



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil Engineering**

Fund Code: **IR044**

Prepared By: **Mehran Mazari**

Program Code:

Budget: **\$ 6,000** Expenditure: **\$ 3,763**

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 that they learn in class and apply it to the real world which will strengthen their understanding of the subject. Additionally, the projects help students prepare you for future class because they would already have some knowledge on the subject already. Students will be able to see how their design compares to that of other schools during 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 has placed among the top half of the institutions at the regional level. IRA funding will allow our team to continue to climb higher up towards 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 get the mold machine cut which will result in a better performing canoe as the amount of error is reduced. Our metric for success includes how many students are involved with club activities and our placement in the competition.

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

The IRA funds helps the ASCE Concrete Canoe team to be successful and allows us to apply our knowledge for real-world applications by designing and implementing ideas. Which helps students have a better understanding of Civil engineering topics. The current challenge is dealing with Covid-19 and how to work while at home but we are still working. Another challenge this year was that we were not able to build a canoe due to Covid-19 and competition was held online. However, we will still be working on a hull design and the theoretical side of the project which is just as a valuable experience as constructing the actual canoe for students. We will work on the hull design to make sure that it is good enough so that future Cal State LA teams can still reference it. As of right now, it is unclear if the full payment will be necessary to attend this year's competition, but a fee will most likely be required.



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Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil Engineering**

Fund Code: **IR050**

Prepared By: **Mehran Mazari**

Program Code: **ASCE Steel Bridge**

Budget: **\$ 2,700** Expenditure: **\$ 2,154**

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 Steel Bridge team allow students to design, implement, and deliver a unique design idea and compete with various students from different institutions across the nation. This team usually has more than 15 CE students involved in various tasks for the project. Students are able to get real world experience learning how to design bridges using steel, learning various properties of steel, utilizing various equipment to work on fabricating the bridge, and other additional equipment to construct the bridge at competition. The project is usually the loudest project being able to attract many CE students and provide the students many opportunities to learn what the project has to offer.

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

The project team has multiple locations where they can measure their performance. Each area; the design, the fabrication, and the construction; are all areas that are evaluated when it comes to the project. The design is graded in class by a professor where the students learn to use AUTOCAD and SAP2000 to design the bridge and test its theoretical stressed components. The fabrication is a process that is worked on throughout the year and evaluated by the team captains and other team members to make sure each piece of the bridge is good enough. The construction of the bridge is finally evaluated by judges during the competition who come from various institutions and companies. The construction process is ranked among the other institutions to display where the team ranking is. IRA funding is crucial to the team in order to provide students transportation, logging, registration, and materials for the project.

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

The outcomes for the project include a lot of real world experience designing, fabricating, and constructing with steel. Many of the students are asked about their experiences within the team during job interviews and many employers find it an interesting and invaluable experience to a student's resume. Many challenges that the team encounters is funding where students tend to have to pay out of their own pocket in order to go to conferences; and another challenge tends to be that there is sometimes not enough funding to purchase all the material needed for the best possible bridge and quality is reduced because of the constraint.



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Division: **Academic Affairs**

Dept ID: **201520**

Department: **Mechanical Engineering**

Fund Code: **IR069**

Prepared By: **John Bachman (Baja SAE)**

Program Code: **[REDACTED]**

Budget: **\$ 8,000** Expenditure: **\$ 7,833**

Project ID: **[REDACTED]**

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 a 40 year old student-run organization made up of mechanical engineers, electrical engineers, computer scientists, technologists, and chemists. Each year, the team of 20-30 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.

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 successful, we measure how many students participate, how active the students are, how well we perform against our competitors 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 50 students on the team and ~20 students who are actively involved. The previous year we took ~20 students to the competition in Gorman, CA and ~12 students to Rochester, NY in May and June 2019. This is the first time in the team's 40 year history that we have gone to two competitions in two years. We are also engaging a diverse group of students on the team in terms of gender, race/ethnicity, major, and year-in-school. We have gone from finishing 64th overall out of over 100 schools in the competition in 2018 to 24th and 34th in 2019. During 2020 the competition was switched to a virtual competition where the team placed 3rd in their sales presentation.

Due to the lack of lab access it is currently difficult to do design and to build the team, but the team has still assisted in MESA events, continues to design, we had 3 speakers in the spring, and a Race Car Design workshop to continue the growth of the team members. The second challenge for the team is finding funding. The budget for this year was decreased from \$8,500 to \$8,000 even though the number of students and impact of the team is growing rapidly. 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.



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Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil Engineering**

Fund Code: **IR225**

Prepared By: **T. Rodriguez-Nikl (faculty) and K. Dorado (Team Pres.)**

Program Code: **[REDACTED]**

Budget: **\$ 4,000** Expenditure: **\$ 1,402**

Project ID: **[REDACTED]**

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.

Earthquake Engineering Research Institute (EERI) Seismic Design Team uses the funds provided to purchase materials, tools and for travel expenses. EERI activities align with the the campus strategic plan in the following ways:

- Inclusive to all Cal Stale La campus: EERI welcomes and accepts students from all majors. The competiton has various technical and non technical components, therefore everyone can contribute.
- As the organization gets ready for competition the students get to experience hands engineering design activities such as AutoCad model construction and SAP 2000 strucutral anaylsis, along practicing written and verbal communication skills.

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

This organization uses active student membership along with the competition final ranking score to measure success. EERI has had 11- 18 active student members per year over the past three years. As an active EERI student member one should participate in ECST volunteer events, attend organization meetings and events. Members also help with competition tasks such as reasearching, writing the proposal, designing and anzlyzing the structure, preparting for the presentation, and creating a poster. To attend the competition the student membeb must pay the EERI national membership fee \$25-\$20. The EERI Cal State LA Student Chapter has been successfeul in their previous competitions ranking within the top 10 schools.

