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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Surgical Fire Safety and Prevention System	Surgical fires are a rare but very real risk of electrosurgery procedures, which can result in serious trauma or even death. The SAFirE deviceis an intelligent system designed to improve safety and reduce the risk of such occurrences.	West Askew, Michelle Bohner	Paul Davison	2011	BIOE	None	Digital version available starting 2012
Detection of Pathogens Using Electrochemical DNA Sensors for Resource-Limited Settings	Development of a microfluidic diagnostic device capable of determining local water safety by incorporating a high-throughput concentratorand an electrochemical DNA sensor to rapidly concentrate, lyse, and detect the presence of pathogens in a given water sample without the need for expensive and bulky lab equipment.	Sarah Ghanbari, Nick Giustini	Unyoung Kim	2011	BIOE	None	Digital version available starting 2012
SEED: Sustainability Energy Engineering through Digestion	Using the process of anaerobic digestion in a small scale biodigester, the goal is to create usable biogas. By feeding the digester with on-campus food waste from the Benson dining commons, we aim to create a cost-effective source of renewable and sustainable energy.	Todd Bruschwein, Jenna Fong, Katie Kurtz; Business students: Jonathan Mari Codilla, Chloe Michelle Halstead	Craig Stephens	2011	BIOE	None	Digital version available starting 2012
Sustainable Design in Ghana	Research and implement a new building material into a sustainable and economical residence for the people in Northern Ghana. Our new material eliminates the need for a brick press, simplifying production. A catenary arch creates simple and easy-to-build structures that can serve as a residence and other functions.	Daniel Lawrie, William Sommer	Mark Aschheim, Sukhmander Singh	2011	CIVIL	Ghana	Digital version available starting 2012
New Design for Haiti	This project includes the design of structurally insulated panels implemented for quick and easy construction and fabrication of an affordable single family home in an effort to rebuild Haiti. This design would promote economic growth, improve living quality, and address the right to shelter that is vital to all individuals.	Danielle Locklar, Kelli Oura, Lauren Reinnoldt	Reynaud Serrette	2011	CIVIL	Haiti	Digital version available starting 2012
EBNet Haiti Natural Masonry Program	Working with the Ecological Building Network on the Haiti Native Reconstruction Project, we will focus on designing low-cost, sustainably minded housing options to rebuild Haiti. Our project will require the research, fabrication, and testing of ecologically designed concrete blocks, incorporating recycled concrete rubble and other local building materials.	Maura Cyrus, Nicholas deCesare, Alvaro Lacayo	Mark Aschheim, Sukhmander Singh	2011	CIVIL	Haiti	Digital version available starting 2012
EBNet Haiti Bamboo Connections	Our project addresses the bamboo framing portions of a housing system developed in collaboration with the Ecological Building Network for post-earthquake reconstruction in Haiti. Experimental research focuses on validating a new bamboo lateral-load-resisting system for withstanding earthquakes and hurricanes, as well as a bamboo roof truss system.	Jake Echeverria, Chris Sampson	Mark Aschheim, Tonya Nilsson	2011	CIVIL	Haiti	Digital version available starting 2012
Sustainable Design of an Outdoor Classroom	The purpose of this project was to design a sustainable and cost-effective outdoor classroom for the Santa Clara Community Garden. Multiple design options were analyzed, which utilized different materials such as tension fabric and bamboo. A final design was chosen based on cost and environmental impact.	Anne Drinkward, Jeanine Ruffoni	Mark Aschheim	2011	CIVIL	Santa Clara, CA	Digital version available starting 2012
Outdoor Classroom Design for the Santa Clara Bronco Garden	A lightweight structure for an outdoor, open-air classroom in the Santa Clara Bronco Gardens will incorporate sustainable materials and a green roof linked to a water catchment system. The water collected will irrigate the garden during the summer and will heat up the classroom through the use of solar heating in the winter.	Enli Li, Rojil Peralta	Edwin Maurer, Tonya Nilsson	2011	CIVIL	Santa Clara, CA	Digital version available starting 2012

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Gravity-Fed Water Distribution System in Malawi	This project involves creating a water distribution system for the people in the Mlowe Watershed of Malawi, Africa. This system utilizes gravity to bring water from two rivers down to villages at lower elevations. The main goal is to improve the distribution and quality of water for the local people.	Marian Price	Steven Chiesa	2011	CIVIL	Malawi	Digital version available starting 2012
Low-Tech Coconut Shell Activated Carbon Filter	This activated carbon filter is made from coconut shells readily available in Bluefields, Nicaragua. This rural town suffers from bacteria- and pesticide-infested waters, leading to a high mortality rate in children and the elderly. We hope to make an impact by using a low-tech method to filter their drinking water.	Ami Cobb, Mikell Warms	Steven Chiesa, Edwin Maurer	2011	CIVIL	Bluefields, Nicaragua	Digital version available starting 2012
Redesign of NASA's Sustainability Base	Redesign of the structural components in NASA's Sustainability Base to utilize less steel, by weight, while implementing core concepts of green building and sustainability. Comparison of four designs in an attempt to present a structure that, by comparison, best exemplifies sustainable building practices.	Maria Campbell, Luis Orea, Juan Vargas	Tonya Nilsson, Reynaud Serrette	2011	CIVIL	None	Digital version available starting 2012
Residential Hill-Top Design: Phase Two	Provide an efficient and inexpensive structural and geotechnical design using a mixture of sustainable and economical materials for a basement of a two-story residential hilltop home. This hilltop design will serve as an alternative for urbanization and encourages the preservation of San Joaquin agricultural lands.	Jonathan Perez	Reynaud Serrette, Sukhmander Singh	2011	CIVIL	San Joaquin Agricultural Lands	Digital version available starting 2012
Sustainable Subdivision Design	The project entails a sustainable subdivision design for the Kumuhau and Kakaina parcels in Waimanalo, Hawaii. The 19.52 acres of undeveloped agricultural land, owned by the Department of Hawaiian Home Lands, has been designed to accommodate residents with the intent of establishing a healthy, community-based environment.	Colin Kodama, Jonathan Okada, Chelsea Unemori	Steven Chiesa	2011	CIVIL	Waimanalo, HI	Digital version available starting 2012
Sustainable Residential Development	The project incorporates sustainability into a 30-acre plot of land located in San Jose, California. The goal is to minimize the residential development's impact on earth by following environmentally responsible and sustainable development practices.	Ernesto Araica, Matt Paolercio	Steven Chiesa	2011	CIVIL	San Jose, CA	Digital version available starting 2012
Multimodal Traffic Management System Design for Recurrent and Emergency Situations	Development of a traffic management model for the City of Santa Clara using Paramics Modeller to study the current traffic flow and determine the best course of action to take in emergency evacuation situations.	David Kojima, Jake Roths	Rachel He	2011	CIVIL	Santa Clara, CA	Digital version available starting 2012
Traffic Control and Pedestrian Bridge Design	The consistently high rate of vehicular volume on Stevens Creek Boulevard presents hazards for both pedestrians and bicyclists, making crossing the street by foot a dangerous task. Our proposed solution is the placement of a pedestrian bridge in order to improve traffic volume by faster signal timing.	Leanna Elserougi, Gabriela Mercado	Rachel He, Reynaud Serrette	2011	CIVIL	Santa Clara, CA and San Jose, CA	Digital version available starting 2012
The Future Is Green	The Future Is Green project, for the Girl Scouts of Northern California, teaches young girls about green technologies. We laid the foundation for the website which works as a learning tool, incorporating information about sustainable technologies, and teaching the advantages of these technologies through interactive simulations.	Melissa Conlin, Michael Truong	Rani Mikkilineni	2011	COEN	Northern California	Digital version available starting 2012

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GPRS + Paramics: Low-Cost Traffic Signal Synchronization	Across the United States, incorrect timings on traffic signals waste millions of gallons of gasoline and hours of travel time. GPRS + Paramics connects powerful traffic modeling software with low-cost microcontrollers via cellular modems, cheaply and effectively providing system-wide traffic signal monitoring and control to cities of any size.	Nick Bergseng, Riccardo Franchi	JoAnne Holliday, Rachel He	2011	COEN	United States	Digital version available starting 2012
Organic Polymer Solar Cells	This design project seeks to improve the efficiency of solar cells made with organic semiconductors by leveraging recent discoveries in the field of organic photonics.	Mark Loiseau	Mahmud Rahman	2011	COEN	None	Digital version available starting 2012
Fuel Efficient Cook Stove	Design, build, and implement a fuel-efficient cook stove for use in impoverished communities of Nicaragua by incorporating the use of thermoelectric power generation to produce a forced air flow.	Abimael Bastida, Miguel Gomez, Saul Hernandez, Alejandro Lobato	Hohyun Lee	2011	MECH	Nicaragua	Digital version available starting 2012
Make It Rain	Our team partnered with Walden West Science Center for this project to design a sustainable drip irrigation system for their garden. Excess power from the solar panels will be stored for general use. This project will be explained to the students at the camp in order to educate them on sustainability.	Dean Hoang, Kenneth Murata, Geoffrey Zen	Timothy Hight, Shoba Krishnan	2011	MECH	None	Digital version available starting 2012
Mud Brick Press	Create and implement a mud brick press using an injection molding method. The brick itself will have two hollow sections to conserve material and reduce weight. This design will be used in developing nations to build houses.	Miriam Rodriguez, Lawson Tong	Mark Aschheim	2011	MECH	Developing Countries	Digital version available starting 2012
Solar-Powered Water Purification System	Brackish water and salt water are purified using a vapor distillation process. The energy required for the system is primarily provided by solar power. The system generates a maximum of 25L of pure water/day.	Ryan Hinds, Megan Ingemanson, Jason Santiago	Drazen Fabris, Hohyun Lee	2011	MECH	None	Digital version available starting 2012
Solar-Powered Regenerative Fuel Cell	This project focuses on developing a hydrogen PEM fuel cell for storing energy from PV panels.	Joseph Baini, Jacob Becker, Michael Calcagno, Jensen Machathil, Michael Ryan, Sapaan Shah; Business student: Tyler Richard Johnston	Timothy Healy, Daniel Strickland	2011	MECH	None	Digital version available starting 2012
Blades of Power	Our project involves educating young children about wind energy. Our focus is to analyze and test two different types of wind turbines and then integrate them together. We have also created an interface to compare and display the amount of energy being produced from each turbine.	Ayesha Ahmad, Christina daSilva, Zaireen Razzak	Shoba Krishnan	2011	MECH	None	Digital version available starting 2012
ECHO: Ergonomic Chair for Health Optimization	The purpose of the ECHO project is to design and build an affordable, revolutionary ergonomic chair that will be available to anyone who currently suffers or may eventually suffer from back pain caused by extensive periods of sitting.	Natasha Ahuja, Chris Lord, Kristen Stieger, Christian Zempel	Timothy Hight	2011	Interdisciplinary	None	Digital version available starting 2012
Omoverhi	Team Omoverhi developed a low-cost, low-maintenance, solar-powered incubator for premature infants in Nigeria. A solar thermal system heats the incubator through pipes containing hot water while a control system monitors the heat depending on the needs of the infant.	Collin Burdick, Katherine Fazackerley, Ben Frederiksen, Nick Greos, Katherine Mardula, Simi Olabisi, Matt Renner; Business students: Maria Veronica Lleva Bass, Kristen Lee	Shoba Krishnan, Hohyun Lee	2011	Interdisciplinary	Nigeria	Digital version available starting 2012

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Pathogen Detection by Two-Dimensional Paper Networks	The objective of our research is to develop an inexpensive, automated, rapid pathogen detection system without the use of electricity or cold storage. We plan to achieve this goal by using a two-dimensional paper network with specific base pair recognition.	Ian Nova, Samuel Pontrelli, Miller Bauer; Business students: Luis Carillo, Marc Nguyen, Kirtan Patel	Unyoung (Ashley) Kim	2012	BIOE	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Detection of Waterborne Pathogens for the Developing World	One of the most prevalent issues in underdeveloped areas is the lack of access to clean water. Our microfluidic device, which utilizes a lysis chamber and an electrochemical DNA sensor, can provide a reliable, fast, and safe method for waterborne pathogen detection in underdeveloped areas.	Jennifer Batara, Anusha Ravikumar	Unyoung (Ashley) Kim	2012	BIOE	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Downtown Bike Lane Design	There is a severe lack of bicycle lanes in San Jose making the commute difficult for pedestrians and bicyclists. Currently, bicycle transportation is not at its safest, being geared more toward motorists. Streets have been analyzed to incorporate bike lanes and to complete the streets that appeal most to pedestrians, bicyclists, and motorists.	Phillip Linarte, Maung Lay Maung, Gabriel Peralta	Rachel He, Henry Servin	2012	CIVIL	San Jose, CA	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
A Sustainable Approach to Disaster Relief Housing	A Sustainable Approach to Disaster Relief Housing fuses traditional bamboo construction techniques with modern structural engineering concepts to yield a permanent single-family residential structure that is environmentally friendly, economical, and strong.	Quinn Peck, Scott Wallace	Reynaud Serrette	2012	CIVIL	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Sustainable Design Solutions for Housing in Ghana	In the Upper East region of Ghana, overpopulation and inadequate building practices have led to deforestation and poor housing for the local communities. Previous sustainable building methods were examined and refinements investigated to determine the least expensive and most effective method for homebuilding in Ghana's remote villages.	J. Matt Jansen, Nathan Rogers	Mark Aschheim, Sukhmander Singh	2012	CIVIL	Ghana	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
El Pital, Honduras, Water Purification/ Distribution Design	The project entails the design of a peaking tank, chlorination device, and pipe system. All should accommodate the appropriate volume of flow for a rural town with a projected maximum population growth.	Ashley Ciglar, Lilya Ouksel	Steven Chiesa	2012	CIVIL	El Pital, Honduras	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Design for Community Improvements in Sabana Grande, Nicaragua	Our design consists of three components. The first will be a washing station that will implement water catchment systems and a solar pumping system. The second component is a bio-digester that produces bio-gas used for cooking purposes. The third component will be a design for double composting latrines.	Hildaisabel Garcia, Kyle Magazu, Elizabeth Mercado, Agustine Perez-Rojas, Lisa Yabusaki	Steven Chiesa, Sukhmander Singh	2012	CIVIL	Sabana Grande, Nicaragua	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Water Pathogen Detection App	We are working with electrical and bioengineering students to create a probe that can detect bacteria in water for developing countries. We will be creating the Android application.	Connor Carey, John Seubert	Silvia Figueira	2012	COEN	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Get Me There	An iPhone application that will allow individuals with learning disabilities to travel through their communities independently. Our primary user group currently consists of the students at the Santa Clara Adult Education Center.	Monica Camorongan, Joe Schneider	Silvia Figueira	2012	COEN	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Waterborne Pathogen Detector	Our project addresses the issue of testing for potable water. Current lab equipment is large and costly, so our goal is to take this lab equipment and make it portable and easily affordable. We also want our system to be user friendly.	Michael Busch, Alexander Coffin, Lauren Yamauchi	Shoba Krishnan	2012	ELEN	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/

