



ECCE 2023 Expo: Spotlight on Universities & Other R&D Institutions

**PAYTON PLANAR
MAGNETICS**
the global leader of Planar Magnetics Technology
UK USA JAPAN RO KOREA

INDUSTRIAL MEDICAL DEFENSE

HONORING LUMINARIES
ECCE 2023 Special Session
October 21st - 23rd 8:00am - 5:00pm

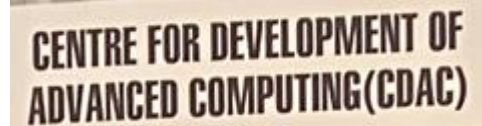
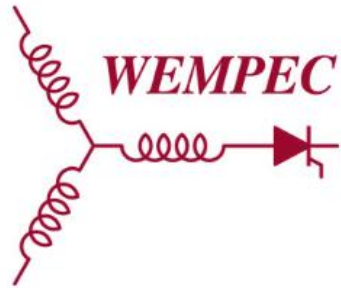
CPES
Center for Power Electronics Systems

Virginia Tech

ECCE 2023
Analysis and Design of a Hybrid Propulsion System for Aerospace Applications

ECCE 2023
Redundant Motor Drives for Automotive Applications

ECCE 2023 Welcomed 13 Universities, 2 National Laboratories and 1 Scientific Organization To The Expo





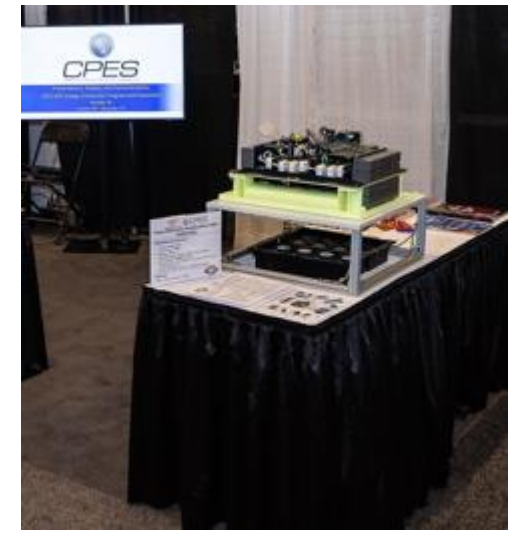
CURENT

Center for Ultra-wide-area Resilient
Electric Energy Transmission Networks

actuation
control
modeling
monitoring

- High Bandwidth Printed Circuit Board Stacked Rogowski Coils
- This prototype is absent for Student Demo Session Table 6
- GaN Based High Efficiency Multi-Load Wireless Power Supply
- 1 kV/6.25 A/50-W Transformer for Medium Voltage Dual Active Bridge Converters
- 800 V/75 A/VA Three-Level GaN Based EV Drive Inverter







NREL

Transforming
ENERGY

Smart
Grid
Solutions

- Q&M Costs
- Capital Costs
- Demand Cost
- Energy Cost
- Energy Saving
- Demand Savin

Saturday, April 02, 2016 11:05

Careers at NREL

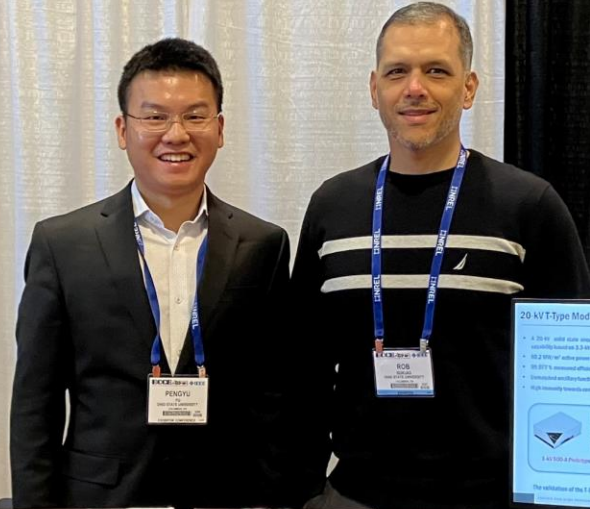
GaNPOWER
the Future!

