Project Name & Description	Team Members	Course
QAQ QAQ is a speedy automatic online answer generated platform for new college students. It pushes questions to target users and gains quantitive and quality answers.	Jiayang Miao, Zhongyang Gao, Minnie Ma, Zhenyang Zhong	CSCI 404
Virtual DJ Our project is a virtual DJ platform that allows users to DJ music without a physical DJ set. Using image/video processing, the system detects and tracks your hand movements to add audio effects to real-time music, such as volume, speed, and scratching. features of UAV operation.	Alexander Adeleye, Ashley Iu	EE 434X
Continuous Noninvasive Blood Pressure Monitor There is a significant medical need for a robust, non-invasive, and continuous alternative to aneroid BP monitoring systems for patients undergoing surgery or facing prehypertension, hypertension, hypotension, heart disease and other cardiovascular conditions. To meet this need, the Continuous Noninvasive Blood Pressure Monitor (CNBPM) using Pulse Transit Time allows a clinician to continuously observe and collect a patient's systolic blood pressure, SpO2 and heart rate readings. The CNBPM measures the pulse transit time from the heart to the finger to infer the patient's instantaneous systolic blood pressure.	Amanda Hajj, Andrianna Ayiotis, Jenny Pan, Steven Lai	BME 405
Drops - Bring Change, With Change Roundup your transactions to the nearest dollar and donate the spare change to a charity of your choice. Your everyday purchases become everyday donations!	Chaitanya Pilaka, Dana Thomas, Alex Yang, Anush Kadoyan, Josue Campos	CSCI 401

S p e c i a l   T h a n k s   t o

O u r   J u d g e s • O u r   P a r t i c i p a t i n g   V i t e r b i   S e n i o r s • C a p s t o n e   F a c u l t y • V i t e r b i   A d m i s s i o n   &   S t u d e n t   A f f a i r s

USC Viterbi

9th Annual

KIUEL Senior Design Expo

Friday, April 28, 2017

2:30-4:30 p.m.

Epstein Family Engineering Plaza

Welcome to the USC Viterbi School's 9th Annual KIUEL Senior Design Expo!

This program showcases the design projects that are completed in the senior capstone engineering courses. The projects are often presented within the class, but rarely to other students, staff, faculty and industry partners. The Senior Design Expo is an opportunity to

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iLegal Self Help Mobile applications that allow users to natively fill in PDFs. Process allows upload of any encoded PDF in an admin portal (web app); then they can use mobile apps to natively fill in PDFs regardless of fields on the form. This allows us to provide hints and assistance to people that are not legally savvy and would otherwise have difficulty filling in legal forms.	Hooman Zarrabi, Jordan Banafsheha, Grace (Yoo Jin) Lee, Nicky Guangorena	CSCI 401
Dynaflex The Dynaflex system offers a method to quantify the motor impairment of patients with neuromuscular trauma such as stroke. Currently, physicians qualitatively asses wrist extension, grip strength, and finger strength to determine severity of impairment and monitor rehabilitation, however qualitative data is unreliable and unstandardized. Dynaflex allows physicians to easily obtain force data from each of these tests to build a patient record to more effectively rehabilitate patients.	Adam Seifert, Conor Corbin, Linda Xu, Mayme Cline	BME 405
Fitro Fitro is a meal-replacement shake that's personalized to your body's needs.	Oscar Michael Abrina	CSCI 404
Design of an Autonomous Cage System for Identification and Tracking of Mice Near Darkness Commonly used tracking systems for biological scientific research studies are often expensive and can influence the results of a behavioral experiment. A cost effective, non-invasive, autonomous infrared tracking system and smart cage were designed for an experiment studying the nocturnal behavior of mice. The cage system had a computation time of 0.28 ± 0.08 seconds per frame, an identification accuracy of $100 - 5\%$ and a complete cage system cost \$422.37, which is significantly less expensive than traditional off-the-market tracking systems.	Emma Harrelson, Dima Milbes, Amy Jang	AME 441

