ECCE 2025

IEEE ENERGY CONVERSION CONGRESS & EXPO PHILADELPHIA, PA, USA OCT. 19-23

PROGRAM

Connecting Minds, Powering Innovations

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POWER ELECTRONICS NEWS

Welcome to IEEE ECCE 2025

Iqbal Husain
General Chair

Giovanna Oriti
General Co-chair

Dear Colleagues and Friends,

It is our great pleasure and true privilege to welcome you to the 17th Annual IEEE Energy Conversion Congress and Expo (ECCE 2025)—the world's leading technical event for power and energy conversion technologies. We are thrilled to present this event from October 19 - 23, 2025 at the Pennsylvania Convention Center in Philadelphia, Pennsylvania, USA. As always, ECCE is proudly co-sponsored by the IEEE Power Electronics Society (PELS) and the IEEE Industry Applications Society (IAS).

ECCE 2025 continues its tradition of bridging cutting-edge research and real-world applications. The program will feature nearly 1000 peer-reviewed technical papers selected from global submissions alongside a visionary plenary session and two luminaries sessions honoring our pioneers in power electronics and electric machines, 24 tutorials, post-journal presentations, and special industry sessions focused on emerging and industry-driven topics. Tutorials, a cornerstone of ECCE, will provide valuable educational opportunities, while our stimulating plenary sessions will feature influential thought leaders from industry, and government addressing the most urgent and exciting topics in energy conversion.

This year's theme, "Connecting Minds, Powering Innovations," reflects our commitment to driving innovation across a wide spectrum of technologies—from emerging and novel materials to devices and converters, to innovative controls and electric machines, to energy storage and grid applications, and to transportation and renewable systems. This year's plenary theme explores the convergence of energy resilience, AI-powered design, and decarbonization.

Our dynamic exhibit hall will highlight the latest technologies, tools, and solutions from top companies, startups, universities, and research organizations. With over 1400 attendees expected, a record number of exhibitors this year will have the opportunity to showcase innovations, build partnerships, and interact with top talent. The Career Fair, returning by popular demand, will connect students and professionals with leading employers in the power electronics and energy sectors.

In keeping with ECCE's commitment to community and professional development, we're excited to host a range of events including:

> Women in Engineering (WIE) events— featuring a panel discussion on professional growth and a talk on how AI affects the workplace.

> Young Professionals programs, including Monday's Networking Workshop and Mentorship Roundtable event.

> Networking dinner on Wednesday with a theme of colorful lighting, awards luncheon, regular coffee breaks and open technical meetings to encourage networking and collaboration

This year, ECCE is appropriately emphasizing sustainability by integrating the three R's: reducing printed materials, reusing where we can, and recycling as much as possible. Please help us to make this ECCE our most sustainable yet and provide feedback on this effort through the ECCE2025 App.

Philadelphia—rich in history, innovation, and cultural vibrancy—provides a remarkable setting for ECCE 2025. For it was in Philadelphia in the mid 1700's that Benjamin Franklin established the connection between lightning and electricity with his famous kite experiment. The Pennsylvania Convention Center is adorned with works by 52 artists and offers a dynamic and accessible venue for attendees from around the world. The conference venue is just a short walk from iconic landmarks like Independence Hall and the Liberty Bell, world-class museums, and the Reading Terminal market which is America's oldest farmer's market providing a thriving culinary scene.

On behalf of the Organizing Committee, we thank our volunteers, sponsors, and contributors whose dedication and effort make ECCE 2025 possible. Whether you're presenting, networking, exploring the exhibit floor, or mentoring future leaders, we hope you find ECCE 2025 to be an unforgettable and enriching experience.

We can't wait to get started and welcome you to Philadelphia—join us as we shape the future of energy conversion together!

Welcome from Technical Program Chairs

It is our great pleasure to welcome you to the **IEEE Energy Conversion Congress & Exposition (ECCE) 2025** in Philadelphia, Pennsylvania, United States. As the flagship conference of our societies, IEEE ECCE continues to serve as a premier forum where innovative ideas are exchanged, groundbreaking technologies are introduced, and collaborations are forged to address the most pressing challenges in energy conversion and electrification.

The global pursuit of a resilient and reliable energy future depends on advances in power electronics, electrical machines, motor drives, and their seamless integration into complex systems. These technologies highlight the rapid growth of inverter-based resources, electrified transportation, modern data centers, and hybrid AC/DC infrastructures, topics that are both critical and transformative. ECCE 2025 provides a unique venue to showcase these advances and to explore their impact on shaping the future of our industry and society.

This year's program reflects both the breadth and depth of our field. We received around 1,500 submissions from across the world, a testament to the creativity and vitality of our profession. Following a rigorous peer-review process led by our dedicated Technical Program Committee, including the Technical Program Chairs, Vice Chairs, Topic Chairs, and thousands of professional reviewers, we are proud to present a comprehensive technical program. It features oral and poster sessions, special sessions, tutorials, and Journal-to-Conference presentations, collectively covering a wide range of topics from fundamental device technologies to system-level applications. We are confident that every attendee will find opportunities for learning, discovery, and inspiration.

We are deeply grateful to the many individuals who made this program possible: the authors for sharing their latest work; the reviewers, Vice Chairs, and Topic Chairs for their thoughtful evaluations; and the entire Technical Program Committee for their contribution and leadership throughout the process. We also extend our sincere appreciation to our sponsoring societies, the IEEE Industry Applications Society (IAS) and IEEE Power Electronics Society (PELS), and to the broader organizing team for their tireless support.

Philadelphia, one of the most historic and dynamic cities in the United States, provides a fitting setting for ECCE 2025. We encourage you to explore its rich cultural offerings, from renowned landmarks and museums to its thriving food, art, and music scenes.

On behalf of the Technical Program Committee, we warmly welcome you to IEEE ECCE 2025. We hope you find the technical program intellectually stimulating, the discussions inspiring, and the connections you make here both lasting and impactful.

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General Information

All session times are shown per the local time zone, EST

Registration Hours

Registration Bridge East

Sunday, October 19 ..... 7:30AM – 7:00PM

Monday, October 20 ..... 7:15AM – 6:00PM

Tuesday, October 21 ..... 7:15AM – 6:00PM

Wednesday, October 22 ..... 7:15AM – 6:00PM

Thursday, October 23 ..... 7:15AM – 4:00PM

Exhibit Hall Hours

Exhibit Hall A

Monday, October 20 ..... 4:30PM – 7:00PM

Tuesday, October 21 ..... 10:30AM – 5:00PM

Career Fair Hours

Exhibit Hall A

Tuesday, October 21 ..... 8:30AM – 11:30AM

Creative Digressions

Sunday through Thursday | 8:00AM – 6:00PM

Room 300

The Creative Digression Room is available to attendees looking for a break from busy conference activities. This room will be equipped with tables in order to facilitate one-on-one discussions, idea generation sessions, business meetings, or quiet social interactions. Coffee will also be available.

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Attendees have full access to Wi-Fi in the meeting space, foyers, and exhibit hall.

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Schedule-at-a-Glance

All session times are shown per the local time zone, EST

Sunday, October 19th

7:30AM – 7:00PM	**Registration** ..... *Registration Bridge East*
8:00AM – 12:00PM	**Speaker Ready Room** *100B*
8:00AM – 6:00PM	**Creative Digressions** *300*

Tutorials • 8:30AM – 12:00PM

201C	102A	103A	204B	201B	204C	103B	202A	203A	203B	103C	202B
FDT1: Part 1 Trends, Challenges, and Implementations of Model Predictive Control in Power Electronics	**FDT2: Part 1** Rotating Machines: Insulation and Partial Discharge Inspection	**FDT3: Part 1** Magnetics Bootcamp	**RT2:** Control and Optimization of Multiport Power Converters – A Scalable Software Solutiony	**RT3:** Control of Grid-Forming Inverter-Based Resources: A Tutorial on Selected Topics	**RT4:** Cybersecurity Modeling and Testing for Smart Inverters	**RT5:** AI-Powered Adaptive and Reconfigurable Bidirectional Control of Grid-Connected EVs for Sustainable Smart Grid Operation	**RT7:** Challenges and Mitigation of EMI and Partial Discharge in WBG-based Power Electronics	**RT9:** Power System Protection With High Inverter-Based Resources (IBRs)	**RT11:** Integrated HIL Simulation Environment: Streamlining the Development Cycle from Offline to Real-Time	**RT15:** Encoderless Control of AC Drives Concepts, Recent Developments and Realistic Expectations	**RT17:** High-performance Electrical Machine Solutions with Less Rare-earth Materials

10:00AM – 10:30AM	**Coffee Break**..... *100 and 200 level Hallways*
12:00PM – 1:00PM	**Lunch On Your Own**
1:00PM – 5:00PM	**Speaker Ready Room** *100B*

Tutorials • 1:00PM – 4:30PM

201C	102A	103A	201B	202A	203A	204B	103B	204C	103C	202B	203B
FDT1: Part 2 Trends, Challenges, and Implementations of Model Predictive Control in Power Electronics	**FDT2: Part 2** Rotating Machines: Insulation and Partial Discharge Inspection	**FDT3: Part 2** Magnetics Bootcamp	**RT1:** Meeting the Demands of Fault-Tolerant Machine Drives for Safety-Critical Applications	**RT6:** Time for Power Electronics to Consider Both Physical and Cyber-Physical Reliabilities	**RT8:** Multilevel Converters in Multiport Multiterminal High-Voltage DC (MT-HVDC) Converter Stations	**RT10:** Industrial Medium-Voltage Converters and Drives: From Components to Systems and Applications	**T12:** Advanced EV Battery Charging Strategies: Effects on Battery System Performance, Lifetime, and Reliability	**RT13:** Optimizing Rotating Machine Performance with Multiphysics Modeling: From Electromagnetic to Structural Analysis	**T14:** Partial Power Processing Converters: Myth, Reality and Proper Implementation of a Groundbreaking Concept	**RT16:** Reimagine Power Electronics Design with AI: Opportunities and Challenges Ahead	**RT18:** Winding Technologies for Electric Machines

2:30PM – 3:00PM	**Coffee Break**..... *100 and 200 Level Hallways*
5:00PM – 5:30PM	**ECCE Newcomers Orientation**..... *202A*
6:00PM – 8:00PM	**Welcome Reception**..... *Ballroom AB Pre-function*

FDT = Full Day Tutorial | RT = Regular Tutorial

Monday, October 20th

7:15AM – 6:00PM	**Registration** ..... *Registration Bridge East*
7:30AM – 8:20AM	**Speakers Breakfast** ..... *Ballroom A*
8:00AM – 12:00PM	**Speaker Ready Room** *100B*
8:00AM – 6:00PM	**Creative Digressions** *300*
8:20AM – 9:50AM	**Morning Keynotes** ..... *Ballroom B*
9:50AM – 10:10AM	**Coffee Break** ..... *Exhibit Hall A Pre-function*

Oral Sessions • 10:10AM – 11:50AM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S1: Protection Systems in AC & DC Grids	**S2:** Hybrid Renewable Sources	**S3:** Machines for Sustainable Transportation	**S4:** Modeling & Control of DC/DC Converters	**S5:** SiC Device Characterization	**S6:** Induction Machines	**S7:** Advanced Power Conversion & Control Strategies for Grid-Connected Systems	**S8:** Battery Health Monitoring & Safety for Transportation	**S9:** Advanced Control Strategies for Induction & Synchronous Motor Drives	**S10:** Wireless Power Transfer & EMI

Special Sessions • 10:10AM – 11:50AM

103A	103B
SS1: Part 1 Variety of GaN Devices on the Market: Which to Select for My Design [9019]	**SS2:** Addressing Next-Generation Challenges in Magnetic Components and Materials [9014]

11:50AM – 1:30PM	**Lunch On Your Own**
12:00PM – 1:30PM	**WIE Luncheon** *201C*
1:00PM – 5:00PM	**Speaker Ready Room** *100B*
1:30PM – 2:40PM	**Afternoon Keynotes** ..... *Ballroom B*

Oral Sessions • 2:40PM – 4:20PM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S11: Grid Forming Converters: Control	**S12:** DC Grids	**S13:** Axial Flux Machines	**S14:** Modeling & Design of DC-DC Converters	**S15:** Gallium Nitride & Gallium Oxide Power Devices	**S16:** Noise, Vibration, Reliability & Diagnostics of Electrical Machines	**S17:** Solar Energy Applications	**S18:** Battery Management: Thermal, SOC, & Voltage Control	**S19:** Advanced Modeling & Control Techniques for Electric Drives	**S20:** Advanced Topology & Control Strategies of DC-AC Inverters

Special Sessions • 2:40PM – 4:20PM

103A	103B
SS1: Part 2 Variety of GaN Devices on the Market: Which to Select for My Design [9019]	**SS3:** Top Challenges & Design-for-Test Considerations in Modern Power Conversion Systems [9009]

4:30PM	**Exhibit Hall Opens** ..... *Exhibit Hall A*
5:30PM – 7:00PM	**Expo Reception** ..... *Exhibit Hall A*
5:00PM – 7:00PM	**Student Demos** ..... *Exhibit Hall A*

Poster Sessions 1 • 5:00PM – 6:40PM

Exhibit Hall A

PS1:	PS2:	PS3:	PS4:	PS5:	PS6:	PS7:	PS8:	PS9:
Solar Applications	Power Converters in Renewable & Sustainable Energy Applications I	Power Converters: Control & Applications	Data Driven Control & Monitoring	EV Chargers, Converters, & Powertrains	Bidirectional & Multiport Converters for Grid & Mobility Applications	DC-DC Converter Designs & Analysis	Power Converter Stability	Toward More Reliable Power Electronics

Exhibit Hall A

PS10:	PS11:	PS12:	PS13:	PS14:	PS15:	PS16:	Post Journal Presentations
Advanced Modeling & Control of DC/DC Converters I	Materials, Losses, Thermal, & Manufacturing Issues	Axial Flux Machines	Induction & Synchronous Machines, Transformers	Control, Diagnosis, & Modulation in AC Motor Drives	Power Devices	Thermal Management, Insulation and Magnetics	

7:00PM – 9:00PM	**Organizing Committee Dinner** ..... *Off-site*
7:00PM – 9:00PM	**PELS Mentorship Roundtable** *204A*

Tuesday, October 21st

7:15AM – 6:00PM	**Registration**	*Registration Bridge East*
7:30AM – 8:20AM	**Speakers Breakfast**	*Ballroom A*
8:00AM – 12:00PM	**Speaker Ready Room**	*100B*
8:00AM – 6:00PM	**Creative Digressions**	*300*
8:30AM – 11:30AM	**Career Fair**	*Exhibit Hall A*

Oral Sessions • 8:30AM – 10:10AM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S21: Hybrid AC/DC Grids	**S22:** Topological Advancements in WPT Systems	**S23:** PM-Assisted Synchronous Reluctance & Interior PM Synchronous Machines	**S24:** Modeling & Control of Grid-Interactive Converters	**S25:** Resonant Converters	**S26:** Magnetic Gears, Actuators & Non-Conventional Machines	**S27:** DC/DC Converters for Renewable Applications	**S28:** Control & Evaluation Techniques for EV Charging	**S29:** Control Techniques for Synchronous Machines	**S30:** Control & Reliability

Special Sessions • 8:30AM – 10:10AM

103A	103B
SS4: Aerospace Electrification: Integrated Powertrain Development & Testing for Electrified Aircrafts [9015]	**SS5:** Rapid Prototyping of Digital and Mixed-Signal Controllers for High Switching Frequency Power Supplies [9016]

10:10AM – 10:30AM	**Coffee Break**	*Exhibit Hall A*

Poster Sessions 2 • 10:30AM – 12:10PM

Exhibit Hall A

PS1:	PS2:	PS3:	PS4:	PS5:	PS6:	PS7:	PS8:	PS9:
Energy Storage & Harvesting	Power Converters in Renewable & Sustainable Energy Applications II	Power Converters: Architecture & Protection	Land & Aerial Vehicles Propulsion & Electrification	Charging Techniques, SOC Estimation, & Thermal Management for EV Batteries	Advanced Topology, Modeling & Control of DC-DC Converters	AC-AC Converter Design & Analysis	Converter Power Quality	Advanced Control & Optimization Techniques in Power Converters

Exhibit Hall A

PS10:	PS11:	PS12:	PS13:	PS14:	PS15:	PS16:	Post Journal Presentations *(meet the authors)*
Advanced Modeling & Control of DC/DC Converters II	Modelling & Analysis of Electrical Machines I	Magnetic Gears, Actuators & Non-Conventional Machines	IPMSM, Synchronous Reluctance & Switched Reluctance Machines	Electric Drive Topologies & Control Strategies	Power Electronic Packaging	Emerging Architectures, Topologies & Components	

10:30AM – 5:00PM	**Exhibit Hall Open**	*Exhibit Hall A*
12:15PM – 2:00PM	**Expo Lunch**	*Exhibit Hall A*
1:30PM – 5:00PM	**Student Demonstrations Judging**	*Exhibit Hall A*

Poster Sessions 3 • 2:10PM – 3:50PM

Exhibit Hall A

PS1:	PS2:	PS3:	PS4:	PS5:	PS6:	PS7:	PS8:	PS9:
Applications for Renewables: Power to X & Storage	Power Electronics-based Grids: Control & Applications	Data-Driven Learning & Design Techniques	Inductive Wireless Power Transfer for Transportation	Multilevel & Modular Inverter Topologies for High-Performance Power Conversion	DC-AC Inverters for Renewable Applications: Topology, Control, & Reliability Analysis	Power Converter EMI	Modeling & Design Methods for Power Electronics	Modern Control Strategies for Grid-Connected & Multilevel Converters