engine 4 us

NREL
Transforming

OHIO STATE UNIVERSITY

511



20 kV-T-Type Modular DC Circuit Breaker (T-Breaker) for Future DC Networks

- A 20-kV, 4000 A-rated circuit breaker with 100-A fault current capability and 2.5 μs DC zero-current time
- 99.2 20% w/o arcing protection
- 100% 20% w/o arcing protection
- High immunity towards control signal malfunctions

OSU
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63 W & 90 W Six-Phase Boost DC-DC Power Converters

High Temperature Naturally-Cooled 2.5 kW Integrated Drive

Electric Propulsion: Challenges and Opportunities

120 V, 10 kW Low-Bandwidth DC Energy Buffer





**Centre for Development
of Advanced Computing (CDAC)**
University Table #10



**New Exhibitor at ECCE 2023*

FREEDM SYSTEMS CENTER

NC STATE UNIVERSITY

100% REVENUES
20% INDUSTRY PARTNERS
140 Ph.D. AND MASTER'S GRADUATES

FREEDM SYSTEMS CENTER

Plug in to the power of FREEDM

FREEDM SYSTEMS CENTER

Research in Power Systems

- Model of Control Response
- Model of Control Response
- Model of Control Response
- Model of Control Response

ECCE 2023
IEEE ENERGY CONVERSION CONGRESS & EXHIBITION

EXPO HALL

811 ENERGY CONVERSION CONGRESS & EXHIBITION | KANSAS CITY, MO | OCT 28-NOV 2

Man in brown jacket and blue lanyard talking to a woman with curly hair.

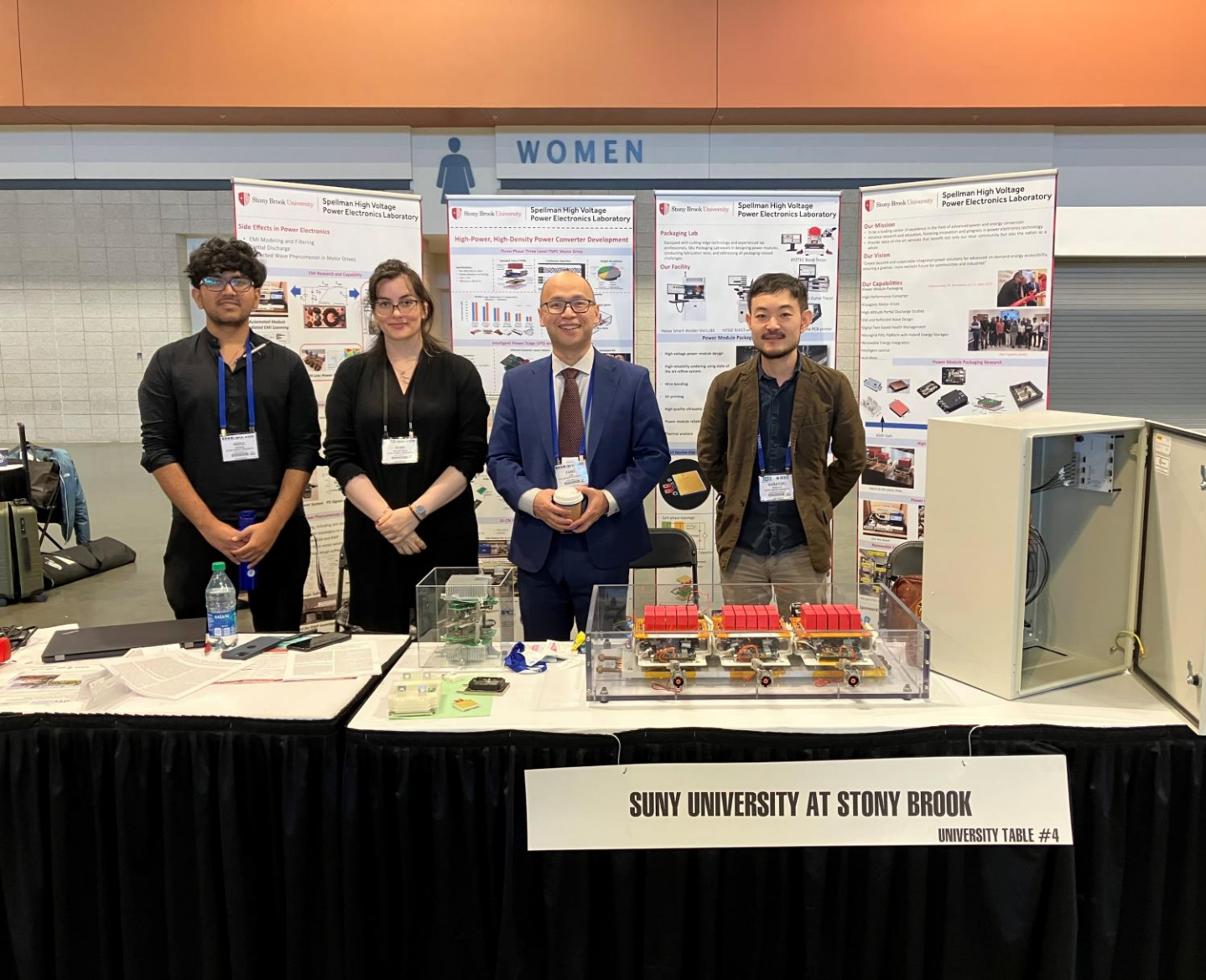
Distributed Energy
and the rapidly evolving grid

