



2019

SDSU COLLEGE OF ENGINEERING

DESIGN DAY

Montezuma Hall

Conrad Prebys Aztec Student Union

May 8, 2019 / 1:30-4:00PM

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WELCOME



Welcome to the College of Engineering's Spring 2019 Design Day at the Conrad Prebys Aztec Student Union, Montezuma Hall. We are proud to have our undergraduate students showcasing their design project work completed during the 2018-19 Academic Year. There are teams representing our Senior Design classes in Aerospace Engineering, Civil, Construction & Environmental Engineering, Electrical & Computer Engineering, and Mechanical Engineering.

Please join me in congratulating our student teams on their innovative design projects which represent the culmination of the technical knowledge they have developed during their time at San Diego State University's College of Engineering. These projects provide the students with real-world experience that involve design constraints, budgets, reviews, and deadlines. Through these projects our students learn to apply and develop their critical thinking skills, recognize human and societal needs, and design novel, sustainable engineering solutions.

We are grateful to our many sponsors for their generous support of these student projects. Our sponsors include: Ametek, ASML, County of San Diego, Delane Engineering, Michael Baker International, and Northrop Grumman. Many of these sponsors are integrally involved with the student design teams and serve as mentors to the teams. This provides meaningful projects of value, and instills a professional orientation in the student teams. We appreciate all of our sponsors and their support for the student teams.

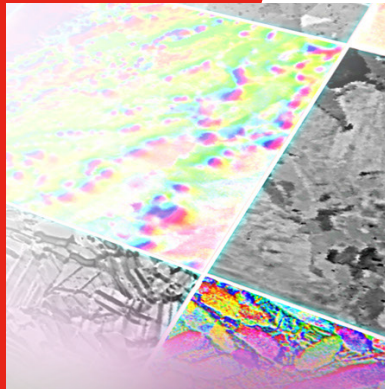
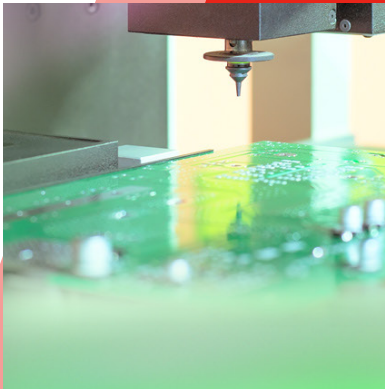
Enjoy SDSU's Spring 2019 College of Engineering Design Day. Thank you for being a part of this important event.

Eugene Olevsky, Ph.D.
Dean
College of Engineering

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THANK YOU TO OUR SPONSORS



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- Mike Reidy • SDSU Aerospace Engineering Department • SDSU Rocket Project
- SDSU Santa Margarita Ecological Reserve • SDSU Student Success Fee • Michael Sloan
- West Coast Civil • Paul Wield • Dr. Bob Wolff • Dr. Kevin Wood



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for our Students**

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Contact: Kate Carinder, SDSU College of Engineering
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Campanile Foundation Tax ID: 33-0868418
<http://campaign.sdsu.edu/engineeringfund>

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AutoTech - Fully Autonomous, Self-Guided Car
Battery Boss - Moisture Controlled Automated Irrigation System
BiSense - Virtual Reality Glove
D.E.S.K. - Home Network Security Manager
Edge Inferencing Solutions (E.I.S.) - Plastic Material Identification Device (P.M.I.D.)
Full Send - Smart Home for the Elderly (SHE)
Goodfellas - Speed-E
Hy-Wire Designs - Radiation Detection Vehicle
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Montezuma Mobility - Montezuma Mobility's Electric Drive Prototype
Parking Buddy - Parking Buddy
Project Spacetrip - Analog Synthesizer
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ROB - Rescue Operation Bot ROB
SAR Bumble Bees - SAR Bumble Bees
SiMonN - Sports Impact Monitoring Network
SMARTDog - SMARTDog
SolMAN - Solar Mobile Analyzer
Speak - Speech Pathologist Toy
Spectra VI - 6GHz Cognitive Radio
Synthesthesia - Synthesthesia
Team Anti-Drone - Design a motion detection turret for the purposes of deterring Unmanned Aircraft
Team CEMT - Smart RPG
Team Georgia - KGB Shoes
Team Hydra - Hydra
TesseDyn - Stackable Modular Inverter
True Color - Color Analyzer
The Watcher - Antenna Tracking System
Zenith - Triton

MECHANICAL ENGINEERING

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Archimedes' Crew - Emergency Communication Drone
Aztecs Airlines - 3D Printed Aircraft
BiomeCANical Engineers - Motorized Stability Brace for Stroke Patients
Camel Crew - Beetle 007 Plant Seeding Robot
Codename S.E.A.L. - Adaptive Surfboard System for a Disabled Veteran
Cymer Bois - Material Buildup Simulator for an Extreme Ultraviolet (EUV) Light Source Exhaust
The Fire Analysts - Pneumatic System for Flame Ignition and Nanomaterial Sampling

MECHANICAL ENGINEERING (CONT...)

Fire n' Ice - Emissivity Testing Chamber
Grab and Go - ASME Student Design Competition Robot for "The Pick-and-Place Race"
Montezuma's Aircraft - 3D Printed Aircraft
Off the Hooke - Material Containment System for Manufacturing Applications
Plastic Pirates - Floating Robot for Eliminating Ocean Debris
Ruff n' Teff Engineers - Miriti Alpha - Ethiopian Teff Harvester
The Salty Crew - Floating Robot for Eliminating Ocean Debris
SDSU Atlatl - 3D Printed Aircraft
SDSU Brewing Waste E.D. - Brewery Wastewater Treatment System
Simple Solutions - Piano Auto Tuner
Steering the Future - Aztec Electric Racing Steering System
The Supercritical Six - Miniature Pressure Vessel for Carbon Dioxide Sequestration
Supreme Engineers - Custom Fit Mechanical Prosthetic
SurfacePros - Cold Spray Deposition System
Team Baja CVT - Aztec Baja SAE Racing Continuously Variable Transmission
Team Buoyah! - Sonobuoy Deployment System for Vertical Takeoff and Landing Vertical Tactical Unmanned Aerial Vehicles
Team Rocket - Liquid Rocket Engine Injector Testing Apparatus
Team Volt-Swaggen - Aztec Electric Racing Energy Storage System
Team Zamboni - Wheelchair to Ice Hockey Sled Loading System for a Disabled Veteran
Too Hot To Handle - Isolating Thermal Blanket for Composites Repair Applications
Traffic Assassins - Personal Flight Vertical Takeoff and Landing Drone
Under-Arm - Mechatronics Autonomous Manipulator
Wheelchair Warriors - Motorcycle Wheelchair Carrier for a Disabled Veteran

Dynamic Avionic Systems

MEMBERS: Aziel Blanco, Jason Centanni, Pedro Chavarria, Nasry Jawaad, Jemper Marvin, Austen Thompson
 ADVISOR: Jeremy Nelson - Faculty Lecturer, SDSU Aerospace Engineering

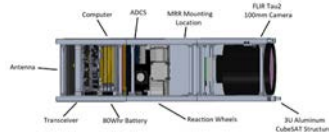


DAS one

Fighter jet with two missions, one is a ferry mission and one is a combat mission.

Fire Watch CubeSat

MEMBERS: Jewar Doski, Stephan Paessler, Karl Parks, Ewald Polifrone, Schon Siguenza
 ADVISOR: Dr. Ahmad Bani Younes, Assistant Professor, SDSU Aerospace Engineering



Fire Watch CubeSat

Fire Watch is a 3U cube satellite that is designed to monitor California's countryside for wildfire outbreaks. This will be accomplished by using an infrared sensor that scans for thermal abnormalities and relays the information to fire authorities. Fire Watch utilizes a high speed asymmetric laser communication system to rapidly relay data to ground stations, as well as a redundant RF antenna system to send and receive mission commands.

Instant Mapping Atmospheric Probe

MEMBERS: Matt Darrow, Jennifer Martin, Jaymee Panian, Claire Pray, Eric Ralls, Levi Schlapfer
 ADVISOR: Dr. Ahmad Bani Younes, Assistant Professor, SDSU Aerospace Engineering



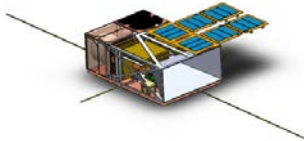
Instant Mapping Atmospheric Probe (IMAP)

Atmospheric composition levels of foreign planets and moons have previously been understood through Earth-based observations. However, their environments and atmospheres are constantly changing. In order to gather specific information of an extraterrestrial atmosphere, Elevated Celestial Technologies is in the development process of a CubeSat system designed to characterize the atmosphere of any celestial body.

