



CALIFORNIA STATE UNIVERSITY
LONG BEACH
 College of Engineering

20
 25

MAY 8TH

SENIOR DESIGN PROJECT EXPO

■ THE
 WALTER
 PYRAMID

College of Engineering
 California State University, Long Beach

CALIFORNIA STATE UNIVERSITY
 LONG BEACH

DEPARTMENTS

- Biomedical Engineering
- Civil Engineering and Construction Engineering Management
- Chemical Engineering
- Computer Engineering and Computer Science
- Electrical Engineering
- Mechanical and Aerospace Engineering



MESSAGE FROM THE COE AFFILIATES PROGRAM CHAIR

Today, we are celebrating a year-long achievement of our students and faculty in sharing their Senior Design Projects with our community.

Our industry partners, future engineers, student clubs, and high-school students join us today for the third Senior Design Expo of the College of Engineering!

With the strong support of the College of Engineering and our Corporate Affiliates, we present to you a rich and exciting program, consisting of student exhibits and competition, spotlight talks, poster presentations, and outreach activities.

I am grateful to share this celebration with all of you, and would like to thank our Dean Dr. Jinny Rhee, our faculty and students, and the entire College of Engineering Team for their continued dedication and efforts. I wish everyone a great time during the Senior Design Expo 2025!



Dr. Emel Demircan

Dr. Emel Demircan
Chair, Engineering Corporate Affiliates

DEPARTMENT CHAIRS



Perla Ayala
Biomedical Engineering



Mehrdad Aliasgari
Computer Engineering and
Computer Science



Sergio Mendez
Chemical Engineering



Ebrahim Amiri
Electrical Engineering



Joseph Kim
Civil Engineering and
Construction Engineering
Management



Jalal Torabzadeh
Mechanical and
Aerospace Engineering

WELCOME FROM THE DEAN

The College of Engineering at California State University Long Beach is excited to welcome you all to the third annual 2025 Senior Design Project Expo!

Building on the success of the past two years, we are thrilled to present to you this year's Expo. This event has quickly become a signature tradition for our college, providing a platform to celebrate the creativity, skill, and innovation of our seniors in engineering, construction management, engineering technology, and computer science.

As you explore today's projects, you will witness how our students continue to rise to the demands of a rapidly changing world – combining technical excellence with a deep sense of purpose. They have taken on real-world challenges, designed thoughtful solutions, and pushed the frontiers of technology and engineering design. Their work reflects not only countless hours of effort and collaboration, but also their readiness to step confidently into their roles as future engineers, computer scientists, and industry leaders.

We encourage you to engage with our students, ask questions, share insights, and offer your professional feedback. Your presence and input are vital to their growth and the continued strength of the bridge between academia and industry.

My appreciation goes to Dr. Emel Demircan, alongside our dedicated department chairs and senior project instructors, for making this event possible. Additionally, thanks are owed to the Corporate Affiliates who provide the all-important resources that enable our students to take design ideas to reality.

Thank you for being part of this celebration of innovation, perseverance, and vision. I hope you leave today inspired by the passion and potential on display.

Go BEACH!



A handwritten signature in black ink that reads "Jinny Rhee".