Select Progress

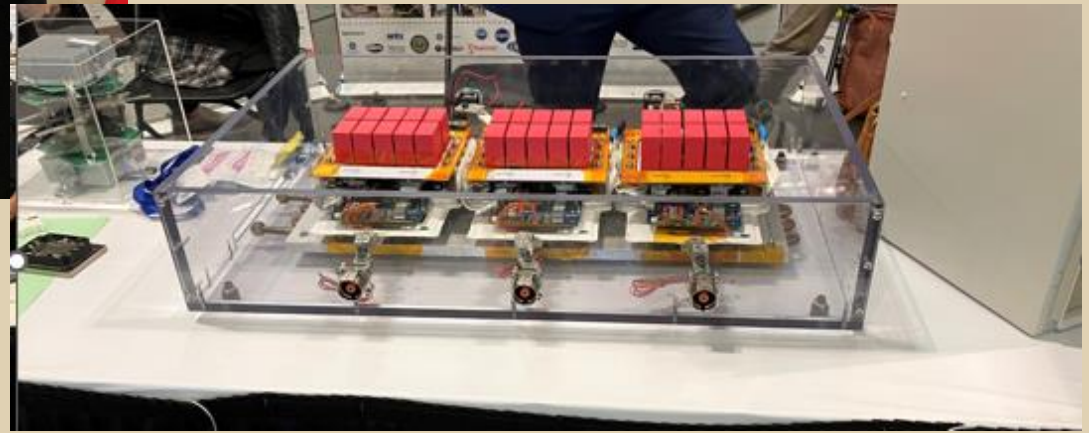
Research in Power Systems

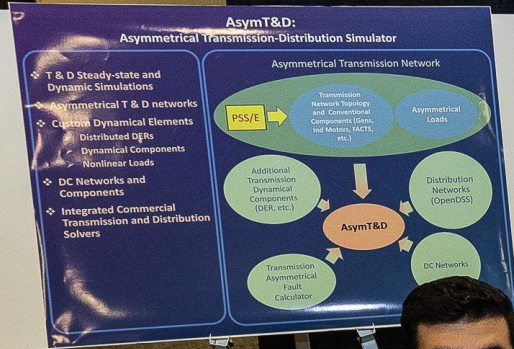
ECCE 2023: Reduction of Converter EMI Research in Power Electronics System

ECCE 2023: Near-Field EMI Research in Power Electronics System



**New Exhibitor at ECCE 2023*





This vertical poster is divided into four sections:

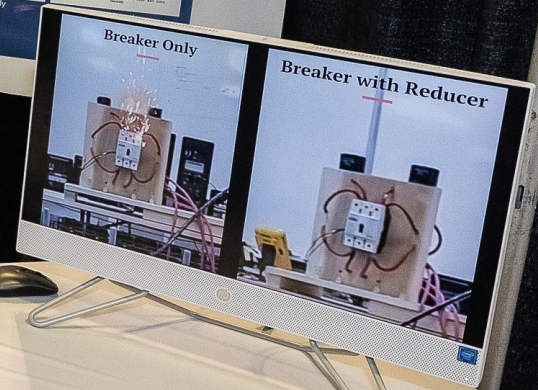
- Power system analysis:** Lists 'Steady-state', 'Dynamic (EMT-EMT)', and 'Small-signal analysis'. It includes a graph showing a signal over time.
- Finite Element Analysis:** Lists 'Verifex studies with COMSOL' and 'AC-DC, Heat Transfer, etc.'. It includes two 3D mesh models.
- Hardware-in-the-loop (HIL) simulations:** Lists 'Experience in building state-of-the-art laboratories' and 'Establishing state-of-the-art laboratories'. It includes a graph and a photo of a lab setup.
- Programming for Engineering solutions:** Lists 'Developing tools for steady-state/dynamics analysis' and 'Visualizing the results'. It includes a circuit diagram.

The bottom of the poster features the LSU logo and the text 'LSU UNIVERSITY OF LOUISIANA'.

The poster is titled 'Arc Reducer For DC Breaker'. It contains two columns of bullet points:

- Mechanical DC Breakers are prone to significant arcing due to the absence of current zero crossing. Inductive electrical paths can generate significant arcs that can damage the circuit breaker contacts. Current reduction methods can help reduce the arc in the DC Breaker at the expense of:**
 - Costly inductors
 - Delayed contact operation
 - Complex power electronic-based circuitries
- Our Arc Reducers:**
 - Can significantly reduce contact arc in inductive DC circuits
 - Can significantly reduce the current interruption time
 - Provide current zero crossing in an oscillatory fashion
 - Do not use inductors
 - Utilize simple power electronic circuitries
 - Tested at voltages up to 1000V
 - Can increase the voltage rating of the DC breaker

At the bottom, it states '500V 800A current interruption under 5mH circuit inductance' and 'Interruption time improved from 0ms to 10ms'. It includes two graphs: 'Breaker Only' and 'Breaker with Reducer', showing current over time.



*New Exhibitor at ECCE 2023

Spellman High Voltage Power Electronics Laboratory
WEMPEC
 WISCONSIN ELECTRIC MACHINES & POWER ELECTRONICS CONSORTIUM

Our Mission
 To build better products in the field of advanced power and energy conversion. Research, development and education. Keeping pace with progress in power electronics technology. We do this for the benefit of our customers and the broader academic and industrial communities.

Our Vision
 To become the world's leading provider of advanced power and energy conversion technology. We do this by providing the highest quality products and services to our customers and the broader academic and industrial communities.

Our Capabilities
 High Voltage Power Electronics
 High Power Power Electronics
 High Frequency Power Electronics
 High Current Power Electronics
 High Voltage Power Electronics
 High Power Power Electronics
 High Frequency Power Electronics
 High Current Power Electronics
 High Voltage Power Electronics
 High Power Power Electronics
 High Frequency Power Electronics
 High Current Power Electronics

Power Quality Technology Research
 100kW
 100kVA
 100MVA

Power Quality Technology Research
 100kW
 100kVA
 100MVA

Power Quality Technology Research
 100kW
 100kVA
 100MVA

Power Quality Technology Research
 100kW
 100kVA
 100MVA

WEMPEC
 WISCONSIN ELECTRIC MACHINES & POWER ELECTRONICS CONSORTIUM
 Collaboration and Innovation Since 1981

Hands-on Education
 Pre-Competitive Research
 Advancing Technology

Faculty:
 Jinia Roy
 Lei Zhou
 Daniel Ludovis
 Bulent Sarioglu
 Girij Venkataramanan
 Thomas Jahns



WEMPEC
 www.wempec.wisc.edu

WISCONSIN
 UNIVERSITY OF WISCONSIN-MADISON

WEMPEC
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2023 Research Summary