Project SPAMS

MEMBERS: Jesus Arellano, Daniel Hillis, Phong Huynh, Claire Quento, Kyl Stanfield, Mike Stromecki

ADVISOR: Dr. Ahmad Bani Younes, Assistant Professor, SDSU Aerospace Engineering



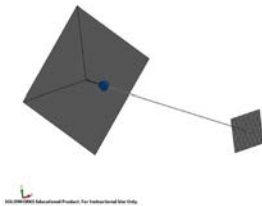
Project SPAMS

Project SPAMS is a Space Propulsive Atmospheric Measurement Satellite that was designed to measure the concentration of several gases of Earth's atmosphere at a low earth orbit for the purpose of detecting change in atmospheric concentrations around the planet. The satellite is a 6U CubeSat that has a mission designed to last several years at an altitude of 300km. SPAMS is developing a flight model to demonstrate the mission design concept including the structural and attitude determination control systems.

Solar Sailors

MEMBERS: Victor Amaya, Nathan Dolan, Dalton Fletcher, Adrian Juarez, Francisco Magana, Matthew Morgan

ADVISOR: Dr. Ahmad Bani Younes, Assistant Professor, SDSU Aerospace Engineering



DARSat

Debris Acceleration and Reentry Satellite (DARSat) will accelerate the orbital decay of space debris that pose a risk to current and future space missions. After being launched, the satellite will rendezvous with the intended piece of debris and deploy its deorbit sail. The sail increases the profile of the satellite allowing increased atmospheric drag to deorbit the vehicle. The satellite will remain permanently with the debris until both drop low enough to be destroyed upon reentry by frictional heating.

Team-FlyWright

MEMBERS: Joshua Hunt, Manolo Laguna, David Nguyen, Michael Walker, Rodrigo Zamora

ADVISOR: Jeremy Nelson - Northrop Grumman



TX-2 Fledgling

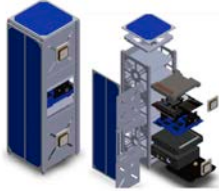
The TX-2 Fledgling is designed to be the US Air Force's next premier trainer for advanced undergraduate pilot training replacing the T-38 Talon. Equipped with 150 square inch Large Area Displays, and the latest avionics suite, this aircraft is designed to train and prepare America's up and coming fighter pilots for the 21st century and beyond.

WaveSat

MEMBERS: Lonsdale Adeoye, Matthew Beranek, Matthew Jones, Colin McCaskill, William Winsby

ADVISOR: Dr. Ahmad Bani Younes, Assistant Professor, SDSU Aerospace Engineering

SPONSOR: SDSU Aerospace Engineering Department



Wave Height Monitoring Using a CubeSat Satellite

Using our own 3U CubeSat, WaveSat will use GPS satellites orbiting the Earth to perform readings of the ocean's surface using GNSS-R (Global Navigation Satellite System Reflectometry), our CubeSat will have two signals to pick up: a direct signal from a GPS satellite and an Earth-reflected signal from that same GPS satellite. The CubeSat will receive these two signals on any of its four GPS receiving antennas, then measure the difference in signal strength. The On Board Computer will determine wave height.

Aztec Design and Construction (ADC)

MEMBERS: David Downs, David Espley, Katie Frankie, Aidan Langtry, Thomas Lanphear, Cody Rokosz, Katharine Stewart

ADVISOR: Jim Haughey, PE - Michael Baker International, Nensi Lakrori - San Diego State University

SPONSOR: County of San Diego



Ramona Intergenerational Community Center (RICC)

The County of San Diego is seeking Design-Build Entities qualified to design and construct the Ramona Intergenerational Community Center (RICC). The project is to construct a new Live Well Center, Gymnasium, Cafe, Community Plaza, Skatepark, an expanded and new parking lot in Ramona, California.

Blackat Engineering

MEMBERS: Ali Fakhrriddine, Bailey Fuimaono, Lorelay Mendoza, Chelsi Pascua, Kennadi Prince, Anita Sanchez, Thomas Whickham

ADVISORS: John Prince, PE - Delane Engineering, Jim Haughey, PE - Michael Baker International

SPONSORS: San Diego Water County Authority, Mission Trails Regional Park



SDCWA Mission Trails Regional Park

The San Diego County Water Authority is proposing new pipelines, flow control facility, and flow regulatory structure along with a new overflow facility near the Mission Trails trail head. Our team has been tasked with designing and calculating the hydraulics, maintaining water quality levels, detailing the cost estimates, designing the site logistics and construction access, determining structural design and assessment of new and existing facilities, and ensuring the project is LEED compliant.

BTS

MEMBERS: Cole Benson, Michael Sohikish, Justin Sornberger, Nicholas Steffenino, Scott Troncone, Pierre Tumpach

ADVISOR: KPFF



Solar Carport

The design of a solar panel array on top of parking lot structure 4 that will provide sustainable energy for San Diego State University.

Coast Align

MEMBERS: Lyndsey Becotte, Daniel Jabasa, Ha-Eun Mary Kim, Eden Romero-Zavala, Steffani Seiler, Michaela Wood
ADVISORS: James R. Haughey, PE - Michael Baker, John Prince, PE - Delane Group



Chula Vista Fire Station 5

The City of Chula Vista has identified areas where fire protection coverage is lacking and is in need of a new fire station. One site that has been chosen is south of Orange Avenue between 3rd and 4th Street, adjacent to the South Chula Vista Library. The project will include building a fire station on a lot that is currently a public dog park and a portion of the library parking lot.

Coastal Design Development

MEMBERS: Morteza Farahani, Kevin Galindo, Marcus Kellogg, Jason Ritchey, Saul Tello
ADVISORS: James Haughey, PE - Michael Baker International, John Prince, PE - Delane Engineering



Ramona Intergenerational Community Center (RICC)

The Ramona Intergenerational Community Center project is one that offers exercises from each of the multiple disciplines on our team. Water, Sewer, and Storm Water drainage designs tie in with grading, parking requirements, traffic impact studies and site layout design. Structural calculations and design of multiple buildings go hand in hand with construction phasing, scheduling and materials costing.

ENVI AZ Engineering

MEMBERS: Ian Bernados, Vermina Chao, Zoë Orandle, Norma Ramirez, Edgar Ruiz, Andrea Weckle
ADVISORS: Pedro Orso Delgado - Under Construction Consulting, James Haughey, PE - Michael Baker International, Nensi Lakrori - SDSU, Tim Smith - SDSU, County of San Diego



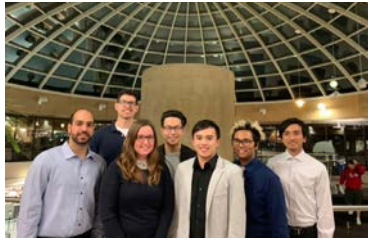
County Live Well Campus Redevelopment with an Emphasis on Sustainability

ENVI AZ Engineering has been hired to redevelop the County Live Well Campus located at 3851 Rosecrans Street, San Diego, California. A new 220,000 square-foot, multi-story building for up to 800 staff and patrons as well as new parking will be included. Additionally, 3-acres will be set aside for a separate future affordable housing development. Our personal goal is to make this site as sustainable as possible by incorporating LEED Gold standards and on-site stormwater and graywater treatment and reuse.

Flow Patrol, Inc.

MEMBERS: Amadeus Mozart Agatep, Gabriel Gallardo, Siyang Gu, Sean Joseph Marque, Cara Skinner, Andre Vejar, Sean Youssefi

ADVISORS: Colin Kemper – San Diego County Water Authority, Troy Matsura – Jacobs Engineering, Sean McCarty – West Coast Civil



Mission Trails Flow Regulatory Structure II and Flow Control Facility

Flow Patrol, Inc. was tasked with the design of new water pipelines, an underground storage reservoir, and a flow control facility. The goal of this project is to meet future increased demand from the City of San Diego and Sweetwater Authority. For this project, Flow Patrol Inc. has analyzed the hydraulics to meet flow and storage requirements, the structure of the pipeline tunnel and storage structure, and the impacts of construction.