Dean Jinny Rhee

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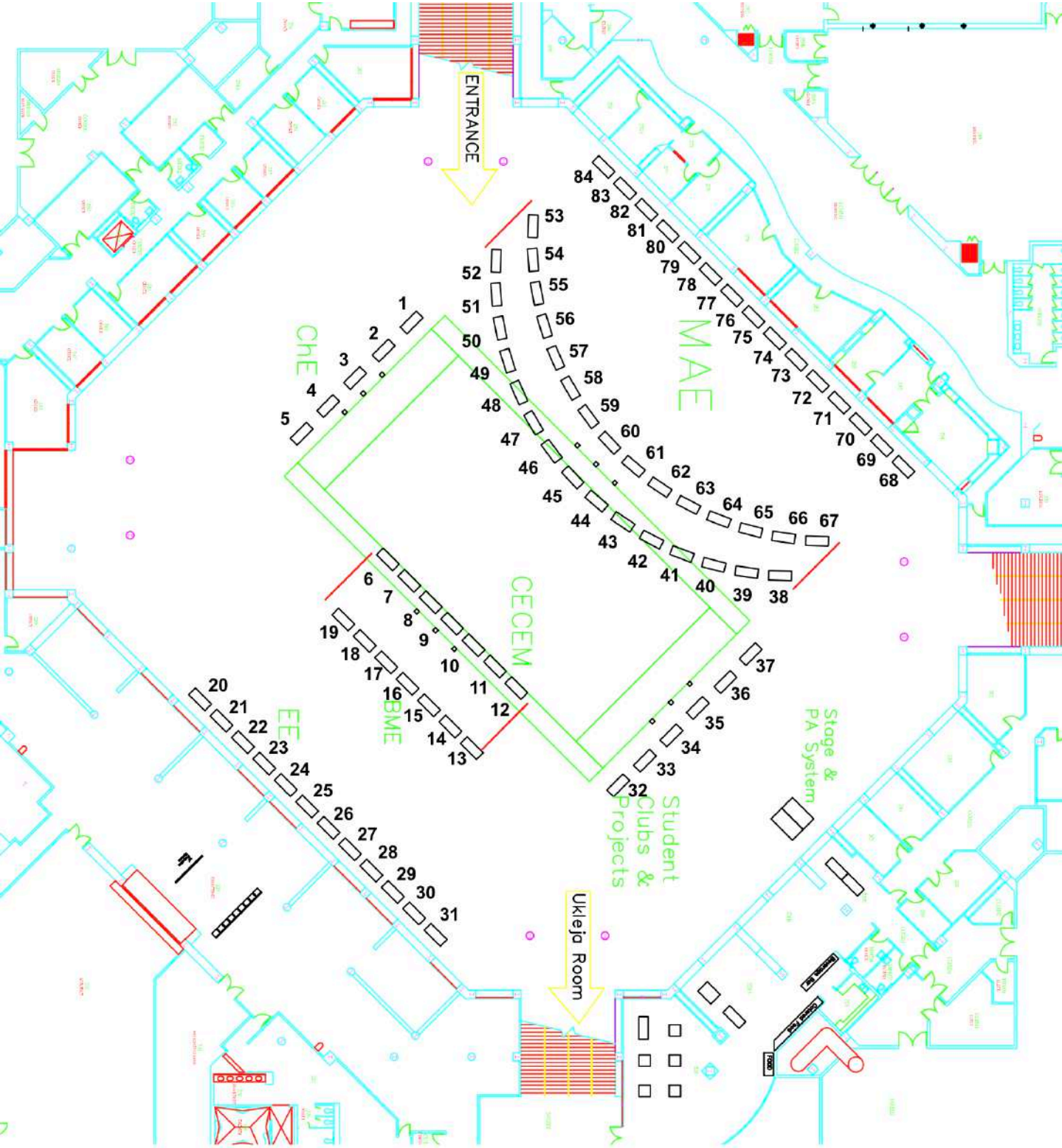
EXPO SCHEDULE OF PRESENTATIONS

THURSDAY, MAY 8, 2025

TIME	SESSION	LOCATION
11 AM	Registration Opens	Entrance
12 PM	VIP Lunch	Ukleja Room
1 PM	Opening by the College of Engineering Dean Rhee	Main Area
1-3 PM	POSTER SESSIONS: Biomedical Engineering Chemical Engineering Civil Engineering and Construction Engineering Management Electrical Engineering	Main Area
2-3 PM	Computer Engineering and Computer Science Spotlight Talks	Upstairs
3-5 PM	Coffee Service	Upstairs Lounge Area
3-5 PM	POSTER SESSIONS: Computer Engineering and Computer Science Mechanical and Aerospace Engineering	Upstairs & Main Area
5 PM	Closing Remarks by the College of Engineering Dean Rhee	Main Area

