graul  
Team Members: Patrick Linton, Luis Urdaneta, Grant Watson, Ishan Ray, Nate Murphy  

**Project Summary**

The Houston Toolbank was founded with the mission of providing an affordable tool lending program for non-profit organizations in the Houston area. The Toolbank’s warehouse currently stores over twenty thousand tools with over two hundred sixty different tool types. This project uses cutting-edge technology and innovation to redesign the Houston Toolbank’s warehouse’s current layout to improve efficiency. Relocating tools based on utilization rates allowed pull times to be reduced and utilization of space to be optimized. Improving the Toolbank’s day-to-day operations increases the support they can provide the Houston community.

**IEA Safety Hazard Analysis**

**Booth Number: L08**

Sponsor: Texas A&M Transportation Institute | Robert Brydia  
Faculty Advisor: Dr. Nancy Currie-Gregg  
Team Members: Savannah Warren, Kaitlyn Broll, Jose Vazquez, Garrett Willett, Zach Ong  

**Project Summary**

Roadway Safety Improvement (RSI) is a new concept in the world of autonomous vehicles. It includes infrastructure that helps reduce the needs for each vehicle to figure out the roadway environment on its own. An investigation and analysis into the potential safety hazards associated with IEA subsystems and the overall system needs to be completed in order to compile a detailed safety requirements report. This report will include a Preliminary Hazards List and an analysis of the top two worst-case scenarios in the system. Then our team will compose possible mitigations to reduce the frequency and/or severity of the risks, thus bringing these risks into an acceptable risk level according to the Texas A&M Risk Management Standards. Lastly, any other suggestions concerning safety within the systems will be included in the report.

**Improving Upset Forging Efficiency**

**Booth Number: L16**

Sponsor: NOV Grant Prideco | Norman Cooper  
Faculty Advisor: Dr. Dinakar Sagapuram  
Team Members: Zachary Havelka, Kishan Agrawat, Jose Vazquez, Garrett Willett, Zach Ong  

**Project Summary**

This project’s goal is to help Grant Prideco achieve a Six Sigma Quality level in their forging process. Data analysis showed improvement potential in two forge-related processes. The two improvements have shown positive results that will be validated through this project.

**Interior Re-design of the TAMU Autonomous Shuttle**

**Booth Number: L13**

Sponsor: Texas A&M Transportation Institute | Robert Brydia  
Faculty Advisor: Dr. Thomas Ferris  
Team Members: Joshua Majek, Zac Poehler, Rebekah LeBlanc, Josh Lee, Estefania Dimas  

**Project Summary**

The existing chassis base for the TAMU autonomous shuttle prototype is an electric utility vehicle with a 4-seat capacity in a 2x2 arrangement with steering and braking controls. While this arrangement works for the development phase, it is not the anticipated final design. This project aims to re-examine the interior space and consider the passenger’s ability to interact with a remote controller of the shuttle via voice and video capability. The chassis must also accommodate wheelchair loading and stowing. The work will include a simulation of various seating configurations and loading and unloading operations as well as performance characteristics.

**Internally Illuminated Reflective Roadway Beacon Safety Analysis**

**Booth Number: L07**

Sponsor: Texas A&M Transportation Institute | Robert Brydia  
Faculty Advisor: Dr. Nancy Currie-Gregg  
Team Members: Savannah Warren, Kaitlyn Broll, Austin Fairris, Travis Coltharp, Edgardo Fajardo  

**Project Summary**

The Texas A&M Transportation Institute (TTI) has installed several Internally Illuminated Reflective Roadway Beacons (IIRRB) along the crosswalk on Penberthy Blvd. between the Physical Education Activity Program (PEAP) building and Reed Arena. Their purpose is to increase the crosswalk’s visibility in an effort to decrease vehicle-pedestrian collisions. Currently, TTI has no data on the efficacy of these IIRRBs and no system for evaluating them.
This project evaluates the IIRRB’s effectiveness through the collection and analysis of several metrics to include vehicle speed reduction, pedestrian attentiveness, and light output among others. Results could impact implementation at other on-campus crosswalks.

**Inventory Management: A Tool for Tools**

**Booth Number: B01**

Sponsor: Houston Community ToolBank | Erika Hornsey

Faculty Advisor: Dr. Mike Graul

Team Members: Robert Moreman, Andrea Acuff, Phuong Pham, Charles Cooper, Tyler Wiener

**Project Summary**

The Houston Community ToolBank needs recommendations for an improved inventory management system. The ToolBank does not have the luxury of an expansive budget to give all new employees and volunteers training, therefore the new system needs to be easy to learn and operate. The current plan for the project is to build an IDEF0 and IDEF1 (Integrated Definition Methods) model to develop a better understanding of the ToolBank system. These modeling tools will ultimately help determine a set of requirements that an effective inventory management system should satisfy as well as make appropriate software recommendations.

**Lockheed Martin Tool Calibration Project**

**Booth Number: L10**

Sponsor: Lockheed Martin | Scott Swann

Faculty Advisor: Dr. Amarnath Banerjee

Team Members: Emily Pettiet, Piper Arg, Michael Woodworth, Eric Czarnecki, Austin David

**Project Summary**

Lockheed Martin needs a method to track and determine the number of tools required for the Automatic Dispensing Units that provide tools to users. Many issues arise during the overlap of the off-annual cycles and determining how many task kits are needed during the overlap of the annual cycles is primary among them. The main objective for completing this project is a predictive simulation model created using Simio. This method will be the most successful and advantageous for this project as the customer, Lockheed Martin, is familiar with this interface as well. The multiple functions available within Simio qualify as the easiest way to solve the project problem based on the customer’s needs.

**Material Feasibility for Microgravity 3-D Printing**

**Booth Number: L14**

Sponsor: Texas Space Grant Consortium | Timothy Urban

Faculty Advisor: Dr. Nancy Currie-Gregg

Team Members: Katelyn Key, Rachel Mitchell, Andrew Camp, Timothy Sitorus, Tyler Powers

**Project Summary**

NASA wants to test the feasibility of 3-D printing materials on board the International Space Station (ISS) for logistics and maintenance purposes as well as future space missions. This initiative began due to the inefficiency and high cost of sending replacement and spare parts to space. Cost estimates are $10,000 for every pound launched, so spare parts will be costly. NASA would like to determine if there are commercially available filaments that could be 3-D printed in micro or partial gravity environments. The antenna must exhibit the necessary characteristics for functional antennas. Specifically, the antenna must be conductive enough to effectively transmit X-band frequencies.

**Operational Excellence in Lathing Processes**

**Booth Number: L05**

Sponsor: NOV Grant Prideco | Norman Cooper

Faculty Advisor: Dr. Zhijian Pei

Team Members: Patrick Seiler, Alec Blodgett, Juan Inclan, Dustin Shaver

**Project Summary**

Grant Prideco wants to improve their CNC Threading and Turn & Bore processes; specifically, they want machine’s setup time, also known as the changeovers, reduced. In order to conduct this analysis, observations must be made of the current processes, data collected and observations recorded so decision makers will understand the process both in-place and optimal. Standard Operating Procedures (SOP’s) might be developed through changeover observation, careful note-taking, and consulting with the manufacturing experts on site. Processes will be compared and contrasted to identify strengths and weaknesses of each and ultimately generate improvements to both.

**Optimization of Information Flow Between ER and ICU of Texas A&M Small Animal Hospital**

**Booth Number: L04**

Sponsor: Texas A&M Small Animal Hospital | Sheila Carter

Faculty Advisor: Dr. Mike Graul

Team Members: Nicholas Keeley, Sarah Mack, Chelsey Brown, Gineth Valbuena, David Rodriguez

**Project Summary**

The Texas A&M Small Animal Hospital is a fast-paced, high-traffic environment. This project focuses on reducing bottlenecks and roadblocks throughout the Hospital’s information architecture. Specifically, it seeks to identify four gaps in patient information flow between the ER and ICU that includes communication through paperwork processes and information systems. Ultimately reducing bottlenecks in the communication flow between the ER and ICU will facilitate a smoother operating system and reveal areas for future improvement.

**Optimizing Transportation Services Fleet Management System**

**Booth Number: A02**

Sponsor: Transportation Services | Kenneth Kimball

Faculty Advisor: Dr. Li Zeng

Team Members: Khalid Alrakban, Kenneth Ho, Rene Espinoza, Brandon Peterson, Abel Compile

**Project Summary**

Fleet leasing is one of the functions carried out by Transportation Services (TS). They purchase vehicles at the state’s contract price, and then lease them to university departments. To help their clients make better informed decisions, TS had been collecting data on each vehicle. Out of concern for being good stewards of the state’s money, TS sought a data-driven solution that takes into account the complex interface between TS and its clients. Using the data collected on each vehicle—such as fuel, maintenance costs, and downtime—we seek to develop a model for optimal replacement time. The model shall provide TS and its clients with insights regarding their fleet size, age, and reliability that would serve as a decision-making support tool.

**Optimum Autonomous Shuttle Route**

**Booth Number: B02**

Sponsor: Texas A&M Transportation Institute | Bob Brydia

Faculty Advisor: Dr. Tony McDonald

Team Members: Andrea Arelano, Colton Carter, Michael Hughes, William Ryan Thelen

**Project Summary**

There are multiple algorithms that exist to find a path from Point A to Point B given constraints and inputs. This project seeks an evaluation of the top algorithms to examine data needs, pros, cons, and their applicability to a Texas A&M University shuttle route optimization solution which may include routes other than roadways (e.g. sidewalks), and then simulate multiple A-B trip events with various data sets (limited to full) to test their assumptions and the selected algorithm. The goal is to determine which best path algorithm will be the most beneficial and optimum for the Texas A&M autonomous shuttle and the data requirements for that algorithm.

**Revitalizing American Manufacturing with Lean Practices**

**Booth Number: C08**

Sponsor: Talon Controls | Scott Maxwell

Faculty Advisor: Dr. Mike Graul

Team Members: Calvin Ullman, Aaron Verrett, Kyle Robichau, Brandon Howell, Dawson Lochridge

**Project Summary**

Talon is looking into implementing lean manufacturing to their facility to reduce production costs and cut lead times substantially. The down time when waiting for projected orders to be placed is an ideal opportunity to reorganize the process flow in their contracting division to reduce the material handling and non-essential functions currently being performed on the extruded contract parts. The aim is to move a large number of pallet racks thus changing the powder paint process to resemble an assembly line, with hopes of eventually reducing the batch sizes and increase the throughput.

**Root Cause Analysis Approach in Diagnosis and Recommendation to Increase Operational Efficiency in a Hospital Setting**

**Booth Number: E01**

Sponsor: Texas A&M Small Animal Hospital, Veterinary Medical Teaching Hospital | Sheila Carter
Faculty Advisor: Dr. Mike Graul
Team Members: Marilyn Rios, Clint Cage, Katia Carmona, Pribadi Sulistiyadi, Jiahui Biau

Project Summary
Increasing the operational efficiency of a hospital includes analyzing the different functions and departments in it. This semester, Vet Team 1 was assigned the task to improve Admissions, Communications/Scheduling and Discharge departments at the Texas A&M Small Animal Hospital. Through observations, staff interviews and managerial meetings it was concluded that communication between departments is the most urgent concern and leading cause of non-value added time. This project’s goal is to use a root cause analysis approach along with other applicable lean principles to offer a more efficient solution communication system between departments. An in this area will greatly benefit the hospital by providing a better customer experience.

TAMU ISEN Halliburton Senior Capstone
Booth Number: L02
Sponsor: Halliburton | David Eubank
Faculty Advisor: Dr. Erick Moreno-Ceneno
Team Members: Abby Hutton, Jonathan Callender, David Saenz, Katia Cruz, Annemarie Boyd

Project Summary
Halliburton’s Manufacturing Strategy Department is looking to streamline logistics movements. Fourteen Halliburton manufacturing facilities receive products either for value-added operations or inventory storage. Manufacturing Strategy is looking to minimize the product’s shipping distances and their associated shipping costs. Halliburton has realized a need for a repeatable process or tool that can periodically re-evaluate logistical moves for inefficiencies. These inefficiencies result in increased lead times and unnecessary shipping, holding, and opportunity costs. The aim of this project is to provide Halliburton with an adaptable system that can assess their manufacturing network for inefficient logistical moves.