High Klass Consulting

MEMBERS: Jordan Cain, Jake Dani, Christian Jones, Cordlan Maszk, Luke Tabor, Calvin Yeh-Tinetti

ADVISOR: Jim Haughey, PE - Michael Baker International



Brown Property/Hollister Bridge - Tijuana River Rehabilitation

The County of San Diego (County) is seeking Design-Build Entities (D-BE) qualified to design and construct removal of unclassified fill material on the Brown Property and reconstruct the existing Hollister Bridge over the Tijuana River. The project will include grading design to remove fill material placed on the Brown Property and a hydraulic analysis of the effects of the grading effort on the Tijuana River. The project will also include the removal and replacement of the Hollister Bridge over the Tijuana River.

Hong Kong Engineering

MEMBERS: Daniel Barragan, Bradford Bolton, Nino Enriquez, Alexander Griswold, Huy Nguyen, Andreas Rahm, Fernando Romero

ADVISOR: James R. Haughey, PE - Michael Baker International



Ramona Intergenerational Community Center (RICC)

The RICC project consists of designing a community center in the County of San Diego at the intersection of 13th and Main Street in Ramona. The community center will have a new live well center, gymnasium, and cafe buildings. Furthermore, a community plaza, skatepark, and an expansion of an existing parking lot are to be constructed. The scope of work ranges from design of civil site & utility, stormwater drainage, traffic control modifications, structural, geotechnical & foundation, to construction.

JoVo's Engineering Design Industries

MEMBERS: Leamarie Diaz, Cheyenne Graves, Michael Mascarenhas, Guillermo Munoz, Sherin Sonny, Joseph Tawn, Jonathan Vo

ADVISORS: Live Well San Diego, County of San Diego



County Live Well Campus - Rosecrans St and Pacific Highway

Potential project plans that redevelops land that currently contains the Human and Health Service Agency Office of Vital Records into a 220,000 square foot multi-story building and associated parking structure for its employees and patients.

KASTLD Engineering

MEMBERS: Kingston De Laurentis, Tessa Lim, Alex Martens, Tam Nguyen, Sindos Nuhaily, Leandro Serron, Donovan Stacy

ADVISORS: James Haughey, PE - Michael Baker International, John Prince, PE - Delane Engineering



Ramona Intergenerational Community Center (RICC)

The County of San Diego (County) is seeking Design-Build Entities (D-BE) qualified to design and construct the Ramona Intergenerational Community Center (RICC). The project is to construct a new Live Well Center, Gymnasium, Café, Community Plaza, Skatepark, an expanded parking lot (Parking Lot A) and a new parking lot (Parking Lot B).

LAR Construction

MEMBERS: Ashley Lopez, Raeid Malatani, Luis Martinez

ADVISOR: John Prince, PE - Delane Engineering

SPONSORS: SDSU SAGE PROJECT, SDSU Santa Margarita Ecological Reserve



Santa Margarita Ecological Reserve Visitor Center

The Santa Margarita Ecological Reserve (SMER) & the Sky Oak Field Station are two of the four large reserves managed by the field stations program (FSP) at San Diego State University (SDSU). SDSU is looking to build a visitors center 60 miles north of the main campus between Temecula & Fallbrook. The 4,344 acre reserve along the 5 mile reach of Santa Margarita river is one of the longest protected coastal rivers in Southern California. The main goal is to enhance the land in order to use it for research & education.

MERGE

MEMBERS: Mohammad Alabad, Ali Alajmi, Mosab Alenezi, Naser Alfaraj, Ahmad Bierkdar, Jasem Murad

ADVISOR: Kyle Schellenger, KPFF



SDSU Parking Structure 4 Photovoltaic (PV) Solar Carport Structure

San Diego State University is looking to become more of a leader in renewable energy and has been looking to install a steel carport over the roof deck of Parking Structure 4. The University is seeking assistance to determine the best and most cost-effective solution. Parking Structure 4 is centrally located on the campus just north of Viejas Arena.

One Engineering

MEMBERS: Jasem Alateeqi, Dalal Albastaki, Khaled Aljeri, Ali Alnassar, Ali Alroomi, Hoor Alsilahi

ADVISOR: John Prince, PE - Delane Engineering



Chula Vista Fire Station 5

The fire station is going to be created due to the lack of fire protection coverage in the City of Chula Vista. The site is located on Orange Avenue adjacent to the South Chula Vista Library. The station will be a total of 12,000-sf including one or two stories accommodating three large apparatus bays, eight dorms, four offices, two bathrooms, and a kitchen.

Stanton & Blatch

MEMBERS: Haocheng Chen, Waleed Eskandarani, Kaitlyn Kirkup, Elona Odisho, Natalie Rios, Gilberto Torres, Alison Vargas

ADVISOR: John Prince, PE - Delane Engineering



Chula Vista Fire Station 5

Stanton & Blatch has designed the traffic details, water resources, environmental engineering and site development while taking into account the sustainability of the project as a whole.

Synergy

MEMBERS: Khaleel Abdulsattar, Anas Alhaddad, Reem Alhamad, Tareq Alhasmi, Abdulmohsen Alrashed, Anwer Ibriheem, Hasan Mohammad

ADVISOR: John Prince, PE - Delane Engineering

SPONSORS: Kyle Schellenger & Shaun Walters - KPFF



SDSU Solar Carport

We will be designing the structure of the solar panel that will be located on Parking Structure 4 at San Diego State University.

Very Good Engineering

MEMBERS: Drake Cornelisz, Olivia Gonsman, Hannah Mahfood, Amy Pawlowski, Christian Santos, Theodore Tseu, Hailey Tyson

ADVISOR: County of San Diego



County Live Well Campus

Very Good Engineering was given the task to design the County Live Well Campus. The new County Live Well Campus will include a 220,000 square-foot, Zero Net Energy building that has multiple stories. The building will hold a maximum of 800 persons at once, including staff and visitors, therefore a minimum of 800 parking stalls are required in surface lots or structural parking on site as well. Additionally, three of the 7.1 acres on the lot will be privately developed into affordable housing. Many specialties are involved to guarantee the project's success.

Visionary Viaduct Engineering

MEMBERS: Eric Argamaso, Edward Esguerra, Kenneth Gervacio, Ricardo Ibarra, Daniel Olague, Bryan Ramirez, Justin Sojourner

ADVISORS: County of San Diego, James Haughey, PE - Michael Baker International

SPONSOR: County of San Diego



Brown Property/Hollister Bridge - Tijuana River Rehabilitation

We were tasked to design and construct removal of unclassified fill material on the Brown Property and reconstruct the existing Hollister Bridge over the Tijuana River. Tasks included: Geotechnical investigation, hydraulic analysis using HEC-RAS, multiple plan drawings for both grading site and bridge, foundation and bridge structural design and analysis, and a multitude of construction plans and documents. The local businesses and entities were also contacted about their opinion on the project and its possible impacts.

WTR Incorporated

MEMBERS: Hessah AlBoloushi, Abdulaziz Alshatti, Mireille Garcia, Natalie Hernandez, Michelle Laurendine, Casandra Leach
MiLinda Salas

ADVISOR: Professor Tim Smith - San Diego State University

SPONSORS: Colin Kemper - San Diego County Water Authority, Troy Matsura - Jacobs Engineering, Sean McCarty -
West Coast Civil



San Diego County Water Authority Mission Trails Flow Regulatory Structure II and Flow Control Facility

The San Diego County Water Authority (SDCWA) delivers raw and treated water to 24 member agencies in San Diego County and owns and maintains hundreds of miles of large diameter pipelines, reservoirs, and treatment plants. The primary objective of this project is to provide additional regulatory storage and improved flow control and capacity at the Mission Trails site for raw water in response to future increased demands from water treatment plants in the south county area.

AgroGate

MEMBERS: David Aguilar, Marlin Badra, Ostin Flores, Chad Hill, Karim Ortiz, Elias Sibane, Bao Vo

ADVISORS: Dr. Santosh Nagaraj - Associate Professor, SDSU ECE, Dr. Sridhar Seshagiri - Associate Professor, SDSU ECE



Smart Irrigation System

Team AgroGate has developed a moisture-sensing smart irrigation system to minimize water waste by maximizing the efficiency of residential watering schedules. A capacitive moisture sensor is used to sense and transmit moisture readings to a base station connected to the sprinkler system controller. The base station utilizes readings from the sensors to modify the watering days and duration for each zone to provide the minimum amount of water needed to maintain a green yard.

