SDSU
College of Engineering

DESIGN DAY
2022

MONTEZUMA HALL

Wednesday,
MAY 4
1:30 – 4 pm

SDSU | College of Engineering

WELCOME

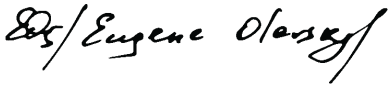
Welcome to the College of Engineering's Spring 2022 Design Day at the Conrad Prebys Aztec Student Union, Montezuma Hall. We are proud to have our undergraduate students showcase their design project work completed during the 2021-22 Academic Year. There are teams representing our Senior Design classes 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: ASML, Caltrans, County of San Diego, Dexcom, D&K Engineering, J.R. Filanc Construction Co., Fluidra, Masimo, Michael Baker International, NASA, Nordson ASYMTEK, Northrop Grumman, T.Y. Lin International, and Quality of Life Plus. 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 2022 College of Engineering Design Day. Thank you for being a part of this important event.

Eugene Olevsky, Ph.D.



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2021 DESIGN DAY FACULTY

Aerospace Engineering

Ahmad Bani Younes, Ph.D., Associate Professor

abaniyounes@sdsu.edu

Dr. Bani Younes is an Associate Professor in the Department of Aerospace Engineering. He received an M.S. in Aerospace Engineering from the University of Dayton and a Ph.D. in Aerospace Engineering from Texas A&M University. Dr. Bani Younes' research interests lie in the areas of optimization, estimate and control applications in dynamical systems; guidance, navigation, and astronautics; space robotics and autonomous UAS; and algorithm development. After his successful achievement in building the Spacecraft Platform for Astronautics & Celestial Emulation (SPACE) at Khalifa University, Dr. Bani Younes is currently developing a Space GNC and astronautics laboratory at SDSU. It aims to be a 6DOF facility that supports comprehensive studies and hardware experiments for sensing, guidance, dynamics, and control of space operations in an operationally relevant environment. The lab conducts research in robotic sensing and control with an aim to enhance the fields of proximity operations, human-robot interaction, stereo vision, swarm robotics, and autonomous aerial vehicles.

Geoffrey S. Butler, Lecturer

gbutler@sdsu.edu

Mr. Butler is a working professional aerospace engineer involved in the design and analysis of aircraft for both military and civil applications. He has over 39 years of experience in the aerospace industry and has contributed to the development of vehicles ranging from cruise missiles, to unmanned aircraft, to hypersonic vehicles, as well as launch vehicles. He is an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA) and is a member of the AIAA Missile Systems Technical Committee. He has been a lecturer teaching aerospace engineering courses at SDSU including Dynamics, Astrodynamics, Stability and Control, and Aerospace Engineering Applications (AE 460) for over 25 years, and applies a thorough yet practical, applied engineering approach. He was awarded the AIAA Outstanding Teacher award in 2015.

Civil, Construction & Environmental Engineering .....

Mark Filanc, PE, Lecturer

mfilanc@filanc.com

Mr. Filanc is the CEO of J.R. Filanc Construction Company Inc. and has over 40 years of experience in water/wastewater design and construction, as well as extensive expertise in all areas of project management. He is a registered professional engineer in the State of California and has been designated as a Design-Build Professional in Design-Build Institute of America's (DBIA) charter group for lifetime experience. He is past chairman and current member of DBIA's Water Committee, past President of the San Diego Chapter of AGC, and an instructor at the national level for AGC's Supervisory Training Program. Mark also serves on the SDSU College of Engineering Dean's Advisory Board and the Department of CCEE Industry Advisory Board. Mark holds a Bachelor of Science degree in Environmental Engineering/Water from California Polytechnic State University, San Luis Obispo, and a Master of Science degree in Civil Engineering, specializing in Construction Management, from Stanford University.

James R. Haughey, PE, MBA, LEED AP, ENV SP, Lecturer

jrhaughey@mbakerintl.com

Mr. Haughey is Vice President with Michael Baker International in San Diego, California. Jim has over 30 years of experience in Design-Build with an emphasis in public social infrastructure, military engineering, healthcare, aviation, and school development. Jim has a BS in Civil Engineering (BSCE) from San Diego State University and has an MBA from the University of Phoenix. Jim is a Past President of APWA and serves on several industry boards including Society of American Military Engineers (SAME), ACE Mentorship San Diego, Design Build Institute of America (DBIA), SDSU College of Engineering Dean's Advisory Board, and Chair of SDSU Civil, Construction and Environmental Engineering Industry Advisory Board.

Jeremy LaHaye, PE, Lecturer

jeremy.lahaye@tylin.com

Mr. LaHaye is a bridge engineer at T.Y. Lin International with over 20 years of experience in roadway, highway, and structure design including Project Initiation Documents, plans, specifications, and estimate, and construction inspection. He has experience with large scale signature bridge projects, as well as conventional state DOT bridge projects. He currently serves as Vice-Chair for the SDSU Civil, Construction and Environmental Engineering Advisory Board and is the SD ASCE Practitioner Advisor to the SDSU ASCE Chapter. He graduated from San Diego State University in 2001 and was extensively involved in ASCE.

John Prince, PE, PMP, QSD, Lecturer

jprince@delanegroup.com

Mr. Prince is Co-Owner/Vice Presidnent of DELANE Engineer with over 20 years of Site Civil Engineering and Site BIM Experience. John has been teaching at SDSU for over 10 years with 2 classes; Intro to Civil and Senior Design, and also serves on the CCEE Industry Advisory Board. John's initial goal and continued passion for teaching at SDSU is to enhance the industry involvement, helping bridge the gap between academia and profession and prepare students for their careers. John is an alumnus of SDSU where he met his wife, (also a Civil Engineer). They have two children (both girls) who are very active skiers and enjoy the mountains.

Electrical & Computer Engineering

Barry L. Dorr, PE, Lecturer

bdorr@sdsu.edu

Mr. Barry Dorr is a full-time lecturer in SDSU's Department of Electrical and Computer Engineering. Prior to that he worked for San Diego Electronics companies for 35 years as a design engineer and project manager. Between 1995 and 2006 he owned a small product development firm creating digital radios, control systems and audio systems for local manufacturers. He holds eight patents for various communication, control, and calibration systems. Professor Dorr earned a BSEE from California State Polytechnic University, San Luis Obispo and a MSEE from SDSU. He is a registered Professional Engineer in the State of California. Professor Dorr's Senior Design course (EE/COMPE 496) emphasizes practical applications of the fundamentals taught in the ECE curriculum completed within a framework of industry-standard project management practices and personal/team ethics.

Mechanical Engineering

Scott Shaffar, Ph.D., Lecturer

sshaffar@sdsu.edu

Dr. Scott Shaffar is responsible for the development and implementation of the San Diego State University Mechanical Engineering Senior Design Capstone program (ME 490) including course content and program management through all phases from project definition to final system demonstration. This program includes project management, system engineering, research, ideation, detailed design, engineering analysis, fabrication, assembly, test, and customer delivery. Previously, Dr. Shaffar retired from Northrop Grumman Corporation after a 34-year career. In his assignment at retirement, Dr. Shaffar served as a senior director for Northrop Grumman Aerospace Systems, a premier provider of manned and unmanned aircraft, space systems and advanced technologies critical to our nation's security. Dr. Shaffar earned a Bachelor of Science in aerospace engineering from the California State Polytechnic University, Pomona, and a master's and doctorate in mechanical and aerospace engineering from the University of California at Irvine. He is a member of the American Society of Quality, Society of Automotive Engineering, and the American Society of Mechanical Engineers.

Every gift to the College of Engineering has IMPACT. Generous donor support helps to ensure student success, promote faculty excellence, fund meaningful research, and champion the continued success and growth of the College.

Please consider making a charitable gift TODAY to make your own meaningful impact!

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The College of Engineering is grateful for all those who provide philanthropic support. If you have an interest in supporting the College, please contact Kate Carinder, Senior Director of Development, College of Engineering at kcarinder@sdsu.edu.

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Mech X - ***Breadboard Actuator in EUV Research Chamber***
One Step at a Time- ***Walk to Run Prosthetic Challenge***
Perihelion - ***GPS Based Solar Tracker***
Plane Jane - ***3D Printed Aircraft Competition***
T - Dex - ***Alternate In-Process Packaging Tray***
Team BCB - ***Beach Cleanup Bot***
Team Turbine - ***Enclosure Door Handles for Industrial Applications***
VAXIS Solutions - ***Mapping Wind Tunnel Characteristics for a Shaded VAWT***

Beta Orbital Systems

MEMBERS: Daniel Castillo, Gillian Dowdy, Keona D'Souza, Jared Frank, Luke Griffin, Thomas Ridgeway, Linda Williams

ADVISOR: Ahmad Bani Younes - SDSU Space Lab

Life Investigation and Testing on Enceladus

Mission design for a spacecraft that will collect samples from the plumes on Enceladus to test for biosignatures.