Experimental Validation of a Novel Power Converter

High Power Power Electronics

High Frequency Power Electronics

High Current Power Electronics

High Voltage Power Electronics

High Power Power Electronics

High Frequency Power Electronics

High Current Power Electronics

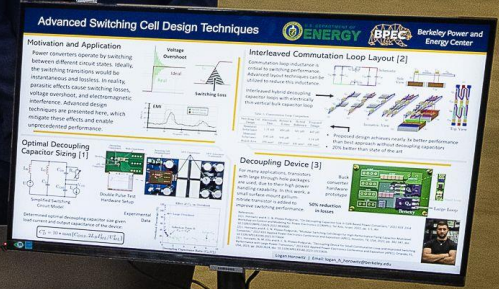
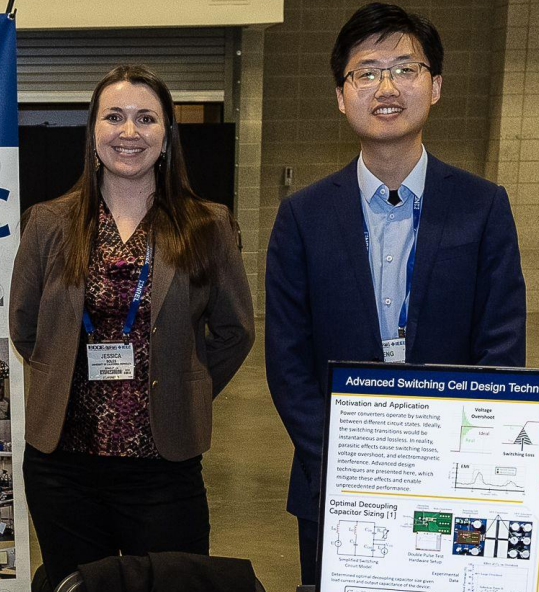
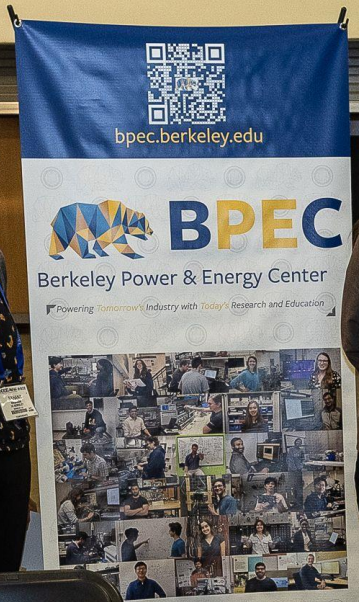
High Voltage Power Electronics

