

3D-PEIM 2025 Program

**Day 1 - Tuesday July 8, 2025**

| Time               | Description/Title  | Presenter                | Affiliation                     |
|--------------------|--|--------------------------|---------------------------------|
| 7:30 - 8:30 a.m.   | Registration Opens & Contentual Breakfast  |                          |                                 |
| 8:30 - 9:00 a.m.   | Welcome and Opening Remarks  | Faisal Khan, Peter Green | NREL                            |
| 9:00 - 9:45 a.m.   | <i>Plenary I : Beyond 2030, Powering the E-Powertrain with a High-Value and High-Efficiency Power Conversion System - a BorgWarner Perspective</i> | Harsha Nanjundaswamy     | BorgWarner                      |
| 9:45 - 10:15 a.m.  | Break  |                          |                                 |
| 10:15 - 11:55 a.m. | <b>S1: Converter Integration and Manufacturing</b>   |                          |                                 |
|                    | <i>Session Co-Chair</i>  | Jared Hornberger         | Wolfspeed                       |
|                    | <i>Session Co-Chair</i>  | Fang Luo                 | Stony Brook University          |
| 10:15 - 10:40 a.m. | Motor-Integrated Segmented Inverters   | Dakshina Murthy Bellur   | Cummins                         |
| 10:40 - 11:05 a.m. | Cost Reduction of Solar PV and Storage systems through the use of Advanced Inverters   | Leo Casey                | GoogleX                         |
| 11:05 - 11:30 a.m. | A High Power Density Inverter Design for Traction Applications   | Rohit Baranwal           | Eaton                           |
| 11:30 - 11:55 a.m. | Isolation Integration Into Cold Plate and Thermal Densification of Liquid-Cooled Power Modules and Environmental Stress                            | Thilo Vethake            | Trumpf                          |
| 12:00 - 1:00 p.m.  | Lunch  |                          |                                 |
| 1:00 - 2:40 p.m.   | <b>S2: Thermal Management</b>  |                          |                                 |
|                    | <i>Session Co-Chair</i>  | Adam Wilson              | U.S. Army Research Laboratory   |
|                    | <i>Session Co-Chair</i>  | Jong Ryu                 | North Carolina State University |
| 1:00 - 1:25 p.m.   | Overview of DARPA'S Heterogenous Integration Efforts   | Sumit De                 | DARPA                           |
| 1:25 - 1:50 p.m.   | Thermal Management Techniques for Power-Dense Advanced Packages  | Clay Pullins             | Northrop Grumman Corporation    |
| 1:50 - 2:15 p.m.   | Thermal Management in Power Electronics: The Role of Multifunctional Components and Phase Change Materials   | Rachel McAfee            | U.S. Army Research Laboratory   |
| 2:15 - 2:40 p.m.   | Die and Baseplate Warpage As a Critical Factor for Thermal Interface Material Development  | Dave Saums               | DS&A LLC                        |
| 2:40 - 3:10 p.m.   | Break  |                          |                                 |
| 3:10 - 4:50 p.m.   | <b>S3: Reliability</b>   |                          |                                 |
|                    | <i>Session Co-Chair</i>  | Przemek Gromala          | Bosch                           |
|                    | <i>Session Co-Chair</i>  | David Huitink            | University of Arkansas          |
| 3:10 - 3:35 p.m.   | Reliability Challenges for High-Power Modules  | Yong Liu                 | onsemi                          |
| 3:35 - 4:05 p.m.   | Power Electronics Module with Integrated Ceramic Heat Exchanger  | Doug DeVoto              | NREL                            |
| 4:05 - 4:30 p.m.   | Thermal and Reliability Considerations in Integrated Cooling inside a 3D Power Module  | David Huitink            | University of Arkansas          |
| 4:30 - 4:55 p.m.   | Reliability of Space Power Module  | Patrick McCluskey        | University of Maryland          |
| 3:10 - 5:10 p.m.   | <i>Lab Tour of Power Electronics and Electric Machines Facilities in Building 16 (Optional, advanced registration required)</i>                    |                          |                                 |
| 6:00 - 8:00 p.m.   | <b>WELCOME RECEPTION &amp; DINNER</b>  |                          |                                 |

