Hands, Mind & Hearts-on Design for Service & Outreach

CSULA MadScientists Laboratory

Rehabilitation & Environmental Engineering Vehicles for Service Learning –
Within and Beyond the Campus Community

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A new concept for prosthetic hands for infants and toddlers

Solar & Body-Powered Trike https://www.youtube.com/watch?v=0yHGiSZaE6g

Partners in Learning

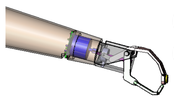
California State University, Los Angeles *Department of Mechanical Engineering & School of Kinesiology & Nutritional Science*

Rancho Los Amigos National Rehabilitation Center, Long Beach VA Prosthetics Lab & Spinal Cord Injury Center UCLA/Los Angeles

Orthopaedic Hospital, U.S.C. Center of Excellence in Developmental Disabilities

Children's Hospital, Los Angeles, Shriners Hospital, Los Angeles

Hybrid Easy-Feed Hand

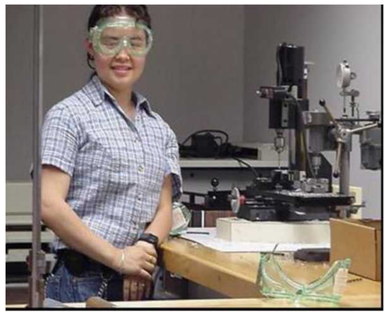


Mission and Goals:

(i) Spark interest in Rehabilitation & Sustainable Engineering, and provide a rewarding learning and service experience for university students from traditionally disadvantaged backgrounds.
(ii) Provide Motivation for intensive study: enable students struggling with fundamental math & science skills to apply their budding analytical and creative skills to address vital needs.
(iii) Introduce Middle and High School students, particularly in less advantaged communities, to the exciting fields of Rehabilitation Engineering, Sustainable Energy and Kinesiology.

Mobile Arm Support assist for weaker upper limbs

HERO Outreach Engages with youth in K-12 in 2 Phases
https://drive.google.com/open?id=1i0N_hpb1-dZjrF-abpe6wDc_E1QTqzNz



Hands-&-Minds-On!

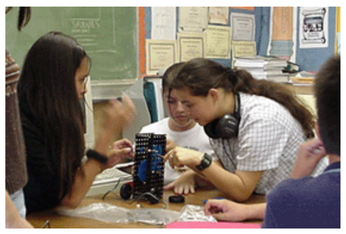
Staff & Students

Beach-Cruiser V1 Powered Mobility for Independence

Piano Pedal-Pusher for Young Virtuoso with Paraplegia (i) https://www.chla.org/blog/patient-stories/when-the-engineer-met-the-virtuoso and
https://drive.google.com/open?id=1JgMmxCBgEBx39afgR1Tp7cY5avvX3aLf

The **Hands-on Experiences in Rehabilitation and Sustainable Engineering Program (HERE)** provides a stimulating project experience, while fostering mentoring among students of different ages and levels of engineering training. The student participants - frequently from the least served communities of Los Angeles - range from 6th graders in Compton, CA to graduate students at the California State University, Los Angeles. HERE provides direct contact between students and individuals with disabilities in the context of team design projects. The projects evolve into designs that students can take pride in, are tested at the on-campus Mobility Center and Centro de Ninos Y Padres, and are sometimes ready for manufacture as products to benefit people with disabilities.

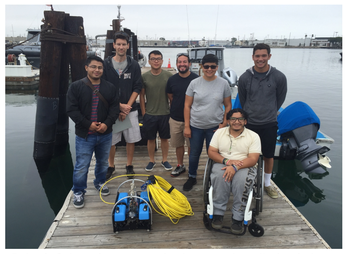
A closely interwoven **outreach program called HERO (HERE-Outreach)** links HERE college students with grade school students in at-risk neighborhoods. The mission of HERO is to inspire youngsters, both by example and through engaging hands-on projects, to keep free from gangs and drugs, apply themselves to their current studies, and in the future attend college and consider Rehabilitation Engineering, Renewable Energy or Kinesiology as careers.



Mentorship by CSULA engineering & kinesiology students with Middle School students in Compton inspire while teaching teamwork & structures & creative design. http://www.youtube.com/watch?v=qDXhL7Gy_-E

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

MadScientists with Electric Porsche Conversion

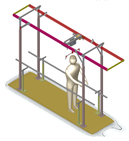


Robotic Submarines customized to sample pollution in Los Angeles Harbor: https://www.youtube.com/watch?v=-9MjyX3RS_w

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

Beach-Cruiser V4 Enables first-ever independent field trip for eager Geology student
https://drive.google.com/open?id=154ZUjgrLhmG6-VqfuRDon_8_3lncWMMC

Body-Weight Support



The Way It Works:

The Program comprises three elements to develop student awareness of disability issues and to build creative skills:

1. **Overview & Fundamentals**: lectures, reading and site-visits giving direct exposure to the needs of people with disabilities, along with accomplishments and techniques of Rehabilitation Engineering.
2. **Hands-on Creative Design**: team-based work to help a specific client with a disability. Laboratory instruction supports the design work, including computer aided design skills and hands-on training in manufacturing skills. Final designs and results are presented by the students to a public audience.
3. **HERO Outreach:** bring R. E. exposure to middle and high school students in at-risk areas.

Aquaponics system designed for Communities First Initiatives. Installed&tested at El Arca Independence Center. Purpose: Enable subsistence farmers in rural Cambodia to provide for their families and earn added income. https://www.youtube.com/watch?v=wke-y05tTTM&feature=youtu.be

Accessible Rowing
Client: Row of Life/California Adaptive Rowing Program

The Final Exam:...how big a smile?