

Autumn 2016
CHPPE Orientation and Recruitment
Session

Date: August 30, 2016

Location: DL 260

Time: 4:00 – 5:30 PM

Learn about our research activities

Meet graduate students

Lab tour

Visit our website for more information:

chppe.osu.edu

Research Structure



Dr. Longya Xu,
Center Director



Dr. Mahesh Illindala



Dr. Jian Kang Wang

Power System

Research Focuses

Power Devices:

- Advanced heterostructure devices
- New materials and fabrication
- Device characterization and modeling

Machine & Converter:

- WBG-based converter
- Smart actuator
- Module/system packaging
- Power quality/EMI

Power System :

- System architecture
- Microgrid
- Control and stability
- PE penetrated system Analysis



Dr. Longya Xu



Dr. Jin Wang



Dr. Fang Luo

Machine / Circuit / Packaging



Dr. Siddharth Rajan



Dr. Wu Lu

Semiconductor Devices

Contact:

Dr. Longya Xu

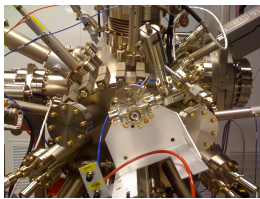
Xu.12@OSU.edu

CHPPE.OSU@gmail.com

Research Capability

- Material growth
- Device fabrication
- Power device characterization, dynamic evaluation and modeling
- High voltage arc / insulation testing
- High power electronics testing and experiments
- Very-High-Voltage device testing and evaluation
- High power ,high speed electric machine testing
- EMI testing
- Integrated power module packaging
- Power hardware-in-the-loop based hybrid microgrid testbed
- Large scale real-time simulation

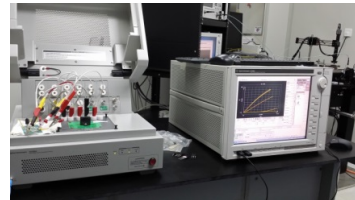
Facilities (*Full Access to OSU Nanotech West Lab <http://www.nanotech.osu.edu/>)



MBE



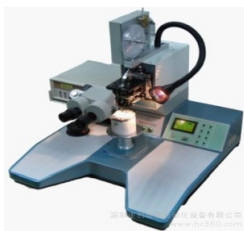
*Nanotech West Lab:
10,000 ft² Cleanroom Space



Power Curve-Tracer



Probe Station



Wirebonder



Filpchip bonder



Reflow belt



Pull-Shear tester



High Power High
Speed Dyno



Dyno-room Control



High Power
Testing Bay



HIL Realtime
Simulation Tower

Faculty List



Dr. Longya Xu
Professor, Center Director
xu.12@osu.edu

- Power electronic converters
- Electric Machine and Drives
- FEA
- FACTS



Dr. Mahesh Illindala
Assistant Professor
illindala.1@osu.edu

- Smart grids & microgrids
- Distributed energy resources
- Electrical energy conversion & storage
- Advanced electric transportation systems



Dr. JianKang Wang
Assistant Professor
wang.6536@osu.edu

- Modern power system operation and planning
- Electricity markets, reconfiguration
- Demand side management
- Distributed generation and renewable energy



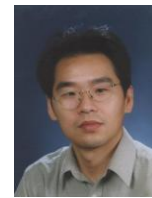
Dr. Jin Wang
Associate Professor
wang.1248@osu.edu

- High voltage and high power converters
- Special circuit topologies for WBG devices
- Renewable energy resources, hybrid electrical vehicle/fuel cell vehicle
- FACTS and high voltage engineering



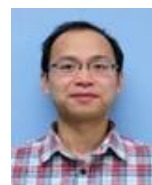
Dr. Siddharth Rajan
Associate Professor
rajan.21@osu.edu

- Nano-scale semiconductor devices
- Molecular beam epitaxy
- III-nitride semiconductors.



Dr. Wu Lu
Professor
lu.173@osu.edu

- Semiconductor device physics and design
- Advanced semiconductor processing technologies
- Device characterization and modeling
- Energy storage devices



Dr. Fang Luo
Research Assistant Professor
luo.571@osu.edu

- High power-density converters
- EMI filter integration and minimization
- EMI modeling
- Power module packaging & integration



Dr. Ayman Fayed
Associate Professor
fayed.1@osu.edu

- Mix-signal circuit design
- On-chip power grid
- Power management IC
- Energy Harvesting

Project Funding Agencies



National Institutes
of Health



U.S. DEPARTMENT OF
ENERGY



Department of
Development



Research Trusts

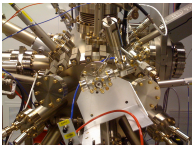
High Performance Power Electronics Lab a multi-million dollar center geared towards advanced power electronics circuits and devices;

High Voltage Laboratory a 3600 square feet facility that hosts the biggest arcs and sparks in the U.S. universities;

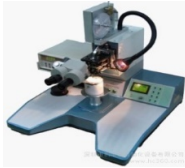
Distributed Real Time Simulation Platform a DoE sponsored real time simulation platform for both the electrical and communication systems within a smart grid, featured in the New York Times on Dec. 30 2010.

Integrated Power Electronic Packaging Lab an integrated cleanroom lab space, with the equipment for die handling, interconnection, and module encapsulation.

Part of the Facilities



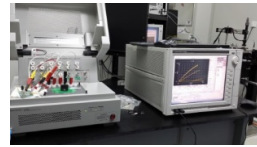
MBE



Wirebonder



High Power High-Speed
Drive-stand



Power Curve-Tracer



HIL Real Time
Simulation Tower

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- New materials and new energy storage devices
- Device characterization and modeling
- Power management IC and energy harvesting IC

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Funding Achievement in Q1 2016

> \$6 M

- **Medium Voltage Drive for Next Generation High Speed High Power Electric Machines**, PI: Longya Xu, Department of Energy, \$2.7 M, 2016~2018;
- **Design and Synthesis of Resilient Microgrid Systems**, PI: Mahesh Illindala, Office of Naval Research Young Investigator Award, \$500 k, 2016~2018
- **Intelligent Power Systems**, PI: Jin Wang, Air Force Research Lab, \$680 k, 2016~2018
- **Medium Voltage Gate Drive for Silicon Carbide Devices**, PI: Jin Wang, PowerAmerica/Department of Energy, \$200 k, 2016~2017
- **Hybrid and Turbo Electric Propulsion System**, PI: Fang Luo, State of Ohio/Federal Research Network, \$1.5 M, 2016~2018
- **Control of Intelligent Power Systems**, PI: Jiankang Wang, State of Ohio/Federal Research Network, \$500 k, 2016~2017