Audio Guys

MEMBERS: Christian Adam, Scott Breier, Robert Fuelle, Steven Humes, Josue Moreno

ADVISOR: Ken Arnold - SDSU ECE



Guitar Multi-effects Pedal

We have designed a multi-effects pedal for guitar players to change their sound with a foot switchable device. There are digital (i.e. delay, reverb, etc.) as well as an analog overdrive effect with a screen to display the information.

AutoTech

MEMBERS: Adam Jabar, Michael Habeeb, Mubarak Aldossary, Nawaf Alkathiri, Yousif Razooqi, Yousif Yaldo

ADVISOR: Dr. Sanguoon Chung



Fully Autonomous, Self-Guided Car

AutoTech is passionate about the future and revolutionary tech cars. Our plan is to design an autonomous RC-size vehicle. The vehicle will be equipped with an ultrasonic sensor and a top-mounted camera to help achieve its mission. The top-mounted camera will assist with lane keep as well as detecting traffic lights and/or stop signs. The ultrasonic sensor will help the vehicle to stop driving while it senses any type of obstacles as it is moving forward. The vehicle will be turned on/off using a wireless communication system and will include a manual switch to overwrite any wireless communication issues.

Battery Boss

MEMBERS: Darwin Tindan, Allen Yost, Marc Lapid

ADVISOR: Dr. Chris Mi, Department Chair & Professor, SDSU ECE Department



Moisture Controlled Automated Irrigation System

Battery monitoring system (BMS) plays an important role in maintaining safe operating levels of lithium batteries. Our goal is to design a battery management system for a battery powered electric bicycle that will prolong the longevity of its battery cells.

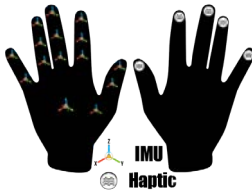
BiSense

MEMBERS: Abdulaziz Almuzairee, Faris Asfour, Kevin Belew, Yafet Bitwoded, Chenxi Chu, Jonathon Juarez, Riker Quintana, Justin Wagoner, Suleyman Yusupov

ADVISOR: Scott Amack

SPONSOR: SDSU Student Success Fee

WEBSITE: <https://www.bisense.org/>



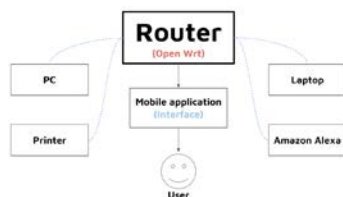
Virtual Reality Glove

A glove that allows a user to experience VR in an all new way. Sensors all over the glove allow for precise movement tracking within a virtual environment. Haptic modules at the finger tips provide the user with immediate feedback to what they are touching.

D.E.S.K.

MEMBERS: Steven Evert, Kian Maranon, Eric Romo, Dominick Sahagun

ADVISOR: Scott Amack

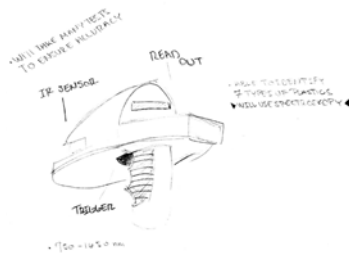


Home Network Security Manager

A home network monitor, management system, and security helper that makes it easy to get information and control your home network.

Edge Inferencing Solutions (E.I.S.)

MEMBERS: Michael Aragon, Jerrol De Vega, Matthew Farazi, Dean Hess, Llendel Reyes, Jonathan Tran
 ADVISOR: Dr. Christopher Paolini, Assistant Professor, SDSU ECE Department
 WEBSITE: <https://gargbagemeninc.wordpress.com/>



Plastic Material Identification Device (P.M.I.D.)

The Plastic Material Identification Device (PMID) will assist people who sort plastics by utilizing handheld infrared sensors, a camera, and insitu machine learning to detect which of the 7 types of plastic is being scanned. The goal of this project is to enhance efficiency and reduce the risk of contaminating a batch of recyclables at a recycling plant by allowing recycle sorters to scan and easily identify whether or not an unfamiliar plastic is recyclable.

Full Send

MEMBERS: Luke Grantham, Kenny Huynh, Zoran Khoshnaw, Daniel Waugh
 ADVISOR: Dr. Chris Mi, Department Chair & Professor, SDSU ECE



Smart Home for the Elderly (SHE)

Many smart home devices and systems exist, but they are hard to setup and use. These smart homes are controllable only from a smartphone or pc which many elderly people do not own or know how to use. Full home smart systems exist, but are unaffordable to many consumers. Our goal is to create a simple, cheap, and easy to set up smart home targeted specifically for elderly people who have not grasped an understanding of modern technology.

Goodfellas

MEMBERS: Mahrlo Amposta, Adam Cruz, Mark Ewest, Son Pham, Mayra Pulido, Christian Rizzo, Ernesto Rodriguez
 ADVISOR: Dr. Saeed Manshadi, Assistant Professor, SDSU ECE
 WEBSITE: <https://goodfellas15.github.io/>



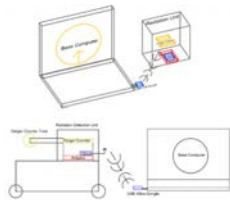
Speed-E

A real-time traffic density sensor that tells its user whether a road has low, medium, or high amounts of traffic. Our target audience is emergency responders who find it difficult to navigate through high traffic conditions in attempts to reach their destination.

Hy-Wire Designs

MEMBERS: Omar Al Jedani, Faisal Al Qarni, Jessica Ansorge, Eric Lewandowski, Romeel Saleef

ADVISOR: Dr. Sanguoon Chung



Radiation Detection Vehicle

The goal of this project is to design an autonomous vehicle equipped with a Geiger counter with the purpose of gathering ionizing radiation data while being remotely controlled by a user. The data will be streamed wirelessly back to a user terminal for data visualization. This prototype design has the advantage of accessing areas within a nuclear facility without exposing the radiation safety staff and medical physicists to ionizing radiation.

Könröl

MEMBERS: Nasser Alobaid, Matthew Kim, Andrew Kutzler, Dong Liang, Jack Tran, Phu Tran

ADVISOR: Dr. Ke Huang - Assistant Professor, SDSU ECE Department

SPONSOR: IEEE San Diego & PCBGOGO



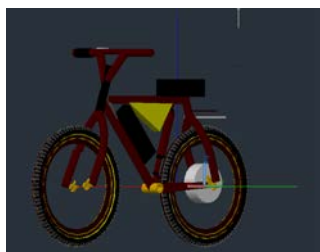
Smart Outlet

A set of smart outlets that use the Xbee wireless module to communicate through a mesh network and RFID technologies to identify any appliance that's plugged in. Once a device is plugged in and identified, the smart outlet will then track its' electrical consumption. In case of abnormal behavior the outlet will automatically shut off the device. Thank you to IEEE and PCBGOGO for making this project possible.

Montezuma Mobility

MEMBERS: William Chhit, Alex Dermitt, Kyle Gherardi, Ryan Joralemon, Fadee Kannah, Jeff Onners, Erick Ramirez, Bryan Zepeda

ADVISOR: Professor Ken Arnold - SDSU ECE



Montezuma Mobility's Electric Drive Prototype

For the 2018-19 Senior Design track, 8 students have come together to produce an electric vehicle that fulfills the standard known as MM20/20: Montezuma Mobility will build an approachable, functioning electric bicycle that has a minimum range of 20 miles and can reach 20 miles per hour. Student designs emphasized the creation of a motor controller and accompanying inverter, safety shutdown circuit, power distribution system, rider interface, and companion app, all integrated onto a bicycle. Let's go for a ride!

Parking Buddy

MEMBERS: Travis Aubrey, Chanel Bernarte, Rodrigo Bondoc, Ariane Buenaobra, Christopher Crum, Stevenson Dang, Alex Grove, Sean Paz

ADVISORS: Hassan Moradi, Shawn Healey



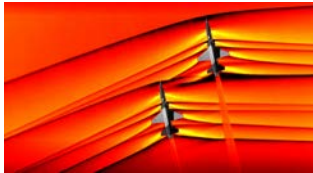
Parking Buddy

The Parking Buddy team has an overall objective of solving one of the bigger issues on campus: parking. With thousands of students attending the campus, parking becomes a hassle and time consumed on finding parking negatively impacts the students. As a result, Parking Buddy aims to make parking easier by monitoring the density of available parking via cameras and displaying it on a mobile application via real time.