Exhibit Hall A

PS10:	PS11:	PS12:	PS13:	PS14:	PS15:	PS16:	Post Journal Presentations
High-Speed Machines, Bearingless Machines & Machines for Sustainable Transportation	Modelling & Analysis of Electrical Machines II	Noise, Vibration, Reliability, Machine Diagnostics & Protection	Predictive & Fault-Tolerant Control Strategies for AC Motor Drives	Modulation & Sensorless Control Strategies for AC Motor Drives	Gate Drivers & Reliability	Sensing & Control	

5:00PM – 5:30PM	**Luminaries Special Sessions Light Reception**	*200 Level Hallway*
5:30PM – 7:00PM	**Luminaries Special Sessions**	*204C & 204B*

Wednesday, October 22nd

7:15AM – 6:00PM	**Registration**	*Registration Bridge East*
8:00AM – 6:00PM	**Creative Digressions**	*300*
7:30AM – 8:20AM	**Speakers Breakfast**	*Ballroom A*
8:00AM – 12:00PM	**Speaker Ready Room**	*100B*

Oral Sessions • 8:30AM – 10:10AM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S31: Grid-Forming Inverters Under Nonideal Conditions	**S32:** EMI Design in Power Electronics	**S33:** Materials, Losses & Thermal Issues in Electrical Machines	**S34:** Control of DC/DC Resonant Converters	**S35:** Multilevel & Modular Converter Topologies	**S36:** Gate Driver Circuit Design	**S37:** Multilevel Inverters for Sustainable Energy Applications	**S38:** EV Onboard Charger Topologies	**S39:** Predictive & Advanced Control Strategies for Electric Drives	**S40:** Emerging Power Electronic Technologies & Applications

Special Sessions • 8:30AM – 10:10AM

103A	103B
SS6: Versatile Power Electronics: Building Blocks for Resilient and Reliable Power Systems [9023]	**SS7: Part 1** Putting Commercial Bidirectional Switch Devices to Work in Tomorrow's Power Converter Products [9020]

Wednesday, October 22nd *(continued)*

10:10AM – 10:30AM **Coffee Break** ..... *100 and 200 level Hallways*

Oral Sessions • 10:30AM – 12:10PM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S41: Transient Operation of Power Electronics-based Grids	**S42:** Modeling & Mitigation of Power Converter EMI	**S43:** Advanced Modelling of Electrical Machines	**S44:** Advanced Control of Various DC/DC Converter Topologies	**S45:** Advanced Control Techniques & Modulation Stategies for Multi-level Power Converters	**S46:** Gate Driver Performance & Optimization	**S47:** Batteries for Renewables: Modelling & Management	**S48:** Onboard Chargers and Power Converters	**S49:** Modeling, Control, & Thermal Analysis of Electric Drives	**S50:** AI-Based Design & Optimization for Efficient Energy Conversion

Special Sessions • 10:30AM – 12:10PM

103B	103A
SS7: Part 2 Putting Commercial Bidirectional Switch Devices to Work in Tomorrow's Power Converter Products [9020]	**SS8:** Advanced Manufacturing, Computation, Winding, & Materials for NextGen Electric Machine Applications [9018]

12:10PM – 2:00PM **Lunch On Your Own**

1:00PM – 5:00PM **Speaker Ready Room** *100B*

Oral Sessions • 2:00PM – 3:40PM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S51: Solid State Transformers	**S52:** Power Converter Stability	**S53:** Interior PM Synchronous Machines	**S54:** Modulation & Control Strategies for High-Performance Power Electronic Systems	**S55:** DC-DC Converters	**S56:** Power Module Design	**S57:** Batteries for Renewables: Technologies & Characterization	**S58:** EV Chargers, Converters, & Propulsion	**S59:** High-Speed & Bearingless Machines	**S60:** Power Conversion Quality in Electric Drives

Special Sessions • 2:00PM – 3:40PM

103A	103B
SS9: Wide Bandgap Enables Energy Intensive Data Centers [9002]	**SS10:** Next-Generation Electrical Energy Infrastructure: From Intercontinental Networks to Space Power Systems [9008]

3:40PM – 4:00PM **Coffee Break** ..... *100 and 200 Level Hallways*

Oral Sessions • 4:00PM – 5:40PM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S61: Grid Forming Converters in Power Systems	**S62:** Health Monitoring for Reliable Power Electronics	**S63:** Advanced Manufacturing of Electrical Machines	**S64:** Modulation Methods for Power Converters	**S65:** Modern Control Strategies & Converter Designs for Power Electronics Systems	**S66:** Power Electronic Modules: Materials & Other Considerations	**S67:** Energy Storage & Harvesting	**S68:** Aircraft Electrification	**S69:** Switched Reluctance & Flux Switching Machines	**S70:** Data-Driven Monitoring, Diagnostics, & Fault Analysis

Special Sessions • 4:00PM – 5:40PM

103A	103B
SS11: Digital Twins for Real-World Power Electronics Applications [9003]	**SS12:** Trends, Challenges, and Opportunities for Power Electronics in Mission Critical Applications [9025]

6:00PM – 8:00PM **Networking Dinner** ..... *Grand Hall*

Thursday, October 23rd

7:15AM – 4:00PM	**Registration**	*Registration Bridge East*
8:00AM – 6:00PM	**Creative Digressions**	*300*
7:30AM – 8:20AM	**Speakers Breakfast**	*Ballroom A*
8:00AM – 12:00PM	**Speaker Ready Room**	*100B*

Oral Sessions • 8:30AM – 10:10AM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S71: Microgrids Control	**S72:** Fault-tolerant Methods for Reliable Power Electronics	**S73:** Synchronous Machines	**S74:** Optimal Control Methods for Power Electronic Systems	**S75:** Multi-port & High-step DC-DC Converters	**S76:** Magnetic Components: Materials and Design	**S77:** Wind Energy Applications	**S78:** Electric Traction & Propulsion	**S79:** Sensorless Control for Electric Drives	**S80:** Digital Twins for Energy Conversion

Special Sessions • 8:30AM – 10:10AM

103A	103B
SS13: Grid Infrastructure for Emerging Ai Data Centers: Challenges and Opportunities [9024]	**SS14:** Next-Gen Automotive Electrification: Advances in Electric Propulsion, Power Electronics, and Drives [9013]

10:10AM – 10:30AM	**Coffee Break**	*100 and 200 Level Hallways*

Oral Sessions • 10:30AM – 12:10PM

102A	103C	201B	201C	202A	202B	203A	203B	204B	204C
S81: Distributed Energy Resource Integration	**S82:** Reliability & Protection of Power Electronics	**S83:** Analysis & Optimized Design of Electrical Machines	**S84:** Control & Modulation Aspects in Power Electronics	**S85:** Resonant & Switched-capacitor DC-DC Converters	**S86:** Thermal Management in Power Electronic Applications	**S87:** Realtime Simulation & HIL Technologies for Renewable Energy Systems	**S88:** Modeling & Control of WPT Systems	**S89:** Reliability in Motor Drives	**S90:** Data Center Power Supply & UPS Systems

Special Sessions • 10:30AM – 12:10PM

103A	103B
SS15: Design Methodologies – Sustainable Power Electronics by Design [9011]	**SS16:** Tackling EMI/EMC Challenges in the SiC and Gan Era with Nanocrystalline Materials [9021]

12:10PM – 2:00PM	**PELS & IAS Awards Luncheon**	*Ballroom B*

Special Sessions/Tutorials • 2:00PM – 3:40PM

201B	204C	201C	204B
SS17: Part 1 Design Methodologies: Verification and Validation Techniques [9005]	**SS18: Part 1** DC Distributed Solutions: Applications, Challenges, and Opportunities [9006]	**SS19:** Recent Advances and Emerging Applications of Solid-State Transformer-Based Multiport Converters [9012]	**Short Tutorial 3:** Electromagnetic Compatibility of Switched Mode Power Supplies

3:40PM – 4:00PM	**Coffee Break**	*200 Level Hallway*

Special Sessions/Tutorials • 4:00PM – 5:40PM

201B	204C	201C	204B	203A
SS17: Part 2 Design Methodologies: Verification and Validation Techniques [9005]	**SS18: Part 2** DC Distributed Solutions: Applications, Challenges, and Opportunities [9006]	**SS20:** Advances in EMI/EMC Research in Power Conversion Systems [9026]	**Short Tutorial 1:** Fundamentals of SiC Power Devices	**Short Tutorial 2:** Applications of Model Predictive Control in Microgrids

For a full list of the technical program, please scan the QR code

Sustainability Initiatives at ECCE 2025

We are pleased to share that, thanks to the support of our Sustainability Sponsor How2Power.com, along with IAS and PELS, ECCE is taking meaningful steps toward a greener future.

This year, we encourage you to travel lighter—each attendee will receive a recycled plastic backpack, a stainless steel water bottle, and additional eco-friendly items designed to reduce waste and promote sustainability.

Stay tuned for further updates on our continuing efforts to make ECCE more sustainable.

PELS, IAS & ECCE Meetings

Do you want to get more involved in IEEE IAS and/or IEEE PELS?
Then we enthusiastically invite you to attend many of the IAS or PELS open meetings, editor meetings, and technical committee gatherings. You will network, learn, and engage with colleagues who share your technical interests. Unless indicated as an "invitation only," the meetings below are generally open to society members.

IAS Committee Meetings at ECCE

Sunday, October 19	
2:00PM – 3:30PM	**IAS – IPCSD Standards Meeting** ..... *Room 102B*
3:30PM – 6:00PM	**IAS – IPCSD Department & Editorial Meeting** ..... *Room 102B*
Tuesday, October 21	
2:00PM – 3:00PM	**IAS Renewable and Sustainable Energy Conversion Systems Committee (RESC) Meeting** ..... *Room 102A*
2:00PM – 3:00PM	**IAS Industrial Drives Committee (IDC) Meeting** ..... *Room 103A*
3:00PM – 4:00PM	**IAS Transportation Systems Committee (TSC) Meeting** ..... *Room 103C*
3:00PM – 4:00PM	**IAS Industrial Power Converters Committee (IPCC) Meeting** ..... *Room 103B*
4:00PM – 5:00PM	**IAS Power Electronics Devices and Components Committee (PEDCC) Meeting** ..... *Room 102A*
4:00PM – 5:30PM	**IAS Electrical Machines Committee (EMC) Meeting** ..... *Room 103A*

ECCE Committee Meetings

Tuesday, October 21	
8:00AM – 9:00AM	**ECCE 2025, 2026 and 2027 Handoff** *(Invitation Only)* ..... *Room 102B*
9:00AM – 10:00AM	**ECCE 2026 Organizing Committee Meeting** *(Invitation Only)* ..... *Room 102B*
10:00AM – 12:00PM	**ECCE Steering Committee Meeting** *(Invitation Only)* ..... *Room 102B*

PELS Meetings *(open to everyone, unless specifically indicated otherwise)*

Sunday, October 19

10:00AM – 11:30AM	RoadMap Leaders Meeting	*Room 303 A*
3:00PM – 5:00PM	Executive Committee Meeting	*Room 303 B*

Monday, October 20

10:00AM – 12:00PM	PELS & IAS YP Workshop	*Room 204 A*
10:30AM – 1:30PM	TC Cluster 1: From Stationary to Large System (TCs 5, 7, 8, 12)	*Room 201 A*
11:30AM – 12:30PM	ECCE-Europe Steering Committee Meeting	*Room 303 B*
1:30PM – 2:30PM	IFEC Information Session	*Room 204 A*
1:30PM – 3:00PM	Region 1-6 Chairs Meeting	*Room 303 A*
1:30PM – 2:30PM	ITRG Meeting	*Room 303 B*
2:00PM – 5:00PM	TC Cluster 2: Methodologies, Modeling, Control and Design (TCs 1 2, 6 10)	*Room 201 A*
2:30PM – 4:00PM	Energy Access Committee Meeting	*Room 302*
7:00PM – 9:00PM	PELS Mentorship Roundtables	*Room 204 A*

Tuesday, October 21

8:30AM – 9:30AM	ITRW	*Room 303 A*
9:30AM – 10:30AM	Industry Forum	*Room 303 A*
8:30AM – 2:00PM	E4USA: Teacher Workshop	*Room 201 A*
8:30AM – 11:00AM	TC Cluster 3: Rotating Machines, Wireless, & Transportation (TCs 3, 4, 9, 11)	*Room 303 B*
11:00AM – 1:00PM	VP Industry & Standards	*Room 302*
12:00PM – 1:30PM	ACE Committee Meeting	*Room 303 B*
2:00PM – 2:30PM	PELS Townhall Reception	*204 A Foyer*
2:30PM – 4:30PM	PELS Townhall	*Room 204 A*
4:30PM – 5:00PM	TPEL Celebration	*Room 204 A*

Wednesday, October 22

7:30AM – 9:00AM	WIE Breakfast	*Room 204 A*
9:00AM – 12:00PM	VP of Technical Operations Meeting	*Room 201 A*
9:30AM – 11:00AM	Mentorship Committee Meeting	*Room 302*
10:30AM – 11:30AM	E4USA: Train the Trainer Experience	*Room 303 B*
12:00PM – 2:00PM	PELS Publications Awards Lunch	*Room 204 A*
12:30PM – 2:00PM	Conference Training Manual Lunch & Learn	*Room 303 A*
2:00PM – 5:00PM	VP of Conferences Meeting	*Room 303 A*
2:00PM – 3:30PM	Meet with the EICs	*Room 204 A*
2:00PM – 4:00PM	Education & Digital Media Committee Meeting	*Room 302*
2:00PM – 3:30PM	WIE Committee Meeting	*Room 303 B*
3:30PM – 4:30PM	TTE Editorial Board Meeting	*Room 204 A*
4:30PM – 5:30PM	JourTools Training Session	*Room 204 A*

Thursday, October 23

12:20PM – 2:20PM	PELS & IAS Awards Lunch	*Ballroom B*

Friday, October 24

7:30AM – 12:00PM	PELS Strategic Meeting	*Room 103 ABC*

Special Events

Newcomer's Orientation

Sunday, October 19 | 5:00PM – 5:30PM
Location: 202A

The Newcomer's Orientation is designed for first time attendees and will cover everything you need to know about the conference, schedules, program offerings, behind-the-curtain tricks and tidbits to help you navigate the conference.

ECCE Welcome Reception

Sunday, October 19 | 6:00PM – 8:00PM
Location: Ballroom AB Pre-function

Kick off the conference at our Welcome Reception: ***Lights, Liberty, and Jazz.*** Join us for an evening that captures the spirit of our host city with vibrant lights, the freedom to connect with colleagues old and new, and the smooth sounds of live jazz. Don't miss this chance to network, unwind, and celebrate the start of an unforgettable week together.

Expo Opening Reception

Monday, October 20 | 5:30PM – 7:00PM
Location: Exhibit Hall A

Join us for the opening of the ECCE 2025 Exhibit Hall! Enjoy a drink and hors d'oeuvres inspired by global flavors as you connect with industry partners and friends. As part of the celebration, we'll highlight light festivals from around the world—honoring the spirit of innovation and cultural traditions that illuminate our shared future. Explore the latest advances in products and services that are shaping the future of energy conversion.

PELS Mentorship Roundtable

Monday, October 20 | 7:00PM – 9:00PM
Location: Room 204A

Since 2017, the PELS Mentorship Roundtable event has been facilitating access to distinguished leaders from research and industry. Covering non-technical topics essential for professional and personal growth, the Roundtable is an intimate setting comprised of a mentor who leads the topical discussion and a small group of mentees. Mentors may come from diverse fields, not only power electronics. The Roundtable event is open to all engineers at any stage of their career. **For more information, please see the PELS Mentorship Website https://www.ieee-pels.org/event/pels-mentorship-roundtables-at-ecce-na-2025/**

Luminaries Special Sessions

Tuesday, October 21 | 5:00PM – 7:00PM
Location: 204C (Prof. Dushan Boroyevich Special Session)
204B (Dr. Bruno Lequesne Special Session)

Join us for an exclusive series of special sessions dedicated to honoring the contributions of two esteemed scholars in the field of power electronics::

- **Prof. Dushan Boroyevich**, Emeritus Professor, Virginia Tech, VA, USA
- **Dr. Bruno Lequesne**, E-Motors Consulting, LLC, Menomonee Falls, WI, USA

This unique opportunity offers a chance to learn from their experiences, celebrate their remarkable achievements, and engage in discussions about future trends in this dynamic domain. The sessions will open with a light networking reception from 5:00 - 5:30PM to be followed by the opportunity to enjoy the special session.

Networking Dinner

Wednesday, October 22 | 6:00PM – 8:00PM
Location: Grand Hall

Illuminate your conference experience at our themed networking dinner! Inspired by the brilliance of energy, color, and light, this evening brings together engineers, researchers, and industry leaders for meaningful connections in a vibrant setting. Enjoy dinner, conversation, and a dynamic atmosphere that reflects the power and creativity driving innovation in electrical and energy conversion technologies.

IEEE Awards Luncheon

Thursday, October 23 | 12:10PM – 2:00PM
Location: Ballroom B

We will gather to celebrate the great achievement of some of our colleagues at our traditional IEEE Awards Luncheon event.