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

During the past years EERI members have worked extensively and have been rewarded by consistently placing in the top 10 schools in the national competition. The annual competition provides students with great traveling and networking opportunities with students from all over the nation and recruiters.

A challenge EERI has faced is not having the proper materials to create our best possible model. This past year although we had a laser cutter it was not the best as it would occasionally burn our material when cutting it. Therefore, we requested the Cal State La Makerspace to allow us to access their laser cutter since it was better and more advanced than the one we had. In addition to this we have also been skeptical whether our shake table works properly as sometimes it does not take the reading when conducting a shake test.



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Division: **Academic Affairs**

Dept ID: **201520**

Department: **Mechanical Engineering**

Fund Code: **IR245**

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

Program Code: [REDACTED]

Budget: **\$ 4,000** Expenditure: **\$ 602**

Project ID: [REDACTED]

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.

[REDACTED]

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

[REDACTED]

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

[REDACTED]

1. Summary of Resource Alignment with Campus Strategic Plan: With support from the IRA funds, 24 Engineering 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. 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 GeoSciences, to enable her to participate in field trips over rugged terrains that have heretofore been inaccessible https://drive.google.com/open?id=1BRGjWGD LGtX4vWYy_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 24 engineering students and 42 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 : A great indication of the value of our outcomes and success with the innovative, hands-on multidisciplinary program to involve kinesiology and engineering students in developing devices to improve the lives of those in our university and surrounding community was the Invitation to Present for the Los Angeles City Celebration of the 30th Anniversary of the Americans With Disabilities Act Legislation of 1990. <https://disability.lacity.org/ada30-virtual-event>. I invited our own Connie Wong, P.T., my longtime collaborator in the Dept of Kinesiology who directs the campus Mobility Center for Rehabilitation Exercise, to join me as co-presenter.

[ADA 30th Anniversary Virtual Event | Department on Disability](#)

The City of Los Angeles Department on Disability and the ADA 30 Planning Committee invite you to join us in celebrating the 30th Anniversary of the ADA in the first of two virtual events scheduled. July 17, 2020 - Advancing Inclusion. Protecting Our Rights: Los Angeles Pre- and Post-ADA Opening Remarks
Accessible Los Angeles: Reflection During the 30th Anniversary of the ADA
disability.lacity.org

Here is a brief thank-you from both the Director, Stephen Simon, of the LA City Office of Disabilities, and Ms Claudia Natera, the Community Outreach Director:

Dear Samuel,

The City of Los Angeles Department on Disability and the ADA 30 Planning Committee would like to thank you for taking part in the City’s ADA 30 Celebration *Amplifying Our Voice: The Future of Disability Rights and Inclusion* on July 24th, 2020.

Your talk on *The Nexus of Physical Therapy, Engineering, and Kinesiology* with Connie Wong gave a wonderful insight into the innovation of The Mobility Center.

It was an honor to have you speak. We are very grateful you shared your valuable time and expertise. We believe that the information you shared both commemorates the ADA and provides a path forward in the fight for Disability Rights and Inclusion. The [recording](#) of the event will be archived online for the benefit of future generations.

Again, thank you.

Respectfully,

Claudia

CLAUDIA A. NATERA

Community Outreach, Referrals, & Education

Pronouns: she/her/hers

213.202.2767

Stephen David Simon
Executive Director
Department on Disability
City of Los Angeles
213.202.2764

There is a link to a YouTube made of the Event from July 24th: As it happens, we were the opening act!

[Sam Landsberger & Connie Wong, City of LA ADA Celebration Event Talk, July 24, 2020: minute 6:40 - about 24:45](#)

<https://www.youtube.com/watch?v=-dWII0247eg&feature=youtu.be>

Error! Filename not specified.

[Amplifying Our Voices: The Future of Disability Rights and Inclusion \(Opened Captions\) - YouTube](#)

DATE and Time: July 24th, 2020 2:00 PM - 4:00 PM

DESCRIPTION: The City of Los Angeles Department on Disability (DOD) celebrates the 30th Anniversary of the s...

www.youtube.com

Accolades and recognition aside, 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 66 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, was the need to move classes to an on-line format. Fortunately, 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:

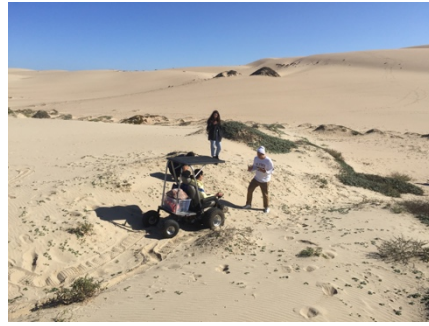
For many years our CSULA MadScientists Lab has had a close collaborative relationship with the Children's Hospital Los Angeles and the director of its orthodontics program, our friend Dr. Steve Yen. Collaboration began with work in the late 1990s to mid-2000s to bring to life a new generation of surgical 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-old 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=1dljMuijAsSujJwuQbtelfXif9LGFoHk>
- (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_3IncWMMC
- (ii) Cindy begins to explore the Guadalupe Dunes State Beach with her class: https://drive.google.com/open?id=1BRGjWGD LGtX4vWYy_3xUsBerCtQhCN9x
- (iii) Cindy challenges a severe dune dip – <https://drive.google.com/open?id=1iYj5eZlnzqcVGSXCBYdnqKfNmdvD-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:

