2015 STEP Conference
October 6, 2015

As part of the University of California-Riverside, CE-CERT is committed to furthering education and outreach for the next generation of engineers. On October 6th, 2015 CE-CERT hosted nearly 300 high school students at the 4th Annual Science and Technology Education Partnership (STEP) Conference for high schools throughout the Riverside County School District. CE-CERT hosts this conference on an annual basis in conjunction with Bourns Inc., as part of a larger five thousand Southern California elementary students program.

Graduate students, Partho Roy and Sean Franco in the Advanced Thermochemical Research Laboratory, demonstrated how biomass and biosolids can be used to produce fuels or electricity through the use of UCR’s patented Steam Hydro-gasification Reactor. Students were able to view different types of biomass and visit a working reactor in the laboratory setting.
Petroleum is a depleting a nonrenewable source of energy. The **Aqueous Biomass Processing Laboratory** demonstrated how plants can be used to make transportation fuels and various chemicals. Graduate students Nikhil Nagane and Yen Nguyen explained the pretreanent process of turning plants into fuel for transportation.

Tiny suspended particulate matter (known as aerosols) is a widespread atmospheric pollutant. The vast majority of these aerosols are secondary, meaning they start out as gases but react and condense to form particles as they age in the atmosphere. Patrick Roth & Paul Van Rooy, demonstrated how secondary aerosols are studied in the **Atmospheric Processes Laboratory**.

**Environmental Aerosol Research Laboratory** demonstrated how to understand the relationship between engines, emissions and fuels and its relationship with air pollution. The students were shown a presentation on the fundamentals of emission measurement and had an informative Q&A session with two seasoned graduate students, Liem Pham and Yue Lin, about air pollution in the Inland Empire.

Powering vehicles with hydrogen renewable energy (i.e. solar energy) is able to provide the energy that is needed to drive the process of splitting water into its two components, hydrogen and oxygen. Graduate
students Darren Kwee and Kichang Jang, demonstrated how to generate hydrogen gas by electrolysis and ran model cars on solar cell energy in the Solar Energy Research Laboratory.

David Kari and Nigel Williams had students test drive an eco-driving simulator, in the Transportation Research Laboratory that models heavy duty trucks driving on various roads and observed the output of the truck’s speed, acceleration and fuel consumption. Students enjoyed driving the eco-driving simulator that presented energy-saving driving recommendations directly to the driver in real time.

Xuewei Qi, an electrical and computer engineering graduate student, demonstrated Transportation Research Laboratory's LIDAR imaging device - a remote sensing tool also used by many autonomous cars. This sensor measures distance by illuminating a target with a laser and analyzing the reflected light to provide valuable data. Students were able to view LIDAR images of themselves on a high-definition monitor, where different colors highlighted their distance to the rotating camera.

Jade Jiang and Joey Yang demonstrated how to measure particulate matter emissions from light-duty vehicles. Students walked around a light-duty dynamometer in the Vehicle Emissions Research Laboratory: viewing where the vehicle sits during testing, where the exhaust emissions are collected and lastly, where the research on the data takes place.