WOMEN IN ENGINEERING (WIE) Events

WIE Distinguished Leaders Panel and Luncheon

Monday, October 20 | 12:00PM – 1:30PM

Location: Room 201C

The IEEE ECCE Women in Engineering (WIE) Committee is excited to invite you "to an inspiring and insightful panel discussion on the topic: ***"Paths of Wisdom – Reflections from Three Mentors Insights and stories from different stages of personal and professional growth."***

MENTORS:

- **Dr. Rashmi Prasad,** General Motors
- **Prof. Jungwon Choi,** University of Washington
- **Prof. Johan Enslin,** IEEE PELS President, ARPA-E, & Clemson University

Join us for ***Paths of Wisdom – Reflections from Three Mentors***, where distinguished leaders share personal insights and stories from their journeys through different stages of professional and personal growth. The panel will offer valuable perspectives on mentorship, career development, and leading with purpose, providing inspiration for the next generation of engineers.

The discussion will be followed by an awards ceremony to recognize outstanding achievements. Be sure to arrive early and stay through the end for a chance to receive a special gift—quantities are limited! This is an exclusive opportunity to gain valuable insights, network with leaders, and be part of an important conversation about empowering future leaders in engineering.

This event is open to everyone! Register now to reserve your spot by visiting the ECCE website.

WIE Breakfast | Elevated Engineer

The AI Revolution at Work: How Robots Are Changing Jobs and Managers

Hosted by IEEE PELS Women in Engineering

Wednesday, October 22 | 7:30AM – 9:00AM

Room 204A

BIO: Lynn Wu is an Associate Professor at the Wharton School of the University of Pennsylvania. Her research examines how artificial intelligence transforms innovation, productivity, and labor markets. She investigates how AI adoption shapes firm strategy, workforce dynamics, and entrepreneurial success, as well as its broader implications for market competition and policy. Her work, published in top journals across economics, management, and computer science, has earned multiple early career and best paper awards and has been featured in The Wall Street Journal, The New York Times, The Economist, and NPR.

AI-powered robots aren't just science fiction—they're already transforming how companies operate. While many worry that robots will wipe out jobs, our research tells a different story: firms that invest in robotics often hire more people overall. The surprise? They tend to cut back on managers, not frontline workers. Robots let supervisors handle bigger teams, boost product and service quality, and make it easier to measure individual performance.

We also find that robots shift the kinds of jobs companies need: middle-skill roles decline, but both high- and low-skill jobs grow. Beyond the workforce, robotics adoption reshapes how companies are organized, changing incentive systems, reporting lines, and decision-making.

In this talk, the speaker will share what these changes mean for the future of work—and,most importantly, what employees and managers can do now to thrive in an AI-driven workplace.

This event is open to all. Sign-up today to participate in this invigorating event.

REGISTER HERE:

Tour Options

Franklin Institute + Planetarium Experience

Tuesday, October 21 | 10:00AM – 12:00PM

Location: Franklin Institute

Join us on Tuesday morning at 10:00 AM for a visit to the Franklin Institute, one of America's leading science museums. Explore hands-on exhibits and innovative displays, then sit back for an immersive journey through the cosmos with a spectacular planetarium experience. ***A perfect mix of science, wonder, and inspiration!***

Grim Philly Historic Walking Tour

Tuesday, October 21 | 1:00PM – 3:00PM

Location: Independence Visitor Center

On Tuesday afternoon at 1:00 PM, discover Philadelphia's past on an Historic Walking Tour. Led by expert historians, this tour brings the city's rich history and legendary stories to life as you explore iconic landmarks. A fascinating way to experience the City of Brotherly Love while connecting with fellow ECCE attendees.

How to Purchase: *Tickets for the tour are available for purchase when registering for the conference. Check website for cost. Bus transportation included in tour cost. See ECCE website for complete details.*

IAS/PELS Young Professionals Event

Join us for an engaging and transformative Young Professionals (YP) Session at IEEE ECCE 2025!

This special session is dedicated to empowering young engineers, researchers, and innovators as they shape the future of energy conversion and beyond. Together, we will offer you not only technical perspectives but also the essential skills to thrive in today's global, fast-changing workplace.

IAS – PELS Young Professional (YP) Session

Monday, October 20 | 10:00AM – 12:00PM

Location: Room 204A

About the Event

The IEEE IAS–PELS Young Professionals (YP) Session at IEEE ECCE 2025 offers a dedicated platform for career development, networking, and personal growth. This year's session emphasizes the importance of achieving professional excellence while maintaining balance and well-being.

As emerging leaders, young professionals face a rapidly evolving landscape where continuous learning and adaptability are essential. Through inspiring discussions and practical strategies, this session will empower attendees to advance their careers, build resilience, and cultivate personal fulfillment, equipping them to thrive both professionally and personally.

Themes

The session will feature a rich blend of industry and academic perspectives, alongside insights from IAS and PELS. Attendees will gain exposure to both the technical and professional dimensions of engineering, ensuring a well-rounded learning experience.

In addition, a dedicated networking program will be included, focusing on two key themes:

- IEEE Volunteering: how to get involved, the benefits of engagement, and pathways to leadership within the IEEE community.
- Professional Career Development: practical advice and shared experiences on building a strong career foundation, seizing opportunities, and navigating challenges in today's evolving workplace.

This combination of technical content, professional insights, and networking opportunities will make the session a valuable experience for all participants.

What to expect:

- Inspiring presentations from leaders in IAS, PELS, Academia and Industry, sharing their career journeys and lessons learned.
- Practical tools and strategies to accelerate your professional development and strengthen your leadership potential.
- Interactive discussions and networking opportunities with peers, mentors, and experts who can support and guide you in your career path.
- Insights on balancing professional success with personal fulfillment, ensuring sustainable growth and long-term impact.

Whether you are just starting your career or seeking to take the next step, this session is tailored to help you unlock opportunities, build meaningful connections, and expand your horizons.

Don't miss this chance to be inspired, empowered, and connected with a vibrant community of young professionals at IEEE ECCE 2025.

Program agenda

Part 1: Presentations - 50 Minutes

- IAS YP – Activities & Opportunities by Eng. Achref Selmi.
- PELS YP – Activities & Opportunities by Dr. Bruna Seibel Gehrke.
- Industry Topic: Begin with the end in mind – professional and personal development in the wind industry by Dr. Yanni Zhong.
- Academic Topic: The importance of research in your career by Dr.Christina DiMarino.

Part 2 : Round Table discussion and networking activities 50 Minutes.

Click Here to Register

QUESTIONS? Please contact:

> **Achref Selmi (IAS),** selmi.achref@ieee.org

> **Bruna Seibel Gehrke (PELS),** brunagehrke@ieee.org

Join us as we navigate the journey toward not only a successful career but a thriving professional life.

Presenter Information

Oral Presenters

SPEAKER READY ROOM

Sunday through Thursday

Location: Room 300

All oral presenters must check in at the Speaker Ready Room at least four (4) hours prior to their scheduled session. Even if you have submitted your presentation in advance and have no changes, you must check and confirm that the presentation is correct.

Speaker Ready Room Hours:

Sunday, October 19. 8:00AM – 12:00PM & 1:00PM – 5:00PM
Monday, October 20 8:00AM – 12:00PM & 1:00PM – 5:00PM
Tuesday, October 21 . . . . . 8:00AM – 12:00PM
Wednesday, October 22. . . . . 8:00AM – 12:00PM & 1:00PM - 5:00PM
Thursday, October 23 . . . . . 8:00AM – 12:00PM

You may also edit your presentation during speaker ready room hours. If you have edits to your presentation, you will need to re-upload your presentation by 4:00PM the day prior for speakers presenting before 12:00PM or by 12:00PM for speakers presenting after 1:00PM. Please note, if you have edits to your presentation after the cutoff time, you will need to bring them with you on a flash drive directly to the session room. AV personnel will upload all presentations onto the laptop in your scheduled session room.

ORAL PRESENTERS' ORIENTATION

A Speakers' Breakfast will be held for oral presenters and session chairs from 7:30AM – 8:20AM Monday – Thursday in room Ballroom A on the 300 Level.

Oral presenters should meet with their respective session chairs to review the format and timing of their session and alert conference management of any changes. Oral Presenters should attend the orientation each day that they are scheduled to provide an oral presentation (or chair a session); you may only attend on days on which you are scheduled to speak. Please have your short bio already printed to give to your session chair during Speaker's Breakfast.

Poster presenters must stand close to their poster during the entire poster session.

Poster Presenters

Poster Session maps can be found on pg. 28

POSTER PRESENTATION SCHEDULE

Monday, October 20 and Tuesday, October 21

Location: Exhibit Hall A

POSTER SESSION 1
Monday, October 20 . . . . . 5:00PM – 6:40PM

POSTER SESSION 2
Tuesday, October 21 . . . . . 10:30AM – 12:10PM

POSTER SESSION 3
Tuesday, October 21 . . . . . 2:10PM – 3:50PM

Posters will be on display on Monday and Tuesday in Exhibit Hall A. Poster presenters should be available for questions at their display boards during their scheduled poster presentation time. Your poster will be assigned a specific poster board number and section referenced in the Poster Session section of the program. If you are unsure which session your poster should be presented, please review the complete Technical Session schedule.

Poster Presenters will have access to Exhibit Hall A posterboard area to set up and tear down their posters at the times listed below.

POSTER SESSION 1

Monday, October 20

Setup . . . . . 4:30PM – 5:00PM
Poster Session . . . . . 5:00PM – 6:40PM
Breakdown . . . . . 6:40PM – 7:00PM

Presenters for Poster Session I must have their posters set-up no later than 5:00PM. Any posters that remain on the poster boards at 7:00PM, and do not belong in Poster Session II will be removed and kept at the Registration Desk.

POST JOURNAL SESSION

Please follow the same guidelines as above. These posters are located at the EV lounge in the middle of the exhibit hall and all post-journal posters will remain up for the remainder of the expo hours.

POSTER SESSION 2

Tuesday, October 21

Setup . . . . . 10:00AM – 10:30AM
Poster Session . . . . . 10:30AM – 12:10PM
Breakdown . . . . . 12:10PM – 12:40PM

Presenters for Poster Session II must have their posters set-up no later than 10:30AM. Any posters that remain on the poster boards at 12:40PM and do not belong in Poster Session III will be removed and kept at registration.

Post Journal Session Meet the Authors during Poster Session II

POSTER SESSION 3

Tuesday, October 21

Setup . . . . . 1:40PM – 2:10PM
Poster Session . . . . . 2:10PM – 3:50PM
Breakdown . . . . . 3:50PM – 4:10PM

Presenters for Poster Session III must have their posters set-up no later than 2:10PM. Any posters that remain on the poster boards at 4:10PM will be removed and kept at registration.

Monday, October 20 8:20AM – 9:50AM

General Chair Welcome

Iqbal Husain
North Carolina State University, USA
ECCE 2025 General Chair

PELS President Welcome

Johan Enslin
DOE ARPA-E & Clemson University @ Charleston, USA
PELS 2025 President

IAS President Welcome

Ayman EL-Refaie
Marquette University, USA
IAS 2025 President

8:40AM | Technologies for Enabling Transportation Electrification

Burak Ozpineci
Section Head of the Vehicle and Mobility Systems Research Section
Oak Ridge National Laboratory (ORNL)

Burak Ozpineci earned his B.S. degree in electrical engineering from Orta Dogu Technical University, Ankara, Turkey, in 1994. He then completed his M.S. and Ph.D. degrees in electrical engineering at the University of Tennessee, Knoxville, in 1998 and 2002, respectively. Since 2001, he has been with Oak Ridge National Laboratory, where he began as a student and has held positions as a researcher, founding group leader of the Power and Energy Systems Group, group leader of the Power Electronics and Electric Machinery Group. He currently serves as a Corporate Fellow and the Section Head of the Vehicle and Mobility Systems Research Section. Additionally, he has a joint faculty appointment with The University of Tennessee. He also serves as the VP for Technical Activities and President-Elect for IEEE Transportation Electrification Council. Dr. Ozpineci is a Fellow of IEEE.

ABSTRACT

Road transportation is undergoing a rapid transformation as electric vehicle adoption accelerates across passenger, commercial, and fleet sectors. This keynote will highlight the core power conversion and drivetrain technologies enabling this shift. Emphasis will be placed on innovations in electric powertrains, including high-efficiency motors, wide-bandgap-based inverters, and integrated e-axles. In parallel, the talk will explore the critical role of charging systems and vehicle-to-grid (V2G) integration in supporting scalable and resilient electrified transportation. With insights from ORNL research, the presentation will examine how advances in power electronics and system-level integration are shaping the next generation of road vehicles and their interaction with the electric grid.

9:15AM | Commercialization of Electrified Aviation Today

Ed Lovelace
CTO and VP of Engineering
Ampaire

Ed Lovelace is the CTO and VP of Engineering leading the technology and certification roadmap and strategy for Ampaire's electrified propulsion aircraft portfolio. Key technology areas of focus include gas powerplants, electric machinery, power conversion and distribution, and energy storage systems for hybrid and full electric powertrains. Ed has 30+ years of new product development and commercialization experience including CTO and VP/Director of Engineering at several startups focused on electrified powertrain commercial trucks and buses (XL Fleet), hydrokinetic renewable power generation (Free Flow Power), and electric power conversion technology for sea, land, and air mobility (SatCon Technology) as well as leading electrification technology at Aurora Flight Sciences, A Boeing Company, as a Technical Fellow, and aircraft engine controls development with GE Aviation. Dr. Lovelace is a U.S. DOT Eisenhower Fellow in transportation research with a B.S. and M.S. in Mechanical Engineering and an M.S. and Ph.D. in Electrical Engineering and Computer Science from MIT, and he is Chair of the SAE E-40 Electrified Propulsion Aircraft standards committee.

ABSTRACT

There are many different pathways towards zero-emission flight. Energy pathways pose challenges including performance, integration, cost, and infrastructure challenges. These are coupled with business challenges of capital requirements, certification, adoption, and growth. Ampaire's near-term roadmap is focussed on two strategies for early introduction of sustainable aircraft, first leveraging existing commercialized aircraft models, and second hybrid electric powertrains. Dr. Lovelace will give an overview of Ampaire's strategy and recent accomplishments and address key sustainable aviation challenges and opportunities.

9:50AM – 10:10AM | Coffee Break

Exhibit Hall A Pre-function

Monday, October 20 1:30PM – 2:40PM

1:30PM | Powering the Future – Innovation, Challenges and Opportunities in Power Electronics Amid AI and Electrification

Dr. Xin Wu
Technology to Market Advisor
ARPAe

Dr. Xin Wu is the Technology to Market Advisor at ARPAe, with a focus on electrification, aviation and grid. She joins ARPAe from Pratt and Whitney (PW), where she and has over 16 years of design and development experience in the areas of Power Electronics and Electrical System Integration.

A career starting at Ansys Corporation in 2005 provided her with her initial background in the area of Electromechanical System Modeling and Simulation. In 2010, Dr. Wu joined Raytheon Technologies Research Center, leading efforts in the application of advanced semi-conductor devices across RTX business units (BU) and leading efforts to design and develop wireless power transfer and embedded sensing systems through additive manufacturing. She led a multidisciplinary BU team, to design, built and test a high-power high-density power converter for RTX's Hybrid Electric Propulsion Demonstration programs, as well as the MegaWatt Power Distribution System program to develop high speed high density Solid State Circuit Breaker and power quality filters with advanced materials for aerospace electrical system integration. Dr. Wu transferred to PW as the Discipline Chief for Integrated Electrical Systems and Architecture. While at PW, she led electrical system technology development activities to establish an integrated strategy with the Military and Commercial Advanced Development Program Offices into demonstrator and program plans, leveraged outside technology capabilities from partners, suppliers, other RTX business units, universities and government labs and lead studies to ensure technology identification and benefits quantification are addressed.

Dr. Wu holds a Bachelor's Degree in Electrical Engineering from Huazhong University of Science and Technology – China, and a PhD. in Electrical Engineering from the University of South Carolina.

ABSTRACT

As electrification accelerates and artificial intelligence reshapes energy consumption patterns, the U.S. electrical grid faces unprecedented challenges in capacity, reliability, and efficiency. To meet these challenges, advancements in power electronics are essential across all levels of the grid, from generation and transmission to distribution and end-use applications. Advanced materials, high-performance converters and machines, as well as robust control strategies are some of the technology thrusts crucial to enhance grid stability, flexibility and resiliency.

This talk will highlight some of programs and initiatives from the Advanced Research Projects Agency-Energy (ARPA-E) in driving transformative innovations to meet the rising demand in grid capacity and fostering groundbreaking technologies that enhance grid flexibility, integrate renewable energy sources, and improve overall system efficiency.

2:05PM | Rethinking Energy Conversion in the Modern Era of AI and Robotics

Jamie Haas
Vice President, Technology Development and AI
Allegro

Jamie Haas is Vice President, Technology Development and AI, and Technology Fellow, returned to Allegro in 2023 after serving as VP of Engineering at an AI sensor startup. He has 25 years of semiconductor design and development experience, including his initial 18-year tenure with Allegro that began in 2003. Jamie designed many of Allegro's current sensing and position sensing products and has a love for analog mixed signal design, software, and AI. In his current role, Jamie is responsible for leading Allegro's next generation technology developments in the areas of semiconductor process technologies, magnetic sensing, robotics actuation system integration and spearheading the company's AI product/tool strategy.

Jamie holds a BS degree in Electrical Engineering from Rochester Institute of Technology and has completed extensive continuous learning coursework, including a Dartmouth Leadership program in 2023. He currently holds 25 semiconductor-related US patents.

ABSTRACT

The quest for intelligent machines has been propelled by parallel evolutions in digital computing, robotics, sensing, and artificial intelligence. This presentation charts this interconnected journey, highlighting advancements from basic sensors to precise contactless magnetic sensing technologies like Tunneling Magnetoresistance (TMR), BLDC motor systems and the power conversion shift towards GaN and SiC essential for complex actuators. Today, humanoid robots emerge as a potent physical embodiment of AI, integrating these advanced computational, sensing, motor, and power technologies. This convergence, however, illuminates the significant energy demands inherent in sophisticated AI systems, contrasting sharply with the efficiency of biological intelligence. This reality, coupled with the persistent challenges of energy storage density, compels a critical re-evaluation of overall system energy conversion. Join me as we explore this journey together and imagine a future with sustainable autonomous intelligent machines.

