CSUN®

COLLEGE OF
ENGINEERING AND
COMPUTER SCIENCE

SENIOR DESIGN PROJECT SHOWCASE

SDPS 2018

FRIDAY
APRIL 27, 2018
1 - 5 P.M.
USU Northridge Center
and Grand Salon

Pictured in cover are winners of the 2017 Senior Design Project Showcase oral presentation and project display competitions:

1. **Human Powered Vehicle team**, Grand Prize Display winners and Mechanical Engineering Department oral presentation winners. Also, first place winners at ASME's Human Powered Vehicle Challenge in 2016 and 2017, and second place in 2018.
2. **Pomona College team**, Civil Engineering and Construction Management Department oral presentation winners.
3. **Wireless Transcutaneous Power Transfer for Implantable Left Ventricular Assist Devices**, Electrical and Computer Engineering Department project display winners.
4. **Folding Electrical Bicycle team**, Manufacturing Systems and Engineering Management Department project display and oral presentation winners.
5. **Super One Punch Team Turbo HD Remastered II**, Computer Sicence Department project display winners.

Not pictured: Steel Bridge, Civil Engineering and Construction Management Department project display winners; Tint, Computer Science Department project display winners; Smart Home Management, Electrical and Computer Engineering Department oral presentation winners; and CSUN Aeronautics, Mechanical Engineering Department, project display winners. The CSUN Aeronautics team was also second place winner, Overall Advanced Class, at the SAE 2017 Aero Design West international competition.

SDPS 2018

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Message from our INTERIM DEAN

Greetings,

On behalf of our students and faculty, I welcome you to our ninth annual 2018 Senior Design Project Showcase (SDPS) event from 1:00 p.m. – 5:00 p.m. on April 27, 2018 in the USU Northridge Center and Grand Salon at California State University, Northridge. This year's SDPS features 29 senior design projects from all the undergraduate programs in our college. Also, oral presentation sessions have been planned where the teams from each program as selected by the department/program have been invited to compete for prizes. As in past years, the projects will be judged by a distinguished panel of industry experts. You can find detailed information about the event on the web at http://www.csun.edu/engineering-computer-science/senior-design-project-showcase. It has been exciting to watch this event grow and expand over the years and is a testament to our hardworking students who are ably guided by our faculty and our supporters from industry.

By way of background, the College of Engineering and Computer Science is home to about 4,500 students and 66 full-time faculty members, with active searches to fill four new faculty positions this fall. We offer ABET accredited undergraduate programs in Civil Engineering, Computer Science, Computer Information Technology, Electrical Engineering, Computer Engineering, Manufacturing Systems Engineering, Engineering Management, and Mechanical Engineering. The Construction Management program is accredited by the American Council for Construction Education. We also offer several contemporary Master's Degree programs such as our newly revamped Engineering Management program emphasizing entrepreneurship and innovation. The college graduates approximately 600 students annually from these programs to meet emerging workforce needs. Our students continue to garner accolades and recognition for their accomplishments at regional and national competitions. Graduates from the college's programs serve in leadership positions in industry, government and academia. A testament of the vision of our President Dr. Dianne Harrison: Through CSUN we all rise.

Don't miss this opportunity to see and hear firsthand from our outstanding students and soon to be graduates. I am sure you will be impressed with the diversity and quality of our student projects and look forward to seeing you on April 27th.

Sincerely,

Hamid Johari, Ph.D.
Interim Dean

CSUN | COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

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Northrop Grumman Corporation
Navigation Systems

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Systems Engineering Fellow
Systems Engineering Division
The Aerospace Corporation

DAN WILDT
Director, Woodland Hills Engineering
Northrop Grumman Corporation
Mission Systems

INDUSTRY JUDGES

Pratik Agrawal
Sr. Manager, Data Science
Data & Informatics Innovation
Medtronic

Andrew Anagnost '87
President and CEO
Autodesk

Lisa Bayne
Mechanical Engineer
Combustion Devices Design
Aerojet Rocketdyne
Mechanical Engineering Liaison Council

Khashayar Behdinan
President, Pointfar Automation
and Director of Process and
Measurement Control Division
International Society of Automation

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Founder and CEO
E-Contek
Electrical and Computer Engineering
Liaison Council

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Spacecraft Antenna Research Group
Caltech-JPL
College Industry Advisory Board (Chair)
Electrical and Computer Engineering
Liaison Council

Luis Carbajo '08, MS '11
IEEE LA Council Chair

Tuan Dinh '10
Senior Manufacturing Engineer
Haas Automation

Michael Dipsia
Branch Chief
Senior Construction Engineer
Department of Transportation

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Chief Engineer
Energy & Advanced Programs
Aerojet Rocketdyne
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Chief Financial Officer
San Fernando Pallet Company
Manufacturing Systems Engineering
& Management Liaison Council

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Director, Software & Systems Engineering
Northrop Grumman Navigation Systems
Computer Science Liaison Council

Neal Gaborno
Section Manager
SAS Systems Verification Center
Raytheon, Space and Airborne Systems
College Industry Advisory Board
Computer Science Liaison Council

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Bill James
Managing Director
Avery James Inc.

Al Khella '03, MS '05
Engineering Manager
Medtronic

Kenny Long
Software Program Manager
Advanced Research
Medtronic Diabetes

Jeffrey Megivern
Mechanical Systems Engineer
Jet Propulsion Lab (JPL)

Reza Miremadi '90, MS '93
Director of Engineering
Tactical Missile Systems
AeroVironment Inc.

Felix Rabinovich
Vice President
ATIMS
College Industry Advisory Board

Amin Rashidian '08
Electrical Engineer
AeroVironment Inc.

Jeffrey Rodman '74
Co-Founder/Fellow/Chief Evangelist
Polycom, Inc.

Lisa C. Sachs
Managing Principal
Cumming
Construction Management Advisory Board

Scott Schultz '04, BS '12
Structures Lead – Stratolaunch Program
Scaled Composites LLC.