High Power Power Electronics

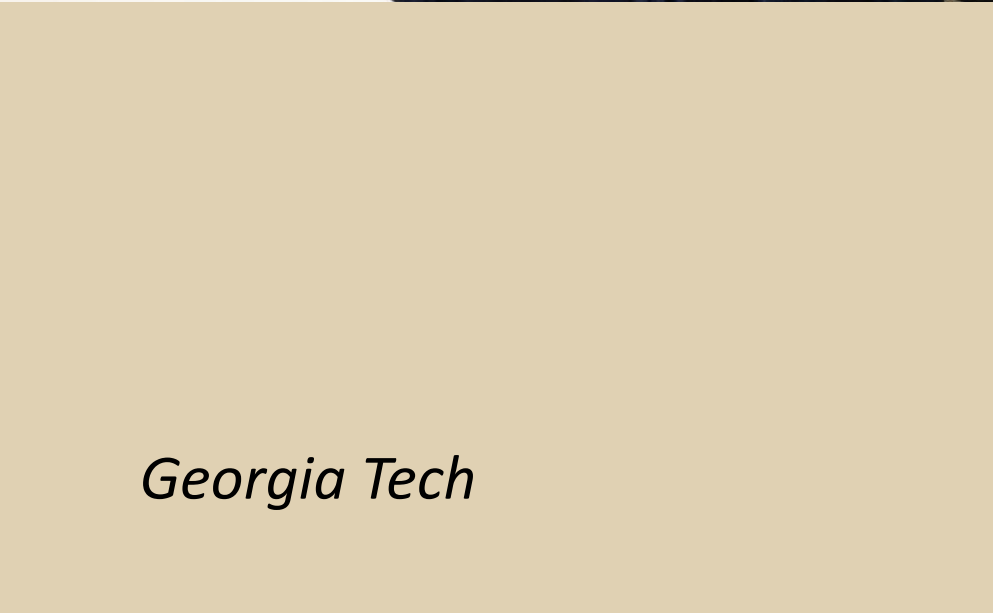
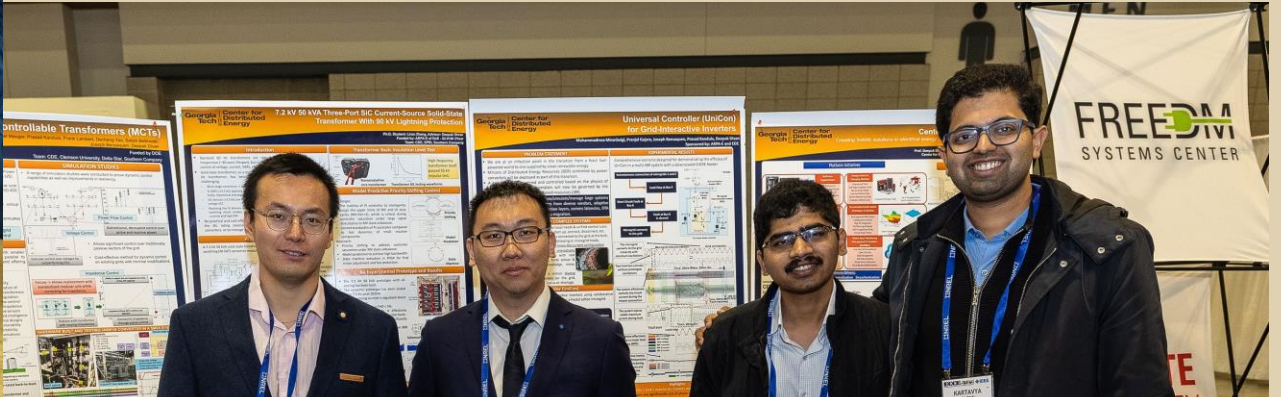
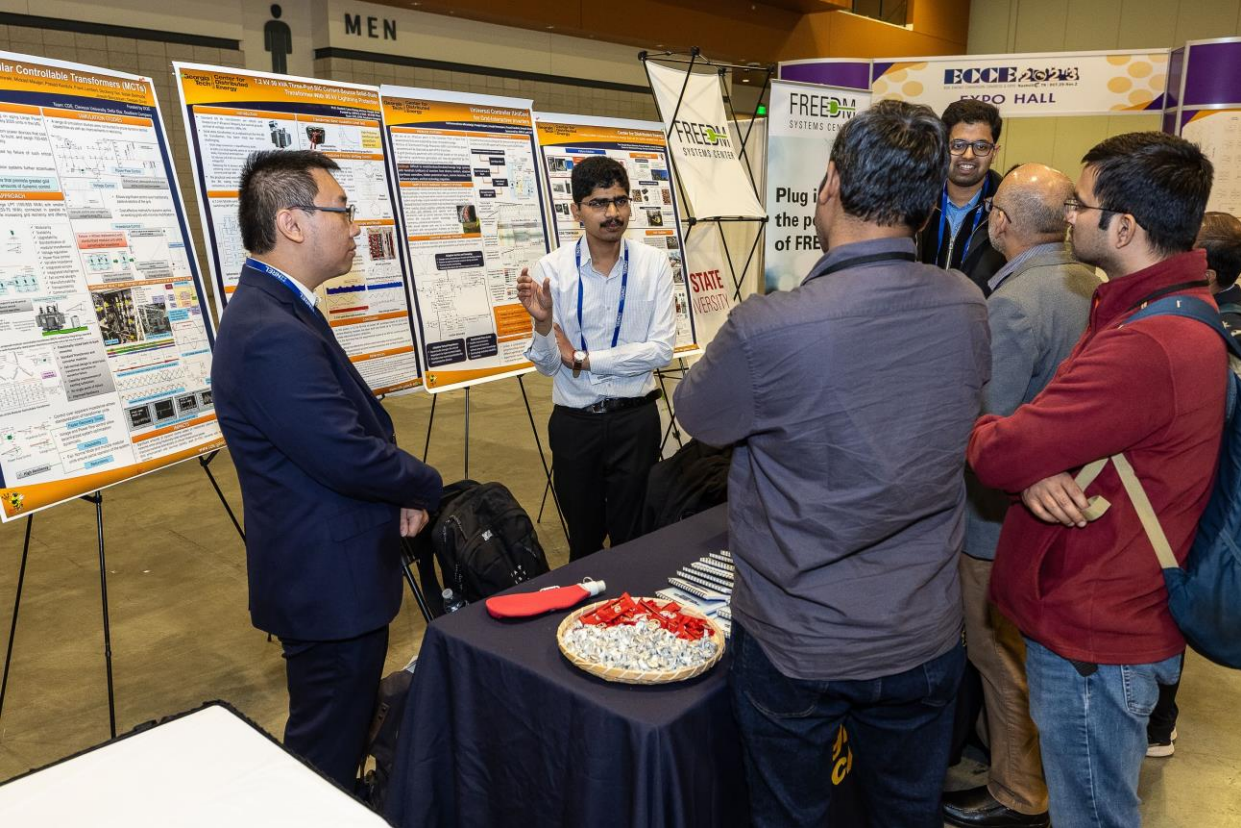
High Frequency Power Electronics

