2016 STEP Student Conference News Article

As part of the University of California-Riverside, CE-CERT is committed to the importance of science, technology, engineering and mathematics to our future scientists, inventors, and makers. On October 5th, 2016, CE-CERT hosted nearly 300 high school students at the 5th Annual Science and Technology Education Partnership (STEP) Conference for high schools throughout the Riverside County School District. Here at CE-CERT we believe that active-learning strategies engage students with hopes to help retain students in a future STEM.

This year CE-CERT not only participated in high school outreach but also participated in the annual teacher conference, Tuesday, October 4th. This event hosted 240 STEM K-12 teachers from throughout Southern California. Teachers were able to engage with the Keynote Speaker, Michael Towne, California State Assembly Teacher of the Year. He focused on the importance of incorporating connections between math and the “real-world” and using practical demonstrations and problems for students to learn the fundamentals of mathematics. CE-CERT was able to tackle both of those concepts with teaching teachers the significance sustainable energy and how to create solar cells that can be easily replicated in their classrooms.

CE-CERT continued these efforts on day two:

Graduate students, Partho Roy in the Advanced Thermochemical Research Laboratory, demonstrated how biomass and bio-solids 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 Ninad Kothari and Christian Alcaraz, along with Adjunct Professor Charles Cai, demonstrated the use of biofuels created in their lab on a RV car and explained the pretreatment process of turning plants into fuel for transportation. Students were able to see an alternative to gasoline on a working vehicle.

Tiny suspended particulate matter (known as an 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. Graduate students Paul Van Rooy and Weihan Peng demonstrated how secondary aerosols are studied in the Atmospheric Processes Laboratory. Students were able to walk into the largest indoor chamber. The high school students learned the importance of a controlled experiment and also, the benefits of having largest indoor chamber. (We can control the elements: the “sun”, the temperature, the light)

Photovoltaic cells, also called solar cells, are devices that create electricity from light. The most common type is made from silicon in a process similar to the way computer chips are made and requires large expensive factories. Graduate students Kichang Jang and Rany Tith taught the students how to use raspberry juice to construct a simple dye-sensitized solar cell and measure the electricity the cell produces in the Solar Energy Research Laboratory. The graduate students explained that solar panels are made up of small solar cells like the ones they just created. Postdoctoral student Jill Luo and graduate student 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.

Graduate student Danyang Tiang demonstrated Transportation Research Laboratory’s precision mapping system—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. The visiting students learned that this mapping system is important for the future autonomous driving cars because to have a fully autonomous vehicle the maps need to be extremely accurate.

Graduate students 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. The information presented showcased the importance of testing vehicles for their emission outputs and testing different types of fuels to potentially find a greener blend of gasoline.