CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs** Dept ID: **201505**

Department: **Civil Engineering** Fund Code: **IR044**

Prepared By: **Wing Shun Kwan** Program Code:

Budget: **$ 6800** Expenditure: **$ 6800** Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.

The allocated funds we receive for this project (ASCE Concrete Canoe Team) will help students receive real-world experience by creating a design from scratch and constructing that design using materials purchased, thanks to the funding received. The project allows students to use the stuff they learn in class and apply it to the real world, strengthening their understanding of the subject. Additionally, the projects help students prepare for future classes because they would already have some knowledge of the subject. Students will be able to see how their design compares to that of other schools during the competition. This project will engage multiple students in different aspects of Civil Engineering, from design to Materials and Structural Engineering.

2. Provide key performance metrics to measure and sustain success.

The ASCE Concrete Canoe team, with more than ten members, has successfully participated in and completed the competition at the ASCE PSWS conference, despite the challenges of the COVID pandemic. IRA funding will allow our team to continue to climb higher up to the top ranks of our regional competition. One of our main expenses includes making a mold for the canoe; these funds will allow our team to build the mold, resulting in a better-performing canoe. Metric for success: the number of students involved with club activities and their participation in the competition.

3. Describe program outcomes and results. Identify challenges encountered.

The IRA funds help the ASCE Concrete Canoe team to be successful and allow the team to apply their knowledge for real-world applications by designing and implementing ideas. The experience helped students have a better understanding of Civil Engineering topics. A significant challenge for the team last year was to work with the COVID19 regulations on campus. For example, no undergrad students were allowed to work on campus during the winter break, so the team had no access to the concrete lab to perform the required

strength tests on their concrete samples. As a result, the team missed a critical piece of information for their concrete canoe design, adversely affecting the team's performance at the competition.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Mechanical Engineering**
Prepared By: **John Bachman (Baja SAE)**
Budget: **$ 9000** Expenditure: **$ 9000**

Dept ID: **201520**
Fund Code: **IR069**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

The Baja SAE Team is an over 40 year old student-run organization made up of mechanical engineers, electrical engineers, computer scientists, and technologists. Each year, the team of 10-20 students designs and builds a new vehicle from scratch and travels to compete against hundreds of universities with the help and mentoring of staff, alumni, and sponsors. The mission of the Baja SAE Team is to have its members increase their knowledge of automotive design and building, gain hands-on engineering and management experience, and gain experience working on a multi-disciplinary competition team. Most importantly the team builds lasting relationships among students, hundreds of alumni, sponsors, and the Los Angeles community and represents the engineering excellence that can be achieved by underrepresented groups on a national stage. With the skills and relationships built on the team, many of the students become leaders in science and engineering. The Baja SAE team also supports senior design projects for 10 students each year.

In addition to working on the competition, the team assists the MESA program in the college by performing outreach events during open house, middle school science bowl, outreach day, MESA day and more to get K-12 students excited about STEM.

2. **Provide key performance metrics to measure and sustain success.**

To be succesful, we measure how many students participate, how active the students are, how well we perform against our competitiors in the annual competition, and how many of our members receive job offers before graduation.

3. **Describe program outcomes and results. Identify challenges encountered.**

We currently are doing very well in the first two categories with 10 students who are highly involved. The previous year we took ~10 students to the competition to Rochester, NY. The team competed in all of the static and dynamic events and performed very well with their first-ever 4WD design. We are also engaging a diverse group of students on the team in terms of gender, race/ethnicity, major, and year-in-school.

The budget for the team is only slightly more than what is required for registration, travel, and lodging to the competition, which leaves little additional money to build the vehicle. To overcome this challenge we spend much of our time fundraising as a team, receiving funds from local businesses, on-campus programs, families, and alumni. The team is also in a growing phase after shrinking significantly during the pandemic. We are making a significant push on recruiting and retention as a result.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs** Dept ID: **201520**

Department: **Mechanical Engineering** Fund Code: **IR245**

Prepared By: **Samuel Landsberger, Sc.D.** Program Code:

Budget: **$ 3000** Expenditure: **$ 3532.35** Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

2. **Provide key performance metrics to measure and sustain success.**

3. **Describe program outcomes and results. Identify challenges encountered.**

1. **Summary of Resource Alignment with Campus Strategic Plan:** With support from the IRA funds, 12 Engineering Students and 23 Kinesiology students this past academic year engaged productively in hands-on and analytical design experiences to understand both the fundamentals and applications of engineering design principles, and *engage in service learning through exercise of their emerging skills*. In a Problem-Based Learning format, students formed multidisciplinary teams and worked closely with real clients with disabilities to first formulate design goals that can be measured, and then brainstorm, analyze, design, build and evaluate new mechanisms and systems to meet those goals. Students learn design skills and apply analytical techniques to create working models of robust and affordable technology. Since innovation is primarily focused upon environmental monitoring, affordable sustainable energy, and rehabilitation

engineering the campus goals of aligning academic work with serving the needs of the community and the Public Good are the centerpiece of the funded activity. Further, since many projects focus upon serving the needs of people with disabilities, the goal of making the campus more accessible and inclusive of students with a wide range of abilities has been directly addressed. For example, in addition to serving the needs of students, faculty and staff from the CSULA community, several of the clients served by our devices in the Mobility Center are from the East Los Angeles and San Gabriel Valley communities.

In spite of the significant limitations on student-student and student-client interactions imposed by COVID safety restrictions, our student teams have been able to hone and practice their problem-solving, teamwork, and client-empathy and interaction skills. We make maximal use of Zoom Meetings, and in some ways this facilitated more regular and, for the clients, easier interaction. Students were "virtually" invited into client homes to see the significant mobility and access challenges their clients face on a daily basis. This included a strength and range-of-motion exercise system for a gentleman confined to his bed for 18 hours/day, an improved elbow brace and foot-drop Ankle-foot-orthosis (AFO) from a middle-aged stroke patient, and and a hand/wrist exercise system and means of safe navigation about the house (using floor-to-ceiling expanding poles) for a former nurse, now facing challenges post-stroke.

Student work continues to extend well beyond our local borders: for example: their diligent and creative efforts in electro-mechanical design to refine and further test an innovative pedal-assist device for a virtuoso young pianist from the Childrens Hospital https://www.chla.org/blog/patient-stories/when-the-engineer-met-the-virtuoso as well as for an **All-Terrain Beach Cruiser** that has been extensively modified to suit the needs of a client with SCI enabling a first-time visit to Death Valley National Park.

Since the majority of projects focus upon serving the needs of people with disabilities, the goal of making the campus more accessible and inclusive of students with a wide range of abilities has been directly addressed.

The engineers-in-training have interacted beyond CSULA borders with physicians, therapists and engineers of the Long Beach VA medical center Spinal Cord Injury and Prosthetics Programs, and USC Childrens Hospital. Students participate actively in a Problem-Based Learning format. They first formulate rehabilitation goals that can be measured, and then design, build and evaluate new equipment for exercise, recreation, home and work to increase clients' independence and fulfillment in life. Some projects are enhancements to previously developed innovations from our Rehabilitation-focused MadScientists Laboratory, such as the Easy-Stand device to assist clients re-learning to walk, the Enhanced Driving Simulator-Exerciser and the Simulator to Assess and Improve Balance on Uneven Terrain. Novel devices have been created to enable younger and older clients to engage in games of manual and cognitive dexterity, such as the Shoot-the-Moon cognitive & physical puzzle activity, low-cost but effective Accessible Pilates Machines, and a collaboration with a neighborhood church to create a Solar Showers of Grace hygiene station for the homeless population in El Sereno. The hands-mind-hearts-on activity, wherein students apply their skills and knowledge in the real world and in the context of serving people with disabilities in the community, reinforces the value of their analytic preparation in biomechanics and exercise physiology while engaging constructively with professionals in their chosen field.

Examples of professional collaboration include developing a Dragon Sled Machine for Low-Moderate Intensity Gait and Concentric Resistance Training developed to serve the Mobility Center clients and those in neighboring Physical Rehabilitation Centers, and an Overhead and Upright Pilates Machine to further serve clients in our University and Regional Rehabilitation clinics with strengthening and range of motion. These complement the numerous devices developed in concert with Mobility Center staff and clients to enable the disabled population that visit our on-campus Mobility Center to participate in a wider range of meaningful and effective exercises. These include, among many others, a the ongoing refinement of a

BeachCruiser and All-Terrain Wheelchair, firstly for an undergraduate student with mobility challenges majoring in GeoScienices, to enable her to participate in field trips over rugged terrains that have heretofore been inaccessible https://drive.google.com/open?id=1BRGjWGDLGtX4vWYy_3xUsBerCtQhCN9x , and more recently, as mentioned, for a client with SCI enabling a first-time visit to Death Valley National Park. Engineering students work hand-in-hand with both the client and kinesiology students to both determine the most important problems to address, the most user-friendly and practicable solutions, and the evaluation of the results and recommendations for future enhancements.