High Current Power Electronics

High Voltage Power Electronics



**New Exhibitor at ECCE 2023*



Georgia Tech


Concordia
 UNIVERSITY

Université Concordia 514 rue Sainte-Catherine Ouest, Montréal, Québec H3B 2W1

PEER POWER ELECTRONICS & ENERGY RESEARCH GROUP

PEER group, formerly the Power Electronics Research Group (PERG), was initiated at Concordia University in 1985.

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Georgia Tech Center for Distributed Energy
Modular Controllable Transformers (MCTs)
 Hui Zhong, Mohan Ravi Varma, et al.

PROBLEM STATEMENT
 The electric power system is heavily stressed by the increasing penetration of renewable energy sources. Large Power Transformers (PTs) are being replaced by smaller modular units to reduce size, weight, and cost, making them very difficult to replace. The flexibility of the grid is greatly affected by failure of such critical components.

CHALLENGE
 To increase LPT design that provides power grid flexibility while adding significant amounts of dynamic control.

PROPOSED APPROACH
 This idea is to increase the range of LPT (MCT) and make modular and independent units. MCTs are designed to be able to handle power for wide ranging grid loading and offering advanced control capabilities.

Key Features

- Scalability
- Flexibility
- Modularity of modular transformers
- Voltage regulation
- Power factor correction
- Energy storage capability
- Advanced design
- Environmental friendliness
- Compactness

IMPACTS
 • Reduce the size and weight of power transformers
 • Increase the range of LPT (MCT) and make modular and independent units
 • Voltage regulation and power factor correction capability
 • Energy storage capability
 • Advanced design
 • Environmental friendliness
 • Compactness

Georgia Tech Center for Distributed Energy
90 kW Light

Introduction
 This project is a 90 kW light fixture that is designed to be used in a variety of applications. It is a modular and independent unit that can be used in a variety of applications.

Proposed Approach
 This idea is to increase the range of LPT (MCT) and make modular and independent units. MCTs are designed to be able to handle power for wide ranging grid loading and offering advanced control capabilities.



**Concordia University*


University of Kentucky
SPARK laboratory
<http://sparklab.engr.uky.edu/>


PEIK
Power and Energy
Institute of Kentucky
www.engr.uky.edu/power


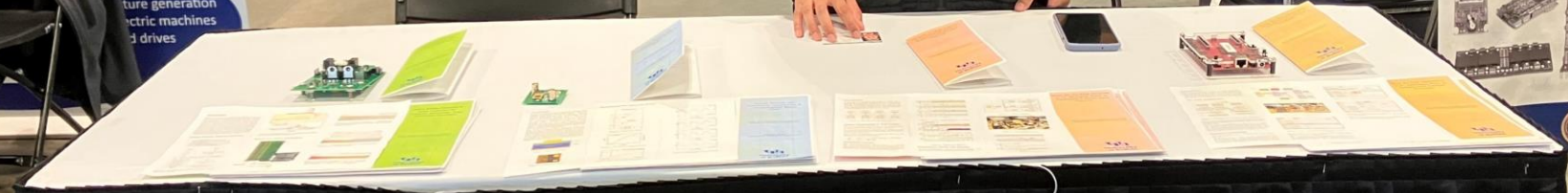

Electrification of transportation - electric motors and power electronics

Simulation smart homes, grids, and EVs

Future generation electric machines and drives


bpec.berkeley.edu

 **BPE**
Berkeley Power & Energy Center
Powering Tomorrow's Industry with Today's Research and Education

UNIVERSITY AT BUFFALO
UNIVERSITY TABLE #1

**New Exhibitor at ECCE 2023*

