



GRAPES
GRid-connected Advanced Power Electronic Systems

About GRAPES

GRAPES is...

A National Science Foundation Industry/University Cooperative Research Center established in 2009. The GRAPES Center's mission is to accelerate the adoption and insertion of power electronics into the electric grid in order to improve system stability, flexibility, robustness and economy.

Our Focus is...

- The design, development, evaluation, control and standardization of grid-connected power electronic equipment on both the supply and load side of power systems.
- To develop new technologies for advanced power electronic systems in the areas supporting grid-connected distributed energy resources, power steering and routing devices and intelligent load-side devices.
- To develop the software and tools for controlling embedded and grid-connected power electronics to benefit the grid as well as controlled loads.
- To educate engineers who understand the power electronic technologies important to member companies and to the power industry as a whole.

The Benefits of Joining are...

- Access to research personnel
- Access to student for GRAPES research, internships and hiring
- Access to cutting-edge university research facilities
- Opportunities to network with other professionals in the power industry
- Opportunities for technology transfer (non-exclusive IP development rights)

Facilities:

University of Arkansas: National Center for Reliable Electric Power Transmission (NCREPT): established for the purpose of investigating solid-state solutions for the electric power grid including protection devices and FACTS as well as energy storage and distributed generation applications. <https://ncrept.uark.edu>

- Highest Power Test Facility on any U.S. University Campus
- Internationally Recognized, Award Winning Research (3 R&D Awards)
- Supports 3 Centers of Excellence
- 70 feet of Wall-Mounted 480 V/1200 A ac Busway
- 70 feet of Wall-Mounted 1500 V/1500 A dc Busway
- Server/IT Room Dedicated for Cyber Security Research Equipment
- 120 Ton Chiller
- 400 Sq. Ft. SCIF/Secure Room

University of Wisconsin-Milwaukee: Center for Sustainable Electrical Energy Systems: This center brings together the capabilities of existing Laboratories and Centers within UWM College of Engineering & Applied Science to enhance the collaborations within UWM and with other groups and organizations. Major research and education areas of the center include power electronics, microgrids, energy storage, protection, and cybersecurity.

- Three labs with over 5000 sq-ft and over 500kVA power supply capabilities (three-phase 480 and 208)
- Full packages of MATLAB/Simulink, PSIM, PSS/E, and PSCAD
- Hardware in loop setups with National Instrument Compact RIO, Typhoon, and OPAL RT
- High power AC and DC sources, oscilloscopes with high voltage and high current probes, power electronics converters and devices
- Two synchronous generators 63 kVA, 100hp dyno, and high power loads
- 50kW solar PV and 12kW wind turbine
- 114kW Li-Ion storage and two 45kW natural gas generators

Membership Benefits

GRAPES Members benefit greatly from their membership in the center. Some of the major benefits are:

- Members have non-exclusive rights to the entire GRAPES research portfolio under the conditions outlined in the Membership Agreement. This includes reports, papers, theses, dissertations, and all protected intellectual property generated by the center.
- All members have the opportunity to propose research ideas and focus areas for research. As part of GRAPES' ongoing activities, all IAB members are invited to work with researchers on the strategic planning work of the center, ensuring a constant focus on the most relevant issues in the power industry today.
- Members have an ongoing interaction with center personnel. Members receive information from the center through monthly email updates, semi-annual project review conference calls, strategic planning meetings, semi-annual face-to-face meetings and through direct interaction with GRAPES faculty and students.
- An opportunity to work with the graduate students who are the next generation of power engineers. GRAPES focuses strongly on IAB member interaction with students both so that students can be intimately familiar with the issues they will face when they go to work and so that IAB members have the opportunity to meet their future employees!
- A significant leverage on the research dollars invested into GRAPES research. With 16 members and support from government agencies such as the National Science Foundation, GRAPES members can leverage their research dollars more than 17:1 in the GRAPES center.



Current GRAPES Members