User Requirements for Blind and Deaf Passengers for Autonomous Transportation Service
Booth Number: L09
Sponsor: Texas A&M Transportation Institute | Robert Brydia
Faculty Advisor: Dr. Farzan Sasangohar
Team Members: Margaret Fowler, Megan Eckelbarger, Seohye Jeong, Abraham Chavez

Project Summary
The Texas A&M Transportation Institute has partnered with the College of Engineering to replace current Paratranstar Services with a fleet of autonomous vehicles. The purpose of this project is to create use case scenarios for students with vision, hearing, or speaking issues while interacting with an autonomous vehicle. Each use case scenario will map information and decisions required of the car, so passengers remain safe and comfortable during their riding experience. To understand what information will be necessary and how best to communicate with the passenger, user requirements will be identified through qualitative and quantitative analysis. Addressing these requirements will aid us in creating use case scenarios and recommending design features that are user-focused.

Veteran’s Affairs Healthcare: A Human Factors Process
Booth Number: L03
Sponsor: Brooke Army Medical Center | Tasha Barden
Faculty Advisor: Dr. Farzan Sasangohar
Team Members: Brooke Wollam, Nhu Nguyen, Patrick Stansberry, Ashley Roberts

Project Summary
Brooke Army Medical Center (BAMC), a Department of Defense resource that primarily serves active duty and retired soldiers and their family members, has a relationship with the South Texas Veterans Health Care System (STVHCS) that allows STVHCS to refer Veterans to BAMC if the VA system cannot see the patient in a timely manner (within 30 days) or if the service is not offered. This is accomplished through the use of Healthcare Resource Sharing Agreements. While this has been a long-standing practice, there is no standardized mechanism for BAMC to readily identify the specific care that STVHCS patients can receive from BAMC. An improved process is needed to monitor and expedite STVHCS patient authorization.

MECHANICAL ENGINEERING – CAPSTONE DESIGN

2018 ASHRAE Student Design Project Competition: HVAC Design Calculations
Booth Number: A14
Sponsor: ASHRAE | John Gross
Faculty Advisor: Dr. Waqar Mohiuddin
Team Members: Madeleine Horelica, Andres Barrios, John Heppard, Lars Frederiksen, Klint Keating

Project Summary
The Texas A&M ASHRAE design team has been tasked with designing the load calculations for a four-story mixed use complex north of Istanbul, Turkey. In addition to calculating the loads of this building, properly sized Heating, Ventilation and Air Conditioning (HVAC) systems must be selected. During this semester, the team has worked to model the system, select heating and cooling systems based off of the model, and hand calculations. The building was modeled in Trane Air Conditioning and Economics (TRACE) software with all of the internal loads and proper ambient weather conditions. It was implemented with Variable Air Volume (VAV) systems.

2018 Formula SAE
Booth Number: Right Car Space
Sponsor: SAE International
Faculty Advisor: Dr. Yuval Doron
Team Members: Spencer Weaver, Kaitlyn Mulkey, Segun Tytler, Seth Burkhalter, Milan Pandya, Mario Heredia, Ross Curran, Jadh Gunawan, Logan Hanzel, Adam Isaacks, Sarah Rohmer, James Compton, Albert Rodriguez, Kevin Campbell, Gill Lipton, Zach Masse, Zach Beck, Sidd Rebbia, Zack Roeder, Wyatt Mountain, Shane Costello, Brendan Cooper

Project Summary
Formula SAE is a College Design Series put on by the Society of Automotive Engineers. Every year, thousands of students from hundreds of universities design, build, test, develop, and compete with a small formula-style race car. This project allows students to test every aspect of their engineering education as well as exercise their business-related skills such as marketing and designing for cost. The rules behind this competition focus mainly on ensuring a safe vehicle for the student drivers; thus, the design freedom given to competitors is huge and allows a diverse group of vehicles to be designed. The 2018 team has decided to take full advantage of this design freedom and has constructed an entirely new vehicle, breaking the status quo that has stood for many years.

3-D Printed Pills
Booth Number: C18
Sponsor: Department of Mechanical Engineering | Dr. Tanil Ozkan
Faculty Advisor: Joshua Riefer
Team Members: Jacob Gordon, Manuel Sanabria, Stephen Rabke, Mitchell Shockley, Muddassir Tai

Project Summary
We have designed a proof of concept that will allow for the 3-D printing of pharmaceutical pills. It is designed to combine a biodegradable filament and an active ingredient for a prescribed dosage of medication. The premise is to allow pharmacies to be able to manufacture medicines on site. This will allow precise dosages for patients and quick turn over for over-the-counter medications. The prototype involves the retrofit of a Maker Select v2 3-D printer that uses the combination of a pharmaceutical grade filament and a combination of active ingredients to fabricate each individual pill. The primary constraint of the prototype is the extruder temperature since it must avoid destroying the active ingredient.

ABOVE Lighter-Than-Air UAV Envelope
Booth Number: A19
Sponsor: ABOVE UAV | Austin Burch
Faculty Advisor: Dr. Swaminathan Gopalswamy
Team Members: Ian McLeod, Chase Harris, Kyle Leitner, Cristian Aguirre, Christopher Montez

Project Summary
Our team has worked the past year to develop the envelope and structure of a lighter-than-air (LTA) UAV for ABOVE-UAV. ABOVE is working to create a fleet of these aircraft that can be operational for extended periods of time and cover large areas of land with a surveillance network. The UAVs will be able to monitor pipelines, power lines, forest areas, or anything else a client desires. Our team has worked to create the envelope and structure of the UAV. This consists of the bladder that holds the lifting gas, the fabric that makes up the skin of the UAV, and the reinforcing frame that holds the UAV together and gives it its shape and strength.
Analysis and Optimization of Air Inlet in a Cooling Tower Using Computational Fluid Dynamics

Booth Number: A18
Sponsor: International Cooling Tower | Brad Vickers
Faculty Advisor: Joshua Riefer
Team Members: Nicholas Price, Ross Nairn, Matthew Myers, Robert Helwick, Miguel Ortiz

Project Summary
Cooling towers are large pieces of mechanical equipment used for removing large amounts of waste heat from industrial processes. Cold air enters the air inlet and cools hot waste water through evaporative cooling. The goal of this project is to determine the appropriate height for the air inlet given the volume of air flowing through the tower. This will be done using the computational fluid dynamic (CFD) software, ANSYS. The next goal is to develop a methodology to determine the optimal air inlet height for any tower when the dimensions and air flow are known. The final goal is to develop a design to alter the air inlet to optimize the distribution of air flow through the cooling tower.

AutoDrive Challenge - Lateral Control
Booth Number: B12
Sponsor: General Motors and SAE International | Dr. Alireza Talebpour
Faculty Advisor: Dr. Swaroop Darbha | Dr. Swaminathan Gopalswamy
Team Members: Samir Hassen, Clayton Hess, Sam Konopcyznski, James Lecher, Federico Renteria

Project Summary
The GM AutoDrive Challenge is an inter-scholastic competition hosted in Yuma, Arizona where universities will compete to modify a Chevy Bolt for autonomous driving. As one of eleven sub-teams of Texas A&M’s AutoDrive team, the Lateral Control team is responsible for developing steering controls for the vehicle. In preparation for the competition, the team designed a controller that accepts way-point input from another sub-team and outputs a corresponding angle for the car’s steering wheel. The controller employs two methods in tandem, a ‘feedforward’ predictive model and a ‘feedback’ corrective algorithm to ensure that the vehicle maintains its position within the competition’s lanes and drives smoothly.

AutoDrive Challenge - Longitudinal Controls
Booth Number: C19
Sponsor: General Motors and SAE International | Dr. Alireza Talebpour
Faculty Advisor: Dr. Sivakumar Rathinam | Heather Lewis
Team Members: Austin Maxwell, Brianne Murray, Levi Bailey, Paco Falcon, Quang Le

Project Summary
The AutoDrive Challenge is a collegiate design competition, sponsored by General Motors and the Society of Automotive Engineers International, tasked students from 8 universities to modify a Chevy Bolt to drive autonomously. Texas A&M has subdivided the project across 60 students into 10 teams. Our team, the Longitudinal Control Team, focused on developing and implementing a throttle and braking control for the vehicle. Our final product was coded in C++ and uses desired velocity inputs to calculate and output the torque necessary to manipulate vehicle speed. The controller is both predictive and corrective. Gains and constants have been fine-tuned this semester to meet the desired maximum steady-state error.

AutoDrive Challenge - Safety Architecture
Booth Number: A17
Sponsor: General Motors and SAE International | Dr. Alireza Talebpour
Faculty Advisor: Dr. Swaminathan Gopalswamy | Dr. Waqar Mohiuddin
Team Members: Michael McClure, Lauren Carnahan, Reynaldo Chavez, Nicholas Hernandez, Grant Sheffield, Ben Swain

Project Summary
The AutoDrive Challenge is a three-year competition sponsored by General Motors and the Society of Automotive Engineers with the goal of producing a level four autonomous vehicle. Eight different universities across the U.S. are participating in the competition. At Texas A&M, there are about 50 members from three different majors collaborating on the project. The goal of the Safety Architecture team is to develop a comprehensive product architecture that accounts for the full functionality and safety of an autonomous vehicle. The Safety Architecture team has also developed requirements and test scenarios to ensure total functionality. The vehicle has been completed and will be competing in the year one competition as the “12th Unnamed” team in Yuma, AZ on April 30th, 2018.

Bray Smart Valve
Booth Number: E15/16
Sponsor: Bray International | Jim Schmidt
Faculty Advisor: Joshua Riefer
Team Members: Andrew Garza, Daniel Tan, James Henger, Emilio Taltique

Project Summary
Bray International has requested a smart valve system that can be added to their current valves. The system will measure the amount of vibration the valve experiences, and the torque required to open and shut it. From this data, the system will estimate the amount of wear on the valve and predict the remaining life. This information will be communicated to workers with an LED indicator on the valve and will also be accessible via a smartphone application. This will allow for companies to schedule shutdowns for maintenance and replacement, rather than perform costly visual inspections. This system should save the company money on inspections and improve worker safety by lowering the chance of a sudden failure.

BVCIL Bus Transporter Project
Booth Number: A15
Sponsor: Brazos Valley Center for Independent Living | Jacqueline Pacha, Ph.D.
Faculty Advisor: Heather Lewis
Team Members: Kaci Dove, Connor Taylor, Thomas Henger, Emilio Taltique

Project Summary
The Brazos Valley Center for Independent Living (BVCIL) was created in October 2010 to satisfy a great need serving individuals that required additional resources to pursue a more independent lifestyle when. BVCIL provides a variety of services including transportation to and from these service locations. In order to identify services and conduct interviews with their clients, BVCIL currently travels up to 100 miles round trip to pick up clients and bring them to their office in Bryan. The staff at BVCIL spend a great amount of time in transit and would like a more efficient way to provide these services while reducing transportation time. In order to satisfy this need, the BVCIL staff would like to redesign one of their current buses to function as a mobile office.

Danfoss Capstone: Gas Foil Bearing Test Rig
Booth Number: B19
Sponsor: Danfoss Turbocor | Aida Rezaei, Ph.D.
Faculty Advisor: Heather Lewis
Team Members: Christopher Rech, Kylie Nielson, Colton Brehm, Alec Wojcik, Dean Barbalias, Nicholas Manning

Project Summary
Gas foil bearings are a specific kind of bearing used in tandem with fast moving rotary components, such as turbomachinery equipment. Rather than resting on a low friction surface, such as with ball bearings, a journal in a gas foil bearing rests on a pocket of pressurized fluid, which reduce the friction experienced by the journal. Though gas foil bearings function well at high velocities, their performance is affected during start-up and slow-down processes when the fluid film has not developed. The bearing is subject to increased wear until it has achieved a lift-off velocity, when the journal no longer contacts the bearing. Understanding how a gas foil bearing is affected during these low velocity conditions would provide valuable information.