Amit Singh
IT Director
Digital Platforms
Medtronic

Adrian Sita '09
Controls Software Engineer
Virgin Hyperloop One

Danny Wise
Head, Avionics, Transmitters and Antennas
Offensive Electronic Warfare Systems
Engineering Division
Naval Air Warfare Center Point Mugu

Thank you Project Showcase Judges!

FACULTY MODERATORS

Dr. Tzong-Ying (Kay) Hao
Civil Engineering
and Construction
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Mechanical Engineering
Department

Dr. Diane Schwartz
Computer Science
Department

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Manufacturing Systems
Engineering and
Management Department

Dr. Habib Taouk
Electrical and Computer
Engineering Department

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Management Department

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Management Department

Dr. Peter Bishay
Mechanical Engineering
Department

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Civil Engineering
and Construction
Management Department

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Computer Science
Department

Dr. Vibhav Durgesh
Mechanical Engineering
Department

Dr. Steven Fitzgerald
Computer Science
Department

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Electrical and Computer Engineering Department

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Mechanical Engineering Department

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Manufacturing Systems Engineering and Management Department

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Prof. Felix Rabinovich
Computer Science Department

Dr. John Valdovinos
Electrical and Computer Engineering Department

Dr. Jeff Wiegley
Computer Science Department

Dr. Tadeh Zirakian
Civil Engineering and Construction Management Department

SDPS 2018

PROGRAM

Friday, April 27, 2018

DISPLAY OF PROJECTS

1:00 - 5:00 p.m.

(Projects in the process of being judged will not be available for display)

Northridge Center, University Student Union
Civil Engineering & Construction Management (CECM)
Manufacturing Systems Engineering & Management (MSEM)
Mechanical Engineering (ME)

Grand Salon, University Student Union
Computer Science (CS)
Electrical & Computer Engineering (ECE)

ORAL PRESENTATIONS

1:00 - 4:45 p.m.

(see page 11 for specific times for each project)

Civil Engineering & Construction Management (CECM)
1:00 - 4:45 p.m.
USU Reseda Room, Northridge Center

Computer Science (CS)
1:00 - 4:00 p.m.
USU Granada Hills Room, Northridge Center

Electrical & Computer Engineering (ECE)
1:00 - 2:10 p.m.
USU Tujunga Room, East Conference Center

Manufacturing Systems Engineering & Management (MSEM)
1:00 - 2:10 p.m.
USU Van Nuys Room, East Conference Center

Mechanical Engineering (ME)
1:00 - 4:20 p.m.
USU Lake Balboa Room, Northridge Center

ANNOUNCEMENT OF AWARDS

5:30 p.m.

Please see University Student Union (USU) map on page 11 for room locations.
Directions and parking information are on page 30.