Luminaries Special Sessions

Join us for an exclusive series of special sessions dedicated to honoring the contributions of two esteemed scholars in the field of power electronics:

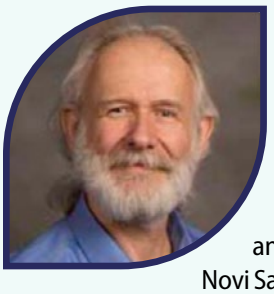
Prof. Dushan Boroyevich
Emeritus Professor
Virginia Tech, VA, USA

Dr. Bruno Lequesne
E-Motors Consulting, LLC
Menomonee Falls, WI, USA

Tuesday, October 21

200 Level Hallway | 204C & 204B

5:00PM – 5:30PM | Light Refreshments
5:30PM – 7:00PM | Special Sessions



Prof. Dushan Boroyevich SPECIAL SESSION

Room 204C

Prof. Dushan Boroyevich earned a Dipl. Ing. degree from the University of Belgrade (today Serbia) in 1976, and an M.S. degree from the University of Novi Sad in 1982, both in electrical engineering. After obtaining his Ph.D. degree from Virginia Tech in 1986, he returned to the University of Novi Sad, where he founded the power and industrial electronics research and education programs.

In 1990, Dr. Boroyevich joined the Bradley Department of Electrical and Computer Engineering at Virginia Tech, as associate professor, and in 1996 became associate director of Virginia Power Electronics.

In 1998, Prof. Fred Lee and Dushan led the winner team of the US National Science Foundation funding for the first national engineering research center in the area of power electronics, the Center for Power Electronics Systems (CPES). Dr. Boroyevich is now also the CPES Deputy Director and Virginia Tech's Associate Vice President for Research and Innovation in Energy Systems. He has led numerous research projects in the areas of multi-phase power conversion, electronic power distribution systems, modeling and control, and multi-disciplinary design optimization. He developed a comprehensive geometric approach to modeling and control of high-frequency switching power converters that is widely used in the analysis, design, and control of multi-phase ac power conversion systems. He has co-authored over 1000 technical publications and 20 patents.

Dr. Boroyevich is an IEEE Life Fellow, a recipient of the IEEE William E. Newell Power Electronics Technical Field Award and of IEEE Power Electronics Society Harry A. Owen Distinguished Service Award, and he was the President of the IEEE Power Electronics Society in 2011-2012.

Dr. Bruno Lequesne SPECIAL SESSION

Room 204B

Dr. Bruno Lequesne received the Engineering degree from Ecole Supérieure d'Electricité, Rennes, France (now Centrale-Supélec) in 1978, and a PhD degree in Electrical Engineering from the Missouri University of Science and Technology, Rolla, MO, USA, in 1984. He then joined General Motors Research Laboratories, and, later on in 1999, Delphi Research Labs, when Delphi Corporation was spun off from General Motors. At both organizations he conducted research in automotive electro-mechanical systems. In 2006, Dr. Lequesne moved to Delphi's Advanced Powertrain Engineering organization as a group manager. After a brief stint with the University of Alabama's Center for Advanced Vehicle Technologies, he joined Eaton Corporation's Corporate Research & Technology in 2010 to develop programs in the hybrid and transportation electrification fields.

He recently (2014) went on his own as a consultant, forming E-Motors Consulting, LLC, in Menomonee Falls, WI, for technology and intellectual property investigation in electrical machines, electromagnetic devices, and their applications, particularly in the energy conversion and transportation fields. An expert witness with court experience, he holds 54 issued US patents. Dr. Lequesne authored or co-authored 25 papers in referred journals, for which he received 11 Best Paper Awards, eight from the IEEE Industry Applications Society (IAS), including two Transactions awards, and three from the Society of Automotive Engineers.

Dr. Lequesne is an IEEE Life Fellow, a recipient of the IEEE IAS Gerald Kliman Innovator Award in 2007 and of IEEE Nikola Tesla Award in 2016. He was the President of the IEEE Industry Applications Society during 2011–2012 and Chair of the IEEE Transportation Electrification Community during 2019–2022.

Monday, October 20 10:10AM – 11:50AM

SS1 | Variety of GaN Devices on the Market: Which to Select for My Design [9019]

Room 103A

Chairs/Organizers
Tanya Gachovska, Ph.D., MDA *Montreal*
Raghav Khanna, Ph.D., *University of Toledo*

Part 1: 10:10AM – 11:50AM
Part 2: 2:40PM – 4:20PM

The rise of Gallium Nitride (GaN) High Electron Mobility Transistors (HEMTs) is transforming high-frequency, high-efficiency, and high-power applications. This special session provides a market overview of commercially available lateral GaN HEMTs and their performance metrics. Leading industry experts will present the advantages, challenges, and integration considerations for GaN devices, covering thermal management, speed, and size optimization. Attendees will learn how to navigate the expanding GaN ecosystem to select the right technology for applications ranging from automotive to renewable energy and data centers. Case studies and panel discussions will provide practical insights for successful design implementation.

Session Panelists/Speakers
Simon Li, Ph.D., Co-founder, *GaNPower International*
Bhargav Pandya, P.Eng., PMP, *Lead Principal Engineer, Infineon Technologies Americas*
Davide Bisi, *Program Manager and Senior Member of Technical Staff, Renesas*
Alex Lidow, Ph.D., *CEO and Co-founder, Efficient Power Conversion Corporation*
Tamara Baksht, Ph.D., *CEO, VisIC Technologies Ltd.*
Peter A. Di Maso, Ph.D., *Product Marketing Manager, Cambridge GaN Devices Ltd.*
Kengo Ohmori, *Technical Marketing Manager, Rohm Semiconductor*
Dan Kinzer, Director, *Navitas Semiconductor*
Andrew Koehler, Ph.D., *Senior Electronics Engineer, US Naval Research Laboratory*

SS2 | Addressing Next-Generation Challenges in Magnetic Components and Materials [9014]

Room 103B

Chair/Organizer
Alex Hanson, Associate Professor, *University of Texas at Austin*

Magnetic components are often the bottleneck to high power converter density and low loss, responsible for 30-50% of both volume and heat dissipation in many designs. Elevated switching frequencies and circuit topologies that rely less on magnetics (hybrid switched-capacitor converters) can alleviate this bottleneck, but not fully overcome it. New advancements to achieve better magnetic, electric, and thermal performance of the components themselves—thus permitting smaller and more efficient designs—are therefore necessary. This special session will present advances from industry and industry-leaning academic voices on novel magnetic materials, structures, and design procedures. Topics include heat extraction, management of dimensional resonance/wave propagation, multi-objective optimization, and manufacturing process opportunities through powdered iron materials. These topics advance solutions to both current and upcoming challenges as magnetic components are called to operate at next-generation density, frequency, and efficiency.

Session Panelists/Speakers
Michael Arasim, *Lead Product Manager, Fair-Rite*
Paul Ohodnicki Jr, *Professor, University of Pittsburgh*
Jasdeep Sadam, *Applications Engineer, Magnetics Inc*
Slater Shelek, *Applications Engineer, Magnetics Inc*
Alex Hanson, *Associate Professor, University of Texas at Austin*
Lukas Mueller, *Director of Application Engineering, Micrometals*

Monday, October 20 2:40PM – 4:20PM

SS3 | Top Challenges and Design-for-Test Considerations in Modern High Voltage/High Current Power Conversion Systems [9009]

Room 103B

Chairs/Organizers
Michael Schnecker, *Digital Design Test Technologist, Rohde & Schwarz*
Marcus Sonst, *Senior Application Engineer, Rohde & Schwarz*

Higher and higher power requirements with increases in both current and voltage require more diligent circuit design, component selection and placement, and manufacturing care. To take advantage of modern wide band-gap semiconductors and other power electronic devices, circuits, and probes, the circuit designer must consider a number of new physical and electrical design constraints. These design-for-test considerations will optimize the measurement system and allow for the most thorough circuit and system evaluation. This talk will explore some of the latest recommendations and testing methods available to designers and engineers in this market space.

Session Panelists/Speakers
Michael Schnecker, *Digital Design Test Technologist, Rohde & Schwarz*

Tuesday, October 21 8:30AM – 10:10AM

SS4 | Aerospace Electrification – Integrated Powertrain Development and Testing for More Electrified Aircrafts [9015]

Room 103A

Chairs/Organizers
Bulent Sarlioglu, Ph.D., *Professor, University of Wisconsin-Madison*
Xin Wu, Ph.D., *Technology-to-Market Advisor, ARPA-E*
Sara Roggia, Ph.D., *Head of magniDrive Project, Magnix*
Ziaur Rahman, Ph.D., *Senior Lead Engineer, Booz Allen Hamilton*

The rapid advancement of electrification in aviation is driving the development of integrated electrical drivetrain technologies as a cornerstone for future sustainable flight. This session highlights breakthroughs in electric motor designs, power electronics, and thermal management systems that enable high-power-density solutions for electrified aircraft. Government and industry leaders from NASA, ARPA-E, and private aerospace companies will share insights into their collaborative efforts to overcome challenges

in safety, performance, system integration, testing and certification. Discussions will include case studies from government programs, as well as private sectors, offering attendees a comprehensive overview of the technical progress and future directions in aerospace electrification.

Session Panelists/Speakers

Ed Lovelace, *CTO/VP Engineering, Ampaire*
Shengyi Liu, *Boeing*
Diederik Marius, *Sr. Manager, Electric Motor Controls and Simulation, Archer*
Vlado Blasko, *Lockheed Martin-Sikorsky*

SS5 | Rapid Prototyping of Digital and Mixed-Signal Controllers for High Switching Frequency Power Supplies [9016]

Room 103B

Chair/Organizer
Jeroen Arnoud Buitendijk, Embedded Engineer, Plexim

Developing a power electronics system is a multidisciplinary endeavor. It includes not only the design of the electrical circuit, but also the development of advanced controls. Often, controllers for power electronics systems are designed as digital or mixed-signal controllers which are implemented on a microcontroller (MCU). Implementing a particular control scheme on a microcontroller is very time consuming, and taking advantage of advanced microcontroller features such as multithreading is often outside the scope of expertise of power electronics engineers. Automatic code generation from simulation models has established itself as a powerful tool to circumvent these constraints and perform rapid control prototyping for power electronics systems.

Whether or not an automatic code generation tool is suitable for rapid control prototyping for a particular power electronics application is determined by its feature set. As the power electronics field evolves, new challenges arise for these tools. A consistent trend in the industry has been the transition to ever higher switching frequencies. This special session examines what microcontroller features are useful for implementing digital and mixed-signal controls for high switching frequency power supplies with a special focus on microcontrollers in the TI C2000 and STM32 families. Such features include high resolution timer or PWM peripherals, control algorithms running on multiple CPUs, and current mode controllers implemented using analog comparators as well as digital controls. The special session will be concluded with a live demonstration of how the embedded code generation tool that we develop at Plexim, the PLECS Coder, can be used for rapid control prototyping for high switching frequency power supplies.

Session Panelist/Speaker

Jeroen Arnoud Buitendijk, *Embedded Engineer, Plexim*

Wednesday, October 22 8:30AM – 10:10AM

SS6 | Versatile Power Electronics: Building Blocks for Resilient and Reliable Power Systems [9023]

Room 103A

Chairs/Organizers
Xiaonan Lu, Ph.D., *Associate Professor, Purdue University; Energy Systems Research Scientist (Joint Appointment), Argonne National Laboratory*
Hanchao Liu, Ph.D., *Senior Electric Power System Engineer, GE Vernova*

Power electronic inverters are playing a critical role in enhancing the resiliency and reliability of modern power systems. This session highlights innovative approaches to grid-interactive power electronics, including grid-forming inverters, modular and networked microgrids, and solid-state substations. With the rising deployment of inverter-based resources across transmission and distribution systems, challenges such as stability, interoperability, and control complexity require advanced solutions. Leading experts from national labs, OEMs, and utilities will present state-of-the-art research and field implementations. Attendees will gain insights into emerging technologies driving grid modernization and supporting renewable integration at scale.

SS7 | Putting Commercial Bidirectional Switch Devices to Work in Tomorrow's Power Converter Products [9020]

Room 103B

Chairs/Organizers
Thomas Jahns, Grainger *Emeritus Professor of Power Electronics and Electric Machines, University of Wisconsin–Madison*
Victor Veliadis, *Executive Director & CTO, PowerAmerica; Professor in Electrical and Computer Engineering, North Carolina State University*

Part 1: 8:30AM – 10:10AM
Part 2: 10:30AM – 12:10PM

2025 is shaping up to be a transformative year for solid-state power electronics, with multiple companies launching commercial bidirectional (BD) switch devices. This special session focuses on technical challenges and opportunities associated with integrating these devices into power converter products. Industry leaders will discuss various device materials and configurations—including dual-gate GaN switches and other emerging technologies—exploring their potential for revolutionizing power converter architectures. Attendees will gain insights into practical considerations for adopting BD switches in high-performance applications, along with lessons learned from early adopters. The session concludes with a Q&A panel designed to foster dialogue between device manufacturers and engineers from the user community.

Session Panelists/Speakers

Dan Kinzer, *Power Semiconductor Technical Advisor, Navitas*
Dr. Davide Bisi, *Program Manager, Renesas*
Dr. Mohamed Imam, *Senior Director, Infineon*
Jeff Knapp, *VP of Business Development, Ideal Power*
Dr. Jonas Huber, *Professor, ETH Zurich*

Wednesday, October 22 10:30AM – 12:10PM

SS8 | Advanced Manufacturing, Computation, Winding, and Materials for Next Generation Electric Machine Applications [9018]

Room 103A

Chairs/Organizers

Md Sariful Islam, *Lead Electromagnetic Engineer, HL Mechatronics – Tausif Husain, Senior Research Scientist, Amazon Prime Air*

Peter Wung, *Adjunct Professor, University of Dayton and Marquette University*

Next-generation electric machines demand advancements in manufacturing, computation, winding techniques, and materials to meet performance, efficiency, and sustainability targets. This session highlights cutting-edge developments in soft magnetic materials, such as iron-cobalt alloys and rare-earth-free alternatives, as well as innovative winding processes and simulation tools. Experts will share insights on challenges and opportunities in designing high-power-density machines for automotive, aerospace, and industrial applications. Case studies will showcase novel manufacturing approaches that unlock new design possibilities and reduce dependency on critical materials. Attendees will gain an understanding of how these innovations are shaping the future of electric machine technology.

Session Panelists/Speakers

Ahmed Shoeb, *EM Design Engineer, Powersys*

Simon Haase, *Application Engineer, Wafios Machinery*

Maddy Manjeri, *Technology Manager, Electronics Stacks, Carpenter Technology Motor Technology Center*

Jun Cui, *Professor, Iowa State University*

Dave Fulton, *Director of Electric Machine Innovation, BorgWarner*

Wednesday, October 22 2:00PM – 3:40PM

SS9 | Wide Bandgap Enables Energy Intensive Data Centers [9002]

Room 103A

Chairs/Organizers

Victor Veliadis, *Executive Director and CTO, PowerAmerica*

Brij Singh, *Senior Fellow, John Deere Electronic Systems*

Data centers are facing unprecedented energy demands due to the rapid rise of cloud computing, artificial intelligence (AI), and edge computing. Wide Bandgap (WBG) technologies are emerging as a key solution, offering superior efficiency, size, and thermal performance compared to traditional silicon devices. This session will explore innovations in WBG device integration for high-current, low-voltage operations that enable more energy-efficient data center infrastructures. Industry leaders will discuss advances in power architectures, design challenges, and sustainability considerations. Attendees will gain insights into practical approaches for deploying WBG technologies to support the next generation of high-performance, energy-intensive computing systems.

Session Panelists/Speakers

Gregory Ratcliff, *Chief Innovation Officer, Vertiv*

Slavko Mocevic, *Principal Scientist, ABB*

Deepak Veereddy, *Director of Technical Marketing, Infineon*

Dan Kinzer, *Navitas*

SS10 | Next-Generation Electrical Energy Infrastructure: From Intercontinental Networks to Space Power Systems [9008]

Room 103B

Chair/Organizer

Prof. Dushan Boroyevich, *Virginia Tech, USA*

This session explores groundbreaking advancements in electrical energy systems, spanning terrestrial grids, microgrids, and space applications. Presentations will address innovations in intercontinental power grids, smart microgrids for dynamic energy networks, and solutions for integrating electrified transportation infrastructure. Topics include grid routing algorithms, advanced power electronics for flying car ecosystems, and space microgrid designs for extraterrestrial habitats. The session fosters interdisciplinary dialogue among experts from academia, national labs, and industry to highlight transformative technologies that can enable scalable, sustainable energy systems for future demands.

Session Panelists/Speakers

Dr. Murali Baggu, *NREL, USA*

Prof. Dushan Boroyevich, *Virginia Tech, USA*

Prof. Josep Guerrero, *Aalborg University / CROM, Huanjiang Laboratory, Zhuji, Zhejiang University*

Prof. Issa Batarseh, *University of Central Florida, USA*

Wednesday, October 22 4:00PM – 5:40PM

SS11 | Digital Twins for Real-World Power Electronics Applications: Challenges, Opportunities, and Future Directions [9003]

Room 103A

Chair/Organizer

Gernot Pammer, *Principal Engineer, AVL List GmbH*

Digital twins are emerging as a transformative technology in the field of power electronics, enabling advanced system design, optimization, and predictive maintenance. This session brings together leading experts to explore how digital twin technology is being applied in real-world power electronics applications, from automotive to industrial systems. Discussions will cover challenges such as model accuracy, computational requirements, and integration with hardware-in-the-loop testing. Case studies will highlight successful implementations and provide insights into future research directions to fully unlock the potential of digital twins in next-generation power electronics systems.