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Project Omoverhi	An economically viable thermal energy storage solution utilizing a phase change material to provide consistent and sustainable thermal energy to people in developing countries. The main design applications include chicken brooding and neonatal incubation.	Peter Graham, Alex Kranenburg, Tor Krog, Cameron Schwab	Tim Hight, Hohyun Lee	2012	MECH	None	http://scholarcommons.scu.edu/mech_senior/5/
Solar Powered Water Purification System	A solar powered water purification system has been designed to produce clean water for developing communities. This system uses a distillation process to desalinate ocean water, and falls in between reverse osmosis and solar stills in terms of price and performance.	Alina Carlson, Reece Kiriu, Andrew Nose, Chris Sugii, Erin Taketa, Alex Tamai	Monem Beitelmal, Drazen Fabris	2012	MECH	None	http://scholarcommons.scu.edu/mech_senior/9/
Spartan	Our current grid system has not been altered for many years, which implies there is potential for more blackouts due to future technology. Our proposed solution is a prototype for an electrical power control mechanism based on theoretical research to build more robust and efficient power management systems.	Arun Koshy, Siddharth Parmar, Anirudh Rao	Ahmed Amer, Shoba Krishnan	2012	Interdisciplinary	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Passive Unitized Regenerative Fuel Cell (PUReFC)	In off-grid settings, companies are using clean energy sources such as wind and solar. Due to the intermittence of these technologies, these companies turn to environmentally unfriendly batteries to store surplus energy. The PUReFC team has developed a regenerative fuel cell to offer a cleaner energy storage alternative.	Sandeep Lele, Ross Pimentel, Jeff Schwartz, Michael Sizemore, Sutyen Zalawadia	Shoba Krishnan, Daniel Strickland, Abdie Tabrizi	2012	Interdisciplinary	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Heat Activated Wearable Technology (HAWT)	A self-sustaining system has been developed using human body heat to power a low-energy biomedical device. The battery life in low-powered systems can be greatly increased by utilizing this alternative energy source. Additionally, biomedical readings are transferred and displayed on an iPhone.	Sonny Gandhi, Marcia Leung, William Rosario, Lauren Shishido, Brian Tseng	Ahmed Amer, Shoba Krishnan, Hohyun Lee	2012	Interdisciplinary	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Roverwerx: RoboMedic for Triage (RMT): Triage Function	Roverwerx has been redesigned to function as a robotic remotely-operated triage system designed to be used in mass casualty disasters to minimize the risk to emergency rescue workers while maximizing the number of victims assisted. The design includes biometric sensors and a triage centered user interface to facilitate safer triage.	Kelsey Brunts, Martin Chuang	Christopher Kitts	2012	Interdisciplinary	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Affordable, Self-Contained and Quantitative Microfluidic Device for the Detection of Arsenic Contamination in Groundwater Samples	Our electrochemical solution utilizes a three-electrode system with modified carbon-ink electrodes printed onto a disposable substrate to determine trace amounts of arsenic in water. We intend this device to meet the World Health Organization's (WHO's) ASSURED criteria for third-world diagnostic devices.	Kyle Perricone, Mary Reynolds	Unyoung (Ashley) Kim	2013	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/5/
Detection of Waterborne Pathogens	We seek to develop a portable device for the developing world powered by cellular phone. Utilizing a biological sensor developed to detect RNA of these waterborne pathogens and mapping the electrical output of this sensor further miniaturizes the device and decreases the power needed to run it.	Allison Kamiya	Unyoung (Ashley) Kim	2013	BIOE	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Design and Development of Engineered Bamboo Shear Walls	We have aimed to develop a bamboo shear wall that will replace the standard timber shear wall in this year's Solar Decathlon house and begin to pave the way for developing an accepted set of codes and standards for bamboo construction in the U.S., providing a more sustainable alternative.	Davin Chan, David Steenson	Mark Aschheim, Tonya Nilsson	2013	CIVIL	None	http://scholarcommons.scu.edu/ceng_senior/8/

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Radiant House – Structural Design	Santa Clara University's 2013 Radiant House uses structural engineering as a crucial element in showing new methods of sustainable development and design looked for in the U.S. Department of Energy's Solar Decathlon competition.	Mey-Ling Leon, Katherine McKenzie	Mark Aschheim, Tonya Nilsson	2013	CIVIL	None	http://scholarcommons.scu.edu/ceng_senior/12/
An Approach to Light-Frame Natural Disaster Relief Housing	Proposed is a sustainable approach to a geotechnical and structural design of a single-family home for a community in the Northern Philippines. The solution studies the integration of a completely bamboo structure into an innovative foundation design. Flood, wind, and seismic loads were considered in the implementation of the solution.	Katherine Busch, Megan Cronan, Hayley Dickson, Anne Walkingshaw	Reynaud Serrette, Sukhmander Singh	2013	CIVIL	Northern Phillippines	http://scholarcommons.scu.edu/ceng_senior/4/
Ghana Footbridge Project	Our project features the design of a footbridge for a small village in the Upper East Region of Ghana. The footbridge will allow villagers to cross a river that floods every wet season. The bridge will provide safe access to schools and an increase in local business.	Kevin Leatham, Justin Mogannam	Mark Aschheim, Sukhmander Singh	2013	CIVIL	Ghana	http://scholarcommons.scu.edu/ceng_senior/3/
Lightweight Concrete Roof Tile Design	This project seeks to improve the cool roof tile that was designed last year. The lightweight concrete roof tile aims to emit more of the sun's radiation, causing the structure to be cooler, lowering energy consumption, and reducing the Urban Heat Island (UHI) effect.	Kristee Ogata, Jamie Wallis	Tonya Nilsson	2013	CIVIL	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
The Blue Plug	This project involves a mobile interface plus central unit that communicates with multiple households to designate when electronics run, for the purpose of reducing peak energy usage.	Loquen Jones, Sahil Verma	Ahmed Amer	2013	COEN	None	http://scholarcommons.scu.edu/cseng_senior/1/
Dewey: Social Media for Social Good	Dewey is a social mobile app designed to (1) increase transparency of charities to the public and (2) incentivize being a good samaritan within communities. Users are encouraged to post local causes in order to draw awareness, donations, volunteers, etc. Points are awarded for participation in meaningful ways.	Sophia Boettcher	Ahmed Amer, Nam Ling	2013	COEN	None	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Dynamic Poverty Heat Map	Working alongside HP and Fundación Paraguaya, we will be creating a Web application that will visually display data gathered in terms of graphs and a dynamic heat map. The sole purpose is to facilitate the distinction between the areas of most need, and thus be able to allocate resources efficiently.	Jonathan Ahumada, Jasmine Farias, Kurt Jurgens	Silvia Figueira	2013	COEN	None	http://scholarcommons.scu.edu/cseng_senior/10/
Energy Made in Uganda	In partnership with a community-based organization in Mpigi, Uganda, this project aims to frugally design the electronics for a standalone Solar Home System. To increase technical capacity on a local-scale and avoid market spoilage, this system is designed to be manufactured and serviced by community members using technologies available in-country.	Jaqueline Barbosa, Kirsten Petersen	Shoba Krishan	2013	COEN	Mpigi, Uganda	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/

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M3– Phase Change Material in Automated Window Shades	Molten Moon Mechanical (M3) is working to develop window blinds that will provide daytime shading and extremely high efficiency nighttime heating. To realize this goal, the team is automating phase change material filled louvers to track the sun during the day and release the collected heat at night.	Quin Adler, Jake Gallau, Ali Nash, Alex Zatopa	Hohyun Lee	2013	MECH	None	http://scholarcommons.scu.edu/mech_senior/10/
Thermoelectric Cookstove	We are developing a cookstove optimized for Nicaraguan communities and cuisine, which will generate power using thermoelectric generators that will increase the fuel efficiency by providing better air circulation during fuel burn. To meet the needs of food vendors, our stove will have the capability to boil, fry, and grill.	Christine Horman, Matt Lee, Mark Wagner	Hohyun Lee	2013	MECH	Nicaragua	http://scholarcommons.scu.edu/mech_senior/3/
QuikChill	This project aims to integrate a cooling feature to established water filtration methods. Low-powered thermoelectric modules will be utilized to chill the water as it is filtered. The proposed device presents an alternative to energy-inefficient refrigerator water dispensers and Brita pitchers by providing on-demand cold water at the sink.	Franz Louies Chua, Brandon Oh'ara, Rachel Reid, Bernadette Tong	Hohyun Lee	2013	MECH	None	http://scholarcommons.scu.edu/mech_senior/12/
Omoverhi	Low–cost premature infant incubator for implementation in developing countries.	Richard Fong, Guillermo Gallardo, Will Jeffrey, Danny Maeda, Gabriel Romero	Robert Marks	2013	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/3/
Wireless Impact Detection System (WIDS)	This project encompasses designing and implementing a system to record impacts to the head sustained by youth football players. The system consists of an impact detection device mounted in the helmet and an Android application connected via Bluetooth. This project will aid concussion research and alert users to potential problems.	Shawno Auwae, Kyle Terriere	Silvia Figueira, Sarah Kate Wilson	2013	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/2/
POSEIDON: Perennial Endograft System	Abdominal aortic aneurysms (AAA) affect about 24 million people worldwide and are the cause of death of millions, including the world-renowned scientist, Albert Einstein. We are developing a novel stent-graft design that aims to modulate the flow in the AAA and promote healing, and thus prevent AAA rupture.	James Brennan, Valerian Lee, Stepanus Widjaja	Gerardo Noriega	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/6/
Continent Prosthetic Reservoir	Recepticol replaces functions of the large intestine and/or rectum in patients requiring a partial or total colectomy. It serves as an internal reservoir for fecal matter, drained by catheter insertion. This alternative to current treatment options will significantly improve patient quality of life, namely patient freedom.	Marissa Crosetti, Jeffrey Dunbar, Lia Vosti	Gerardo Noriega and Shane Rogers	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/13/
Electrolysis Powered Micropump Utilizing Planar Check Valves	To address the growth of point of care (POC) diagnostics, we have developed a low-power, low-cost, and compact micropump that easily integrates with lab-on-a-chip devices in POC applications. Powered by electrolysis and controlled by a planar membrane and check valves, this micropump supplies precise microliter amounts of fluid.	Aleen Michaelian, Connie Truong	Unyoung (Ashley) Kim	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/9/

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TALENs: Genome Surgery	Utilizing a novel genome editing technology to elicit targeted gene integration opens possibilities for a new and more effective approach to gene therapy. Using this approach to introduce a GFP-tagged transcription factor at its endogenous site will also allow for more accurate real-time monitoring of gene expression.	Carson Harms, Serena Lerkantitham	Leilani Miller	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/15/
3D Printing Toward the Study of Potential Anti-MRSA Agents	At the intersection of bio-device engineering and bio-pharmaceutical studies, our purpose is twofold. We are 3D-printing a hydraulic manifold to be used in isothermal titration calorimetry (ITC), with the ultimate goal of using ITC to study the thermodynamic binding parameters of potential anti-MRSA agents to our drug target, Sortase A.	Powell Fansler, Karla Geisse, Ryan Marshall	Zhiwei (Jonathan) Zhang	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/11/
Reverse Protein Engineering of Luciferase	Luciferase is a bioluminescent protein obtained from fireflies (Photinus pyralis). Our goal is to reduce the size of luciferase while retaining its original function, characterize its active site, and increase its applications in biomedical research. Further testing on the newly synthesized protein will compare its bioluminescent activity to the original.	Kahler Bugtong, Skyler Herczeg, Abraham Munoz, Alexandra Obata	Zhiwei (Jonathan) Zhang	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/10/
Genome Editing of Human iPSCs using the Cas9 System	Human Induced Pluripotent Stem Cells (iPSCs) are important tools in both regenerative medicine and disease biology. However, advancements in the field are hindered by the inefficiency of determining iPSC differentiation. This project uses the Cas9 genome editing tool to engineer a reporter cell line that will help this process.	Cade Ellis Ito, James Wolfe	Zhiwei (Jonathan) Zhang	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/12/
IAP Inhibitors as Potential Tools for Ovarian Cancer Therapy	We aim to better understand epithelial ovarian cancer by investigating a signaling pathway that allows tumor cells to evade death. Our research examines how agents that inhibit cells' inherent pro-survival proteins can mediate their sensitivity to drugs, especially in cell lines that have developed a resistance to certain chemotherapy regimens.	Aditi Bellary, Marko Buljan	Zhiwei (Jonathan) Zhang	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/14/
Microchip Capillary Electrophoresis	Many neuromuscular diseases can be caused by irregular amounts of bioamine neuromodulators. To this end, we designed and implemented a microfluidic device to quickly and precisely detect concentrations of bioamines in a sample. Such a device could analyze hemolymph from the Cancer borealis crab, which contains many bioamines found in humans.	Scott Hardy, Daniel Shull, Mark Vinopal	John Birmingham, Unyoung (Ashley) Kim, Steven Suljak	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/16/
Electrochemical Detection of Arsenic Using a Microfluidic Sensing Platform	Arsenic contamination of water sources is a global health concern affecting up to 200 million people. This proposed device, consisting of a three-electrode system and disposable substrate, allows for point-of-use detection of arsenic when integrated with an electrochemical analyzer and mobile application.	Ben Demaree, Allie Sibole, Jessica VanderGiessen	Unyoung (Ashley) Kim	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/8/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
EndoCATH® Occlusion Balloon Catheter Bubble Elimination during Preparation	SentreHeart's occlusion balloon catheter for left atrial appendage ligation surgery introduces bubbles within the contrast during preparation. Bubbles present a safety concern, potentially escaping and entering the bloodstream and posing risk of stroke for the patient during surgery. The goal is to find a solution by modifying SentreHeart's current product.	Adam Hall, Cameron Mar, Samantha Nguyen	Paul Davidson	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/22/
Design of Methane-to-Methanol Conversion Device	Despite the abundance of natural gas, petroleum still remains the world's main source of energy. This is because natural gas is usually found in isolated reserves and is challenging and expensive to transport. We will address these problems by inventing a low-energy, high-volume process to convert methane to methanol.	Pankti Doshi, Jessica Garcia	Prashanth Asuri	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/23/
Optimizing the Performance of an Alginate-Based Stent for Mammalian Cell Immobilization	Stent implantation is a common treatment for atherosclerosis, but there are problems with current metal stent designs. As a solution, our project focuses on optimizing the membrane stability of biodegradable hydrogel-based stents. Experimental testing allows us to enhance the membrane permeability and mechanical strength of our mammalian cell-encapsulated alginate stent.	Alissa Johnston, Jeffrey Kunkel, Samantha Meredith, Katherine Sapozhnikov	Prashanth Asuri, Maryam Mobed-Miremadi	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/24/
Mammalian Cell-Encapsulated Transdermal Patch	Transdermal drug delivery is one of the fastest growing fields in the current drug industry. Our group seeks to fabricate a human stem-cell-encapsulated transdermal patch by optimizing preservation, durability, and diffusivity to create a novel method of efficacious drug treatment.	Megan Anders, Jared Hara, Jordan Tottori	Prashanth Asuri, Maryam Mobed-Miremadi	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/25/
In Vitro Metastasis Platform	Our project focuses on the development of an in vitro metastasis platform. We hope to prove its utility for the study of migrating cancerous and noncancerous cells at tissue interfaces, as well as for the testing of anti-metastatic compounds in cancer research and drug development.	Justus Carlisle, Mark-Phillip Pebworth	Prashanth Asuri	2014	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/29/
Rainwater Catchment System at Walden West Outdoor Science School	At Walden West, children learn science as it relates to the environment and sustainability. We designed a full-scale bioswale to capture and reuse the rainwater runoff on the site. To provide an educational tool for campers, we built a model bioswale and performed water quality analyses.	Jessica Bolanos, Melissa Crapps, Alessandro Folchi	Steven Chiesa, Edwin Maurer	2014	CIVIL	Walden West	http://scholarcommons.scu.edu/ceng_senior/27/
Mission Well Design	This project is designed to adequately irrigate a community garden located at the Dominican Sisters Convent behind Mission San Jose in Fremont, California. To meet the irrigation needs, a solar-powered water pump will be installed, and the existing well on the property will be brought up to city regulations.	Mary Foran, Nonda Kozas, Daniel Lafranchi	Steven Chiesa, Edwin Maurer	2014	CIVIL	Fremont, CA	http://scholarcommons.scu.edu/ceng_senior/1/

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Life Water	Design and implementation of a rainwater collection, purification, storage, and distribution system for an orphanage in Kigali, Rwanda. Project team traveled to site for construction of system components. This water system will enable the orphanage to become more self-sufficient and independent of municipal water, which has proven to be unreliable.	Colin Boyle, Scott Hanson	Edwin Maurer	2014	CIVIL	Kigali, Rwanda	http://scholarcommons.scu.edu/ceng_senior/21/
Design of a Low-Impact Wastewater Treatment Solution for Siladen Island in Indonesia	Design of a low-cost, centralized wastewater treatment system for Pulau Siladen, a tiny undeveloped island in Indonesia without a sustainable sanitation method. The chosen design was based on technologies that can be used to solve sanitation issues in similar communities and potentially provide recycled water to offset potable water demands.	Kyle Astill, Charles Rymer, Joseph Sarmiento	Steven Chiesa	2014	CIVIL	Pulau Siladen, Indonesia	http://scholarcommons.scu.edu/ceng_senior/18/
Design of an ANAMMOX Process to Treat Sludge Processing Return Flows at the San Jose–Santa Clara Wastewater Treatment Plant	The San Jose–Santa Clara Regional Wastewater Treatment Facility is planning improvements to its sludge management system. Digested sludge will be dewatered with the production of a nitrogen-rich centrate stream. This project focuses on designing an ANAMMOX process in a sequencing batch reactor treating the centrate stream and reducing ammonia-nitrogen load.	Jocelyn Barragan, Marissa Tsuruda	Steven Chiesa	2014	CIVIL	San Jose, CA	http://scholarcommons.scu.edu/ceng_senior/14/
Design and Evaluation of a Home-Scale Arsenic Removal System	Arsenic contamination in groundwater is a global health concern. Our goal was to develop an affordable household arsenic filter using electrocoagulation technology that reduces arsenic concentrations to safe levels. This may lead to manufacturing the filter in Southeast Asia and other regions, including the United States.	Megan Alferness, Alex Casares	Steven Chiesa	2014	CIVIL	None (Southeast Asia)	http://scholarcommons.scu.edu/ceng_senior/26/
Cold Climate Solar Thermal Greenhouse	The design of a cold climate solar thermal greenhouse at the Denali Education Center, utilizing a pre-existing solar thermal array to heat soil beds, thereby extending their growing season. The greenhouse will provide fresh produce to education center employees and visitors.	Samuel Heath, Ashley Husbands, Cora Lemar, Mariko Tollan	Tracy Abbott, Tonya Nilsson, Sukhmander Singh	2014	CIVIL	Denali Education Center	http://scholarcommons.scu.edu/ceng_senior/7/
Mixtlan's Senior Community Center	Our project features the structural design of a one-story building that will house the elderly who have been left behind by their migrating families and will house programs that focus on improving living conditions in Mixtlan, Jalisco, Mexico. Ultimately, we will maximize space usage with the most economical materials and design.	Maria Guadalupe Perez, Priscilla Ramirez	Tracy Abbott, Sukhmander Singh	2014	CIVIL	Mixtlan, Jalisco, Mexico	http://scholarcommons.scu.edu/ceng_senior/9/
Youth StreetConnect	Youth StreetConnect consists of two mobile applications that connect young, homeless women to health services and improve their communication with health providers. One app will be used by the young women to locate and rate services, receive text messages, and access information. The other app will be used by service providers and contains tools, resources, and referrals.	Kelsey Dedoshka, Kaitlin Kirasich, Katie Le	Silvia Figueira	2014	COEN	None	http://scholarcommons.scu.edu/cseng_senior/30/