2. Performance metrics to measure and sustain success: Approximately 12 engineering students and 23 Kinesiology students participated in the hands-on design/ analysis / build & test projects supported by the IRA funds. They include undergraduates in senior-level (4000) classes, senior design students, and graduate students pursuing independent design projects. Clients served by the devices created by our students are delighted with their work, and some of their testimonials, along with successful project Outcomes, are documented both in their Final Project Reports and Documentary YouTubes, a sampling to be found in an appendix to this Accountability Report. They are also readily available by searching YouTube for "CSULA Rehabilitation Machines Landsberger", e.g. www.youtube.com/watch?v=0yHGiSZaE6g .

3. Program Outcomes, Results and Challenges : The primary outcomes and results of this IRA-funded program are the qualitative and quantitative effects on their education, professional development and societal outlook and sense of responsibility of the students who participated in the active, problem-based learning projects to serve clients with disabilities and our increasingly urgent environmental needs for sustainable energy and wise stewardship of resources. A brief itemization of the beneficial outcomes of the IRA sponsorship of these students' involvement are as follows:

(i) motivate the students to better master and apply their theoretical disciplinary knowledge in mechanics (statics, dynamics and kinematics), strength of materials, materials selection, machine design (including knowledge and proper selection of components from motors to bearings, gears and fasteners) and even fluid mechanics, thermodynamics and heat transfer by seeing their relationship and relevance to solving concrete, real-world problems of sustainability and rehabilitation,

(ii) awakening students' creative energies and motivating them to become creative problem-solvers and to consider careers that address vital needs of society and the planet,

(iii) provide valuable training in focused, multi-disciplinary teamwork with measurable outcomes, along with CAD and applied analytical/prototyping/testing skills that future employers value highly,

(iv) provide noteworthy, real-world experiences that greatly enhance their career portfolios and further their attractiveness to future employers as engineers who can apply their knowledge and hit the ground running to solve real-world problems.

Alumni with projects in the Laboratory for Rehabilitation and Sustainable Engineering repeatedly comment on the help their experience has been in successful job searches for both general engineering work, and in emerging markets for biomedical and "Green" engineering – it is often the most-discussed part of their job interviews. I always ask – and the alumni are always happy to oblige – in sharing with our current students the elements of their education that they perceive as crucial to future success.

Greatest Challenges: the sheer number of students participating in the Hands-Minds-Hearts-on Program, vs. the meaningful and appreciated but very modest resources allocated to training and supervising the real-world work in which they engage. Particularly, technician support in the lab to maintain equipment and

supervise hands-on fabrication would be much appreciated, given the large number of students participating and the detailed and carefully-executed, reliable designs they strive to create to meet real-world problems of real clients. Of course, a further challenge, manifesting itself in late February and early March of 2020 and continuing through our past Academic Year '21-'22, was the need to move classes to an on-line format. Fortunately, as mentioned, we have found ways for the students to continue to interact constructively and empathetically with clients via Zoom, sharing ideas and insights with each other and clients, while learning more in-depth of the struggles of folks with special needs to lead lives of maximum independence and breadth of participation in exercise, hobbies, work, and activities of daily living.

Appendix

Sample YouTube Publications from the MadScientists Laboratory, a.k.a.

Laboratorio de Los Cientificos Locos

for Rehabilitation and Sustainable Engineering Design and Research

(Note - Searching "***Youtube CSULA Landsberger Madscientists Lab***" or, within YouTube, ***CSULA Rehabilitation Engineering, CSULA Kin439, CSULA Madscientists, CSULA ME Rehab*** will yield many other examples of our students' work.)

Lab Overview Poster: https://drive.google.com/open?id=17FaHTimPoWepZTf26uPwNWSSaqL0f2xc

Alberto's Story: Creating a Pedal-Pusher to enable a young Virtuoso with paraplegia to access the piano *sostenuto* pedal.

Background:

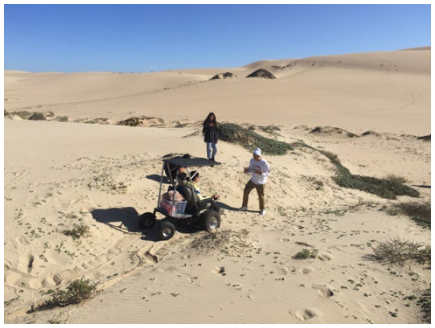
For many years our CSULA MadScientists Lab has had a close collaborative relationship with the Children's Hospital Los Angeles and the director of its orthodontics program, our friend Dr. Steve Yen. Collaboration began with work in the late 1990s to mid-2000s to bring to life a new generation of surgical devices to help correct mandibular malformation in children with cleft palate and hemi-facial microsomia by a technique known as osteo-distraction (lengthening of the mandibular bone by an implanted appliance that the mother adjusts to create approximately 2mm of new bone each day), to a novel method of securely but unobtrusively attaching a hearing aid to an active child.

Our most recent project is the Alberto Piano Pedal Pusher. The spirited MadScientists, together with their Professor, Dr. Yen and a 92-year-young volunteer Master Machinist, John Weiland, worked fervently over the course of Fall 2017 and the academic year 2018 to bring to life a tongue-activated piano pedal activator for a gifted young pianist, Alberto. The team first tried out the new invention in May of 2018 outside the Mobility Center, and it was amazing for Alberto, his mother, and the whole team of MadScientists to see Alberto use the pedals!

A story of that development follows, a link to the recent article in the Children's Hospital Blog (soon to be published in its print Journal) that you have, I believe, already read, and then several videos and photos documenting development and testing of the Piano Pedal Pusher are attached.

(i) https://www.chla.org/blog/patient-stories/when-the-engineer-met-the-virtuoso
(ii) Poster presented April 10 for the USC Ostrow Dental and Occupational Therapy Research Symposium: https://drive.google.com/open?id=1dIjMuijAsSujJwuQbteIflXjf9LGFoHk
(iii) Playing Moonlight Sonata: https://drive.google.com/open?id=1JgMmxCBgEBx39afgR1Tp7cY5avyX3aLf

Cindy's Story: Ms. Cindy Zhang is a wonderful, long-term friend (and client) of our MadScientists Laboratory. Cindy is a student in Geological Sciences at CSULA, and has been able to navigate some of the field trips only because of the use of our MadScientists BeachCruiser wheelchair.


(i) Two Special Teens test the BeachCruiser: https://drive.google.com/open?id=154ZUjgrLhmG6-VqfuRDon_8_3lncWMMC

(ii) Cindy begins to explore the Guadaloupe Dunes State Beach with her class: https://drive.google.com/open?id=1BRGjWGDLGtX4vWYy_3xUsBerCtQhCN9x

(iii) Cindy challenges a severe dune dip – https://drive.google.com/open?id=1iYj5eZInzqcVGSXCBYdnqKfNmdvD-LNT

Cabrillo Marine Aquarium Tank Explorer Robotic Camera with Human Interface:
https://drive.google.com/open?id=1zyFoOw9Tfk8cSCy7uJbAUBs3gZA_eV-j

Marine Aquarium Cable Crawler Robotic Camera for Live Web Feed:

https://drive.google.com/open?id=1dNFpNLbdtDLMTf8s8jPObnXVrY97qdPD

Rehabilitation Engineering Research & Educational Outreach of Dr. Landsberger and the MadScientists Laboratory

(i) Lab Overview Poster: https://drive.google.com/open?id=17FaHTimPoWepZTf26uPwNWSSaqL0f2xc

(ii) Lab Research and Outreach Brief Presentation: https://drive.google.com/open?id=1fAH5YBdvSTute5SDjhH244e6v0POmIDr

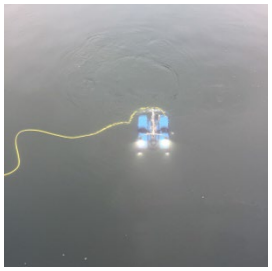
(iii) Outreach story to Los Angeles Orthopaedic Hospital Medical Magnet High School: https://drive.google.com/open?id=1_bk8T8fm_Ymjo0lpuEWUbzOd1wo51P4x

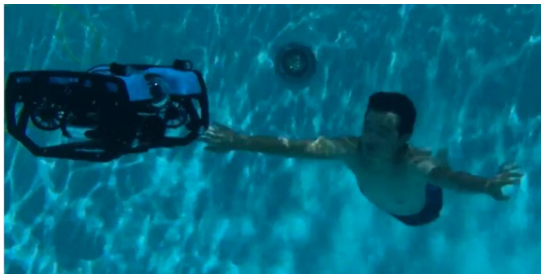
(iv) Early work with Mobile Arm Supports for Children with weak Upper Limbs: https://drive.google.com/open?id=1CIJrbGthWCWkNJpUHsIkAnyMa-LFI_fF

(v) **Engaging At-Risk Students with Lively and Meaningful Hands-on Projects**: https://drive.google.com/open?id=1JCiBMBDNn8n60BlDyTk-JCG2XzsGg7zz (Link may need updating!)