Flat Earth Co.

MEMBERS: Alfonso Acosta, Jazmyn Alcantar, Syle Marie Anton, Elliott Cumming, Ian Jackson, Mohit Kumar, Saverio Masotto, Mario Ramirez

ADVISOR: Ahmad Bani Youne - SDSU Space Lab

SPONSOR: SDSU SPACE Lab

SDSU SPACE Lab

To safely transport humans to the moon and establish a base on the moon.

The spacecraft shall deliver a crew of 4 to the moon's South Pole from South Texas launch site.

Use a rocket to launch the spacecraft into space.

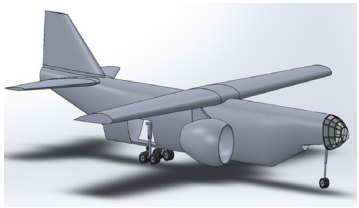
The spacecraft shall have a constant, streamlined communication with Earth, and the latency of the telecommunications system shall be no more than 5 seconds.

Hermes

MEMBERS: Jesus Carreno, Joshua Kleinendorst, Alexander Linares, Daniel Hernandez, Trevor Nieman, Andrew Panduro, River Watts

ADVISOR: Professor Butler - SDSU

SPONSOR: San Diego State University



Hermes, the firefighting airplane

We have spent 2 semesters thinking of and developing a proper design for an efficient firefighting airplane that can be in service within the next decade.

MOSS Group

MEMBERS: Will Bensey, Miles Johnson, Jacob Kinczel, Brenden Lopez, Gilbert Rodriguez, Harrison Siefke, Tyler Wilke

ADVISOR: Ahmad Bani Younes - SDSU

SPONSOR: AE Department

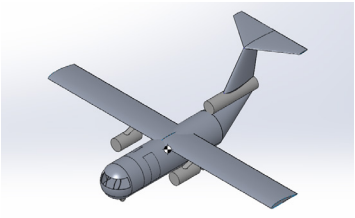
Mars Orbital Space Station

The Mars Orbital Space Station (MOSS) is designed to serve as a hub for future astronauts and scientists to explore Mars, as it orbits around the grand red planet. MOSS showcases the future of what manned Mars exploration will be.

Practical Pelicans

MEMBERS: Andrew Birch, Andre Galarza, Viviana Perez, Errin Quiazon, Efrain Ramos, Brian Torgerson

ADVISOR: Professor Butler - SDSU



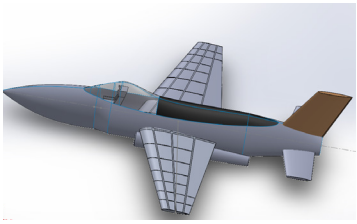
Triple-Engine Firefighter Tanker Aircraft

In the AE460 class, we are tasked with designing an aircraft. From the available choices, our team decided on the aerial firefighter aircraft designed to operate in highly impacted forest fire areas, specifically on the west coast of the United States. Unique choices on the design of our aircraft include 3 turbofan engines; 2 located on each wing and 1 located on the empennage, and a T-tail configuration.

T-39 Yellowjacket

MEMBERS: Luis Estrada, Vitor Guerra-Caine, Gunnar Hendrickson, Chandara Heng, Kyle Mapanao, Tyler Matlock, Joshua Scullin

ADVISOR: Dr. Geoffrey Butler - SDSU



The T-39 Yellowjacket - a conceptual Advanced Pilot Trainer

With the imminent retirement of the T-38C fleet, the U.S Air Force (USAF) issued a request for proposal in 2016 for and Advanced Pilot Trainer (APT) aircraft. This two-seated trainer is expected to replace the T-38C used in the USAF's Specialized Undergraduate Pilot Training advanced phase fighter and bomber (F/B) track, and in the Introduction to Fighter Fundamentals course. The APT program will provide student pilots with the foundational flying skills and core competencies to transition into current F/B aircraft.

Team Rocket

MEMBERS: Camden Carter, Josh Goldstein, Brady Johnson, Ivanne Nogoy, Trenton Penick, Amaury Reed, April Thongrivong

ADVISOR: Ahmad Bani Younes - SDSU

SPONSOR: Ahmad Bani Younes - SDSU

TEAM ROCKET
Mission To Mars

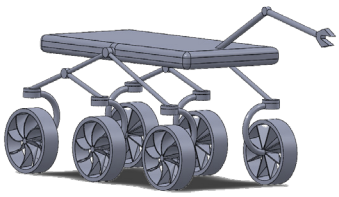
Manned-Mission to Mars

Our team has developed a mission that can extend human kind's reach to Mars. By establishing mankind on Mars, this would allow for a better understanding of Mars' history and to answer the overarching question: Has there ever been life on Mars?

TitanX

MEMBERS: Alexander Donabedian, Riley Martin, Koan Ng, Jesus Rodriguez, Alexander Semon, Kyle Switzer, Thomas Tran, Dhruv Vij

ADVISOR: Ahmad Bani Younes - SDSU



Titan Turtle

To determine the existence of extraterrestrial life in the hydrocarbon lakes on Titan, collect any biological data from existing life forms on its surface via an amphibious rover, and survey the geological surface of the moon and its lakes.

Aztec Associate Engineering

MEMBERS: Meshal AlTamimi, Abdullah Aldaihani, Emran Alfaouri, Ahmad Alothman, Abdulaziz Alshaiji, Rene Guerrero-Huerta, Savannah Regan

ADVISOR: Mark Filanc

SPONSOR: Filanc Construction

Torrey Highlands Park Stormwater Capture and Reuse

The Torrey Highlands Park Stormwater Capture and Reuse projects plans on developing and designing a stormwater capture and storage that will be used for irrigation. The project will maintain the park's current level of maintenance, reduce outside water supply reliance, as well as reduce maintenance costs.

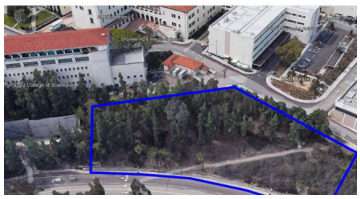
Aztec Builders

MEMBERS: Justin Bernard, Pablo Dunoyer, Gema Garcia, Fadya Odeesho, Jastan Sandhu, Victoria Tran

ADVISOR: James Haughey - Michael Baker International

SPONSOR: Jim Cleaton - Director of Construction at SDSU

View from Canyon Crest Drive looking Southwest



Construction Engineering & Management Consultation for SDSU North Life Sciences Building

Our team of construction engineers is looking to provide construction engineering & management solutions and consultation for the development of the new North Life Sciences Building at SDSU. Our goal is to provide a comprehensive analysis of the construction of this project specifically, with detailed reports and exhibits in areas including but not limited to:

•Site Logistics Plans •Cost Estimates •Scheduling •Trade Coordination •Safety •Sustainability •Feasibility •Constructability

Aztec Builders

MEMBERS: Ebrahim Alattar, Ahmad Aleisa, Humoud Aljoumah, Zahra Alrashid, Carlene Masar, Katie Rietman, Tazio Rosenburg

ADVISOR: Mark Filanc, PE, DBIA - J.R. Filanc Construction Company, Inc.

Torrey Highlands Park Stormwater Capture and Reuse

Aztec Builders designed an innovative, efficient, and cost effective stormwater capture and reuse system for Torrey Highlands Park. By utilizing gravity-fed systems based on the natural topography of the region and tapping into existing stormwater infrastructure, costs were minimized. In addition, an adaptable water treatment system was designed to target the region's anticipated pollutants. Lastly, an appropriately sized storage tank was designed to store as much captured stormwater as possible, while minimizing costs.

Aztec Civil Engineering

MEMBERS: Laura Barney-Munoz, Rezeq Khalifeh, Zohra Kushkaki, Suriya Laiq, Daniel Langstraat, Yara Metlak, Derian Theberge

ADVISOR: Jeremy LaHaye - T.Y. Lin International

AZTEC CIVIL

Newhall Ranch Bike Path-Retaining Wall

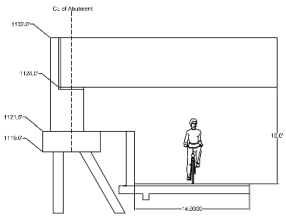
This project is to design and construct a bike path that connects to the established bike path network in the City of Santa Clarita. In addition a retaining wall will be developed in the San Francisquito Creek channel beneath the Newhall Ranch Road Bridge. This link is required to provide access and connectivity to the network, and to promote movement between bicyclists and pedestrians.