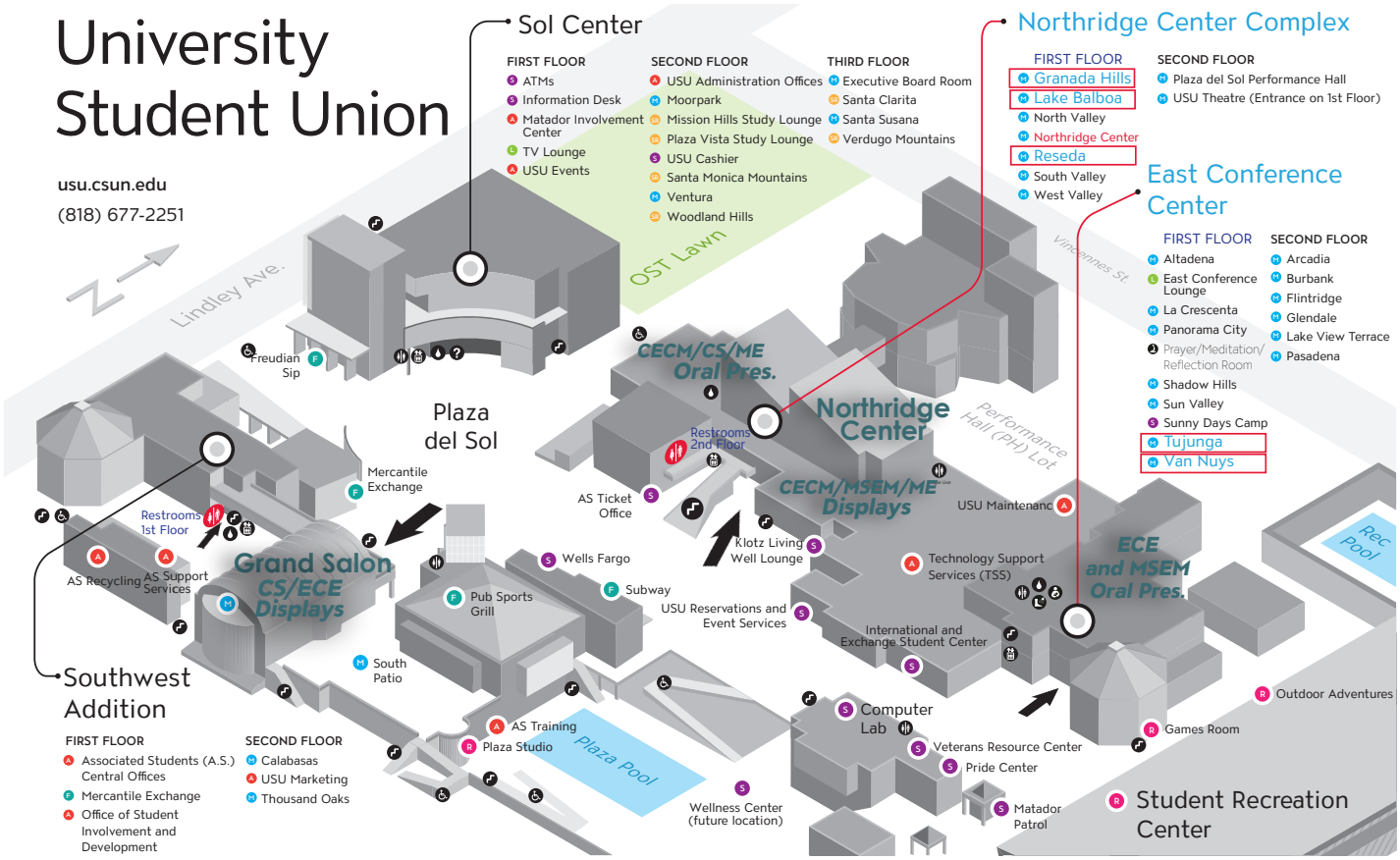
Oral Presentation SCHEDULE

	CECM RESEDA ROOM	ME BALBOA ROOM	CS GRANADA ROOM	ECE TUJUNGA ROOM	MSEM VAN NUYS ROOM
1:00 - 1:20 PM	The Soraya	Formula SAE	FourYears	Unmanned Aerial Vehicle	Ultra-Violet Digital Light Bioprinter
1:25 - 1:45 PM	Earthquake-Resistant Design	Human Powered Vehicle	NP Games	Ultrasonic Radar	Smartcase
1:50 - 2:10 PM	400 Spectrum Drive	CSUN Aeronautics	Project Voice Control	Wireless Heart Pump	Foldable Knee Scooter
2:15 - 2:35 PM	Steel Bridge	Wheelchair Assist	Everhart		
3:10 - 3:30 PM	Concrete Canoe	Smart Prosthetics	CarbCap		
3:35 - 3:55 PM	"Communal" Living LA	Smart Morphing Wing	Umbrella Irrigation		
4:00 - 4:20 PM	Design of a LEED Timber Structure in California	Biodiesel Fuel Project			
4:25 - 4:45 PM	Engineered Green Structure in California				

CECM	Civil Engineering & Construction Management
ME	Mechanical Engineering
CS	Computer Science
ECE	Electrical & Computer Engineering
MSEM	Manufacturing Systems Engineering & Management

University Student Union

usu.csun.edu
(818) 677-2251



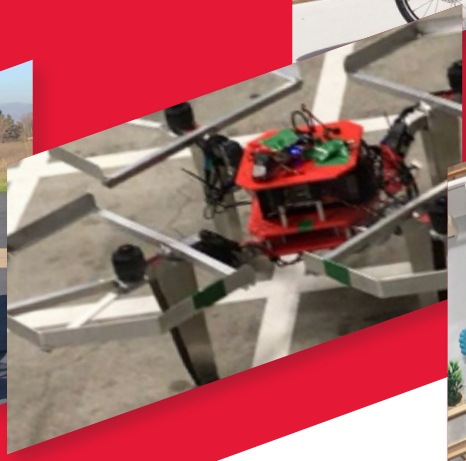
Thank you

FOR YOUR SUPPORT

AEROJET ROCKETDYNE

SDPS 2018

SENIOR DESIGN PROJECTS



Engineered Green Structure in California

FACULTY ADVISOR

Dr. David Boyajian

TEAM MEMBERS

Ammar Alawadhi
Naser Alnaser
Khaled Alsabej
Jeremy Hignite
Jose Nemi
Safiyah Saleh (Captain)

Project Description: *This project focuses on the structural and architectural design of an environmental-friendly, three-story wood structure. The structural components of the building, including the beams, columns, shear walls, foundation, etc., were designed in accordance with the code specifications. Moreover, architectural and structural plans were prepared and cost estimation was performed. The LEED (Leadership in Energy and Environmental Design) rating system was also used for the green and sustainable design of the building with the aim of improving its environmental performance.*

Design of a LEED Timber Structure in California

FACULTY ADVISOR

Dr. Tadeh Zirakian

TEAM MEMBERS

Rawan Alenezi
Ali Alkhazam
Edwin Isagholian
Brayan Ortiz
Sean Shahmiri (Captain)

Project Description: *This project focuses on the structural and architectural design of an environmental-friendly, three-story wood structure. The structural components of the building, including the beams, columns, shear walls, foundation, etc., were designed in accordance with the code specifications. Moreover, architectural and structural plans were prepared and cost estimation was performed. The LEED (Leadership in Energy and Environmental Design) rating system was also used for the green and sustainable design of the building with the aim of improving its environmental performance.*

The Soraya

FACULTY ADVISOR

Dr. Anwar Alroomi

TEAM MEMBERS

Justin Alvarado
Jose Castro
Anand Jigmedsanjaa
Anthony Martinez (Captain)
Jorge Ruiz

Project Description: *The Valley Performing Arts Center, now known as The Soraya, is located at California State University, Northridge. This astonishing building will successfully weave complex mechanical, electrical, theatrical, acoustical, audio visual and structural systems into cost effective, energy efficient and sustainable LEED Gold. Within this 166,000 SF building, there will be 1,700 seats in the concert hall, 178 seats in the black box theater, backstage support, rehearsal rooms, events space, classrooms, a 230 seat lecture room and a new broadcast facility for KCSN public radio. Some key features of this five-story building are: dramatic curved glass curtainwall, incredible acoustic wood panels for sound purposes, and state of the art technology. The Soraya will support a full spectrum of professional performing arts programs including symphonic orchestras, dance, opera, theater, and musical theater as well as film and lectures.*

Wiseburn High School

FACULTY ADVISOR

Dr. Anwar Alroomi

TEAM MEMBERS

Douglas Barillas (Captain)
Lorenzo Lopez
Iman Moein
Luis Soto
Allen Yarijanian

Project Description: *El Segundo is an emerging development market with scores of new constructions project planned and currently underway. DIALL Construction is aggressively pursuing work in this growing market, particularly in the public sector. As the population grows, so has the demand for another high school to accommodate more students. This school will be an expansion of the Wiseburn High School District in El Segundo, CA. The property sits on 13 acre lot. The school will consist of 4 levels, equipped with all newly-designed laboratories, "open air" common spaces and classrooms, and the most up-to-date audio and visual technology. Da Vinci Science will be housed on Floor 2, Da Vinci Communications on Floor 3, and Da Vinci Design on Floor 4. The first floor will house administrative offices, community space, music rooms, and kitchen facilities. Finally, a professional development center will be established to provide adult learning opportunities for practitioners to study and engage in collaborative practices.*

