UCF Faculty Cluster

Resilient, Intelligent and Sustainable Energy Systems (RISES)

The research cluster, *Resilient, Intelligent and Sustainable Energy Systems* (RISES), is an interdisciplinary cluster that, when completed, has **three pillars**: **smart grid** (sensing, communication, control, transmission and distribution) for *intelligence* and *resiliency*, **PV system** for *sustainability*, and **energy storage** for *efficiency* and *integration*. RISES has a core membership of faculty members from College of Engineering and Computer Science, College of Optics and Photonics, College of Health and Public Affairs, College of Business Administration, and Florida Solar Energy Center.

Vision

As a university-wide multi-disciplinary team of faculty and students, the RISES cluster commits itself to transformative and collaborative research in resilient, intelligent and sustainable energy systems. Through partnerships between university, utility, and government stakeholders, we aim at facilitating deployment and integration of renewable energy resources as well as providing innovative solutions that make electricity grids self-organizing, efficient and resilient.

Technical Goals

The cluster focuses upon holistic analysis, design, development and deployment of distributed renewable energy resources (PV systems in particular), advanced information, communication, control and optimization technologies, along with supporting economic and management policies. Through meeting these technical goals, we can reliably integrate renewable resources, achieve better power quality, and best use markets to enable customers to make intelligent and environmentally conscientious decisions. Given that renewable generation is varying, intermittent and distributed and that more and more customers will have large and schedulable loads such as electric vehicle, radical changes are underway in power distribution networks, and next-generation power systems are emerging as adaptable, self-healing and efficient. Public policy and economic incentives will play a vital role in facilitating adoption of renewables, incorporation of new markets and operations, asset optimization and operational efficiency, encouraging customers' behaviors, and achieving a high penetration level. Furthermore, electric power grids at both distribution and bulk transmission levels must also be resilient against both natural disasters and cyber/physical attacks.

Core Faculty Members

- Department of EECS, College of Engineering and Computer Science
  Zhihua Qu, Professor and Chair, Director of FEEDER
  Marwan Simaan, Professor and 21st Century Chair
  Azadeh Vosoughi, Associate Professor
  Wei Sun, Assistant Professor
  Issa Batarseh, Professor
  Peter Yuan, Professor and Director of MIST
  Tom Wu, Professor

Qun Zhou, Research Assistant Professor

- College of Optics and Photonics
  Winston Schoenfeld, Associate Professor, Director of PVMC
  Kristopher Davis, Engineer
- Florida Solar Energy Center
  Robert Reedy, Engineer
- Department of Public Administration, College of Health and Public Affairs
  Naim Kapucu, Professor
- Department of Economics, College of Business Administration
  Mark Soskin, Associate Professor
- Department of CECE, College of Engineering and Computer Science
  Nicos Makris, Professor

Externally-Funded Research Centers under the Cluster

- FEEDER Consortium (funded by DoE, 2013-2018)
- PV Manufacturing Consortium (funded by DoE, 2012-2017)
- MIST Center (funded by NSF, 2014-2019)