



# Florida microgrids avaru

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Florida International University is a Top 50 public university that drives real talent and innovation in Miami and globally. High research (R1) activity and high social mobility come together at FIU to uplift and accelerate learner success in a global city by focusing in the areas of environment, health, innovation, and justice. Today, FIU has two campuses and multiple centers. FIU serves a diverse student body of more than 58,000 and 270,000 Panther alumni. U.S. News and World Report places dozens of FIU programs among the best in the nation, including international business at No. 2. Washington Monthly Magazine ranks FIU among the top 20 public universities contributing to the public good.

## EMINENT SCHOLAR CHAIRED PROFESSOR

Genie lab is a state-of-the-art Control Room for AI-Renewable Microgrid and hardware-in-the-loop real-time simulations. GENIE Lab houses OPAL-RT, and LabVolt simulators along with the InTouch Wonderware system, thereby providing the capability to test, simulate, and validate inverters, batteries, and other grid-based equipment.

## Recent Journal Publications

The Department of Electrical & Computer Engineering encompasses a broad range of research and educational interests. It is the policy of the department to involve each faculty member in a balanced combination of research and teaching so as to fully benefit the students. A large number of our faculty has considerable industrial experience, and many maintain active consulting roles to provide current and relevant knowledge to the students in classroom and research settings.

FIU Water? Check! Batteries? Check! Flashlights, first aid, canned goods? Check! If you're a Floridian, you know this checklist by heart. Storm season began June 1 and, as we've already seen, it's a busy one.

Florida Power & Light Company (FPL) has its own checklist to prepare for hurricane seasons, such as conducting an annual storm drill and countless pole inspections and tree trimmings. FPL is also working with FIU on cutting-edge research to protect the reliability of our energy supply during future severe weather events.

This is a project that not only has the potential to revolutionize the grid, it also demonstrates how cross-sector partnerships can result in innovation that benefits us all and provides meaningful opportunities for the next generation. As a professor at FIU's College of Engineering and Computing and director of FIU's Energy, Power and Sustainability Group, I have led research into renewable energy systems, large-scale storage, big-data, Artificial Intelligence (AI), electric vehicle systems, grid resiliency and smart grids. The project that my students and I have been developing with FPL is an AI-based microgrid scheduled to launch this fall.



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A micro-what? A microgrid is a smaller grid that can transition between grid-connected operations and "islanded" or autonomous operations. In other words, a microgrid can operate independently from the larger grid. To understand the significance of this capability and how its impact extends beyond FIU, it's important to understand how the larger grid that FPL operates works.

The larger grid is an interconnected system that delivers electricity to our homes, businesses and even college campuses. Because the system is interconnected, when one area of the grid is damaged by a devastating storm or natural disaster, it can cause many of us to lose power. But a microgrid's ability to operate autonomously changes the game and is an example of how South Florida's leaders can come together to tackle the unique challenges our region faces, like hurricanes and their impact on our infrastructure.

Should a hurricane damage a substation or cause a tree to knock out a power line, a microgrid can disconnect from the larger grid and operate independently using a decentralized group of local electricity sources to supply power to the buildings or homes connected to it. So, in the event of severe weather, the FIU-FPL microgrid would be able to supply uninterrupted power to our engineering campus.

The microgrid also pairs this reliability with clean energy production, leveraging a 4,400 solar panel array FIU developed with FPL to generate and store renewable power in a large-scale battery (3MW/ 9 MWh) integrated with a Command-and-Control Center and Real-Time Simulation lab spread over 30,000 sq. ft. facility. As a bonus, this solar canopy also provides shade for about 400 parking spaces. The microgrid will use AI and machine learning to optimize microgrid operations while running autonomously.

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