Project Spacetrip

MEMBERS: Nour Chihwaro, Abbas Jomah, Angel Lopez, Kenny Maldonado, Jerico Napalan, David Rakieten

ADVISOR: Barry Dorr



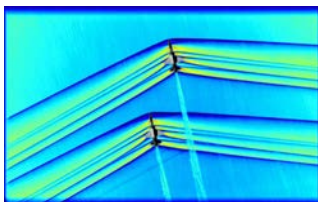
Analog Synthesizer

The goal of Project Spacetrip is to simply design quality, commercially viable, and easy to use analog synthesizers and audio amplifiers. Using a combination of digital and analog components both products will deliver unparalleled quality in sound to the user. The synthesizer will be able to reach 3 octaves in terms of sound production as well as coming with the industry standard set of effects. The audio amplifier will have standard AUX input capabilities, microphone inputs, and equilibrium control.

Project Spacetrip

MEMBERS: Rashed Abdullah, Khaled Almatar, Abdullah Alqallaf, Nicolas Luna, Kevin Machado, Jesse Sismey

ADVISOR: Barry Dorr

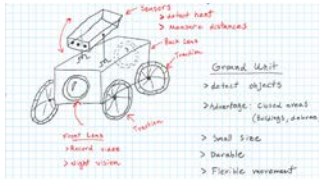


Audio Amplifier

An audio amplifier that receives an array of modulated signals from an analog synthesizer with an objective of amplifying the signals with minimal distortion, with low heat dissipation, stable frequency response, and while delivering power efficiently to a 4-Ohm load speaker box.

ROB

MEMBERS: Diana Abyшева, Roque Figueroa, Carlos Fletes, Merwin Gubat, Gino Herrera, David Kubera, Brian Valenzuela
ADVISOR: Ken Arnold - SDSU ECE



Rescue Operation Bot ROB

Search and rescue operations bot with the purpose to save lives by detecting humans in the event of a natural disaster.

SAR Bumble Bees

MEMBERS: Milan Azet, Colton Beery, Aiven Dawood, Victor Munguia, Rachelle Ramos, Francisco Sastre, Eddy Zarate
ADVISOR: Scott Amack - SPAWAR
WEBSITE: <https://sarbumblebees.tech/>



SAR Bumble Bees

The first 48 hours following a natural disaster is crucial to finding any survivors or injured victims that may be trapped under rubble and debris, and Bumble Bees help make this process efficient and quick. After they are deployed, a swarm of drones will simultaneously use different methods to detect and find trapped victims and use a mesh network to relay that information to the first responders who will then be guided to where to look.

SiMonN

MEMBERS: Brandon Beamon, David Boles, Cerina Diesh, Damian Gariza, Kelly Jentis, Derrick Jones, Tyler Kelehan
ADVISOR: Ken Arnold - SDSU ECE



Sports Impact Monitoring Network

Life threatening sports injuries occur often, especially when involving the brain. Repeated high impact events can lead to higher incident rates of Chronic Traumatic Encephalopathy. Creating a reliable platform to track and study impact events by providing real time injury detection will allow for earlier diagnosis of CTE and allow for long term trend analysis. The SiMonN team will incorporate hardware and software to provide sports impact telemetry system to reliably measure and record impact events.

SMARTDog

MEMBERS: Michael Hill, Carlo Hormoz, Francis Kanouno, Anush Shetty, Kevin Sprigg, Brandon Veltre
ADVISOR: Ken Arnold - SDSU ECE

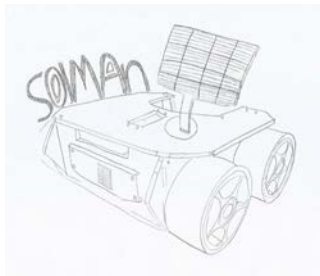


SMARTDog

Keep tabs on the furry friends in your life with an easy to use attachment for their collar. No need for monthly fees like other products. App integration for on the go updates when you need them.

SolMAn

MEMBERS: Cesar Arredondo, Sarah Basel, Travis Bushnell, Justin Costa, Thang Giang, Vinh Hoang
ADVISOR: Dr. Chris Mi - Department Chair & Professor, SDSU ECE



Solar Mobile Analyzer

A battery powered semi-mobile data collecting platform able to wirelessly transmit data over distance and utilizing solar power for charging and stationary operations purposes.

Speak

MEMBERS: Nick Annunziato, Sean Chaanine, Zach Gordon, Ivan-Garcia Mauro, Jason Ruberman, Mitchell Timken
ADVISOR: Dr. Baris Aksanli, Assistant Professor, SDSU ECE



Speech Pathologist Toy

This is a toy to help children with their exams who are timid in helping pathologists. The toy will serve as a medium for the kids to practice on so they feel more comfortable when it is their turn. The toy will be able to open and close its mouth as well as protrude its tongue and move it side to side. The toy will have voice recognition, so the kids are able to speak to it.

Spectra VI

MEMBERS: Tommy Khoury, Connor Laffey, Philip Nguyen, Matthew Nickels, Marquise Smart, Mark Thomsen, Huy Tran, Kemakeo Wilson

ADVISOR: Dr. Mahasweta Sarkar, Associate Professor, SDSU ECE



6GHz Cognitive Radio

A Wireless Local Area Network operating in the 6 GHz spectrum is proposed. The expected product is a radio system which operates between 5-7.125 GHz which can send a text file. The access point will use Dynamic Frequency Selection to avoid interference with pre-existing radar channels on the 6 GHz band. Included in the system package will be an antenna design for 5-7.125 GHz.

Synthesthesia

MEMBERS: Duncan Hammitt, Daniel Palisoc, Anthony Savitt, Shane Witsell

ADVISOR: Dr. Yusuf Ozturk, Professor, SDSU ECE



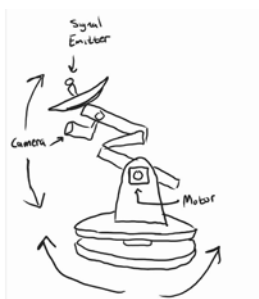
Synthesthesia

Synthesthesia is a project that explores relationships between sound and color. Our team accomplished this by creating software that will translate the music from our own analog synthesizer with analog effects into colored light. The software utilizes beat and pitch detection algorithms to determine characteristics of the music that will be interpreted based on our knowledge of color theory. The synthesizer is a simple but iconic instrument that anyone can play, and the effects allow users to customize the sound.

Team Anti-Drone

MEMBERS: Daniel De Los Santos, Nicholas Farella, Matthew Mitschke, Leonardo Olvera, Javier Valdovinos

ADVISOR: Ken Arnold - SDSU ECE

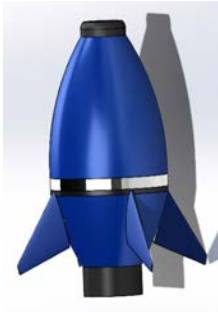


Design a motion detection turret for the purposes of deterring Unmanned Aircraft, i.e. drones, from operating near critical facilities or infrastructure such as airports

Once a drone has been spotted in restricted airspace, our device will first send an email alert to local authorities, including the FAA, FCC, and the local Police department. Next we plan to transmit a signal to interrupt the connection between the pilot and drone.

Team CEMT

MEMBERS: Tyler Bashinski, Michael Val Bolibol, Carlo Lontok, Esteban Lopez
ADVISOR: Dr. Christopher Paolini, Assistant Professor, SDSU ECE



Smart RPG

This project is a projectile implanted with a camera, FPGA, and four servos. The camera will capture real-time images that will be sent to the FPGA. Then the FPGA will analyze the images with object detection and an image processing neural network to determine the target. And lastly, the FPGA will then send the position data to the servos, in order to correct its flight path in mid-air using movable fins controlled by a micro servo.

Team Georgia

MEMBERS: Alexander Khoperia, Luka Lomtadze, Teimuraz Nikolaishvili, Grigoli Vashakidze
ADVISOR: Ken Arnold - SDSU ECE

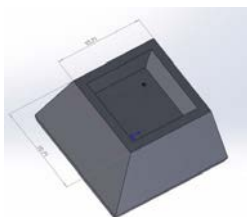


KGB Shoes

KGB shoes is a project that introduces new ways of communication by utilizing universal insoles with a smartphone. The project will enable users to send/receive data via foot-tapping and vibrations. We will be using Arduino Nano to support hardware requirements of Android and iOS applications that will be implemented using Java and Swift.