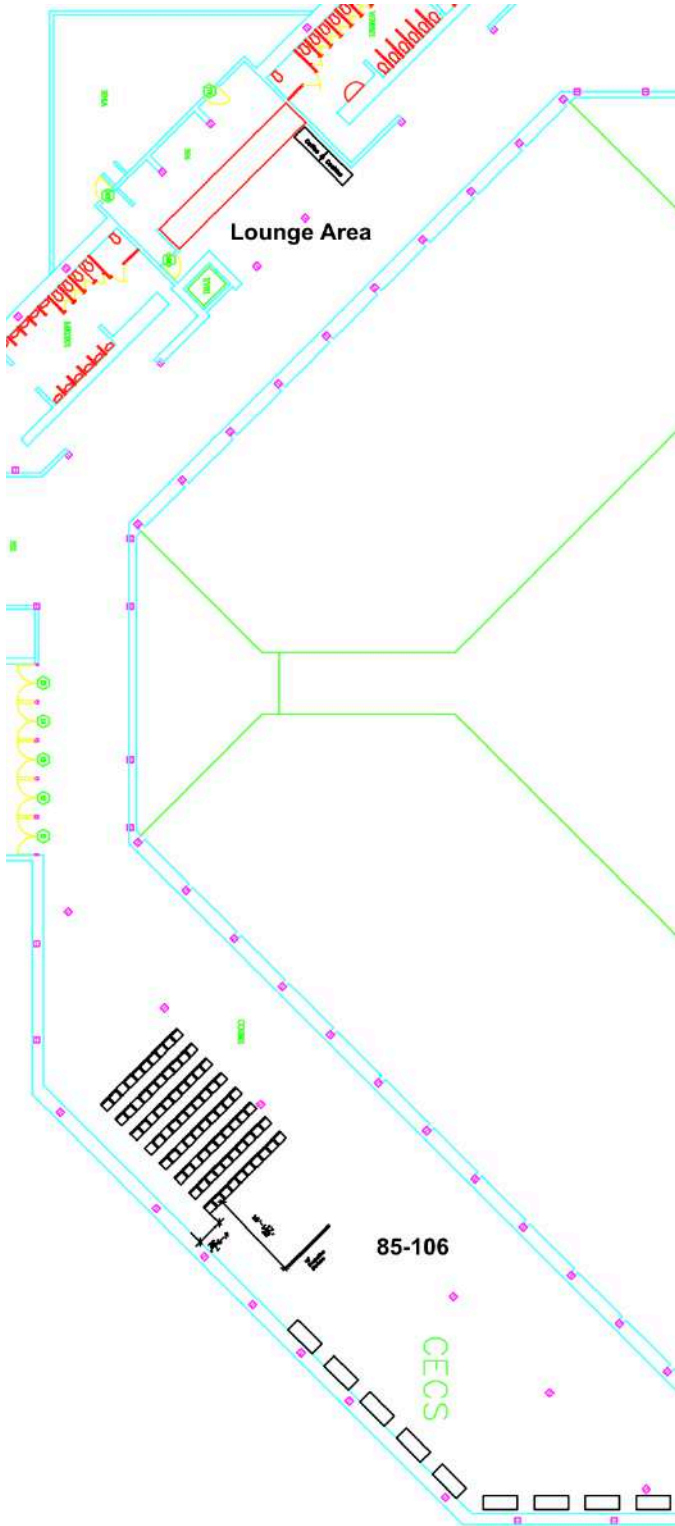
DISPLAY STATIONS MAP

■ The Walter Pyramid, Main Area



DISPLAY STATIONS MAP

■ The Walter Pyramid, Upstairs



SENIOR DESIGN PROJECTS

■ Table Locations + Project Titles

CHEMICAL ENGINEERING:

- 1 Modelling and Design of Cryogenic Process for Air Separation
- 2 Biomass Gas Treating
- 3 Steam/Methane Reforming Hydrogen Plant
- 4 Carbon Capture from Flue Gas
- 5 Tequila Production

CIVIL ENGINEERING AND CONSTRUCTION ENGINEERING MANAGEMENT:

- 6 Altadena Roadway Revival and Lot Development Project
- 7 Palisades Recreation Center
- 8 Eucalyptus Children's Wellness Center
- 9-10-11-12 Best Value Design-Build Project: Interdisciplinary Science & Technology Building

BIOMEDICAL ENGINEERING:

- 13 Platform for mechanical testing of arterial stents with lower limb movement (Stenteam)
- 14 Smart pill dispensing system for caregiving and real-time medication monitoring (GOTE)
- 15 Fluidic pump device for dynamic cell culture (FlowReact)
- 16 Soft robotic actuation for automated colonoscope propulsion (EndoWorm)
- 17 Automating serial dilution with microfluidics (DiluTech)
- 18 Integration of OpenBCI and VR for rehabilitation of immobilized patients (VirtuRehab)
- 19 *Information Desk*

SENIOR DESIGN PROJECTS

■ Table Locations + Project Titles

ELECTRICAL ENGINEERING:

- 20 Bluetooth-Controlled Robot Arm with Hand Gestures
- 21 Home Security System
- 22 Low-Frequency Sound Fire Extinguisher
- 23 Uninterruptable Power Supply with Automatic Transfer Switch
- 24 Dance Rush Motion Controller
- 25 Dual Axis Solar Panel Tracking System
- 26 Stationary Fire Fighting System
- 27 Gauss Gun Darts
- 28 Garden Analysis System (GAS)
- 29 Laser Piano (LP)
- 30 Torque Readout Glove (TRG)
- 31 Object Identification and Prismatic Robotics for Autonomous Weeding Applications

32-33-34-35-36-37

Student Clubs & Competition Projects

MAE Rocket Project; MAE SharkSat-1: First Mission Status and Workforce Development
SAE, ASCE, AGC, BMES, AIChE; VR Club: Full-body tracking Hole-In-The-Wall Project

MECHANICAL AND AEROSPACE ENGINEERING:

- 38 Project Dust Off: Optimizing Technologies for Lunar Dust Filtration
- 39 Mars Relay Network Satellite
- 40 Herschel-Athena Project
- 41 Trailblazer Firefighting UAV
- 42 Satellite De-orbiting Vehicle (SDV)