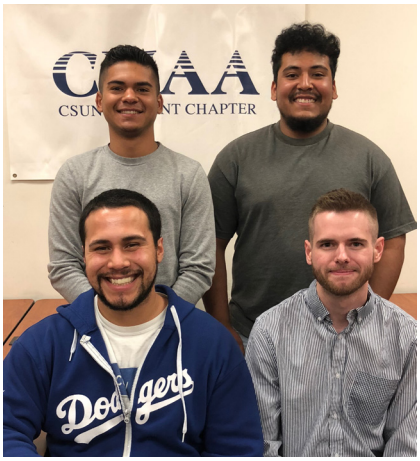
400 Spectrum Drive

FACULTY ADVISOR

Dr. Anwar Alroomi

TEAM MEMBERS

Rudy Esqueda (Captain)
Ulises Garcia
Matt Osborne
Andy Vielman



Project Description: *Project Location 400 Spectrum Center Drive is located at intersection of Alton and Gateway. The project consists of a 20-Story office building, 1 story support building, 6 levels parking structure. Level 1 is used for businesses with a floor area of 22,500 SF. Levels 2-21 (no level 13) are typical levels used for business with floor area of 21,766 SF. Mechanical penthouse with floor area of 5,954 SF. The total project duration for the tower is 612 days and 423 days for the parking garage. The total project cost was a little over 135 million dollars. It is considered as the tallest building in Orange County involved 36 companies to complete the project.*

"Communal" Living LA

FACULTY ADVISOR

Dr. Sami Maalouf

TEAM MEMBERS

Apekshya Bajracharya
Adam Dorner
Devin Moneo (Captain)
Mareia Wisa Wasef

Project Description: *Three-story Multiple Family Dwellings (MFD's) flat roof residences that include living space, kitchen, dining area, bedrooms, bathrooms, a study area, as well as green measures. These four homes are an example on how future "communal" spaces are envisioned in Los Angeles. Resilience and sustainability measures include solar systems (generating electricity and heat), water reuse possibilities and roof gardens. These MFD's use wood, recycled wood products, structural steel and concrete as building materials.*

Earthquake-Resistant Design

FACULTY ADVISOR

Dr. Sami Maalouf

TEAM MEMBERS

Haitham Ali (Captain)
Ivan Ramirez

Project Description: *The design of a seismically-resistant 30-story building model is presented. The architecture of the building reflects the unique culture of Los Angeles. Furthermore, there exists a living roof (also known as a green roof), and an open layout for the first, second and third floors. This balsa wood model was subjected to multiple scaled-down ground motions, representative of recorded historical earthquakes. The model of the building resisted collapse during seismic ground motion simulations. This included total collapse or non-serviceability damages.*

Concrete Canoe

FACULTY ADVISOR

Dr. Rais Ahmad
Dr. Sami Maalouf

TEAM MEMBERS

Daniel Akmakdjian
Armil Allahyarian (Captain)
Dannick Castaneda
Janna Chahbaz
Byrone De La Paz
Jonathan Delfin
Phat Duong
Emily Garcia
Nicole Kishimoto
Justin Le
Consuelo Macias
Andrew Magallanes
Eileen Marquez
Joe Medina
Jasmine Molina
Kenneth Nguyen
Martin Pasamba
Ernesto Pedroza
Jecsan Perez
Joanna Phung
Sam Potts
Claris Rivera
Vincent Roldan
Luis Rosales
Robert Sahagun
Miguel Sanchez
James Stuemke
Cody Stults
Julie Yin

Project Description: *Each year, the American Society of Civil Engineers (ASCE) challenges students to design, construct, and race a canoe cast entirely using lightweight concrete. Using ASCE regulations, the competition allows students to further develop their engineering skills. This includes discovery, problem identification, solution plans, implementation, analysis and interpretation. Working together, the team is able to analyze and develop an efficient canoe design which can in turn be used to build a product that can withstand hydrodynamic forces, one that is stable and can propel across coastal waters.*

Steel Bridge

FACULTY ADVISOR

Dr. Rais Ahmad
Dr. Sami Maalouf

TEAM MEMBERS

Arshak Amirbekyan
Apekshya Bajracharya
Adam Banihamed
Angel Cach
Gabriel Canel
Ivan De La Cruz
Byrone De La Paz
Rury De Santiago
Adam Dorner
Dominic Enero
Adrian Esquivel-Paredes
Alejandro Garcia
Omar Garnica (Captain)
Jose Gomez
Angel Martinez
Wuelman Morales
Emanuel Moreno Valdez
Arturo Sanchez
Soledad Tlamasico
Josue Villatoro

Project Description: *The American Society of Civil Engineers (ASCE) and the American Institute of Steel Construction (AISC) challenge and sponsor civil engineering students nationally to design, fabricate and construct a structural steel bridge, on an annual basis.*

The ASCE CSUN Steel Bridge team was tasked with designing and constructing an economical and versatile bridge that adapts to different locations. In order to prove the feasibility of design, we were asked to construct a 1:10 scale model to demonstrate the concept. Unique challenges for this year include a viable design that accommodates challenging site conditions. There are restrictions on transportation, site layout, temporary support, and access. Serviceability, construction cost and duration, material cost, and aesthetics are also critical considerations. Steel is specified for ease of prefabrication, rapid erection and superior strength to weight ratio.