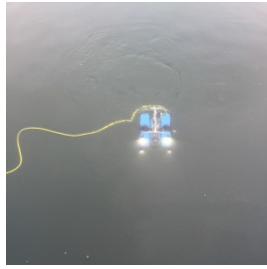
<https://drive.google.com/open?id=1dNFpNLbdtDLMTf8s8jPObnXVrY97qdPD>



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_Ymjo0lpuEWUzbOd1wo51P4x
- (iv) Early work with Mobile Arm Supports for Children with weak Upper Limbs: https://drive.google.com/open?id=1CIJrbGthWCWkNjpUHslkAnyMa-LFI_ff
- (v) **Engaging At-Risk Students with Lively and Meaningful Hands-on Projects:** [https://drive.google.com/open?id=1JCiBMBDnN8n60BIDyTk-JCG2XzsGg7zz_\(Link_may_need Updating!\)](https://drive.google.com/open?id=1JCiBMBDnN8n60BIDyTk-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=1pZnICX9IdleCrN8SfXsrn3tItidwZXuH>

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](https://www.youtube.com/watch?v=0yHGiSzaE6g&t=2s)

www.youtube.com

Some examples of MadScientists' work with solar hot water

heating: <http://www.youtube.com/watch?v=loUPYZQNhcs&feature=related>



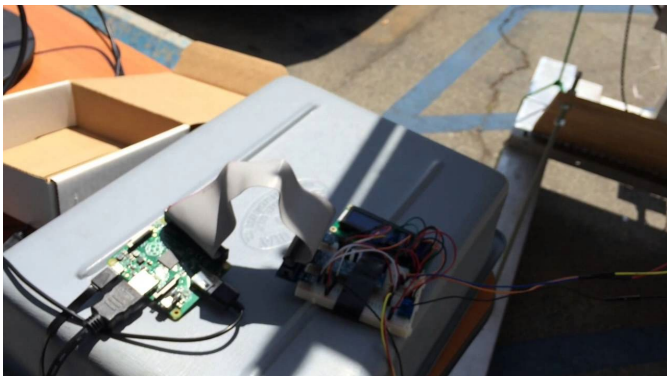
[CSULA, SWEM Parabolic Solar Collector. ME-554.wmv - YouTube](#)

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=AB40DAZ4jll>

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=T2IANiadZHI>



[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=mwxal4BcJrQ>

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

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

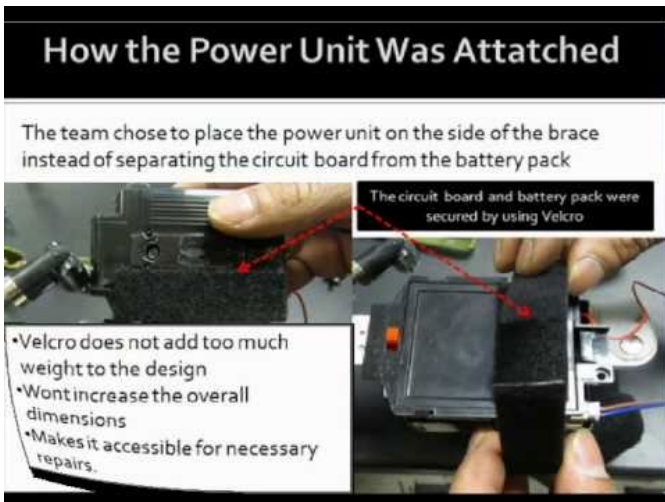
Wheelchair Roller Exerciser v1: <https://www.youtube.com/watch?v=0EvsA5e47SE&t=13s>

Wheelchair Roller Exerciser v2: <https://www.youtube.com/watch?v=eIKAZrT3EYw>

Driving Simulator v1.0 and Testing: <https://www.youtube.com/watch?v=iNlc6WFsVpQ> ; <https://www.youtube.com/watch?v=KFJIRuEJ2v8>

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=mwxal4BcJrQ&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=klkn8RCvLtE&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

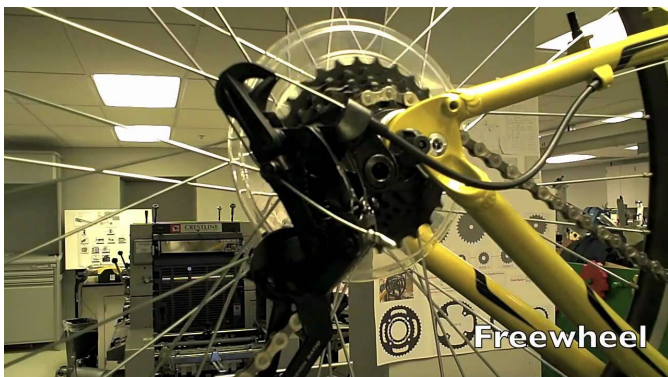
<http://www.youtube.com/watch?v=2XOvJddQsb8&feature=related>

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=lcBH8iJrOZA> 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 2019-20

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: XXXXXXXXXX

Budget: **\$ 8,000** Expenditure: **\$ 7,995**

Project ID: XXXXXXXXXX

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-based 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 successful after completing their degree. 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 successful, we measure how many students participate, how active the students are, how well we perform against our competitors 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 45 students on the team and ~20 students who are actively 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 10 students to the competition in Lincoln, NE June 2019. Due to the Covid-19 pandemic the competition was changed into a virtual event that the team competed in during the spring of 2020 with ~20 students participating. Due to the lack of lab access it is currently difficult to do design and to build the team, but the team has still assisted in MESA events, continues to design, we had 3 speakers in the spring, and a Race Car Design workshop to continue the growth of the team members. The second challenge for the team is finding funding. The budget for this year was decreased from \$10,000 to \$8,000 eventhough the number of students and impact of the team is growing rapidly. The team will require closer to \$15,000 to be able to compete in such a competition environment where some teams have over \$100,000 budgets. 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 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Department: **Civil Engineering**

Prepared By: **Mehran Mazari**

Budget: **\$ 6,000** Expenditure: **\$ 4,693**

Dept ID: **201505**

Fund Code: **IR380**

Program Code: **ASCE GeoWall**

Project ID: **[REDACTED]**

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. Challenges encountered would usually be getting enough members interested in the team since the team is competing with other CE teams for an overall attraction. Then there is also the cost of travel. Usually national competition is far and registration gets pricey, so paying for transportation, lounging, and registration eats up a lot of the budget for conferences.