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RoseBud RoseBud is an assistive device for visually impaired individuals that detects and notifies the user of obstacles in their path. Additionally, the device provides a designated caretaker with the user's location in the event that the user has experienced a fall or significant impact.	Alex Budde, Roby Menefee Daniel Amchin, Jose Padilla	BME 405
Collaborative Engineering Model Visualization (JPL) Multi-platform virtual reality environment paired with motion-tracking peripherals to enable a feature-rich design review experience. Our project allows isolated team members to interact with 3D models as if they were in the same room as their team. Off-site engineers can interact with their projects in an intuitive virtual space using headsets, hand movements and controllers.	Howard Gil, Jason Lin, Karas Yu, Franlin Wang, Alex Chang	CSCI 401
SMR Hydrogen Plant Design (M2AKRT) The engineering team M2ARKT was tasked with designing a hydrogen production process capable of generating 7500 kg/hr of hydrogen with 99.999% purity using Steam Methane Reforming (SMR). It includes all stages from the initial desulfurization of the raw natural gas to the purification of the hydrogen.	Chumeng Cheng, Manning Zhang, Jiaxin Cui, Tiffany Li, Miriam Bedrin, Annalaura, Arredondo	CHE 480
Mass Hydrogen Production by Steam Methane Reforming Technology Hydrogen gas is essential in the oil and gas industry, and increases the efficiency of hydrocarbon extraction. Furthermore, the technology for mass production of hydrogen gas will define the hydrogen vehicle industry and thus is an important technology to advance. Steam methane reforming is the most efficient and safest method to mass production today, and continues to	Cecilia Quintana Baez, Ana Peccin, Lucas Jordao,. Madhav Gupta, Rebeca Thweatt, Kimberly Hui, Becklin Davis	CHE 480
Steam Methane Reforming Furnace Design Design and costing of a furnace in a steam methane reforming plant	Po-Hsuan Lin, Blake Simon, Ava Tan, Alvin Wong	EE 459L

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Airfoil Design for an Autonomous, Solar-Powered Mars Surveyor An airfoil was designed for a Mars solar surveyor aircraft with the objective of increasing maximum lift in cruising flight (Re=120,000, M = 0.17). A Particle Swarm Optimization algorithm used in conjunction with XFOIL to improve a baseline airfoil's (MH45) geometry, and the resulting design (WL4385) was constructed and tested in a wind tunnel along with the baseline. Experimental findings show a 14% increase in maximum lift coefficient without an increase in drag for cruising flight.	Joseph Wyer, Yucen Liu	AME 441B
Affordable Pressure Ulcer Mitigation System The purpose of our project is to provide an affordable, accessible notification system to mitigate pressure ulcers in a clinical setting. Our device displays a pressure map of the patient laying on the device and notifies practitioners when it is necessary to turn the patient. We hope our device increases adherence to turning protocols, improving the health of future patients as well as efficiency within the clinic.	Viktoria Norekyan, Alex Teboul ,Seth Schachter, Paranat, Thirawattanawong	BME 405
Hydrogen Production via Steam Methane Reforming and Pressure Swing Adsorption without Carbon Dioxide Sequestration The design of a hydrogen production plant that undergoes steam methane reforming and pressure swing adsorption.	Jay Paek., Seonghwan David Park, Ana Pendon, John Luke McConn, Ian Gill	CHE 480
Positive Feedback Device to Promote Early Movement in Infants at Risk for Developmental Delay This device aims to improve the outcome of infants at risk for developmental delay by promoting increased movement at an early age. Currently designed as a research tool, the device monitors and stores the leg movement of an infant while encouraging continued movement through wireless connection to the toy. The toy lights up and plays music according to parameters that can be personalized to each infant.	Mary Beth Amrine, Matteen Maroofian, Mark Miller, Barry Cruvant	BME 405

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GNED GO GNED GO is a group navigation and emergency device designed to assist people partaking in outdoor activities that cover large areas and introduce the risk of member isolation or incapacitation - such as skiing, snowboarding, hiking, backcountry camping, long-distance biking, etc. Not knowing the relative location of other members in the group is a common issue of these outdoor activities; yet, the single largest hindrance of keeping members of a group together in these outdoor activities is the lack of cellular and wireless services in remote areas such as national parks and the backcountry. Hence, GNED GO is intended to serve as a personal transponder assigned to each individual in a group and can communicate with other group members' devices within range to relay information, such as emergency distress signals and their location relative to the individual and his/her transponder.	Anna Bachand, Dasmany Deniz, Lila Marshall, Erik Wang	BME 405
Making the Basics: Hydrogen Production by Steam Methane Reforming The goal of this project is to determine whether it is economically feasible for a Hydrogen plant to be built and run for 30 years. Given some basic guidelines, we then research, simulate, and analyze our developed model to see whether the plant is viable or not.	In Gi Seo, Daniel Chow, Benny Char, Shane Williams, Caitlyn Wiebe, Manuel Perez, David Park	CHE 480
Design of a Paddle-Driven Wave Generator A paddle-driven wave generator was designed and fabricated for use at the USC Viterbi AME water channel laboratory, which produces 2-D free-surface waves at free-stream channel velocities between 0 and 52 cm/s. To enable effective wave profile measurements and mitigate the effects of channel wall reflection, a triangular damping structure was installed opposite the wave generator and its effectiveness was measured across a variety of experimental parameters. The combined system enables the pursuit of wave dynamics research to be conducted at the USC Viterbi AME water channel laboratory.	Henry Miskaryan, David Freeman, Andrew Lindo	AME 441B