(vi) **The Lab Long Story and exposition on Rehabilitation Engineering Education and Outreach for Underserved Communities:** https://drive.google.com/open?id=1pZnICX9IdIeCrN8SfXsrn3tItidwZXuH

Some Recent MadScientists' work on Robotic Submarines to investigate marine life, ecological conditions and pollution levels:





https://www.youtube.com/watch?v=-9MjyX3RS_w

Undergraduate and Graduate studies and projects that may be of interest:

(i) *A recent video on the Solar Trike, Electric Porsche 914 and a few rehabilitation – design projects:*

https://www.youtube.com/watch?v=0yHGiSZaE6g&t=2s

Landsberger MadScientists Lab CSULA v1

www.youtube.com

Some examples of MadScientists' work with solar hot water heating: http://www.youtube.com/watch?v=IoUPYZQNhcs&feature=related

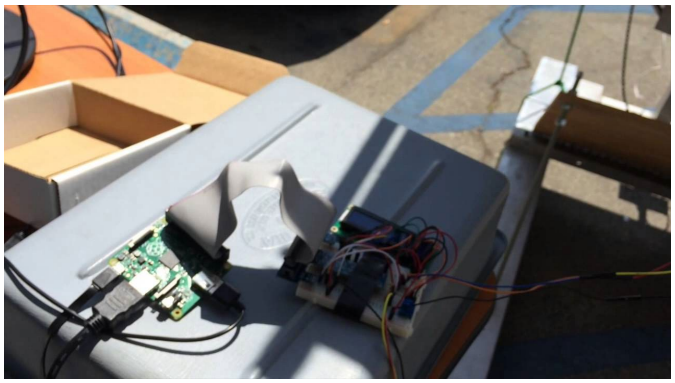
CSULA, SWEM Parabolic Solar Collector. ME-554.wmv - YouTube

www.youtube.com

CSULA, SWEM Parabolic Solar Collector. Parabolic Trough. Fall 2010. ME-554

and

https://www.youtube.com/watch?v=HFSg5EEvC9w



Solar Boiler Project Summer 2015 CSULA

www.youtube.com

Madscientists' Aquaponics and Cambodia:

https://www.youtube.com/watch?v=wke-y05tTTM&feature=youtu.be

Madscientists First Adventure in Aquaponics: https://www.youtube.com/watch?v=_iB363aVk88&list=PL-tUmCX6rOA-971ZB44Xp-xsJ03jx02DF

Aquaponics Vertical Garden Abhimanyu:

https://www.youtube.com/watch?v=mf1VtyePcxY

Madscientists' Rehabilitation Aquaponics: https://www.youtube.com/watch?v=AB40DAZ4jII

Kin4390 & ME4590 Projects Fall 2018:

Simulator to Develop & Assess Balance on Soft, Uneven Terrain

Affordable Easy-Stand Upright Mobility Aid;

Johny uses new MadScientists Easy Stand

Niki enters Easy Stand with assistance Niki rises in Easy Stand

Safe On/Off Access for the Vigor Gym Leg & Core Exerciser

ADL Mobile V3.0 - a Simulator & Trainer for Activities of Daily Living

Active Passive Trainer Leg Guidance Machine to Control Adduction and Abduction

Pedal Power Wheelchair Improvements

Smart Sling for Surgery Recovery

Both creative design and electro-mechanical analysis and measurements of practical machinery can be fun and instructive - converting a lawnmower from gas to electric: https://www.youtube.com/watch?v=T2lANiadZHI

CSULA Engineering: Power Analysis of an Electric Lawnmower

www.youtube.com

Check out our CSULA Engineering video straight from Dr. Landsberger's famous lab at CSULA.

Many Students find that learning to **design electro-mechanical systems incorporating Arduinos** is challenging but very rewarding, and of great interest to industry in their job-searching adventures:

CSULA Mad Scientists Lab EagleCon 2015 Highlights

www.youtube.com

CSULA EagleCon 2015 highlights from the CSULA Mad Scientists Lab display. 3D Printing, Arduino projects, and general engineering demonstrations.

LA Times Coverage of Maker Convention Pomona, Nov 2014. Our Lab Presented upon invitation by the MIT Assoc of Southern California:

http://www.latimes.com/business/technology/la-defining-the-maker-movement-20141111-premiumvideo.html

Defining the 'maker' movement

www.latimes.com

Inventors, tinkerers and creative people of all ages at SoCal Maker Con at the Pomona Fairplex explain what being part of the technology-based DIY culture means to them.

Soccer Heading Simulator/Ball Launcher http://www.youtube.com/watch?v=plvR1qN0oto

Rehabilitation Machines and Assistive Devices to promote maximum independence and quality of life for people with disabilities.

Accessible Merry Go Round : https://www.youtube.com/watch?v=7jHDr7uhGj0&index=59&list=PL-tUmCX6rOA-971ZB44Xp-xsJ03jx02DF

CSULA Merry-Go-Round/Assisted Mobility Platform Test Run 1

www.youtube.com

Early-stage test run of the Merry-Go-Round/Assisted Mobility Platform ---------- Check out our lab Web site at (http://landsbys5.yolasite.com/). --------...

Hand Orthosis Project with Remote http://www.youtube.com/watch?v=mwxaI4BcJrQ

Rehab Machines OT Mobile: https://www.youtube.com/watch?v=6MdD4oc0eb8

Rehab Mobile WorkStation: https://www.youtube.com/watch?v=irk3RehSZ5g

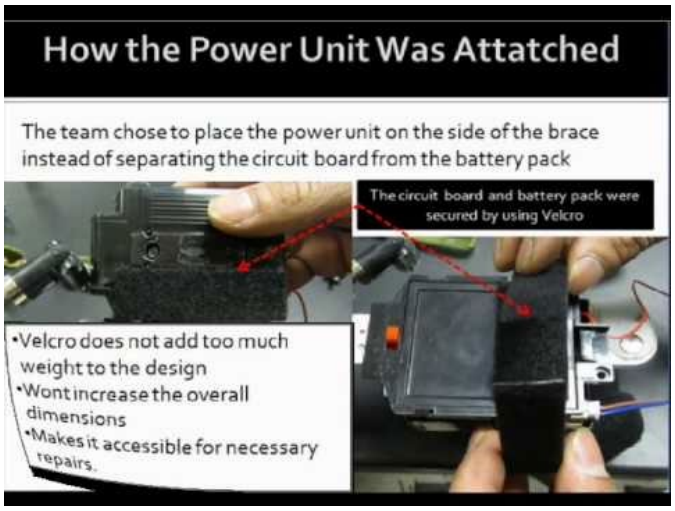
Wheelchair Roller Exerciser v1: https://www.youtube.com/watch?v=0EvsA5e47SE&t=13s

Wheelchair Roller Exerciser v2: https://www.youtube.com/watch?v=elKAZrT3EYw

Driving Simulator v1.0 and Testing: https://www.youtube.com/watch?v=jNIc6WFsVpQ ; https://www.youtube.com/watch?v=KFJlRuEJ2v8

Driving Simulator v2.0 : https://www.youtube.com/watch?v=-7BFCD6wRfA

Driving Simulator v3.0 : https://www.youtube.com/watch?v=OW1PAO5TRPA



CSULA ME REHAB - Remote Control Hand Orthosis Brace.wmv ...

www.youtube.com

Four Mechanical Engineering Masters Students : Yosman Marroquin, Monica Olguin, Emerzon Cruz, and Jesus Yepiz Implemented a remote control, circuit board ...