California Master Builders

MEMBERS: Maryam Alkhaled, Brett Aspacio, Neil Heckerman, Aayah Khawajah, Kevin Matias, Giovanny Robles

ADVISOR: Mark Kaems, PE - California Department of Transportation

SPONSOR: Nensi Lakrori, PE, LEED AP BD+C - SDSU



Newhall Bike Path and Retaining Wall

Newhall Bike Path and Retaining Wall is apart of the City of Santa Clarita's infrastructure improvements plan. As California Master Builders we are taking on the project as a design builder to develop the site and design a structural retaining wall and bike path that will connect the existing bike paths via an undercrossing.

Capital Construction

MEMBERS: Elijah Berry, Garret Bomhoff, Jose Figueroa, David Gasca, Marcus Gay, Kianna Tejada

ADVISORS: Sam Amen - SDSU, James Haughey - SDSU, Lima Saft - SDSU

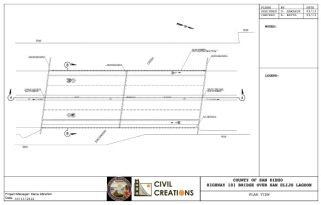
SPONSOR: County of San Diego

County Woodside Avenue

Capital Construction will be designing and building street improvements on Woodside Avenue for the County of San Diego. Our improvements will include the stretch of road that connects Winter Gardens Boulevard to Channel Road. We are focusing on improvements to the current bike lanes, sidewalks, adjacent driveways, and the two traffic signals located within the intersections in our scope. Our plans include improving the quality of life of the community while making sure not to decrease the Level of Service of the traffic.

Civil Creations

MEMBERS: Dena Abrahim, Kamran Azhand, Amir Batta, Jake Espinoza, Josiah Imperial, Julia Recker



Highway 101 Bridge over San Elijo Lagoon

The Civil Creations team is providing design services for replacing the existing highway 101 bridge over San Elijo Lagoon. We will be implementing accelerated bridge construction and using the slide-in method by pre-fabricating the bridge to significantly reduce closure and construction time due to the nature of the site location.

Civil Minded

MEMBERS: Nathan Audo, Ryan Herd, Lance Hermiz, Jewel Jamou, Jesus Rabago, Michael Szpyrka

Newhall Bike Path and Retaining Wall

In the San Francisquito Creek channel underneath the Newhall Ranch Road Bridge, a bike path and corresponding retaining wall will be built. This connection is necessary to connect to the City of Santa Clarita's large bike path system.

Clear Line Construction

MEMBERS: Katie Dalby, Annie Herron, Kyra Leach, Katelyn Makanvand, Nima Nasirpour, Manuella Sobol

ADVISOR: Mark Filanc - J.R. Filanc Construction

SPONSOR: San Diego State University

SDSU West Campus - SURF (Surveillance and WateReuse Research Facility) Flagship Facility Design

The project will be to design and develop a new "State of the Art" water lab where students, professors, and industry can come together to develop testing and treatment solutions utilizing modern and future technologies.

Dawn to Dusk Engineering

MEMBERS: William Augustine, Jackson Cacciarelli, Carson Knutson, Matthew Macasaddu, Callum McRae, Ryan Zwick

ADVISOR: Mark Filanc - J.R. Filanc Construction

SPONSOR: Mark Filanc - J.R. Filanc Construction

SDSU West Campus - SURF (Surveillance and WateReuse Research Facility) Flagship Facility Design

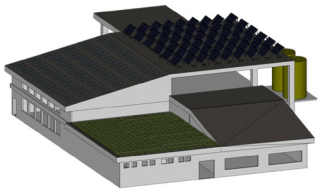
Design a state-of-the-art Wastewater Treatment facility that can be utilized as a research laboratory and learning environment for the students and faculty of San Diego State University at the new Mission Valley campus.

Fortitude Engineering

MEMBERS: Fiona Esho, Silvana Jebraeil, Kyle Jones, Brooke Miller, Jocelynn Padilla, Jessica Tohill

ADVISORS: Marc Filanc - Filanc Construction, Joshua Woodruff - Michael Baker International

SPONSORS: San Diego State University, Mark Filanc - Filanc Construction, Clark Construction



SDSU West Campus - SURF (Surveillance and Watereuse Research Facility) Flagship Facility Design

The SDSU Mission Valley campus will grow the university's education, housing, laboratory resources, and employment for students. In today's environment, the economy is facing water shortages due to the current climate change. Due to this, SDSU is implementing a water laboratory in the new Mission Valley campus to focus on water quality and treatment research. The project involves a drainage design, sanitary sewer design, structural design, hydrology study, storm water quality management plan, and environmental analysis.

Hydraulic Solutions

MEMBERS: Bianca Anderson, Robert Chaney, Tristen Cain, Trevor Eckermann, Cory Erlenbach, Jake Wheeles, Adam Zein

ADVISOR: Mark Filanc - J.R. Filanc Construction Company

SPONSOR: Gary Silverman - J.R. Filanc Construction Company

Oceanside OMG Pump Station

The Oceanside OMG Pump Station project will consist of various pipelines as well as a new lift station, complete design for the new lift station including locating the new Station and support facilities on the site, as well as the sizing of the wetwell, pumping strategy, pump selection, discharge piping, emergency power generation, architectural building housing the pump station and civil sitework for the new facility.

MARL Consultants

MEMBERS: Alhaiba Alallao, Moheb Beshay, Merna Griess, Rita Isaac, Mario Morcos, Lorhan Zaccarias

ADVISOR: James Haughey - SDSU

SPONSORS: Jim Cleaton - SDSU, Jeff Morgan - City of Santee, Melisa Wiedemeier - Caltrans

SDSU North Life Sciences Building

Brand new technologically advanced SDSU North Life Science Building to replace the outdated existing structure. The new improved building will consist of four floors with more space for teaching labs and research facilities. The building will accommodate more students and allow future research endeavors and opportunities.

Pacific Hydro Engineering

MEMBERS: Yousef Alramzi, Christopher Berkoben, Mark Cringan, Michael Morrissey Hanson, Elisa Rivera, Fatima Shahine

ADVISOR: Mark Filanc - J.R. Filanc Construction Co, Inc

SPONSOR: Gary Silverman PE - J.R. Filanc Construction Co. Inc

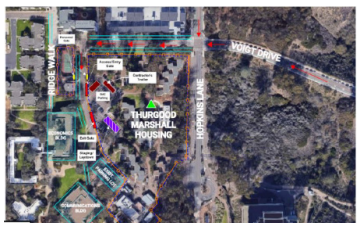
Oceanside OMG Pump Station

Our team is developing a design of a sewer pump station for The City of Oceanside. We are providing the hydraulic, civil/site work, storm water, geotechnical, structural, and construction engineering design four our client.

Poseidon Engineering

MEMBERS: Joseph Armas, Kyle Domingo, Dana Focardi, Marielle McMullen, Reese Patterson, Eric Watkins

ADVISOR: James Haughey - Michael Baker International



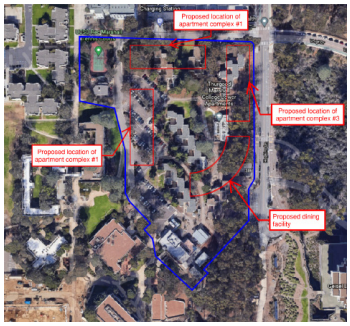
UCSD Marshall Undergraduate Housing

The University of California San Diego (UCSD) is seeking Design-Build Entities qualified to design and construct a new Thurgood Marshall Undergrad Housing (aka Thurgood Marshall Housing). The project shall replace the existing Thurgood Marshall Lower Apartments.

Seal T6 Engineering

MEMBERS: Hasan Alqaoud, Davy Artho-Phan, Austin Monterola, Lauren Nolan, Erwin Rivera, Benjamin Zee

ADVISOR: Clark Construction



UCSD Thurgood Marshall Undergrad Housing

Our team is set to design and build a new housing facility for UCSD's Thurgood Marshall College. We will be replacing the existing Thurgood Marshall Lower Apartments with 3 new buildings for housing and an additional dining facility for the residents. In between these buildings will be a central courtyard.

Seaside Engineering

MEMBERS: Sean Jude Bartes, Jessica Felix, Kyle Gard, Nicole Hurtado-Savin, Manuel Martinez, Alma Serdarevic

ADVISOR: Jeremy LaHaye - T.Y. Lin International

Highway 101 Bridge Over San Elijo Lagoon

The Highway 101 Bridge spans over San Elijo Lagoon and is located southwest of Glen Park between Cardiff State Beach and San Elijo State Beach. This project proposes to design a replacement for the existing Highway 101 Bridge over San Elijo Lagoon that addresses the rising floodplain, all while remaining considerate to the public and the local environment. The goal of this project is to enhance the mobility of people, goods, and services, leading to the improvement of the community's quality of life.

