



Through key research from Pegasus Professor Jayanta Kapat and a Pegasus Partnership, UCF and Siemens Energy continue to advance energy innovation.

BY RYAN RANDALL

Growing up in India during the oil crisis of the 1970s, Pegasus Professor Jayanta Kapat remembers frequent rolling blackouts that underscored the urgent need for reliable energy sources. These formative experiences ignited his passion for energy, propelling him to earn bachelor's, master's and doctoral degrees in mechanical engineering, with the goal of becoming a pioneering researcher in the field.

Kapat, who is director of the Center for Advanced Turbomachinery and Energy Research, was drawn to UCF in 1997 because of the university's collaboration with Siemens Energy. Three years later he began working with the global tech company on groundbreaking research initiatives that have led to a deeper partnership. Since 1996 Siemens Energy has invested more than \$13 million in research at the university. The partnership also resulted in more than 900 UCF alumni currently employed by the company, with many in leadership roles.

Kapat's contributions to the field have led to six U.S. patents, over 200 peer-reviewed publications and several accolades over the years, including most recently the 2024 International Gas Turbine Institute's Technology Award, presented by the American Society of Mechanical Engineers.

Here's how Kapat's work continues to strengthen UCF's partnership with Siemens Energy.

INNOVATION THAT DRIVES INDUSTRY

At the center of a power plant is a gas turbine, a continuous flow internal combustion engine that can produce up to 400 megawatts and power cities.

To increase power production, Kapat is working with Siemens Energy to improve gas turbine cooling. This allows the turbine to operate at higher temperatures, sending out more power and reducing the amount of fuel consumed.

Kapat is also researching cost-saving techniques for industrial steam production that can be used in the paper and pulp industry. To utilize the energy produced during the process, he's studying using steam created by electricity. The steam would be used for paper production, while the electricity would be stored for use later, he says.

This collaboration is producing industry-evolving research, showcasing how strong partnerships fuel innovation at UCF.

INVESTING IN THE INDUSTRY OF THE FUTURE

Kapat's research has laid a foundation for a recent expansion in UCF's collaboration with Siemens Energy. In October 2024 the company became a Pegasus Partner, engaging with the university on talent development and recruitment, shared research projects, joint ventures and strategic philanthropy.

The partnership includes a minimum investment of \$5 million to boost UCF's research in the energy sector and academic offerings for experienced energy professionals to enhance their management, leadership and business skills. It also supports continued research collaboration in the Siemens Digital Grid Lab, a research and educational facility established at UCF in 2017, now led by Associate Professor of Electrical Engineering Wei Sun.

At the lab, UCF students are preparing to enter the ever-evolving energy sector through hands-on training to design and manage self-healing power distribution grids. These grids will allow workers to quickly resolve issues caused by natural disasters, cyberattacks and other challenges. With access to the energy industry's latest microgrid software to manage and operate dynamic generation assets, students are better prepared for positions in the growing industry.

According to a study from the U.S. Department of Energy, the utilities sector added nearly 30,000 jobs from 2022 to 2023, a 5% increase from the previous year, and one of the fastest gains in employment growth across national industries. Florida is among the top five states with the greatest number of new energy job openings in the nation.

Siemens Energy also plans to invest \$800,000 in student recruitment efforts, focusing on postdoctoral researchers who can drive inventive ideas to meet the increasing global energy demand.

UCF's College of Engineering and Computer Science will be a key resource in identifying and nurturing top talent for the company.

FORWARD-THINKING COLLABORATION

UCF and Siemens Energy are examining additional ways to prepare students for careers in energy through future initiatives, such as a fellowship program. Similar to programs Siemens Energy has launched with European universities, a fellowship at UCF could attract students to contribute to energy advancements at the university. It will be the first fellowship for the company in the U.S.

There are discussions around executive education, with training for cybersecurity professionals on how to keep power grids secure. Like a master class, the course would allow UCF to showcase its educational excellence and allow Siemens Energy professionals to further their knowledge.

Additionally, UCF and the company are discussing a potential space on campus dedicated to research. While the Siemens Orlando Innovation Center is in Central Florida Research Park adjacent to UCF's main campus, there is a desire to build a research facility even closer to students to meet them where they are, says Michael Harding, UCF's associate vice president for partnerships.

Through this powerful partnership, UCF is utilizing the industry leader to help prepare students for the workforce, while also using research to drive technological advancements and keep those in the field aware of the latest trends.

"UCF is taking an applied approach to real-world problem solving and building partnerships to help get that done," Harding says. "Siemens Energy is a hallmark and we're here to help [discover] what could be the next best thing." ♦