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Skyshot Skyshot is a first-person ball and hoop game with grappling hooks. Players play online with their friends, compete in teams to outmaneuver opponents, steal the ball, and score.	Izzy Benavente, Wenfei Cao, Zach Chaco, Charles Hankins III, Aaron Hong, Nathan Iskandar, Eu-Ann Liu, Kyle San, Steven Truong, Jasmine Ying, Albert Yue	CSCI 491B
CubeSat Simulation We designed and implemented robots as a two-dimensional model for the autonomous flight of CubeSat satellites. A fully contained vehicle prototype using sensors and actuators inspired by CubeSat was constructed to navigate a near-frictionless air table. Using camera and image processing algorithms the robots find their relative positions to a target and each other, then coordinate together to move into a formation around the target.	Brian Schwedock, Zijian Hu, Emma Smith, Cathy Ji James Mason, Dima Milbes, David Kidwell III	AME 441B
Huff n Puff A huff cough incentive and data acquisition device for adolescent cystic fibrosis patients.	Mark O'Connell, Jacques Esterhuizen, Franklin Johnson, Julia Paley, Connor Behnen, Nolan Uribe	CHE 480
Motion Controlled Cursor for Cerebral Palsy Patients Cerebral Palsy affects body movement, muscle coordination, and balance. This device allows people who lack fine motor control and cannot use a computer mouse to instead make purposeful weight shifts in a seat to navigate a cursor on a digital screen. The device consists of a seat cushion with load cells to interpret the user's movement and override the computer's cursor control.	Ruben Espana, Sydney Forsyth, Vanessa Grainger, Melisa Osborne	BME 405
LAX Runway Safety Design Our team has partnered with LAX to design an improved navigational system for planes on the ground. We're working with ground controllers and pilots to enable faster routing, navigational displays, and better safety practices to improve current LAX capabilities. This project is part of an annual FAA University Design competition to address airport needs across the country.	Joyce Yan, Justine Foote, Megan Joseph, Sina Karachiani, Haohan Tang, Utsav Ahuja, Ellen Jiahui Wei, Shiyao Wu, Alexander Leung, Laura Gouillon, Michael Crowley	ENGR 499

Project Name & Description	Team Members	Course
The EDSSerciser: Digitizing Your Respiratory Health Over 30,000 abdominal and chest surgeries are performed nationally each year in addition to 11 million COPD patients seeking to restore their lung capacity. Currently, volumetric exercisers are tedious and unstimulating, creating a need for a digitized and engaging renovation. The EDSSerciser uses lights and sounds to guide users in their prescribed, daily respiratory exercises and conveniently presents the necessary data electronically to be viewed by the user or physician.	Dina Levashova, Simone Frusina, Elizabeth Brosseau, Shi-Hao Hong	BME 405
Portable Water Treatment The water treatment design team is designing and manufacturing a portable 4-stage water treatment system for the intent to use in disaster relief applications, including a 2-element reverse osmosis system. This team was formed to provide valuable engineering experience towards tackling a real world and very apparent problem.	Madhav Gupta, AnnaLaura Arredondo, Chad Province, Evan Link, Tyler Matthews, Trisha Palit, Ryland Mortlock	AIChE
ChemE-Car Design Chem-E-Car is a team-oriented, hands-on design project. We work throughout the year to design and construct a car powered by a chemical energy source (Aluminum Air Battery) that will carry a load over a given distance. The car stops exactly at that distance using an Iodine-Clock reaction.	Prin Harinsuta, Joseph Stiles, Mason Wong, Hefzi-ba Camilo, Hannah Adams, Jonathan Fuentes, AnnaLaura Arredondo, Anna Peccin, Kyler Correia, Jose Ruiz	CHE 480
Little Helpers Infant Vitals Monitor This project presents a functional infant vitals monitor for clinical and home use, with the goal of adapting the technology for low-income hospitals in developing nations. The wearable monitor and indicator system measures axillary body temperature and respiration rate using thoracic impedance, in addition to providing corrective vibration to stimulate proper breathing patterns.	Benjamin Balansay, Shadi Razipour, Karam Kashouri, Madelina Pratt	BME 405L
Passive 2-Way Studio Monitors Project-based design of loudspeaker transducers, filters, and enclosures. Measurement of transfer functions, acoustical performance, distortion, Thiele-Small parameters, and power handling.	James Bunnign, Brian Ji, Anindya Mehta	EE 423