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Greenmission: An Off-Grid Energy System	Sustainable and efficient, this climate-controlled greenhouse functions as an educational tool for local pre–high school science students. Wind turbines and photovoltaics energize the structure year-round to cultivate a variety of selected crops.	Richard Dobbins, Andrew Izawa, Tyler Marting, John Nolan	Shoba Krishnan	2014	ELEN	None	http://scholarcommons.scu.edu/elec_senior/5/
AkaBot: 3D Printing Filament Extruder	The AkaBot is a machine that intakes ground bits of waste plastic water bottles, melts them, and extrudes them as filament for a 3D printer. Our project is intended for Village Energy, an electronics business in Kampala, Uganda, which is experimenting with 3D printing its enclosures.	Emily Albi, Kevin Kozel, Daniel Ventoza, Rachel Wilmoth	Panthea Sepehrband	2014	MECH	Kampala, Uganda	http://scholarcommons.scu.edu/mech_senior/19/
Pure Water	An off-the-grid water purification system is designed to deliver clean drinking water. This system utilizes concentrated heat from solar parabolic troughs to boil brackish water for the distillation process. The process of fabricating the parabolic trough and optimizing other system components (heat exchanger, control system) will be presented.	Jasper Adamek-Bowers, Jamie Anderson, Peyton Harrod, Madison More, Alexander Thal	Monem Beitelmal, Drazen Fabris	2014	MECH	None	http://scholarcommons.scu.edu/mech_senior/23/
Mobile Cooler for the Last Mile Distribution of Vaccines in Developing Nations	This project provides a way to safely transport vaccines for an extended range in a mobile form utilizing thermoelectric modules. The device uses an active cooling system rather than passive, allowing the container to be opened and closed while maintaining a specified temperature range for the payload.	Paul Novisoff, Arturo Nunez Perez, Ryne Sitar	Hohyun Lee	2014	MECH	None	http://scholarcommons.scu.edu/mech_senior/24/
Solar Powered Absorption Chiller	The Solar Absorption Chiller utilizes concentrated solar power as a heat source by collecting sun rays reflected from a parabolic mirror. This device is intended for use in developing nations with limited electricity.	Craig Carlson, Mark Coulter, Claire Kunkle, Patrick Watson	Hohyun Lee	2014	MECH	None	http://scholarcommons.scu.edu/mech_senior/35/
Poverty Crusher	Our goal is to design and build a human-powered rock crusher, which is safe, efficient, ergonomic, and affordable. The purpose of the device is to improve the lives of widowed women in Birendranagar, Nepal, who make a living through grueling rock crushing work.	Rob Golterman, Brian Hammond, Thien-Ryan Le, Arvin Lie	Timothy Hight	2014	MECH	Birendranagar, Nepal	http://scholarcommons.scu.edu/mech_senior/52/
Smart Water Heater Controller	Our project is to design an artificially intelligent controller to reduce the energy consumption of domestic water heaters. The controller will log data from wireless sensor networks powered by thermoelectric modules and then implement a machine-learning algorithm to heat water based on homeowner usage patterns.	Rebecca Barney, Rachel Donohoe, Xavier Moya, Kerbasi Ugarte, Russell Williams	Hohyun Lee	2014	MECH	None	http://scholarcommons.scu.edu/mech_senior/29/
Wireless Impact Sensing Headband	Athletes who suffer repeated Traumatic Brain Injuries face severe long-term health consequences. In an attempt to find a solution to this issue, our project is to design and test a device that can sense and alert an athlete of a dangerous head impact.	Ryan Daly, Doug Furstinger, Tim Sashegyi, Nicklaus Schmidt, Mihir Shah	Christopher Kitts, Shoba Krishnan	2014	Interdisciplinary	None	http://scholarcommons.scu.edu/mech_senior/30/

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Arsenic Detection Project: Electronics	In order to address clean water concerns in the developing world, this project designed a portable electronic interface to go with a sensor that will detect arsenic in groundwater. The electronics will power the test and present the results to the user via a cell-phone application.	John Barth, Anthony Clemetson	Silvia Figueira, Shoba Krishnan	2014	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/5/
Mobile Audiometry Application	The Mobile Audiometry Application enables a mobile device to perform audiometric testing to detect users' hearing range. This project seeks to fulfill the social need for increased access to hearing testing.	Kevin Nguyen, Shweta Panditrao	Silvia Figueira	2014	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/4/
Electrochemical Detection of Nitrate	This project aims to develop a low cost, user friendly, accurate, and portable device for the electrochemical detection of nitrate in drinking water, for use in developing countries where this problem is prevalent.	Monica De Lazzari, Kristina Howard, Lillian Tatka	UNYOUNG (ASHLEY) KIM	2015	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/30/
ASSURED Bacterial Detection toward Paper-Based Microfluidic Chip for Resource-Limited Areas	The World Health Organization estimates that over 3 million people die annually from waterborne illnesses. To address this, we propose a preventive diagnostic device that uses a paper-based sandwich assay and a smartphone application to detect the presence of bacterial pathogens in water samples.	Willy Leineweber, Mallory Williams	UNYOUNG (ASHLEY) KIM	2015	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/17/
Redesigning Lp-PLA2 while Retaining Catalytic Function	Our project focuses on redesigning the enzyme lipoprotein-associated phospholipase A2 (Lp-PLA2) into a novel enzyme of peptide size. Successfully eliminating unnecessary amino acids from the structure of Lp-PLA2 will produce a smaller, functional enzyme. With this result, highly effective therapeutic protein drugs will gain feasibility.	Kevin Cronin, Stacie Lim, Eddy Liu	ZHIWEN (JONATHAN) ZHANG	2015	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/34/
Insulin Pump Housing Modification Project	In collaboration with Asante Solutions, the Insulin Pump Housing team is working to change the method by which Asante Solution's insulin pump bodies are sealed. This will streamline the manufacturing process as well as increase the consistency of sealing the insulin pump bodies.	Matt Coleman, Kurt Holloway, Steven Long, John Tidwell	PRASHANTH ASURI	2015	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/33/
Tongue Suspension Suture for Obstructive Sleep Apnea Patients	Our goal is to create an elastic, biocompatible tongue suspension implant for patients with obstructive sleep apnea, one that eliminates the need to be tethered to the mandible and incorporates Siesta Medical's Encore Tongue Suspension System.	Erin Araj, Leah Karlsen, Abigail Kilkenny	UNYOUNG (ASHLEY) KIM, ERIK VAN DER BURG	2015	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/18/
Micro Motion Controller	We are developing a 2-D-of-freedom controller for micro-surgical procedures including neurosurgery, retinal surgery, and vascular surgery. This is intended to be further developed so that it may be used by da Vinci robotic surgeons in micro-surgical procedures.	Sandeep Adem, Cameron Chu, Karan Kapoor	ZHIWEN (JONATHAN) ZHANG, RAJEEV KELKAR	2015	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/26/

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Micro-Controller: Part 2	Our goal is to allow paralyzed children and adults the possibility to play chess. This requires additional construction of a micro-controller, adding a motorized third axis and a finger gripper to pick up chess pieces.	Bergen Antell, Michael McNaul, Steve Shushnar	UNYOUNG (ASHLEY) KIM	2015	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/35/
Sustainable Design in Ghana	Our project explored the replacement of a roof in Ghana using the Nubian Vault construction method. While La Voute Nubienne Association currently builds physically stable structures, we aim to provide the technical data needed for international support of this method to further expand the NGO's capabilities.	Anthony DeCosta, Amanda Laufer, Theresa McArdle	MARK ASCHHEIM	2015	CIVIL	Ghana	http://scholarcommons.scu.edu/ceng_senior/29/
Structural Housing Improvements in Oaxaca, Mexico, Using Arundo donax	This project researches Arundo donax—a type of giant, perennial cane plant—to examine its use as a viable structural building material. Used alongside other traditional building methods, this material may offer new technologies for housing in developing countries.	Greg O'Neill, Jonathan Tadros	MARK ASCHHEIM, TONYA NILSSON	2015	CIVIL	Oaxaca, Mexico	http://scholarcommons.scu.edu/ceng_senior/16/
Interlocking CMU Geometry Design	This project consists of the design of interlocking voided concrete block and the evaluation of block wall strengths. We aim to find an inexpensive solution for wall construction that can be tailored to work in different wind and seismic environments.	Raquel Avila, Nick Jensen	TRACY ABBOTT, MARK ASCHHEIM	2015	CIVIL	None	http://scholarcommons.scu.edu/ceng_senior/31/
Designing with Bamboo: Frames and Connections in Underdeveloped Areas	Our project focuses on the construction and testing of a proposed structural system in which bamboo and concrete masonry block are incorporated with a plastic hinge mechanism. This structure would primarily be used in Haiti and other developing countries that are prone to seismic activity.	Bryson Kam, Andrew Spencer	MARK ASCHHEIM, TONYA NILSSON	2015	CIVIL	Haiti	http://scholarcommons.scu.edu/ceng_senior/11/
Bannan Pedestrian Bridge	The proposed pedestrian footbridge design is a project that aims to develop and improve the quality of student life at Santa Clara University. Construction design includes estimating, scheduling, and logistical analysis of the project, and structural design includes design calculations and computer analysis of the columns.	Chris Banaga, Kevin Delos Santos, Tim Mort	TRACY ABBOTT, HISHAM SAID	2015	CIVIL	Santa Clara, CA	http://scholarcommons.scu.edu/ceng_senior/28/
Seismic Retrofit of Soft Story Building in San Francisco	This project aims to analyze the existing conditions of a soft story residential building located in San Francisco to determine the effectiveness of available soft story retrofit methods and to design an implementable and cost-effective seismic retrofit.	Maggie Jones, Alexei Sinkevich, Will Smithers	REYNAUD SERRETTE	2015	CIVIL	San Francisco, CA	http://scholarcommons.scu.edu/ceng_senior/32/
Homeless Garden Project	This project includes the design of a gravity-fed water delivery and distribution system for a 12-acre farm. The farm will be used by the Homeless Garden Project, a nonprofit organization geared toward helping the homeless in Santa Cruz, California.	John Miller, Tara Pozzi, Caroline Ruwe	STEVEN CHIESA	2015	CIVIL	Santa Cruz, CA	http://scholarcommons.scu.edu/ceng_senior/34/

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Low Environmental Impact Neighborhood District in Gilroy, California	Our project involves the planning and design of a low environmental impact neighborhood in Gilroy, one which includes a mix of single-family and multi-family homes with an integrated commercial component. The design process consisted of establishing street and lot layouts and designing utility systems with local connections. The final product addresses the need for sustainable, family-friendly communities.	Ellen McKay, Kaelynn Willey	STEVEN CHIESA, RACHEL HE	2015	CIVIL	Gilroy, CA	http://scholarcommons.scu.edu/ceng_senior/13/
Hearst Avenue Complete Street Design	This project implements comparative street designs that incorporate sustainable features such as bike and pedestrian accessibility, efficient traffic signal sequences, and effective stormwater management attributes along Hearst Avenue in Berkeley, California.	Nabilah Deen, Robbie Powell	RACHEL HE	2015	CIVIL	Berkeley, CA	http://scholarcommons.scu.edu/ceng_senior/33/
Hayward Shoreline Levee Design	This project encompasses the design of a section of levee in Hayward. A new levee is needed to protect the shore from flooding due to rising sea levels and future storm events.	Samuel Beering, Karissa Canonizado, Caleb Young	SUKHMANDER SINGH	2015	CIVIL	Hayward, CA	http://scholarcommons.scu.edu/ceng_senior/35/
Beacon Pack	The British Airways-sponsored Beacon Pack is a solar-powered data repository that stores educational and world news content accessible through SMS text. This product will provide information to millions of individuals in developing countries who have low-level cellular devices.	Aiden Barbari, James Mack, James Terry	SILVIA FIGUEIRA	2015	COEN	None	http://scholarcommons.scu.edu/cseng_senior/40/
Wakabi: On-Demand Ride Service for Rural Uganda	Wakabi is an SMS-based application designed to streamline the ride-sharing process currently existing in rural Uganda. The system allows individuals to connect with hired motorcyclists (Boda drivers) by texting a single number. Wakabi will deliver more business to Boda drivers and provide Uganda with a unified, simple, on-demand transportation solution.	Michael Brew, Bryant Larsen	SILVIA FIGUEIRA	2015	COEN	Uganda	http://scholarcommons.scu.edu/cseng_senior/37/
Sankara Eye Records: Eye-Health Tracker for Children in India	Sankara Eye Records is a mobile application created for Sankara Eye, an Indian social enterprise that provides eye care services in India. Our mobile application will make the process of creating and editing schoolchildren's eye health records quick and efficient for Sankara Eye screeners.	Francis Cuenca, Amy Truong	SILVIA FIGUEIRA	2015	COEN	India	http://scholarcommons.scu.edu/cseng_senior/48/
Using Virtual Reality for Anxiety Therapy	For our project, we are developing a system that employs virtual reality as a tool for therapists to treat various anxiety disorders, such as phobias, using exposure therapy. We will be developing a small library of simulations corresponding to the most prevalent phobias in our society.	Bryce Mariano, Paul Thurston	MARIA PANTOJA	2015	COEN	None	http://scholarcommons.scu.edu/cseng_senior/22/