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RESOURCE ALLOCATION PLAN
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ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201515**

Department: **Electrical Engineering**

Fund Code: **IR381**

Prepared By: **Deborah Won**

Program Code: **[REDACTED]**

Budget: **\$ 8000** Expenditure: **\$ 8000**

Project ID: **[REDACTED]**

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 creating demos for and giving lab tours to local area K-12 students, raising their awareness of the BME field and inspiring them to consider future careers in the field.

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

Metrics include:

- 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
- Workshops conducted for engineering students

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

BMES IRA supported educational and enriching academic and community engagement, including a tunneling magnetic resonance imaging device design project, a robotic arm design presentation, both of which led to participation in 2 different design competitions, and recognition and awards in both competitions: the TMR project was presented at the national Biomedical Engineering Society (BMES) conference; the IEEE Los Angeles Engineering in Medicine and Biology Design Competition. The total number of students who participated in these two projects and two design competitions was six. BMES IRA additionally funded undergraduate research which led to an accepted abstract on threshold calibration for a wireless-sensor driven energy expenditure metric at the national BMES conference. BMES IRA funded the undergraduate researcher's travel in addition to the student design competition teams' travel to the competitions. IRA also funded the renewal of a software license to continue wireless EEG (electroencephalography) studies which supported a master's thesis and encouraged undergraduate participation in research. Finally, BMES also supported one senior design project, thereby supporting a total of 12 students in high impact design and research projects which enabled participation in conference presentation, senior design work, or design competitions. This was all carried out before the campus shutdown in March 2020. Up until that point, BMES still hosted a couple engineering workshops (soldering, Arduino) which help prepare students to work on engineering design projects and help them to apply their classroom learning to tangible biomedical product development. BMES also carried out outreach events, including tabling and hosting lab tours at ECST welcome and open house events. IRA funding supported a guest speaker event in which more than 20 students learned about our alumnus's work in firmware and engineering design at Midmark, a biomedical device and supplies company. Through the connection made with students led to the full-time hire of one of our engineering students at her company.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil Engineering**

Fund Code: **IR387**

Prepared By: **Gustavo Menezes**

Program Code: **[REDACTED]**

Budget: **\$ 2000** Expenditure: **\$ 270**

Project ID: **[REDACTED]**

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.

Every year students are challenged to design and build a treatment system to convert contaminated water into safe drinking water. The competition helps in developing students problem-solving and design skills as well as soft skills such as team working and presentation. We have participated in the past three years getting 2nd and 3rd places. This year's competition involved designing a wastewater treatment system based on a set of given variables and constraints. Students had the opportunity to apply the knowledge learned in class in an actual engineering project. Students also have to prepare a report and a presentation.

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

The following learning outcomes are used as performance metrics: ability to work in teams; ability to apply science and math knowledge to design the water treatment system; ability to communicate through reports and orally.

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

Due to COVID-19 campus closure, and cancellation of conference and competition, not all activities were performed. Nevertheless, during the process students still had the opportunity to design a new system, and improved their design process skills. They struggled at first with the open-ended nature of the problem, which is

not the realit of classrooms, but that of engineering careers. They also struggled in effectively working in team. It took so time and mentoring from the faculty before they were able to effectly divide and coordinate their efforts.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

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: **[REDACTED]**

Budget: **\$ 5,000** Expenditure: **\$ 4,908**

Project ID: **[REDACTED]**

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 engaged a non-for-profit organization called MVLE in Springfield, VA. Our team designed jigs and fixtures for beewax candles and submitted to the competition. CSULA made to the one of the three finalists and participated in the virtual competition. We won the Third Place in the Nation.

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

- Many workers with disabilities are able to use the jigs and fixtures to roll beewax candles.
- Our students got exposure to the community that are often overlook, and able to apply what they have learned at school to the fields. The interdisciplinary team work among the students is real enough to meet challenging time management and expertise orientation.
- The University gets the recognition.

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

Although we made the finalists and able to win the Third Place in the Nation, however the allocated budget was much smaller than requested. This project brought recognition to the University, especially when the USA is hit by COVID-19 pandemic.



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RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201515**

Department: **Electrical Engineering**

Fund Code: **IR409**

Prepared By: **Deborah Won**

Program Code: **[REDACTED]**

Budget: **\$ 8000** Expenditure: **\$ 5679**

Project ID: **[REDACTED]**

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 2019-20, BOOST established relationships with 2 new community partners; two teams, for a total of 10 students, were formed and learned engineering skills that will benefit them throughout their engineering careers; and two peer mentors gained meaningful leadership experience that deepened their own engineering understanding.