SoCal Civil Services

MEMBERS: Alex Rivera Aguilar, Aseel Alawadhi, Gerardo Perfecto, Jonathan Rivera, Logan Voegele, Julio Rivas Zamora

ADVISOR: James Haughey

SPONSOR: County of San Diego

Socal Civil Services

Woodside Avenue Project

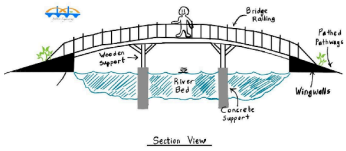
The street improvement project will cover 0.6 miles along Woodside Avenue. The improvements will consist of implementing new sidewalks for safe pedestrian travel as well as bike lanes which will help enhance traffic flow by providing a dedicated space for cyclists on the road. The improvements will also include new stripping, improved traffic signaling and storm drain.

Systemic Engineering

MEMBERS: Yousif Alfadhel, Yousiff Almesri, Abdulwahab Alshuaib, Fidel Martinez Munoz, Richard Schamp, Dawit Teckle

ADVISOR: Jeremy LaHaye

SPONSOR: T.Y. Lin International



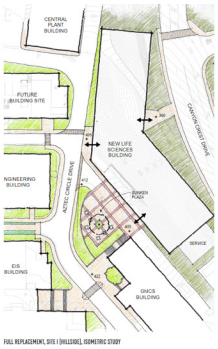
Mission Trails Pedestrian Bridge

Our team aims to design and implement a memorial bridge that crosses the San Diego River, connecting the North and South trails during the rainy season without obstructing existing pathways.

The A-Team Inc.

MEMBERS: Abdullah Al Awadi, Bader Al Ghareeb, Fatmah Al Mutairi, Ban Ebrahim, Ryan Freedman, Isabel Rivera, Treonnie Shelton

ADVISOR: Jim Haughey - Michael Baker International



SDSU North Life Science Building

The SDSU North Life Science building will replace the existing SDSU North Life Science building across campus. We will be providing engineering and contracting services throughout the duration of the project.

Truss Me Engineering Inc.

MEMBERS: Ann Habib, Aveen Ashoor, Saneer Dawood, Sara Gaspar, Ledya Sbeih, Armando Zavala

ADVISOR: Jeremy LaHaye, PE T.Y. Lin International Group

SPONSORS: T.Y. Lin International Group, CALTRANS, San Diego State University, Walsh Engineering & Surveying INC., San Diego County

Mission Trails Pedestrian Bridge

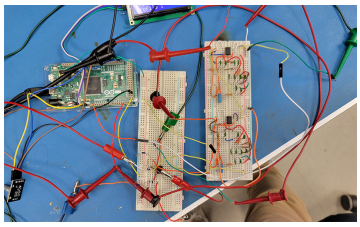
Construction of the Max Lenial-Memorial Pedestrian Bridge at Mission Trails Regional Park, traversing the San Diego River. The river-crossing location is popular amongst hikers, bicyclists, local families, and tourists visiting the City of San Diego. A new pedestrian bridge provides safe passage for those who seek to enjoy the natural beauty, that is, San Diego.

Aztec Audio

MEMBERS: Mubarak Aljadei, Maximillan Guinto, Nazreth Negash, Lana Pantskalashvili, Alexis Llamas Zamora

ADVISOR: Professor Barry Dorr, PE - SDSU

SPONSOR: San Diego State University



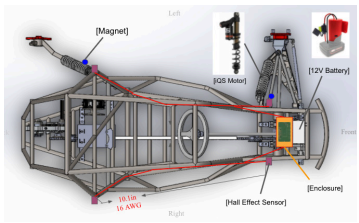
Project: Smart Sound System

The Smart Sound System 555 (SSS-555) is a stereo audio system that will periodically detect ambient noise levels to automatically adjust the sound levels produced internally not to exceed a set threshold for volume and only 10-15 dB above the ambient noise level.The SSS-555 sound system is being developed to deliver stereo quality audio without the need for excess space and or complexity.

Aztec Baja Active Suspension System (ABASS)

MEMBERS: Da Chung, Kyle Hill, Benjamin Johnson, Desmond Maxwell, Eric Rosas

ADVISOR: Professor Barry Dorr, PE - SDSU



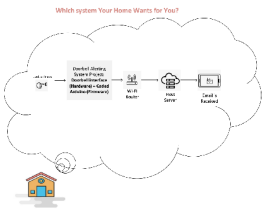
Baja Active Suspension System

Aztec Baja Active Suspension System Team delivers an electrically controlled suspension system that dynamically responds to variable terrains for the SDSU Baja SAE club competition race vehicle. Upgrading the mechanical suspensions of the 2019 car, our controller replaces the same functionalities of the FOX intelligent Quick Switch (iQS) commercial-off-the-shelf soft, medium, and hard shock settings and adds a custom “Active” mode in response to wheel position and speed.

Dorr-Bell Engineering

MEMBERS: Rashed Abdullah, Rawan Althrwi, Zewei Liu, Jose Perez, Eddie Salazar

ADVISOR: Professor Barry Dorr, PE - SDSU



Doorbell Alerting System

Our system is a smart upgrade for conventional doorbell systems that works with the existing residential doorbell components and provides an easy upgrade. It interfaces with an existing 16-24V doorbell and its wiring. When a visitor presses the button, an optocoupler passes a 5V digital signal to an Arduino with Wi-Fi capabilities. When the button is pressed, it sends an event to a host server that uses IFTTT protocol to generate an email and send it to a phone app.

Good Vibes

MEMBERS: Jona Andres, Jose Belmar, Ethan Cua, Hugo Rivera Garza, Ninos Younadam

ADVISOR: Professor Barry Dorr, PE - SDSU

SPONSOR: San Diego State University

Audio Compressor for Hearing Impaired

The Audio Compressor is a device that will aid the elderly or hearing impaired by helping them listen to the loud and soft passages of their audio. The user can listen to their audio through speakers or headphones. The user will have the option to choose different audio compression profiles by using a knob to cycle through each profile and pressing in the knob to select their profile. Each profile will give the user the ability to customize the dynamic range of their audio. Additionally, there will be another knob allowing the user to adjust the gain of the audio. There will be an LED to indicate to the user if their gain adjustment causes audio clipping. The current status of the system will be displayed to the user through an LCD display on the audio compressor's enclosure.

Only Electrons

MEMBERS: Brian Ahlers, Abraham Carranza, Kaitlyn Hamiter, Christopher Johnson, Christopher Kihano

ADVISOR: Professor Barry Dorr, PE - SDSU

SPONSOR: San Diego State University

Class D Audio Amplifier

HappyTunes is a portable speaker, using a discrete class D audio amplifier developed by the team. The system is powered by a classic car's 12 volt auxiliary power port, placed in a convenient location of the vehicle, used to improve the overall sound experience, and be easily removed to maintain the original aesthetics of the vehicle. Furthermore, the device may also be powered via an electrical outlet.

Solar Tri-Generation

MEMBERS: Dennis Chhoeuk, Eduardo Mercado Figueroa, Zackary Hollingworth, Elise Serrano, Steven Shaaya

ADVISOR: Dr. Saeed Manshadi - SDSU

SPONSOR: Enersion


Solar Tri-Generation GUI

Solar Tri-Generation

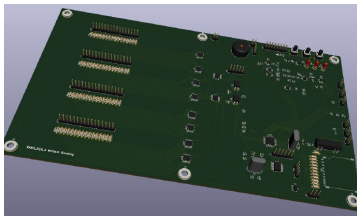
Enersion is a clean energy start-up with a system called tri-generation where they provide cooling, heating, and electricity to a customer. To assist their analysis, we created a GUI that displays input data such as solar availability, electrical and hot water usage, cooling load, and compares it with the projected energy capabilities of various sizes of Enersion's system. Ultimately, a cost of energy upkeep and carbon footprint analysis is output to help a customer realize the benefits of installing Enersion's system.

The Abstract Alarmists

MEMBERS: William Bowling, Raul Palomo, Zachary Tarkowski, Isaiah Webster, Kevin Wuertz

ADVISOR: Professor Barry Dorr, PE - SDSU

SPONSOR: Dennis Berglund, PE - Priax Corporation



RANS Product Update

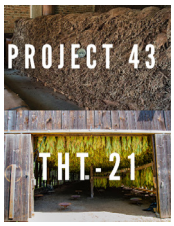
The Roving Alarm Notification System (RANS) is a security system designed to give nearby roaming personnel up to date location information for designated security zones. This iteration of the system seeks to upgrade the obsolete components and the memory storage of the device.