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Low-Cost ECG for Rural Populations of Developing Countries	Our device allows doctors to remotely screen patients for cardiovascular arrhythmias by sending them ECG data via text message. Additionally, our device was built with mostly open sourced electronic components, and our software will be made open source to encourage future development efforts.	J.P. Ertola, Michael Whalen	DAN LEWIS	2015	COEN	None	http://scholarcommons.scu.edu/cseng_senior/45/
Smart Thermostat	Our goal is to create a thermostat which learns user behavior and intelligently manages the temperature. Through this control, we can maintain a more comfortable and energy efficient environment.	Matthew Wade Allen, Samuel Hardy Billett, Kevin Michael Read	MARYAM KHANBAGHI	2015	ELEN	None	http://scholarcommons.scu.edu/elec_senior/16/
Assistive Reminder	Memory loss is enhanced by symptoms of autism, which is estimated to affect 1 percent of the world's population. Customizable and cost-effective, Assistive Reminder is a novel device aimed to remind users, such as individuals with autism, to complete tasks at various times of the day.	Jocelyn Tan	RADHIKA GROVER	2015	ELEN	None	http://scholarcommons.scu.edu/elec_senior/21/
Sunplanter	Sunplanter, a modular, prefabricated residential solar-tracking system, provides a unique solution to high solar installation costs.	Matt Diaz, Joseph Gaither, Stephen Hight, Brandon Suehiro	TIMOTHY HIGHT	2015	MECH	None	http://scholarcommons.scu.edu/mech_senior/31/
AkaBot	AkaBot is an extrusion machine that produces 3D printing filament by recycling PET plastic water bottles. This filament gives entrepreneurs in developing countries the tools to compete with foreign import filament while using sustainable technology.	Jay Dubashi, Brian Grau, Alex McKernan	PANTHEA SEPEHRBAND	2015	MECH	None	http://scholarcommons.scu.edu/mech_senior/44/
Backpack Cooler	The project is a portable backpack cooler using thermoelectric modules to cool the chamber in order to provide a refrigeration system for off-grid communities. The cooler will be powered using a battery that will be charged using solar panels installed in the home.	Sebastian Brisbois, Patrick Crane, Daniel Lee, Kaci McCartan, Connor O'Brien	HOHYUN LEE	2015	MECH	None	http://scholarcommons.scu.edu/mech_senior/38/
Might-E Wheel	The Might-E Wheel converts existing bicycles into electric bicycles by an easy and approachable installation. Through a rear wheel replacement containing the motor, batteries, and control system, efficient travel by electric bicycle is made affordable and accessible.	Daniel Doke, Abby Grills, Zach Jesberger, Jared O'Rourke	TIMOTHY HEALY, ROBERT MARKS	2015	MECH	None	http://scholarcommons.scu.edu/idp_senior/11/
Low Cost 3D Bioprinter	We are repurposing a RepRap printer into a low cost 3D bioprinter that will be printing biomaterials and proteins.	Andrew Shi, Connor Smith, Victor O'Brien	PRASHANTH ASURI, CHRISTOPHER KITTS	2015	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/14/
AquaSift: Point-of-Use Microfluidic Detection System	We present a simple, affordable, and portable system that works with a three-electrode device to detect contaminants in drinking water. The system comprises a potentiostat to perform voltammetric sweeps, an Android application to interface with a smartphone, and a database application for the mapping of results.	Daniel Beyers, Jasper Tan, Brandon Young	SILVIA FIGUEIRA, SHOBA KRISHNAN	2015	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/10/

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Innovations in Traumatic Hemorrhage	This project seeks to develop novel methods with which to treat serious bleeding injuries. We hope to deveop an injectable device that is functional and effective at treating both internal and external bleeding moieties. We further hope to target this developed solution to rural, military, and developing world EMS systems.	Joseph Choy, Nicholas Domek, John Tavelli	PRASHANTH ASURI, UNYOUNG (ASHLEY) KIM, MARYAM MOBED-MIREMADI	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/45/
Phosphate Contaminant Detection in Water through Electrochemical Biosensor	In order to detect phosphate contaminants in water sources and promote global health, we aim to create a portable microfluidic biosensor that will support a point-of-care platform. Through the combination of electrochemical and signal processing methods, the sensor detects the presence of phosphate analyte concentrations in water samples.	Kelene Boyle, Zina Kurian, Xitlalic Soto-Sida	UNYOUNG (ASHLEY) KIM	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/50/
Intracranial Pressure Sensor	Our goal is to develop an ultrasound read pressure sensor to be implanted along with intracranial shunts for patients who suffer from Idiopathic Intracranial Hypertension. This will provide early detection of complications associated with this condition such as clogged shunts.	Matthew Murray, Jared Shimada	EMRE ARACI	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/46/
Mitigation of Radiation-Induced Bone Loss by Dried Plum	Working in collaboration with NASA Ames Research Center, the goals of our project are to study the molecular mechanisms by which radiation induces bone loss and by which dried plum protects bone and promotes its formation. Our findings may lead to better treatments for astronauts and patients with bone conditions.	Carlos Medina, Sonette Steczina	PRASHANTH ASURI	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/49/
Bolstering the S. cervisiae Membrane for Efficient Bioethanol Production from Lignocellulosic Biomass	Lignocellulosic biomass is the most abundant carbon source used in biofuel production utilizing yeast. Unfortunately, this material requires pretreatment resulting in the release of several inhibitors that stunt the activity of yeast. Our project is to engineer yeast to make it resilient to this harsh environment to promote sustainable energy.	Matt Kubit, Conary Meyer	MARYAM MOBED-MIREMADI, TERESA RUSCETTI	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/39/
Aptamer-Based Hybrid Assay for Early Stage Disease Diagnosis	Our goal is to utilize aptamers, oligonucleotides with high specificity and affinity for protein targets, to create a novel methodology based on the traditional Enzyme-Linked Immunosorbent Assay (ELISA). The ultimate goal of our project is to improve diagnostic methods for diseases, resulting in better prognoses.	Riley Parsons, Mari Ueno	STEVEN SULJAK	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/38/
Frugal Vital Sensor	In developing nations, people suffer from inadequate healthcare due in part to the high cost of medical diagnostic equipment. Our goal is to design a frugal vital sensor system to measure a patient's blood pressure, heart rate and blood oxygen concentration, outputting the information to a terminal for diagnostic use.	Jonathan Bird, Travis McAuley, Conor McMahon	UNYOUNG (ASHLEY) KIM	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/53/
3D Printed Imaging Apparatus for Monitoring Intraocular Pressure Using Smartphone Camera	We are designing a 3D printed apparatus for a smartphone that will allow its camera to take a magnified image of an implanted intraocular lens sensor used to track changes in intraocular pressure (IOP) of glaucoma patients.	Gino Castillo, Christopher Gaines, Joshua Godfrey, Michael Zhao	EMRE ARACI	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/37/

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Suture Passing Device for Hyoid Suspension in Sleep Apnea Surgery	We will design a medical device suitable toward ameliorating the symptoms of sleep apnea in critical patients. Our primary focus is developing a highly efficient suture passer that will successfully pass a suture around the hyoid bone, which will be simulated in cadavers and other representative tissue material.	Corbin Craven, Solomon Mulugeta, Nicholas Leavengood	ZHIWEN (JONATHAN) ZHANG	2016	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/52/
Nicaragua Water Distribution System Design	With the support of Dr. Chris Bacon in the Environmental Science Department and ASDENIC, this project explores the process of designing a water distribution system for a rural community in Nicaragua. The goal of the design is to increase efficiency and maximize access to potable water.	Leah Bensching, Jamie Monk	LAURA DOYLE, EDWIN MAURER	2016	CIVIL	Nicaragua	http://scholarcommons.scu.edu/ceng_senior/47/
Regional Wastewater Facility Systems Design	The San Jose-Santa Clara Regional Wastewater Facility's water distribution systems are currently inadequate due to age and condition. This project proposes a redesign of the potable and ground water systems through hydraulic modeling.	Sage Aoki, Joseph Calvo, Kayden Haleakala, Steward Yang	EDWIN MAURER	2016	CIVIL	San Jose, CA and Santa Clara, CA	http://scholarcommons.scu.edu/ceng_senior/46/
Green Roof Filtration and Storage System	Our project is a design of a green roof water filtration and storage system that will both collect rainwater and recycle gray water. Our research is focused in Salinas, Puerto Rico, where water supply issues are prominent.	Austin Rodrigues, Joel Scianna	EDWIN MAURER	2016	CIVIL	Salinas, Puerto Rico	http://scholarcommons.scu.edu/ceng_senior/43/
Cleaning Up the Dirty 530	Due to the recent drought, California has been realizing it is vital that we Californians carefully use what little water we have. We have designed hypothetical upgrades that can be made to a wastewater treatment facility so that its effluent stream can be recycled and used for irrigational purposes.	Troy Lopez, Fernando Teran, Daniel Villescaz	STEVEN CHIESA	2016	CIVIL	California	http://scholarcommons.scu.edu/ceng_senior/41/
Habitat for Humanity Apartment Complex Redesign	This project includes the redesign of an apartment building for a Habitat for Humanity complex in Walnut Creek, CA. The initial design exceeds the building height limitation in the Walnut Creek Building Code, making a complete structural redesign of this timber structure necessary.	Megan August, Molly Bencomo, Ashley Waite	TONYA NILSSON	2016	CIVIL	Walnut Creek, CA	http://scholarcommons.scu.edu/ceng_senior/44/
24th National Timber Bridge Design Competition	This timber pedestrian bridge was devised, constructed, and tested for the National Timber Bridge Design Competition. The bridge aims to showcase the reliability and cost effectiveness of timber as a viable and sustainable material in rural infrastructure.	Marie McNamara, Andrew Porter, Martina Sbicca	TRACY ABBOTT	2016	CIVIL	None	http://scholarcommons.scu.edu/ceng_senior/39/
Bamboo Roofing System for Egyptian Houses	This project provides a sustainable, affordable, and easy to construct bamboo roofing system for marginalized people in Egypt with inadequate roofs. Engineering guidelines were created for both spans and connections to accommodate houses of varying sizes. This project is a proof-of-concept for future implementation in Egypt.	Zach Fielder, Joseph FitzPatrick, Kathleen Scheer	TONYA NILSSON	2016	CIVIL	Egypt	http://scholarcommons.scu.edu/ceng_senior/40/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Rise Above the Flood: Bridge Building in Ghana, Africa	This project involves the design of a pedestrian footbridge for a rural village named Gambibgo, located in Northern Ghana. The bridge will let villagers safely cross a river during the flooding season in order to reach the city of Bolgatanga where they have access to jobs, clean water, and education.	Vanessa Diaz, Ariana Govan, Matthew Millsaps	TRACY ABBOTT, MARK ASCHHEIM, JAMES REITES, S.J.	2016	CIVIL	Gambibgo, Ghana	http://scholarcommons.scu.edu/ceng_senior/48/
Seismic Design of Interlocking Concrete Masonry Unit Blocks	This project addresses the need for improved third world structural designs by researching mortar-less, interlocking CMU blocks. Our blocks will be constructed into a reinforced wall that we have designed, and then will be tested against earthquake-like forces.	Ryan Gokey, Phil Mirenda, Joe Papangellin	MARK ASCHHEIM	2016	CIVIL	None	http://scholarcommons.scu.edu/ceng_senior/49/
Analysis and Redesign of Pruneridge Avenue from Lawrence Expressway to Pomeroy Avenue	Our goal is to decrease the traffic density on Pruneridge Avenue between Lawrence Expressway and Pomeroy Avenue. We will analyze alternatives using manually recorded traffic data and Synchro 6 simulation software. We believe a reversible lane on Pruneridge will reduce traffic and promote pedestrian and bicyclist safety.	Tyler Isaac, Matthew Wong	RACHEL HE	2016	CIVIL	Santa Clara, CA	http://scholarcommons.scu.edu/ceng_senior/45/
Looma Lesson Planning Web Application for Education Technology	The Looma Lesson Planning Application improves the usability of Looma, an off-grid computer-on-a-chip device seeking to enhance the classroom experience for children in rural Nepal. This web application organizes Looma's educational content and allows the user to create customized lesson plans.	Elise Herrmannsfeldt, Suparna Jasuja, Kate Lassalle-Klein, Roshan Ramankutty	SILVIA FIGUEIRA, DON RICCOMINI	2016	COEN	Nepal	http://scholarcommons.scu.edu/cseng_senior/62/
Fix the City	This application is for the citizens of San Jose to report when city property needs fixing. Citizens can send in photos of the problem through the app, and then those reports will be sent to a web database for the city government to view.	Amanpreet Dhoor, Melissa Portillo, Kevin Ta	SILVIA FIGUEIRA	2016	COEN	San Jose, CA	http://scholarcommons.scu.edu/cseng_senior/59/
Mobile Glaucoma Detection Application	Glaucoma is an asymptomatic disease that affects the lives of millions of people. If left untreated, the disease will result in loss of vision or blindness. Our application will interface with a special contact lens to help detect the common characteristics associated with glaucoma.	Samuel Holeman, Ryan Lowe	EMRE ARACI, SILVIA FIGUEIRA	2016	COEN	None	http://scholarcommons.scu.edu/cseng_senior/64/
Bringing Electricity to Alafiarou: The Solar Microgrid Project	97% of the 1.3 billion people who still do not have access to electricity live in Sub-Saharan Africa. To help solve this problem, our team designed and installed a solar microgrid for 133 people living in Alafiarou, Benin, so that they may see in the dark and charge their phones.	Jacob Leatherberry, Nicolas Metais	TIMOTHY HEALY, JAMES REITES, S.J.	2016	ELEN	Alafiarou, Benin	http://scholarcommons.scu.edu/elec_senior/23/
Infinity	The project consists of designing educational lantern kits with a solar charging system. The project will have lesson plans along with assembly of the lanterns. The kits are intended to be used by the Lightyear Foundation with high school students in Ghana, Africa.	Alejandra Huitron, Nicholas Supan	TIMOTHY HEALY	2016	ELEN	Ghana	http://scholarcommons.scu.edu/elec_senior/25/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Smart Aquaponics System	An aquaponics system with automatic light, water, and temperature control using Direct Current components for off-grid and micro-grid design flexibility.	Ryan Toal	MICHAEL MCELFRESH	2016	ELEN	None	http://scholarcommons.scu.edu/elec_senior/36/
Wireless Healthcare Monitoring System	The wireless healthcare monitoring system consists of two main parts that communicate with each other via Bluetooth connection. Information is gathered on a user or patient through several sensors. That data is then processed and sent to a user's laptop or phone where the information will be displayed.	Ryan Grzejka, Chan Lee, Justin Visas	RAMESH ABHARI	2016	ELEN	None	http://scholarcommons.scu.edu/elec_senior/29/
Energy Management Control Center	Our goal is to create a system to reduce home energy use without sacrificing comfort of the occupants. Through a control strategy, we will manipulate HVAC and appliance use to maximize overall efficiency.	Francis Estacio, Ren Hirokawa, Devon Quaternik, Matthew Salmanpour	MARYAM KHANBAGHI	2016	ELEN	None	http://scholarcommons.scu.edu/elec_senior/24/
Reactive Power Compensation	Our project is to create a Matlab simulation to increase the power factor of transmission lines thereby increasing the efficiency of power transmission. Apart from the simulation, a small-scale device will measure the power factor of industrial loads and output recommended changes to increase energy efficiency.	Kimberly Meyers, Martin Prado	MARYAM KHANBAGHI	2016	ELEN	None	http://scholarcommons.scu.edu/elec_senior/28/
Wavefront Sensor	We present a low-cost, functional wavefront sensor that can determine optical path length differences with an accuracy of 40 nm. This device can be used by future optics students to experiment with Frenzel zone plates or to measure the phase introduced by various perturbations including turbulent airflow or transparent media.	Richard Mule	CHRISTOPHER WEBER, SALLY WOOD	2016	ELEN	None	http://scholarcommons.scu.edu/elec_senior/30/
Forge: Thermoelectric Cookstove	In numerous parts of the world, necessities like adequate meal preparation or access to electricity are not available. We plan to make a cookstove for people in developing countries, that will convert excess heat from the cooking process into electricity.	Austin Jacobs, John Maffeo, Jared Sheehy, Isaac Stratfold, Matt Nelson, Bradley Ydens	ROBERT MARKS, SALLY WOOD	2016	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/18/
RSL Rover: Disaster Response Vehicle	The RSL Rover team upgraded a drive-by-wire Polaris ATV by integrating the industry-standard Robot Operating System (ROS) and custom sensing packages targeted at post-fire environment assessment.	Patrick Barone, Giovanni Briggs, Aaron Burns, Zoe Demertzis, Hesham Naja	CHRISTOPHER KITTS	2016	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/24/
STEF: Solar Thermoelectric Evaporative Fridge	STEF is a low power, low cost refrigerator for off-grid communities. Thermoelectric modules, a heat dissipation system, and evaporation are used to cool the refrigerator, while a microcontroller monitors and maintains the internal temperature. A battery box powers the refrigerator, which attaches to any small solar array for off-grid power.	Daniel Avalos, Viet Huynh, David Lyons, David Swan, Thomas Watson	HOHYUN LEE, WEIJIA SHANG	2016	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/25/

Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Microfluidic E. coli Detection	Our project provides a method for people in developing countries to detect E. coli in their water sources. A microfluidic chip is used to mix a water sample with a binding agent and move it past an optical setup, where images are collected for E. coli concentration analysis.	Scott Fukuoka, Andy Ly, Andres Maldonado-Liu, Kyle Pietrzyk	UNYOUNG (ASHLEY) KIM, ON SHUN PAK	2016	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/21/
Medical Screening Solution for Pregnant Women in Rural Communities	This project decentralizes health services for pregnant women by integrating medical screening and web technologies into a comprehensive solution. The device analyzes urine samples for biological markers indicative of health complications, storing the results and relevant patient information to improve the consistency of healthcare for women in rural, developing communities.	Blair Koeneman, Amy Miller, Joe Neumeyer, Jake Prince	UNYOUNG (ASHLEY) KIM, SILVIA FIGUEIRA	2016	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/22/
Gazelle: A Human-Powered Vehicle	Our goal is to create a vehicle that can be used for short distances in everyday life that is safe, affordable, and completely human powered. We want to focus on comfort of the rider and include ample amount of storage space, which makes our design very competitive with other HPVs.	William Fluharty, Werner Nistler, Amulya Rao, Brian Rice	CALVIN TSZENG	2016	MECH	None	http://scholarcommons.scu.edu/mech_senior/57/
SAFER: Search and Find for Emergencies Rover	SAFER is a remotely operated search and rescue rover for collapsed structure disasters. It will provide useful reconnaissance without risking the lives of search and rescue team members.	Zachary Agustin, Charles Lewis, Elizabeth McMahon, Cameron Pierce, Pranav Pradhan, Michael Tamshen	CALVIN TSZENG	2016	MECH	None	http://scholarcommons.scu.edu/mech_senior/63/
Gravity Charger	Nighttime treatment and the use of small medical devices becomes difficult without reliable electricity. By harnessing the potential energy of a hanging mass, the Gravity Charger provides a reliable source of energy under any circumstances. With this reliability, medical outreach programs can better equip themselves to provide the best care.	Will Gonder, Luke Lindsay, George Montgomery	TIMOTHY HIGHT	2016	MECH	None	http://scholarcommons.scu.edu/mech_senior/59/
Power Flame	Thermoelectric phone charger designed specifically for developing communities in Central America.	Don Bollard, Alan Johnson, Nicholas Wenzel, Peter Wilke	HOHYUN LEE	2016	MECH	Central America	http://scholarcommons.scu.edu/mech_senior/61/
Cool Stove 1	Our aim is to create a reliable refrigeration solution that caters to the specific needs of individuals who live off-grid. We intend to do so by using the absorption cooler method, which we will power using the existing thermal energy emitted from a cook stove.	Paola Flores, Eduardo Melendez	HOHYUN LEE	2016	MECH	None	http://scholarcommons.scu.edu/mech_senior/55/
AquAdapt	Our team's project aims to create a smart sensor that will attach to any existing residential gas or electric water heater, increasing its efficiency to match that of a state-of-the-art water heater.	Scott Jansen, Michael Simmons, Joseph Singer	HOHYUN LEE	2016	MECH	None	http://scholarcommons.scu.edu/mech_senior/53/
Cool Stove 2	Our aim is to create a reliable refrigeration solution that caters to the specific needs of individuals who live off-grid. We intend to do so by using the absorption cooler method, which we will power using the existing thermal energy emitted from a cook stove.	Robert Bernal	HOHYUN LEE	2016	MECH	None	http://scholarcommons.scu.edu/mech_senior/56/

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Solar Panel Automated Cleaning Environment	The SPACE system seeks to maximize the energy generated from existing solar panels by removing dust and grime. Fully Autonomous, the SPACE system will provide a continuous clean at a fraction of the cost of manual labor.	Matthew Burke, Ryan Greenough, Daniel Jensen, Elliot Voss	ROBERT MARKS	2016	MECH	None	http://scholarcommons.scu.edu/mech_senior/62/
Low-Cost Sensor for the Detection of E. coli in Donated Human Breast Milk	The paper-based breast milk sensor is designed to test for the presence of pathogenic E. coli in donated human breast milk. The goal is to ensure distributed human breast milk post-pasteurization is safe for infants to consume without the use of traditional lab culturing methods.	Nina Morrison, Samantha O'Connor, Callie Weber	UNYOUNG (ASHLEY) KIM, MICHELE PARKER	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/64/
Detection of the Contaminant Phosphate in Drinking Water	Our project focuses on developing an affordable and easy-to-use microfluidic sensor that can accurately detect and pinpoint water sources contaminated with phosphate. Our device integrates with a hand-held analyzer and a mobile app that automate interpretation and mapping of our detection results.	Brandon Miura, Alex Wagner, Philip Wu	UNYOUNG (ASHLEY) KIM	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/66/
Immunomagnetic Capture and Release of Circulating Tumor Cells for Personalized Treatment	Our project involves optimizing the immunomagnetic capture and release of circulating tumor cells (CTCs). The project objective is to maximize the elution of captured circulating tumor cells from a magnetic sifter chip. This "liquid biopsy" would reduce the need for invasive tumor biopsies for personalized cancer treatment and diagnosis.	Nikita Bhatnagar, Abby Ribisi, Alanna Sewalt	EMRE ARACI	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/62/
Chimeric Antigen Receptor (CAR) Protein Tagged Exosomes for Targeted Leukemia Cancer Therapy	We aim to add chimeric antigen receptor (CAR), a known Leukemia-localization protein, to cell-secreted nanovesicles called exosomes to create a carrier for a safer, targeted Leukemia cancer treatment. This carrier construct exclusively targets cancer cells and eliminates the need for cellular carriers, resulting in fewer side effects.	Jacqueline Cummings, Nicole Jewett, Jennifer Yarp	BILL LU	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/57/
Exosome Membrane Bound TNF-Receptor for Treatment of Rheumatoid Arthritis	Rheumatoid arthritis (RA) is an autoimmune disease that causes painful inflammation of the synovium of patients' joints. Current treatments for RA are limited and have a variety of drawbacks. Thus, we are proposing a new treatment: TNF-receptors (TNFR) anchored onto the surface of exosomes, naturally secreted nanovesicles.	Kevin Curley, Natalie Duong	BILL LU	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/61/
Engineering Synthetic Antibody with Expanded Genetic Code	A peptide, predicted by an in silico library screen, will be engineered by site-specific incorporation of an unnatural amino acid to bind its cognate prostate cancer biomarker comparably to a monoclonal antibody. This modular synthetic antibody design creates a cost-effective, stable, and ethical tool for countless diagnostic and therapeutic applications.	Elizabeth Batiuk, Casey Kiyohara, Tracy Nguyen	ZHIWEN (JONATHAN) ZHANG	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/60/

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Pel-vise	Every year, there are more than 300,000 total-hip-replacement surgeries conducted in the United States. The Pel-vise is designed to reduce the rate of hip dislocations following these surgeries. In order to accomplish this, the device secures the initial orientation of a patient's hips.	Jonathan Huber, Christopher Wright	PRASHANTH ASURI	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/65/
Collagen Vitrigels for Corneal Replacement	A severe shortage of donor corneas has led to millions of untreated blind patients worldwide. We are working with Eyegenix, LLC, to develop an efficient protocol to create a biosynthetic cornea that can aid in the donor shortage and provide alternative transplant options.	Alexandra Krmpotic, Wil Morrison, Kevin Vuong	PRASHANTH ASURI, JAMES GRAINGER	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/58/
Biologic Therapeutic Patch	Our patch consists of three porous biocompatible layers that will control the delivery of superoxide dismutase, which is responsible for breaking down free radicals that result from cellular metabolism. By inhibiting the free radicals, we will be able to promote cell growth and enhance the beginning stages of wound healing.	Anjel Brown, Johnathan Der, Chloe Herczeg	MARYAM MOBED-MIREMADI	2017	BIOE	None	http://scholarcommons.scu.edu/bioe_senior/55/
Panelized, Pre-Engineered Light Frame Structural System	Rising housing costs require innovative solutions. Our structural system uses 2'x10' panels made of cold-formed steel and sheathing. These wall and floor panels are pre-engineered and prefabricated. Panelization lowers material, labor, and design costs.	Jack Dinkelspiel, Joyce Fung, Anna Harris, Kara Horwald	REYNAUD SERRETTE	2017	CIVIL	None	https://scholarcommons.scu.edu/ceng_senior/52/
Garbage Beam	This Senior Design Project aims to replace expensive steel reinforcement found in concrete with common, non-compostable waste to provide a lightweight and less expensive reinforcement while addressing the growing waste management issue in developing countries. Concrete beams reinforced with potential materials will be designed, built, tested, and analyzed.	Paula Back, Mariela Murillo	TONYA NILSSON	2017	CIVIL	None	https://scholarcommons.scu.edu/ceng_senior/54/
Syrian Refugee Shelter Design Competition	We are participating in the Disaster Shelter Competition hosted by John Brown University in which we designed and built a prototype shelter for refugees coming from the Middle East into Greece. We also created a budget and plans for housing 5,000 people in a refugee camp.	Julia Anderson, Katie Bipes, Antonio Gonzalez, Danny O'Malley, Colin Skaggs, La'akeaikawaiola Warren	TRACY ABBOTT, HISHAM SAID	2017	CIVIL	None	https://scholarcommons.scu.edu/ceng_senior/56/
Design of a Single Family Earthbag Home and Rooftop Rainwater Catchment System in Nepal	The 2015 earthquake in Nepal destroyed villages, which remain unbuilt. Additionally, subsistence farmers in Takure, Nepal, struggle to provide for their families due to a long dry season. To address these issues, we designed and traveled to Takure to construct a single-family, seismically resistant Earthbag house and rooftop rainwater catchment system.	Olivia Carreon, Nabila Farah, Makena Wong	EDWIN MAURER, TONYA NILSSON, SUKHMANDER SINGH	2017	CIVIL	Takure, Nepal	https://scholarcommons.scu.edu/ceng_senior/53/

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Porous Concrete Design	For our project, we are going to develop a mixture of porous concrete that will not only be functional, but also cost effective. By varying the aggregate, water-to-cement ratio and types additives, we hope to achieve maximum compression strength while having a certain amount of permeability.	Jonathan Ang, Erik Lindahl	EDWIN MAURER	2017	CIVIL	None	https://scholarcommons.scu.edu/ceng_senior/58/
Sustainable Recharge of Flint Lake	This project will focus on designing a pump and pipe system to bring water from a groundwater well over a hillside using either wind or solar power. This system will allow for the recharge and rehabilitation of Flint Lake, a dry pond located at the St. Francis Retreat, in San Juan Bautista, California.	Melene Agakanian, Cathy Cantoni	LAURA DOYLE, EDWIN MAURER	2017	CIVIL	San Juan Bautista, California	https://scholarcommons.scu.edu/ceng_senior/59/
Woodchip denitrification bioreactor for reducing nitrate in contaminated well water for St. Francis Retreat Center	A bioreactor system will be constructed and tested for its effectiveness in reducing nitrate in contaminated water supply for the St. Francis Retreat Center in San Juan Bautista, California. The goal is to recharge a nearby pond with water clean enough for human contact and to sustain the pond's ecosystem.	Andrew Highlander, Patrick Johnson	EDWIN MAURER	2017	CIVIL	San Juan Bautista, California	https://scholarcommons.scu.edu/ceng_senior/61/
Vrishabhavathi Valley Wastewater Treatment Plant System Upgrade	The project aims to increase the existing secondary treatment capacity of the Vrishabhavathi Valley Wastewater treatment facility in Bangalore, India. By adding modular activated sludge and secondary clarifier treatment options, the facility will be able to treat much more wastewater in order to meet the demands of the growing population.	Vijay Chellaram, Christian Miller	STEVEN CHIESA, HISHAM SAID	2017	CIVIL	Bangalore, India	https://scholarcommons.scu.edu/ceng_senior/60/
Decentralized Wastewater Treatment Plant in Bangalore, India	This project involved designing a medium-capacity decentralized wastewater treatment plant for the Kengeri region of Bangalore, India. The plant was designed to handle sewage needs of this area and to drain the treated water into the Vrishabhavathi River. Construction of the plant was then planned, estimated, and scheduled.	Cameron Akhavan, Simon Barbe, Alejandro Fernandez	STEVEN CHIESA, HISHAM SAID	2017	CIVIL	Bangalore, India	https://scholarcommons.scu.edu/ceng_senior/51/
Taking Afrobarometer Data	Afrobarometer is an organization that collects data on African infrastructure. This project will make this data available via tablets throughout Africa. Of particular interest to this project is data caching to enhance performance. This application allows users to access comprehensible data. Future work concerns the application's compatibility on commercial-size touchscreens.	Christen Nguyen, Sean Thomas,	SILVIA FIGUEIRA	2017	COEN	Africa	http://scholarcommons.scu.edu/cseng_senior/94/
Conversation Station	We are building a mobile application that will improve speed and personalization in conversations for people struggling with verbal communication. Many people diagnosed with autism and other disorders face daily challenges involving communication due to speech impediments. Our solution will speed up personalized communication by applying machine learning principles.	Davis Allen, Robert Bayer	YI FANG	2017	COEN	None	http://scholarcommons.scu.edu/cseng_senior/77/

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EHRaS	EHRaS is an inexpensive, mobile-first electronic health care record management system for ad hoc settlements such as refugee camps. EHRaS gets vital patient information to healthcare providers in the field quickly, securely, and cost effectively, especially in locales where traditional healthcare systems would be unfeasible.	Jack Kingsman, Evan Paul, Max Werner	AHMED AMER	2017	COEN	None	http://scholarcommons.scu.edu/cseng_senior/79/
Automating Libraries in Rural Areas of Africa	Friends of African Village Libraries (FAVL) is a nonprofit organization that establishes community libraries in rural areas of Africa. Our project will provide the librarians with a mobile application that automates librarian tasks such as checking in and out books, with the intention of easing their workload.	Matthew Johnson, Jose Santillan, Michael Walsh	SILVIA FIGUEIRA	2017	COEN	Africa	http://scholarcommons.scu.edu/cseng_senior/76/
AmbientLife	AmbientLife is a wireless sensor hub aiming to help patients who are recovering from addiction by measuring and transmitting basic vital signs to a smartphone or laptop via Bluetooth, where the results can be viewed by patient or physician. It also has the capability of harvesting power through radio frequency (RF).	Renee Bakker-Zenon, Ryan Scott, Shaun Suezaki	RAMESH ABHARI, LEYNA COTRAN	2017	ELEN	None	http://scholarcommons.scu.edu/elec_senior/31/
Cmag—IoT Baby Monitor	Our project is to design an IoT camera monitor that can detect early symptoms of sudden infant death syndrome (SIDS) and alarm parents and caregivers in order to decrease the response time and increase the survival rate when SIDS occurs.	Xiaoting Liu, Kyle Takeuchi	TOKUNBO OGUNFUNMI, SHIVAKAUMAR MATHAPATHI	2017	ELEN	None	http://scholarcommons.scu.edu/elec_senior/34/
Solar Microgrid in Togo	We are designing a solar microgrid for a selected village in Togo, Africa, called Danyi Mempassem. We identified the primary needs and desires of the villagers to be lights, cell phone chargers, and television. We are designing a system that will best provide them with electricity for their needs.	Alexander Mayorkis, Christian Jason Wintery	TIMOTHY HEALY, CONSTANT BOSSOU, S.J.	2017	ELEN	Togo	http://scholarcommons.scu.edu/elec_senior/37/
Smart and Sustainable Aquaponics	We are building a sustainable and automated aquaponics system, which combines aquaculture (raising fish) and hydroponics (soil-less growing of plants) to achieve greater food production density and efficiency. We are using solar energy harvesting techniques and embedded systems to increase the sustainability and reduce the energy investment of the system's user.	Kevin Claggett, Justin Goh, Ryan Toal	MICHAEL MCELFRESH, SALLY WOOD	2017	ELEN	None	http://scholarcommons.scu.edu/elec_senior/36/
Vital Sign Multi-Sensor Kit for Use with Telemedicine in Developing Countries	Our objective is to develop a kit equipped with sensors that will be used to take a patient's blood pressure, heart rate, oxygen concentration, and blood glucose concentration non-invasively. This kit will then allow doctors to have access to a patient's vital signs through most mobile devices.	Natalie Arrizon, Jose Hernandez, Antonio Maldonado-Liu, Alejandra Pacheco	UNYOUNG (ASHLEY) KIM, TOKUNBO OGUNFUNMI	2017	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/35/