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

IRA funding supported two projects and two teams of undergraduate engineering students to both improve our students' engineering skills and serve our community. The first project was a mobile app to help Hispanic diabetes' patients with health management. In Fall 2019, a partnership was started with the Latino Diabetes Association (LDA), which is based in LA County and provides community-based healthcare and support to Latino diabetes patients and their families. Also, in the Fall, the student team was selected, the peer mentor hired, and the team began meeting to discuss the project scope and brainstorm ideas, as well as getting trained on mobile app programming skills and software tools. The plan was for

LDA to help provide beta testers for a very preliminary version of the app in order to provide feedback on the app design. Before the Covid-19 pandemic, students began designing the diabetes management mobile app. However, after the shutdown, LDA was unreachable and the students stopped meeting. The second project was a robotics project to serve local high schools that offered robotics classes. The team wanted to use the robotic arm to not only demonstrate an application that could potentially serve clients at a local health clinic but also to help provide one potential robotics lab activity for high school students. The plan was that the faculty mentor would not only provide technical guidance on the design but also help develop laboratory modules from it, so that by the end of the project, the high school teachers could be given not only lab modules but also a demo robotic arm. In Fall 2019, a relationship was established with a local high school robotics instructor, the student team was selected, and peer mentor hired. Much progress was made with brainstorming and trade analyses to select major components of the system. After the pandemic, the team no longer met and no further progress was made on the project. Through the preliminary design process, both students on both teams had still fulfilled the goal of BOOST to enhance their engineering knowledge and skills (including learning circuits, prototyping, Java programming and programming environment, and CAD). A total of 12 ECST students were directly impacted, in addition to the many more who will benefit from our local community gaining awareness about ECST and our capability to do meaningful engineering service projects.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil Engineering**

Fund Code: **IR426**

Prepared By: **Sonya Lopez**

Program Code: XXXXXXXXXX

Budget: **\$ 6,000** Expenditure: **\$ 4,950**

Project ID: XXXXXXXXXX

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.

This funding award sponsored 16 students to attend the Society for Hispanic Professional Engineers National Conference in Cleveland, OH. Attending the convention is a great opportunity for students to represent Cal State LA on a National level. The convention helps students become successful as professionals by attending workshops targeted to develop their soft skills. Students network with company employees at the Hospitality suites, participate in corporate tours, attend an extensive career fair, and compete in technical competitions such as Nissan Design Challenge to win up to \$10,000 in winning prize.

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

We sent a post conference survey, received 10 out of 16 responses, and found that all students took advantage of the company sponsored Hospitality Suites, Corporate tours, and Career Fair. 30% had scheduled on-site interviews before attending the conference. Students were encouraged to upload their resume to the SHPE Career center; this led to an increase in our on-site interview count to 50%. 40% of the cohort received an internship opportunity after the conference. All students agree that they would like to attend the conference again next year.

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

Outcomes:

- 100% of the cohort attended the hospitality suites, corporate tours, and career fair
- 40% of the cohort received an internship opportunity after the conference

- Students were engaged and interested in returning to the conference next year

Challenges:

- Housing (affordability)
- Transportation (affordability)
- Post-conference survey response (did not achieve 100%)



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil & Mechanical Engineering**

Fund Code: **IR436**

Prepared By: **Mark Tufenkjian, He Shen, Ricardo Medina, Aron Petrossian**

Program Code: XXXXXXXXXX

Budget: **\$ 6000** Expenditure: **\$ 6000**

Project ID: XXXXXXXXXX

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 Robosub competition is an annual event focused on underwater robotics in which high school and college students from around the world design and build an Autonomous Underwater Vehicle (AUV). These vehicles navigate underwater obstacles and tasks autonomously for a ranking in the competition. The team at Cal State LA is partially sponsored by the Office of Naval Research via a STEM Grant (PI: Dr. Mark Tufenkjian). The competition is sponsored by the Naval Information Warfare Center, making it a reputable competition among industry and defense companies. The program at Cal State LA offers a unique experience for students since it is a multidisciplinary project focused specifically on underwater robotics. The program features the designing, building, and testing of a complex system that takes inputs from several different sensors to understand and navigate its environment. The outcomes of the project align with the campus strategic plan in several ways, detailed as follows:

1. The Robosub program promotes engagement, service, and the public good by reaching out to local companies for partnerships, interacting closely with alumni who participated in the Robosub program while they attended Cal State LA, and offering the opportunity to attend a competition where our team can form connections with other Robosub teams from all around the world.
2. The program promotes student success by offering a unique and engaging engineering experience for students to gain experience outside the classroom. Robosub students have a large support system of knowledgeable members and alumni that are always willing to provide advice on matters both inside and outside the classroom. Students have the freedom to try any innovative ideas they have and implement them on a hands-on engineering project.
3. The Robosub program contributes to the campus goal of creating a welcoming and inclusive campus by offering a supportive community of like-minded students all working towards the same goal. The program is very team-oriented and requires students to work collaboratively and make decisions as a team to ensure the success of the project. This environment also promotes friendly interactions among students who participate.

4. The program promotes academic distinction by creating a multidisciplinary project that requires a team of students from all majors. The program allows students to interact with faculty members from several disciplines and encourages knowledge in all areas of the project.

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

The success of this project can be measured by 1) Student involvement, 2) Competition performance, 3) Student success, 4) Contributions to the college and university.