THT-21

MEMBERS: Andrew Castillo, Collin Chapman, Maria Del Pilar Mata Gomez, Cheryl Hagar

ADVISOR: Ying-Khai Teh

SPONSOR: Alejandro Mata Alfambra - Alfambra Cigars



THT-21

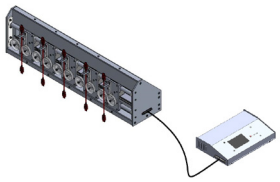
The THT-21, for Tobacco, Humidity and Temperature 2021, is being developed to serve as a more accurate and dependable technology for monitoring conditions of drying and fermenting warehouses used on a tobacco farm in Nicaragua. There is a need for this technology as the current tools being employed are obsolete, and the farm experiences heavy product losses when conditions fall out of ideal ranges (26-30°C and 80-90% relative humidity).

22 Bend Street

MEMBERS: Abdulwahab Alqurtas, Kyle Collins, Grace Fraser, Brandon Lipscomb, Joseph Marquez, Christopher Martin, Jeremy Minimo, Alfonso Monroy, Phummin Rotphan, Frank Slewa

ADVISORS: Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU, Glenn Pohly - Masimo, Desmond Mok - Masimo, Jonathan Truesdell - Masimo

SPONSOR: Masimo



Integrated Cable Bend Cycle Test System

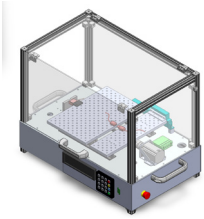
The Electrically Integrated Cable Bend Cycle Test System is designed to test the durability of medical-grade cables manufactured by Masimo. Our device features five independently controlled motorized workstations to carry out flexion stress tests and comes equipped with fully automated testing procedures. Key technologies built into the device include: precision motor control, adjustable workstations coupled with an ergonomic cable mounting system and continuity detection.

Akula Zub Technologies

MEMBERS: Fahad Alsahli, Mark Blair, Jeffrey Calimbahin, Thomas Floisand, Andrew Jefferson, Christine Maryfield, Belinda Nguyen, Jake Prittie, Nereyda Lopez Resendiz, Han Tang

ADVISORS: Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU, Chris Cardenas - Masimo, Austin Pike - Masimo, Glenn Pohly - Masimo

SPONSOR: Masimo



Electrically Integrated Linear Mating Cycle Test System

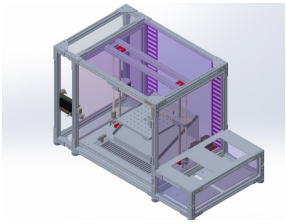
Connector Resistance and Force Tester (C.R.A.F.T.) is an electrically integrated linear mating cycle test system capable of measuring insertion/removal forces and electrical resistance of connectors of various shapes and sizes. This system was designed for Masimo, a medical device company focused mainly on noninvasive patient monitoring, with the purpose of testing their multiple connectors' lifespan and their mechanical and electrical properties. C.R.A.F.T. is a benchtop sized, fully enclosed system, designed with both mechanical and electrical components. With a user-friendly interface, C.R.A.F.T allows the operator to determine customized parameters for each connector during setup such as cycle speed, travel distance, and connection time.

All Suds No Duds

MEMBERS: Abdulaziz Alrshaid, Jason Babayev, Ahmad Bandar, Jackson Cruise, Sean Eckstein, Luka Emrashvili, Kamar Mirza Hussein, Lauren Jansen, Jared Meeks, Lori Voong

ADVISORS: Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU, Chris Cardenas - Masimo, Austin Pike - Masimo, Glenn Pohly - Masimo

SPONSOR: Masimo



Automated Chemical Wiping System

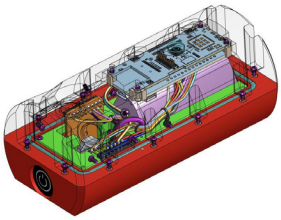
Devices used in a medical setting must have proper labeling on the exterior casing to maintain FDA certification. Team All Suds No Duds worked with sponsor Masimo to create a test device that will be capable of completing up to 100,000 cycles autonomously to test material degradation of devices. This device consists of multiple subsystems for linear motion, drainage, wiping, camera, chemical application, and electrical components.

ARGUS II

MEMBERS: Mohammed Alfailakawi, Dwight Anthony Diesmo, Jhovanna Garcia, Nathan Mincks, John Pawlak, Marcos Rodriguez, Kaylin Sabado, John Sadiq, Nina Truong, Riley Turner

ADVISORS: Kevin Demesa - USN, Cassie Heyman-Schrum - NSIN, Dr. Duy H. N. Nguyen - SDSU, Dr. Scott Shaffar - SDSU

SPONSORS: NSIN, USN, USMC



USMC Small Ground Sensor

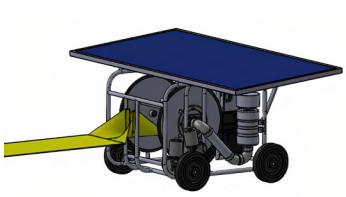
Marines require a sophisticated understanding of where adversary forces are located within their battlespace. The USMC small ground sensor project can provide the Marine ground forces with a deployable compact sensor system that includes audio, visual, seismic, and GPS data to fully understand an evolving battlespace. The Phase 2 teams focus is on optimizing the form factor, reliability, durability, weight, and performance.

Blockade Brigade

MEMBERS: Sean Connolly, Alyssa Elkins, Khalid Nunow, Jomari Paguia, Marc Tanwangco, Timothy Turner, Nick Wolford, Bianca Yousif, Ala Zeidan

ADVISORS: Dr. Chris Mi - SDSU, Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU, Mr. Phillip Benham - Benham Aviation Services

SPONSORS: Benham Aviation Services



Rapid Deployment Runway Closure System (RDRCS)

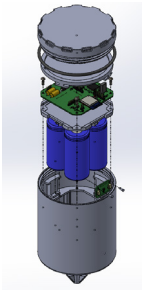
The Rapid Deployment Runway Closure System is an inflatable system developed to quickly deploy and retract to prevent the landing of unauthorized aircraft on remote airstrips by exhibiting the appearance of a barrier. The inflatable is anchored by a ground stake and an off-the-airstrip housing complex containing the blower, power supply, and control system. The system was engineered to be operable by a single person and adhere to airstrip safety protocols.

Cliff Sense

MEMBERS: Po-Hsien Chen, Eliott Giberson, Nicolas Kano, Kassandra Marquez, Adrian Melgoza, George Mirza, Tristan Schultz, Richard Stoddart, Harrison Ward, Kevin Winchell

ADVISORS: Dr. Christopher P. Paolini - SDSU, Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU

SPONSOR: SDSU Electrical and Computer Engineering Department



Seismic System for Detecting Beach Bluff Collapses

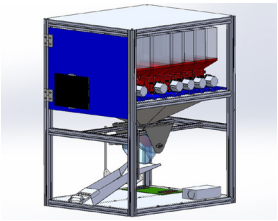
California coastlines have awe inspiring world class beauty, however cliff bluffs with hidden dangers put public safety at risk. Our solution is to deploy a long range underground wireless sensor probe network capable of localized real-time event data processing of: seismic data, tilt changes, temperature and soil conductivity. Our system is both wireless rechargeable, and has redundant wireless data download pathways to maximize operational longevity.

Granola GOATS

MEMBERS: Adhel AJ Corpuz, Kimo Barrere, Paris Bee, Claudia Callejas Dominguez, Conrado Dela Rosa, Joe Huang, Daniel Izarraras, Xavier Lovato, Zayne Mirza, Evaristo Rodriguez

ADVISORS: Dusty Fisk - D&K Engineering, Wayne Jackson - D&K Engineering, John Reep - D&K Engineering, Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU

SPONSOR: D&K Engineering



Granola Kiosk

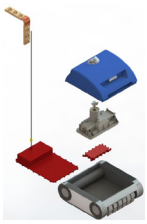
This project involved the design, fabrication and tesing of a consumer, self-serve granola dispensing kiosk. The design solution takes into consideration the customer's ingredient choices as well as the desired serving size. It then uses its control system to maneuver all the mechanical components responsible for measuring, mixing, and dispensing the granola. The secondary goal of this project is to provide a modular design that may be utilized in future kiosks that D&K may be looking to manufacture.

Indux

MEMBERS: Abdulmohsen Alabdulkarim, Aeron Joshua Gonzalves, Mohammed Mohammed, Uriel Molano, Paul Nguyen, Truong Nguyen, Rene Orellana, Alejandro Ortuno, K'Von Tanner, Shane Wegener

ADVISORS: Dr. Chris Mi - SDSU, Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU, Mr. Dustin Borg - Fluidra, Mr. Brian Liss - Fluidra

SPONSOR: Fluidra North America



Inductive Charging for Pool Robots

Current robotic pool cleaners exist as either hard-wired to an external power source or battery operated with manual periodic charging, similar to current robotic home vacuums. The project researched inductive charging methods, pool cleaning technologies and various regulatory and practicality concerns. The team designed and fabricated a working prototype of an inductive charging system for Fluidra's robotic pool cleaner.