Design with Recyclable Plastic
Booth Number: B16
Sponsor: Department of Mechanical Engineering and Department of Architecture
Faculty Advisor: Joshua Riefer
Team Members: Lauren Rainey, Cameron Cooley, Caitlyn Eury, Brandon Swaim, Andrew Beltchev

Project Summary
Approximately 50 billion water bottles are used in the U.S., but only 12 billion are recycled. The remaining water bottles are left in landfills where they will never decompose. By recycling these water bottles, the plastic can be transformed into another usable form. The objective of this project is to design a portable system capable of transforming plastic bottles. A concept has been modeled that allows plastic bottles to be shredded, melted, and extruded into connectors. The connectors are then used to attach plastic bottles together to create a modular, dome-like structure that can be used as an interactive experience for children. To validate the design of the connectors and overall dome, 3-D printing was used.
Drive by Wire Golf Cart  
**Booth Number:** R16  
**Sponsor:** Department of Mechanical Engineering | Dr. Srikanth Saripalli  
**Faculty Advisor:** Joshua Riefer  
**Team Members:** John Garner Haflich, Ta Duong, José Durán, Mack Ragland, Brian Mahaffey, Steven VandenBrook  
**Project Summary**  
Dr. Saripalli is looking for a more cost-efficient and effective solution to convert a golf cart to “Drive by wire.” Drive by wire means a commanding computer can send electronic signals to replicate a driver’s inputs; steering, braking, and throttle. Our solution will replicate these inputs with a power steering motor, linear actuator, and digital to analog converter, respectively. Our solution has the advantages of being less expensive, modular, and easily installed. Our solution also maintains a high level of safety with features; such as, an intact hand brake, an emergency stop button, and a relief system for braking safety. Our solution can also be removed from a golf cart and manual control can be regained, if need be.

Early Phase Design of an Amine Gas Treating System  
**Booth Number:** C20  
**Sponsor:** Fluor | Adam Callarman  
**Faculty Advisor:** Dr. Waqar Mohiuddin  
**Team Members:** Jesus Maltos, Trenton Seely, Martin Cruz, Benjamin Lyon, Stephen Hirschbuehler  
**Project Summary**  
The team was sponsored by Fluor to develop an “early phase” design of an amine gas treating system. This gas sweetening system must remove Hydrogen Sulfide from an off-gas stream. The deliverable for this project was an on-paper design of the gas sweetening process, which includes exact specifications, sizing selection, and configuration of the main components. An economic analysis containing the cost estimate of the plant as well as the operational costs within a 6-year window was also included. This project was completed as joint project between senior design teams at Texas A&M University in College Station, Texas and Doha, Qatar.

Engineered to Fail: Test Specimen Design for Controlled Crack Development  
**Booth Number:** D19  
**Sponsor:** Electrical Power Research Institute | Dr. Craig Harrington  
**Faculty Advisor:** Joshua Riefer  
**Team Members:** Cullen Chovanec, Carson Crow, Robert Henderson, Michael Mateck, Ezra Hein, William Barr  
**Project Summary**  
The Electrical Power Research Institute (EPR) is a non-profit organization that needs a specimen which can be used to simulate leakage in dissimilar weld pipe joints found in nuclear power plant pressurized water reactors. The type of crack that forms in the joint is known as a primary water stress corrosion crack. Current methods used to study this type of crack are expensive and costly. The goal of this project is to take the first step toward creating a more efficient specimen design for studying these cracks. The deliverable is a thick-walled specimen which can be used to create an internally contained through-thickness fatigue crack.

HVAC Zoning  
**Booth Number:** D18  
**Sponsor:** Goodman Manufacturing Company, L.P. | Yuki Oji  
**Faculty Advisor:** Namita Anil Kumar  
**Team Members:** Christopher Kroupa, Joshua Barton, Larry Douthitt, Chen Yu Tsai, Sudikshya Bhandari  
**Project Summary**  
Creates a more comfortable atmosphere by eliminating hot or cold spots in a room. An infrared sensor coupled with a distance sensor mounted on a system of two servos that rotate in different directions to scan the whole room. The data from the scanning sensors are then passed to a computer to create a heat map showing all temperature gradients in the room and identifying areas that are hotter or colder than the rest of the room. The computer then determines which areas require focused temperature correction and sends that data to a microcontroller. The microcontroller uses the directional data provided by the computer to position louvers in the ventilation covers to direct temperature-controlled air from the HVAC system to the hot or cold spots.

Inclusive Golf Cart  
**Booth Number:** R15  
**Sponsor:** Department of Mechanical Engineering | Dr. Srikanth Saripalli  
**Faculty Advisor:** Namita Anil Kumar  
**Team Members:** David Bielefeld, Albert Ollre, Ryan Hall, Ian Legg, Jack Kirk  
**Project Summary**  
The purpose of this project is to alter an existing Polaris golf cart to make it accessible by those with disabilities. The main user group focused on the course of the project was those who are wheelchair-bound. To solve the problem at hand, a ramp was attached to the golf cart to increase accessibility. The America’s with Disabilities Act (ADA) was consulted and the guidelines outlined in this act were used as the baseline minimum requirements during the design phase. Additionally, the floor plan of the golf cart was altered to promote occupant interaction while maximizing space and comfort for all occupants.

Innovative Rainwater Collection, Storage and Distribution for Remote Villages  
**Booth Number:** A13  
**Sponsor:** Departments of Mechanical Engineering and Biological & Agricultural Engineering  
**Faculty Advisor:** Namita Anil Kumar  
**Team Members:** Veronica Krisley, Marisa Gras, Mauricio Gutierrez, David Henney, Brent Howard, Spencer McKee  
**Project Summary**  
Access to clean drinking water can be limited in the world’s remote villages, a number of which do not have electrical or plumbing systems. In order to help people in such areas, concrete cisterns have been constructed to store rainwater which drains off of the villagers’ roofs. Currently, this water must be manually pumped out of the cistern, and the water inside is not aerated, creating the potential for bacterial growth. The design team was tasked with making modifications to the current rainwater collection and filtration systems in remote Guatemalan villages. Additionally, the team designed a water distribution system which could be installed with the current cisterns.

IP68 Compliant Grid Analytics Housing Unit  
**Booth Number:** B14  
**Sponsor:** Sentient Energy | Mark Sloan  
**Faculty Advisor:** Namita Anil Kumar  
**Team Members:** Gabrielle Krzyzsiak, Pedro Riojas, Krystopher Terreri, Kaylee Kaigler, Marcell Harmati  
**Project Summary**  
The national power grid is comprised of a series of subsystems and checkpoints which monitor the instantaneous status of the power grid network. Sentient Energy, a leading player in power grid analytics, has sponsored the design of a mechanical housing for electrical components to be located in a subsystem checkpoint. This housing must ultimately function inside of a concrete underground utility vault and protect the internal electronics from harsh weather, salt fog, water, and other environmental conditions. Once customer needs were analyzed by the project team, concepts were generated and refined until a final concept was selected. This prototype has been tested for functionality to provide Sentient Energy with a means to protect their electronics from the vault environment.

Mad Taco - Mad Machine  
**Booth Number:** A20  
**Sponsor:** Madden’s Market Inc. DBA Mad Taco | Peter Madden  
**Faculty Advisor:** Dr. Swaminathan Gopalaswamy  
**Team Members:** Amy Truong, Gabriel Avila, Alexandra Zemlicka, Brianna Laza, Elaine Eberhardt, McKenzie Sweeney, Caitlin Carroll  
**Project Summary**  
Mad Taço, a local taco restaurant, recently opened a second location that requires a faster and more efficient method to shape and cook tortillas. The current process requires two workers where one rolls out the tortilla dough to the proper shape while another cooks the tortilla on an open-flame grill at rate of 250 tortillas per hour. Mad Taco has a unique tortilla recipe, known as “Tamale Bread,” which differs from traditional tortillas as it has an elastic consistency. The ultimate project goal to design and implement a compact, automated tortilla machine that could produce 500+ cooked tortillas per hour. The machine will be known as “Mad Machine.” The machine must be able to shape the tortillas to the correct size and thickness, as well as, cook both sides with an open flame.
Mechanical Modification of a CNC Lathe
Booth Number: B20
Sponsor: Tenaris | Oswald Hoyos
Faculty Advisor: Namita Anil Kumar
Team Members: Blake Wallace, Mauricio Palacios, Alyssa Wallace, Anthony deCardenas, Daniel Valle

Project Summary
Tenaris, a steel pipe manufacturer, uses CNC machines to cut threads into the ends of steel pipes. In this cutting process, helical strands of steel shavings get lodged inside and around the pipe workpiece, which are then removed by the operator by pausing production. To eliminate the issue of operator intervention and to preserve machine use time, the design team has developed a device and a process to automatically extract these shavings out of and away from the steel pipe. The presentation of this project includes the design methods that the team executed as well as the general features of the device itself.

Method for Forming Superconducting Radiofrequency Cavities
Booth Number: B18
Sponsor: Bailey Tool and Manufacturing | John Buttries
Faculty Advisor: Heather Lewis
Team Members: Anissa Kneese, Ryan Ayers, Robert Lipharm, Brittany Spivey, Nolan Payne, Christian Crowley

Project Summary
Superconducting radiofrequency (SRF) cavities store radiofrequency electromagnetic waves and are geometrically designed to match the resonant frequency wave shape. This in turn causes high intensity magnetic and electric fields to form. SRF cavities are commonly used in particle accelerators. The current method of manufacturing SRF cavities involves a costly multi-step process inducing excessive impurities within the metal. Bailey Tool & Manufacturing requires a manufacturing process that is more cost and time efficient than the existing mode of production. In response, the team has numerically modeled a forming process as well as created a physical prototype of an SRF cavity through rapid prototyping and investment casting applications.

Refrigerant Distribution System for CPU Cooling
Booth Number: D17
Sponsor: Dell EMC | Kevin Mundt and Robert Curtis
Faculty Advisor: Yasushi Mizuno
Team Members: Arcon Garcia, Thomas Addison-Smith, Ross Dusterhoft, Tristan Fletcher, William Holland, Jerod Smith, Guillermo Villalobos

Project Summary
Developing computer processors offer more power, but also generate more heat which must be cooled to avoid melting electronic components. Currently used air cooling methods will not be sufficient for future CPUs, and water cooling methods present the risk of electrical shortages. The goal of this project was to develop a refrigerant distribution system to cool several CPUs within a half server rack. R134a was routed to CPU mounted cold plates via copper tubing with a control system to vary the flow based on different heat loads. A pump was used instead of a compressor to increase system efficiency, and servers were attached and detached using quick connections for modularity during operation. This system can be scaled to meet the cooling needs of full sized server racks.

Remote Control Multivariate Water Analysis Craft
Booth Number: Right Boat Space
Sponsor: Nalco Champion | Victor Keasler
Faculty Advisor: Yasushi Mizuno
Team Members: Jessica Stephenson, Kaitlin Dwight, Ryan Harrington, Scott VonBorstel, Jeremy Tushnet, Ross Roberts

Project Summary
This project, sponsored by Nalco Champion, focuses on the oil field industry. Large pits of water are stored for drilling operations that over time will become unusable due to the process itself or contaminants from the environment. Knowing the quality of this water is crucial to make sure it can still be used. The current process of acquiring samples is inefficient, dangerous and unrepresentative of the whole pit. Our goal is to expedite this process and accuracy by designing a device capable of analyzing and collecting multiple water samples at various depths in real-time. This will provide a better understanding of the water’s overall consistency so that faster and more informed decisions can be made on how to best use the water for further application in industrial processes.

Research Reactor Safeguard Project
Booth Number: B17
Sponsor: Pacific Northwest National Laboratory | Dr. Jesse Johns
Faculty Advisor: Dr. Waqar Mohiuddin
Team Members: Gabriel Strong, Trevor Luckemeyer, Jonah Noureddine, Hudson Quesada, Reagan Foxley, Matthew Foley

Project Summary
The purpose of this project is to prevent nuclear proliferation. The Pacific Northwest National Laboratories has developed a technology, a hafnium tag, which can track the amount of run time each reactor has performed versus how much their operators say that the reactor has performed. We have been tasked with designing and manufacturing a container for this tag. Our container must be able to remain in the reactor for the lifetime of the reactor fuel. The device must detect whether or not someone has attempted to tamper with the tag in order to continue their proliferation operation without detection. The team has been working on a design for a simple system to attach the tag to the vicinity of the reactor core.