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 Involvement.** During the development of the submarine robot, students are required to apply their classroom training through a wide range of disciplines such as kinematics, Software Design, electronics, signal processing, mechanical design, 3D modeling, machining and 3D printing. An estimate of over 50 Cal State LA students have benefitted from the program in the past year as a result of skill training programs, one-on-one mentoring, and hands-on experience working on the project. This year due to our online only environment focus has been shifted to provide more workshops and skill building activities in order to prepare our members for the eventuality of a physical build. We continued our program where new members get to experience working on a sub with a second low-budget vehicle as we found results in both skill experience as well as leadership experience. We have also made documentation a priority. Software has been a major weakness in this point. We lack documentation that would help streamline our build process as well as our software design process. We believe that this focus on documentation and skill building of new students will allow our designs and code be refined and repurposed year on year, eliminating the need for complete rebuilds unless a major design change is necessary.
- 2) **Competition Performance.** The goal of the Robosub competition team at Cal State LA is to outperform teams from all over the world at the Robosub competition. This year, the Cal State LA team placed 11/32. This year there was a switch in the way teams were evaluated, as the in person portion of the competition was cancelled due to COVID. Points were awarded for the technical report, Video, and Website. Also, many teams declined to participate in the online portions.
- 3) **Student Success.** The team is run by undergraduate students of all skill levels. This allows our members to gain experience working in a group environment with individuals of varying experience, enabling opportunities for newer members to learn from the more experienced members. Student leaders organize meetings with company representatives and workshops for the benefit of other students in the program. These workshops are a way for us to continue the work that has been done year to year, helping advance the team as a whole. As a result of these programs, several previous Robosub members obtained full-time jobs after graduation with companies such as NIWC, Caltech, JPL, and Raytheon. We believe that this year with the online only environment student engagement is a necessity for student success. It is difficult to connect and network with other students and staff. We provide a community that students can engage with through our meeting environments, with access to officers and members on a daily basis through online chat programs, developing those communication and networking skills and engaging them as part of the Cal State LA student community.
- 4) **Contributions to the College and University.** The organization provides a safe and fun environment for students to test ideas and learn from mistakes. We also provide engineering workshops open to all students who want to learn new skills. This is an opportunity that many students do not get from a classroom setting

alone, as it allows them the freedom to design and experiment without consequences for making mistakes. The team reaches out to the Cal State LA community and is proud to support and provide help to underrepresented groups. The team participates every semester in a variety of outreach events, such as Boeing Day, Science Bowl, and Summer Launchpad Program, to inspire the younger generation to participate in engineering and pursue higher education at Cal State LA. Our team also has active communications with industry leaders and engineers from companies such as The Office of Naval Research, SolidWorks, Teledyne and Blue Robotics. These interactions also help our students develop their communications skills in a professional environment.

Challenges Encountered: The main challenges our team has encountered thus far is working in a virtual environment due to COVID and keeping knowledge and expertise. Our team struggles to maintain members with complete knowledge of all the systems resulting in starting many projects from scratch. As such we have not been able to iterate and advance the design of our subs to complete the more complicated tasks. Collecting enough underwater data has also proven to be a challenge due to the limited amount of time our team can afford to reserve the school swimming pool or other pools for. A database with images added year on year would greatly help our ability to further our computer vision skills.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-2020

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201520**

Department: **Mechanical Engineering**

Fund Code: **IR438**

Prepared By: **He Shen, Richard Chavez (ME Student)**

Program Code: **[REDACTED]**

Budget: **\$ 2000** Expenditure: **\$ 946**

Project ID: **[REDACTED]**

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 American Society of Mechanical Engineers (ASME) has strategically planned its expenditures based on the given budget in an effort to maximize the opportunities for our students and local communities here at California State University, Los Angeles. Our club's effort to maximize the use of our given resources are aligned with the campus strategic plan with the motives of Engagement, Service, and the Public Good; Welcoming and Inclusive Campus; Student Success; and Academic Distinction.

Engagement, Service and the Public Good emphasize the importance of reaching out to our local communities. In ASME, students reach out to these local communities and provide services such as educating prisoners for a better future. Through this experience, students gain consciousness of real-world issues around their area and hopefully, allow them to find a purpose to better improve the world for the greater good. Similarly, ASME takes this notion and uses it to expose our club members to some real-world problems which challenge many engineers in the STEM field. For example, we competed in a Student Design Competition, which is hosted by the national organization of ASME, and we witnessed how robotics is revolutionizing the world right now. In addition, we use our experiences from these competitions to educate future members and to try to persuade them to join this robotics club.

In addition, Cal State LA tries its best to offer a Welcoming and Inclusive Campus for students who are having difficulty adapting into new environments. Our club welcomes its new members with enthusiasm, support and resources. With the support of ECST, we recruited many students of various different disciplines at Welcome Back BBQ. At this event, we answered any questions they may have had in relation to our organization and at the same time, we took their feedbacks using a survey in an effort to improve their experience at the club. After this recruitment process, our club hosted a variety of workshops which included: SolidWorks, MATLAB, Arduino, Soldering, etc. The purpose of these workshops was to develop our members' technical skills in their respected

engineering field. In addition, we engaged with our members during our office hours to help them with any work or to answer any question they might have had. Keep in mind, that a huge chunk of our financial budget goes into these workshops and we understand that a lot of students are visual learners, so we try our best to incorporate real life demonstrations. A lot of these demonstrations require parts that need to be bought, but we know that it is a good investment if we are using the funds to teach other students and to impact their lives. Through this effort, we hope to grow the number of club members and to impact more students.

Through this development, we are able to build a supportive community within the organization that nurtures student success. During our office hours, we are often faced with challenges that are beyond are club members capabilities and that is the dividing factor between a student's academics and the club's vision. Therefore, over time, students learn to adjust their routines to make time for both ASME and their classes. This increases their efficiency and allows them to apply what they learn in the classroom and onto a real-world problem. In fact, ASME provides technical skills and valuable information which can be reapplied into multiple courses such as, ENGR 1500, ME 2010, ME 2030, ME2040, ME 2800, and ME 3800.