A-Frame Final Ninos Y Padres http://www.youtube.com/watch?v=3jmCqkO6MN0&feature=related

CSULA Rehab Machines KIN 439 Centro De Ninos Y Padres ...

www.youtube.com

This feature is not available right now. Please try again later.

http://www.instructables.com/id/Bath-Transfer-System/ 10 Steps with Pictures. Excellent Do-It-Yourself Instructable Published on How to build a Bath Access Device (for Rosa Jimenez' daughter, Vanessa). It has been chosen to be a featured project in the Living-Health section of the projects. It has already received over 4500 views, and many positive comments.

: Abstract This project is a simple and inexpensive transfer system that allows a wheelchair user (or any individual with mobility issues) to easily...

Accessible Bathing: Sliding Bath Chair: https://www.youtube.com/watch?v=SVhqCPRU6U0&t=1s

Wrist-Hand Orthosis with Remote Control

https://www.youtube.com/watch?v=mwxaI4BcJrQ&list=PLA66F55767815E89C&index=7

Spider Cage for Walking Rehabilitation and whole Range of Motion exercises: https://www.youtube.com/watch?v=Axb_ouSje14&t=35s

Portable Exercise Device "CEFTY" http://www.youtube.com/watch?v=JfdJVLy0HCE

Rehab Machines KEBKE: https://www.youtube.com/watch?v=kIkn8RCvLtE&t=2s

Wrist Extension Brace http://www.youtube.com/watch?v=niHOq9MdGvk

Whack-a-mole exercise/therapy game http://www.youtube.com/watch?v=tvLNjrQRrLI

Whack A Mole Jr. Kin 439 CSULA

http://www.youtube.com/watch?v=mry0vl-76QQ&feature=relmfu

Shuttle Board Balance Exercise https://www.youtube.com/watch?v=gZkrwuL3UH4&t=16s

Orthotic Hand Glove 2012 http://www.youtube.com/watch?v=SB2zAR3xZ14

Marisol Walker v1 http://www.youtube.com/watch?v=Z3A8pGOcOH8&feature=relmfu

CSULA KIN 439 Rehab Machines-Adjustable Stairs

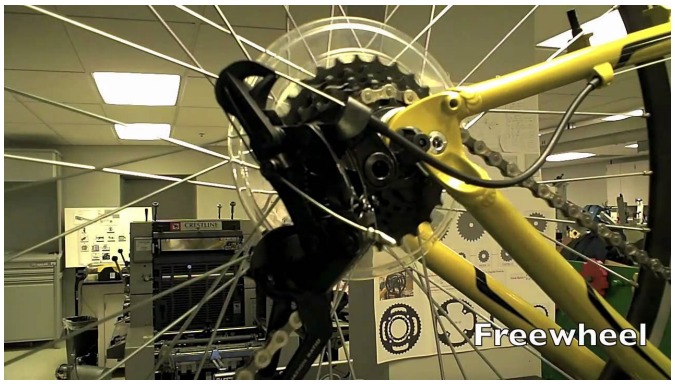
http://www.youtube.com/watch?v=2XOvJddQsb8&feature=related

Pressure Relief Device CSULA KIN 439 Spring 2012

http://www.youtube.com/watch?v=-P4xPmipIJE&feature=related

A Few More Selected Student Design Videos

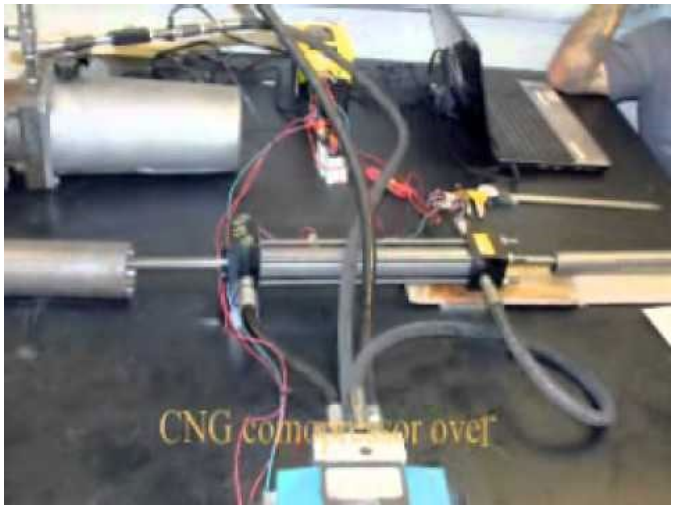
http://www.youtube.com/watch?v=sFZ1IXx2gVQ Bicycle Lab Machine Design



CSULA ME Design: Bicycle Lab Project

Project Background: For our project, we will be analyzing the components of a bicycle and creating a lab for undergraduate students. The lab will allow the s...

http://www.youtube.com/watch?v=lcBH8iJr0ZA CNG Compressor Video



CNG Video

www.youtube.com

http://www.alarabiya.net/ar/alarabiya-today/2016/08/03/سعودي-يحول-سيارة-بورش-إلى-صديقة-للبيئة.html

http://www.youtube.com/watch?v=qDXhL7Gy_-E

2010 VESTED Summer Academy

http://www.instructables.com/id/The-Ecological-Submarine/

2007 NSF Research in Educational Experiences Undergraduate Project

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs** Dept ID: **201520**

Department: **Mechanical Engineering** Fund Code: **IR276**

Prepared By: **John Bachman (Formula SAE)** Program Code:

Budget: **$ 9000** Expenditure: **$ 8998.72** Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

Formula SAE is an over 10 year-old team of students, alumni, staff, and faculty who design and produce an open-wheel, open-cockpit, formula-style vehicle and compete with schools from around the world. Our competition consists of static and dynamic events testing our design, fabrication and reasoning skills compared to other universities. We push our team members to grow as engineers and team members by taking them through the engineering cycle which begins by creating requirements, then generating concepts, followed by completing detailed designs, prototyping, testing, manufacturing, and performance verification. The team then presents their design to experts in the field and compete against ~100 other universities from around the world in a variety of events. The mission of the Formula SAE Team is to have its members increase their knowledge of automotive design and building, gain hands-on engineering and management experience, and gain experience working on a multi-disciplinary competition team. The team also builds lasting relationships among its members and with the Cal State LA community that increase students interest and identity in engineering, helping them be succesful after completing their degree. The team also supports ~10 students on the senior design team. In addition to working on the competition, the team assists the MESA program in the college in performing outreach events during open house, middle school science bowl, MESA day and more to get K-12 students excited about STEM.

2. **Provide key performance metrics to measure and sustain success.**

To be succesful, we measure how many students participate, how active the students are, how well we perform against our competitiors in the annual competition, and how many of our members receive job offers before graduation.

3. Describe program outcomes and results. Identify challenges encountered.

We currently are doing well in the first two categories with ~20 students who are highly involved. We are also engaging a diverse group of students on the team in terms of gender, race/ethnicity, major, and year-in-school. The previous year we took ~15 students to the competition in Michigan. The team competed in all of the static events. Unfortunately, the team was unable to make all of the necessary modifications to the vehicle in order to pass the technical inspection. The team is now in a much better position for the following year with a completely built car to work off of. The team also has a very small budget relative to their needs. The funding from IRA is enough to get the team to the competition, but there is no additional money to spend on the vehicle. To overcome this challenge we spend much of our time fundraising as a team, receiving funds from local businesses, on-campus programs, families, and alumni.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-2022

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Civil Engineering**
Prepared By: **Wing Shun (Welson) Kwan**
Budget: **$ 6000** Expenditure: **$ 3920.68**

Dept ID: **201505**
Fund Code: **IR380**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

The allocated funds for the ASCE Geowall team helped students design, implement, and deliver an innovative design idea and compete with other students from various institutions across the nation. This competition has more than 10 CE students partake in various elements in the competition. The team provides students with bonding, learning, and mentoring opportunities that are unique to the team. All these values allow those who are new to CE to join in the team to learn and give back as a cycle of students providing newcomers a place within ECST and mentorship to learn about ECST to pass on to other students.

2. **Provide key performance metrics to measure and sustain success.**

Each year the Geowall team competes at a regional and national level competition and usually places within the top 3 in at least one of the competitions. Students first must create a report detailing their design of the wall for the competition and if passing, are able to compete in the national competition. After this, students build the design for the regional and national competition and receive their scorings from each competition ranked among other institutions. Continued IRA funding would provide more opportunities such as more competitions, job fairs, outreach, and involvement that the team can provide for its members.