Sandia National Laboratories: Pressure and Acceleration Actuated Mechanical Switch
Booth Number: B13
Sponsor: Sandia National Laboratories | Jeffrey L Dohner, Ph.D.
Faculty Advisor: Dr. Swaminathan Gopalaswamy
Team Members: Troy Anora, Kyle Beuriot, Aaron DePaolo, Clayton Wittler, Grayson Woods, Jeffrey Zhao

Project Summary
Sandia National Laboratories has presented a need for a switch that physically actuates under the vacuum of space. This new mechanical switch is meant for the protection of critical circuits on a spacefaring vehicle. Since there are electronic components that should not be powered until the space vehicle reaches a safe distance from the surface, the switch must sense its pressure and acceleration environment conditions to actuate only once the vacuum of space and the rocket launch accelerations are detected. The switch will activate under the low-pressure environment of space, but not prior to that condition, as the device will be subjected to launch vibrations and routine handling.

Shredder for Recycling Plastics
Booth Number: D16
Sponsor: Shell | Darrel Canfield
Faculty Advisor: Dr. Tanil Ozkan | Namita Anil Kumar
Team Members: Joshua Vandervort, Jack Reagor, Bryan Zieren, Zane Rudd, Joseph Valencia

Project Summary
The design team aims to improve the economics and reduce the environmental impact of 3-D printing through plastic recycling. There are four steps to the local recycling process. This project focuses on the reduction of macrostructures into extrudable particulates. The team will develop a shredder type machine which will convert 3-D printed material of various shapes and sizes to 3mm diameter size or smaller. The device will help with sustainability and overhead cost reduction at the TAMU MEEN 3-D Printing Studio. The team aims to develop such a device to be energy efficient and cost effective, without compromising safety or functionality. The 3-D printing studio already possesses the other steps in the plastic recycling process, this would complete the recycling process.

Smart Harness System: The Future of Fall Protection
Booth Number: B11
Sponsor: Smart Harness Systems, LLC | David Dillon and Adam Laubach
Faculty Advisor: Yasushi Mizuno
Team Members: Anthony Kornegay, Jarrett Pawelek, Reynaldo Martinez, Anthony Kornegay, Emily Brown, Trevor Lubianski, Richard Hayden Meeks

Project Summary
Fall-related incidents are the leading cause of death and injury on worksites in the United States. A majority of these incidents are caused by workers failing to attach their harness to an anchor point while working at dangerous heights. To address this issue Smart Harness Systems, LLC has tasked our project team with creating a safety harness system that can audibly alert a harness-wearing worker and those around them when the worker is not safely attached to an anchor point. Through the use of various electronic sensors, our prototypes do just that. With the Smart Harness, we aim to save people’s lives by changing human behavior through increased accountability.
Swing Sleeve
Booth Number: C16
Sponsor: College of Engineering | Rodney Boehm
Faculty Advisor: Devesh Bhasin
Team Members: Ian Cash, Sarah Van Kalker, Mozheng Hu, Andres Crucetta, Cole Batsell, Han Hong

Project Summary
Golf is a sport that relies heavily on swing technique. The ability to properly swing the club can be the difference between a hole-in-one and a triple bogey. Due to the importance of swing form, many golf players find the need to utilize performance enhancing tools. Current solutions either restrict player movement, track only a few metrics, or are prohibitively expensive. The Swing Sleeve is a compression sleeve that can track the wearer’s arm position in real time. This allows for the mapping of a golfer’s swing in real time. By tracking the arm position and not just the club, the swing motion can be analyzed to tell the user what went wrong, where it went wrong, and how to fix it.

Team Igloo: Solar Powered Cooler and Radiation Test Chamber
Booth Number: E18
Sponsor: Igloo | Doug Hardesty
Faculty Advisor: Joshua Riefer
Team Members: Travis Henry, John Hesse, Irfan Beg, Camilo Torres, Scott Satterfield, Kaitlin Enyart, William Peltier

Project Summary
Ice chests have been fundamental forweekenders, athletes, and outdoor enthusiasts. While modern coolers can maintain temperatures of under 40°F for days at a time, one problem has hindered them from achieving maximum performance: the sun. Our project intends to change this. Our objective is to develop a device that uses the solar energy from the sun to cool the contents within, as well as a device that can test the performance of not only our cooler but of every cooler in sunny conditions. With this objective in mind, our team has been working on two different products to meet this need, the first of which is a solar powered cooler. The second product that is being designed is a test chamber that is capable of simulating the ambient heat and solar radiation experienced on a sunny day.

Test Fixture for Coefficient of Friction Determination
Booth Number: B15
Sponsor: Los Alamos National Laboratory | Dr. Lloyd Brown
Faculty Advisor: Namita Anil Kumar
Team Members: Haley Worsham, Willie Caraway, David Franklin, Abigail McElhenney, Angela Olinger, Trevor Reagor

Project Summary
The coefficient of friction between two materials is a value often approximated, especially between a diverse selection of materials. It is also dependent on ambient conditions, such as temperature and humidity. Although devices exist which measure the value of the coefficient for specific materials and conditions, a widely applicable test apparatus is yet to exist. Los Alamos National Laboratories (LANL) requested a device to solve this problem. The goal of this project is to improve upon a previous, somewhat problematic, design. Specifically, the customer needs include a 25% weight reduction from the previous design, improved sample alignment, greater precision in measuring motion, temperature, humidity, and force, reduced internal friction, and a 25% reduction in the time to assemble.

Texas A&M University Libraries Document Encapsulator Project
Booth Number: C17
Sponsor: Texas A&M University Libraries | Julie Mosbo
Faculty Advisor: Heather Lewis
Team Members: Jose Bendana, Connor Christian, Sheila Khodadad, Eric Santen, Alan Vicars

Project Summary
The Capstone Design team has been asked to develop an encapsulator system for the Texas A&M University Library system. The encapsulator will be required to provide effective and consistent seams onto sheets of polyethylene terephthalate (PET). The device will need to be easy to use and maintain and capable of operating for many hours at a time without interruption. The design concept entails a single-axis rail system that will drive the binding component of an ultrasonic welder in a straight line to seal the document. Ultrasonic welding converts electrical signals to mechanical energy to produce friction between the sheets of plastics and welding them together.

Torque and Tension Test Bed
Booth Number: D20
Sponsor: DrawWorks, LP | Matt Hickl
Faculty Advisor: Dr. Swaminathan Gopalaswamy
Team Members: Alex Bridges, Adam Huebner, Collin Haun, Michael Fox, Hogan Sauer

Project Summary
DrawWorks, LP, our team’s sponsor, designs, manufactures, tests, and sells casing/tubular running tools. These tools attach subsequent casing pipes with large torques and also run the casing string downhole. Our task was to improve the current method by which DrawWorks proof tests casing strings and their casing running tools used in oil/gas drilling. We were to design a test bed in SolidWorks that could simultaneously apply maximums of 4.5 million lb in tension and 200,000 ft-lb in torsion. This combined loading would more accurately simulate the applied loads during operation. By proving that the casing running tool could withstand these loads, it would improve the marketability of the tool. Other deliverables include a DAQ, controls system, and user manuals for all the components.

Utilization of Solar Cell Umbrellas to Provide Long-Term Photovoltaic Power on Mars
Booth Number: A11
Sponsor: NASA | Boeing
Faculty Advisor: Magdalini Lagoudas | Dr. Greg Chamitoff | Jim Mabe | Dr. Swaminathan Gopalaswamy
Team Members: Cole Frazier, Uday Toodi, Gabrielle Adams, Joshua Banks

Project Summary
In this report, a novel concept to employ a solar array on the surface of Mars in support of a manned mission will be detailed. This work has been inspired by NASA’s Breakthrough, Innovative, and Game-Changing (BIG) Idea Challenge, a competition designed to allow student led University teams to pursue creative avenues of design to solve some of the biggest engineering challenges posed by space exploration and settlement. We will present our proposed solar array design, the Applied Photovoltaic Power Array (APPA). APPA involves the deployment of four umbrella-like structures covered in flexible, thin film solar cells. These umbrellas will be installed on a rectangular lander with electromagnetically actuated booms that deploy the system autonomously.

V-Pump Flow Visualization Method Design and Computational Fluid Dynamics Analysis
Booth Number: A12
Sponsor: Veretek | Iain Belcher
Faculty Advisor: Dr. Waqar Mohiuddin
Team Members: Laura Umpleby, Daniel Brubaker, Nicholas Fionda, Mason McMillan, Fernando Vazquez

Project Summary
Veretek tasked our team with creating a Computational Fluid Dynamics (CFD) model and analysis of their V-pump technology. In addition, a flow visualization method was designed by the team to provide validation to the CFD model. The project has entailed designing and manufacturing a clear, visualization housing that was subject to testing at Veretek’s facilities. The testing results provided further validation to the CFD model created in ANSYS. With the model, several load cases were performed to provide a better understanding of the physics occurring inside the V-pump. The analysis provided engineers at Veretek with the data necessary to continue improving and understanding their technology.

Advanced Vapor Compressor Desalination (3D Modeling and Marketing Team)
Booth Number: F22
Sponsor: College of Engineering
Faculty Advisors: Dr. M. Holtzapple | Dr. M. El-Halwagi | Dr. P. Tsvetkov
Team Members: Hieu Nguyen, Drew Marks, Mouhamad Ahmad, Shubham Bhakta, Alvin Teh, Juan Carlos Burboa, Joshua Yutiamco, Mohammad Abbas, Kiersten Potter, Sara Mustafa, Cheng Zhu, Kyle Short, Noucha Tayefeh, Thomas Butterfield, Natalie Marshall

Project Summary
The Advanced Vapor Compressor Desalination (AVCD) project is so large, we split our group into three teams. Each team is composed of two sub-teams, each with a more specified objective. The 3-D Modeling Team is tasked with creating 3-D models and designing the AVCD system. These models include designs on heat exchangers, compressors,
piping, and much more. The goal of the Marketing Team is to market the AVCD system to drought prone areas in need of freshwater. Another goal of this team is to present our ideas and models to the Texas Water Development Board and other companies. The Marketing Team is also responsible for finding new regions and areas to market this technology to, and to find potential investors who can provide funding for a project of this scale.

Advanced Vapor Compressor Desalination (Desalination and Power Team)

Booth Number: E09

Sponsor: College of Engineering
Faculty Advisors: Dr. M. Holtzapple | Dr. M. El-Halwagi | Dr. P. Tsvetkov,
Team Members: Thomas Butterfield, Katya Cope, Sebastian Chutrau, Renzo Gonzales, Alexander Cruz, Jessica Leung, Will Lipscomb, Shan Sonthalia, Mouhanad Al-Rabbit, Phillip West, Renato Jhingree, Shreya Kedia

Project Summary

The Advanced Vapor Compressor Desalination (AVCD) is a project so large, we split our group into three teams. Each team is composed of two sub-teams, each with a more specified objective. The main purposes of the Desalination Team are to analyze the AVCD Report and make updates to the document where necessary. While the other five sub-teams have a specific part of the project, the Desalination Team focuses on the entire report. The AVCD can be powered by a variety of different energy sources. Examples of energy sources we are considering include, but are not limited to: solar power, waste heat, wind energy, and a diesel engine. The purpose of the Power Team is to gather information on different power sources and decide which method will be most effective in powering the AVCD.

Augmented Reality for the Rehabilitation of Stroke Patients

Booth Number: G13

Sponsor: College of Engineering
Faculty Advisor: Dr. Reza Langari
Team Members: David Ratliff, Brandon Anderson, Marco Ravelo, Mannan Mendiarratta

Project Summary

Stroke is a leading cause of disability around the globe. With increasing life expectancy, the incidence of stroke is expected to rise as well. This will place increasing strain on physical therapists and will result in expensive and inadequate treatment for stroke patients. To mitigate this problem, our team is developing part of a system to automate therapy, allowing a therapist to run sessions for many patients at once. Our project has two tasks: to offer a motivating environment to the patient during therapy, and to deliver feedback on patient progress to the therapist. To accomplish this, we are developing augmented-reality video games for the Hololens which integrate with therapy, as well as a web portal from which the therapist can monitor the session and view patient analytics.