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SMS-Enabled EKG for Use in Developing Countries	To fully meet the screening needs of rural populations, we propose a two-part solution involving a simplified electrocardiogram device that will utilize cellular networks prevalent throughout the world to send and receive EKG waves to be evaluated by doctors in developing nations.	Augustus Boling, Gabriel Christ, Shachi Kakkar, Michael McElroy	DANIEL LEWIS, SARAH KATE WILSON	2017	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/32/
SCUCube	We have designed a small satellite (CubeSat) to provide communications services to areas suffering from natural disasters, utilizing a semi-passive gravity gradient attitude control system.	Matthew Condino, Andrew Drape, Evan Eberheart, Cooper McDonnell, Brayton McKnight, Isaac McQuillen, James Olwell, Laura Tschudy	CHRISTOPHER KITTS, MICHAEL TAYLOR	2017	Interdisciplinary	None	http://scholarcommons.scu.edu/idp_senior/31/
Poly Pelletizer	We are using recycled water bottles to create polyethylene terephthalate (PET) pellets. These pellets are to be utilized for a past Senior Design Project called the AKAbot, which will turn them into usable 3D printing filament.	Logan Costa-Smith, Ian Maltzer, James Martino	TIMOTHY HIGHT, PANTHEA SEPEHRBAND	2017	MECH	None	http://scholarcommons.scu.edu/mech_senior/70/
Forge 2.0: Clean-Burning Cookstove	The objective of this project is to build a clean-burning cookstove for rural Nicaraguans. The purpose for building this stove is to help reduce respiratory illness caused from cooking with biomass. Our stove utilizes gasification to burn off harmful emissions, reducing negative environmental impact caused by burning wood.	William Gebb, Emily Gray-Gribble, Matthew Lee, Thai Ha Sloan	ROBERT MARKS	2017	MECH	Nicaragua	http://scholarcommons.scu.edu/mech_senior/68/
Human-Powered Concrete Mixer	Amigos for Christ, based in Chinandega, Nicaragua, requires a mobile, cheap, and efficient concrete-mixing method to replace the existing method of hand-mixing with shovels. Our Human-Powered Concrete Mixer provides all of these features, allowing Amigos for Christ to complete projects—such as building schools and feeding centers—more quickly.	Madelyn Bustard-Gustafson, Nathan Metzger, Connor McLoughlin, Nicholas Szychowski	ROBERT MARKS	2017	MECH	Chinandega, Nicaragua	http://scholarcommons.scu.edu/mech_senior/69/
CERVIS: Cervical Cancer Early Response Visual Identification System	CERVIS is a cervical cancer diagnostic developed for use in low resource settings. Our device screens for biomarkers in the urine and provides a simple colorimetric readout that helps diagnose cervical cancer and distinguish it from the human papillomavirus infection.	Ivy Fernandes- Bio Eng Evangelia Bouzos - Bio Eng Marina Predovic - Bio Eng Alyssa Miawotoe - Biology Lea Daran - Biology Christina Kraus - Public Health Science	Asuri, Ph.D., Prashanth Parker, PhD., Michele	2018	Multidisciplinary in partnership with E.W.H.	Tanzania	https://scholarcommons.scu.edu/bioe_senior/71/
MilkGuard: A Low-Cost PaperBased Sensor to Detect the Presence of E. Coli in Donated Human Breast Milk	Our device utilizes an enzyme-substrate, colorimetric assay on a paper-based platform to detect the presence of E.coli in donated human breast milk. The project aims to reduce the cost and time of traditional bacterial detection methods in human breast milk banks.	Margaret May - Bio. Eng. Nicholas Kikuchi - Bio. Eng. Matthew Zweber - Bio. Eng. Sara Kelly - Public Health Science Taylor Maya Tromburg - Environmental Studies Karen Mac - Public Health Science	Kim, Ph.D., Ashley Mobed-Miremadi, PhD Maryam Parker, PhD., Michele	2018	Multidisciplinary in partnership with E.W.H.	India	https://scholarcommons.scu.edu/bioe_senior/78/
Diagnostic Color Strip Reader for World Health Partner Clinics	We are creating an application designed to read and analyze fluid color strips and return medical results and diagnostics.	Geminiano Yabut - Comp. Eng. Jisoo Park - Comp. Eng. Steven Hu - Comp. Eng.	Kim, Ph.D., Ashley Figueira, Ph.D., Silvia	2018	Comp. Eng.	India	https://scholarcommons.scu.edu/cseng_senior/105/
Urinalysis Screening for Rural Communities	The Urinalysis Screening for Rural Communities Project uses urine strip tests to perform health screenings for patients and communicates results with the mobile application.	Dana Bren-Cardali - Bio Eng. Lilian Dao - Bio Eng. Jeff Destruel - Bio Eng. Ryan Fernandez - Bio Eng.	Kim,Ph.D. Ashley	2018	Bio. Eng.	India	https://scholarcommons.scu.edu/idp_senior/47/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Vibration Attenuating Medical Platform (VAMP)	Emergency response vehicles are often traveling at high speeds and over uneven terrain, causing vibrations, discomfort or even further injuries to patients. Our platform is designed to attenuate part of the vertical motion, and it can be retrofitted into existing vehicles.	Cameron Fisch- Mech. Eng. Noah Friedman - Mech. Eng. Tyler Gambill - Mech. Eng. David Harris - Mech. Eng. Kelek Olais - Mech. Eng.	Restivo Ph.D., Gaetano	2018	Mech. Eng.	No specific location	https://scholarcommons.scu.edu/mech_senior/84/
Engineering Synthetic Antibody for Prostate Cancer Detection	Monoclonal antibodies, a standard in therapeutics and diagnostics, present ethical and economic challenges. Synthetic antibodies have potential to circumvent these challenges, allowing cost-effective, scalable production using E. Coli. We are engineering and quantifying the binding activity of a synthetic antibody for prostate cancer detection to improve current diagnostic techniques.	Kimberley Gonzalez - BioEng Tatum Prosswimmer - BioEng Cassandra Stawicki - BioEng	Zhang, Ph. D., Jonathan	2018	Bio. Eng.	No specific location	https://scholarcommons.scu.edu/bioe_senior/75/
Camera-Based Distance Sensor	Our team has designed an electrical component that uses a camera and laser point to sense distance up to 10 meters.	Evan Holmes - Elec. Eng. Kai Schmidt - Comp. Eng.	Wood, Ph. D. Sally	2018	Interdisciplinary	No specific location	https://scholarcommons.scu.edu/idp_senior/37/
Active Auxetic Heel Support for Achilles Tendon Therapy	We are designing a force-activated support for Achilles tendinitis. It will include metamaterials that will not compress when force is applied, allowing the individual to be active and participate in daily activities without further injury.	Anna Hinrichs - BioEng Kseniya Malukhina - BioEng Ishaan Sharma - BioEng Micaela Vierra - BioEng	Araci, Ph. D., Araci	2018	Bio. Eng.	No specific location	https://scholarcommons.scu.edu/bioe_senior/70/
Skin Graft Expansion Device	Skin graft meshers enable the expansion of graft surface area for the treatment of severe burns. However, current devices are expensive and time consuming. We aim to design an affordable, modular, and autoclavable meshing device that improves the overall success and quality of treatments in both high- and lowresource settings.	Josée Fournier - BioEng Madeline Krenek - BioEng Maggie Alt - BioEng Will Paton - BioEng Sophia Sparagana - Public Health Kaileen Cruden - Public Health	Asuri, Ph.D., Prashanth Parker, PhD., Michele	2018	Multidisciplinary in partnership with E.W.H.	No specific location	https://scholarcommons.scu.edu/bioe_senior/77/
At-Home Neurofeedback Treatment	Neurofeedback is a therapy that can be used to treat depression, anxiety, ADHD, and other disorders. It uses EEG signals to self-regulate brain function; however, it is a costly treatment. Our project is a device that allows for cheaper, home-based neurofeedback treatment.	Sanah Imran - Elec. Eng. Frank Cannizzaro - Elec. Eng.	Krishnam, Ph.D. Shoba	2018	Elec. Eng.	San Jose, Ca. US	https://scholarcommons.scu.edu/elec_senior/40/
Pressure Ulcer Prevention System	P.U.P.S. is designed to prevent injuries such as pressure ulcers from bedbound patients. Based on information collected from on-body sensors, it will provide automated actions such as notifying a caregiver. It will then display the information on an easy to understand interface.	Ojus Rao - Comp. Eng. Rey Palomares - Elec. Eng.	Lewis, Ph. D. Dan Wood, Ph. D. Sally	2018	Interdisciplinary	No specific location	https://scholarcommons.scu.edu/idp_senior/42/
The Human Keyboard	The objective of our project is to demonstrate the validity of mapping precise arm and hand muscle movements through the use of EMGs. We also strive to demonstrate a software library that can accurately track hand and finger movements.	Derek Char - Elec. Eng. Thomas Chung - Elec. Eng./Comp. Eng Allen Pai - Elec. Eng. Alex McKee - Bio.Eng.	Wood, Ph. D. Sally Ahmed, Ph.D. Amer Yan, Ph. D. Yuling	2018	Interdisciplinary	No specific location	https://scholarcommons.scu.edu/idp_senior/44/
Unsupervised Parkinson's Disease Assessment	Our goal is to create a device that will utilize a patient's daily actions, instead of choreographed actions, to monitor and quantify Parkinson's disease based on part of the motor control section of the UPDRS scale.	Alexander Adranly - Comp. Eng. Senbao Lu - Bio. Eng. Yousef Zoumot - Comp. Eng.	Dezfouli, Ph. D. Behnam Yan, Ph. D.,Yuling	2018	Interdisciplinary	No specific location	https://scholarcommons.scu.edu/idp_senior/46/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Hedhi Help: Menstruation Education for Rural Africa	Our goal is to create an Android application aimed at teaching young Kenyan women about women's health, specifically menstruation. Our intention is to eradicate the stigma associated with menstruation as well as to provide women with resources so that they can be better equipped to handle the challenges of menstruation.	Kelsey Pasco - Comp. Eng. Sarah Pagnani - Comp. Eng. Sarek Sotelo Jimenez - Comp. Eng. Brandon Smith - Comp Eng. Arbelina Bebla - Public Health Science Elizabeth Smith - Public Health Science Mira Diwan - P.H. -Psychology	Figueira, Ph.D., Silvia Parker, PhD., Michele	2018	Multidisciplinary in partnership with E.W.H.	Uganda	https://scholarcommons.scu.edu/cseng_senior/108/
Virtual Museum for NACHA	Art and knowledge from the country of Cameroon is in danger of being lost due to political unrest and poor artifact conservation. To prevent this, we are creating a website where people all over the world will be able to view the unique culture of the Nso people of Cameroon.	Alisa Hawthorne - Comp. Eng. Sonali Chaudhry - Comp. Eng.	Figueira, Ph.D., Silvia	2018	Comp. Eng.	Cameroon	https://scholarcommons.scu.edu/cseng_senior/125/
Climate Smart Farming in East Africa	We are working with the nonprofit organization, Collaborative Enterprise Exchange, to design and implement a climate smart farming system in rural Uganda. This sustainable system, which will include an aquaponic system for growing vegetables and raising fish, will allow the women to provide for their families and increase their monthly income.	Cristina Whitworth - Civil Eng. Lauren Oliver - Civil Eng.	Doyle, Ph.D., Laura	2018	Civil Eng.	Uganda	https://scholarcommons.scu.edu/ceng_senior/65/
Frugal Clay Press for Nicaragua	The Frugal Clay Press for Nicaragua is a human-powered device that allows clay brick makers in Ciudad Dario, Nicaragua, to more densely compact and rapidly produce bricks. This design is composed of sustainable and locally accessible materials that make the clay press especially appropriate for implementation in rural communities.	Kevin Ellis - Mech. Eng. Milan Copic - Mech. Eng. L. Isaac Marcia - Mech Eng. Rafael Guerrero - Mech Eng.	Hight, Ph.D., P.E., Tim K	2018	Mech. Eng.	Nicaragua	https://scholarcommons.scu.edu/mech_senior/79/
Cob Property Analysis	The goal of this project is to work alongside the Cob Research Institute to help facilitate the use of cob in the United States building code. Cob structures are needed in today's society because they are relatively inexpensive and ecofriendly.	Gabi Brunello - Civil Eng. Jose Espinoza - Civil Eng. Alexandra Golitz - Civil Eng. Massey Burke Anthony Dente	Nilsson, Ph.D Tonya	2018	Civil Eng.	No specific location	https://scholarcommons.scu.edu/ceng_senior/67/
Buturi Solar	Our objective is to design and implement a solar microgrid system for a school building in Buturi, Tanzania. We will harvest enough solar energy each day to power 50 light bulbs for 6 hours, a single full charge for 25 laptops, and a single full charge for 10 cellular phones.	Patrick Mihelic - Elec. Eng. Alfredo Munoz - Elec. Eng. Ruben Tapia - Elec. Eng.	Healy, Ph.D., Timothy	2018	Elec. Eng.	Tanzania	https://scholarcommons.scu.edu/elec_senior/41/
Rainwater Capture and Purification System for Rural Tanzania	We designed a rainwater capture and purification system for a rural village located in the Buturi region of Tanzania. The project includes designs for gutters, ferroconcrete storage tank, and slow sand filter. The design team addresses the needs of the villagers by working with the nonprofit organization, The Buturi Project.	Matthew Sasaki - Civil Eng. Audrey Gozali - Civil Eng. Nathan Miyashiro - Civil Eng.	Maurer, Ph.D., P.E., Edwin Doyle, Ph.D., Laura	2018	Civil Eng.	Tanzania	https://scholarcommons.scu.edu/ceng_senior/69/
Dehydr8	Dehydr8 is an alternative method of food preservation for off the grid communities. The system relies on solar energy to dehydrate fruits and vegetables.	Ian Tierney - Mech. Eng. David Kim - Mech. Eng. Nicholas Lurie - Mech. Eng. Catherine Murray - Mech. Eng. Logan Smith - Mech. Eng.	Hight, Ph.D., P.E., Tim K	2018	Mech. Eng.	Brazil	https://scholarcommons.scu.edu/mech_senior/78/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Auxetic Metamaterial Design for Expanding Backpack Straps	This project designs a metamaterial to improve backpack strap comfort and safety for Nepalese porters in the extreme working conditions of the Himalayan Mountains. Auxetic metamaterials have a negative Poisson's ratio due to their geometric structure. The strap will widen under increased load, spreading the forces over a larger area.	Bethany Hsu - Mech. Eng. Derek Lau - Mech. Eng. Jamie Sahlberg - Mech. Eng. Titus Whitehead - Mech. Eng. Alex Winter - Mech. Eng. Leslie Yang - Mech. Eng.	Taylor Ph.D., Michael	2018	Mech. Eng.	Nepal	https://scholarcommons.scu.edu/mech_senior/77/
Enhancing Mobility and Independence of Wheelchair Users	Our design for wheelchair seat and armrest modification to improve user mobility and independence uses an electric scissor jack mechanism to raise the seat and a track system to slide it past the wheels. These modifications help users achieve daily tasks such as accessing chairs, beds, toilets, and car seats.	Paul Nauleau - BioEng Briar Blake - BioEng	Asuri, Ph.D., Prashanth Kittz, Ph.D., Christopher	2018	Bio. Eng.	No specific location	https://scholarcommons.scu.edu/idp_senior/39/
Cob: A Sustainable Building Material	Cob, a sustainable building material, has gained popularity due to its low costs and low environmental impact. This project tests the capabilities of the material through large-scale wall testing as well as small-scale sample testing.	Joseph Novara - Civil Eng. Brandon Popovec - Civil Eng. Daniel Eberhard - Civil Eng.	Nilsson, Ph.D Tonya	2018	Civil Eng.	No specific location	https://scholarcommons.scu.edu/ceng_senior/66/
Halo	Our project aims to create a device powered by energy harvested from its environment that can monitor and log air pollution levels. This device can be used in homes and cities regardless of current infrastructure to promote awareness of individuals' exposure to harmful particulates.	Samantha Morehead Naeem Turner-Bandele Benjamin Lampe Taylor Mau	Shoba, PH.D., Krishnan	2018	Elec. Eng.	Bay Area	https://scholarcommons.scu.edu/idp_senior/40/
Communication System for Firefighters	We present a web application on Android devices for first-responders to communicate with their team and compile on-site media. The application aims to increase the efficiency and accuracy of report generation for teams of first-responders.	Nick Goodpaster - Comp. Eng. John-Paul Hurley - Comp. Eng. Griffin Moede - Comp. Eng. Steven Booth - Comp. Eng.	Figueira, Ph.D., Silvia	2018	Comp. Eng.	Bay Area	https://scholarcommons.scu.edu/cseng_senior/102/
SpotMe Emergency Locator Service	During or after a disaster, people are sometimes stranded and need help to be found. We are developing a system through which stranded people can ask for help and rescuers can locate them.	Zain Umerani - Comp. Eng. Kunal Bhimjiyani - Comp. Eng. Arya Faili - Comp. Eng.	Figueira, Ph.D., Silvia	2018	Comp. Eng.	TBD	https://scholarcommons.scu.edu/cseng_senior/123/
Phoenix Y-6	Our mission is to design and fabricate a VTOL, fixed-wing drone for use by emergency first-responders. This vehicle is designed for uses that include surveying wildfires and spotting vehicular accidents. We are developing a working prototype that will be able to collect and relay this important data.	Alastair Hood - Mech. Eng. John Strong - Mech. Eng. Sean Backes - Mech. Eng. Bruce Iverson - Mech. Eng. Brian Meier - Mech. Eng.	Ayoubi, Ph.D., Mohammad Ali	2018	Mech. Eng.	Bay Area	https://scholarcommons.scu.edu/mech_senior/80/
6U CubeSat Platform for Disaster Relief Communications	Natural disasters often devastate communications infrastructure, impeding relief efforts. The SCUCube mission aims to re-establish communications between locals and emergency responders via amateur radio. We have developed and verified the mechanical subsystems of a 6U nanosatellite platform for this continuing mission.	Uche Agwu Duncan Bradley Corey Brown Mani Gnanasivam Grant Mishler Steven Parks	Kitts, Ph.D., Chris Michael, Ph.D.,Taylor	2018	Mech. Eng.	Bay Area	https://scholarcommons.scu.edu/mech_senior/76/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Analysis of Structural Components During Cyclical Loading of Steel Reinforced Earthbag Construction	We present a pilot method for coupling reinforcing steel in earthbag wall construction. Benefits of earthbag wall construction include use of alternative building materials, frugal cost, and ease of construction. The goal of the project is to establish predictable structural standards for eventual inclusion in residential building code.	Emil Huebner-Schurch - Civil Eng. Ethan Jensen - Civil Eng. Noah Strong - Civil Eng.	Nilsson, Ph.D., Tonya	2018	Civil Eng.	Nepal	https://scholarcommons.scu.edu/ceng_senior/63/
Cyclic Testing of Reinforced Earthbag Walls	We present the design, construction, and testing of earthbag walls for earthquake resistance properties to support research and advance inclusion of this frugal construction method in building codes. The project required comprehensive long-term planning, designing lab tests to validate field observations, and the design of wall base, reinforcement, and connections.	David Aguilar Rodriguez - Civil Eng. Jeffrey Stein - Civil Eng. Taylor Darby - Civil Eng.	Nilsson, Ph.D., Tonya	2018	Civil Eng.	Nepal	https://scholarcommons.scu.edu/ceng_senior/68/
B.O.G.G.L.E.S.: Boundary Optical GeoGraphic Lidar Environment System	We are creating a proof of concept system that scans the general layout of a room and superimposes the rendering of the scanned space onto a mixed reality headset. This will provide first responders with better spatial awareness in life or death situations.	Isaac Jorgensen - Comp. Eng. Carl Maggio - Comp. Eng. Miguel Chapa - Elec. Eng. Evan Hoerl - Elec. Eng.	Wilson, Ph. D., Sarah Amer, Ph., Ahmed	2018	Interdisciplinary	No specific location	https://scholarcommons.scu.edu/idp_senior/36/
RF Roaming System Locator: A Modular Omnidirectional Antenna System	We present a 3 sector antenna location tracking system. This system will track a 915 MHz signal and display the location on a GUI.	George Stathakis - Elec. Eng. Josh Sullivan - Elec. Eng. Christian Ayscue - Comp. Eng.	Ramesh, Ph. D. Abhrai Amer, Ph.D. Ahmed	2018	Interdisciplinary	No specific location	https://scholarcommons.scu.edu/idp_senior/43/
Human-centered Electric Prosthetic (HELP) Hand	Design of an electrically powered, bio-controlled prosthetic hand for amputees in India. A versatile, single actuator prosthesis that can be easily manufactured in India at a dramatic cost reduction from the current standard while maintaining performance measures near those found in other modern prostheses.	Shiyin Lim- Bioeng Jamie Ferris- Mech Michael Mehta- Mech Evan Miscuraca- Mech Mira Diwan- Public Health Kirsten Dodroe- Public Health/biology Maddie Bolinger- Public Health/biology	Asuri, Ph.D., Prashanth Kitts, Ph.D., Christopher	2019	Interdisciplanary-partnered with Engineering World Health	India	https://scholarcommons.scu.edu/idp_senior/52/
CERVIS: Cervical Cancer Early Response Visual Identification System	Our project aims to address the high rates of cervical cancer in the developing world. We are trying to develop a low-cost, minimally invasive, visual identification device that tests for bacterial changes in the vaginal microbiome as an indication of cervical cancer.	Claire Hultquist- Bioeng Hallie Mcnamara- Bioeng Julia Lanoha- Bioeng Rosie McDonagh- Bioeng Mason Seely- Biology Dave Heil- Public Health/Biology Nicola Gerbino- Public Health/Spanish	Asuri, Ph.D., Prashanth Parker, PhD., Michele Stepens, PhD., Craig	2019	Bioengineering-partnered with Engineering World Health	No specific location	https://scholarcommons.scu.edu/bioe_senior/83/
AI Remote Medical Diagnosis	We've developed an app with a machine learning based backend that brings medical care to patients who don't have accessible health care facilities. Our app is focused on diagnosing skin cancer, and allows anyone anywhere to take a picture of a mole and get a pre-mature checkup on the spot.	Gregory Maulick- Comp. Eng Juliana Shihadeh- Comp. Eng	Ogunfunmi, Ph.D. Tokumbo Figueira, Ph. D., Silvia Yan, Ph. D., Yuling	2019	Computer Engineering	No specific location	https://scholarcommons.scu.edu/cseng_senior/132/
NavSense: Computer Vision for the Visually Impaired	For our project, we propose an assistive device that improves navigation for the visually impaired in day-to-day life, and supplements existing technology. Our product, NavSense, provides near real time object identification and context to the user through both tactile and auditory feedback.	Michael Dallow- Comp. Eng Daniel Okazaki- Comp. Eng Jack Ryan- Comp. Eng	Dezfouli, Ph. D. Behnam	2019	Computer Engineering	No specific location	https://scholarcommons.scu.edu/cseng_senior/146/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Doorbell for the Hearing Impaired	We aimed to design an architecture for an affordable doorbell system for the hearing impaired. Present solutions are expensive or are not taking advantage of current technology. Our solution hopes to allow hearing impaired individuals to be more involved in their communities and homes.	Dominic Magdaluyo- Comp. Eng Shannen Edwin- Comp. Eng	Dezfouli, Ph. D. Behnam	2019	Computer Engineering	No specific location	https://scholarcommons.scu.edu/cseng_senior/136/
GalapaGuide	GalápaGuide is a system designed for the Galápagos Islands' Ministry of Tourism. It will enable ecology/tourism guides to report issues around the islands, which will be tracked and reported by an aggregation tool.	Paul Ahrens- Comp. Eng Mason Bruce- Comp. Eng Stephen Pacwa- Comp. Eng Neel Sampemane- Comp. Eng	Figueira, Ph.D., Silvia	2019	Computer Science and Eng	Galapagos	https://scholarcommons.scu.edu/cseng_senior/139/
GalapaGo!	The Galápagos Islands are a tourism hub in Ecuador that greatly benefit economically from the tourism industry. GalápaGo! will assist tourists with navigating the island by providing information on hotels, restaurants, tourist attractions, and cultural customs.	Jeffrey Nguyen- Comp. Eng Sally Park- Comp. Eng Manuel Sanchez- Comp. Eng	Figueira, Ph.D., Silvia	2019	Computer Science and Eng	Galapagos	https://scholarcommons.scu.edu/cseng_senior/138/
UFEEL: Understanding Feelings Effectively and Enhancing Life	We are creating a mobile mental health application for Santa Clara University students. The application, UFEEL, will try to break the social stigma around mental health and will combine Cowell Center resources and research from other mental health professionals to provide better mental health aid.	Paul Jin- Comp. Eng Dara O'Sullivan- Comp. Eng Bobby Kresge- Comp. Eng Claire Capeloto- Public Health Tatiana Valentine- Biology	Figueira, Ph.D., Silvia Parker, PhD., Michele	2019	Computer Science and Eng- partnered with Engineering World Health	Santa Clara, CA	"Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/"
Agora Teaching App	An interactive mobile app to provide online courses to educators in Lima, Peru, through the organization, Agora. The courses will encourage educators to continue their own education and teach their students with new methodologies such as project-based learning.	Casey Xuereb- Comp. Eng Sam Burns- Comp. Eng Daisuke Kurita- Comp. Eng	Figueira, Ph.D., Silvia	2019	Computer Science and Eng	Lima, Peru	https://scholarcommons.scu.edu/cseng_senior/131/
Top Level Mesh	We are designing a management system for mesh networks. Our solution allows users to easily understand and control the flow of data packets via a web interface.	Tristan Islam- Comp. Eng Matt Jasaitis- Comp. Eng	Dezfouli, Ph. D. Behnam	2019	Computer Science and Eng	Uganda	https://scholarcommons.scu.edu/cseng_senior/154/
Synergy: An electricity usage monitoring system	Synergy is a modular Energy Monitoring and Visualization system that monitors your electrical energy usage securely and then displays that data in real time. The system can be used in single residences, expanded to larger complexes that monitor the electrical energy usage of multiple buildings at the same time.	Pearce Ropion- Comp. Eng Sarah Johnson- Comp. Eng	Dezfouli, Ph. D. Behnam	2019	Computer Science and Eng	Santa Clara, CA	https://scholarcommons.scu.edu/cseng_senior/150/
Home Book	Our project is a mobile application that uses GPS coordinates to generate a permanent address, which can then be shared with other people and services. These addresses will be stored on the application, and can be viewed alongside details of the location at any time by the users.	Stephen Poth- Comp. Eng Simon Stauber- Comp. Eng Jake Vargas- Comp. Eng	Figueira, Ph.D., Silvia	2019	Computer Science and Eng	Cameroon	https://scholarcommons.scu.edu/cseng_senior/142/
Tiny Home Innovations: Alternative Uses and Designs with the San Jose Bridge Housing Community	Our project investigates, analyzes, and develops alternative tiny home uses for the City of San Jose's Bridge Housing Community Initiative. This includes detailed retrofit modifications to the current cabin design if the program is discontinued and a fully engineered modular design if the program is expanded.	John O'Hagan- Civil Jackson Bordelon-Civil	Nilsson, Ph.D Tonya	2019	Civil Eng	San Jose, CA	https://scholarcommons.scu.edu/ceng_senior/78/
Design of a Groundwater Irrigation System for Sustainable Agriculture	This project aims to design and build a replicable, sustainable irrigation system to help communities kickstart their agricultural economy. This system will allow villagers to grow crops such as cassava, okra, and squash during the dry season to help alleviate food insecurity while providing a source of income for farmers.	Ciara Murphy- Civil Ricky Matthews- Civil Peter Koros- Civil	Maurer, Ph.D., P.E., Edwin Doyle, Ph.D., Laura	2019	Civil Eng	Zwedru, Liberia	https://scholarcommons.scu.edu/ceng_senior/77/

Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Sustainable and Potable Water for Valle Del Paraíso	Implementing sustainable, affordable, and local water filtration devices in a rural community located in Puebla, Mexico. These individual household-scale devices provide a reliable means for the families to collect and filter rainwater throughout the year, replacing their weekly expense of purchasing water bottles from the main city.	Nikhita Jingar- Civil Angela Chang- Civil	Doyle, Ph.D., Laura	2019	Civil Eng	Puebla, Mexico	Thesis not available. To check current availability go to http://scholarcommons.scu.edu/eng_senior_theses/
Design of an Urban Garden Aquaponics System	A low-maintenance soil-less vegetable and fish farming system intended to increase nutrition for food insecure communities in San Jose, California. This aquaponics system is off-the-grid and powered by solar panels with an integrated sensor network that measures different water conditions and transmits information to the end user.	Sydney Thompson- Mech Riley Albright-Borden- Mech James Wang- Electrical Petra Nelken- Public Health/Poli Sci Sophia Sparagana- Public Health/Gender Studies	Doyle, Ph.D., Laura Lee, Ph.D., Hohyun Wilson, Ph. D., Sarah	2019	Interdisciplanary	San Jose, CA	https://scholarcommons.scu.edu/idp_senior/50/
BiciTaxi	Our project was to create a two-passenger attachment for a standard bicycle. This attachment connects to any standard bicycle at the seat, has storage capabilities, and provides an alternative to walking on muddy unpaved roads. Our goal was to create an affordable, durable, and easily serviceable attachment.	Alesis Gonsalves- Mech Brenden Stone- Mech Sean Flanagan- Mech Tianhao Jiang- Mech	Restivo Ph.D., Gaetano	2019	Mechanical Eng	Puebla, Mexico	https://scholarcommons.scu.edu/mech_senior/87/
Pedal 4 Purification	Pedal 4 Purification is a universally adaptable water purification and transportation system optimizing the centripetal pedal force of a bicycle. Partnering with Maya Pedal Guatemala, a non-profit organization focused around helping those in need to gain access to potable drinking water while promoting community involvement of women and children.	Coleton Rodd- Mech Matt Lograsso- Mech Cory Yamagata- Mech Jonathon Keyes- Mech	Restivo Ph.D., Gaetano	2019	Mechanical Eng	Ixtapa, Gautemala	https://scholarcommons.scu.edu/mech_senior/89/
CERVIS: Cervical Cancer Early Response Visual Identification System	The aim of CERVIS is to develop a low-cost, minimally invasive, highly specific screening device to detect cervical cancer in a low-resource setting. Our target population is Kenya. The device will indicate the presence of fusobacteria, which is highly correlated to cervical cancer diagnosis. Detection by our device will indicate the need for further diagnostic tests, including pap smears or VIA. Pap smears are costly and invasive, and limited access to resources can inhibit the number of available tests in low and middle-income countries (LMICs). We aim to create a clinically administered device that addresses the specific needs of both women and clinicians, keeping in mind ethical considerations. The test will be administered in an urban setting initially to ensure access to further diagnostics and treatment if necessary. Along with the device, an educational component is being developed by the Public Health team to focus on prevention of cervical cancer.	Kira Palazzo - Bioeng Juliana Trujillo - Bioeng Lauren Serfas - Bioeng William Nelson - Public Health/Biology Lauren Cherrey - Public Health	Asuri, Ph.D., Prashanth Parker, PhD., Michele Stepens, PhD., Craig	2020	Bioengineering partnered with Engineering World Health	Kenya	https://scholarcommons.scu.edu/bioe_senior/92/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Height-measuring Medical Device for Pediatric Health	The goal of this project is to develop a portable and low-cost height-measuring medical device, also known as a stadiometer, that will be used to accurately measure and report height data to health practitioners, allowing them to better monitor the growth patterns of pediatric patients. Currently, the most common stadiometers implemented in health clinics are simple manual measuring devices mounted to a wall. Some issues which often occur include low accuracy and lack of consistency between height measurements. This may be caused by young patients being uncomfortable standing straight against a wall for a length of time, or measuring practices from nurses who may be shorter than their patients. Therefore, these stadiometers have great potential to be improved. This portable stadiometer will utilize various electrical components to measure the height of the patient including a distance/proximity sensor (Infrared, Ultrasound, LED, etc.), an accelerometer that positions the sensor parallel to the floor for an accurate reading, a microcontroller to control these electrical components, an LCD or other screen for immediate height measurement readout, and a Bluetooth component to transfer the height recording to an online database.	Valerie Woo- General Eng	Kuczenski, PhD., Jessica	2020	General Eng	Redwood City, CA	https://scholarcommons.scu.edu/idp_senior/64/
HelpHand	India has a large population of amputees, with estimates of approximately 1 million individuals living with some form of amputation. Not only do these individuals struggle with the loss of freedom and ability to work, but they also face social stigma, discrimination, and even ostracism from the community. Therefore, we are partnering with Bhagwan Mahaveer Viklang Sahayata Samiti (BMVSS) in order to build a low-cost, electrically-powered, and anthropomorphic prosthetic hand for transradial, unilateral amputees. BMVSS is a Jaipur-based non-profit organization that has distributed almost 1.8 million prosthetics to people in 27 different countries, all free of cost. Through this project, we are hoping to empower those living with transradial amputations to be able to perform all the activities of daily life with minimal impairment, potentially rejoin the workforce, and to regain their confidence.	Tehmi den Braven - Bioeng Seamus Hudnut - Bioeng Bradon Hong - Bioeng Taylor Yamane - Mech Alonzo Billips - Mech Garrett Stone - Mech Fatima Israr - Public Health	Asuri, PhD., Prashanth Kitts, PhD., Christopher Parker, PhD., Michele	2020	Multidisciplinary: Bioengineering, Mechanical Eng partnered with Engineering World Health	India	https://scholarcommons.scu.edu/idp_senior/67/
MilkGuard	The objective of this project is to create and validate a paper-based test that successfully differentiates between bacteria-free samples of breast milk from samples containing E. coli with high sensitivity. The pasteurization process is incredibly expensive, so in developing nations they can not pasteurize every sample. Our project will alleviate this financial burden on the milk banks in developing nations by allowing them to quickly and easily test every milk sample so they can determine whether or not to pasteurize the sample. Our objectives will focus on making the test more reliable, sensitive, and reproducible through a paper-based test similar to a pH strip to help developing nations.	Emily Brogan - Bioeng Ariana Haddad - Bioeng Bridget Woody - Bioeng	Kim, PhD., Ashley Mobed-Miremadi, PhD., Maryam	2020	Bioengineering	Developing Nations	https://scholarcommons.scu.edu/bioe_senior/96/