3. **Describe program outcomes and results. Identify challenges encountered.**

IRA funding is what makes up the majority of the opportunities the team is able to participate in. The students are able to keep focused on studying different variables on how to design and construct the wall for the competition; provide students the time to put themselves out there in job fairs to connect themselves to possible employers, provide opportunities to spread awareness of ECST to local high schools and other organizations, such as the Girl Scouts; and give students real world experience with engineering. The results would be that multiple students have been able to receive multiple job offers throughout the job fairs and provide engineering events for younger students to get involved with mini engineering events.

The ASCE student chapter is trying to bounce back from the COVID19 lockdown. The number of members was halved, and we had difficulty recruiting new members because in-person activities were prohibited. Unfortunately, there were not enough members interested in the Geowall team, so we did not participate in the student competitions. The expenditure was used to support the travel cost of the ASCE concrete canoe team.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Electrical Engineering**
Prepared By: **Deborah Won**
Budget: **$ 4500** Expenditure: **$ 4483.86**

Dept ID: **201515**
Fund Code: **IR381**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

IRA funding helps support student success by providing design experience in the biomedical field and exposure to biomedical engineering (BME). IRA funding was used to encourage and support student involvement in the Biomedical Engineering Society (BMES) student organization by funding engineering design projects and giving them more networking opportunities with professionals in their field. They also engaged in service and the public good by welcoming freshmen students and raising their awareness of the BME field and inspiring them to consider future careers in the field and mentoring students interested in BME to learn skills that could be applied to developing medical technology that helps improve the health and lives of others.

2. **Provide key performance metrics to measure and sustain success.**

Metrics include:

- Engineering workshops conducted to guide and mentor students in acquiring new skills and practice with engineering tools
- Participation in BME-related conferences – attendance, research presentation, workshops, or competitions
- Participation in BME-related design competitions – numbers of students and projects
- Recognition or awards at these conferences or competitions
- BME industry speaker event
- Outreach events to local K-12 schools (such as College open house)
- Service events to students on campus (such as Welcome Back and National Engineering Week events)

3. **Describe program outcomes and results. Identify challenges encountered.**

BMES planned, organized, and hosted several engineering workshops (e.g., soldering, Arduino, CAD, Python) which helped prepare students to work on engineering design projects and help them to apply their classroom learning to tangible biomedical product development. These workshops are preparing BMES members to work on a multi-year design project that not only can be submitted to a design competition but also could help assist individuals with hearing impairment. The BMES officer board planned the workshops to prepare students to design and build a robotically controlled glove that will sign in American Sign Language the text typed into their software application to be developed in the following year.

BMES IRA funded two peer mentors who helped plan, organize, and lead these workshops as well as help mentor 25 students in a series of workshops that were part of the BE WINNORs (BioEngineering Women Innovators) program to guide students in designing and building components of a robotic shower assist prototype. This prototype and the workshops were also utilized as the basis for a biomedical engineering workshop in the LaunchPad program the subsequent summer (Summer 2022). Thus, BMES IRA supported educational and enriching academic and community engagement through all these workshops.

BMES IRA supported the participation of two ECST students in the annual national BMES conference undergraduate research, at which they not only networked with other students and researchers and industry professionals in the BME field, but also presented their own research in the poster session. Various resources (equipment, tools, and supplies) acquired through past BMES IRA funding also supported a biomedical senior design project to develop a navigational device to aid the blind, and two graduate research projects and three undergraduate students' research projects which have led to conference and symposium presentations.

BMES also carried out outreach events, including tabling and hosting lab tours at ECST welcome and open house events.

The BMES IRA-supported peer mentors also helped host a BME industry speaker series, consisting of 10 speakers at each of which 20-30 students were inspired by each speaker's engineering work in the medical industry as well as their career journeys. The speakers included

1. Robin Grandl (Marketing Director, Activ Surgical)
2. *Parisa Kamgar (Engineering Manager, Midmark Corporation)
3. *Kenji Karuhaka (Adv. Prod. Mgmt. Engineer, Biosense Webster)
4. Courtney Lane (Principal Consultant, Anacapa Clinical Research)
5. Michelle Hasse Richmond (Operations Mgr., Clarix Imaging)
6. *Cecilia Zurita Lopez (Assistant Professor, Chapman University)
7. *Corey Baker (Assistant Professor, Univ. of Kentucky)
8. Kit Yee Au-Yeung (General Manager, SandboxAQ; formerly Product Development Director at Profusa, Inc.)
9. Erik Anderson (Clinical Marketing Manager, Synaptive Medical)

*= Cal State LA alumnus

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-2022

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs** Dept ID: **201525**

Department: **TECHNOLOGY** Fund Code: **IR391**

Prepared By: **Dr. Paul Liu** Program Code:

Budget: **$ 5,000** Expenditure: **$ 5,074.02** Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

The SourceAmerica Design Challenge Project planned to engage a non-for-profit organization called The American Foundation for the Blind (AFB), used to be called Hellen Keller Foundation in Arlington, VA. Our team wanted to design and build an electronic obstacle avoidance system for people with visual impairment to navigate the surrounding walkways or rooms. Due to the travel restriction during the COVID-19 pandemic, the project was abolished.

2. **Provide key performance metrics to measure and sustain success.**

a. Conceptual design ideas generated to create and fabricate such navigation system for the people with blindness.
b. Five students recruited to join the project, with one undergraduate and four graduate students.

3. **Describe program outcomes and results. Identify challenges encountered.**

Project got canceled due to difficulty in arranging travel for data collection and system testing. Power tools and supplies purchased are available for future use.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Electrical Engineering**
Prepared By: **Deborah Won**
Budget: **$ 7500** Expenditure: **$ 8380.68**

Dept ID: **201515**
Fund Code: **IR409**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

BOOST is directly in line with the University's mission to engage in community, serve our community, and promote student success. BOOST equips our students with design experience that will better prepare them for careers in engineering and which they do not get in the conventional curriculum, and more generally enhance student success. Students work on engineering projects which serve our local community, and thereby gain real-world experience working directly with community partner clients.

2. **Provide key performance metrics to measure and sustain success.**

BOOST's original cohort had a 53% 5-year graduation rate in Spring 2020, almost 10-fold that of a matched control group. Also in 2021-22, 30 ECST students participated in 6 different teams working on one of two design projects, the goal of which was to serve individuals with mobility impairment or improve public health; six peer mentors gained meaningful leadership experience that deepened their own engineering understanding; and BOOST deepened relationships with a local high school, El Rancho High School, and in particular with 50 students in two robotics classes at the high school. Finally, these BOOST/BE WINNORs projects were leveraged to form the basis for a day of workshops for approximately 40 female high school students who were participating in our College's LaunchPad program. Five participants from the BOOST/BE WINNORs projects served as LaunchPad faciliatators.

3. **Describe program outcomes and results. Identify challenges encountered.**

In 2021-2022, BOOST was carried out under the umbrella of a larger externally funded program called BE WINNORs. In this program, ECST students were invited to meet weekly throughout the academic year to be walked through the design

process and implementation of one of two projects: 1) robotic shower assist prototype for individuals with upper mobility impairment and 2) a mobile health app to track Covid-19 statistics and visualize trends. IRA funding supported two peer mentors who led and helped prepare for weekly workshops and mentored teams of students to learn skills such as electrical instrumentation, microcontroller programming on the Arduino platform and Xilinx's Pynq Z2 platform, CAD on SolidWorks, computer vision techniques and Python libraries to implement these techniques, data visualization, and mobile app programming. The 25 students who participated ranged from sophomores through senior levels; there was even one graduate level student. All shared positive feedback regarding the benefit they received from the workshops, peer and faculty mentorship, the teamwork, and the industry professional speaker series. This feedback was consistent with the commitment they exhibited in showing up every Friday and spending half their day learning these new skills and participating in the program. In future offerings of BOOST, we hope to gain more support from the ECST Student Success Center in promoting the program so freshmen and sophomores can benefit more from these service oriented projects.

In Fall 2019, a relationship was established with a couple local high school robotics instructor. We stayed in touch during the pandemic, and one of the high schools, El Rancho High School, welcomed our mentorship with their year-long robotics project. In 2021-22, we invited them to learn about the BOOST projects, and virtually joined our end of semester events both in the Fall and Spring. About 50 students joined on Zoom to hear the ECST BOOST project / BE WINNORs program students present their work from the semester.

While we did not have a direct community partner client for this project, we had community members in mind and the students stayed motivated to work on a project (namely a robotic shower assist device and mobile health app) which could be used to serve the public health and community health needs.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Civil Engineering**
Prepared By: **Sonya Lopez**
Budget: **$ 6000** Expenditure: **$ 6000**

Dept ID: **201505**
Fund Code: **IR426**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

The purpose of the 2021 GMiS Conference has been to expand the knowledge-base and provide access to career growth opportunities to all STEM students. We were able to fully sponsor 30 members to the 2021 GMiS Virtual Conference.