Influunt

MEMBERS: Ameer Alhelli, Ahmad Ali, Nicholas Davis, Jose Maldonado Villarreal, Zachary McGraw, Kevin Nguyen, Laith Noeil, Christopher Torres, Brian Tran, Kenny Truong

ADVISORS: Merinda Nugent, Mechanical Engineer III - Fluidra North America, Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU

SPONSOR: Fluidra North America

Particle Measurement Test System for Pool Filtration

To test the quality of filters, Fluidra performs tests in accordance with the NSF 50 standard for pool equipment. For this, the team was tasked with designing a system capable of measuring the particle size/count in the water at the inlet and outlet of a filter, be able to draw water from two tanks, measure and throttle the flow rate in the system, measure the pressure across a filter, read the temperature of the water, and measure the turbidity (measured in NTUs) at the inlet and outlet of the filter, all in real-time.

Kraken

MEMBERS: Ahren Kimo Aguinaldo, Frank Aosman, Abdulaziz Bandar, Shane Cooke, Jason Lin, Kyle McCoy, Jorge Martinez, Ivan Orozco, Andrew Preece, Juan Rojas

ADVISORS: Dr. Scott Shaffar - SDSU, Dr. Baris Aksanli - SDSU, Professor Barry Dorr - SDSU, LCDR Eric C. Jr. Watkins, USCG

SPONSORS: Ocean Aero, U.S. Department of Defense NSIN, U.S. Department of Homeland Security United States Coast Guard

Detection of Unmanned, Autonomous Surface Vessels

Transnational Criminal Organizations (TCOs) are using autonomous surface vessels to transport contraband undetected across the Maritime Boundary Line. Such vessels are difficult to detect, so they pose a threat to national security. Therefore, the United States Coast Guard requires a fully autonomous vessel under a materials budget of $700 that is similar to previously seized vessels and is as advanced as possible in order to determine the best method to detect them before they reach their destination.

Licensed to Pill

MEMBERS: Courtney Baugh, Julian Ditona, Kimberly Duron, Ziyad Elfar, Max Greiner, Isomiddin Kamilov, Jason Kassissieh, Mark Le, Ryan Shimizu, Ethan Tallorin

ADVISORS: Dr. Scott Shafar - SDSU, Professor Barry Dorr - SDSU, Dr. Sridhar Seshagiri - SDSU, Ms. Annemarie Orr - Quality of Life Plus, Colonel Arthur Yeager - Quality of Life Plus

SPONSOR: Quality of Life Plus

Automated Pill Dispenser (Phase III)

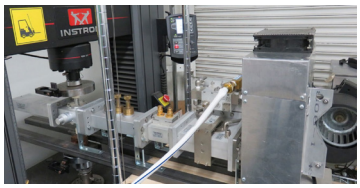
Team Licensed to Pill designed and manufactured an automated pill dispenser to ease the process and reduce the need for fine motor skills for patients and caregivers when dispensing pills into a pill organizer. The pill dispenser is able to distribute a desired amount of pills to their respective days in both weekly and monthly pill organizers, can accommodate a variety of pill shapes and sizes, and has an easy to use, high contrast Graphical User Interface.

Sintering Engineers

MEMBERS: Omar Alshatti, Logan Beltz, Gabriel Facco Bettinelli, Dante Gonzalez Corbett, Aquin Manners, Christopher Sarabia, Eric Segura, Jimmy Tran

ADVISORS: Dr. Elisa Torresani - SDSU, Dr. Scott Shafar - SDSU

SPONSOR: SDSU Powder Technology Laboratory



PID Controlled Microwave Press

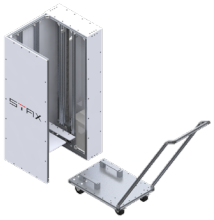
In support of SDSU materials search, team Sintering Engineers have created a sintering chamber that includes a Proportional–Integral–Derivative (PID) controller system for an existing Microwave Press. The PID controller will utilize input data from the materials' increase in temperature and difference in the emitted and reflected power over time, to govern the energy emitted from the magnetron. The intention is to flash sinter a powder based material, under pressure to create more homogeneously transparent material and progress microwave sintering technology.

Stax Engineering

MEMBERS: Ali Al-Azmi, Faakhir Ali, Saud Al-Mutairi, Ian Estacio, Steven Magayanes, Karim Omara, Alejandro Ortiz, Joel Osuna, Chaitanya Patel, Kevin Uy

ADVISORS: Engineer Pratul Singh - Masimo, Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU

SPONSOR: Masimo



Automated Tray Stacker & De-stacker (Stax TSD)

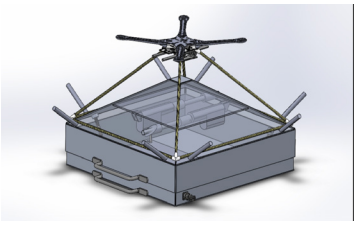
The Stax Engineering team, along with the sponsorship of Masimo, has developed the Automated Tray Tacker & De-stacker with the intent to improve the efficiency of Masimo's production line. The machine's design is similar to a 3D printer, where it utilizes rotational motion and converts it into linear motion through the use of a stepper motor, microcontroller, and Lead Screw. As a joint ME/ECE team, we were able to develop an automated mechatronic system that includes sensors, emergency protocols, and a touchscreen.

Talon

MEMBERS: Christopher Bowman, Charles Kaui, Nicholas King, Bryce Kirklen, Cesar Nuno-Banuelos, Angelo Peck, Chanthol Phea, Robert Spiers, Nathaniel Thomas, Fady Yousif

ADVISORS: Andrew Simmons - Northrop Grumman, James Downs - Northrop Grumman, Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU, Dr. Junfei Xie - SDSU

SPONSOR: Northrop Grumman



Self-Securing Landing Mechanism for VTOL Autonomous Vehicle

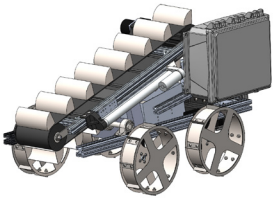
The goal of this project is to create a system which allows a drone upon landing to autonomously dock with, and be secured to a ground based landing pad. The drone will include a control system and sensor suite that is able to detect the landing location, maneuver itself toward, and align itself with the landing pad. The landing pad will then mechanically secure the drone once the landing procedure is complete. When the drone is ready to leave the landing pad, the process will happen in reverse and allow autonomous flight to once again occur.

Team HADES

MEMBERS: Sterling Belaire, Alyssa Brunen, William (Billy) Bilicki, Nathan de Chambeau, Andrew Chung, Linda Clark, Josh Dolled, Jaquelyn Fernandez-Iniguez, Jean Michel Vives, John Paul Edwin Ventura

ADVISORS: Dr. Scott Shaffar - SDSU, Dr. Zahra Nili Ahmadabadi - SDSU, Professor Barry Dorr - SDSU, Dr. Sridhar Seshagiri - SDSU

SPONSOR: NASA, San Diego State University



Handy Aztec Digging & Extraction System

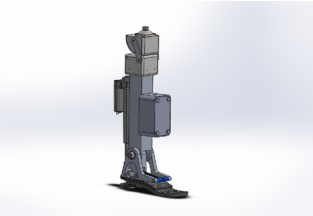
Team HADES is representing San Diego State University at the NASA Robotic Mining Competition (RMC) Lunabotics 2022 by designing, building, and operating a lunar mining robot. The goal of NASA RMC is to find innovative solutions to extract material from beneath the lunar surface using a partially autonomous robot with a dust-free operation/design. The competition is an engineering challenge in which students gain experience with the engineering lifecycle process, from concept development to system closeout.

Team Tyr

MEMBERS: Nasser Almarshoud, Marc Anthony Do, Susana Arellano, Dina Batros, Matthew Blake, Zach Brueggeman, Garrett Grommes, Justin Killam, Jarel-John Macanas, Sony Shosani

ADVISORS: Dr. Scott Shaffar - SDSU, Professor Barry Dorr - SDSU, Ms. Annemarie Orr - Quality of Life Plus

SPONSOR: Quality of Life Plus



Hiking Powered Prosthetic

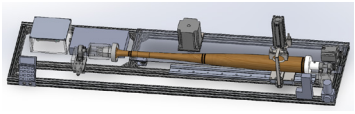
Most current powered prosthetics serve the purpose of assisting the user with their everyday walking. Our team was challenged to design a more advanced prosthetic capable of going on long hiking and hunting expeditions in inclement weather. Our prosthetic uses a linear actuator in series with a spring to provide powered assistance to the user's gait, making it easier and more comfortable for them to hike and walk on uneven terrain.