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Project name	Description	Students	Prof./Coordinator	Year	Department	Location	Thesis URL
Design of Cultural Preservation Center for Nez Perce Tribe	Design of a set of preliminary economical structural plans following a general set of architectural plans given by the Nez Perce tribe for the Cultural Resource Program in the form of a Cultural Preservation Center located within the Nez Perce Tribal Reservation community in Lapwai, Idaho. The project will also incorporate an environmental impact report for the structure with regards to the effects on the community in addition to environmental recommendations to increase sustainability and sustainable sourcing of materials and resources.	Catherine Moore - Civil Rodolfo Leon - Civil Carolin Avelar - Civil	Serrette, PhD., Reynaud	2020	Civil Eng	Lapwai, Idaho	https://scholarcommons.scu.edu/ceng_senior/81/
OmwanaThrive: A Mobile Application for Neonatal Survival in Rural Uganda	Eighty-one babies within their first month of life die each day in Uganda. Our solution is a mobile application for rural mothers that includes educational lessons with culturally relevant graphics and limited text, help with navigation to nearby clinics, and reminder messages about important healthcare checkup dates.	Story DeWeese - Comp. Eng Samantha Sy - Comp. Eng Tiffany Lee - Web Design Eng Emily Zhang - Web Design Eng Tatiana Valentine - Biology Tia Halsey - Public Health Hayley Seeno - Studio Art	Figueira, PhD., Silvia Parker, PhD., Michele	2020	Computer Science and Eng partnered with Engineering World Health	Rural Uganda	https://scholarcommons.scu.edu/cseng_senior/175/
YouLearn: Offline Video Streaming App for Uganda	The country of Uganda has implemented universal primary and secondary education. But still, some families cannot afford to send their children to school. When young people drop out of school, they often must resort to working illegal, unsafe, and low-paying jobs. Job prospects are even worse for disabled children. Youth need support and vocational training for in-demand skills to ensure that every Ugandan has a chance at social mobility. In order to support the disabled and deaf youth population in rural Uganda, we are creating a video streaming application that will be populated with videos teaching computer literacy and computer skills. Our system will include an RPi to store the videos locally and allow streaming of the videos without WiFi being necessary. Our system will support those most in need by bringing them the skills to make them participating members of society.	Brianna McGovern - Comp. Eng Emma Allegrucci - Comp. Eng Jiabei Luo Major: Web Design Eng	Figueria, PhD., Silvia	2020	Computer Science and Eng	Kampala, Uganda	https://scholarcommons.scu.edu/cseng_senior/186/
Disaster Relief Communications Box	Our team is proposing that we create a prototype of a "Natural Disaster Communication Box". Some key features of this box include: three different power sources (the device will be able to seamlessly switch between each), long range connectivity, and ruggedness/weather proofing. We wanted to include three power sources because one of the main problems with emergency equipment is reliability during the most crucial times. There will be a solar panel, hand crank, and large back-up battery cell. The device will be able to monitor the charge, the functionality of the power source, and switch between the three power sources based on the functional and situational conditions. In terms of connectivity, we plan on implementing an iteration of a Wi-Fi and some form of messaging.	Karter Naito - Elec. Eng Kyle Johnson - Elec. Eng	Wolfe, PhD., Andrew Krishnan, PhD., Shoba	2020	Electrical Eng	Local Community	https://scholarcommons.scu.edu/elec_senior/52/

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GalapaGo!	The Galápagos Islands are home to around 25,000 residents, and nearly 225,000 tourists visit each year. Although cruise ships constantly pass through the islands, tourists mostly stay on the cruise ships and do not necessarily get to explore the full authentic Galapagos Island experience. We plan to draw more tourists to local businesses by creating a mobile and web application that contains easily accessible information about local businesses such as dining places, entertainment, and more. The Galápagos Islands' Chamber of Tourism will be able to add entries to the mobile/web application, and users will be able to search through the listings and explore local offerings. Because the Galápagos Islands does not have reliable internet connectivity, our application must not rely on connectivity to function. Instead, users will only need to connect once in order to download the mobile application before having full functionality of it.	Catrina Nguyen - Comp. Eng Mariah Manzano - Web Design Eng Kristina Anderson - Comp. Eng Kat Hibbert - Comp. Eng	Figueria, PhD., Silvia	2020	Computer Science and Eng	Galapagos Island	https://scholarcommons.scu.edu/cseng_senior/167/
Greywater-Fed Hydroponics System with Self-Monitoring Control System for LEAP Schools in South Africa	The overall goal of our project is to establish a hydroponics system in the LEAP 5 School, located in Jane Furse, South Africa. We are piloting this project with LEAP School 5 in hopes that this system will be implemented across the entire system of LEAP schools. There are three important components to our project: sesign and build a greywater system to filter used kitchen water that can be used in the hydroponic system, develop a self-correcting and continuously monitoring controls system for the hydroponics system (that will monitor pH, temperature, and conductivity), and implement an education program covering plant biology, nutrient cycling, and other topics related to hydroponic systems. Our aim is to make the hydroponics system functional for the needs of the LEAP 5 school, sustainable (in terms of water use and building materials), long-lasting, and replicable for the LEAP 5 school in Jane Furse, South Africa.	Andrew Feldmeth - Mech Alex Estrada - Mech Katya Fairchok - Mech Claire Pavelka - Biology/Environmental Science Carson Edgerton - Biology	Lee, PhD., Hohyun Doyle, PhD., Laura Parker, PhD., Michele	2020	Mechanical Eng partnered with Engineering World Health	Jane Furse, South Africa	https://scholarcommons.scu.edu/idp_senior/62/
Sunny-Side Solutions	Partnered with Sabore's Well, an NGO co-founded by Maasai warrior Sabore Oyie and Therese Hejm, Sunny-Side Solutions is designing a solar powered heating and shower system for the new Maasai school in Narok, Kenya. What any person wants at the end of the day is to feel relaxed and rejuvenated through use of a hot shower. While this is a part of daily life in many first world nations, this isn't so for the teachers currently working at the newly opened school. With the teachers feeling refreshed they can teach young Maasai girls and boys the knowledge necessary to advance in their society and gain the opportunity to seek and do more than before.	Jada Paddock - Mech Adrienne Lee - Mech Jesus Reyes - Mech Malonda McElwee - Mech	Lee, PhD., Hohyun	2020	Mechanical Eng	Narok, Kenya	https://scholarcommons.scu.edu/mech_senior/101/
Weather Forecast and Water Quality Data Distribution	We are creating a multi-platform application on behalf of the Association of Nicaraguan Social Development (ASDENIC), that town officials can use to distribute information to local farmers about weather forecasts and water quality. This is valuable information that is currently being distributed in-person during weekly meetings. Not only will this application cut out the need for meetings, but it will also provide information to the people a lot faster than at the moment.	Rachael Freitag - Comp. Eng/Spanish Sarah Ortiz - Comp. Eng	Musurlian, Angela	2020	Computer Science and Eng	Nicaragua	https://scholarcommons.scu.edu/cseng_senior/172/

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Bici Bomba Well Water Purification System	We will be using bike power to pump water up from a well of up to 45 meters and run it through a biosand filter and into a separate container for drinking.	Matthew Kamimura - Mech Ally Belicia - Mech Liam Scobey - Mech Devan Hollar - Mech	Restivo, PhD., Tony	2020	Mechanical Eng	San Adres region of Guatemala	https://scholarcommons.scu.edu/mech_senior/102/
Flomosys 2.0: A Scaleable, Secure, and Affordable Flood Monitoring System	Flomosys is a project that aims to provide tested designs for a low-cost flood monitoring and warning system backed by real-world usage data. These hardware designs and the corresponding open source code will be released to the public such that low-income, at- risk areas can build their own systems (or purchase them affordably if manufactured at scale) to increase the safety of residents. In addition, Flomosys sensor nodes are designed to use as little power as possible, capable of operating off of a battery trickle-charged by a solar panel, allowing it to remain truly wireless for geographic regions that are off the grid. Flomosys v1.0 is already installed and operational in the City of San Jose thanks to the hard work of all those involved with the project. However, due to time and cost restraints, not all desired features were implemented. For example, only one sensor per base station is currently supported, there is no dynamic frequency sampling capabilities to enhance power usage, and the data transmission mechanism is not fully secured against Man-in-the-Middle attacks. This project aims to implement these missing features into the Flomosys project to allow it to scale smoothly and enhance performance.	Tai Groot- Comp. Eng	Dezfouli, PhD., Behnam	2020	Computer Science and Eng	San Jose, CA	https://scholarcommons.scu.edu/cseng_senior/166/
Milkguard: Biosensor Geometry Optimization and Mobile App Development	a multiyear effort in Santa Clara University's Bioengineering department to develop a low-cost, environmentally friendly sensor to detect the presence of E. Coli at a sensitivity level of less than 10^4 CFU/mL. in donated human breast milk (DHBM). Our goal is to create a product that will reduce the cost of bacteriological testing of DHBM. Ultimately, the MilkGuard sensor and associated colorimetric results analysis aim to decrease cost, and increase availability, of DHBM to infants worldwide.	Emma McCurry - Bioengineering Beau Hsia - Bioengineering	Ashley Kim, PhD: Bioengineering Maryam Mobed-Miremadi, PhD: Bioengineering	2021	Bioengineering	Developing Nations	https://scholarcommons.scu.edu/bioe_senior/78/
Water project in Guatemala	This project will focus on designing a community sized biosand filter for a community in San Andres, Guatemala. This will include putting together a guide/manual for other communities in need of creating a method to get clean drinking water.	Joshua Seo - Civil Engineering Connor Thomas - Civil Engineering Marieli Rubio - Civil Engineering	Laura Doyle, PhD: Civil Engineering Ed Mauer, PhD: Civil Engineering	2021	Civil Engineering	Guatemala	https://scholarcommons.scu.edu/ceng_senior/85/
Nicaragua App	In continuation of a previous project focused on sharing water quality information in rural Nicaragua, this project will create a mobile application that will act as a platform for leaders to share valuable weather indicators with members of the community in real-time instead of on a weekly basis.	Alexa Grau - Web Design and Engineering Justin Ling - Web Design and Engineering Greta Seitz - Web Design and Engineering	Angela Musurlian, PhD: Computer Science & Engineering	2021	Web Design and Engineering, Computer Engineering	Nicaragua	https://scholarcommons.scu.edu/cseng_senior/204/
Seedling Irrigation Design for Valley Verde	This project is in parternship with Valley Verde, a non-profit organization working to combat food insecurity in San Jose. With increased stress on the organization due to extreme weather conditions and increasing demands due to COVID-19, SCU civil engineers will design and implement new systems to increase the efficiency and decrease the cost of Valley Verde's seedling program.	Sarah(Sally) Ferguson - Civil, Environment Hope Laborin - Civil, Environmental and Su Sarah Dao - Civil, Environmental and Susta	Laura Doyle, PhD: Civil Engineering	2021	Civil Engineering	San Jose, Ca	https://scholarcommons.scu.edu/ceng_senior/86/

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Santa Clara Community Gardens Composting System	The established laborious composting system in place at the City of Santa Clara Community Gardens is a hindrance in the production lifecycle of their gardening process. This project will design a device that removes much of the manual labor associated with conventional composting methods. It will also serve to encourage and educate the community about the benefits of growing local produce utilizing a digital interface and viewable/interactive areas within the compost container.	Jay Weber - General Engineering Kyle Uyehara - General Engineering, Minor Bradley Lostak - Computer Engineering Nick Buccino - General Engineering and Ec	Jessica Kuczenski, PhD: General Engineering	2021	Computer Engineering Genereal Engineering	Santa Clara, Ca	https://scholarcommons.scu.edu/idp_senior/76/
Tutor Matching	Tutor Matching needs a centralized system where all users (tutors, pupils, and administrators) can log on to manage their daily tasks. The solution is this project (a website platform) that will provide tracking, documentation, and metrics for staff and students as needed, and is more efficient than their current system of using multiple websites and google sheets. Desired specifications include calendar and shift visualization, leave requests and availability, a forum/opt-in messaging feature, and a notification system (some kind of change log or alert system for changes to calendars [especially tutor availability submissions]) among other things. This platform will overall make every Tutor Matching member's experience more efficient and powerful.	Sparsh Chauhan - Computer Science and I	Bob Schaffer, PhD: Electrical Engineering	2021	Computer Engineering	San Jose, Ca	https://scholarcommons.scu.edu/cseng_senior/192/
Martha - Cameroonian Refugee Camp Educational App	Today, hundreds of thousands of Cameroonian citizens have been displaced from their homes, seeking refuge in encampment communities across many central African countries. This project will develop an app, Martha, which will be a platform for adolescents to access important educational material, circumventing infrastructural and circumstantial barriers. Martha will open countless doors for Cameroonian children, with lesson plans and educational modules covering relevant health topics, vocational training, and tools to manage stress and trauma, as well as deliver content in math, language, and sciences, all without the need of connecting to the internet.	Hannah Rubens - Public Health Science Carson Edgerton - Biology Nicole Mossing - Public Health Science Marco Marenzi - Computer Science and En James Grom - Computer Science and Engi Eason Liu - Computer Science and Engine Leila Scola - Computer Science and Engine	Silvia Figueira, PhD : Computer Science & Engineering Michele Parker, PhD: Biology & Public Health	2021	Computer Engineering, Biology & Public Health	Cameroon	https://scholarcommons.scu.edu/cseng_senior/202/
Frugal Urban Greenhouse	This project is in partnership with Valley Verde, a non-profit organization working to combat food insecurity in San Jose. With increased stress on the organization due to extreme weather conditions and increasing demands due to COVID-19, this project will serve a pressing need in the community as it works to improve Valley Verde's existing greenhouse design by lowering the overall cost and increasing efficiency. The team is focused on the structural design to improve water and space usage, but will also work on user-friendly control systems for ventilation, temperature, and soil moisture.	Alexandra Rivera - Mechanical Engineering Emma Rosicky - Mechanical Engineering Connor Pearson - Mechanical Engineering Liam Swanson - Mechanical Engineering	Godfrey Mungal, PhD: Mechanical Engineering	2021	Mechanical Engineering	San Jose, Ca.	https://scholarcommons.scu.edu/mech_senior/107/

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Enhancing Sensing Methods for UAV-based Disaster Recovery Applications	Natural and human-caused disasters can cripple, displace, and diminish civilian populations and over the past century, the rate at which these catastrophes occur has skyrocketed. The goal of this project is to develop UAV technology that uses image analysis to quickly identify the location of humans affected by a natural disaster. This project will combine inexpensive hardware systems and novel image classification to improve the efficiency of humanitarian organizations and developing nations in the emergency search and rescue phase.	Connor Azzarello - Computer Science and Chris Gerbino - Computer Science and Eng Ruchir Mehta - Computer Science and Eng	Behnam Dezfouli, PhD: Computer Science and Engineering	2021	Computer Engineering	San Jose, Ca.	https://scholarcommons.scu.edu/cseng_senior/194/
Generating Rock Volumes of Lower Radii - GRVLR	In Birendranagar, Nepal, women have few opportunities to independently support themselves and their families. Because of this, it is common for women to make a living by crushing river rocks into gravel with a hammer for local construction companies. In an effort to alleviate the physical burden on and time spent by these women and their children, this project will design and manufacture a financially accessible, ergonomic, safe, and human powered, rock crushing device.	Hailee Silva - Mechanical Engineering Sam Broyles - Mechanical Engineering Karla Raigoza - Mechanical Engineering James Forman - Mechanical Engineering	Dr. Gaetano Restivo: Mechanical Engineering Dr. Timothy Hight PhD: Mechanical Engineering	2021	Mechanical Engineering	Nepal	https://scholarcommons.scu.edu/mech_senior/108/
Drone Mesh Wifi Network for Disaster Scenarios	Communications during a disaster scenario is one of the most important, and oftentimes overlooked, parts of any highly efficient disaster response. The goal of this project is to create a drone system that can deploy a wireless mesh network over a disaster area, allowing first responders to use internet enabled wireless devices to find people and give aid.	Mark Rizko - Computer Science and Engin Cameron Burdsall - Computer Science and	Behnam Dezfouli, PhD: Computer Science and Engineering	2021	Computer Engineering	San Jose, Ca.	https://scholarcommons.scu.edu/cseng_senior/191/