FourYears

FACULTY ADVISOR

Prof. Felix Rabinovich

TEAM MEMBERS

Hrag Ayvazian
Stephanie Contreras
Robert Kyupelyan
Samir Matin
Hamoun Mojib
Amir Yamini (Captain)

Project Description: *Our project is designed to improve student's four year graduation rates. The current national four year graduation rate is only 19% and CSUN's is even below that. Our project takes in student's information (major, interests, work schedules, etc.) and creates a plan to graduate in four years for the student. This process is much more efficient as it bridges the disconnect between the students and university. Our project is a web application and can be found at www.fouryears.net. Currently, our commercial and slide deck can be found on the website for more information.*

Project Voice Control

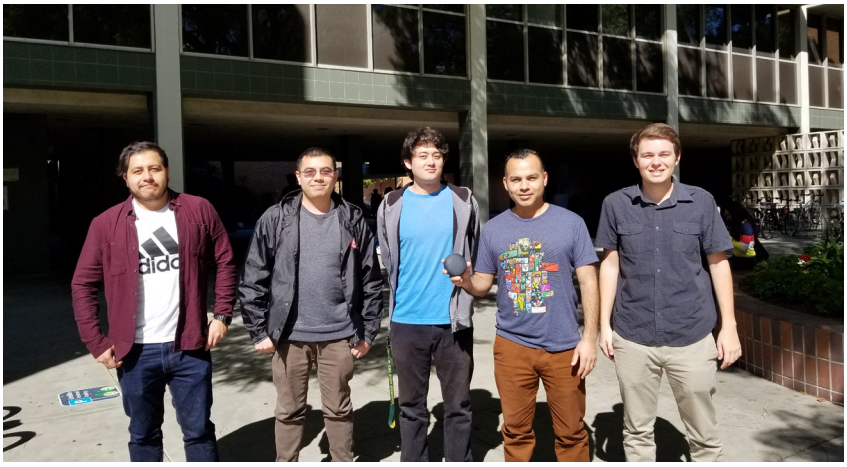
FACULTY ADVISOR

Prof. Felix Rabinovich

TEAM MEMBERS

Armando Freire
Jonathan Carrasco (Captain)
Brandon Garcia
Ian Wilson
Kodi Winterer

Project Description: *Project Voice Control is intended to create a class registration system using Google Assistant and integrating it with Google Home. The project makes use of several services such as Dialog Flow and the CSUN Curriculum Webservice to handle features such as Search, Add and Remove a class to accept input and perform the registration process using only voice. A Flask API was also established as a webhook to connect Dialog Flow to CSUN Curriculum and handle constructing the output for Dialog Flow.*



CarbCap

FACULTY ADVISOR

Prof. Patricia Dousette

TEAM MEMBERS

Paul Chacon
Brendon Hawley (Captain)
Tingrui Ming

Project Description: *The CarbCap is a device with accompanying software, which measures the carbonation level in bottles. This device is very handy for those who home brew beer, sparkling wine, and soft drinks. The information recorded from this device is sent to a computer application that has the ability to check beer carbonation on demand or on a schedule, and chart its progress every day. CarbCap also alerts the user by in-app notification, email, or Twitter when the pressure has plateaued, reached its proper level, or is in danger of exploding. The application has common beer statistics built in, as well as the ability for the user to save their own favorites for future use. By tracking the information recorded from the beer, CarbCap is able to estimate how long it will take for the beer to be ready, and update this date if the rate of carbonation changes.*

NP Games

FACULTY ADVISOR

Prof. Patricia Dousette

TEAM MEMBERS

Pierre Azar
Alonso Gonzalez-Flores
Ivan Guzman
Itai Hofman
Leon Nguyen
David Pineda (Captain)

Project Description: *The NP Games project is designed to be an entertaining and interesting learning tool for those who are learning about the concept of non-deterministic polynomial (NP) and its applications. The project consists of a variety of 3-dimensional games and puzzles that are considered NP-complete, inlcuding Instant Insanity, Sokoban, and more. The games/puzzles themselves have been developed using the C# programming language in the Unity game engine. Along with the games & puzzles, there is a website users may visit in order to gain a better understanding of what non-deterministic polynomial is, how each game is played, why each game is NP-complete, and more.*

Umbrella Irrigation

FACULTY ADVISOR

Dr. Steven Fitzgerald
Dr. Jeff Wiegley

TEAM MEMBERS

Raffi Bilemjian
Lemuel Dizon (Captain)
Sina Eradat
Armine Khachatryan
Ramses Ordonez
Moises Zurita

Project Description: *This project is an irrigation control system with user management. The irrigation control system is responsible for managing valves, from turning them on or off, taking data, assigning schedules, adjusting schedules based on weather conditions, water usage predictions and past water usage retrospectives. User management is responsible for assigning privileges to users and the assignment of users to valves. Our irrigation control system is managed on the web server and accessed through our web application. Communication between valves and server is done through a raspberry pi as the pi connects to our server through the web accessing scheduling information and commands. From the pi communicates with micro-controllers that manage or take data from the valves.*

Everhart

FACULTY ADVISOR

Dr. Steven Fitzgerald

TEAM MEMBERS

Tom England
Alex Kitinski
Alex Melendez
Angel Meraz (Captain)
Denzel Perez
Emil Rafael
Sam Ware
Evan Wolfe

Project Description: *Everhart is a 2D dungeon crawler RPG for desktop. The player is running through the dungeons of a medieval castle where they must attack/dodge enemies & obstacles to escape and reach freedom.Everhart aims to make the player feel rushed by limiting their time in each room, forcing them to make quick choices before progressing to the next room. Invoking a sense of urgency in the player will make them feel increasingly hurried as levels become more difficult. The mode of gameplay will be time-limited, a compromise between turn based and real-time gameplay.*

Ultrasonic Radar

FACULTY ADVISOR

Dr. Shahnam Mirzaei

TEAM MEMBERS

Giovanni Alonzo Cordero
Xiaoao Feng
Hambartzum Gamburian (Captain)
Saba Janamian
Hamed Seyedroudbari
Andre James Zaragoza

Project Description: *The goal is to create a 2D mapped ultrasonic radar with max distance of 20 feet. There are 2 ultrasonic sensors onboard programmable logic, on a motor rotating 180 degrees, both facing the same direction and being a distance apart, measuring objects within 20 feet. This now becomes a triangle, and after successfully obtaining a distance, the exact x, y coordinates of the object intruding the area of the sensors are calculated. The data is transmitted over to another processing system using a serial protocol to be sent via a web socket over to an Amazon Web Services cloud instance in order to neatly display the object with its x, y coordinates in a neat JavaScript framework. If any 2 sides of the triangle is greater than 3rd side, an error message is shown.*

