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Georgia Southern students to help Herty Center reduce wastewater by 90 percent

OCTOBER 2, 2015

Students to address wastewater management, measure performance of materials used in transportation sector



(left to right) Dr. Alexander Koukoulas, Herty president and CEO, with engineering students Joel Demeritt, John West, Will Antonisse, Jacob Huckaby, Ignacio Donnet, Marcus Bess, David Tshimanga, Russ Spratlin, and Zachariah Coles, and Dr. Walter Chappas and Darnell Wilson of Herty.

The Herty Advanced Materials Development Center is sponsoring final-year capstone projects for 18 undergraduate engineering students at Georgia Southern University. In this year's projects, students will assess a range of industrial problems and work in teams to find solutions. Using Herty's expertise and resources, one team of students will address the issue of wastewater management to reduce water usage, and another team will focus on the equally important challenge of developing a

process for measuring the performance of materials produced at the Center and used in the transportation sector.

The capstone project, required for graduation, is designed to solve real-world problems through process design, technology selection and budget constraints. The project allows students to demonstrate their capabilities as an engineer by bringing together all the skills and knowledge learned during the students' undergraduate programs.

"The capstone project is an important part of the undergraduate experience as it combines all the learnings into a focused effort while emphasizing teamwork to solve problems," said professor Brian Vlcek, Ph.D., chair of the Department of Mechanical Engineering. "We are thrilled the Herty Advanced Materials Development Center, which is a world-class research facility, is undertaking this endeavor to help develop our undergraduates and give them the experience in research and industrial applications they will need as they move forward in their careers."

Wastewater management is a \$600 billion a year industry that is becoming an increasingly important field. According to the United Nations, one-fifth of the world's population is challenged by water scarcity, and another 1.6 billion have limited access for economic reasons.

"This means that three billion people have poor to limited access to clean water," said Alexander A. Koukoulas, Ph.D., president and CEO of the Herty Center. "With much of the western United States in severe to exceptional drought conditions, water management has become an issue of national importance."

Under the mentorship of Herty, one student team will assess current water use and water pretreatment processes to develop a system that will recover and reuse 90 percent of all water used at the facility. The goal is also to design the system to meet water quality targets and provide a payback period of three years that would justify the capital expenditures for the new system.

"We are pleased with this opportunity to work with great young minds and use their creativity and capabilities to solve a problem that is becoming a key challenge for government, communities and industry, namely, the management of water," added Koukoulas. "Herty conducts a range of development projects where we typically discharge up to 100,000 gallons of wastewater per day. By working with these student engineers, our goal is to reduce this amount by 90 percent, essentially eliminate wastewater discharge and drastically reduce our need for fresh water. The environmental benefits and cost savings in doing this will be significant, and the knowledge we gain through this project could be used as a model for local industries looking to conserve their water use."

The students completing this project will first assess current water use at Herty to establish a baseline of water use and quality. They will then use client-defined water quality targets to select

appropriate water treatment technologies. Herty currently pretreats its wastewater by removing solid materials. The challenge for the students is to find cost-effective technologies that will further clean the wastewater stream so that it can be returned to the facility and reused without compromising operations. Treatment options that will be considered include nanofiltration and reverse osmosis (RO) and forward osmosis (FO). The FO system, an emerging desalination technology, is particularly attractive because of its low operating costs and other far-reaching applications.

The second team will undertake a completely different but equally important challenge to develop a process for measuring the performance of materials that are produced at Herty and used in the transportation sector. The students will design and construct a test rig that will be used to measure material properties that Herty scientists believe will be predictive of end-use performance.

“At this time, the only measure of end-use performance is actual use in the field. Through the development of this test rig, we expect to be able to measure properties in the lab. This will not only benefit our quality control program but it will open a whole new door to product development, where we can drastically reduce cycle times,” said Walter Chappas, Ph.D., director of Advanced Materials for the Herty Center.

The Herty Advanced Materials Development Center, an applied research center of Georgia Southern University, is a world-class research, development and demonstration facility. Located in Savannah, Herty was established in 1938 as a state authority and became part of Georgia Southern in 2012 at which time the Center began working with undergraduate and graduate students to provide real-world experience in industrial processing and technology development. Herty is a new product and process accelerator providing technical, market and development expertise in short-fiber composites, biomaterials, and biomass processing. Herty’s expertise and extensive pilot-scale capabilities for prototyping new products help companies de-risk the commercialization process. For more information, visit herty.com

Georgia Southern University, a public Carnegie Doctoral/Research University founded in 1906, offers more than 125 degree programs serving more than 20,500 students. Through eight colleges, the University offers bachelors, masters and doctoral degree programs built on more than a century of academic achievement. Georgia Southern is recognized for its student-centered and hands-on approach to education. Visit GeorgiaSouthern.edu

Tailor-Made: FMAD Starts Alteration Shop on Campus

OCTOBER 2, 2015

Tattered jeans and ill-fitted tops will no longer cause problems for the Georgia Southern community. The FMAD Stitch Alterations Shop, a project of the Department of Fashion Merchandising and Apparel Design (FMAD) opened on campus Sept. 1 and is opening up new possibilities for designers at the University.

Marketing and design student Amber Shelton came up with the idea for a campus alterations shop while taking the Apparel I class, taught by FMAD Professor Rachel Eike, Ph.D. After performing alterations for a friend as part of an assignment, Shelton was inspired to take this to another level. She reached out to Eike and another FMAD professor, Beth Myers, Ph.D., about her idea, and soon they began working on a grant to begin the shop.

"This program is helpful to our Georgia Southern community because as college students our first thought is often comfort," said Shelton, who is shop manager for the project. "But as we start to explore career opportunities and internships, making the right first impression, beyond our resume, is having well-fitting professional clothing."

The FMAD trio applied for a grant from the University's Center for Sustainability (CfS) in the spring of 2015. The idea was to create a program that met the needs of students on campus for quality, affordable clothing while offering a sustainable way to reuse clothes that just needed some mending, and encouraged students like Shelton to get real-world, hands-on experience. The \$2,500 grant was approved for the 2015-2016 academic year, and the team got to work immediately setting up shop.

"I'm excited to see how this FMAD Stitch shop will increase our students' learning and understanding of garment construction, fit, and business management," said Eike. "I'm also excited to see the quantity of garments we have processed in these first few weeks of being open and how many people we have been able to provide our skills and services to."

FMAD Stitch offers hemming, fittings, button repairs, patchings and other basic alterations in lieu of purchasing more clothes or tossing ill-fitting clothes. The shop also handles scrubs and lab coat patching and alterations for clinicals, a unique, cost-efficient opportunity for hundreds of students.

"Not only do we as FMAD students get a chance to work with real life customers, but we also get to reduce how much we consume," said Shelton. "Clothes that may otherwise be tossed or left in the back of our closets are now made like new again often with just a needle and thread."

The shop is located in the School of Human Ecology Building 0212, room 1006. FMAD Stitch is open on Tuesdays and Thursdays from 4:30-7 p.m. Services are completely free for all students, faculty and staff with a current Eagle ID. Customers are allotted a maximum of two, freshly-laundered garments per day to ensure a one-week turnaround. The shop is not open to the public.

Student volunteers interested in gaining practical knowledge and skills in garment construction and business management are encouraged to email the shop at FMADstitch@georgiasouthern.edu to apply for this resume-building opportunity.

Find the shop on Instagram, Facebook and Twitter under @FMADStitch. Share your appreciation for this unique service, and encourage the GS community to take part in this free opportunity.