WVU ENGINEERING: A culture of winning

From the classroom to the research lab to supporting industry through workforce development, West Virginia University's Statler College of Engineering and Mineral Resources has created a culture of winning through the outstanding contributions and academic excellence of its students and faculty.

The Statler College is known for the quality programming and advising it provides to students from the minute they enroll in its Fundamentals of Engineering Program or FEP.

FEP provides an important first-year experience that helps prepare students for their intended major. One component of the FEP is the Academy of Engineering Sciences, which recently got a boost thanks to a nearly $955,000 award from the National Science Foundation. The funds will provide five-year merit scholarships to students in AcES, which is an academic success and professional development bridge program designed for first-time freshmen. The program was established in 2012 by Teaching Associate Professor Ordel Brown as a way to help freshmen who are at-risk academically develop a set of skills to help them succeed in engineering.

And succeed they do.

Student successes

WVU is quickly becoming known for its success in student competitions and in partnering with faculty on research awards that impact the future of the state and nation. These hands-on experiences better prepare students for their professional careers, helping to make them more marketable to the hundreds of companies that recruit them annually.

Examples include:

• A collaborative team of student organizations from the Statler College was one of only 11 selected to advance to the next stage of the Amateur Radio on the International Space Station or ARISS program. ARISS allows students worldwide to experience the excitement of talking with crew members on the ISS in hopes of inspiring them to pursue careers in science, technology, engineering and math.

• Two teams from the College will participate in the first Mars Ice Challenge, a special competition under NASA's Revolutionary Aerospace Systems Concepts – Academic Linkage Program. The challenge is a technology demonstration competition that seeks revolutionary methods to drill into and extract water from simulated Martian subsurface ice stations.

To participate, interested teams submitted project plan proposals containing innovative designs for drilling and water extraction systems on Earth that could be modified for use on Mars. Only eight universities in total were selected to participate and WVU is the only university to have two teams chosen.

• WVU's prize-winning robot, Cataglyphis, has a future in farming! The robot, which was originally created to find and return samples on Mars, is being converted into a precision pollination robot, thanks to a grant of more than $700,000 from the National Robotics Initiative. Cataglyphis was the only winner in NASA's Centennial Challenges, where it won $855,000 over three competition years.

Winning research environment

It is important that the state's flagship educational institution be a winner in research. The Statler College provides an exciting learning environment that integrates research with education, and also helps promote economic development and industry growth. There are many winning examples in the Statler College and its academic departments that also include undergraduate and graduate students working with faculty.

The Industrial Assessment Center received a $1.5 million award from the U.S. Department of Energy to conduct assessments for small and medium-sized enterprises. The assessments focus on waste reduction, opportunities for smart manufacturing including potential enhancements to cyber security, in addition to energy efficiency and water conservation. Since opening in 1993, the WVU IAC outreach efforts have conducted 527 assessments and recommended nearly 6,000 measures that saved businesses $89 million when implemented. Undergraduate and graduate student assist in these assessments.

West Virginia is rich in carbon resources, which can be vital to the U. S. economy when used safely and in an environmentally responsible manner.

Natural gas-fueled vehicles are expected to play an increasing role in meeting future transportation needs. Researchers with the Center for Alternative Fuels, Engines and Emissions recently published a study that expands on the limited data available on methane emissions. The research team studied natural gas-fueled transit buses, refuse trucks and over-the-road vehicles as well as liquefied natural gas and compressed natural gas refueling stations to develop models to forecast methane emissions from the future heavy-duty transportation sector.

WVU's Center for Innovation in Gas Research and Utilization conducts transformative, fundamental, research directed at innovative pathways for shale gas utilization and upgrading. The Center, under the direction of Statler Endowed Chair John Hu, has become part of the newest branch of the National Network of Manufacturing Institutes. The Rapid Advancement in Process Intensification Deployment institute, or RAPID, will focus on developing breakthrough technologies to boost domestic energy productivity and efficiency by 20 percent in the next five years. WVU also remains committed to finding new ways to use coal, such as use of patented technologies to make carbon products.

Associate Professor Debangsu Bhattacharyya and Assistant Professor David Mebane were part of a team that won an R&D 100 Award, known as the "Oscars of Innovation." Organized by the DOEs National Energy Technology Laboratory, the Carbon Capture Simulation Initiative — or CCSI — Toolset consists of a suite of computational tools and modules to accelerate the development of carbon-capture technology for manufacturing businesses.

Researchers continue to find ways to utilize one of this state's — and this nation's — greatest research tool: the Green Bank Observatory. Thanks to a nearly $600,000 award from the National Science Foundation, Natalia Schmid and Kevin Bandura, faculty members in the Lane Department of Computer Science and Electrical Engineering, will do just that when they create a research experience for high school teachers. In partnership with the WVU Center for Gravitational Waves and Cosmology, they will create hands-on experiences for teachers using high-quality, open source software development tools, in both research engineering and educational settings.

WVU team chosen for contact with International Space Station crew

A proposal submitted by a collaborative team of student organizations from the Statler College of Engineering and Mineral Resources at West Virginia University was one of only 11 selected to advance to the next stage of the Amateur Radio on the International Space Station or ARISS program.