Team Hydra

MEMBERS: Thomas Barbarito, Andrew Freiha, Carlos Hernandez, Alejandro Peraza, Tristan Sizik, Kris Whaley
ADVISOR: Dr. Ying-Khai Teh, Assistant Professor, SDSU ECE
SPONSOR: San Diego State University
WEBSITE: <https://teamhydra25.wordpress.com/>



Hydra

A hands-free device that floats on a body of water and characterizes it using on board sensors. These sensors include temperature and depth which are controlled by a microcontroller inside the body of the device. This data is collected through a raspberry pi and transmitted using an LoRa Hat transceiver to a local base station.

TesseDyn

MEMBERS: Luke Bucon, Ben Gutierrez, Brian Lyle, Josh Natalina

ADVISOR: Ken Arnold - SDSU ECE

WEBSITE: <https://tessedyn.com/>



Stackable Modular Inverter

We have built an inverter that will accept a 48V DC input, and output a 120V AC, 60Hz signal that can be used by any user appliance. Each inverter will be able to connect, or “stack” to others to give the user any desired power they may need. Uses for this project will be either to provide power to impoverished or disaster stricken areas who don’t have access to the grid, or for recreational use as a cleaner alternative to a generator.

True Color

MEMBERS: Brian Drennen, Donny Lazatin, Cedric Miller, Tony Morales, Michael Newcomer, Bradley Snetsinger

ADVISOR: Dr. Duy Nguyen, Assistant Professor, SDSU ECE Department



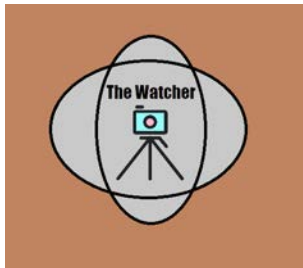
Color Analyzer

Handheld device that can analyze a color in nature. Used to assist people who are colorblind. Display color name and RGB value on handheld device and a mobile app.

The Watcher

MEMBERS: Marc Absin, Xiaoxiao Dong, Kylan Fabila

ADVISOR: Dr. Ying Khai-Teh, Assistant Professor, SDSU ECE Department



Antenna Tracking System

A tripod mounted, battery operated tracking module capable of following the movements of a powered tag that has been secured on an object of interest. The module’s movement is controlled via a stepper motor and location data is taken using communicated RF and GPS data from the tag. A camera can be mounted on top of the tracker module in order to capture/record the tracked subject.

Archimedes' Crew

MEMBERS: Ali Baroun, Benjamin Bettencourt, John Drinkard, J. Paul Koutoulas, Joel Maguire, Ceara Martinez

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering



Emergency Communication Drone

Inspired by the movie "Lone Survivor", this team designed and fabricated a remote controlled drone capable of a hover time sufficient for 10 minutes with on board components to serve as a long distance radio communication in emergency situations.

Aztecs Airlines

MEMBERS: Yousef Alazemi, Naser Alhai, Hamad Alrashdan, Othman Malak, Nicholas Murro, Ian Porter

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering; Dr. Satchi Venkataraman, SDSU Aerospace Engineering; Chuck Norris; Mike Morgan

SPONSOR: Morgantech



3D Printed Aircraft Competition

The goal of this capstone senior design project is to design and manufacture a 3D printed aircraft to compete in the 3rd annual 3D Printed Aircraft Competition (3DPAC) hosted at the University of Texas, Arlington in July, 2019. The aircraft is allowed 5 seconds of powered flight, after which, it competes for the longest flight duration under 30 feet. All lifting surfaces must be 3D printed, with exceptions for electronics and some fasteners.

BiomeCANical Engineers

MEMBERS: Gaby Baumgardner, Ryan Buttler, Shannon Isley, Isaac Mota

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering



Motorized Stability Brace for Stroke Patients

Every year approximately 795,000 people in the United States suffer from strokes resulting in a variety of injuries including unilateral paresis, the weakness of one entire side of the body. Additionally, strokes can cause other injuries including drop foot, spasticity of muscles, or total paralysis. Our team's goal was to create a simple motorized leg brace that will assist in flexing the user's knee joint and stabilizing their ankle, allowing them to swing their leg forward and achieve a normalized gait when walking.

Camel Crew

MEMBERS: Abdullah Alfaiikawi, Sulaiman Allaho, Abdullah Alsalahi, Eisa Alyahya, Jamayel Hussain, Jenan Hussain
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering



Beetle 007 - Plant Seeding Robot

The Camel Crew team designed and fabricated an autonomous robot to assist farmers in Kuwait. This robot is able to move and plant commonly used seeds on a straight line with the aid of an electric propulsion system and an Arduino based electronic control system. This plant seeding robot will protect farming laborers in Kuwait from harsh weather conditions including high heat and airborne particulates.

Codename S.E.A.L.

MEMBERS: Collin Beaty, Dominic Castillo, Dylan Doan, Dante Legaspi, Anders Ohrstrom, Dustin Ybarra
ADVISOR: Rolando Rivera, Northrop Grumman; Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: Dr. Bob Wolff, Quality of Life Plus
WEBSITE: <https://qlplus.org/>

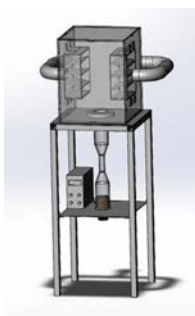


Adaptive Surfboard System for a Disabled Veteran

Quality of Life Plus, a national organization that aids disabled veterans, challenged SDSU with the project of creating a system that provides enhanced control and stability of a surfboard for a disabled veteran surfer who does not have the use of his legs. The team designed and fabricated two systems that fulfilled that requirement, one being a custom shaped and professionally made surfboard with an adaptive handle system, and one being an external propulsion system that attaches to the side of a surfboard.

Cymer Bois

MEMBERS: Nathaniel Bell, Anthony Delgado, Ryan Edinger, Ryland Lyons, Geoffrey Mendoza
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering; Dr. John Abraham, SDSU Mechanical Engineering
SPONSOR: Joe Bendik, ASML/Cymer
WEBSITE: <https://www.cymer.com/>



Material Buildup Simulator for an Extreme Ultraviolet (EUV) Light Source Exhaust

ASML/Cymer produces laser light sources that photolithography scanners used to image patterns on silicon wafers. The company has tasked the team with producing an experimental exhaust model of an EUV light source that can be used to test varying flow parameters at similar conditions to the full-scale EUV light source system. Using a combination of wax and multiple flow conditions at low Reynolds numbers, an optical system measures the buildup of wax material.

The Fire Analysts

MEMBERS: Jonathan Bravo, Cesar Meza, Sagar Purohit, Laura Sandoval, Katie Whitmore

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Dr. Joaquin Camacho, Assistant Professor, SDSU Mechanical Engineering



Pneumatic System for Flame Ignition and Nanomaterial Sampling

Dr. Joaquin Camacho's Energy Flames, Aerosols and NanoScience (FANS) research lab collects nanomaterials using combustion of manganese dioxide (MnO_2). The Energy FANS lab is in need of a remote ignition system and sampling system. This team designed and fabricated a system that will improve the reliability of flame ignition as well as collection protocol for Dr. Camacho's lab. This system also prevents the inhalation of nanoparticles by keeping the flame in an enclosed space.

Fire n' Ice

MEMBERS: Brianna Baskerville-Bridges, Eli Diaz, Sophia Ebright, Ben Sellers

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Dr. Fletcher Miller, Professor, SDSU Mechanical Engineering



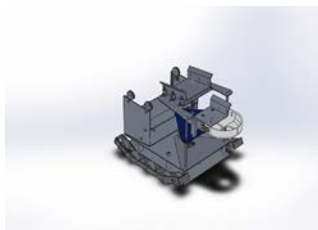
Emissivity Testing Chamber

Dr. Miller studies emissivity of semi-transparent materials but has issues with background interference. A sub-freezing, low-emitting housing was constructed to reduce this interference and noise in the data. The walls are kept at low temperatures which are monitored by sensors, and the specimen can achieve and maintain temperatures up to 350°C using a controlled heating system. This isolates the emission of the thin fuel sample by creating contrast in the infrared camera, improving data acquisition.

Grab and Go

MEMBERS: Donald Crawford, Garrett Erickson, Eric Gonzales, William Johnson, Salvatore Monica, Zac Rosenbaum, Michael Schultz

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

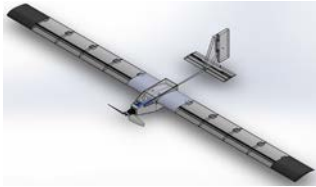


ASME Student Design Competition "The Pick-and-Place Race"

The Grab and Go team designed and fabricated a remote-controlled robot to compete in the ASME competition called "The Pick-and-Place Race." The robot's primary objective is to traverse a predefined course, collect as many balls as possible, and place them in a collection area. System design features include a Bluetooth to cell phone controller, a tracked wheel electric propulsion system and a motorized capture system.