Biomimetic Engineering of Venous Thrombosis

Booth Number: C13

Sponsor: College of Engineering
Faculty Advisor: Dr. Abhishek Jain
Team Members: Navaneeth Krishna Rajeeva Pandian, Pranav V Gadangi, Justin D Bui, Kendrick Lim, Zane A Ni, Jay-Paul Serrano, Carolina I Serrano

Project Summary

Clotting of blood in deep veins (deep vein thrombosis or DVT) is responsible for more than 100,000 deaths annually in the US. Due to their location, deep veins in humans are inaccessible for observing thrombosis or for testing the efficacy of drugs. On the other hand, animals do not present the same biological and physical complexity of DVT as humans. Therefore, there is a need to study DVT through engineered models. We present a 3-D printed prototype of a human vein which incorporates venous valves, pulsatile flow and cyclic mechanical strain that are key drivers of the DVT process. The prototype is built with a biocompatible material that will support lining it with vascular cells. This functional model of DVT is expected to discover new treatments for DVT not possible currently.

Bioprinted Organs on Chips

Booth Number: E22

Sponsor: College of Engineering
Faculty Advisor: Dr. Akhilesh Gaharwar

Project Summary

In order to engineer and manufacture better medicines, tissue evaluation ex vivo must be considered. Currently animal models are the standard, yet they fail to fully recapitulate the human physiology. As such, there is a need for ex vivo human-based models that could lead to new medicines approaches. We have developed this need into a bioprinted organ on chip model that holds potential for drug screening. Two separate bioinks have been developed and simultaneously printed in a unique spatial pattern. Upon maturation, cell-material and cell-cell interactions were monitored. It was found that upon deposition of bioinks, multiple cell types can cooperate in closing a gap when scratched. Overall these results are promising and can lead to a testing method development for new drug screenings.

Chemo-mechanical Characterization, Simulation, and 3-D Modeling of CO2-fluid Rock Interactions

Booth Number: E07

Sponsor: College of Engineering
Faculty Advisors: Dr. S. Abedi | Dr. A. Noshadaran
Team Members: Dharrish Paramasvaran, Ailda Zamani, Qusai Amer, Raysha Prawira, Thai Hoang Nguyen, Jincheng Li

Project Summary

This project is a multi-disciplinary venture addressing the Development of Carbon Sequestration Methods. It seeks to better understand the mechanisms involved in an efficient, safe and successful CCS program using experimental, computational, and statistical methods. Experimentally, we will develop a laboratory setting to expose various shale samples to CO2-brine under preset temperature and pressure conditions. We will then perform nano-indentation, FE-SEM, and ICP-MS to assess the CO2-induced effects on the rock mechanical properties and determine the changes in the brine chemical composition respectively. Computationally, we will utilize the experimental data to build statistically representative digital microstructure of different types of shales during different stages of CCS.

Concexture

Booth Number: G10

Sponsor: College of Engineering
Faculty Advisors: Dr. A. Srinivasa | Dr. A. Muliana | Dr. N. Kalantar | Dr. D. Sagapuram
Team Members: Ryan Obenhous, Nandan Shettigari, Sola Babatunde

Project Summary

We were tasked with creating a reusable concrete mold to create more aesthetically pleasing architectural structures and restore and renew urban infrastructure in a cost-effective way. To do this, we utilized an adjustable grid of balloons to achieve a general waveform and through further research created a grid of water bladders to achieve continuous curves in a multi-title structure. Through research of material science, plastics, and polymers, we developed a prototype capable of molding concrete into various shapes multiple times over. This will incorporate beauty and elegance into urban infrastructure.

Designing a Temporary Skin Smart Tattoo – A New Type of Biosensor

Booth Number: F23

Sponsor: College of Engineering
Faculty Advisor: Dr. Tracy Hammond
Team Members: Yuncheng Yu, Dustin Le, Halwagi | Dr. P. Tsvetkov,
**Project Summary**
Creating miniature technologies that are wearable and multifunctional beyond the traditional form of wearables has become a trend. Designing a next generation wearable device that is more affordable and distributable has been a fascinating and challenging topic in many diverse fields. This project attempts to print a fashionable biosensor on human skin and analyze the color change of the tattoo. The objective of this project is to design and inject a pH changeable solution into an inkjet-printer and print it on temporary tattoo paper to transfer on human skin. The color change potentially will alter due to the reactions between the pH solution and the fluids. Such a color change biosensor could lead to next generation wearable devices and enhance global health and healthcare.

**Developing a Setup to Mass Produce Nanofibers with Applications to Water Purification**
**Booth Number: D21**
Sponsor: College of Engineering
Faculty Advisor: Dr. M. Naraghi | Dr. M. Green
Team Members: Ian Tallerine, Kai Morikawa, Zainul Aebin Abbas, Reginald Frank, Colton White, Artisia Susanto, Byana Wyman, Razan Ghabin, Joshua Yu Tiamco, Navira Alifa, Logan Duran, Emily Nowlin, Gabriel Zolton

**Project Summary**
According to National Academy of Engineering, about 1 in 6 people living to day do not have adequate access to clean water. This is one of the 14 Grand Challenges for Engineering in the 21st Century. Our goal is to design and fabricate a process to make a cheap, portable system for water filtration. We will achieve this by combining two elements: 3-D printing and electrospinning. We will use 3-D printing to make a housing for the filters. Electrospinning will be used to fabricate the filters themselves. Electrospinning will allow us to make filters with nanofibers, which inherently have a high surface area, which makes them suitable to reject undesired materials. However, these filters will maintain a high degree of porosity to allow clean water to pass through.

**EcoMold**
**Booth Number: G09**
Sponsor: College of Engineering
Faculty Advisors: Dr. A. Srinivasa | Dr. A. Muliana | Dr. N. Kalantar | Dr. D. Sagapuram
Team Members: Lauren Meyers, Brian Muldoon, Zachary Poehler

**Project Summary**
Current construction procedures of curved building envelopes can use and waste over 100,000 molds due to the custom nature of each building panel. For this reason, the Flexiform EcoMold team is developing an environmentally friendly mold to significantly reduce the amount of wasted molds during construction procedures of building envelopes. The environmentally friendly mold, or ‘EcoMold’, uses high ductility elastomers with custom 3-D printed joints within the mold surface to provide an adjustable but strong mold surface. With every use of the EcoMold, a wasted mold from traditional construction techniques is eliminated, and manufacturing time is reduced due to the versatility of the adjustable mold.

**EEG Analysis for Performance Measurement and Intention Detection in Stroke Patients**
**Booth Number: E17**
Sponsor: College of Engineering
Faculty Advisor: Dr. Reza Langari
Team Members: Lya Nguyen, Brett Jackson, Charles Seaberg, Swati Iyer

**Project Summary**
Robotics based rehabilitation is emerging as a method of limb rehabilitation for patients with neurological disorders such as stroke. This will allow patients to have automated rehabilitation, reducing the need for constant supervision. For maximum recovery, patients need to be engaged and put maximum effort in performing prescribed exercises. In order for these devices to effectively help with patient recovery, patient’s effort and focus need to be quantified. These performance measures can be identified using electroencephalography (EEG) signals. In fact, artifacts within EEG signals are characterized by unique features that indicate different aspects of movement such as intention and focus. Our goal is to extract and analyze these features to provide quantitative performance measures.

**EMG Analysis in LabVIEW for Use in Exoskeleton Based Stroke Rehabilitation Therapy**
**Booth Number: G12**
Sponsor: College of Engineering
Faculty Advisor: Dr. Reza Langari
Team Members: Gabriella Adame, Connor Johnson, Ethan Vargas

**Project Summary**
As the population ages, there will be an increased number of stroke patients and an increased demand for stroke therapy. In order to deal with the demands that this will place on the healthcare system, a therapy solution is being developed that will utilize a computer-controlled exoskeleton arm, in place of conventional therapy techniques that will also include a virtual reality game to keep patients engaged. This team is using the Myo Armband sensors within the LabVIEW environment supplemented by C++ to develop code to analyze live EMG signal information to detect the initiation and termination of movement in the arm. This will be used with the exoskeleton so that it integrates the biology of the patient to the robotic arm to help guide, and not control, the patient during their therapy.

**Foot Wearable for Gaze-based Computer Interaction**
**Booth Number: F21**
Sponsor: College of Engineering
Faculty Advisor: Dr. Tracy Hammond
Team Members: Jeffrey Zhao, Amy Li

**Project Summary**
The goal of this project is to provide a seamless interface to replace the traditional mouse/keyboard combination. The main application is to allow those with motor disabilities to use their feet and eyes to interact with their computer, rather than hands. Furthermore, it is also possible to use this device as a multi-task enhancement. The device allows for multiple functions, such as click, double click, forward, and back. The prototype is able to perform approximately 2-3 clicks per second using intuitive foot commands. Furthermore, the device is fully rechargeable, with a battery life of approximately 10 hours. Finally, the prototype is wireless and fully compatible with any computer, without the use of any external program.

**HapticDive: Intuitive Warning System for Underwater Users**
**Booth Number: G06**
Faculty Advisor: Dr. Tracy Hammond
Team Members: Leslie Escalante, Sneha Santani

**Project Summary**
This research creates an application for smartphones with capable sensors that accurately measures depth and provides decompression sickness warning signals when used underwater. It will track of a diver's depth in relation to time passed underwater to pace a diver's ascent or descent from the surface so users avoid experiencing decompression sickness symptoms. Current research that uses the barometer sensor in smartphones is conducted largely above water. Divers can use dive computers to calculate their decompression ascent and descent automatically, however, their cost is not low, and casual users may often forego such equipment. The application aims to provide a cost-effective solution, and additional features, for surface supported divers, free divers, and general shallow water diving.

**HaptiGlove: An Intuitive System for Activity Recognition and Instant Feedback for Golfers**
**Booth Number: A16**
Sponsor: Sketch Recognition Laboratory
Faculty Advisor: Dr. Tracy Hammond
Team Members: Andres Crucetta Nieto, Sameer Keshti

**Project Summary**
The experiment we’re performing is important because it allows golfers to have their own personal hands-on trainer and improve their swinging technique. We plan to improve their swinging technique by leveraging a “Golf Glove” to track movement feedback and compare top performers with beginners to find what makes a “good” swing technique. We’re going to test this by using Arduino Sensors installed in the glove and evaluating the data through Machine Learning. From there the data will transported through Bluetooth to a mobile device, so the user can examine their results and appropriately fix their stroke mechanics.

**Improving Running Technique Using Activity Recognition**
**Booth Number: C10**
Sponsor College of Engineering
Faculty Advisor: Dr. Tracy Hammond
Team Members: Brittney Nelson, Wesley Till, Donald Beyetet, Polina Golikova, Lucas Carvalho

Daher, Akash Kundu
**Project Summary**

We are researching a device which tracks a person’s running efficiency. This device would also bring the knowledge of a professional coach to people at an affordable cost. If we use machine learning algorithms with multiple data sets of people running, then we could create a device that detects inefficiencies during a user’s run. We are solving the problem by researching efficient running techniques, so that we could readily compare and improve the user’s approach to running. We are starting by simply detecting what kind of stride the user has. This device will be finished once it can accurately analyze the user’s run and give feedback on how to improve their technique. Overall this solution could readily impact how society can improve on their running ability and style.

**KidGab as Hazards Education**

**Booth Number: G15**

Sponsor College of Engineering
Faculty Advisor: Dr. Tracy Hammond
Team Members: Adilah Amalia, Mariam Moeen, Yeonju Park, Daniella Edey

**Project Summary**

The KidGab Research Project entails planning and designing an application that will be interoperable in various interfaces. Its primary focus is to inform and educate teenagers about risks of natural hazards. The goal is to provide a platform that can help adolescents who experienced any possible. One of the main goals we are focusing on is to inform and educate teenagers about risk of natural hazards. We cope with the aftermath, and that can help adolescents who experienced any possible. One of the main goals we are focusing on is to inform and educate teenagers about risk of natural hazards. We cope with the aftermath, and that can help adolescents who experienced any possible. One of the main goals we are focusing on is to inform and educate teenagers about risk of natural hazards.