**Day 2 - Wednesday July 9, 2025**

| Time               | Description/Title   | Presenter         | Affiliation              |
|--------------------|---|-------------------|--------------------------|
| 7:30 - 8:30 a.m.   | Contentual Breakfast  |                   |                          |
| 8:30 - 9:15 a.m.   | <i>Plenary P2: Advanced Packaging to System Integration – Trends and Challenges</i>         | Devan Iyer        | IPC                      |
| 9:15 - 9:45 a.m.   | Break   |                   |                          |
| 9:45 - 11:25 a.m.  | <b>S4: Module Integration and Manufacturing</b>   |                   |                          |
|                    | <i>Session Co-Chair</i>   | Chris Kapusta     | GE Aerospace             |
|                    | <i>Session Co-Chair</i>   | Patrick McCluskey | University of Maryland   |
| 9:45 - 10:10 a.m.  | Achieving Heterogeneous 3D Power Electronics Integration                                    | Alan Mantooth     | University of Arkansas   |
| 10:10 - 10:35 a.m. | Electronic Packaging and System Challenges in Deep-Space, Power Electronic Applications     | Joe Kozak         | Johns Hopkins University |
| 10:35 - 11:00 a.m. | GE POL-kW Power Module Packaging and Integration  | Shung ik Lee      | GE Aerospace             |
| 11:00 - 11:25 a.m. | Comparitive Study of Parasitic Capacitance of Dielectric Liquid Cooled Power Module designs | Shuofeng Zhao     | NREL                     |
| 11:25 - 12:30 p.m. | Lunch and Partner Exhibits  |                   |                          |

**Day 2 - Wednesday July 9, 2025 cont'd**

| Time               | Description/Title   | Presenter           | Affiliation                                |
|--------------------|---|---------------------|--|
| 12:30 - 2:10 p.m.  | <b>S5: Passive Components</b>   |                     |  |
|                    | <i>Session Co-Chair</i>   | Matt Wilkowski      | Würth Elektronik                           |
|                    | <i>Session Co-Chair</i>   | John Bultitude      | Consultant                                 |
| 12:30 - 12:55 p.m. | A Novel Capacitor-Embedded Substrate Technology for Next Generation Power Supply Applications                                     | Shuhei YAMADA       | Murata Manufacturing Co., Ltd              |
| 12:55 - 1:20 p.m.  | Segmented winding transformer (SWT) for Surface power delivery of large AI & HPC chips  | José A. Cobos       | Differential Power                         |
| 1:20 - 1:45 p.m.   | Inductive Components on Silicon Substrate 300mm Wafer   | Martin Haug         | Würth Elektronik                           |
| 1:45 - 2:10 p.m.   | FOM for High-frequency Integrated Magnetics   | Ranjit Sai          | Tyndall                                    |
| 2:10 - 2:40 p.m.   | <b>Break</b>  |                     |  |
| 2:40 - 3:40 p.m.   | <b>S6: Partner Presentations</b>  |                     |  |
|                    | <i>Session Chair</i>  | Bidzina Kekelia     | NREL                                       |
| 3:40 - 5:10 p.m.   | <b>S7: Poster Session, and Benchtop/Exhibits from Partners</b>  |                     |  |
|                    | <i>Session Co-Chair</i>   | Jason Rouse         | Taiyo-America                              |
|                    | <i>Session Co-Chair</i>   | Sreekant Narumanchi | NREL                                       |
|                    | <i>Effect of Moisture on the Field-Grading of a Polymer Nanocomposite Coating in Medium-Voltage Power Modules</i>                 | Zachary Zintak      | VirginiaTech                               |
|                    | <i>Low-Temperature Slurry-Cast Copper Structures for Multiple Power Electronics 3D Packaging Applications</i>                     | Sujan Dewanjee      | University of Illinois at Urbana Champaign |
|                    | <i>Low-Pressure (5 MPa) and Short-Time (3 Min) Silver-Sintering Die-Attach</i>  | Yancheng Chen       | Virginia Tech                              |
|                    | <i>Novel Multi Loop 3D-Interconnect-Based Inductance Minimization Technique for Lateral WBG Device Power Modules</i>              | Sourish Sinha       | North Carolina State University            |
|                    | <i>Universal Stacked Die Layout Technique for Minimizing Parasitic Inductance in Flying Capacitor-Based Multilevel Converters</i> | Sourish Sinha       | North Carolina State University            |
|                    | <i>Rapid prototyping techniques for organic direct bonded copper power modules</i>  | Shuofeng Zhao       | NREL                                       |
|                    | <i>Fully printed power module with advanced thermal management</i>  | Sai Avuthu          | Eaton                                      |
|                    | <i>Double-Side Liquid Cooling of a 1.2 kV SiC Three-Phase Traction Inverter Power Stage with Integrated Parallel Flow</i>         | Joshua Gardner      | VirginiaTech                               |
|                    | <i>Liquid Vapor Control Structures for Electronics Cooling Using Pool Boiling</i>   | Roman Giglio        | University of California Merced            |
|                    | <i>Evaluation of Heat Spreading Technologies Within Double-Side Cooled Power Modules for Thermal Performance Enhancements</i>     | Gilbert Moreno      | NREL                                       |
|                    | <i>Saturation Dependent Heat Transfer Coefficients for Design of Evaporative Wicks</i>  | Gokce Ozkazanc-Guc  | University of California Merced            |
|                    | <i>Packaging of double-side-cooled 3.3kV 100A SiC Mosfet module</i>   | Li Zhang            | Virginia Tech                              |
| 3:40 - 5:40 p.m.   | <b>Lab Tour of Power Electronics and Electric Machines Facilities in Building 16 (Optional, advanced registration required)</b>   |                     |  |
| 6:15 - 9:15 p.m.   | <b>DINNER (Offsite)</b>   |                     |  |