Session Panelists/Speakers

Aditya Ashok, *OPAL-RT – Director – Energy Systems Research*

Arunprasanth Sakthivel, *RTDS Technologies Inc – Application Engineer*

Caio Osório, *Typhoon HIL – Global Manager of Academia Programs*

Carlos Villegas, *Speedgoat GmbH – Electrification Industry Manager*

SS12 | Trends, Challenges, and Opportunities for Power Electronics in Mission Critical Applications [9025]

Room 103B

Chairs/Organizers

John Noon, *Electrical Engineering Manager, Otis Elevator Company*

Stefan Bilyk, *Project Engineer, TRIUMPH Group, Inc.*

Today's mission-critical applications are becoming increasingly power-hungry, and the environments in which the power electronics must operate are getting increasingly harsh. Furthermore, modern breakthroughs in wide-bandgap power semiconductors have allowed designers to push the limits of power density and efficiency, enabling applications of power electronics that could not have been conceived previously. Beyond the new application space, the requirement for reliability remains paramount, and the intersection between these requirements is explored in this panel. This Q&A session focuses on applications in the aerospace and defense industries that are pushing the boundaries of what is technically feasible in terms of reliability and performance. Trends in ground-based systems as well as airborne systems, such as electrified aviation, are explored. The expert panelists from leading companies will discuss the challenges they face, as well as the opportunities presented by innovative power electronic solutions. The target audience for this panel spans industries and academia: students and professors will gain insight into the considerations of these critical applications, and engineers in industry will gain an understanding of the trade-offs considered when designing at the limits.

Session Panelists/Speakers

John Tsinetakes, *Principal Member of the Engineering Staff and Lockheed Martin Corporate Fellow, Lockheed Martin*

Vishram Deshpande, *Staff Electrical Engineer, Northrup Grumman*

Michael Jungmuk Choe, *Discipline Chief, RTX Corporation (Pratt & Whitney)*

Thursday, October 23 8:30AM – 10:10AM

SS13 | Grid Infrastructure for Emerging AI Data Centers: Challenges and Opportunities [9024]

Room 103A

Chair/Organizer

M A Awal, *Lead Power Electronics Controls Engineer, EPC Power Corporation*

Generative artificial intelligence (AI) data centers represent critical infrastructure with exponentially increasing power requirements and highly variable load patterns. This session explores the challenges and solutions for ensuring reliable power supply to these facilities while maintaining grid stability. Topics include planning and operational issues from a utility perspective, lessons learned from large-load events, and potential technical solutions utilizing power electronics-interfaced energy resources such as grid-forming battery energy storage systems (BESS). Economic optimization strategies for deploying these solutions will also be discussed. Attendees will gain valuable insights into managing the complex interplay between AI data centers and the electric grid.

Session Panelists/Speakers

M A Awal, *Lead Power Electronics Controls Engineer, EPC Power Corporation*

Rahul Chakraborty, *Senior Engineer, Dominion Energy*

Sujay A. Kaloti, *Staff Engineer, Electric Transmission Planning, Dominion Energy*

Oluwatimilehin (Timi) Adeosun, *Staff Engineer, Electric Transmission – Strategic Initiatives, Dominion Energy*

Faeza Hafiz, *Principal Engineer, Quanta Technologies*

Kurtis Toews, *Senior Technical Sales Engineer, RTDS Technologies Inc.*

SS14 | Next-Gen Automotive Electrification: Advances in Electric Propulsion, Power Electronics, and Drives [9013]

Room 103B

Chairs/Organizers

Bulent Sarlioglu, *Professor, IEEE Fellow, University of Wisconsin-Madison*

Ozge Taskin, *Principal Electromagnetic Design Engineer, Protean Electric*

The rapid shift toward electrification is transforming the automotive industry, driving the need for more efficient, compact, and high-performance propulsion systems. Advances in electric propulsion, power electronics, and motor drives are key enablers of this evolution, improving vehicle efficiency, sustainability, and driving dynamics. This session will explore cutting-edge developments in electric motor topologies, high-efficiency drive systems, and next-generation control strategies that are shaping the future of mobility. Key topics include high-performance electric machines, novel drive architectures, and advancements in thermal management and system integration. The discussion will also cover modular and scalable propulsion solutions, enabling greater flexibility in vehicle design, from passenger EVs to commercial and high-performance applications.

Session Panelists/Speakers

Harsha Nanjundaswamy, *Global Director, BorgWarner, E-Mobility Product & Application Engineering Executive*

Vandana Rallandi, *Staff Member, Oak Ridge National Laboratory*

Brij N. Singh, Ph.D., *John Deere Technical Fellow & Region 4 Manager External Relationships*

Silva Hilti, *Technical Fellow, Rivian Automotive*

Brian Welchko, *Technical Specialist, General Motors*

Yingjie Li, *Staff Motor Design Engineer, Tesla*

Thursday, October 23 10:30AM – 12:10PM

SS15 | Design Methodologies: Sustainable Power Electronics by Design [9011]

Room 103A

Chair/Organizer

Kevin Hermanns, *General Manager, PE-Systems GmbH*

Subham Sahoo, Professor, Aalborg University

As global energy demands rise, the need for sustainable solutions in power electronics becomes critical. This session explores how circular economy principles, efficient design strategies, and enhanced recycling approaches can contribute to reducing energy losses, minimizing material waste, and extending the lifecycle of power electronic devices. Topics include advancements in wide-bandgap semiconductors, modular architectures, and design automation tools that support sustainability goals. Experts from academia and industry will present case studies and discuss challenges and opportunities for fostering environmentally conscious innovation in power electronics systems.

Session Panelists/Speakers

Tobias Keller, *Hitachi Energy*

Jean-Luc Shan, *University of Grenoble*

Subham Sahoo, *Aalborg University*

Philipp Kappes, *PE-Systems GmbH*

Jonas Huber, *ETH Zurich*

Mylene Delhommais, *Schneider Electric*

Ariya Sangwongwanich, *Aalborg University*

SS16 | Tackling EMI/EMC Challenges in the SiC and GaN Era with Nanocrystalline Materials [9021]

Room 103B

Chair/Organizer

Mariana Perez de Oliveira, *Senior Market Development Manager, CBMM*

As power electronics evolve with wide bandgap (WBG) devices such as SiC and GaN, managing electromagnetic interference (EMI) and ensuring electromagnetic compatibility (EMC) have become critical design challenges. Nanocrystalline soft magnetic materials offer unique advantages for EMI/EMC mitigation, enabling compact, high-performance filters and inductors. This session highlights innovative applications of these materials across electric vehicle systems, onboard chargers, and high-frequency motor drives. Leading experts will share insights into material properties, design considerations, and case studies demonstrating how nanocrystalline materials contribute to more efficient, power-dense, and reliable systems. Attendees will learn about system-level optimization strategies that incorporate these advanced materials for improved thermal stability, reduced interference, and total cost of ownership benefits.

Session Panelists/Speakers

Subhashish Bhattacharya, *Duke Energy Distinguished Professor, NC State University*

Christian Kasper, *Project Leader in Product Development, VACUUMSCHMELZE*

Paul Ohodnicki, *RK Mellon Faculty Fellow in Energy, University of Pittsburgh*

Bharadwaj Reddy Andapally, *Technical Market Development, CBMM*

Andreas Heim, *General Sales & Marketing Manager – USA, Magnetec GmbH*

Thursday, October 23 2:00PM – 3:40PM

SS17 | Design Methodologies: Verification and Validation Techniques [9005]

Room Room 201B

Chairs/Organizers

Kevin Hermanns, *General Manager, PE-Systems GmbH*

Ke Ma, Professor, *Jiao Tong University Shanghai*

Part 1: 2:00PM – 3:40PM
Part 2: 4:00PM – 5:40PM

As power electronics systems become more complex and demanding, robust verification and validation (V&V) techniques are critical to ensuring performance, safety, and reliability. This session will explore cutting-edge V&V methodologies for hardware and software systems, including hardware-in-the-loop (HIL) testing, automated verification frameworks, and fault injection techniques. Experts from academia and industry will present best practices for integrating V&V into design cycles to detect issues early, optimize development time, and comply with safety standards. Attendees will gain insights into emerging trends and tools that support reliable and efficient product development.

Session Panelists/Speakers

Ke Ma, Professor, *Jiao Tong University Shanghai*

Kevin Hermanns, *General Manager, PE-Systems GmbH*

Lee Gill, *Sandia National Laboratories*

Bill Driver, *Tektronix*

Pierre Küster, *University of Kassel*

Peter Wilson, *University of Bath (Confirmed)*

Shin-Ichiro Hayashi, *Chiba Institute of Technology*

Bryan Lieblick, *Plexim*

Huai Wang, *Professor, Aalborg University*

SS18 | DC Distributed Solutions: Applications, Challenges, and Opportunities [9006]

Room 204C

Chairs/Organizers
Ahmed Mohamed, *Technology Manager, Eaton*
Shafquat Khan, *Lead Engineer, Eaton*

Part 1: 2:00PM – 3:40PM
Part 2: 4:00PM – 5:40PM

The transition to DC distributed power systems is accelerating due to the need for efficient integration of distributed energy resources (DERs) and electrification in sectors such as transportation, data centers, and aerospace. This session brings together leading experts to explore DC distribution applications, challenges, and opportunities. Topics include fault management strategies, protection mechanisms using solid-state circuit breakers, and standardization efforts critical for widespread adoption. Case studies on EV charging infrastructure, microgrids, and data centers will provide practical insights into the technical and economic considerations driving the deployment of DC systems.

Session Panelists/Speakers

Calvin Zhang, *Global Technology Director, Eaton Corporation*
Adel Nasiri, *Thomas L Gregory Endowed Professor, University of South Carolina*
Andrew Meintz, *Chief Engineer, National Renewable Energy Laboratory*
James McBryde, *Engineering Director, Eaton Corporation*
James Langston, *Research Faculty, Center for Advanced Power Systems (CAPS), Florida State University*
Faisal Khan, *Chief Researcher, Center for Energy Conversion and Storage Systems, National Renewable Energy Laboratory*
Montreal

SS19 | Recent Advances and Emerging Applications of Solid-State Transformer-Based Multiport Co[illegible]or Next-Genera[illegible] Grids [9012]

Canceled

Room 201C

Chairs/Organizers
Rasel Mahmud, *Senior Researcher, National Renewable Energy Laboratory*
Mehdi Abolhassani, *CTO, Resilient Power Systems*

Solid-state transformer (SST)-based multiport converters are revolutionizing power grids by enabling efficient bidirectional power flow and integration of distributed energy resources (DERs). This session explores cutting-edge advancements in SST design, focusing on modular multilevel topologies, wide-bandgap semiconductors, and advanced control strategies that improve efficiency and fault tolerance. Presenters will highlight applications ranging from medium-voltage DC (MVDC) grids to electric vehicle (EV) charging infrastructure and data centers. Attendees will gain insights into regulatory frameworks, real-world deployment challenges, and future opportunities to enhance grid flexibility and resilience.

Session Panelists/Speakers

Rasel Mahmud, *Senior Researcher, National Renewable Energy Laboratory*
Mehdi Abolhassani, *CTO, Resilient Power Systems*
Sudip K. Mazumder, *Distinguished Professor, University of Illinois Chicago*

Thursday, October 23 4:00PM – 5:40PM

SS20 | Advances in EMI/EMC Research in Power Conversion Systems [9026]

Room 201C

Chairs/Organizers
Shuo Wang, *Professor and Michael Hsing Faculty Fellow, University of Florida*
Dehong Liu, *Senior Principal Research Scientist, Mitsubishi Electric Research Laboratories*

The adoption of wide-bandgap (WBG) semiconductors such as SiC and GaN in power electronics is enabling higher switching speeds and power densities but also introduces significant EMI/EMC challenges. This session brings together leading experts to discuss the latest advances in EMI modeling, suppression techniques, and compliance strategies for modern power conversion systems. Presentations will cover novel approaches to EMI filter design, characterization of high-frequency switching noise, and practical solutions for meeting stringent EMC standards. Case studies from automotive, renewable energy, and aerospace applications will illustrate how EMI/EMC issues are being addressed in cutting-edge systems.

Session Panelists/Speakers

Shuo Wang, *Professor, University of Florida*
Seungdeog Choi, *Associate Professor, Mississippi State University*
Dehong Liu, *Senior Principal Research Scientist, Mitsubishi Electric Research Laboratories*
Fang Luo, *Associate Professor and Director, Spellman High Voltage Power Electronics Laboratory, Stony Brook University*

Full Day Tutorials

Sunday, October 19 PART 1: 8:30AM – 12:00PM
PART 2: 1:00PM – 4:30PM

Full Day Tutorial 1 | Trends, Challenges, and Implementations of Model Predictive Control in Power Electronics

Room 201C

Prof. Marco Rivera, *University of Nottingham*
Prof. José Rodríguez, *Universidad San Sebastián*
Prof. Emrah Zerdali, *Ege University*
Prof. Sergio Toledo, *Universidad Nacional de Asunción*
Prof. Patrick Wheeler, *University of Nottingham*

In recent decades, the rapid advancement of fast and more powerful microcontrollers has transformed power converter control, paving the way for the development and implementation of more intelligent strategies that go beyond conventional techniques. One of these advanced strategies is Finite Control Set Model Predictive Control (FCS-MPC), which has emerged as a powerful and versatile alternative and has received significant attention in both academia and industry. FCS-MPC offers several advantages, such as an intuitive design, the elimination of the need for linear controllers and modulators, and the seamless integration of nonlinearities and constraints into the control law. These features make FCS-MPC a highly promising solution for tackling complex control challenges in power electronics and electrical drives.

Despite the progress made with FCS-MPC, there are still several challenges to its implementation in power converters and electrical drives as reported in the literature. The most significant issues are the high computational burden, the need for accurate mathematical models, sensitivity to latency and delay, scalability issues, hard-coded control logic and difficulty in tuning the cost function. To address the aforementioned challenges, researchers and engineers around the world have explored various strategies to enhance the robustness, efficiency, and adaptability of FCS-MPC. These include the development of reduced-complexity formulations, adaptive model identification techniques, compensation methods for delay and noise, and the integration of artificial intelligence (AI) for cost function tuning and control logic generalisation. In particular, AI-enhanced MPC and digital twin-based approaches are gaining traction as they enable real-time adaptability, scalability across different converter topologies, and resilience to uncertainties and disturbances.

This tutorial delves into the latest MPC advancements and trends for power converters and electrical drives, emphasising their practical benefits and potential for widespread industrial adoption. Participants will gain insights into the fundamental principles of MPC, explore state-of – the-art applications and learn about emerging opportunities for optimising system performance. The session will provide a comprehensive understanding of how MPC is reshaping the future of power electronics and drives by bridging the gap between academic research and real-world implementation. This tutorial will not only present the state of the art in MPC for power electronics and drives but also equip participants with a forward-looking perspective on its evolution and deployment in next-generation applications such as electric mobility, renewable integration, smart grids, and energy-aware control in industrial environments.

Full Day Tutorial 2 | Rotating Machines: Insulation and Partial Discharge Inspection

Room 102A

Dr. Nancy Frost, *Frosty's Zap Lab, LLC*
Eran Frisch, *OFIL Ltd.*

Industries such as power generation, manufacturing, and electric vehicles depend on the efficiency and longevity of rotating machines. Partial Discharge (PD) in electric motors and generators serves as an essential indicator of potential insulation issues. If not detected, PD can cause significant equipment failures, requiring expensive repairs and leading to unplanned downtime that disrupts operations and increases maintenance costs.

Partial Discharge is a localized electrical discharge that only partially bridges the insulation between conductors. It can occur at any point in the insulation system where the electric field strength exceeds the dielectric strength of the surrounding medium. Over time, these discharges can erode the insulation material, potentially leading to its failure. Detecting PD early is crucial for maintaining the integrity and performance of electric machinery.

This tutorial aims to enhance participants' understanding of insulation systems in MV/HV rotating machines and LV rotating machines, failure mechanisms, PD theory and PD measurement and inspection techniques. Through hands-on demonstrations, case studies, and guidance from experienced instructors, participants will acquire both the theoretical knowledge and practical techniques necessary for effective PD detection.

TUTORIAL OBJECTIVES:

- Rotating Machines Overview: Learn about the design, key components, materials, manufacturing processes, testing methods, and standards for both MV/HV and LV rotating machines.
- Insulation Materials: Review various insulating materials and their performance characteristics. The session will compare options based on thermal efficiency, cost, environmental impact, and ease of installation.
- Understanding PD Impact: Explore how PD affects the design, testing, and manufacturing stages. Participants will examine different types of PD—such as internal discharges in solid insulation voids, surface discharges along insulation boundaries, and corona discharges in gas – filled environments. Understanding the conditions under which PD occurs will help anticipate insulation issues and enable preventative design strategies. ·
- PD Measurement and Inspection Techniques: Learn to apply PD detection methods during optimization and quality assurance phases to improve machine reliability and performance. This includes the use of PD monitoring tools to assess insulation health throughout the equipment lifecycle.
- Case Studies: Review real-world examples of PD detection in rotating machines and examine how PD-related aging mechanisms develop over time.
- Live Demonstration: Experience a live demonstration showcasing the use of UV cameras and other PD measurement tools on a stator and sample electrical equipment.