**NASA Supersonic ULI: Data Visualization of Flight Conditions**

**Booth Number: G08**

Sponsor: University Leadership Initiative
Faculty Advisors: Dr. D. Hartl | Dr. D. Lagoudas | Mr. J. Mabe
Team Members: Kevin Troy, Sanskruthi Priya Guduri, Giovanni La Fontaine, Callen Hajda

**Project Summary**

Our goal is to take relevant flight condition data from weather balloons across the United States, as well as population data of the United States, and use that data to create an interactive map of the United States that graphically shows Flight Conditions as a function of the Altitude above ground as well as population densities. The Goal of the Flight Conditions team is to have this interactive map be an accessible website made through Google Maps APIs. The interactive map could be implemented in the future to find the most efficient flight path for a supersonic aircraft such that there is no noise effects on the populations over which such aircraft may fly.

**NASA Supersonic ULI: Shape Memory Alloy Actuated Desktop Demonstrator**

**Booth Number: D26**

Sponsor: University Leadership Initiative
Faculty Advisors: Dr. D. Hartl | Dr. D. Lagoudas | Mr. J. Mabe
Team Members: Nicholas Manavi, Tanner Cooper, John Malanga, Daniel King, Brian Chien

**Project Summary**

Shape Memory Alloys (SMAs) are materials able to deform and recover their shape by varying temperature. They have the potential to make supersonic flight economically feasible by adjusting sections of the plane such as the wings and the empennage when flight conditions change in ways that are detrimental to low boom flight. Our team created a model that proves the mechanical utility of SMAs in the context of commercial supersonic aircraft. The model demonstrates three different methods whereby SMAs can be deformed to perform different tasks required by engineers within industry. All processes are user-controlled in the model, but they can be reconfigured to be autonomous, triggered by sensors that can detect disturbances around the plane while flying.

**NASA Supersonic ULI: Shape Memory Alloy Actuated Supersonic Wind Tunnel Model**

**Booth Number: D24**

Sponsor: University Leadership Initiative
Faculty Advisors: Dr. D. Hartl | Dr. D. Lagoudas | Mr. J. Mabe
Team Members: Zackery Murphy, Nicholas Eley, Jared Lilly, Prasun Dhawan, Henry Morgan

**Project Summary**

Overland supersonic flight has yet to become mainstream due to the loud sonic boom produced by shockwaves. To combat this issue, NASA selected a team of researchers as part of its five-year University Leadership Initiative (ULI). The Texas A&M University Leadership Initiative (ULI). The Texas A&M University Leadership Initiative (ULI).

**Point-of-Care Health Informatics for Proactive Epilepsy Seizure Alert**

**Booth Number: C12**

Sponsor: Department of Industrial & Systems Engineering
Faculty Advisors: Dr. Satish Bukkapatnam | Dr. S. Reddy
Team Members: Rohit Madhav, Sandesh Reddy, Kasra Ghadiri, Vasant Kurvari, Stefan Manoharan, Sagar Patel, McKenna Mitchell

**Project Summary**

Epilepsy, the manifestation of seizures in the brain, remains an uncured burden to millions worldwide. We have developed an affordable wearable device that aims to predict seizures minutes before they occur. The device is custom 3-D printed to exactly fit the head of each patient, improving electrode contact and device ergonomics. EEG readings are taken from electrodes near the temples and transmitted via Bluetooth to a smartphone. The EEG signals are subsequently relayed to an online server that processes seizure trends using a MATLAB-driven machine-learning algorithm. As buffered segments of EEG data are processed, seizure predictions are relayed to the smartphone. The phone app logs all seizure records and can automatically message or email emergency contacts, including clinicians.

**Power-aware High-Performance Computing Technologies in Addressing Real World Engineering Applications**

**Booth Number: G07**

Sponsor: Texas A&M Engineering Experiment Station and Texas A&M High Performance Research Computing
Faculty Advisor: Dr. Jian Tao
Team Members: Shaina Le, Sheldon Wei, Samra Tariq, Sean Dormiani, Isaac Fernandez Decastro, Michael Anthony Hagaman, Michael Kevin Lau, Mohammad Sagor, Alexander Ngo

**Project Summary**

Power usage has become a critical constraint in the design of modern processors. Building power aware computing systems via co-design is a promising approach to maximize the power-performance efficiency for next generation high-end computing systems as well as personal computers. The engineering practice and methods obtained in this project could potentially contribute to more power efficient devices everyone uses in the future. Our grand challenge tasks our team with co-designing hardware and software for real world engineering applications on a limited power budget. We aim to design and build a computer suitable for a given engineering application with up
to a 3000W power budget and optimize real world engineering applications in preparation for an international competition.

PTSDSocial: A social support system for Veterans diagnosed with PTSD
Booth Number: G14
Sponsor: College of Engineering
Faculty Advisor: Dr. Farzan Sasangohar
Team Members: Miha Bernat, Mike Choi, Benton Guess, Chinmay Phulse

Project Summary
Hundreds of thousands of veterans are returning home with both mental and physical afflictions affecting one’s ability to reintegrate into society. While there are support groups existing for PTSD patients, organizations such as the U.S. Veterans Affairs (VA) focus on treating these issues with clinical treatment first and foremost. To address this gap, we developed an application to allow veterans to communicate with each other through the use of a social platform. We anticipate that if adopted this application would give veterans a sense of solidarity and community when their current social lives may lack an easily accessible community that understands their unique issues and would support their reintegration into society.

Recovery of Potassium and Magnesium from Brine
Booth Number: E10
Sponsor: College of Engineering
Faculty Advisors: Dr. M. Holtzapple | Dr. M. El-Halwagi | Dr. P. Tsvetkov
Team Members: Irene Johnson, Cedar Marshall, Kevin Dang, Natalie Parr, Ben Jones, Irene Johnson, Adan Hernan, Rishi Vaze, Rini Maiti, Imna Melendez, Juan Roman-Pavajeau, Cheng Zhu, Thomas Butterfield

Project Summary
The Advanced Vapor Compressor Desalination (AVCD) is a project so large, we split our group into three teams. Each team is composed of two sub-teams, each with a more specified objective. The Potassium Team seeks to determine and recommend the best method for producing an economically viable form of potassium from brine. By isolating carnallite, a double salt which can be recovered from brine, both potassium chloride and magnesium chloride can be separated and processed to form various potassium salts and magnesium metal. The Magnesium Team seeks to produce magnesium metal through electrolysis of the isolated magnesium chloride. By analyzing the potential reduction in cost from self-sourcing the magnesium chloride, the economic viability of this process can be determined.

Rotary Jet Spun Polymer Fibers for Pediatric Hybrid Tracheal Graft
Booth Number: E19
Sponsor: College of Engineering
Faculty Advisors: Dr. Roland Kaunas | Dr. W. Hung
Team Members: Robert Reese, Rohit Bachani, Jeffrey Chen, Kaitlyn Davis, Brian DeSalme, Mohamed Harhash, Taylor Irish, Victor Montes, Oliva Moss, Sydney Nobles, Mason Sheffield, Brett Stanzione, Joanne Yoo

Project Summary
Pediatric tracheal stenosis is a rare birth defect (60-70 babies/year) that results in respiratory issues due to narrowing of the tracheal lumen. To facilitate the replacement of the stenotic region with a patch tracheal xenografts are often employed. Current xenografts are created from off the shelf products, which are not always easily customized. Instead of utilizing commercially available woven products we propose to generate a nonwoven fiber mesh using rotary jet spinning. Rotary jet spinning is a rapid fabrication technique that allows us to choose the composition and characteristics of the fibers within the mesh. By generating fiber meshes we can fabricate a mesh that is resorbable, improves tissue remodeling, and can accommodate tracheal flexion, extension, and axial deformation.

 Scalable Manufacturing of Electrospayed Microgels for Biological Research and Discovery
Booth Number: C11
Sponsor: College of Engineering
Faculty Advisor: Dr. Daniel Alge
Team Members: Faraz Jivan, Margo Hood, Hector Perez, Krishna Patel, Kyra Shine, Steven Cason, Marcus Barton, Reyes Toldeo

Project Summary
Tissue-mimetic microgels are of interest in biomaterials as their small form factor makes them useful vehicles for delivery of biologics. Ideally, microgels in large quantities can fill tissue defects and be potential alternatives to autologous transplantation. We improved upon our electrospaying device from last year by characterizing microrgel size under various instrument parameters, visually monitoring microrgel formation, and scaling-up batch synthesis and collection. Firstly, voltage and injection flow rates were varied to fabricate a range of microrgel sizes with moderate polydispersity. Secondly, a high-speed camera was used to monitor droplet generation and determine the electrospaying regime. Lastly, a continuous particle collection system was designed for improving scalability.

SpaceCRAFT
Booth Number: E13/14
Sponsor: Department of Aerospace Engineering
Faculty Advisor: Dr. Gregory Chamitoff

Project Summary
SpaceCRAFT is a new concept for collaborative space system and mission design. It is a Virtual Reality (VR) Sandbox environment designed to enable students, government and commercial entities to collaborate, design, evaluate and experience the technology for future operations in Space. SpaceCRAFT aims to enable any person or institution to contribute to humanity’s future in Space. At present, it is essentially impossible to test complete Space mission architectures in an integrated fashion, especially one with components designed and developed at different institutions worldwide. SpaceCRAFT provides the capability for system design and scenario-based operational testing of integrated mission concepts in the actual intended environment using detailed physics and engineering models in VR.
Superhydrophobic Sponges Coated with Functional Graphene Quantum Dots for Oil Spill Mitigation Under Variable Environmental Conditions

**Booth Number:** E21  
**Sponsor:** College of Engineering  
**Faculty Advisor:** Dr. Zhengdong Cheng  
**Team Members:** Arun Sabapathy, Janet Sajan, Adam Spencer, Ahmad Nimer, Ram Panda, Yoojin Kim, Audrey Munson, Gabriela Ramos, Christopher Resendez, Evan Situ, Cesar Vitas  
**Project Summary**  
In today’s society, there is an immense need for efficient cleanup and recovery of crude oil. Oil spills in ocean water have resulted in the loss of billions of dollars and in ocean pollution. Demulsifiers in industry for separating oil from water might be detrimental to ocean environments and small oil droplets are difficult to remove. Our proposed solution is to fabricate a superhydrophobic melamine sponge to separate oil from seawater. The reusable sponge is coated with hydrophobic graphene quantum dots and fluorine-silanes, making it possible for the sponge to absorb small oil droplets and prevent the passage of water. Our findings suggest that the functionalized sponges are environmentally friendly and cost-efficient with potential for widespread application in the oil industry.

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**Virtual-reality Enhanced Exoskeleton for Rehabilitation**

**Booth Number:** G11  
**Sponsor:** College of Engineering  
**Faculty Advisor:** Dr. Reza Langari  
**Team Members:** Jingyu Lu, Shreyas Choudhary, Nicholas Cashiola  
**Project Summary**  
The virtual reality game is designed to help aid the recovery of patients who survived a stroke. To do this, our team working on a system of devices: a local host computer, an exoskeleton, and a CompactRio (a processor for the use of input control). The local host computer will run the game environment using the Unity, while the exoskeleton is used as the ‘controller’ for the game with the CompactRio powering the robotics. Patients will be immersed in a 3-D environment, where they will learn how to perform daily tasks, such as making eggs, or games where they can rehabilitate their physical reaction times and coordination. Our goal is to couple the game environment with the exoskeleton device using C-Rio and Labview by operating the system with minimal delay, and robust game designs.