Unmanned Aerial Vehicle

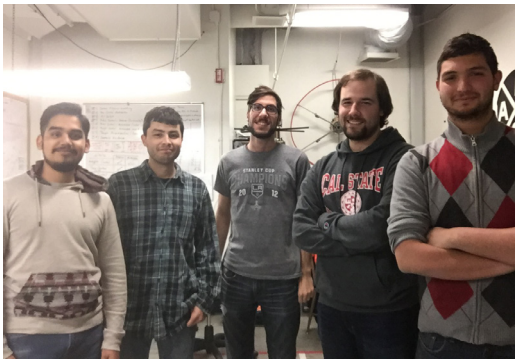
FACULTY ADVISORS

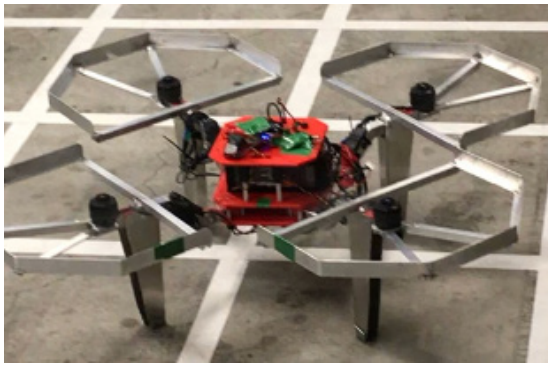
Dr. Xiaojun (Ashley) Geng
Dr. Ronald Mehler

TEAM MEMBERS

Mahdi Ftouni
Michael Phillips
Patrick Schuetterle (Captain)
Brandon Sezgin
Terrance Storey
Jorge Torres
Timothy Transue
Aaron Wenner

Project Description: *This Project involved the design and construction of an Unmanned Aerial Vehicle (UAV) capable of competing in Mission 7 of the International Aerial Robotics Competition organization. The design must be capable of interacting with ten ground robots while visually navigating over a 10x10 meter marked playfield and avoiding obstacles of both ground and air. The design features two Logitech 920 cameras used for navigation and obstacle detection, nine sonar sensors for obstacle avoidance, Px4Flow for drone stability, PixRacer for flight control, and an ODROID companion computer for objective prioritization. Some of the challenges included frame fabrication, power distribution, flight pathing, and protocol standards.*





WATCH

FACULTY ADVISOR

Dr. Jack Ou

TEAM MEMBERS

Paul Archimbaud
Elijah Botte
Taylor Pollard (Captain)
Kalhara Herath Ralalage
Kevin Rivera

Project Description: *WATCH is a wireless medical device designed to track a patient's heart rate and temperature. This allows a caretaker or nurse to easily keep track of their patients from one computer. The project consists of two main components the mobile units worn by the patients and the nursing station which receives and displays the information to the nurse. The nursing station displays this information and will alert the nurse of values out of a selected acceptable range. The heart rate sensor is obviously not as accurate as an EKG but it does provide meaningful data that can be interpreted to the nurse accordingly.*

Wireless Heart Pump

FACULTY ADVISOR

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TEAM MEMBERS

Nairi Dersarkissian (Captain)
Jonathan Mota
Gongyot Poomtago
Jose Paolo Gabriel Rendon
Matawat Udomnopwitthayakul

Project Description: *Our project is the transcutaneous energy transfer, also known as the wireless blood pump for LVAD (left ventricular assistive device). The wireless LVAD system consists of five separate components to power the controller and Jarvik 2000 pump. The oscillator generates a switching pulse for the amplifier which sends the amplified AC signal to the transmitting coil. The voltage on the receiving coil is rectified using a full wave rectifier whose output is fed into the Jarvik 2000 pump controller. A small amount of power sent to the pump is used to charge the internal backup batteries. In the event the voltage is from the coils drops below the turn on threshold for the controller, the battery backup system supplies enough voltage to keep the pump running.*

Foldable Knee Scooter

FACULTY ADVISOR

Dr. Bingbing Li

TEAM MEMBERS

Ahmed Alalawi
Faris Almur
Emad Alqahtani
Saeed Bin Eshaq
Faisal Binblaihed (Captain)
Rayian Muhalhal
Ammar Qahtani

Project Description: *This project aims to design and manufacture a very unique solution for people with lower leg injuries. We aim to create a transformable knee scooter that can be folded into a crutch to allow patients to move in a more stable way either by helping them climb stairs easily or assisting patients stand steadily. The knee scooter will have a braking mechanism to help users stop the motion of the scooter comfortably while in use. The scooter can also be easily stored away while not in use.*

Smartcase

FACULTY ADVISOR

Dr. Bingbing Li

TEAM MEMBERS

Abdulrahman Ahmed
Moneerah AlMeteb (Captain)
Daniel Vanzulli

Project Description: *Technology is growing fast and efficiently. A daily device that is being highly purchased and used would be smart phones. This is why our group decided to engage two different aspects in one product. Creating a smart case with multi-functional sensors would be a great way to contribute to aiding customers. Some people have difficulties navigating their phones, such as the disabled. The smart case is designed and fabricated through 3D printing technology. We wired up 10 buttons to the arduino's, wrote an arduino sketch sending the buttons pressed/released to the android over serial, and used Android device to develop apps that takes inputs and implements a T9 cipher to make it easier to type words.*

Ultra-Violet Digital Light Bioprinter

FACULTY ADVISOR

Dr. Bingbing Li

TEAM MEMBERS

Fhid Alemtairy
Ethan Banton
Juliana Bermudez (Captain)
Cameron Davis

Project Description: *3D bioprinting has opened the doors to new methods of printing, especially the methods used for tissue engineering and the production of artificial organs and tissues. A custom-made ultraviolet digital-light-processing (DLP) bioprinting system was built and utilized to fabricate different cell-laden scaffolds full of vasculature. To increase the speed at which this process currently occurs, the custom bioprinter enables to UV cure hydrogels infused with cells. The hydrogels solidify when exposed to UV light, and the process does not negatively affect the health of the cells. The system uses a DMD chip, or digital micromirror device, which is capable of projecting light to resolutions of just a few microns. The chip reflects light using its millions of aluminum coated mirrors to cure, layer by layer, a design or structure uploaded from a 3D imaging program. The printer seeks to make a precise placement of cell-laden hydrogels in a layer-by-layer fashion.*

