



The SPARK

CERT's
Fall 2018
Newsletter

The Center for Energy Research and Technology is an interdisciplinary energy research center, created to foster collaborative research and development of new energy-related technologies. The center focuses on basic and applied research, outreach and extension activities and education.

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10th Annual ENERGY DAY! April 9-10, 2019

Next spring's event will be located at the Aggie's BB&T Stadium! This extra-special event will feature the Oakridge National Lab's *Traveling Science Fair*. The Science Fair is contained in six tractor trailers that can educate 900 students each day.



Oakridge National Lab is one of the premier science organization in the country, their traveling Science Fair visits only one state per year, so it is a huge deal to have them come to N.C. A&T! This is a once in a lifetime opportunity for the students of Guilford County. Due to anticipated interest, we are extending our event to TWO days, April 9th and 10th. As always, Energy Day will be open to the public, as well as all local schools. Look for updates in our winter newsletter!

CERT Educational Series Has Expanded

CERT has developed a series of Energy Education Modules to be used by teachers in the classroom to teach energy concepts. These modules align with the North Carolina Science Standards, and all provide a FREE plug-and-play, interactive, video-based and hands-on approach to instruction. These modules were developed to provide teachers the resources to expose students to labs using equipment that might not be available in the schools. The teacher acts as a facilitator and resource, while the video teaches and guides the students through the lab using kits. Teacher preparation is minimal (< 15 minutes per module).

Heat Transfer is taught through two experiments involving hot and cold water cups, an aluminum bar and thermometers. Aligns to science standards 5.P.3 and 6.P.3.

Heat Transfer (3rd Grade) is taught through one experiment involving hot and cold water cups, an aluminum bar and thermometers. Aligns to science standard 3.P.3

The Generate Game teaches energy generation and the consequences of generation choices through a board game that allows eight teams to compete in energy-grid management. The Generate Game was created by the Environmental Protection Agency, and aligns with standards 8.P.2, EEn.1.1 and EEn.2.8.

Light and Waves teaches properties of light and waves through several experiments that make waves, measure light, understand light propagation and explore the electromagnetic spectrum. Aligns with standard: 6.P.1.

...And Coming Soon...

Waste Decomposition teaches students how long it takes for commonly used items to decompose after use. Students work in teams to match items to the timeline for decomposition. Aligns with standard 4.L1.3.

Energy Conversion provides the equipment to demonstrate energy conversion between mechanical, chemical, light and wind energy. Aligns with standard: 4.P.3.

N.C. A& T Recycling Pilot Underway

N.C. A&T has one of the lowest recycling rates among higher education institutions in the UNC System. To address this issue, CERT has taken a leadership role with the support of Campus Facilities and the North Carolina Department of Environmental Quality to create a pilot program. The pilot is a research study that determines if a change in recycling infrastructure and education results in increased recycling. The pilot involves three campus buildings: Pride Hall (a residence hall), Carver Hall (an academic building) and Fort IRC (an administrative building). Recycling containers were placed alongside waste cans in these buildings, and education was conducted with the occupants of the buildings. Daily measurements of waste amounts, recycling amounts and contamination rates (items being put into the wrong container) are captured to determine the level of recycling that is occurring throughout the semester.



Energy Wise Off to a Successful Start in GCS

Each year, teachers across Guilford County Schools volunteer to serve as Energy Wise Mentors for their schools. These teachers supervise an Energy Wise Club made up of students at the school, and throughout the year their clubs perform energy assessments of the school, and find ways to reduce the energy consumed. Students audit classrooms and educate fellow students (and teachers) about easy changes they can make to reduce the energy used in their classrooms. This very successful program is in its 10th year, and already has participation in over half of the schools in Guilford County!

Foust Serves as Sustainability Advisor for City of Greensboro

Dr. Vicki Foust, research associate at CERT has been appointed to serve as an advisor to the City of Greensboro Comprehensive Planning Committee. This committee is charged with developing a strategic long-range plan for the city through 2040. Dr. Foust's role during this two-year appointment is to advise the committee on how sustainability can be integrated into its comprehensive plan. In addition to this role, Dr. Foust serves at the vice-chair of the Greensboro Community Sustainability Council, which advises the City Council in matters related to city sustainability.



Dr. Ray Tesiero Returns to N.C. A&T

Ray Tesiero received his PhD from N.C. A&T in 2015. While studying for his doctoral degree he worked at CERT as a research associate under the founding director of CERT, Professor Harmond Singh. Towards the end of Ray's PhD program, Dr. Singh retired, and Ray assumed the role as interim director of CERT until the arrival of Dr. Greg Monty, its current director. Ray has returned to N.C. A&T in a new role as an assistant professor in the Department of Civil, Architectural and Environmental Engineering. He is looking forward to working with CERT to drive research surrounding energy efficiency at N.C. A&T.

CERT Secures Two New Grants From the National Science Foundation



(1) STEP into STEM, Dr. Greg Monty, Director of CERT (PI)

STEP into STEM is a three-year, \$350,000 grant from the National Science Foundation. It funds a data-driven study that will (1) advance the knowledge and evidence base for successful strategies to encourage underrepresented minorities (URMs) at the high-school, community-college and 4-year-undergraduate level, who are either uncommitted or non-STEM majors, to commit to STEM pathways; and (2) develop a set of nationally-applicable policy recommendations (including measurements/metrics) that will dramatically increase the number of URMs that join and remain on STEM pathways to the STEM workforce.

(2) Complex Natural and Human Systems, Dr. Greg Monty, Director of CERT (Co-PI)

Complex natural AND Human Systems is a \$750,000 three-year grant from the National Science Foundation. The proposed research will study the relationships and interactions between human systems and natural systems contributing to food deserts in three geographically diverse regions of North Carolina. This project proposes to create a transformative platform to integrate the human systems with natural systems to understand the issues influencing food deserts in rural and urban communities. Specifically, the objectives are to (1) create a geo-coded, spatial-temporal database including both human factors and natural factors; (2) build an integrated-modeling framework that includes natural-system models (biophysical model, GIS land-use model), human-system models (production model, consumption model), and integrated procedures (multi-agent simulation) to link human systems to natural systems; (3) validate the reliability and the robustness of the database and the integrated modeling framework in selected study areas; and (4) conduct training workshops and educational opportunities for local and state agencies, extension agents, farmers, food retailers, undergraduate/graduate students, and other stakeholders.



Dr. Vicki Foust, Research Associate with CERT is teaching Sustainability and the Built Environment for the Department of Civil and Architectural Engineering. This graduate level CIEN 785 course examines the intersection of sustainability and the built environment. Students in the course will be prepared to take the US Green Building Council exam in order to earn a LEED Green Associate certification. LEED stands for Leadership in Energy and Environmental Systems.