**Day 3 - Thursday July 10, 2025**

| Time               | Description/Title  | Presenter             | Affiliation                          |
|--------------------|--|-----------------------|--------------------------------------|
| 7:30 - 8:30 a.m.   | <b>Continental Breakfast</b>   |                       |                                      |
| 8:30 - 9:15 a.m.   | <b>Plenary P3: The Power Delivery and Energy Storage Challenge in Advanced Packaging</b>                 | Subramanian Iyer      | University of California Los Angeles |
| 9:15 - 9:30 a.m.   | <b>Break</b>   |                       |                                      |
| 9:30 - 11:10a.m.   | <b>S8: Materials for Modules and Converters</b>  |                       |                                      |
|                    | <i>Session Co-Chair</i>  | Andy Mackie           | Indium Corporation                   |
|                    | <i>Session Co-Chair</i>  | G.-Q. Lu              | Virginia Tech                        |
| 9:30 - 9:55 a.m.   | Innovative Ceramic Packaging Solutions for Power Semiconductors by NGK                                   | Jerry Higuchi         | NGK, Japan                           |
| 9:55 - 10:20 a.m.  | Electric Field Neutralization: Rethinking (Ultra)Wide Bandgap Power Semiconductor Packaging              | Chanyeop Park         | Arizona State University             |
| 10:20 - 10:45 a.m. | Next Generation Sintering Technology for Die-bonding   | Minoru Ueshima        | Daicel, Japan                        |
| 10:45 - 11:10 a.m. | Electro-infiltrated Nickel/Iron Oxide Nanocomposite Microinductors for Power Supply on Chip Applications | Sai Pranesh Amiriseti | University of Florida                |
| 11:10 - 12:10 p.m. | <b>Lunch and Partner Exhibits</b>  |                       |                                      |

**Day 3 - Thursday July 10, 2025 cont'd**

|                    |   |              |  |
|--------------------|---|--------------|--|
| 12:10 - 1:50 p.m.  | <b>S9: Advanced Artificial Intelligence, Machine Learning, and Modeling</b>   |              |  |
|                    | <i>Session Co-Chair</i>   | Eric Dede    | Toyota                                     |
|                    | <i>Session Co-Chair</i>   | Doug Hopkins | North Carolina State University            |
| 12:10 - 12:35 p.m. | Data-Driven Models and MagNet Challenge for Power Magnetics Modeling  | Minjie Chen  | Princeton University                       |
| 12:35 - 1:00 p.m.  | Continuous and Categorical Bayesian Optimization for 3D Power Module Package and Cold Plate Design  | Danny Lohan  | Toyota Research Institute of North America |
| 1:00 - 1:25 p.m.   | ML-Based Optimization of Co-Designed Stacked Substrate Power Module Structures  | Jong Eun Ryu | NCSU                                       |
| 1:25 - 1:50 p.m.   | Artificial Intelligence for Power Electronics Thermal Performance and Reliability   | Paul Paret   | NREL                                       |
| 1:50 - 2:00 p.m.   | Closing Remarks   | Faisal Khan  | NREL                                       |
| 2:10 - 4:45 p.m.   | <b>NREL Tour of South Table Mountain Campus – Energy Systems Integration Facility, Solar Energy Research Facility, Science and Technology Facility (Optional, advanced registration required)</b> |              |  |
| 2:10 - 4:10 p.m.   | <b>Lab Tour of Power Electronics and Electric Machines Facilities in Building 16 (Optional, advanced registration required)</b>   |              |  |