Biodiesel Fuel Project

FACULTY ADVISOR

Dr. Abhijit Mukherjee

TEAM MEMBERS

Mubarak Aladwani
Nawwaf Alali
Amir Alawadhi
Ahmad Alfailakawi
Dakheel Al-Khranij
Bader Alsaleh
Mai Bin Shaaban
Kawthar Boland
Jahaziel Bonfil
Hyerin Choi
Tyler Guerra
Raja Gulrajani
Perera Ishara
David Martinez
Daniel Schmitt (Captain)
Henry Serrano

Project Description: *Biodiesel is an alternative energy source made of plant or animal oil that lowers greenhouse gas emissions compared to those of fossil fuels. It is also biodegradable and non-toxic. The objective of this project is to convert commercial cooking biodiesel fuel (B100). A system was designed that allows this process to be portable and able to be installed at the six main eating facilities on campus. The produced biodiesel can be utilized as fuel for diesel-powered machines or generators located on the CSUN campus.*

CSUN Aeronautics

FACULTY ADVISOR

Dr. Vibhav Durgesh

TEAM MEMBERS

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Dalton Caldwell (Captain)
Juan Gomez
Martin Guzman
Mike Hernandez
William Ignacio
Brandon Inatomi
Ramsey Ismail
Woochang Lee
Edgar Medina
Marvin Mendez
Nader Mirzaei
Gerardo Munoz
Hoang Nguyen
Aidan Noonan
Uriel Perez
Brandan Robbins
Xiao Song Gui
Donald Tolentino
Thuan Trinh
Juan Vela
Sergio Vera

Project Description: *TThe CSUN Aeronautics project challenges its members to develop skills fundamental to aircraft design. The team applies basic engineering principle to design and manufacture a radio controlled aircraft to compete in the Society of Automotive Engineers Aero Design Advanced Class competition. This competition challenges students to build an aircraft capable of transporting a maximum amount of cargo up to a gross takeoff weight of fifty-five pounds as well as delivering a portion of this cargo by accurately releasing it over a target area.*

Though the mission is simple, the design is complicated by a limitation on engine displacement. This drives a need for creativity and efficiency, creating opportunities to gain practical experience in aerodynamics, the design and manufacture of composite components, mechatronics, and the performance of internal combustion engines. The multidisciplinary scope of the project also necessitates and fosters the development of teamwork and leadership skills.

FACULTY ADVISOR

Dr. Stewart Prince

TEAM MEMBERS

Abdullah Abdullah
Jesse Abelar
Aliaa Alathari
Amer Albarakati
Yousef Alfalah
Ahmad Alghunaim
Majed Alhajeri
Omar Alhashim
Mohammed Alhusaini
Abdullah Alkafif
Ahmad Alquood
Abdulaziz Alsalmi
Ali Awadh
Blumineaux Baes
Hok Chun Lai
Asher David
Dennis Dozortsev
Henry Erazo
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James Gonzalez
Jorge Guerrero
Gerardo Hernandez
Nicholas Herron
Ryan Hoang
Brandon Holt
Oscar Huinac
Sara Lopez
Lucia Magallon
Joseph Marrone
Alexander Martinchuk
Alex Martinez
Adrian Martinez
Ryan McCalman
Luis Medrano
Jose Mendoza
Justin Moon
Sandino Moscoso
Oyinemi Nesta Okoro
Bryan Rivas
Rafael Ruiz
Michael Ryan
Steven Sherrick
Andrew Theodore
Shunt Vartanian
James Vu

Formula SAE

Project Description: *Every year California State University, Northridge's Formula SAE team designs, builds, tests and races a single-seat open-wheel racecar. It is an educational program that enhances the knowledge, creativity and imagination of engineering students by enabling them to apply their knowledge to real world design situations and manufacturing methods prior to graduation.*

We have a rich history of success here at CSUN, in 2016 the team placed 12th, in 2007 and 2017, the team placed 7th and we hope to improve on our performance at competition. Engineering students that participate in the Formula SAE gain an invaluable experience in management, teamwork, communications, design, and the manufacturing process. Our team features some of the most motivated and team oriented engineering students produced by CSUN.

FACULTY ADVISOR

Prof. Aram Khachatourians

TEAM MEMBERS

Rishil Amin
Benjamin Atkins
Wasim Bhurawala
Tyler Bond
Margaret Bowling
Nikolas Castagnola
Ranjodh Chahal (Captain)
Jonathan Jessiel Cruz
Kyle Gamboa
Connor Jones
Bonnie Keating
Jeremy Lemus
Christian Maya Hernandez
Christina Miller
Homayoun OstadHossein
Tanner Ouellette
Gregory Pealer
Ankit Prajapati
Joshua Reynolds
Sam Sarian
David Stone
Didier Urrego
Natalie Ventura

Human Powered Vehicle (HPV)

Project Description: *With great merit comes great responsibility. It is safe to say the CSUN Human Powered Vehicle team (HPV) lives up to this hallmark considering its first-place competition ranking for the past 2 years, while designing this year's vehicle, the "Khach-22". Careful thought and attention to design detail has been used to craft a vehicle that is both practical and competition ready. Designing a two-wheeled vehicle is not only novel, but also has presented unique design challenges that tested the skills of our team members to their utmost. Our vehicle is partially faired, with an autonomous stability system that will assist the rider with starting and stopping of the vehicle.*

New geometries, design protocol, and open and frequent communication has been utilized by the sub-teams in designing the frame, fairing, and drivetrain of the new vehicle.

In March 2018, CSUN's HPV team competed in the annual Human Powered Vehicle Challenge sponsored by the American Society of Mechanical Engineers (ASME) and placed 2nd overall.

