

## **A Plant for Converting Plants**

*By Mick Kulikowski, NC State News Services*

North Carolina State University is building quite a reputation as an alternative-energy research leader, continually finding new and innovative ways to make biofuels from abundant natural resources. But the university is building more than just a reputation.

NC State has received a \$1.5 million grant from Golden LEAF Foundation to establish a pilot facility that will initially coax ethanol out of cellulose, the common material found in cell walls of plants.

Dr. Steven Peretti, associate professor of chemical and biomolecular engineering at NC State and the principal investigator for the grant, says initial plans call for studying the conversion of three different feedstocks – industrial sweet potatoes, switchgrass and loblolly pine trees – into ethanol. Peretti's co-investigators include faculty and staff from the College of Natural Resources, the College of Agriculture and Life Sciences and the North Carolina Solar Center.

Detail design and layout work on the pilot plant facility has begun, and Peretti says he expects the university will erect a building to include about 5,000 square feet of space.

While converting biomass to ethanol is the hot topic in the burgeoning biofuels industry – and the focus of early efforts of the pilot plant – he sees the plant serving different roles as the bioproducts industry evolves in North Carolina and across the biomass-rich southeastern United States. Besides education and research, the facility will also provide outreach to the state's agriculture and forestry interests.

“This facility is anticipated to have the flexibility to change with research developments,” Peretti says. “We want it to have long-term utility for an industry that is just in its infancy. The biomass industry will evolve to be very different in the future. For example, butanol production may become the focus in the future. Whatever the case, we're looking to create chemical products from cellulose instead of petroleum.”

Coaxing fuel or other products from locally grown feedstocks rather than petroleum is essentially a matter of biologically and thermochemically converting biomass into the desired products, Peretti says.

“Ethanol is just one product,” he says. “The pilot plant will also look at other technologies and recipes – like different organisms, additives, fermenting times and temperatures – to make other products.”

Peretti says the plant will be a training ground for graduate and undergraduate students looking to perform research and learn more about this nascent field. In addition to the multicollge collaboration within NC State, industrial entities and other in-state universities are encouraged to participate in the research, development and demonstration opportunity provided by this the pilot plant resource.

“We’ll be able to test new technologies and gauge how quickly and easily they can be integrated into current production,” Peretti says.

The plant will also serve as an example of how experts in different academic specialties can come together to solve problems. It’s somewhat rare to find a chemical engineer trading knowledge with a tree expert and a crop grower at the same time.

“These are collaborations that I haven’t been able to forge before,” Peretti says. “No one knows all the answers. It’s important to have cross-disciplinary work to find solutions to such challenging technical problems.”

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