Full Day Tutorial 3 | Magnetics Bootcamp

Room103A

Dr. Stanley R. Trout, *PE Spontaneous Materials*

Starting with the simple things we learned about magnets in the first grade, this seminar will present the basics of permanent magnets and magnetic materials, more broadly. Attendees will understand the definitions, parameters and arcane units of magnetism, both CGS and SI. They will learn how magnets are processed, magnetized, characterized and affected by temperature. In addition, they will see how magnets are used, well and not so well, with case studies, finishing with some comments about potential new materials. This small investment of your time will increase your magnet "IQ" and make this complex technology easier to navigate.

OUTLINE

Basic Bootcamp (session 1)
- Introduction
- Things we already knew
- Two simple tests
- Magnetic Theory, Units
- Electromagnetism
- Ferromagnetism
- Processing Permanent Magnets

Advanced Bootcamp (session 2)
- Review
- Thermal Properties
- Magnetizing
- Self-demagnetization
- Measurements
- Case Studies

These seminars are given in an essentially traditional lecture style, although the audience is kept engaged with questions and demonstrations.

Regular Tutorials

Sunday, October 19 8:30AM – 12:00PM

Regular Tutorial 2 | Control and Optimization of Multiport Power Converters – A Scalable Software Solution

Room 204B

Dr. Ayan Mallik, *Arizona State University*
Dr. Saikat Dey, *University of Central Florida*

This tutorial offers a comprehensive approach to modeling, circuit analysis, design, and powerflow optimization techniques for multi-active bridge (MAB)-based multiport power converters (MPC). It provides essential theoretical insights into loss formulation, soft-switching constraints, and optimization of losses, including the use of loss-optimal modulators implemented on digital platforms. Further, since an increasing order of the converter also raises the complexity of digital implementation, this tutorial will delve deep into analyzing and deriving the theoretical limits to the modulation degrees of freedom for a particular selection of converter switching frequency and choice of control platform. This understanding ensures the practical feasibility and optimization of the MAB-based MPC's performance in real-world applications by taking examples from real-world grid-renewable integrations and power conversion in space and avionics. It helps designers optimize these converters not only for efficiency but also for their practical realizability, considering the implementation constraints. An essential part of the tutorial is the automated algorithmic framework for design and control optimization for MPC systems, ensuring accuracy, repeatability, time efficiency, and better-quality control introduced by the team. The rapid evolution of clean energy technologies has prompted frequent changes in converter system architectures. As a result, a highly accurate and fast design automation tool is needed to maximize system performance, including efficiency and miniaturization, before products hit the market. The MAB optimization automation tool box addresses these needs by generating optimal design parameters and control variables for a wide range of power converter topologies, including both PWM-controlled and PFM-controlled converters. The automated process uses a two-layer approach: the first optimizes converter parameters (e.g., transformer turns ratio, L-C values) based on efficiency and volume targets, while the second determines optimal control variables (phase, duty, frequency) to minimize losses and maximize ZVS. Designers can tailor the objective function to their application and generate optimal control variables for final implementation. The toolbox also accommodates specific power device parameters, like junction capacitances and FET on-state resistances, as well as converter non-idealities, such as inter-winding capacitances. These factors are incorporated into the optimization process to improve the design's accuracy. The tutorial includes a demonstration of the optimization software, showcasing the agreement between tool-generated optimization results and simulation outcomes, verifying the toolbox's effectiveness.

Furthermore, the tutorial discusses challenges in implementing closed-loop loss-optimal control in real time. The team proposes using a multivariate polynomial regression method, which requires only knowledge of converter parameters and system variables like input/output voltage and load profiles. Finally, the tutorial explores how the toolbox can be applied to different converter families with AC-type port voltages or varying load profiles and highlight future research opportunities in power electronics design optimization. This software tool box is fully open source, allowing engineers to enhance system performance according to their specific requirements.

Regular Tutorial 3 | Control of Grid-Forming Inverter Based Resources: A Tutorial on Selected Topics

Room 201B

Prof. Dominic Groß, *University of Wisconsin-Madison*
Prof. Sairaj Dhople, *University of Minnesota*
Dr. Nathan Baeckeland, *National Renewable Energy Laboratory*
Dr. M A Awal, *EPC Power Corporation*

This tutorial provides a comprehensive exploration of Grid-Forming (GFM) inverters, focusing on their operation under constraints, stability analysis, and system-level control. The tutorial bridges theoretical foundations and practical applications, offering insights into current-limiting methods, unbalanced system operation, and power system protection.

First, the tutorial examines three distinct methods for current limiting—

switch-level current limiting, current-reference saturation limiting, and virtual-impedance limiting. Each method is analyzed for its speed, implementation complexity, impact on upstream controls, and suitability for transient scenarios. For instance, switch-level limiting provides rapid protection but induces distortion and bypasses upstream control loops. Current-reference saturation limiting is widely adopted due to its simplicity but requires anti-windup measures to prevent integrator issues. Virtual-impedance limiting retains voltage-source behavior but reacts slower during transients. Second, the tutorial delves into the challenges posed by unbalanced grid conditions and explores control strategies using symmetrical components and generalized GFM approaches. Positive-sequence control ensures balanced voltage outputs but may struggle under unbalanced conditions or current limits. Generalized GFM control introduces phase-balancing feedback and droop mechanisms for unbalanced phases while addressing system protection requirements.

Third, traditional protection schemes—overcurrent protection, distance protection, and line-differential protection—are evaluated in the context of IBRs. Overcurrent protection is affected by limited overcurrent capabilities of IBRs but can be improved with adaptive schemes. Distance protection faces challenges due to changes in inverter output impedance during current limiting but remains viable with deliberate design choices. Line-differential protection is inherently agnostic to source characteristics but demands high-bandwidth communication lines for effective operation.

Fourth, the tutorial highlights hardware constraints (current, reactive power), source constraints (real power, ramp rates), and logistical constraints imposed by interconnection agreements. It explores the implications of constraint enforcement on synchronization processes and transient stability.

Fifth, the tutorial reviews classical stability arguments alongside contemporary techniques such as brute-force linearization, data-enabled frequency domain methods, and circuit-based energy functions. These methods address small – and large-signal stability challenges in GFM IBRs.

Finally, primary and secondary control architectures are discussed, emphasizing optimal design and implementation of Automatic Generation Control (AGC) with dual-port GFM IBRs and anti-windup measures. Nested time-scale separation and power-angle curves are utilized to ensure stability during dynamic operations.

This tutorial integrates fundamentals of GFM control with recent developments and provides a critical resource for researchers, engineers, and policymakers aiming to optimize the performance of GFM inverters in modern power systems while ensuring robust stability and protection.

Regular Tutorial 4 | Cybersecurity Modeling and Testing for Smart Inverters

Room 204C

Prof. Taesic Kim, *University of Missouri*
Dr. BoHyun Ahn, *University of Missouri*
Dr. Sudip K. Mazumder, *University of Illinois Chicago*

Distributed energy resources (DERs) are poised to provide numerous benefits to customers and the grid, including lower cost, improved resilience and reliability, more rapid decarbonization, and increased consumer choice. Smart inverters are key power electronic (PE) devices that connect DERs such as renewable energy and energy storage equipment to power grids. Smart inverters include several intelligent grid functions, such as fault-ride through, grid-voltage support, and reactive-power compensation, typically with real-time remote access, data exchange, and seamless over-the-air firmware updates in a cyber-physical environment. However, cybersecurity concerns arise due to extensive information exchange among smart inverters and multiple stakeholders (e.g., utilities, aggregators, vendors, operators, and owners). Recently, sophisticated threat actors have been expanding their targets from bulky power plants and substations to grid edge devices, especially DER. In May 2025, over 100 security vulnerabilities were reported. A recent report from SolarPower Europe indicated that the loss of 3 GW of PV would cause significant implications on the European grid while the loss of 10 GW was estimated as the trigger point for a cascading outage such as Spanish grid blackout. Therefore, smart inverters and their edge network devices account for a growing attack surface as a digital trojan horse and a new security battlefield in the future PE-dominant power grids. Ensuring the security and resilience of PE-dominant grid against prevalent and constantly evolving threats is paramount for maintaining national security, economic stability, and public safety. However, lack of security modeling and tools such as threat modeling, attack modeling, penetration testing tools, and security testbed might impede PE society's research interests in cybersecurity in PE devices and applications.

This tutorial will provide lessons learned from the real-world incidents and security assessment of the industry security best practices including DER security standards, recommendations, certification programs and security features of smart inverters. Furthermore, we will discuss 15 practical cyberattack models utilizing existing vulnerabilities of the industry best practices for smart inverters including malware attacks, controller attacks, and hardware attacks and their penetration testing methods. Finally, we showcase several attack demos and defense methods against the cyberattacks. This tutorial includes traditional lectures and software/hardware demonstrations as hands-on case studies (recorded videos). This tutorial contents can establish a resilience-by-design baseline reference for smart inverter cybersecurity teams, which bridges the gap between cybersecurity and power engineering communities. Besides, this tutorial will greatly benefit attendees who are new to the research area of cybersecurity, as a useful guidance and researchers currently working on cyber-resilient PE, as an avenue to learn about recent advancements and trends.

Regular Tutorial 5 | AI-Powered Adaptive and Reconfigurable Bidirectional Control of Grid-Connected EVs for Sustainable Smart Grid Operation

Room 103B

Prof. Sheldon Williamson, *Ontario Tech University*
Haitham Mazen, *Soneil Electronics*

The rapid integration of electric vehicles (EVs) into smart grids demands advanced bidirectional power flow control to optimize energy distribution, boost grid stability, and support the transition to sustainable energy. This tutorial introduces an AI-powered, adaptive, and reconfigurable control framework for grid-connected EVs, using machine learning (ML) to optimize charging, discharging, and vehicle-to-grid (V2G) operations. Solid-State Transformer (SST)-based Dual Active Bridge (DAB) converters are used for efficient medium-voltage (MV) grid interfacing, featuring fault – tolerant conversion with SiC and GaN devices and FPGA-based real-time control for high-efficiency, high-power-density operation. Central to the framework is ML-based power flow optimization, positioning EVs as distributed energy resources that adapt to grid signals to reduce congestion, peak load, and enhance resilience. Health-conscious charging strategies are presented, employing AI-driven battery diagnostics and predictive analytics to extend battery life and manage energy adaptively. A cloud-based Battery Management System (BMS) further supports V2G operations with real-time monitoring, adaptive control, and secure, decentralized energy transactions. The tutorial highlights the role of Digital Twin technology in simulating and optimizing EV-grid interactions, using virtual replicas of EVs, chargers, and power electronics for predictive maintenance and operational enhancement. FPGA-based control ensures ultra-fast computation, low-latency response, and real – time power electronics optimization. Advanced V2G strategies are explored, showcasing how SST – enabled DAB converters improve power quality, reduce losses, and enable smooth EV integration with MV grids. Fault-tolerant converters using SiC and GaN technologies

offer improved thermal handling, higher efficiency, and increased reliability—addressing the demands of high-power EV-grid systems. Comparative simulations validate the proposed AI-driven scheduling and SST-based conversion over traditional control, demonstrating benefits in cost reduction, voltage stability, peak shaving, and renewable energy integration. The tutorial also addresses scalability and deployment in real-world grids, covering secure cloud-based data handling, real-time AI deployment, and compatibility with existing infrastructures. Policy and standardization aspects for AI-enabled EV-grid systems are also reviewed. Through case studies, simulations, and experimental data, attendees will gain deep insights into real-time AI techniques for adaptive power flow, robust power electronics, and V2G-enabled smart grid integration. The session concludes by identifying future research directions including scalable AI architectures, hybrid energy storage, and AI-enhanced grid resilience to advance intelligent, sustainable EV-grid ecosystems.

Regular Tutorial 7 | Challenges and Mitigation of EMI and Partial Discharge in WBG-based Power Electronics

Room 202A

Prof. Bulent Sarlioglu, *University of Wisconsin – Madison*
Prof. Jin Wang, *The Ohio State University*

Wide bandgap (WBG) semiconductor devices, such as Silicon Carbide (SiC) and Gallium Nitride (GaN), are transforming power electronics by offering higher efficiency, reduced weight, and compact designs. These advanced semiconductors enable higher switching frequencies and lower losses, making them ideal for applications such as electric vehicles, renewable energy systems, and industrial motor drives. However, the fast switching transitions associated with WBG devices introduce new challenges, particularly in managing common-mode electromagnetic interference (EMI) and mitigating partial discharge (PD) effects in power electronics systems. This tutorial provides a comprehensive examination of these critical issues and presents effective mitigation techniques to ensure reliable and robust power conversion. Attendees will gain practical knowledge on how to manage the high switching speeds of WBG power semiconductor devices, which can lead to severe EMI problems in power electronic converters that supply electric motors used in applications like electric vehicles and household appliances.

Dr. Bulent Sarlioglu will begin by exploring the origins of common-mode EMI emissions in WBG-based power electronics, discussing how the common-mode voltage spectrum varies as a function of switching frequency. The session will delve into the impact of high dv/dt (voltage change over time) in motor drives, which significantly exacerbates EMI issues. Various mitigation strategies will be presented, including the adoption of advanced inverter topologies, optimized gate drive techniques, and the implementation of effective filtering solutions. Additionally, the tutorial will include discussions on practical experimental results, equipping attendees with the necessary tools to address EMI challenges effectively.

The second part of the tutorial, led by Dr. Jin Wang, will focus on the phenomenon of partial discharge (PD), particularly in low air-pressure environments, and its impact on the long-term reliability of power electronics and electric machines. PD can lead to insulation degradation and eventual failure in high-voltage systems, making it a critical concern in WBG-based power electronics. Dr. Wang will present recent studies on PD behavior in motor windings and power modules subjected to high dv/dt SiC waveforms, offering a deeper understanding of the underlying mechanisms and design considerations necessary to mitigate PD risks.

The tutorial will also explore recent advancements in SiC device technology and megawatt-scale power converters, providing insight into how cutting-edge innovations are shaping the next generation of high-performance systems. A case study featuring state-of-the-art commercially available SiC power modules will be discussed, showcasing a high-power-density, partial-discharge-free design. The session will include analysis of relevant test waveforms, highlighting effective design strategies that enhance system robustness and efficiency.

By attending this tutorial, participants will gain invaluable insights into addressing EMI and PD challenges in high-performance motor drive systems. The knowledge acquired will empower engineers and researchers to design next-generation power converters with enhanced reliability, efficiency, and long-term durability. This session is essential for professionals looking to stay ahead in the rapidly evolving field of WBG semiconductor-based power electronics.

Regular Tutorial 9 | Power System Protection with High Inverter-based Resources (IBRs)

Room 203A

Dr. Jing Wang, *National Renewable Energy Laboratory*
Prof. Brian Johnson, *University of Idaho*
Aboutaleb Haddadi, *Electric Power Research Institute*
Angelos Kokkinis, *Schweizer Engineering Laboratory (SEL)*

Inverter-based resources (IBRs) have very different fault responses than synchronous generators, which challenges the reliable operation of some commonly applied power system protection elements. Therefore, there are significant research efforts that have been performed in the power industry and in the academic/government research community for enhancing power system protection reliability with increasing penetration of IBRs, with special emphasis on how IBRs' fault responses challenge certain protective relay functions. The challenges are identified in multiple energy sectors, ranging from small-scale systems such as microgrids, to large-scale distribution systems and bulk power grids. It is noteworthy that reliable power system protection schemes are urgently needed to guarantee the reliable operation of IBRs intensive grids. In this tutorial, the diversified and multi-disciplinary instructor team from academia, leaders from the protection industry, and a national laboratory will introduce the latest research advances and industry practices on power system protection with high penetration of IBRs.

The tutorial will cover the four most critical topics in the power system protection areas for high IBR grids, including key impact study of IBRs on protection relays, protection of inverter-dominated transmission system with grid-forming (GFM) and grid-following (GFL) IBRs, and real-world protection design for microgrid using commercial relays. The tutorial serves to share the latest research progress and industry practices of power system protection, and covers a broad guidance group, including universities, inverter vendors, utilities, and government national laboratories. The whole tutorial will be educational and informative with fundamentals, practical examples, and real-world applications.

The first presenter will share the latest research in transmission protection with high IBRs with the focus on the two most critical aspects that affect the protection relay's performance. These two aspects are current limiting and negative sequence current which are evaluated using a real world system with actual relay settings.

The second presenter will discuss commonly applied protection functions used and transmission and distribution systems, followed by a discussion of ways GFL can impact protection response. As more and more GFM IBRs will be integrated into transmission systems to improve system strength and stability, it is important to understand how GFM IBRs' fault responses affect the response of protection relays.

Thus, the third presenter will explore protection of inverter-dominant transmission systems to shed light on how the different fault-ride through (FRT) functions in GFM inverters affect the different protection schemes, including overcurrent, distance protection, line current differential protection, and permissive over-reaching transfer trip.

As transmission protection attracts a lot of attention, microgrid protection is still an interesting topic because more and more microgrid systems start to use only IBRs and become 100% renewable systems. The fourth presenter will present the real-world use cases of microgrid protection and demonstrate their designs using commercial protective relays and test via hardware-in-the-loop (CHIL).

The tutorial is designed as an interactive session for boosting audience interest and participation. Particularly, the interactive tutorial session will be implemented by inviting the audience to access the interactive tools and video tours during the tutorial to dive into the demo with real-world scenarios and applications.

