



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

INDUSTRIAL SOLUTIONS LABORATORY SENIOR DESIGN

SAVE THE DATE!

FALL 2014 Expo

Friday, December 5, 2014

Barnhardt Student Activity Center (SAC)

Open to Public at 11 a.m.

Fall 2014 Kickoff Breakfast



The Senior Design Kickoff Breakfast was held on September 5. Over 200 students enrolled in Senior Design 1 met with project supporters for the first time. Students are working on 47 projects, 35 of which are supported by industry which is a record number. This is the largest Senior Design 1 class in the history of the college. In addition, 116 students enrolled in Senior Design 2 will complete projects this semester and showcase them at the December 5th Expo. A list of new fall semester projects is available at (<https://srdesign.uncc.edu/senior-design-program/projects/2014-fall-projects>).

THANK YOU INDUSTRY SUPPORTERS!



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Daimler Trucks North America





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Senior Design Team Makes Big Splash in Wilmington

Wilmington native Donald Sonnett is a member of the team of engineering students who designed and built a desalination rig powered exclusively by wave energy. It began as a senior project at UNC Charlotte, but Sonnett, Humberto Covarrubias, and Chris Matthews are working after graduation to get the design in the hands of those who need it.



“It’s designed for third-world countries that have limited access to drinking water but have waves and saltwater ... where up to 80 percent of the electricity generated goes to these big plants to run the desalination process. It’s really energy hungry. We’re trying to meet that need,” Sonnett said on May 14.

Capturing wave energy to power desalination is not a new idea, but the team’s decision to forgo electricity production and use highly pressurized water is revolutionary.

Fred Wagner, a partner at Charlotte-based business development firm Eventys who financially supports the project, said converting wave energy to electricity to high-pressure water contributes to a big energy loss.

“The ah-ha moment was going, ‘Don’t try to make electricity. Go directly for what you want,’” Wagner said.

The system is called SAROS, or Swell Actuated Reverse Osmosis System. The 15-foot-long, 2,400-pound desalination rig, which is a smaller prototype of the original design, took four months to build and cost just under \$12,000.

Wagner said he was impressed with how quickly the team executed the idea.

“What was interesting about this whole thing was how fast it went together. These guys were finishing school. They did this in their spare time,” Wagner said.

A hose stretching 10 feet below the rig sucks up seawater. A large pendulum captures wave energy, pumping the water through a filter to remove sediment before running it through a reverse osmosis process, which uses a molecular filter to separate salt molecules from water. The product is both clean water and briny concentrate. Concentrate is discharged into the ocean and clean water is captured.



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The first trial took place at Wrightsville Beach in March, when the team tested the pendulum to see if it could produce high enough pressure and flow rates to sustain the desalination process. The May trials were the first time the desalination process was tested. Despite light swell conditions, Sonnett said the process was successful.

“It worked. We made fresh water but not as much as we expected. ... Now we need to figure out how to capitalize on smaller motions of the waves,” Sonnett said.

Sonnett reported the rig produced 50 gallons compared to the 100 gallons that was expected. He sampled the final product to assure it was fresh, drinkable water.

“It tasted like Wrightsville Beach water. It was definitely no Dasani but it wasn’t salty,” Sonnett said.

The team will tweak the design to work better in smaller swells before returning to Wrightsville Beach to test again. Sonnett estimated it would take two or three weeks to make the changes. In the meantime, they are working to secure a sponsor to bring the device to market.

“It’s not just a cost problem for us. ... We’ve got an idea here and we know we can scale it up, but what we need is real-world application. If we can find a sponsor that has access to that, things will go very quickly from that point,” Wagner said.

2014-15 SCHEDULE OF EVENTS

Mark your calendars for the following important events.

- December 5, 2014 Fall Expo, Student Activity Center, OPEN TO PUBLIC at 11 AM
- January 16, 2015 Kickoff breakfast for spring 2015 industrial supporters, project mentors, and student teams
- April 30, 2015 Spring Expo, Student Activity Center, OPEN TO PUBLIC at 11 AM

CONTACT US

For information or questions about Senior Design or the College of Engineering Industrial Solutions Laboratory, visit www.srdesign.uncc.edu or contact Terry Jordan at 704-687-5029 or tdjordan@uncc.edu.

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