# 2025 Power Electronics and Energy Conversion Workshop

ALBUQUERQUE MUSEUM | 2000 MOUNTAIN ROAD NW ALBUQUERQUE, NM 87104
**JULY 15-16, 2025**

The Sandia Power Electronics and Energy Conversion (PEEC) Workshop, held annually, focuses on the latest technical advancements in power electronics and energy conversion technologies. The workshop features technical sessions and panels that delve into topics across applications, converter topologies, and components. By bringing together experts from academia, industry, and government, the event aims to foster collaboration and accelerate the development of innovative solutions.

**The PEEC 2025 themes are *Integration of Power Electronics and Power Systems* and *Security and Resilience***

## Tuesday, July 15, 2025

### Breakfast

**8:00 am – 9:00 am**

### Opening Remarks

**9:00 am – 9:45 am**

9:00 – 9:10 **Welcome:** Valerio De Angelis *(Sandia National Laboratories)*
9:10 – 9:20 **Welcome:** Erik Webb *(Sandia National Laboratories)*
9:20 – 9:30 **Virtual Welcome:** Department of Energy
9:30 – 9:45 **Overview of MERIT:** Madhu Chinthavali (*Oak Ridge National Laboratory)*

### Break

**9:45 am – 10:15 am**

### Session 1: Grid Security & Resilience

**10:15 am – 12:00 pm** **Co-Chairs:** Steve Glover *(Sandia National Laboratories)* & Mike Ropp *(Sandia National Laboratories)*

10:15 – 10:20 **Introduction:** Session Chairs
10:20 – 10:35 **Building a Smarter Energy Future: Duke Energy's Path to a Secure & Resilient Grid:** Jason Handley *(Duke Energy)*
10:35 – 10:50 **Grid Resiliency and the DoD:** Matt Haupt *(Former Navy)*
10:50 – 11:05 **Ground Induced Current Drivers and Mitigation:** Joseph Blankenburg (*Department of Energy*)
11:05 – 11:20 **Resilient Energy Systems Development at Sandia National Laboratories:** Lee Rashkin *(Sandia National Laboratories)*
11:20 – 12:00 **Panel Discussion**

## Lunch

**12:00 pm – 1:00 pm**

## Session 2: Overview of Power Electronics

**1:00 pm - 2:30 pm** **Co-Chairs:** Stan Atcitty *(Sandia National Laboratories)* & Jake Mueller *(Sandia National Laboratories)*

1:00 – 1:05 **Introduction:** Session Chairs

1:05 – 1:20 **Electrical Insulation Investigation for Medium-Voltage SiC Power Modules:** Christina DiMarino *(Virginia Tech)*

1:20 – 1:35 **Power Electronics and the Energy Transition:** Joseph Benzaquen *(Georgia Institute of Technology)*

1:35 – 1:50 **Evaluation of Power Electronics for Optimal Performance and Offsite Implementation:** Christopher Recio *(Mainstream Engineering)*

1:50 – 2:05 **Powering Data Centers with DC: Opportunities and Design Insights:** Amin Zamani *(Quanta Technology)*

2:05 – 2:30 **Panel Discussion**

## Break

**2:30 pm – 3:00 pm**

## Session 3: Power Electronics Integration with Power Systems

**3:00 pm - 4:30 pm** **Co-Chairs:** Brian Pierre *(Sandia National Laboratories)* & Matthew Reno *(Sandia National Laboratories)*

3:00 – 3:05 **Introduction:** Session Chairs

3:05 – 3:25 **Inverter-dominated Transmission Systems – Protection and Stability:** Matthew Reno *(Sandia National Laboratories)*

3:25 – 3:45 **Advanced Models and Simulation Tools for Studying Power Electronics in Power Systems:** Wei Du *(Pacific Northwest National Laboratory)*

3:45 – 4:05 **Frequency-Constrained Real-Time Co-Optimization of Energy and Regulation Reserve with Inverter-based Battery Energy Storage Systems:** Masood Parvania *(University of Utah)*