Montezuma's Aircraft

MEMBERS: Sara Arredondo, Leo Garcia, Jesus Gutierrez, Edwin Orduno, Varinder Singh, Ryan Toca
ADVISORS: Dr. Scott Shaffar, SDSU Mechanical Engineering; Dr. Satchi Venkataraman, SDSU Aerospace Engineering; Chuck Norris; Mike Morgan
SPONSORS: SDSU Student Success Fee, 3D4E; Morgantech

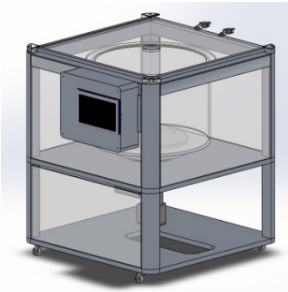


3D Printed Aircraft

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Off the Hooke

MEMBERS: Abdullah Aljaian, Naser AlQenaei, Bailey Dawson, Scott Lindaman, Christopher Shipman, Edwin Ventura
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

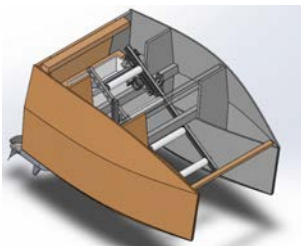


Material Containment System for Manufacturing Applications

The Off the Hooke team designed, fabricated and tested an electro-mechanical system to support a metal component manufacturing company. The system was designed to integrate directly into an existing high-volume production line and process with a primary objective of safely and efficiently collecting and containing extruded material. Design features include both mechanical and electrical components including weight sensors.

Plastic Pirates

MEMBERS: David Dunn, Abdullah Ebrahim, Diego Guardiola, Dane Hollar, Cameron Hopkins, Nathan Rozenberg
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: Susan Baer, Clear Blue Sea
WEBSITE: <https://www.clearblueseas.org/>



Floating Robot for Eliminating Ocean Debris

The Plastic Pirates Team has designed, constructed, and tested a small-scale, solar-powered, semi-autonomous marine robot with functionality to collect plastic garbage in marine environments. Our robot is a prototype of Clear Blue Sea's Floating Robot for Eliminating Debris, which is being developed to cleanse the oceans of plastic pollution. Our team has completed this project by creating our own design architecture for "FRED Jr" that satisfies the solution requirements provided to us by Clear Blue Sea. Through development and test of our marine robot prototype, we have demonstrated the feasibility, sustainability, and effectiveness of ocean plastic cleanup using unmanned, solar-power marine robots capable of returning our marine environments back to "clear blue seas".

Ruff n' Teff Engineers

MEMBERS: Kelly Allen, Abdulaziz AlShati, Christian Carranza-Garcia, Crystal Gama, Tyler Hilderbrand, Sean Hoban, Jessica Roesgen

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSORS: Gemechu Abraham, W.E. DO GOOD; Michael Sloan, SDSU Fowler College of Business



Miriti Alpha - Ethiopian Teff Harvester

The Ruff n' Teff team designed and fabricated an engine powered Teff grass harvesting device that aims to provide a safer and more efficient alternative to the traditional sickle currently used by Ethiopian farmers. Design constraints included affordability, ease of use, manufacturing simplicity, people safety, Ethiopian farming community cultural adaptation, and harvesting yield potential.

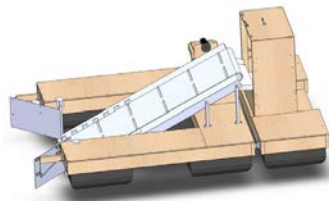
The Salty Crew

MEMBERS: Ryan Abbott, Blake Berman, Timothy Bollinger, Devin Orr, Jordan Walker, William Wiseman

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Susan Baer, Clear Blue Sea

WEBSITE: <https://www.clearblueseas.org/>



Floating Robot for Eliminating Ocean Debris

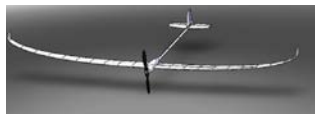
The Salty Crew team designed and manufactured a Debris Collection System (DCS) for Clear Blue Sea's Floating Robot for Eliminating Debris (FRED). FRED is an unmanned, solar-powered robot designed to collect and recycle floating marine plastic pollution.

SDSU Atlatl

MEMBERS: Abdullah Alkoot, Neel Dhawan, Arvin Domier, Chris O'Day, Brandon Pruitt

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering; Dr. Satchi Venkataraman, SDSU Aerospace Engineering; Chuck Norris, Mike Morgan

SPONSOR: 3D4E; Morgantech



3D Printed Aircraft

The goal of this capstone senior design project is to design and manufacture a 3D printed aircraft to compete in the 3rd annual 3D Printed Aircraft Competition (3DPAC) hosted at the University of Texas, Arlington in July, 2019. The aircraft is allowed 5 seconds of powered flight, after which, it competes for the longest flight duration under 30 feet. All lifting surfaces must be 3D printed, with exceptions for electronics and some fasteners. The project received a 3D printer from 3D4E to bolster the team's fabrication capabilities.

SDSU Brewing Waste E.D.

MEMBERS: Richard Corbin, Jorge Ferrer, Colton Long, Justin Randolph, Carlos Sanchez

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Mike Reidy, Ebullition Brew Works

WEBSITE: <https://www.ebullitionbrew.com/>



Brewery Wastewater Treatment

Team SDSU Brewing Waste E.D. has designed and manufactured a treatment system capable of lowering the biological oxygen demand (BOD) and total suspended solid (TSS) content of the wastewater produced from the brewing process. This is accomplished by first screening the wastewater to remove the majority of the solids, continuously introducing the water to an aerobic digester between brew cycles, which greatly reduces BOD's and TSS, before finally entering the settling tank where the remaining solids are settled out.

Simple Solutions

MEMBERS: Abdulaziz Alhamadi, Mohammed Al Hinai, Abdulaziz AlNassar, Mohamed Al-Rasheed, Ibrahim Alsaeed,

Abdullah Alshuaib, Courage Ogbemor

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering



Piano Auto Tuner

The Simple Solutions Piano Auto Tuner is a piano tuning system that can detect the frequency of a piano tone, verify if that frequency is in tune with a selected frequency, and automatically move the piano pin to achieve the selected frequency. The systems goal is to make piano tuning more accessible to people outside the piano tuning community.

Steering the Future

MEMBERS: Tyler Coffman, Cade Foy, David Guirguis, Josh Korty, Kolby Pearson, Kellen Wilson, Brandon James Yue

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Aztec Electric Racing, SDSU



AER Steering System

The Steering the Future team designed and fabricated a complete steering system for the Aztec Electric Racing 2019 race car. This new steering system is designed to satisfy all 2019 FSAE rules and regulations, as well as reducing weight and improving overall steering performance.

The Supercritical Six

MEMBERS: Zohra Muhammadi, Alvin Muliono, Omar Nunez, Scott Teague, Raul Valencia, Danny Villanueva

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Dr. Joaquin Camacho, SDSU Mechanical Engineering



Miniature Pressure Vessel for Carbon Dioxide Sequestration

A miniature pressure vessel has been designed and fabricated to enable research into methods to reduce Carbon Dioxide in the atmosphere through the deposition in mineral rocks. Accomplishing this has potential to aid in the prevention of further climate change. The Supercritical Six team developed a pressure vessel capable of holding Carbon Dioxide in a supercritical state, namely at 72.9 atm and 31°C. The design also allows for the direct observation of mineral rocks located inside the pressure vessel via a microscope.

Supreme Engineers

MEMBERS: Tim Anaya, Hunter Dimler, Joseph Gibbs, Matthew Mills, Brendon Romero, Kevin Schultz, Jordan Stafford

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Paul Wield, SDSU Mechanical Engineering



Custom Fit Mechanical Prosthetic

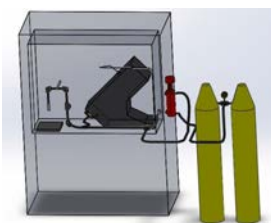
A mechanically actuated partial prosthetic hand has been designed and fabricated to restore normal hand capabilities for a client with partial amputations on all five fingers of right hand. This project included extensive research coupled with material testing and client trials. The design solution allows for the client to perform common daily tasks such as holding a beverage.