The 2022 SHPE Regional Leadership Development Conference (RLDCs) equips both undergraduate and graduate students to be leaders in their academic communities or workplace. Guided by experienced professionals, RLDC participants are inspired and trained to impact their community through STEM. We were able to fully sponsor 24 members to attend the in-person conference as well as pay for 60% of lodging to members who chose a lodging option.

2. **Provide key performance metrics to measure and sustain success.**

After the 2021 GMiS Virtual Conference we surveyed all attendees and 4 students reported successfully obtaining an internship/full time job offer.

From the 24 members who attended the 2022 RLDC Conference, 7 members have decided to enroll in a Board of Directors within SHPE Cal State La. Cal State La members networked with other members from the Region 2 area, local school chapters, and past SHPE alumni.

3. **Describe program outcomes and results. Identify challenges encountered.**

Outcomes: From the 2021 GMiS Virtual Conference, 4 students reported successfully obtaining an internship/full time job offer. From the 2022 RLDC Conference, 7 members have decided to enroll in a Board of Directors within SHPE Cal State LA.

Challenges:
- No funding was available for the 2021 SHPE National Conference due to it being held in a travel ban state

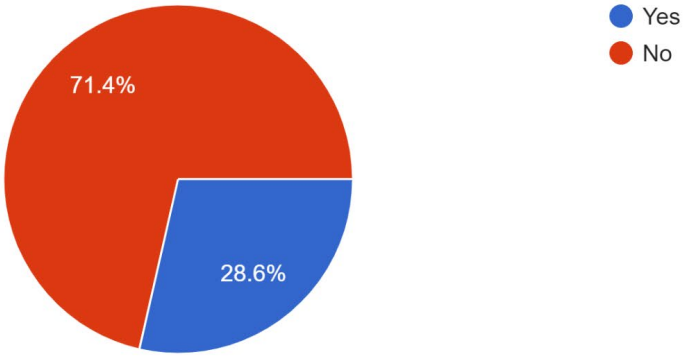
- Location was far for students

- Transportation and lodging was difficult for students

Key Metrics

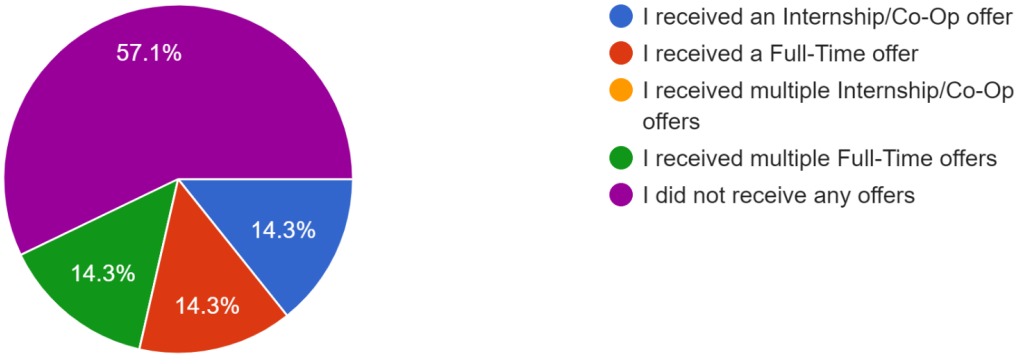
Did you interview with any companies?

7 responses



Did you receive any offers?

7 responses



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs** Dept ID: **201520**

Department: **CE/ME** Fund Code: **IR436**

Prepared By: **Mark Tufenkjian, He Shen, Aren Petrossian, Kat Bonomo** Program Code:

Budget: **$ 6000** Expenditure: **$ 6000** Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

AUVCalState LA, CSULA's autonomous underwater robotics team, is comprised of engineering students. Our ECST team participates in an international competition, "Robosub". High school and college teams design and build Autonomous Underwater Vehicles (AUV'S) to autonomously complete a set of obstacles. Last year, Cal State La was a finalist in the competition taking place at the University of Maryland.

AUV Cal State LA funding is comprised of a STEM Grant from the Office of Naval Research (PI: Dr. Mark Tufenkjian), CSULA ASI, IRA, and **(INSERT?)**.
Cal State LA's Robosub stimulates an long-term project, comprised of several sub-teams in various fields working together to construct a competitive robot. Offering opportunities for students to build a network, prepare for the workforce, and improve multidisciplinary skills, the outcome of the project aligns with the campus strategic plan. Specifically:

1. **Engagement, Service, and the Public Good:** Robosub is an international competition that allows students to travel across the country and interact with teams from around the world, giving students a unique opportunity to branch out and meet others. Service and Public Good is also a rising pillar of the AUV CalState LA team. Last year, a few members took part in a group fundraiser to raise money for #TeamSEAS, an ocean clean-up movement. This year we plan to partner with the Environmental Policy Committee (EPC) during their ocean campaign to continue our clean-up initiative.

2. **Welcoming and Inclusive Campus:** Robosub allows students within the department to meet like-minded individuals. The collaborative space created through various tech workshops and out of school rec events promotes strong ECST inclusivity. Sub teams work together to create a piece of the robot and all members come together bi-weekly to combine efforts increasing teamwork and collaboration.

3. **Student Success**: Robosub offers a vast amount of resources to its participants. Our database of learning tools (https://www.robosubla.com/resources) and hands-on tutorials from successful students and past alumni allow new students with little or no experience to become confident and knowledgeable members. The alumni network, competitive skills taught, and project experience also lands many members internships, setting them up for success post-college.

Academic Distinction: Members work with distinguished faculty members, increasing their professional persona, industry confidence, and skills needed for upper division classes. The Robosub club also prepares students for the AUV elective now offered and Robosub option for senior design.

2. **Provide key performance metrics to measure and sustain success.**

   AUV Cal State LA success can be measured by a few factors: student participation, competition performance, and student opportunities.

3. **Describe program outcomes and results. Identify challenges encountered.**

Program outcomes and results: By following the performance metrics, the program outcomes and results are summarized in the following four categories.
1. Student Participation: Our discord, a collective network of alumni and students, is composed of 85 members. During the ECST Welcome Week, we were able to create an email list of 41 members for the Fall 2022 semester. Our club is composed of various opportunities that students can benefit from. We host several hybrid workshops for each sub-team (ex: Solidworks, cv, schematic reading). Participating in hands-on progress with the robot gives members technical and non-technical skills for the industry. Finally, peer and faculty advising increases members' network and degree confidence. Last year, over 50 CSULA students benefited from at least one of our various opportunities. This year we will be doing several collaborations with other ECST clubs, including SWE and ACM. We plan to increase student participation and resources.
2. Competition Performance: This year, Robosub wants to improve from last year in terms of the overall score and specific criteria. This year CSULA placed 8th among 39 teams. Though we were finalists, we want to place higher at the 2023 international conference. We plan to do this by having more in-depth testing. We also want to improve our low scores in the technical report and strategy video. By allocating more time and resources to these deliverables, we should increase our score.
3. Student Opportunities: This year, Robosub wants to increase our student opportunities for ECST department. Despite COVID-19 circumstances, we have participated in Boeing Day and ECST welcome week. We are excited to increase Boeing Day opportunities by participating in 2022 In Person event. This year the ECST welcome week bbq event, successfully informed a large number of students about the opportunities provided with Robosub. This year student opportunities will provide workshops, hands-on experience, networking for a potential internship, collaboration, and inclusivity.

Challenges Encountered: The main challenge of our team is a lack of funding for travel and select resources. The competition that was originally held in San Diego has moved to Maryland, increasing our travel costs significantly. We could only afford to bring a few members last year. This year we plan to seek out sponsors in order to fund the housing, food, and car needs of the competition. We have a few items we could also like to fund this year to increase the robot's ability to complete the competition obstacles. We have also seen a slight decline in competition participation due to past COVID-19 circumstances.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Mechanical Engineering**
Prepared By: He Shen, **Jovan Lukic (student)**
Budget: **$ 2000** Expenditure: **$ 1432.03**

Dept ID: **201520**
Fund Code: **IR438**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

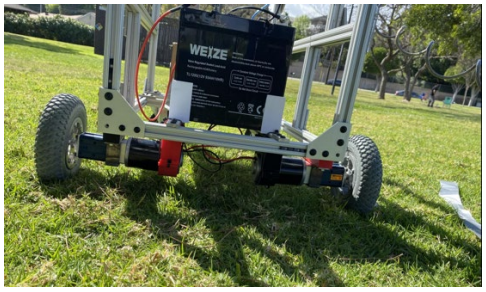
1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

Engagement:

The American Society of Mechanical Engineers (ASME) has strategically planned our expenditures of our given budget to maximize opportunities for our students and communities, which are conveniently aligned with the motives of Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.