Regular Tutorial 11 | Integrated HIL Simulation Environment: Streamlining the Development Cycle from Offline to Real-Time

Room 203B

Caio Osorio, *Typhoon HIL Inc.*
Ivan Celanovic, *Typhoon HIL Inc.*
Prof. Humberto Pinheiro, *Federal University of Santa Maria (UFSM)*

Model-based system engineering is a crucial methodology that supports the entire development cycle of energy conversion components, systems, and applications, from design to test and integration. This process typically involves various simulation approaches (e.g., MIL, SIL, and C-HIL) tailored to the specific requirements of each development stage. However, it often leads to the use of multiple software toolchains, necessitating the creation and maintenance of multiple models. As a result, manual changes must be propagated across these models, requiring additional time and leading to poor version control, a higher risk of introducing modeling errors, and increased costs.

In response to these challenges, this tutorial explores how to seamlessly transition from offline simulation to real controller implementation, maintaining true model continuity from the early design phase through practical implementation and testing. HIL integrated model-based engineering solutions will be showcased, demonstrating how to streamline the development process for intelligent digital power components and systems. An example workflow will guide attendees from initial design using the TyphoonSim™ offline simulator, through automatic code generation for target microcontrollers, and concluding with real-time testing using Hardware-in-the-Loop (HIL) technology.

Regular Tutorial 15 | Encoderless Control of AC Drives Concepts, Recent Developments and Realistic Expectations

Room 103C

Prof. Dr.-Ing. Ralph Kennel, *Technical University of Munich*
Prof. Dr.-Ing. Zhenbin Zhang, *Shandong University*
Dr. Haitao Li, *Shandong University*

As industrial drives demand higher reliability and lower cost, eliminating the mechanical encoder has become attractive. Rotor position must be inferred from voltages and currents. Traditional encoderless techniques include model-based observers and high-frequency injection. Each has strengths and limitations across the speed range, driving the development of hybrid and predictive methods.

(1) Model-based observers: These methods use the motor model, measured stator voltages and currents, and algorithms such as Extended Kalman Filter or Active Flux Observer to estimate rotor flux. Observability at medium and high speeds is strong, but degrades at zero to low speeds due to parameter mismatches and back-EMF amplitude falling. Recent adaptive observers compensate stator resistance drift and inverter voltage drop to improve accuracy.

(2) High-frequency signal injection methods: By superimposing test signals onto the PWM waveform, saliency effects in inductance produce current responses that reveal rotor angle. Techniques include rotating-vector injection, pulsating injection and zero-vector injection. These excel at low speed and standstill but introduce filtering complexity, may generate acoustic noise, and require careful injection frequency selection.

(3) Model Predictive Control (MPC) for encoderless estimation: MPC predicts future inverter switching states and current trajectories over a finite horizon to optimize a cost function that tracks torque or current references. Exploiting predicted current slopes for different voltage vectors, MPC simultaneously regulates currents and infers rotor position. Variants include finite-control-set MPC, which evaluates discrete switching options, and continuous-control-set MPC, which computes analog voltage commands prior to modulation.

In the context of conventional vector control architecture, this tutorial will provide an in-depth introduction to the implementation details and tuning strategies of the two major encoderless control methods, model-based observers and high-frequency signal injection, including stator parameter identification, filter design, and loop tuning. It will then present a detailed explanation of the encoderless MPC algorithm, covering cost-function weight configuration, integration of excitation signals within the prediction horizon, selection of real-time solvers, and the hardware-in-the-loop validation process. Finally, it will conclude with a forward-looking perspective on combining predictive MPC with encoderless control to guide future research.

Attendees will not only master how to apply observer-based and injection-based methods for robust position estimation within a classical vector control framework, but also learn how to integrate encoderless position estimation into the MPC architecture, tune controller and observer parameters, and validate performance on hardware prototypes, thereby laying a solid foundation for practical engineering applications.

Regular Tutorial 17 | High-performance Electrical Machine Solutions with Less Rare-earth Materials

Room 202B

Prof. Baylon G. Fernandes, *Indian Institute of Technology Bombay*
Shovan Dey, *Indian Institute of Technology Bombay*

High-performance electrical machines are critical components of energy-efficient systems across electric transportation, industrial automation, and renewable energy. A key challenge in the next generation of machines is the reduction or elimination of rare-earth permanent magnets which are expensive, environmentally burdensome, and subject to global supply risks. This tutorial will explore innovative electric machine designs that achieve high efficiency and torque density while minimizing or entirely avoiding the use of rare-earth materials.

One such alternative is the interior permanent magnet-assisted synchronous reluctance motor (IPM-SyRM) using low-cost ferrite magnets. Despite environmental and economic advantages, ferrite-based IPM-SyRMs face issues such as partial demagnetization in outer flux barriers under peak torque and elevated total harmonic distortion (THD) in the terminal voltage during flux-weakening operation. This tutorial will present optimization strategies for magnet orientation to address these challenges, including air-gap design refinements to improve performance. Design methodologies, finite element analysis (FEA)-based validations, and experimental results will be discussed in depth.

Next, the line-start PM-assisted synchronous reluctance motor (PMa-SyRM) is presented as an energy-efficient alternative to conventional induction motors, particularly for rural water pumping applications. The tutorial will emphasize the advantages of rib-less rotor designs for improved manufacturability and mechanical robustness. Key aspects such as structural integrity, magnet placement, and inverter-fed performance will be discussed, especially for topologies using rectangular ferrite magnets with fluid saliency-enhancing flux barriers.

Magnetically geared machines are another frontier in high-torque, compact drive systems. A segmented rotor switched reluctance motor (SSRM) integrated with a magnetic gear is introduced to reduce system complexity while preserving performance. Traditional magnetic gear systems require multiple coaxial members and air-gaps, leading to assembly and reliability challenges. This tutorial introduces a simplified topology where motor and gear functionalities are combined using only three members and two air-gaps. The principle of reluctance-based magnetic gearing—eliminating permanent magnets—is central to this concept. A third variant, entirely PM-free, will also be presented, highlighting its suitability for multi-port and modular drive systems.

Lastly, electrically-excited synchronous machines (EESMs) and hybrid-excited synchronous machines (HESMs) provide compelling alternatives to PM-based machines. HESMs incorporate both permanent magnets and field coils to achieve high torque density with reduced rare-earth dependency. A novel fully hybridized and parallel flux-path HESM configuration will be detailed, demonstrating improved efficiency and balanced copper usage compared to both PMSMs and EESMs. Design intricacies, operational principles, and trade-offs will be covered. A key enabler for these rotor-excited machines is a rotary transformer (RT) for contactless power transfer. This tutorial will cover high-frequency, resonant RT configurations suitable for brushless excitation systems (BES), including advanced three-winding RT topologies enabling bipolar field control.

Sunday, October 19 1:00PM – 4:30PM

Regular Tutorial 1 | Meeting the Demands of Fault-Tolerant Machine Drives for Safety-Critical Applications

Room 201B

Prof. Thomas M. Jahns, *University of Wisconsin – Madison*
Prof. Hamid A. Toliyat, *Texas A&M University*
Dr. James Swanke, *H3X Technologies Inc.*

Rapidly growing interest in safety-critical applications such as electrified aircraft propulsion is making it critical to focus more attention on the development of high-performance machine drives with ultra-low failure rates. The objective of this tutorial is to provide a thorough introduction/review of both the basic concepts and current state-of-the-art of fault-tolerant machine drives (FT-MDs) by highlighting a variety of major technical approaches that are being pursued around the world. The basic nature of the FT-MD topic demands that the machine, power electronics, controls, and their system integration all be addressed as part of this tutorial. The first part of the tutorial will focus on three key requirements for successful FT-MDs: 1) the critical importance of achieving electromagnetic, thermal, and galvanic isolation between all of the motor drive segments to prevent faults from cascading to healthy segments; 2) the importance of rapid repair rates to return the FT-MD to full health as quickly as possible; and 3) the critical importance of suppressing all sources of single-point failures in the FT-MD unit. Markov chain analysis will be used to illustrate/quantify the impact of each of these factors. Comparisons between the fault tolerance characteristics of different types of machines will be discussed, highlighting the key features that make make individual machine types appealing or challenging for fault-tolerant machine drive applications. Similar attention will be devoted to comparing different types of power electronic inverters, with a particular focus on the differences between baseline voltage-source inverters (VSIs) and new types of current-source inverters (CSIs) that offer some special fault-tolerance features, particularly for permanent magnet synchronous machines. Comparisons of machine drive control architectures for FT-MDs will also be addressed.

Other key topics that will be discussed during the tutorial include: a) fault-tolerant machine phase winding configurations, with particular attention to high-phase-number (>3) windings; b) fault-tolerant modular machine drive (FT-MMDs) that break the machine drive into multiple independent phase-drive units (often 3-phase drive units) that combine their outputs to drive a single output shaft; and c) a discussion of the major fault types that afflict the machines and power electronics used in FT-MDs; and d) a survey of fault detection techniques that are critical to successful FT-MD implementations. Material presented in the tutorial will be illustrated by examples of fault-tolerant machine drive equipment designed, built, and tested by each of the tutorial presenters. For example, analytical and experimental results from development of a 20 kW 4-module FT-MMD unit at UW-Madison will be used to illustrate key concepts. The tutorial will end with a summary of the current status and promising future directions of FT-MD research, including a discussion of key remaining challenges.

Regular Tutorial 6 | Time for Power Electronics to Consider Both Physical and Cyber-Physical Reliabilities

Room 202A

Prof. F. Patrick McCluskey, *University of Maryland College Park*
Dr. Sudip K. Mazumder, *University of Illinois Chicago*
Dr. Peter Hacke, *National Renewable Energy Laboratory*
Dr. Jack Flicker, *Sandia National Laboratories*

Power electronics today, unlike at its inception, is a cyber-physical system comprising sensing, control, and communication (all of which constitute the cyber layer) aside from complex solid-state power stage (which constitute the physical layer). With the advent of emerging applications like photovoltaic and wind energy, electric vehicle charger, HVDC/MVDC, solid-state transformers, the complexities of modular multilevel power-electronics systems have enhanced multifold both in terms of physical and cyber complexities along with increased interdependencies among the physical and cyber layers. As such, manifestations of reliability issues at the physical layer may not have their origins necessary at the physical layer but could transcend the cyber layer as well. Consequently, the reliability of power electronics for the emerging systems needs to have this broader perspective (i.e., physical as well as cyber-physical reliabilities), which is the focus of this tutorial.

This tutorial first discusses the challenges in assessing the physical reliability of power electronics systems and then explores recent advancements in reliability evaluation. Power semiconductor devices, along with capacitors, MOVs, PCBs etc., are critical to system reliability, with failures often caused by thermal cycling, electrical overstress, and material fatigue. As wide-bandgap (WBG) devices replace conventional silicon, they offer efficiency and thermal performance gains but introduce new failure mechanisms requiring specialized assessment. To evaluate power device reliability, accelerated tests are conducted, and failure mechanisms are studied. As a case illustration, power cycling tests (PCT) assess thermal cycling effects, while advanced inverter-like accelerated tests (IAT) simulate real-world inverter conditions for a more comprehensive evaluation. Complementing bottom-up approaches, this tutorial includes top-down approaches to inverter reliability evaluation, emphasizing system-level reliability in the context of qualification test standards. This perspective integrates component-level insights with holistic inverter performance metrics, aligning with industry benchmarks to ensure robust design and operational

reliability. This tutorial briefly compares these tests and discusses lifetime prediction using physics-of-failure understanding, statistical methods, and AI/ML-based approaches for reliability assessment in power electronics applications.

Additionally, to enhance the reliability of power devices, advanced packaging, or real-time active control techniques, can be used to mitigate stress during operation and extend the operational lifetime of power devices. This tutorial presents these advancements, offering insights into improving the physical reliability of modern power electronics systems. Additionally, addressing the increasingly critical cyber dimension, the tutorial explores cybersecurity vulnerabilities and resilience strategies against electromagnetic side-channel noise intrusion (EM-SNI) and other cyber-physical threats. These threats compromise the control and feedback loops of power converters, causing performance degradation or sudden operational failures at the power stage. Specifically, the tutorial examines the propagation of such cyber-attacks in networked power electronics systems at the grid edge. Participants will learn about cyber-informed methodologies, including proactive safeguards (such as preventive strategies aligned with industry standards) and reactive countermeasures (intrusion section systems and adaptive strategies and real-time system recovery methods). This section also covers the emerging standards landscape for cybersecurity of PV systems to mitigate vulnerabilities in distributed energy resources and securing communication and control in grid-integrated systems. Additionally, degradation-informed control methodologies are discussed to dynamically enhance reliability in response to detected threats. The tutorial concludes by integrating physical and cyber reliability concepts into a unified reliability assessment framework, highlighting gaps, standardization needs, and future research opportunities, providing practical insights for industry professionals and researchers alike.

Regular Tutorial 8 | Multilevel Converters in Multiport Multiterminal High-Voltage DC (MT-HVDC) Converter Stations

Room 203A

Dr Omid Beik, Asst. Prof., *Michigan State University*
Prof. Johan Enslin, *ARPA-E & Clemson University*

The increasing demand for compact, efficient, scalable, and resilient high-voltage direct current (HVDC) transmission systems necessitate advancements in high-voltage modular and multilevel power electronics technology. This tutorial provides a comprehensive exploration of HVDC technologies and their emerging trends, with a focus on modular power converter architectures, submodule topologies, and advanced control strategies. The sessions will cover fundamental principles, recent innovations, and future prospects in multiport and multiterminal HVDC (MT-HVDC) converter stations, aiming to equip attendees with a strong technical foundation and insights into the evolving landscape of power electronics in high-voltage applications. The tutorial begins with an overview of HVDC systems, detailing their operational principles, and their role in modern power grids. This section will introduce the fundamental building blocks of HVDC networks, including power electronic converters and control methodologies essential for stable and efficient power transmission. The tutorial will then explore half-bridge and full-bridge converter submodules. The working principles, advantages, and trade-offs between these two topologies will be examined. Special emphasis will be placed on their impact on converter performance, fault-handling capabilities, and overall efficiency in HVDC transmission. Following this, a deep dive into future HVDC substations and multiport MT-HVDC converter stations using modular valves will be presented. The session will discuss the need for MT-HVDC systems, their benefits in facilitating grid interconnection, and the latest advancements in modular valve technology. Challenges related to reliability, scalability, and control of multiterminal HVDC grids will be addressed, along with potential solutions for enhancing grid resilience and efficiency. An innovative approach to Silicon Carbide (SiC)-based High-Voltage Neutral-Point Clamped (NPC) power electronics building blocks as submodules will also be discussed. This session highlights the significant reduction in submodule footprint (by over 50%), increased power density (by a factor of five), and enhanced voltage capabilities achieved through SiC-based devices. The role of SiC technology in driving the next generation of compact and high-efficiency MT-HVDC converter stations will be thoroughly examined. Finally, an advanced session on Multilevel Space Vector Modular (ML-SVM) modulation will be presented. This strategy integrates phase-shift pulse width modulation (PS-PWM), level-shifted PWM (LS-PWM), and nearest-level control (NLC)/staircase modulation techniques to improve voltage balancing among submodules. The session will highlight how these techniques contribute to a 15% increase in submodule and valve terminal voltage, enabling faster and more efficient low-level control.

Regular Tutorial 10 | Industrial Medium-voltage Converters and Drives: From Components to Systems and Applications

Room 204B

Tobias Geyer, *ABB Switzerland*

This tutorial provides a comprehensive introduction, overview and assessment of medium-voltage converters and drives. Such converters and drives are vital to decarbonize the planet by generating renewable energy and electrifying transportation systems and heavy industry. A particular emphasis is laid on system aspects, i.e., the integration of the transformer, converter, electrical machine and load into a high-performance drive system. To increase the reliability, redundancy can be added on converter level. To minimize the cost of such drive systems – or conversely – to maximize their hardware capability in terms of rated voltage and current, model predictive pulse pattern control (MP3C) offers a disruptive way of achieving this, as will be shown in this tutorial. The classic control methods, scalar control, field-oriented control and direct torque control will be introduced as well.

Medium-voltage drives are highly tailored to their specific application. As such, the understanding of the key drive applications is vital, including marine propulsion, rolling mills of the metals industry, crushers and mine hoists of the mining industry, wind power generation, and pumps and compressors used in the Oil and Gas industry.

Besides the classic motoric applications, non-motoric applications such as static frequency converters (SFCs) and power electronics grid simulators are quickly growing in market size. SFCs provide electrical power to berthed ships or remote locations, whereas grid simulators allow the testing and verification of renewable energy systems. Both applications are much more challenging to control and operate than classic variable speed drives, providing fruitful research problems.

This tutorial will introduce the exciting world of medium-voltage converter and drive systems, it will showcase the opportunities they offer, and will point out challenging research problems for academics and researchers working in industry alike. The target audience of this tutorial are researchers from both academia and industry who are interested in the exciting world of medium-voltage converter and drive systems, as well as traction converters used in electric vehicles and trains, as they face similar challenges and requirements.

All attendees will greatly benefit from the tutorial: Novices because the tutorial provides a comprehensive overview of and introduction to medium-voltage converters and drives; academics and engineers at an intermediate level because the tutorial provides crucial information that is otherwise rarely available, such as system aspects, markets and applications; experts as the tutorial explains the commercial benefits of novel cutting-edge control methods, introduces non-motoric applications, and discusses open research questions in this exciting field.