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

Our club has always focused on the importance of technical skills and as a result we offer a wide variety of workshops throughout the year to really strengthen key skills for that every engineer should have. It is not enough to understand the theory behind these fundamental topics because when applying this knowledge one quickly learns that application is very different. As a result, ASME has created workshops which cover a vast majority of important skills that every mechanical, electrical, and even computer science major should have before they graduate. Some examples of our workshops include the design process for creating CAD models, power distribution systems, and even how to code using Python. These workshops are hosted by the club's board members who are well equipped to teach such topics.

Through these workshops we are able to educate and teach other people how to properly use and understand such real world topics. From these workshops these members are able to apply such knowledge at their respected internships as well as their senior design projects. Its no surprise, that a lot of students reach their senior design project and lack essential skills. ASME has been working hard to stop this issue and we have obtained some very postive outcomes. For the most part we have seen that our dedicated members who used our workshops were able to obtain summer internships. For example, this past summer, five of our club members obtained summer internships at prominent companies such as: Raytheon, Aerojet Rocketdyne, JPL, Boeing, and, Northrop Grumman. Upon asking how they were able to land such internships, the common consensus aside from their GPA was their variety of technical skills. A lot of these company's value experience and they understand the importance of applying the knowledge that one learns into real life scenarios. Through our emphasis of such workshops we are able to better prepare students with skills that will allow them to handle and even solve real life problems.

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

This past year was a rollercoaster to say the very least. Our club, ASME, embarked on an entirely new competition this year in hopes of broadening our overall understanding of robotics. We felt very restricted in our past design competition and we wanted to pursue a competition that really tested all of our engineering fundamentals and had real-life application. The Intelligent Ground Vehicle Competition (IGVC) is an international robotics competition for teams of both undergraduate and graduate students. Each team is asked to design and build an autonomous ground vehicle which is capable of completing different tasks. We began

working on this competition in Fall 2019 and we set out with the mindset to compete that same year. We knew the work to complete the robot itself was going to be difficult, but we were motivated and eager to get the job done. Throughout the Fall semester and into winter break we saw a lot of progress which gave us a lot of hope. During this time period we were able to design a CAD model, identify all of the essential electronics that would be required to go on the robot, assemble the model entirely, and even carry some test runs. The club was putting their best foot forward on a very difficult objective, but all that hard work was put on an immediate pause when COVID-19 struck.

Although we began this competition with high hopes, we faced several challenges along the way. The thing that stuck out about this competition the most was that the robot had to operate itself autonomously. Keep in mind, ASME is a club which mostly consists of Mechanical and Electrical Engineers. This meant that the majority of us did not have very solid background on coding or programming at an advanced level. Anything autonomous requires a lot of experience and a deep understanding of those topics. Surprisingly enough, that challenge did not scare any of us at all. It actually motivated us to try to figure things out and I feel that this experience made us a stronger club overall. Aside from long hours of research, we did our best to maximize our resources. From professors to several past club members, we made sure to reach out and ask questions which allowed us to really narrow down how we should handle and go about this important component for our robot. Although the pandemic struck right before our actual software testing stage, we managed to create enough code which would have allowed us to obtain vital data in terms of how our system would operate.

Another challenge that we faced this year was the quarantine itself. Not being able to go anywhere and having to stay home everyday really changed a lot of aspects of life. Since everything began closing so quickly, it was hard for many clubs to take their projects home. This left them with a lot of uncertainty and raised a lot of questions. Luckily enough, our club had a strong foundation and we didn't allow for the quarantine to hold us back. Since we were unable to take out our robot and other essential parts from our lab, we did everything we could to prepare for the next year. This meant that we continued to work on our code and did our very best to plan for the next year. Fast forward, to Fall 2020 and you can see that we are still working very hard and the goal is to complete and have a fully functioning robot this year and hopefully compete in the annual IGVC in 2021.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil Engineering**

Fund Code: **IR440**

Prepared By: **Mehran Mazari**

Program Code: **ITE Traffic Bowl**

Budget: **\$ 2,000** Expenditure: **\$ 950**

Project ID: **[REDACTED]**

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 ITE Traffic Bowl team helped students participate in the regional ITE conference and compete with students from institutions across the region. This competition had 3 CE students engaged in areas including Traffic and Transportation Engineering.

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

The ITE Traffic Bowl student team has just started participating in the regional conferences and needs more support to be successful. Continuation of the IRA funds will ensure student success and academic distinction. Our performance metrics include the number of students involved in teams, their engagement with faculty advisors, weekly and monthly reports as well as the competition outcomes.

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

The IRA funds helped the ITE Traffic Bowl team to be successful and apply their knowledge for real-world applications by designing and implementing ideas. The current challenge is the initiation of the team on campus and availability of limited funds to support student travel to attend the regional conference.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201525**

Department: **TECHNOLOGY**

Fund Code: **IR450**

Prepared By: **Dr. Paul Liu**

Program Code: **[REDACTED]**

Budget: **\$ 1,000** Expenditure: **\$ 1,000**

Project ID: **[REDACTED]**

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 RESNA (Rehabilitation Engineering and Assistive Technology Society of North America) Student Design Competition (SDC) is an annual competition that showcases creative and innovative assistive technology designs that help people with disabilities function more independently. The funding was only 20% at the original requested amount. We had very limited resources. Only some tooling and supplies were purchased. We started team building while the COVID-19 hits the USA, and the State of California has been taking all possible ways to keep the residents safe and healthy. CSULA did not participate the virtual competition.

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

Not available due to COVID-19.