ARISS allows students worldwide to experience the excitement of talking with crew members on the ISS in hopes of inspiring them to pursue careers in science, technology, engineering and math.

"The team was elated to hear that we were accepted," said Kenneth Hite, a doctoral student from Summit Point, and WVU's Amateur Radio Club president, in a WVU media release. "This was the first proposal many students on the team have ever written, so it was especially exciting for them."

The team, led by WVUARC, submitted a proposal to demonstrate the educational benefits of an ARISS radio contact. With the assistance of WVU's student chapter of the Institute of Electrical and Electronics Engineers and the Student Partnership for the Advancement of Cosmic Exploration, the students proposed a plan to offer grade school children the opportunity to participate in several events featuring amateur radio-based projects.

"It's difficult trying to recruit younger students into amateur radio," said Jessica Liu, an electrical engineering student from Columbia, Maryland. "So what better way is there to promote it than having an opportunity to speak with an astronaut?"

WVUARC and IEEE plan to partner with the outreach department in the Statler College to promote STEM education through summer engineering science camps that will feature projects like communicating using Morse code and controlling robots via satellite. They plan to extend these programs to communities and schools throughout the state.

They have already partnered with University High School in Morgantown on their recently launched new science program, Earth and Space Science. The organizations will prepare presentations and projects on topics such as orbital mechanics, broadcasting basics and elevation antennas that will be incorporated into UHS curriculum.

The acceptance of their education proposal with ARISS will not only allow them to expand their current educational outreach efforts in the community but also expand their reach here on campus. For the past year, WVUARC has put a lot of effort into reviving their membership numbers, and are excited to see increased interest in the group.

"I wanted to get involved with the ARISS project because communicating with the ISS allows us to learn how the processes work between Earth and space," said Katie Warner, an electrical engineering student from Morgantown. "Having the opportunity to speak with crew members of the ISS through the ARISS project is a perfect way to apply the knowledge I have gained about electrical engineering here at WVU to a real-world application."

Before contact with the ISS is scheduled, the team must submit an equipment plan that demonstrates their ability to successfully carry out the amateur radio contact.

"This is also a rather technical challenge," said Heston Van Evera, an electrical engineering major from Shepherdstown. "Talking to the ISS will require not only proper antenna and radios, but also the equipment required to track the Space Station while it orbits. This is a challenge that will allow our club to gain a solid understanding of communication systems that only comes through actual application."

The team will be granted a technical mentor within the next month and plans to work with the Monongalia Wireless Association in order to raise funds for the new equipment and improvements necessary to meet the technical requirements. Pending approval, the contact will be carried out from the WVUARC's home base on the 11th floor of the Engineering Science Building on WVU's Evansdale campus.

NASA will provide scheduling opportunities for those who successfully complete an equipment plan during the second half of 2017.

CDI providing engineering innovation for more than 40 years in Charleston area

West Virginia, rich in natural resources and ripe with technological advancements, is home to a wide range of industries, including chemicals, technology, natural gas, energy, aerospace and automotive. CDI Corporation, with its expertise in these leading industries, has partnered with companies in the area for more than 40 years, providing engineering and technology services.

Based in Philadelphia, CDI has a critical delivery center in Charleston due to the concentration of industry leaders, particularly within the domestic oil, gas and chemical sectors. These clients rely on CDI to provide them with engineering and technology services that support their entire offering lifecycle and help them plan for the future of their enterprises. That means delivering measurable business value from ideation to realization to sustainment.

While providing core engineering services all the way from on-site and outsourced engineering and design, through plant turnaround and start-up support, CDI's team of experts focuses on delivering predictable outcomes through effective quality control on every project, and helping their clients safely meet their objectives in a timely, cost-effective manner.

Coupled with these engineering services, CDI's professional staffing capabilities offer a distinct advantage over the competition with the depth of services available through on-site delivery centers. This dual approach results in more nimble, expedient and flexible solutions for clients.

Since the creation of its Department of Energy in 2007, West Virginia continues to formulate plans to guide the development of its extensive energy resources. As a result, the state is taking a lead in meeting the country's energy needs through traditional resources and advanced technology in compliance with environmental regulations. CDI supports the expansion and profitability of the energy industry in West Virginia, with the natural gas sector providing a good example.

The vast natural gas reserves discovered beneath the state and throughout the region present tremendous opportunity to shift the cost structure of energy, revitalize the chemical/polymer industry and stimulate downstream manufacturing. West Virginia's long history of energy production and its familiarity with the industry, coupled with CDI's ability to provide engineering and professional staffing solutions, have resulted in significant progress in developing the infrastructure to transport natural gas to customers and industry users. Over the last 40 years, CDI has already placed more than 10,000 professionals on a combination of site services and engineering jobs in West Virginia, and this number will only increase as demand increases.

CDI is committed to supporting businesses in the Charleston area and throughout the state as they look to capitalize on the rich resources, advantageous location and local expertise of the region. Together CDI and West Virginia are working toward solutions that are vital to a robust economy and the future of our country.

To learn more about CDI Corporation, visit www.cdicorp.com.