Smart Morphing Wing

FACULTY ADVISOR

Dr. Peter L. Bishay

TEAM MEMBERS

Jaime Aguirre
Christian Alas
Raymond Alvarado (Captain)
Dvin Aslanpour
Jose Contreras
Joseph Edmond
Ryan Finden (Captain)
Douglas Flores
Efrain Gonzalez
Erik Lopez
Agustin Martinez
Edwin Pacheco
Rodi Popa
Christopher Pyne
Shawn Recinos
Michael Solano

Project Description: *Smart Morphing Wing (SMW) is a research-based Senior Design Project whose objective is to design, simulate, build and test low-weight low-drag innovative seamless morphing aerospace structures utilizing 3D printing, smart materials and composite structures. The morphing structures can change their shape at different flight conditions to achieve optimal aerodynamic efficiency and/or control authority. The 2017-18 cohort worked in two teams focusing on the design, simulation, manufacturing and testing of (1) a twist-morphing wing with variable cant angle winglet, (2) a seamless camber morphing UAV tail section. Both designs are utilizing shape memory alloy (SMA) wires for actuation, flexible composite skin and 3D printed components of different materials. Extensive finite element (FE) and computational fluid dynamic (CFD) analyses have been performed to optimize the new designs. Both teams compete at the AIAA regional student conference and present their research work at CSUNposium. The team's 11-page technical paper, entitled "Design and Manufacturing of an SMA-based Seamless Camber Morphing UAV Tail Section", won the second place at the AIAA conference and competition (UC Merced, April 6-8, 2018).*

Smart Prosthetics

FACULTY ADVISOR

Dr. Peter L. Bishay

TEAM MEMBERS

Timothy James Alejandro
Abdullah Baig
Mark Justin Borreta
Chelsey De Leon
Bethany Enos
Jennifer Fernandez
Jonathan Fontana
Thomas Gay
Ayden Hairabedian
Sean Houston
Laura-Ashley Maeda
Kevin Mauricio
Emily Molen
Bret Raquipiso (Captain)
Brian Richter
Julian Rodriguez
Cindy Saldana
Utsavkumar Swami

Project Description: *"Smart Prosthetics" is a new research-based senior design project that focuses on designing, analyzing, building, and testing advanced, light-weight biomimetic prosthetic devices. The 2017-18 prosthetic hand design features life-like skeletal 3D-printed plastic bone structure; flexible elastic joints; and a silicone "flesh" cover that protects the internal components, provides restoring force, and enables better gripping capability. Artificial shape memory alloy (SMA) muscle wires allow the prosthetic to engage several different gripping motions. The palm contains a locking mechanism that controls finger rotation to avoid the need to supply constant electric current to the SMA wires, thereby highly improving the power efficiency. The prosthetic hand is controlled using either a subvocal microphone or an EEG headset that monitors brainwaves and facial expressions. Extensive analysis and testing are done to optimize the actuation and controllability of the design. The work is presented annually at the American Society of Biomechanics (ASB) regional meeting. The team's 10-minute presentation, entitled "Development of a New, Innovative, Smart Prosthetic Hand", won the first place in the College of Engineering and Computer Science session at CSUN's 22nd annual research and creative works symposium (CSUNposium, April 6, 2018).*

FACULTY ADVISOR

Dr. Vidya Nandikolla

TEAM MEMBERS

Ali Alsheikh Musaed
Fahd Altatan
Andres Alvarez
Jhovany Amezcua
Pejman Atai
Eric Chang
Quinn Darrach
Christian Gilmartin
Nick Harabedian
Mikael Mansini
Douglas McDowell
Steven Meza (Captain)
Ali Naser
Miguel Quiroga
Sutichai Savathasuk
Bashir Tirmizi
Johnathan Williams
Evan Wright

Wheelchair Assist

Project Description: *The Mechanical Engineering Senior Design Project: Wheelchair Assist designed two innovations that would improve the mobility of wheelchair users. These included the seat lift assist and rail support system. The additions of these innovations were implemented to assist wheelchair out of their seats. The design goals of the wheel chair includes; a minimum global factor of safety of 1.5, withstanding a maximum load weight capacity of 250 lbs., having a maximum additional components weight of 30 lbs., having a rail support system that is actuated, providing a seat lift assist seat angle of 45°, having a seat lift assist cycle time of less than 40 seconds, providing minimum 60 seat lift assist cycles per battery charge, deploying support rails at a minimum distance of 15 inches, and having a rail support system height extension of 36 inches. The wheelchair was tested for its functionality and the results were found successful.*

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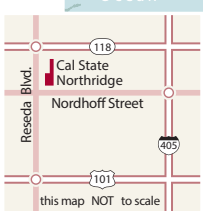

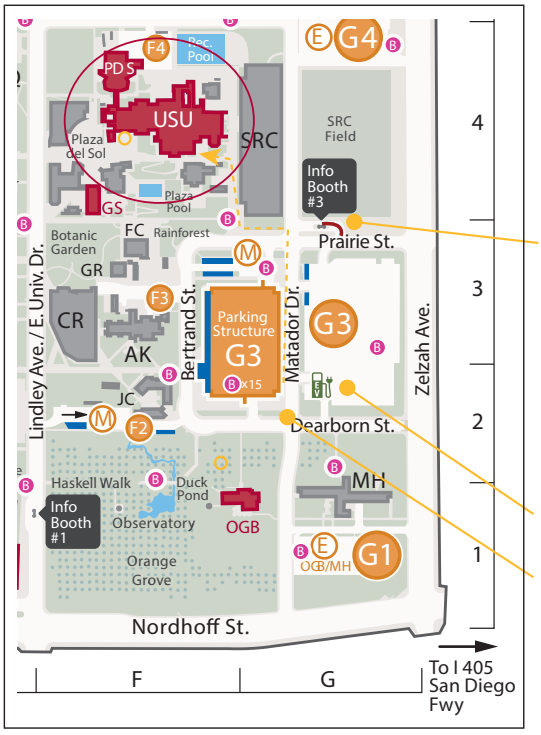

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College of Engineering & Computer Science

Senior Design Project Showcase

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1. Purchase parking permit at Information Booth ($8/permit).

   You can also purchase a parking permit at a permit dispenser located at each level of the parking structure ($8 per permit, cash and credit cards are accepted).

2. Park in Lot G3.

3. Walk to the University Student Union (USU)

Supporting SDPS

To support Senior Design Project Showcase, please contact Mr. Malik Sooch, College Development Director, at 818.677.3850 or by email at malik.sooch@csun.edu.

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