The Sluggineers

MEMBERS: Abdulwahab Altawheed, Vincent Chang, Audrey Paris Chuakay, Anthony Gugg, Scot Haury, Steven Matti, Devin Morningstar, Loran Najjar, Pat Petel, Brandon Pola

ADVISORS: Professor Barry Dorr - SDSU, Dr. Scott Shaffar - SDSU, Professor Ken Arnold - SDSU, Mr. Victor Escobedo - D&K, Mr. John Reep - D&K, Mr. Luciano Silva, Mr. Miguel Valle - Vander Pro Sports

SPONSOR: Vander Pro Sports



Baseball Bat Finishing System

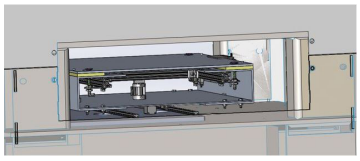
The objective of this project is to design and fabricate a device that increases the hardness and surface finish of a wooden, professional league baseball bat by rubbing along the barrel with a harder material. The design employs a pneumatic cylinder to apply pressure to the bat barrel and two stepper motors to rotate the bat and move the pneumatic cylinder along the bat barrel. This system has been designed to operate at adjustable bat diameters and lengths offered by Vander Pro Sports.

The Teleporters

MEMBERS: Abdullah Alani, May Aldhaiea, Abdallah Alhajeri, Chad Bicoy, Denver Chan, Zachary Chow, Eric Galvan, Aziz Hanna, Jose Hernandez, Shervin Shabanpour

ADVISORS: David Padgett - Nordson ASYMTEK, Dr. Scott Shaffar - SDSU

SPONSOR: Nordson ASYMTEK



Automated Tooling Design for PCB Dispense Application

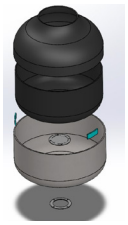
Nordson ASYMTEK dispensing systems provide automation for the semiconductor electronics market where glues and adhesives are applied to electronic assemblies. These can be at the board level, wafer level, or at a package level. This project provides an automated loading, fixturing, heating, and unloading mechanism. The objectives are to (1) provide a fixed "load" and "unload" position(s) to receive a substrate, and (2) provide a fixture to hold and heat the substrate during dispensing.

Aquasafe

MEMBERS: Aubrey Benjamin, Kyle Grant , Brody Harris, Nolan McRae, Joshua Norton

ADVISORS: Dr. Scott Shaffar - SDSU, Annemarie Orr - Quality of Life Plus

SPONSOR: Quality of Life Plus



Osseointegration Prosthetic Cover

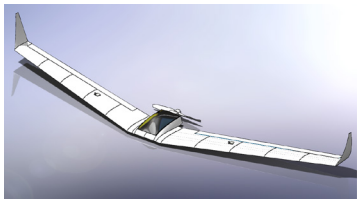
Osseointegration is an operation that provides amputees with an easy attachment point for a prosthetic. Osseointegration patients are left with an open stoma around the abutment, meaning it cannot be exposed to brown water. The objective of this project is to design and manufacture a waterproof cover to be worn during physical activity. The cover shall allow the patient to continue his passion for whitewater rafting and swimming with a prosthetic still attached.

AzTex Flight

MEMBERS: Joyce Huang, Jesus Ibarra, Daryl Lyons, Maria Patrisha Perez, Alexander Williamson

ADVISORS: Dr. Scott Shaffar - SDSU, Dr. Charles Norris

SPONSORS: San Diego State University, University of Texas, Arlington



UTA 3D Printed Aircraft Competition

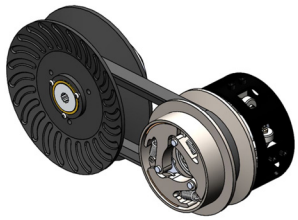
This team performed research, analysis, and testing to design and manufacture a fully 3D printed RC aircraft with the purpose of winning both the Most Innovative Design and Longest Duration of Flight awards in the fixed-wing category at the 6th Annual 3D Printed Aircraft Competition held in July at the University of Texas Arlington. All lifting surfaces and aircraft components must be 3D printed, except for electronics, the propeller, and some hardware. The aircraft is allowed to be powered for only 8 secs and must fly under a 30 ft altitude.

Belted Bandits

MEMBERS: Ciara Garrison, Kedar Kale, Jorge Lacbain, Isaac Miller, Erika Short

ADVISOR: Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Aztec Baja SAE



Continuously Variable Transmission Belt

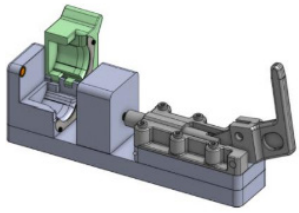
Aztec Baja's SAE vehicle competes each year in the SAE Baja collegiate series, where various aspects of the vehicle are tested. The Aztec vehicle utilizes a continuously variable transmission (CVT), which is prone to belt slippage at low speeds. Team Belted Bandits has designed and engineered a system to decouple the engine shaft from the primary pulley. Consequently, this improves the output power and maintains the previous vehicle's top speed. Furthermore, the system complies with the 2021-2022 SAE rulebook.

Dex5

MEMBERS: Gabrielle Ahad, Victoria Carlson, Jonas Marave, Clint Panian, Andrew Silva

ADVISORS: Leonard Barbod - Dexcom, Dr. Scott Shaffar - SDSU

SPONSOR: Dexcom



Pressure Decay Test Fixture

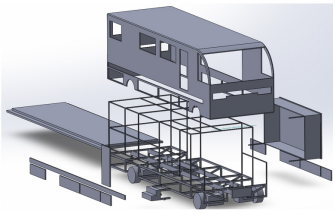
The Dex5 team has designed a fixture that allows production operators to easily conduct a pressure decay test required to confirm production equipment while reducing overall test set up time and steps, and producing a reliable and repeatable result.

F.E.R.V.

MEMBERS: Philip Alberti, Ramil Gapuz, Justin Legaspi, Rene Navarro, Ryan Sternberg

ADVISOR: Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Mechanical Engineering Department



Fully Electric Recreational Vehicle

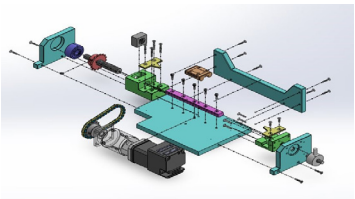
This project involved a system design for a class A, fully electric powered Recreational Vehicle (RV). The team's primary focus was on the powertrain with a secondary focus on structure and exterior. The innovative RV design accommodates 5ft modular structural increments within the vehicle class, and integrates interior customization with slide and lock systems for customer preference. The system includes the integration of cutting edge solar panels for maximum user experience. An exterior wall section providing enhanced thermal and noise insulation over modern examples, as well as 1/12th scale of vehicle design is provided.

G7 Designs

MEMBERS: Osvaldo Chavarin, Peterson Frith, Christopher Guzman, Deven Harrington, Christian Hernandez

ADVISORS: Dr. Scott Shaffar - SDSU, Dr. Wenwu Xu - SDSU

SPONSOR: SDSU Mechanical Engineering Department



Tensile Tester Used for In-Situ Scanning Electron Microscopy

This project suppports SDSU materials research through the innovative design, fabrication and testing of a new Tensile Tester. This Tensile Tester is inteded for use within a Scanning Electron Microscopy to observe fracture and deformation of aluminum and magnesium specimens.

Grip It

MEMBERS: Caroline Duong, Amber McGrogan, Blake Motley, Tighe Reed, Ethan Short

ADVISORS: Dr. Scott Shaffar - SDSU, Annemarie Orr - Quality of Life Plus

SPONSOR: Quality of Life Plus

Mountain Bike Grip Solution

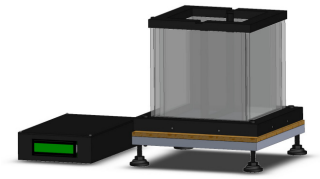
A 36 year-old Army National Guard Combat Engineer was injured in 2004 by a suicide bomb. He sustained multiple injuries including a thumb amputation on his right hand which provides continuous pain and difficulty gripping. He does enjoy mountain bike riding and needs a device to assist with grip, standard riding movements and quick release but does not interfere with use of bike controls or motion in his fingers or palm. With our device, he is able to ride his bike with ease.

Ice Quenchers

MEMBERS: Elias Garcia, Michael Kassissieh, Robert Laski, Jordan Lowe, Daniel Mandujano

ADVISORS: Dr. Amneet Pal Bhalla - SDSU, Dr. Fletcher Miller - SDSU, Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Mechanical Engineering Department



Additive Manufacturing Experimentation System

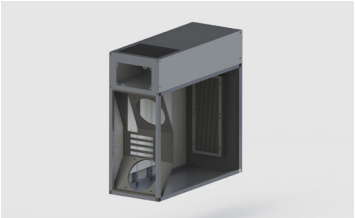
An experimental system was developed to support research by Dr. Amneet Pal Bhalla (SDSU) to develop a numerical model for Selective Laser Sintering (SLS). Starting from a simplistic approach, the phase change interfaces between gaseous, liquid, and solid phases are studied to understand and model how the displacements of such interfaces are influenced by temperature and time. Four experiments are considered.