MECHANICAL AND AEROSPACE ENGINEERING:

- 43 VANGUARD (Vision And Navigation Guidance, Unmanned Aerial Reconnaissance Drone)
- 44 Stealth Thermonuclear Aerial Dominance Vehicle
- 45 Counter UAV UAS
- 46 Accelion Hybrid Rocket
- 47 Mars VTOL UAV
- 48 TRASH: Targeted Removal of Artificial Space Hazards
- 49 Reconnaissance Acquisition Aircraft (RAA/C)
- 50 Electric VTOL Aircraft for Urban Emergency Medical Services
- 51 A Modular and Reusable Architecture for Scalable Launch Vehicle Design
- 52 Long Beach Aviation Design Build Fly
- 53 Precise Automated Wet-Food Server (PAWS)
- 54 Height-Adjustable Walker (Adapt+)
- 55 Self-Actuating Rocker Arm Suspension System
- 56 CSULB Formula SAE Electric Chassis Design
- 57 Ergonomic Micropipette + Stand
- 58 Modified Massage Foam Roller
- 59 Room Temperature Thermoelectric Properties Measurement Apparatus
- 60 ECONet - A Sewage Waste Collection System
- 61 IRIS - Integrated Ranging Insight System
- 62 Ducted Axial Hydrokinetic Turbine
- 63 Braille Label Maker
- 64 Mechanical CPR Machine
- 65 Court Rover
- 66 Vehicle A-Pillar Phone Mount
- 67 Scooter Kinetic Energy Recovery System KERS

SENIOR DESIGN PROJECTS

■ Table Locations + Project Titles

MECHANICAL AND AEROSPACE ENGINEERING:

- 68 IntelliSort: AI-Guided Recycling Conveyor System
- 69 SkyScrub: Quadcopter to Clean Roofs
- 70 Automated Medication Dispenser
- 71 Wildfire Mitigation Rover
- 72 FRU: Fire Response Unit
- 73 Safety Roamer
- 74 EEG-Based Real-Time Drowsiness Detection System
- 75 Electromagnetic Catapult System
- 76 Multifunctional Lawn Mower
- 77 Warehouse Inventory Drone
- 78 Tire Data Test Bench
- 79 Automated Height-Adjusting Water Fountain
- 80 Hole in One: Robotic Precision Stacking
- 81 Biomimetic Anthropomorphic Robotic Tele-hand (B.A.R.T.)
- 82 Long Beach Rocketry: Piston based Recovery System
- 83 Long Beach Lunabotics
- 84 **Information Desk**

COMPUTER SCIENCE AND COMPUTER ENGINEERING:

- 85 Dr. Pill
- 86 CrabZerver
- 87 DroneDash
- 88 SharkSub
- 89 BabyButler
- 90 SmartValet
- 91 NASA
- 92 Seeker
- 93 Bite Book
- 94 Branch
- 95 Spoil Tracker
- 96 MidNight Train
- 97 DigiLimb
- 98 DegreeMate
- 99 Beach Hub
- 100 Pocket Watcher
- 101 Dynamic Digital Agent
- 102 Lens Fusion
- 103 Team Blank / Chip
- 104 Hump Day Hooligans / Project: Calcoy
- 105 PowerPlay : Physical Therapy
- 106 CapyWise



SENIOR DESIGN PROJECT IN THE METAVERSE



INTEGRATING METAVERSE IN THE COE CURRICULUM!



SEE THE WORK.
JOIN THE COMMUNITY.
FIND SUPPORT, EVENTS,
AND RESOURCES.



ENGINEERING CORPORATE AFFILIATES

The Engineering Corporate Affiliates program is a mutually beneficial collaboration between industry and the College of Engineering to support senior design (capstone) projects and co-curricular project-based learning.

The Corporate Affiliates sponsor projects and can engage their employees as mentors to our talented students in areas of interest to the company. In addition, they have access to all senior design projects via the annual Senior Design Expo, and enjoy a suite of recognition, student engagement, and recruitment benefits. The faculty and students, in turn, gain knowledge of the insights, challenges, and priorities of industry. Corporate Affiliate membership fees support project costs, faculty mentoring, publication/presentation of projects, and the annual Senior Project Expo event.

Project-based learning is a cornerstone of engineering education at The Beach. We believe in the power of learning by doing, and the soft skills development that is fostered by project-based learning. Teamwork, communication, and leadership are practiced and honed, alongside application of theory, design, and implementation.

For further information about Engineering Corporate Affiliates membership, please contact Paras Shah at paras.shah@csulb.edu.

Engineering Corporate Affiliates



Additional support for project-based learning provided by WestLAND Group, ISEC, Inc, and Southern California Contractor's Association.



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