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**Unraveling the Physics of Host-Invasion with 3-D Printed Artificial Bacteria**

**Booth Number:** E24  
**Sponsor:** College of Engineering  
**Faculty Advisor:** Dr. Pushkar Lele  
**Team Members:** Jyot Antani, Hea Keoun Jeon, Logan Brabson, Brittany Efendy, Hannah Henderson, Tarek Dawarne, Imaad Vaid  
**Project Summary**  
Bacterial motility is a virulence factor that is involved in bacterial colonization and infections. Recent work suggests that cell morphology plays a crucial role in determining the effectiveness of motility in host invasion. However, the correlation between cell morphology and flagellated motility is difficult to establish accurately due to cell-cell variations in flagellar characteristics and cell lengths. To overcome these challenges, we have employed a novel approach that involves 3-D printing of artificial motile bacteria. We discuss the construction and testing of a battery-powered, cells that incorporate a tiny electric rotary motor. Experiments with these models are helping us develop insights into the evolutionary constraints that govern invasive bacterial behavior.

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**Design Competitions**

**Baja SAE**

**Booth Number:** Left Car Space  
**Sponsor:** General Motors  
**Faculty Advisor:** Dr. Srikanth Saripalli  
**Team Members:** Will Swain, Matthew Urdahl, Jeff Mcdaniel, Chris Fleming, Kyle Patrick, Patrick Cygan, Daniel Jensen, Daniel Calabrese, Brianna Johnson, Rachel Tucker, Austin Volling, Kevin Krenoberger, Addison Maupin, Jamie Flores, Jeremiah Chow, Mason Law, Justin Taylor, Cameron Blackmon, Luke Szrama, Jack Dbewerry, Hunter Hakala, Matthew Fisseler, Michael Bailey, William Spreen  
**Project Summary**  
The BAJA SAE team is a new initiative at Texas A&M University to get sophomores and juniors more hands on and design experience. The objective of the team is to build an off-road vehicle to compete in the BAJA SAE competitions held every summer around the country. This new team is staffed entirely by volunteers and is comprised of 25 sophomore and junior engineering students. The team will be testing this spring and going to competition in May. The team consists of 4 subteams. Powertrain, Suspension, Chasis, and Business team that handles the financial affairs of the organization. This is the inaugural year for the BAJA team and the team members have high hopes for a successful project.

**MARLIN – AUV**

**Booth Number:** E5/E6  
**Sponsor:** Department of Ocean Engineering, Deep Down Inc, Oceanengineering, SubCtech, IXBlue, Samantha, SES, VERIPROS | Dylan Blakeslee  
**Faculty Advisor:** Dr. Sharath Girimaji  
**Team Members:** Dylan Blakeslee, Nabil Moosajee, Sophia Estaban, Lance Lane, Jonathan Beechner  
**Project Summary**  
The BAJA team and the team members have high hopes for a successful project.
Project Summary
The Aggie Ocean Discovery Research Coalition is a multidisciplinary group of engineering student-led initiative aimed at further developing our understanding of the ocean. Thanks to the inspiration of the Shell Ocean Discovery XPRIZE® and the help of passionate partners around the world, we have been able to make strides towards advancing subsea research by creating new technology related to AI, ocean survey and metadata. While we started for the Shell XPRIZE®, we are excited to further develop our technology for the purpose of large scale open access research of the ocean for many years to come.

SAE Supermileage
Booth Number: F1 Car
Sponsor: Texas A&M Women in Engineering | Shawna Fletcher
Faculty Advisor: Dr. Timothy Jacobs
Team Members: Bailey Brawley, Ana Katarina Sweatt, Joanie Rosas, Alyssa Barth, Taylor Ritchie, Faith Gonzalez, Sophie Alderete, Aakriti Singh, Sophie Pervere, Kelly Krenek, Diana Fuentes, Haley Heftner, Kim Blankenhorn, Annette Alanis, Mercedes Lewis, Rudee Vasquez, Patricia Rodriguez, Gariel White

Project Summary
The Women in Engineering SAE Supermileage team is designing and manufacturing a single-person, highly fuel-efficient vehicle that focuses on a lightweight and aerodynamic chassis, a modified stock engine, and an effective electronic system. In June, the team will compete in the international SAE Supermileage competition that takes place in Marshall, Michigan. Throughout this process, members of the SAE Supermileage team learn valuable leadership and technical skills, while the hands-on approach to learning has led to higher retention rates of underclassmen women in engineering majors and valuable career opportunities for our team members.

Simple Water Distillation System
Booth Number: F28
Sponsor: Engineering World Health Organization
Faculty Advisor: Dr. Michael Moreno
Team Members: Joshua Holzhauser, Hector Garcia, Kendall Gibson, Evan Murray, Ashley Holt, Amanda Rakoski

Project Summary
This project designed to function as a low-budget autoclave for use in medical clinics in the developing world. It will use either a solar concentrator or simple electricity in a modified pressure cooker to heat and pressurize water. As a secondary function, this device can produce a modest amount of distilled water for medical use. Because the purpose of this project is to reduce the cost of autoclaving medical equipment and producing medical-safe water, the primary goal will be to design an easy-to-reuplicate and highly affordable autoclave/water distillation unit that requires minimal time to maintain.

Texas A&M SAE Aerospace Design
Booth Number: L17
Sponsor: Department of Aerospace Engineering
Faculty Advisor: Thomas Pollock
Team Members: Brian Muldoon, Sebastian Escobar, Chris Lokey, Collin Haun, Robert Baldwin, Trevor Blair, Britton Bowlin, Jonathan Chiu, Michael Cormann, Joseph El-Ashtkar, Jacob Evans, Kanika Gakhar, Hugo Giordano, David Gordon, Lane Kirstein, Terrence Matelski, Dakota Medley, Anton Oelmann, Jorge Sanchez, Brett Winters

Project Summary
The Texas A&M SAE Aerospace design team has developed a high lift and low Reynolds number remote control aircraft to efficiently carry payload under competition constraints. The team comprises multiple case studies in structural design, stability and control, aerodynamics, avionics, and business administration in order to more efficiently design an aircraft. With a wing span of 12 feet, the team is capable of lifting a gross aircraft weight of 46.5 pounds consistently, which equates to a 3.5 to 1 payload to structure weight ratio. The team competes in a global design competition each year where a technical design report, oral presentation and competition flights determine the outcome.

Texas A&M Sounding Rocketry Team
Booth Number: E12
Sponsor: Department of Aerospace Engineering
Faculty Advisor: Dr. Adonios Karpetis
Team Members: Jacob Pasket, Alan Aguilar Jaramillo, Ross Alexander, Jacob Doll, Jacob Caesar, Tripp Illingworth, Victoria Wright, Armando Gonzalez-Fechter, Daniel Guo, Roshan Doddanavar, Eric Swingy, Andrew Smith, William Young, Silverio Canchola, McKenna Roberts, Colton Finke, Millie Kriel, Angel Castrellon

Project Summary
The Texas A&M University Sounding Rocketry Team (SRT) is a student-run organization dedicated to developing its members' technical & professional skills through the design, analysis, manufacturing, and testing of hybrid rocket systems. Each year, the team's mission is to prepare a hybrid rocket to compete in the Intercollegiate Rocket Engineering Competition (iREC) hosted by the Experimental Sounding Rocket Association (ESRA) at Spaceport America in New Mexico. Our current project and 2018 competition vehicle, Theseus, is powered by our newly refined engine, Nova. Nova has the capability of producing over 900 pounds of thrust, propelling Theseus to altitudes in excess of 25,000 feet.

VEXU Robotics- In the Zone
Booth Number: E11
Sponsor: Texas A&M Women in Engineering & Viasat | Danisha Sturr
Faculty Advisor: Shawna Fletcher

Project Summary
WE-VEXU-TAMU is a Women in Engineering all women VEX Robotics team. Beginning in Fall 2015 as a grassroots team with a lot of spirit, we continue strong in 2017-2018 with upwards 20 members with a majority of Freshman and Sophomores and some Juniors and Seniors and a broad range of Engineering disciplines. Each subteam (mechanical and programming) works and coordinates their respective responsibilities to create and prepare the robot for competition. These responsibilities include the physical construction and maintenance of the robot, and the programming subteam handles the electrical responsibilities such as wiring it as well as the programming of the robot's microcontrollers. Meetings are recorded and logged by respective team historians and can be seen below.

Women in Engineering - Autonomous Underwater Vehicle
Booth Number: Left Boat Space
Faculty Advisor: Shawna Fletcher
Team Members: Rose Quance-Fitch, Abishalini Sivaraman, Alexa Aleman, Anh Thuy Pham, Baylee Voigt, Brenda Lopez, Casey Childs, Elaine Wood, Grace Westerman, Hannah Hutton, Indah Rahmadina, Jamie Smith, Kattien Frierson, Kara Davis, Karen Mares, Kathryn Bickley, Laura Austin, Leah Murff, Lina Zhang, Marissa Cotton, Megan Gallagher, Miranda Chun, Natalie Lerm, Nicole Khoury, Pauline Davila, Priya Patel, Sarah Macias, Sharon Pearnpaln, Shawn Hinkle, Stephanie Frand

Project Summary
An Autonomous Underwater Vehicle (AUV) is being designed and fabricated to compete in the AUVSI Foundation International Robosub Competition. This research project is divided into three subdivisions: Electrical, Mechanical, and Programming. The electrical subdivision entails the power efficient design of the overall electrical system of the AUV while the programming subdivision requires the smart interfacing of sensors with the electrical system. The mechanical components include the small form factor design of the frame and hull, smart waterproofing of various sensors and cables, and ensuring the entire structure is watertight.

Digital Entrepreneurship - D&D
Booth Number: F09
Sponsor: Department of Computer Science & Engineering
Faculty Advisor: Dr. Bruce Gooch | Dr. Paula deWitte
Team Members: Robert Fowler, Brian Maule, Brandon Edge

Project Summary
Dungeons & Dragons is an incredibly popular tabletop game that challenges the imagination and brings friends together in a social experience that is completely unique. Playing D&D is an exercise in collaborative creation where you and your friends build skills of critical thinking, teamwork, and creative problem-solving, but more than that, it gives you and your friends a way to make something new that cannot be found anywhere else. Our team provides a tool for Dungeon Masters, those who facilitate the
game and build the world as the rest of group explores and encounters it. This tool compiles pools of characteristics of people (appearances, moods, behaviors) and unique situations (locations, atmospheres, monsters) to help users generate and brainstorm new ideas for their own story.

**Digital Entrepreneurship - Free Food App (Breadsticks)**
**Booth Number:** F11  
**Sponsor:** Department of Computer Science & Engineering  
**Faculty Advisor:** Dr. Bruce Gooch | Dr. Paula deWitte  
**Team Members:** Ruben Gomez, Sam Agabi, Ander Moron, Wasiq Siddiqui

**Project Summary**  
As many people know, in an effort to entice students, many organizations, school events, and companies provide free food. They want you to attend, but somehow the information gets lost or forgotten in emails, flyers, or in the stack of the dishes that never leave the sink. Now with the Breadstick app, students can be notified in the morning of all the free food, sent reminders for free food events they've saved, and alerted if they are in a proximity of free food (Pokémon?!). Organizations can use this app to post about food that will be provided, and what the meeting will be about. With this app, we hope to help students get more involved with campus organizations, feed hungry students, and minimize food wastage.

**Digital Entrepreneurship - HealthEaze**
**Booth Number:** F16  
**Sponsor:** Department of Computer Science & Engineering  
**Faculty Advisor:** Dr. Bruce Gooch | Dr. Paula deWitte  
**Team Members:** Michael McKenna, Dylan Barnes, Rachel Kellam, Patrick Kitchens

**Project Summary**  
The healthcare industry is still using antiquated paper systems. Additionally, there isn’t a unified system that different hospitals keep their EHR, as we are always filling out paperwork for stuff I have already filled out. With HealthEaze patients will be able to check-in at a hospital with the push of a button on their phone. If they have already created a HealthEaze account on their phone, they can automatically check-in once they enter a hospital. If they do not have an account, they will have to fill out the paperwork once - and only once. From there, admins will be responsible for inputting this information into the system and associated with the patient.