IceCore

MEMBERS: Biruck Halefom, Matthew Robert Ilagan, Xavier Leasau, Brett Schultheis, Leonardo Zuniga

ADVISOR: Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Mechanical Engineering Department



High Airflow and Heat Transfer Personal Computer Case

This project is for the development of a personal computer case with improved cooling capability over current market models. Using airflow as the main method of cooling, various fan and component configurations were explored to achieve the current model. With high airflow, dust filtration, and a large component space for customizability, this PC case aims to compete with other models on the current market.

Ignite Innovation

MEMBERS: Cruz Alarcon, Cheyenne Greer-Potts, Leonardo Montes De Oca, Anna Pieroni, Christopher Tapia

ADVISORS: Dr. Fletcher Miller - SDSU Combustion & Solar Energy Laboratory, Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Mechanical Engineering Department

Upward Facing Cone Calorimeter for Material Flammability Testing in a Simulated Microgravity Environment

A cone calorimeter is a standard test that evaluates a material's flammability properties. Ignite Innovation designed an inverted cone calorimeter that simulates conditions consistent with a microgravity environment. Unlike the standard cone calorimeter, this apparatus will impose a slow laminar flow on the sample while reducing the effects of natural convection cooling. The inverted cone calorimeter has potential applications to study materials used in space.

Mech X

MEMBERS: Matthew Dacayo, Andy Huynh, Sidney Palomino, Xikai Xie

ADVISORS: Dr. Scott Shaffar - SDSU, Joe Bendik - ASML

SPONSOR: ASML

Breadboard Actuator in EUV Research Chamber

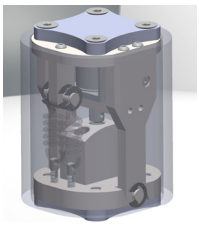
Team MechX was tasked with upgrading the current staging system at the ASML Extreme Ultraviolet research chamber. The actuator introduces additional degrees of freedom adhering to vacuum chamber guidelines. The design consists of simple machines to help position a breadboard used to hold testing materials. This improves the cycle times of testing periods and increases the accuracy of test results. Additionally, positioning the actuator can be completed with a motor-operated wirelessly from a phone app.

One Step at a Time

MEMBERS: Gillian Drees, Ysabel Murguia, Vernon Pineda, Nathaniel Prince, Thomas Tilk

ADVISORS: Dr. Scott Shaffar - SDSU, Annemarie Orr - Quality of Life Plus

SPONSOR: Quality of Life Plus



Walk to Run Prosthetic Challenge

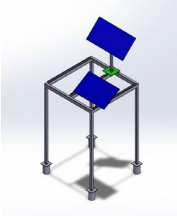
Stefan Leroy a 29 year old army vet sustained a left above the knee amputation and a right below the knee amputation. Our team created a prosthetic ankle that could be placed above the walking foot without altering the users current height. The ankle provides a change in the angle of attack suitable enough to allow for light running or exercises without the need to switch prosthetic feet. The device is triggered remotely and is spring loaded to allow for smooth & convenient transitions.

Perihelion

MEMBERS: Casper Abbasi, Weston Bourgeois, Ava James, Sarah Salgado, Brandon Welsch

ADVISORS: Dr. Asfaw Beyene - SDSU, Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Mechanical Engineering



GPS Based Solar Tracker

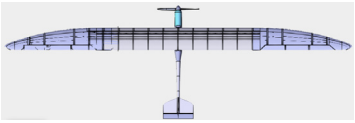
The purpose of the GPS Based Solar is to maximize the efficiency of a solar panel using only GPS coordinates and time. The design solution enables automated panel rotation on two axes so that it maintains a constant orthogonal position to the sun. The power collected from the rotational solar panel will then be compared to the power collected from a stationary solar panel in order to determine the efficiency of the two panels.

Plane Jane

MEMBERS: Scarlett Alexander, Daniel Hernandez Arzate, Daisy Cuevas, Kyle Higa, Michael Lennon

ADVISORS: Dr. Scott Shaffar - SDSU, Dr. Charles Norris

SPONSOR: University of Texas at Arlington, San Diego State University



3D Printed Aircraft Competition

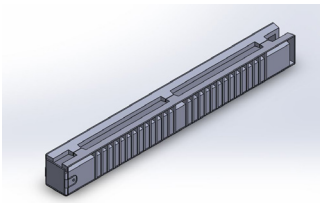
This team performed research, analysis, and testing to design and manufacture a fully 3D printed RC aircraft with the purpose of winning both the Most Innovative Design and Longest Duration of Flight awards in the fixed-wing category at the 6th Annual 3D Printed Aircraft Competition held in July at the University of Texas Arlington. All lifting surfaces and aircraft components must be 3D printed, except for electronics, the propeller, and some hardware. The aircraft is allowed to be powered for only 8 secs and must fly under a 30 ft altitude.

T - Dex

MEMBERS: Diana Arreola, Isabella Enciso, Cameron O'Connell, Brian Peticolas, Amy Turnlund

ADVISORS: Lenny Barbod - Dexcom, Kenneth Savage - Dexcom, Dr. Scott Shaffar - SDSU

SPONSOR: Dexcom



Alternate In-Process Packaging Tray

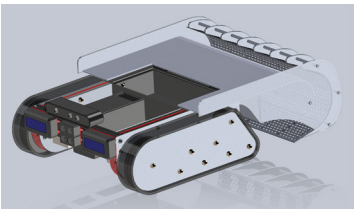
This project, sponsored by Dexcom, has developed a new reusable tray to hold and dispense Instructions For Use (IFUs), an essential component to Dexcom's Continuous Glucose Monitor packaging, into Dexcom's automated assembly line. In contrast to the currently used corrugated tray this reusable thermoformed tray will provide an opportunity for future cost savings while offering an environmentally friendly alternative to the current single use tray.

Team BCB

MEMBERS: Jason Bethmann, Matthew Blackmun, Spencer Dickson, Ben Hayenga, Kyrel Polifronevv

ADVISOR: Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Mechanical Engineering Department



Beach Cleanup Bot

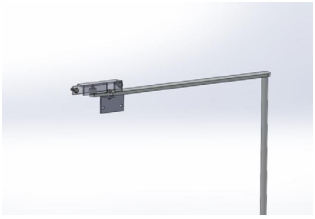
The goal of this project is to design, fabricate, and test a robot that is capable of autonomously traveling across a beach while collecting debris that could be potentially harmful to the environment and surrounding wildlife. The robot is designed to avoid obstacles and return to the home base to safely dispose of the debris that has been found on the beach.

Team Turbine

MEMBERS: Nhat Hoang, Abel Napoleon, Cesar Tellez Ornelas, William Ramirez, Le Tung

ADVISORS: Jordan Fereira - Solar Turbines, Kristopher Schaffer - Solar Turbines, Gregor Robertson - Solar Turbines, Dr. Scott Shaffar - SDSU

SPONSOR: Solar Turbines



Enclosure Door Handles for Industrial Applications

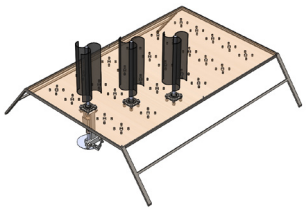
This project involved the design, fabrication and testing of a fully mechanical leverage mechanism that allows field technicians to easily and safely open positively and negatively pressurized doors on Solar Turbines' T130 engine enclosures. With this mechanism, operators can access enclosed machinery without having to shut off the enclosure ventilation system to neutralize the pressure. The mechanism utilizes leverage to create a large push/pull force (depending on the pressure scenario) as a result of a small pull/push force from the operator.

VAXIS Solutions

MEMBERS: Nicholas Lim, Brayan Mota Lopez, Shaunt Malloian, Jake Marino, Carlos Verdeja

ADVISORS: Dr. Asfaw Beyene - SDSU, Dr. Scott Shaffar - SDSU

SPONSOR: SDSU Mechanical Engineering Department



Mapping Wind Tunnel Characteristics for a Shaded VAWT

This project supports wind energy research and involves strategically placing multiple vertical axis wind turbines (VAWTs) in a shaded formation to determine ways to improve wind turbine power production efficiency. The project team mapped the boundary layer parameters of the low-speed wind tunnel as a function of the motor speed to determine the optimum placement of the turbine. The project included manufacturing three VAWTs that will be utilized to evaluate the impact of the turbine's rpm on the downstream behavior of the SDSU Mechanical Engineering Open-Circuit Low-Speed Wind Tunnel.