4:05 – 4:30 **Panel Discussion**

## Closing Remarks

**4:30 pm – 5:00 pm**

## Evening Reception / Software Showcase

**5:00 pm – 6:30 pm**

- COMSOL / TCAD *(Mihai Negoita, Sandia National Laboratories)*
- LTSPICE *(Felipe Palacios II, Sandia National Laboratories)*
- PLECS *(Jake Mueller, Sandia National Laboratories)*
- PSCAD *(Miguel Jimenez Aparicio & Michael Ropp, Sandia National Laboratories)*

## Wednesday, July 16, 2025

### Breakfast

**8:00 am – 9:00 am**

### Opening Remarks

**8:30 am – 9:05 am**

8:30 – 8:35 **Welcome:** Charles Hanley *(Sandia National Laboratories)*

8:35 – 9:05 **Keynote Presentation | Unit of Compute:** Peter Panfil (*Vertiv)*

### Session 4: Semiconductor Materials

**9:05 am – 10:20 am** **Co-Chairs:** Andrew Binder *(Sandia National Laboratories)* & Lee Gill *(Sandia National Laboratories)*

9:05 – 9:10 **Introduction:** Session Chairs

9:10 – 9:25 **The Challenges and Opportunities for Integration of GaN Transistors in Modern Power Systems:** Eric Persson *(Infineon Technologies)*

9:25 – 9:40 **Silicon carbide devices for demanding power conversion applications:** Akin Akturk *(CoolCAD Electronics)*

9:40 – 9:55 **Progress in β-Ga2O3 Materials for High Voltage Vertical Devices:** James S. Speck *(University of California, Santa Barbara)*

9:55 – 10:20 **Panel Discussion**

### Break

**10:20 am – 11:00 am**

### Session 5: Passives & Packaging

**11:00 am – 12:30 pm** **Co-Chairs:** Luciano Garcia Rodriquez *(Sandia National Laboratories)* & Rick Floyd *(Sandia National Laboratories)*

11:00 – 11:05 **Introduction:** Session Chairs

11:05 – 11:20 **Capacitors and Aircraft Power System Considerations for Higher Temperature Operation and Wide Bandgap Enablement:** Roger Brewer *(Lockheed Martin)*

11:20 – 11:35 **High-Power Medium Frequency Transformers in Medium Voltage Power Electronics:** Zhicheng Guo *(Arizona State University)*

11:35 – 11:50 **Advancing High Voltage Power Module Packaging: Strategies for Partial Discharge Mitigation:** Xiaoqing Song *(University of Arkansas)*

11:50 – 12:05 **Advanced Packaging and Optimization for High Power/High Density WBG Modules:** Fang Luo *(Stony Brook University)*

12:05 – 12:30 **Panel Discussion**

### Lunch

**12:30 pm – 1:30 pm**

## Session 6: Demonstrations

**1:30 pm – 3:00 pm** **Co-Chairs:** Jack Flicker *(Sandia National Laboratories)* & Yuliya Preger *(Sandia National Laboratories)*

1:30 – 1:35 **Introduction:** Session Chairs

1:35 – 1:50 **Demonstrations & Value Propositions for Utility Integrated Power Electronics:** Mack W. Knobbe *(Southern California Edison)*

1:50 – 2:05 **Tesla Megapack Grid-Forming:** Mohammed Nassar *(Tesla)*

2:05 – 2:20 **Operationalizing Industrial Sensor Data for Scalable Asset Management of PV Inverters:** Murat Yildirim *(Wayne State University)*

2:20 – 2:35 **The Importance of BESS AC Containers for Grid Forming:** Andreas Fornwald (*StarCharge)*

2:35 – 3:00 **Panel Discussion**

## Closing Session

**3:00 pm – 5:00 pm**

- Student Project Demonstrations with Explora
- Free Entrance to Albuquerque Museum (Tour Guides Available)

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