Engagement is provided through the participation of large engineering projects that supplement students' learning, including the topic of robotics. The participation of these projects allows students to advance their knowledge which will become useful outside of academia. One platform our organization dwelled with is a four wheeled ground robot with the capability of Autonomous drive. "This platform was meant to compete in IGVC(International Ground Vehicle Competition),"The production of this project allowed students to learn: Lane tracking, Electrical systems design and controls, as well as mechanical design. This project will later be used as a stepping stone for a new project, a mars rover by the name of "cali". This platform will be used to compete in URC(University Rover Challenge), an ongoing project that dwells in Autonomous Navigation, Chassis and Suspension system design, robotic arm manipulation, electrical and communication systems, and so on. It is the epitome of robotics and covers all basis of engineering.

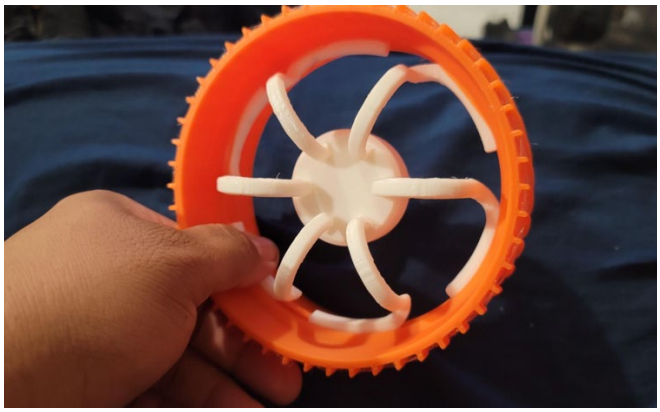
Within the year of Fall of 2021 and summer of 2022 some of the things ASME was able to accomplish regarding student engagement was in regards to the development of lane tracking and controls for the IGVC platform.



IGVC Controls Testing Fall 2021

During the fall of 2021, a group of students was able to successfully implement and test PID based control code and lane tracking, in order to simulate a simple form of autonomous navigation. These students were able to put a new learned skill into practice and involve themselves with the field of robotics.

Pursuing innovation in current Mars rover designs, new ideas were practiced. Innovation is always encouraged, and one example of this is the prototyping of airless wheels for the "Rocker-Bogie" suspension system. During the Summer of 2022, a group of students were experimenting with mechanical design. This design was in the form of a new suspension system used in modern rover applications. After long hours of design and simulations, they were able to design and prototype a new form of airless wheels, that will eventually be a part of a new "rocker-bogie" suspension system. Prototyping of new designs offers many distinct advantages. Small scale testing is an optimal way for students to test out the different designs before implementing them on a large scale. On top of that, students get to learn and participate in the practice of modern systems used now in robotics. These practices allow students to gain knowledge and be up to date in modern engineering systems.


Airless Wheel prototype June 2022

With the funding and resources provided to us, students are able to create and help develop a modern robotic drive system for robotic off-road applications. This is just one example of student engagement in regards to robotics. There is more progress and development such as; prototyping of a modern wheel design.

To summarize, the resources provided to this organization helped Students develop a "SLAM". A form of dynamic 2D mapping created by the sensors and equipment provided to us. One such sensor is a LIDAR, a key component of 2D mapping and autonomous Navigation of the current URC rover platform. Other things included: Suspension system design, prototyping, controls testing, and overall development of our robotic platform. All of this helped students develop engineering skills and

knowledge outside the scope of what is taught within curricular studies. With the resources provided to us, students are being proactive in the field of engineering and robotics which will benefit the students in their future endeavors. For example, students that help develop such knowledge could later use it in further research in the field of robotics.

Service

Workshops provided

Some workshops that ASME provided throughout the years have been ROS (Robotic Operating System) workshop, which was used as a basis for getting into Autonomous Navigation, robotic arm manipulation, Computer Vision, and overall development of robotic software systems. Other workshops included Solidworks CAD, Model, and Assembly as well as An introduction to Electrical system, the list goes on. In the years 2021 and 2022 we were able to host: Robotic arm workshop, Drive system workshop, Arduino workshops and many others.

A lot of these workshops were recorded and are used as instructional videos for many engineering students around California State University Los Angeles who would like to learn more about robotics, with the most prominent ones being ROS tutorials. Ultimately, not only do we have students engaged through projects in advanced robotics, but we also offer relevant workshops and videos to allow students to get into this field of study on their own.

Academic Distinction

Students in Internship

The skills learned in this organization through our projects, such as the URC rover and IGVC platform, were able to give our students an edge in the industry over many other students from other schools. Some of the knowledge and skillsets that this organization provided, such as: Computer Vision, FEA Analysis, Object avoidance, Electrical and Mechanical Design of robotic systems allowed our students to stand out over the rest. Some examples of this included:

2021-2022

1) Joseph(JPL)
2) Ryan(Rivet)
3) Giovanni(Eddison)
4) Tim(OffWorld)

Pre 2021

5) Gary(JPL)
6) Emanuel(Raytheon)
7) Ricardo(JPL)
8) Byron(Sony, Universal Studios Hollywood)
9) Bryan(JPL)
10) Richard(Northrop Grumman)

11) Adriana(Raytheon)

Overall, this list illustrates the number of students who are or were once part of our program who are able to achieve academic and career success as a result of being part of this organization. With the projects we involve ourselves with, and the skills we learn through project engagement, we put ourselves in a distinct advantage.

2. **Provide key performance metrics to measure and sustain success.**

Organization Success

There are two ways we measure success in this organization, one is through organization success, and second is personal success. Regarding success within the organization, that's defined by project milestones as well as participating in competitions. With this past year some of our milestones included obtaining a functioning rover and performing tele-op. On top of that, our students were able to perform lane tracking on an older platform, as well as start prototyping a new suspension. These sorts of milestones are what we set in order to track our performance, with the end goal being to be able to compete with our current rover platform.

Personal Success

On top of organization success, we also measure overall performance with personal success. If a student is able to achieve great things regarding career or academic advancements due to a partial or high degree of influence coming out of ASME, we consider it a success on our part. For example,career advancements, most importantly the form of receiving internship positions. Another example of career advancement can be found in our previous president(Timothy Tang), and his achievement of getting a job at Northrop Grumman as well as pursuing his graduate program. Many of his attributes can be associated with this organization. In addition, students acquire new skills. A student by the name of "Abigail" who is currently learning autonomous navigation is now applying that skill to another research in development of an autonomous car provided at this university. Ultimately these attributions of personal success are what we quantify as both success of the organization as well as the success of the people involved.

3. **Describe program outcomes and results. Identify challenges encountered.**

Outcomes

The overall outcome of this organization is to be able to complete the development of the URC rover and make it competition ready by the end of next year. Our second outcome is in the advancements in our engineering program in the field of robotics and to continue the success of student achievements.

Results

We were able to get the platform running to a huge degree. The platform was showcased in Madison Wisconsin. Right now the rover's autonomous navigation is being developed, but ultimately the completion of the robot is on track. In regards to advancements in CSULA's engineering program by developing a platform that can be showcased it will offer a good stepping stone for both ASME and the University. Furthermore, as more students from our organization gain proficiency in robotics, it will indirectly advance our engineering program in robotics. Throughout this past year, we were able to get into more complicated robotic concepts than we were 3 years ago. For example, this past year we dwelled in Autonomous Navigation, Robotic arm manipulation, Chassis and suspension design for off road navigation, long distance communication, and the list goes on. Lastly, student success continues to grow as the students continue to include themselves in other research and projects. Students are using what is learned in our organization to advance their careers, proving our work benefits all parties involved

Challenges Encountered

Some of the challenges encountered revolved around development, and being progression in a timely manner. However, this comes naturally when dealing with these sorts of topics. Another challenge is student engagement, due to being remote, students involvement dropped for a brief moment. However, we're starting to see "Pre-Covid" numbers again. Ultimately we do have our challenges but these challenges are being resolved, and we are continuing to grow as an organization.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Technology**
Prepared By: **Lily Chen**
Budget: **$ 1300** Expenditure: **$ 1305.29**

Dept ID: **201525**
Fund Code: **IR452**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

The funds were used for purchasing or renewing subscriptions to online workshops/courses/training sessions ((related to hydrogen station/hazardous material fire prevention and firefighting) offered by NFPA, SFPE, and other agencies, fire safety evaluation tools. The funds provided resources to help students learn via real-world projects and engage in fire safety-related public service. The funded projects were designed to enrich the curriculum and contribute to student success.