SurfacePros

MEMBERS: Saleh Al-Hajri, Matthew Keegan, Dayna Moreno, Hannah Nguyen, Kelbi Redquest, Marshall Veyveris

ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering

SPONSOR: Dr. Kevin Wood, SDSU Mechanical Engineering



Cold Spray Deposition System

Team SurfacePros re-engineered a Cold Spray Deposition System for Dr. Wood's battery coating research. Corrosion reactions at interfaces within batteries is the key issue preventing electric vehicles & grid scale energy storage. Engineering robust coatings on the surfaces of battery materials is one strategy for addressing these interfacial issues. In cold spray, a powder is accelerated toward a substrate at an ultra-sonic speed & low temp, effectively modifying the surface of highly reactive and low point materials. This project involved the integration of major subsystems including gas delivery and control, a high temperature heating system, and a powder feeder.

Team Baja CVT

MEMBERS: Gavin Broughton, Matt Lane, Ben Marson, Hannah Pollek
ADVISORS: Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: SDSU Aztec Baja SAE

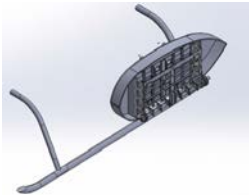


Aztec Baja SAE Continuously Variable Transmission

The Baja CVT design team created a new Primary for the Continuously Variable Transmission (CVT) of the Aztec Baja race car. Aztec Baja builds a single seat off-road vehicle each year, and they saw replacing their outsourced CVT as an area for improvement. This project was tailored to meet the Baja team's need for a new primary that interfaces with their system and improves car performance. The new CVT Primary will work with the previous Secondary to optimize the way power is transmitted to the gear reduction box and out to the tires.

Team Buoyah!

MEMBERS: Colleen Boensel, Connor Forte, Adonis Glasper, Eddie Mendoza, Binh Vu
ADVISOR: Dr. Scott Shaffar - SDSU Mechanical Engineering
SPONSORS: Matthew Handfelt, Chris Maceyko, David Hoyt - Northrop Grumman Corporation
WEBSITE: <https://www.northropgrumman.com/>

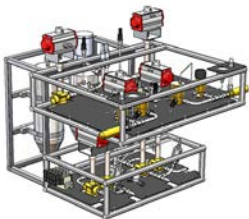


Sonobuoy Deployment System for Vertical Takeoff and Landing Tactical Unmanned Aerial Vehicles

Team Buoyah designed and fabricated an effective, flexible, and affordable sonobuoy deployment system for the Northrop Grumman Corporation. The design consists of a pylon mounted launcher for a Vertical Take Off and Landing Tactical Unmanned Aerial Vehicle (VTUAV) to be used by any ship capable of launching and recovering a VTUAV (e.g., Fire Scout or equivalent capabilities).

Team Rocket

MEMBERS: Jared Beach, Thomas Callahan, Griffin Carter, Max Ellinthorpe, Kristopher Schaffer, Matthew Smith
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: The SDSU Rocket Project
WEBSITE: <https://www.sdsurocketproject.org/>



Liquid Rocket Engine Injector Testing Apparatus

Team Rocket designed and manufactured a testing apparatus that will enhance The SDSU Rocket Projects ability to test and validate different liquid rocket engine injector designs with relative ease. With its modular and rugged structure, this new test apparatus will be able to easily adapt to many different situations and needs for years to come.

Team Volt-Swagen

MEMBERS: Jesse Archer, Alisha King, Julien Laverdiere, Jeff Richard, Matthew Sebastiani, Eli Tagger
ADVISORS: Dr. Scott Shaffar, SDSU Mechanical Engineering; Jerahme Purcell, Northrop Grumman
SPONSOR: Aztec Electric Racing, San Diego State University Student Organization
WEBSITE: <http://aztecelectricracing.com/>



Aztec Electric Racing Energy Storage System

Team Volt-Swagen has designed and manufactured a tangible and fully functioning accumulator, or battery box, for Formula SAE on-campus team, Aztec Electric Racing. Aztec Electric Racing is dedicated to developing an electrically powered formula vehicle, capable of successful performance in the national annual FSAE Electric Static and Dynamic competitions.

Team Zamboni

MEMBERS: Christian Batungbacal, Connor Bucka, Francisco Covarrubias, Matthew Chu, Brian Middlekauff, Christopher Moon, Hannah Morgan
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: Dr. Robert Wolff, Quality of Life Plus
WEBSITE: <https://qlplus.org/>

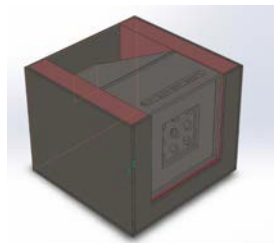


Wheelchair to Ice Hockey Sled Loading System for a Disabled Veteran

Team Zamboni created a design that supports a double-leg amputee veteran who needs a machine to help him transition between his wheelchair and an ice hockey sled. This specialized sled is used in place of traditional ice skates. Design requirements included size and weight limits, time needed to set up and operate, and safety and stability while transporting a heavy load. The system must fit in a van, be light enough that one person can lift it, and take no more than two minutes to transport the veteran from his wheelchair to the sled. The design is purely mechanical and uses a hand actuated hydraulic system.

Too Hot To Handle

MEMBERS: Mohammad Alkandari, Jasmine Cheng, David Perez, Dylan Prodon, Solomon Roberts, Dereck Valles
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: Keith Mclean, Collins Aerospace



Isolating Thermal Blanket for Composite Repair Applications

The Too Hot to Handle team designed and fabricated a thermal blanket that protects composite repair areas related to aircraft engine nacelles. This project team also designed and fabricated a supporting heat transfer test apparatus. The project seeks to improve on existing technology; to make a thermal blanket that is thinner and better performing than current mainstream products. With the assistance of Collins Aerospace, we have a product for use in aerospace, automotive and other thermal applications. The thermal blanket is comprised layers of fiberglass and stainless steel foil for heat reflection and a layer of aerogel and alumina mat, providing thermal insulation.

Traffic Assassins

MEMBERS: Haneen AlSammak, Connor Breuckman, Sam Dixon, Martin Gutierrez, Dillon MacPhail-Weller
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: GSE Inc.

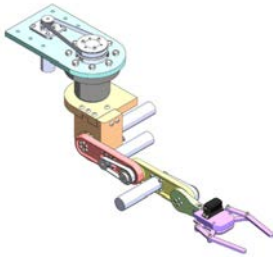


Personal Flight Vertical Takeoff and Landing Drone

The Traffic Assassin team, inspired by the Boeing “Go Fly” challenge, designed and fabricated an operating scale model of a Personal flight Vertical Takeoff and Landing drone. The small scale model we are developing is based off of a design for a human sized personal flight machine.

UNDER-ARM

MEMBERS: Josh Hitzhusen, Karajo Kafka, Zachary Leon, Thomas McCann, and Brandon Mori
ADVISOR: Dr. Scott Shaffar, SDSU Mechanical Engineering
SPONSOR: San Diego State University Mechatronics
WEBSITE: <https://www.sdsu-mechatronics.org/>



Mechatronics Autonomous Manipulator

As a sub-team of SDSU Mechatronics, Under-Arm is a senior design group of mechanical engineers who have been tasked to design and fabricate an autonomous, out-of-water, prototype manipulator. The manipulator designed will be used by Mechatronics to test controls systems and object detection. After the completion of the manipulator, the design will be inherited and modified by another team to be integrated with a Mechatronics autonomous underwater vehicle (AUV).

Wheelchair Warriors

MEMBERS: Edgar Aguilar, Alex Chung, Gianfranco Di Paolo Yorlano, Kyle Hansen, Gregory Olivas, Elmer Onofre, Sean Richard
ADVISORS: Dr. Scott Shaffar, SDSU Mechanical Engineering; Mike Mackey, Northrop Grumman
SPONSOR: Dr. Robert Wolff, Quality of Life Plus
WEBSITE: <https://qlplus.org/>



Motorcycle Wheelchair Carrier for a Wounded Veteran

The Wheelchair Warriors team was challenged with a project by the Quality of Life Plus national organization, which works to improve the lives of disabled veterans. This project supports a US Army veteran who sustained a spinal cord injury. While she has lost the use of her legs, she still enjoys riding motorcycles with her husband. The design solution enables this veteran to attach her wheelchair to the motorcycle, and keep it protected from the elements while they enjoy their ride. Design constraints included the load capacity of the motorcycle, the geometry of the wheelchair and impacts to motorcycle performance and stability.