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

The student team was in the forming with possible persons of disabilities solicited. However, not much was done in the midst of pandemic while the whole CSULA campus is coping with the caotic situation.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201520**

Department: **Mechanical Engineering**

Fund Code: **IR451**

Prepared By: **Adel Sharif**

Program Code: [REDACTED]

Budget: **\$ 1000** Expenditure: **\$ 480**

Project ID: [REDACTED]

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 allocated to this program were intended to be spent to expose our students to materials science and engineering. Students were to engage in research in materials science, which is a rapidly growing discipline both within and without Cal State LA. These students may continue with their education in materials science either at Cal State LA or at another institute distinguishing themselves along with their alma mater.

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

Students' success was to be measured by their level of mastery of fundamental concepts in materials science and engineering and their competence in application of theoretical concepts to practical projects.

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

The intended activities could not be accomplished due to COVID-19 campus closure. Only a small portion of the allocated fund was spent. The intended outcomes were for undergraduate students to gain graduate level competence in sample preparation, testing, and analysis. These skills may pave their paths to graduate programs or industry positions. Time constraint due to COVID-19 was the primary limiting factor for the project. Students were challenged to accomplish as much as possible during a relatively short time available for the project.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
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FISCAL YEAR 2019-2020

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201525**

Department: **Technology**

Fund Code: **IR452**

Prepared By: **Xiaolei Lily Chen**

Program Code: **[REDACTED]**

Budget: **\$ 1000** Expenditure: **\$ 430**

Project ID: **[REDACTED]**

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 students in Fire Protection Administration and Technology program at Cal State LA have the potential to become the future first responders or AHJs (Authorities Having Jurisdiction) in fire service and fire prevention field. In addition to delivering knowledge and enhancing professional skills through textbook-based classroom teaching, it is essential to expose them to real world fire prevention and protection practice and involve them in a variety of the field classes/course projects associated with our community. The program used the hydrogen station at Cal State LA, “the first in the world to sell hydrogen fuel by the kilogram directly to retail customers”, as a “living lab” for FPAT students to learn about fire prevention codes and regulations, fire protection system design, operation and maintenance, hazardous material management, first responder practice, etc.

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

The fund was used to purchase online fire safety workshops/training courses, fire protection standards/codes related to fire safety in hydrogen station as well as data storage for students projects. The fund helped to expose FPAT students to real world fire prevention and protection practice through involving them in exploration project, and hence prepare them to succeed in future careers in the field of fire service.

With the fund I planned ex-curriculum activities involving vivid examples (online fire academy courses/training workshops) and resource (NFPA fire standards) for a number of fire protection course including TECH 3520- Fire Safety Aspects of Building Design & Construction, TECH 3550-Fire Laws and Building Codes, TECH 3580-

Hazardous Materials, TECH 4530 -Fire Protection System Design, TECH 4550- Fire Protection of Building Structure and systems. A total of more than 100 students in FPAT program benefited from this program.

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

In spring semester of 2020, the classes were offered the online workshop series as a learning resource and around 30 of the students started working on a research project “Fire Safety in Cal State LA Hydrogen Station”. 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, what the feature of hydrogen fire/flame are, etc. They also collected information about how FCVs and hydrogen stations used currently worldwide and locally (in California). Based on the information collected, they performed further research on the fire safety issues related to hydrogen station as well as the engineering solutions that may help increase the fire safety in Cal State LA hydrogen station.

The field project turned out to be a success because it connected our students with a real-world project. Students were excited seeing how fire safety issues look like in real world and in high-tech field and this project helped them achieve a better learning outcome.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019-20

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201505**

Department: **Civil Engineering**

Fund Code: **IR453**

Prepared By: **Mehran Mazari**

Program Code: **ASCE Transportation**

Budget: **\$ 1,000** Expenditure: **\$ 0**

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 Transportation team helped students participate in the regional ASCE PSWC conference and compete with students from various institutions from across the region. This competition had 5 CE students engaged in areas including Traffic and Transportation Engineering. Students in this team were able to work together in a project that promotes the campus spirit and awareness.

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

At the regional conference, the teams compete against each other and are ranked on how well they perform. The competition usually has a city perform a request for proposals in which the student teams will work to create a proposal indicating their understanding of the situation, what is needed, and how to achieve a solution based on constraints. The proposals are then graded by judges from various institutions and the city that requested the proposals. Support from IRA funding allow students to focus on the project and stress less on questions relating to their ability to pay for registration, travel, and lounging for conference as well as funding for the material needed for the project.

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

The result of the program allows students to hone their skills and understanding of Traffic and Transportation concepts. The project even provides students real world experience on reading and developing a proposal for the competition. A challenge for this project are that the team is one of the newer teams and need additional funding in order to promote

itself within Cal State LA as well as obtain the necessary materials for the proposal. Another challenge this team has is the student engagement, since the team is new, it needs continued support to promote its awareness to intrigued students.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
RESOURCE ALLOCATION PLAN
FISCAL YEAR 2019

RAP-6

ACCOUNTABILITY REPORT
(Applicable To All Funds)

Division: **Academic Affairs**

Dept ID: **201520**

Department: **Mechanical Engineering**

Fund Code: **IR460**

Prepared By: **Jeffrey Santner**

Program Code: **[REDACTED]**

Budget: **\$ 6000** Expenditure: **\$ 4293**

Project ID: **[REDACTED]**

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, and fees associated with a static rocket test. These activities engaged students in concepts they learn through their coursework - design, manufacturing, material properties, thermodynamics, fluid mechanics, propulsion, electronics, etc.

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

This organization normally enters a competition in June, which was cancelled this year. When the competition resumes, our performance in that competition will be the main metric to measure success.

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

Students successfully designed a rocket. It was not constructed due to COVID-19, but the motor was constructed and tested. The test revealed problems with our motor design and manufacturing method, which will improve the rocket for next year.