2. **Provide key performance metrics to measure and sustain success.**

At the beginning of 2022, around 40 of the students started working on the research project (for others, they were offered the online workshop series as a learning resource). They worked on the questions such as how fuel cells work, what the mechanism of FCV (fuel cell vehicle) is, under what kind of situation (e.g., temperature…) the hydrogen will be ignited, and what the feature of hydrogen fire/flame is, etc. They also collected information about how FCVs and hydrogen stations are used currently worldwide and locally (in California). Based on the data collected, they summarized the fire safety issues related to hydrogen stations. They also worked on finding relevant codes and regulations on fire safety in hydrogen stations and using fire safety evaluation tools to evaluate the fire risks.

With the resource provided, about 80% of the class received a grade above "B" on this group project. This year's effort was successful because it connected our students with a real-world project. Students were excited to see what fire safety issues look like in the real world and in high-tech fields. I believe this project helped them achieve a better learning outcome.

3. Describe program outcomes and results. Identify challenges encountered.

These activities exposed FPAT students to real-world fire prevention and protection practices by involving them in a "real" exploration project. The activities provided examples for a number of fire protection courses, including TECH 3520- Fire Safety Aspects of Building Design & Construction, TECH 3580-Hazardous Materials, TECH 4530 -Fire Protection System Design, TECH 4550- Fire Protection of Building Structure and systems. It is anticipated that more than 100 students in FPAT program have benefited directly or indirectly from this program.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-2022

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **Mechanical Engineering**
Prepared By: **Jeffrey Santner**
Budget: **$ 7000** Expenditure: **$ 3639.54**

Dept ID: **201520**
Fund Code: **IR460**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

Resources were used for rocketry equipment, parts, and raw materials. These activities engaged students in concepts they learn through their coursework – design, manufacturing, material properties, thermodynamics, fluid mechanics, propulsion, electronics, etc. Resources also supported a capstone senior design project with five students. Finally, we have built a strong community of students who are excited about the aerospace field.

2. **Provide key performance metrics to measure and sustain success.**

Unfortunately, we fell behind schedule this year and were not able to enter the competition. However, we made significant progress towards the competition. We have designed two rockets and acquired most of the components.

3. **Describe program outcomes and results. Identify challenges encountered.**

Students designed a rocket and purchased materials, but fell behind schedule and did not compete in the annual competition. This was likely caused by lack of in-person activity during Fall 2021 and the first three weeks of Spring 2022. Now that all classes are on campus, we are already off to a stronger start in F2022, with high attendence at meetings and more active student (and faculty) leadership.
The senior design team successfully designed and manufactured rocket fins and fuselage components from carbon fiber.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: Electrical and Computer Engineering
Prepared By: Y.C. Wang
Budget: **$ 4000** Expenditure: **$ 4934.64**

Dept ID: **201515**
Fund Code: **IR472**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

The ECE Makerspace (Electronics Makerspace) is directly in line with the University's mission to engage students for success and create a welcoming and inclusive campus. The Electronics Makerspace provides two distinct functions: 1) to provide a venue for students interested in electronics to collaborate, including student organizations and individual students in all majors; and 2) to provide student-driven workshops to enable students of all walks of life to learn how to safely operate electronic test and measurement equipment, electronic fabrication equipment, and electronics design tools.

2. **Provide key performance metrics to measure and sustain success.**

The funding was successfully used to develop the "wet lab" area and some of the "dry lab" area. As part of the dry lab development, a Canvas shell was developed (the "Virtual Circuits Makerspace") with many safety and basic circuits design self-paced workshops. There are 134 active students enrolled and using the material in this Canvas shell. The wet lab area, located in E&T B111, is now outfitted with three state-of-the-art digital temperature controlled soldering stations and surface mount device hot air rework devices with anti-static mats for work. There are also other hand tools used for working with printed circuit boards (PCBs) and components such as microcontrollers, resistors, capacitors, and other integrated circuits. As part of the on-ramp transition in AY 2021-2022 from emergency remote instruction to on-campus instruction, the ECE Makerspace student assistants held two soldering workshops, teaching five students in each session how to solder and work with small electronic components. The soldering stations were utilized by students in the EE/ME Senior Design Capstone program as well as those in student organizations.

3. Describe program outcomes and results. Identify challenges encountered.

AY 2021-2022 IRA funds were successfully utilized as described in the proposal for the ECE Makerspace, which was to:

1) Expenses related to low-voltage ET-C252 Makerspace development, including supplies and equipment.

2) Expenses of developing the workshops including the supplies, equipment (e.g., PCBs, soldering tools, micro-controllers), and student assistantships.

Due to the emergency remote instruction period, expenses were primarily shifted to expense category 2, which was to develop student-driven workshops including supplies, equipment, safety/personal protection equipment, etc. Expense category 1, developing ET-C252 as the low-voltage ECE Makerspace, was shifted as the room being utilized for the Electronics Makerspace "dry lab" was changed to ET-B105. The classroom is being updated to enable students to use the space effectively for collaboration, electronics design workshops, and light circuit construction.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: **ECST**
Prepared By: **Sharri Kornblum**
Budget: **$ 5,000** Expenditure: **$ 4284.58**

Dept ID: **201500**
Fund Code: **IR473**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

The funds are instrumental in helping to increase the numbers of the partipants in NSBE chapter at CSULA. They are in alignment with the CSULA's inclusivness campaign. To increase the Black students feeling of being included, and valued by the engineering department and the campus. We let them with the help of this grant that we see them and hear them.

2. **Provide key performance metrics to measure and sustain success.**

We assisted NSBE jr. win the robotics competetion at the National NSBE competition in Anaheim, March 25-27,2022. We hired a metor for the NSBE jr. with the IRA funds. NSBE students used the books we bought them for the engeering professional test to successfully past the exams.

3. **Describe program outcomes and results. Identify challenges encountered.**

We were able to assist NSBE jr with their robotics competition and they won first place at the National NSBE conference which was held in Anahein, Ca. on March 25-27, 2022. The students were able to use the books we bought them from the IRA money to study and pass the engineering professional tests. The only caveat was the monies set aside for the speakers. We had many excellent, inspirational and informative speakers at the NSBE meetings, but the speakers either could not accept a stipend or they wanted to donate their time. Therefore, we did not use the funds designated for the speakers.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2021-22

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**
Department: Electrical and Computer Engineering
Prepared By: Y.C. Wang
Budget: **$ 2000** Expenditure: **$ 1990.93**

Dept ID: **201515**
Fund Code: **IR474**
Program Code:
Project ID:

Please use evidence-based data including year-end financial reports and historical data for comparison.

1. **Describe how resources are aligned with the campus strategic plan, which includes Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.**

IEEE, the student organization for students interested in electronics and computer engineering (ECE), and HKN (Eta Kappa Nu), the ECE honors society, seek to engage and welcome students through professional and community-building activities. The IEEE student organization is student-driven, hosting workshops and project development for beginning students, such as multimeter use or soldering, and engaging students outside of the classroom to develop lifelong acquaintances through networking events with professionals, alumnis, and active students. The HKN honor society serves students with honors and distinction in the Electrical Engineering degree programs, connecting students with professionals in both academia and industry.

2. **Provide key performance metrics to measure and sustain success.**

There are over 150 students served by the IEEE, as measured by active participants in the IEEE student org's Discord server. 10 workshops were held during the academic year, including 4 workshops in person during Spring 2022, serving the greater Cal State LA and ECST community, on topics that were accessible to many, such as professional career workshops as well as basic electronics measurement workshops.

3. **Describe program outcomes and results. Identify challenges encountered.**

Due to the COVID-19 emergency, students were not able to hold the design competition in person. The remote instruction period rendered students unable to meet in person to effectively work on projects. Instead, students held workshops, such as: 2 circuit analysis workshops, 2 digital multimeter workshops, 2 resume workshops, 2 mock interview workshops, 2 emphasis (specialization) workshops for students who did not yet know what specialization in Electrical Engineering they wanted to pursue, and 4 professional speaker events. The circuit analysis and digital multimeter workshops were held in

person in Spring 2022, but the rest of the workshops were held remotely on Zoom. The funding was utilized to purchase digital multimeters as raffle prizes for students who attended workshops.