**Digital Entrepreneurship - IndieAux**
**Booth Number:** F12  
**Sponsor:** Department of Computer Science & Engineering  
**Faculty Advisor:** Dr. Bruce Gooch | Dr. Paula deWitte  
**Team Members:** Benjamin Reed, Clifton Sims, Brady Skuzu, Benjamin D’Antonio

**Project Summary**  
Music streaming services are overcrowded with tracks competing for plays. On Apple Music, over 45 million exist. Unfortunately, music discovery relies on word-of-mouth, social media, human curation, or recommendation algorithms. No incentives exist for most listeners to explore unknown artists without referrals. These independent and unsigned artists find it particularly challenging to find an audience and to become profitable. IndieAux is a music streaming service designed to reward listeners for exploring up-and-coming artists. With a constant refresh of talent, no artist lives on IndieAux indefinitely. IndieAux aims to be the pedestal, elevating the undiscovered. Our mission is to build relationships as artists progress and to foster a love for finding music.

**Digital Entrepreneurship - ProjectBOT**
**Booth Number:** F31  
**Sponsor:** Department of Computer Science & Engineering  
**Faculty Advisor:** Dr. Bruce Gooch | Dr. Paula deWitte  
**Team Members:** Neal Patel, Steve Parsons, Mitesh Patel

**Project Summary**  
ProjectBOT is an organizational tool for the GroupMe chat application, designed to keep track and provide access to: TODO lists, deadlines, and important links amid the high volume of communication messages such projects ensue. Primarily aimed at college and high school students undertaking large team-based class projects that require communication and coordination among remote members, ProjectBOT eliminates the need for many organizational third-party applications and automates managerial administration responsibilities by providing an all-in-one solution within the group's main method of communication.

**Digital Entrepreneurship - ShortReads**
**Booth Number:** F17  
**Sponsor:** Department of Computer Science & Engineering  
**Faculty Advisor:** Dr. Bruce Gooch | Dr. Paula deWitte  
**Team Members:** Matthew Reeves, Clayton Wells, Shazain Ali, Collier Watkins

**Project Summary**  
Plenty of people out there like to read but lack the time and/or money to seek out new reading material. They may also want to avoid committing to the hefty novels from mainstream book subscription boxes. ShortReads solves these pain points by offering short, high-quality stories delivered on either a monthly or bi-weekly basis. The real seller here is the price: ShortReads would be by-far the cheapest book subscription box available ($1 - $5/month), relying on a large target market segment to make up for the low profit per customer. Business can be conducted without a real storefront, and ShortReads will never have an issue with surplus inventory because we know exactly how many books will need to ship each cycle. This eliminates a lot of overhead and make for an easily adaptable company.

**Digital Entrepreneurship - StudyCatch**
**Booth Number:** F33  
**Sponsor:** Department of Computer Science & Engineering  
**Faculty Advisor:** Dr. Bruce Gooch | Dr. Paula deWitte  
**Team Members:** Michael Allred, Richard Santillian, Yahir Bravo

**Project Summary**  
Study Catch is an application that makes students study more by catching them in the act of trying to goof off and instead forcing them to study. Study Catch is a mobile based app that when first opens ask for the user to put in study questions/a review. Based on the review/questions inputted the user would have to answer a randomly picked question to unlock their phone. So basically, whenever the user turns his phone off then tries to get back on it they would type in your password then Study Catch would catch the user from goofing off and ask you one of their review/study questions in order to proceed with using their phone.

**Hailfire Bot (TURTLE Robotics)**
**Booth Number:** F26  
**Sponsor:** Department of Mechanical Engineering  
**Faculty Advisor:** Dr. Pilwon Hur  
**Team Members:** Jacob Sacco, Kevin Troy, Vamsi Gadapolu, Benjamin Wong, Praneeth Nagula, Mazen Ali, Ahmad Jawad

**Project Summary**  
The Hailfire Bot is a project aimed at building an autonomous multicopter completely from scratch. The frame consists of machined aluminum and 3-D printed plastic parts, the control board is prototyping board with a general-purpose microcontroller and all the necessary modules soldered to it, and the embedded code uses no external libraries for control or stabilization. The final goal of the project is to have the drone be capable of maintaining its position and attitude stably in mid-air and follow high level instructions from the user. We are doing this project not for any build competition or class, but rather as an exercise in solving each of the engineering challenges specific to each facet of the project, and in integrating all the elements together to create a working product.

**INSPIRES- Emerson Compact Prover Redesign**
**Booth Number:** F25  
**Sponsor:** Emerson Electric  
**Faculty Advisor:** Ms. Magdalini Lagoudas  
**Team Members:** Samuel Blair, Ky Duyen Cao, Sophia Lin, Zach Duhon, Joshua Tiamco, Hea Keoun (Edward) Jeon, Rodolfo Ruiz, Sola Babatunde, Roehsa Nigos

**Project Summary**  
A prover is an automated system that provides on-site calibration to ensure flow meters in service for fiscal and custody transfer applications maintain sustainable measurement performance as well as remain in compliance with industry standards. This project is focused on reviewing the current Daniel Compact Prover design and making design recommendations for improving several subsystems, including the flow tube, piston, input/output port orientation, and...
hydraulics subsystems. The team will present conceptual designs supported by engineering analysis data.

**INSPIRES- Industrial Shape Memory Alloy Actuator Alignment System**

**Booth Number:** F32  
**Sponsor:** Boeing  
**Faculty Advisor:** Mr. James Mabe | Ms. Magdalini Lagoudas  
**Team Members:** Kevin Troy, Jeffrey Young, Alyssa De Guzman, Irfan Beg, Russell Mendoza, Coleman Hoff  
**Project Summary**  
Shape Memory Alloys (SMAs) are special metal alloys that can change shapes to a set geometry when heated or cooled. This process, caused by an ausenitic to martensitic phase change, can generate very large forces. This project investigates the application of curved SMA actuators to advanced manufacturing. The SMA actuators allow for a lightweight system that is capable of precise movement of very large loads. The goal of this project is to demonstrate the feasibility and capability of nickel titanium alloy actuators to be used for the alignment of very large and heavy parts during manufacturing.

**INSPIRES - Texas A&M Shell Eco-Marathon**

**Booth Number:** F29  
**Sponsor:** Shell | SWRI  
**Faculty Advisor:** Ms. Magdalini Lagoudas | Dr. Pete Hamilton  
**Team Members:** Arundhati Ajithkumar Pillai, Haibib Colmenero, Ziad Wardeh, Alexis Coley, Vishal Modi, Aya Owida, Darla Deckard, Jeremy Ponniah, Dolapo Awe  
**Project Summary**  
In order to begin addressing design ideas for the chassis, frame, and external design of the car, research was done involving the previous year competitors in the Shell-Eco Marathon competition. This was done through the Shell database involving the competition. Data such as team name, fuel type, mileage and pictures of the car designs were obtained and analyzed. From this data, general design components were researched for the car chassis in terms of structural components such as axles, roll bars, suspension and other components. The criteria for these components involved was attainability, cost, material and design fit. With the list of components required, the aerodynamics of a car design was researched and analyzed, and sketches/models of the ideas were tabulated for later comparison.

**Lazarus Specialty Ammunition**

**Booth Number:** F27  
**Faculty Advisor:** Jim Donnell  
**Team Members:** Elise Hackney, Ben Omonira  
**Project Summary**  
The ability to adjust, limit or innovate deadly force in our country has been a sensitive but burning need over the past decade. In today's world there is a lack of options that provide some degree of ethical satisfaction when neutralizing a suspected threat. To provide another option, our project aims to develop ammunition that enables first responders, who intend to neutralize a threat, by minimizing fatality and maintaining stopping power comparable to small caliber ammunition. Our intentions are to provide another option of deadly force through projectiles that are destructive yet compatible with living tissue. The scope of this project is to identify the necessity and feasibility of projectiles that restrict lethal blood loss.

**MEEN 210 - Cooling Backpack Attachment**

**Booth Number:** F10  
**Sponsor:** Department of Mechanical Engineering  
**Faculty Advisor:** Ms. Heather Lewis  
**Team Members:** Natalie Collins, Katherine Lewis  
**Project Summary**  
While going to college in the south, the weather often includes sunshine and humidity on a daily basis. Many days are spent rushing to class to feel the cool air conditioning once inside a building. However, the cooling backpack attachment is designed to keep students cool on the warm walk to classes. It is a re-freezable attachment that is adjustable for various sizes of backpacks and students. While sitting comfortably on a students’ back, the flexible ice packs provide cooling temperatures. The attachment also creates extra room for air flow to the students' back once it is snapped into place.

**MEEN 210 - Modular Phone Case**

**Booth Number:** F13  
**Sponsor:** Department of Mechanical Engineering  
**Faculty Advisor:** Dr. Waqar Mohiuddin  
**Team Members:** Jack Stason, William Spreen  
**Project Summary**  
We will be designing and creating a 3-D printed phone case with the capacity for headphone storage and a compartment for credit cards/cash. This will be done by taking a blank phone case that can be adapted to any model phone and adding modular components to it. The actual case will consist of a phone case with a detachable money clip and an extension underneath to wrap the cord from a pair of headphones. On the back of the case there will be a clamp to hold the headphones in place for when they are not in use. The money clip, once detached, will also double as a stand for the phone when viewing media.

**MEEN 210 - USB Dock**

**Booth Number:** G17  
**Sponsor:** Department of Mechanical Engineering  
**Faculty Advisor:** Dr. Seyed Mostafa  
**Team Members:** Shy Gupta, Andrew Horn  
**Project Summary**  
Every day, students use USB flash drives for printing, downloading, and sharing files. USB's store precious information on a small footprint. However, USBs are often lost. A solution is needed that is both cheaper than the USB (less than $5), does not require dismounting, and comparable in size to a USB. The USB Dock aims for that. The USB Dock is a compact housing where the USB is stored and alerts the user if the USB is forgotten. When the user removes their USB drive from the housing, a timer starts counting down. If the USB is not returned within time, the USB Dock promptly begins flashing an LED and buzzing until the USB is replaced or the device is shut down. The user can choose a timing sequence from 2.5 to 20 minutes in 2.5-minute increments.

**UAS Deployed Robot for First Responders**

**Booth Number:** F30  
**Sponsor:** NASA-JSC Robotic Systems Technology Branch | Lucien Junkin  
**Team Members:** Ethan Reed and Ryan Stockton  
**Project Summary**  
The SideSaw robot was designed to cut into the top of suspect vehicles, such as box trucks and inspect them for Vehicle-Borne Improvised Explosive Devices (VBIEDs). During its development the Houston Fire Department gained interest in the project for the vertical ventilation of burning homes leading to a flame-resistant version of the robot. The SideSaw robot weighs under 10 pounds allowing it to be deployed from a safe distance by an array of commercially available, low-cost drones. This robot allows first responders to accomplish tasks that previously required a human to risk their life completing. This project was sponsored by the NASA-JSC Robotic Systems Technology Branch and the Combating Terrorism Technical Support Office.

**Whiteboard Plotter (TURTLE Robotics)**

**Booth Number:** F14  
**Sponsor:** Department of Mechanical Engineering  
**Faculty Advisor:** Dr. Pilwon Hur  
**Team Members:** Blake Karwowski, Aaron Whitehead, Ryan Alli, Dusten Smith, Kyle Degonge, William Duncan  
**Project Summary**  
Our board consists of two main parts. The first part is a software script (run on a user's computer) that takes the input of a raster image and decomposes it into a series of drawable line segments, then sends this to the board. The second is the board itself, which takes this input and plots each line segment using stepper motors to control the X and Y axes. The system we created is modular, and the device can be picked up and mounted on any classroom whiteboard surface. The electronics consist of a raspberry pi with a stepper HAT to control two servos and a servomotor. The pi accepts commands via a server and can plot arbitrary shapes.

**ENGR 112 - Teams 1 thru 14**

**Booth Number:** F1,2,3,4,5,6,7,8 & F34,35,36,37,38,39,40  
**Sponsor:** College of Engineering  
**Faculty Advisor:** Various First Year Faculty Team Members: See separate handout  
**Project Summary**  
ENGR 112 is the second semester freshman-engineering course required for all engineering students. About 500 freshman-engineering teams have participated in a class project and the top teams were selected by their faculty to present at this year's Showcase.
2019 ENGINEERING PROJECT SHOWCASE

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The Showcase will feature more than 200 team projects representing the work of 1,000+ engineering students from across all engineering majors. These projects include departmental capstone design projects, vertically integrated team projects, design competitions, and select freshman projects.

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