Regular Tutorial 12 | Advanced EV Battery Charging Strategies: Effects on Battery System Performance, Lifetime, and Reliability

Room 103B

Dr. Daniel-Ioan Stroe, *Aalborg University*
Ariya Sangwongwanich, *Aalborg University*

The electrification of the transportation sector is experiencing unprecedented growth due to the continuous development of battery technologies, which have led to substantial cost reductions and enhanced driving ranges. Nonetheless, EV users face one outstanding challenge: the charging speed capability of batteries, which remains considerably inferior to that of internal combustion engine vehicles. From a battery electrochemical perspective, increasing the charging rate is not possible without reducing the energy density and thus, the vehicle driving range. Consequently, to avoid compromising the driving range, engineering approaches have been explored to enhance the battery charging speed. Among the most extensively investigated methods is the transition from traditional constant current – constant voltage charging strategy to more advanced strategies, including multi-step and positive pulse charging. Nevertheless, most studies focus solely on the battery cell performance and lifetime under these alternative charging strategies, while their effects on the performance and reliability of the power electronics are often overlooked.

This tutorial aims to provide a comprehensive overview of the effects of advanced charging strategies on the performance, lifetime, and reliability of EV battery systems. In the first part of the tutorial, the authors will discuss the need for fast battery charging and we will introduce the charging strategies that are mostly considered for achieving this goal. The second section will delve into a detailed analysis of how these fast-charging strategies impact the electro-thermal performance (e.g., available capacity, energy efficiency, surface temperature etc.) and degradation (e.g., capacity fade, resistance increase) of the battery cells. Furthermore, the expected lifetime of the battery cells under these charging strategies will be discussed. The assessment will be carried out at both macroscopic and microscopic level. Finally, the third section of the tutorial will explore the effect of charging strategies on the performance and reliability of battery power converters, proposing a robust methodology for this assessment. Lastly, the authors will introduce prospective approaches that focus on the co-optimization of battery cell lifetime and power converter efficiency, paving the way for more resilient and efficient EV charging systems.

Regular Tutorial 13 | Optimizing Rotating Machine Performance with Multiphysics Modeling: From Electromagnetic to Structural Analysis

Room 204C

Dr. Abdessamed Soualmi, *Altair Engineering Inc.*
Dr. Lavanya Vadamodala, *Altair Engineering Inc.*
Philippe Wendling, *Altair Engineering Inc.*

A multiphysics approach is crucial in the design, analysis, and optimization of modern electric machines. It provides a comprehensive and accurate framework, across multiple physical domains, for the optimization of electric machines and the prediction of their behavior. By simultaneously considering electromagnetic, thermal, mechanical, and control aspect of the design, this methodology enables engineers to improve performance, minimize noise and vibrations, and enhance overall reliability and efficiency. Rotating machine designers commonly face challenges such as thermal management, mechanical stress mitigation, and acoustic noise remediation. An accurate evaluation of the losses is important, as it directly informs thermal design. The thermal behavior and impacts long-term machine durability. Acoustic noise—often driven by radial forces—is influenced by factors including machine topology and harmonic content of excitation frequencies. To mitigate such effects, engineers typically: (1) adapt control strategies by tuning excitation frequencies, (2) optimize rotor and stator geometries, and (3) enhance mechanical structures. However, such optimizations require a thorough understanding of the interdependency of the physical domains, necessitating the use of multiphysics analysis. A comprehensive multiphysics workflow integrates several critical subdomains:

1. Electromagnetic Analysis: This forms the foundation, assessing key parameters such as torque, efficiency, back EMF, and losses (iron losses and Joule losses). Electromagnetic forces also serve as inputs for subsequent mechanical and NVH analyses, helping predict excitation sources for noise and vibration.
2. Thermal Analysis: Thermal simulation uses electromagnetic loss data to evaluate temperature distributions throughout the machine. Accurate thermal predictions help engineers develop effective cooling strategies, choose optimal materials, and ensure the design remains within operational limits under various loading scenarios.
3. Mechanical Analysis: Structural assessments identify rotor stress, fatigue, and deflection under dynamic conditions, ensuring mechanical integrity. Additionally, NVH (Noise, Vibration, and Harshness) analysis quantifies the impact of electromagnetic forces and excitation harmonics on vibration modes and audible noise, guiding design improvements to meet noise regulations and enhance user experience.
4. Control Analysis: Electrical excitation waveforms, including their harmonic content, influence all other physical domains. Analyzing control strategies allows engineers to tune performances, minimize losses, and reduce sources of vibrations and noise. Understanding these effects in a coupled manner is key to designing robust and high-performance machines.

In summary, multiphysics analysis provides a unified and iterative framework for addressing the complex, interrelated challenges in rotating machine design. This approach enables a deeper understanding of cross-domain interactions and supports the development of quieter, more efficient, and more durable electric machines.

Regular Tutorial 14 | Partial Power Processing Converters: Myth, Reality and Proper Implementation of a Groundbreaking Concept

Room 103C

Prof. Thierry Meynard, *Université de Toulouse*
Prof. Petar J. Grbovic, *University of Innsbruck*
Zoran Miletić, *AIT Austrian Institute of Technology*

PART 1

Power electronics and power conversion in general is today part of every segment of our life. Any piece of electric equipment we have today is somehow based on power electronics and converters: home appliance, industrial equipment, renewable energy, automotive, avionic, etc. Conversion efficiency, specific power, power density and converter cost are today the most critical requirements for new converters. One way to increase the efficiency and reduce cost/size/weight is to deploy multi-level and/or multi-cell converters and partial power processing power converters. A novel solution to ultra-high efficiency and specific power dc/dc converters has been proposed and theoretically investigated in this tutorial. The solution is based on the fact that in most of application we do not need to process entire dc bus voltage and output current. A fraction of the dc bus voltage and/or the load current can be processed. In other words, it is not necessary to process the converter total rated power; it would be enough

to process just a fraction of the rated power. This is so-called concept of Partial Power Rated Converters (PPRC). Typical target applications are PV boost converters, energy storage (batteries and ultra-capacitors) interface converters, isolated ac/dc power supplies, electric drives, etc.

Advantages of the PPRC concept, such as significant reduction of the input/output filter size & weight, voltage rating of power devices and conduction/switching losses are theoretically investigated and discussed in the tutorial. Various applications such as energy storage interface converters, isolated ac-dc converters and double feed electric machines are also discussed.

PART 2
State of the art Partial Power Converters include either a transformer to redirect power from one part of the circuit to another or an auxiliary circuit with extra switching devices to rebalance capacitor voltages. The added transformer or switching devices add cost, weight, volume, complexity and losses and counterbalance most of the gains promised by the partiality concept.

Several topologies of Transformer-Less Partial Voltage Converter (TLPVC) are described and analyzed, their main properties are explained and examples of application are presented. These topologies can be used to regulate power flow in Batteries, Fuel cells, Electrolyzers, PV working at their Maximum Power Point and LEDs because all these loads share a common feature: over their full operating area their voltage varies in a limited range. These topologies using semiconductors with a lower voltage rating will bring cost reduction and a better switching frequency/ switching losses tradeoff. They also allow using filters with lower inductance and capacitance for the same current and voltage ripples, thus reducing volume, losses and cost. TLPVC form a wide family of not-so-standard topologies that can be used in all power ranges, for example from battery converters of several Volts and Watts to electrolyzers of several hundreds of Volts and MWs. Several case studies and design examples are given in concluding part of the tutorial. One particular design example presented in the tutorial is 25kW battery interface dc/dc converter. An extraordinary efficiency of 99.5%, specific power of 30kW/kg and power density of 50kW/dm3 have been achieved. This tutorial is aimed at power electronics engineers, professionals and graduate students who want to improve their knowledge and understanding of advanced concepts of power conversion, such as Partial Power Rated Converters and applications.

Regular Tutorial 16 | Reimagine Power Electronics Design with AI: Opportunities and Challenges Ahead

Room 202B

Xinze Li, *University of Arkansas*
Peter Wilson, *University of Bath*
Fanfan Lin, *Zhejiang University-University of Illinois Urbana-Champaign Institute*

There has been ongoing debate in academia and industry on whether AI's application in power electronics is a true game-changer or just hype. Although research papers on AI applications in power electronics have grown significantly in the past decade, many practitioners still find themselves uncertain about how to integrate AI into their engineering workflows. This tutorial aims to bridge that gap, offering a practical and forward-looking exploration of where AI can meaningfully impact power electronics. To begin, the tutorial begins with an overview of AI applications in power electronics design. It will introduce fundamental concepts, representative use cases, and present prevailing methodologies, framed to provide a broad picture for attendees without a background in AI.

Following the overview, a hands-on case study will be presented (attendees are encouraged to bring laptops for an interactive experience). Using AI-assisted modulation optimization of dual-active-bridge converters as an example, we will delve into AI concepts, algorithms, analysis, and evaluation. Code sessions will run on Google Colab, requiring no software setup. Attendees will implement meta-heuristic algorithms (MHAs) in both single-objective and multi-objective settings and learn to tune hyperparameters for balancing global and local search. We will also explore data insights, apply machine learning (ML) algorithms for surrogate modeling, and systematically compare various approaches. To foster an algorithmic mindset, attendees will tackle the same problem using different data formats (tabular or time-series) and modeling strategies (ensemble methods or neural networks). Finally, MHAs and ML algorithms will be integrated into a fully AI-driven, automated design workflow.

After the practical coding session, the tutorial will shift toward a forward-looking perspective. We will first discuss key challenges faced by current AI applications in power electronics—such as data scarcity, model interpretability, and domain transferability. In response to these challenges, we will highlight some emerging AI trends in the field.

First, we will talk about physics-informed AI with a focus on Physics-In-Architecture Neural Networks (PANN) for power converter time-series modeling, showcasing a light, explainable, and flexible physics-informed approach tailored for PE design. Next, we will explore the future of one-stop autonomous power electronics design enabled by generative AI, with a demo and a breakdown of PE-GPT. Reinforcement learning will also be discussed for its potential to scale and handle complex, multi-step decision-making tasks in power electronics design.

To conclude the session, we will address the often-overlooked ethical dimensions of AI in power electronics. Topics include the security of AI-driven decision-making in energy systems, the trade-off between AI model performance and energy consumption, and the evolving roles of electrical engineers in the AI era. This tutorial is designed to engage a broad audience, from industry professionals to researchers and engineers. By the end of the session, we aim to provide attendees with both a clearer understanding of AI's transformative potential in power electronics and practical guidance to harness its benefits while navigating emerging challenges.

Regular Tutorial 18 | Winding Technologies for Electric Machines

Room 203B

Dr.-Ing. Alexander Kuehl, *Friedrich-Alexander-Universität Erlangen-Nürnberg*

This tutorial delivers a comprehensive introduction to the technologies and processes involved in the production of windings for electrical machines, focusing on both theoretical foundations and practical manufacturing aspects. As electrification advances across industries, the demand for efficient, reliable, and high-performance winding solutions has become increasingly important. The tutorial will address the motivation behind advanced winding design and introduce key terms and definitions that form the basis of this specialized field. Participants will gain insight into the various types and properties of conductors used in windings, including copper, aluminum, and emerging materials, as well as the manufacturing and treatment techniques required to meet specific performance and durability requirements.

The session will clarify technical terminology, including the definition of winding components such as coils, bars, and slots, and explain schematic diagrams commonly used in winding design. The tutorial will also detail the significance of packing density and fill factor in achieving optimal performance, highlighting how these parameters influence electrical efficiency, thermal management, and mechanical robustness. Multi-phase alternating current windings and their impact on machine efficiency and reliability will be discussed, with examples illustrating the benefits of different winding configurations for various applications, such as automotive, industrial, and renewable energy systems. The tutorial will also address the challenges associated with insulation systems, including material selection, process integration, and the role of advanced insulation materials in ensuring long-term reliability in demanding environments.

A central focus of the session is the detailed presentation of winding processes and the corresponding production system technology. Attendees will learn about the main components of a winding system, including linear and needle winding machines, as well as advanced automated systems for high-volume production. Production diagrams for different winding processes will be presented, and the integration of the most common winding processes into the production chain for stators will be explained, with special attention to formed coil and bar technology, which is increasingly used in automotive and industrial applications. Practical examples will demonstrate how these processes are implemented in high-volume manufacturing, and how automation and digitalization are transforming traditional winding operations.

After the tutorial, you will be able to describe the basics of electrical drive technology, differentiate between conductor materials and geometries, understand the relevance of the fill factor of a winding, reproduce the process chain for manufacturing electrical conductors, differentiate the manufacturing components and process variants for windings, and select a suitable winding process for typical electric motor designs. The tutorial also covers emerging trends and innovations in winding technology, such as the use of new materials, digital production systems, and the integration of artificial intelligence for process optimization.

Short Tutorials

Thursday, October 23 2:00PM – 3:40PM

Short Tutorial 3 | Electromagnetic Compatibility of Switched Mode Power Supplies

Room 204B

Prof. Dr.-Ing. Günter Keller, *Deggendorf Institute of Technology*

The tutorial is subdivided into several sections. Starting with a brief overview of legal regulations, like CE mark and Declaration of Conformity, a selection of emission and immunity standards is presented. This includes the description of test set-ups, for example for measuring conducted emissions using conventional or STFFT (Short Time Fast Fourier Transform) based test receivers and their detector circuits, as well as test parameters, like frequency ranges, based on international standards. Than four coupling mechanisms (impedance, capacitive, magnetic and radiated) are discussed, based on components and PCB structures. Subsequently basic countermeasures are proposed and evaluated according meaningful applicability to switched-mode power supplies. The section signals and characteristics explains common-mode and differential-mode interferences as well as the detailed Fourier Transform of a trapezoidal waveform, which occur typically in switched-mode power supplies. In particular switching transients are discussed against the background of wide band gap devices like GaN transistors.

One large section discusses the origin of electromagnetic interferences referring to the previous sections. This section addresses some widely used circuits, their operating modes, like continuous conduction mode and discontinuous conduction mode, and also parasitics of passive components, using high frequency equivalent circuits of capacitors, inductors and transformers, and parasitics of active components, like junction capacitances and terminal inductances. A large number of examples is presented in form of results of measurements, simulations or calculations.

The second half of the tutorial deals with EMC design of switched-mode power supplies. This section is subdivided into a number of subsections. Firstly the power factor correction is briefly presented. A large subsection addresses EMC filters, which is subdivided into pre filters and post filters. The filter structure is discussed according common-mode and differential-mode attenuation and source and load impedance. Problem solving approaches of the gap between measurements according standards and filter design are presented. Additionally an outlook to active EMI filters is given. Also design aspects of magnetic components are discussed, e. g. start of winding. A comparison between soft-switching and hard-switching circuits will be given. Finally PCB layout structures are evaluated and recommendations are presented. These investigations also address grounding, one of the most discussed topics in PCB design among engineers, as well as component placing and component selection, e. g. based on integrated circuit pin out and return current paths. Most aspects are explained by measured, simulated or calculated examples. Many examples are discussed against the background of electromagnetic compatibility as well as their impact on efficiency, lifetime and costs of the power supply. The tutorial contains on the one hand practical examples and uses on the other hand the basic physics of Maxwell for a principle understanding. Many principles can be transferred to other electronic circuits.

Thursday, October 23 4:00PM – 5:30PM

Short Tutorial 1 | Fundamentals of SiC Power Devices

Room 204B

Victor Veliadis, *PowerAmerica/North Carolina State University*

There are several reasons behind silicon's dominance of the power electronics market. Silicon is renowned for its excellent starting material quality, streamlined fabrication, opportunity for low-cost mass production, proven reliability, and circuit design legacy. However, despite significant progress, silicon devices are now approaching their operational limits. They are held back by their relatively low bandgap and low critical electric field, traits that result in high conduction and switching losses, and substandard high-temperature performance. To address these shortcomings, much effort has been directed at increasing the competitiveness of commercial SiC power devices. SiC transistors and diodes have superior material properties, enabling the production of highly efficient power devices with a smaller form factor and simplified cooling management.

In this tutorial, the favorable material properties of Silicon Carbide (SiC), which allow for highly efficient power devices with reduced form-factor and cooling requirements, will be summarized. The co-existence of Si, SiC, and GaN will be discussed, and their respective competitive application advantages highlighted. Material and device fabrication aspects will be presented with an emphasis on the processes that do not carry over from the mature Si manufacturing world and are thus specific to SiC. In particular, the tutorial will highlight design aspects of planar and trench MOSFETs, which are presently being inserted in most SiC based power electronic systems. The fab models of the vibrant SiC manufacturing infrastructure, which mirrors that of Si, will be introduced. Barriers to SiC mass commercialization

will be identified and analyzed. These include the higher than silicon device cost that increases disproportionately with area, defects that limit yields and device area (wafer test maps will elucidate the correlation), reliability and ruggedness concerns, and the need for a trained workforce to skillfully insert SiC into power electronics circuits.

Today, SiC power chips are gaining significant market share and are projected to capture 30% of the power chip market by 2029. Their cost, however, remains above that of similarly rated silicon chips and increases disproportionately with area. In this presentation, various elements of SiC chip cost will be qualitatively analyzed including contributions of substrate, epitaxy, and chip manufacturing. Material defects will be discussed in terms of their impact on chip area scalability and yields, and wafer test maps will be presented to elucidate their correlation. Finally, the case of system-level price parity between Si and SiC will be made, achieved primarily through reduced mass and volume of magnetic components, and simplified thermal management.

The nine to tenfold increase in critical electric field strength of SiC over that of Si allows high voltage blocking layers to be fabricated significantly thinner than those of similarly rated Si devices. However, the lack of a well-designed edge termination structure diminishes the high voltage performance of SiC power devices. Indeed, under reverse bias, SiC devices exhibit breakdown voltages well below the ideal SiC drift layer limit due to electric field crowding. Consequently, to maximize breakdown voltage, specialized edge termination structures are utilized and will be briefly discussed.

Short Tutorial 2 | Applications of Model Predictive Control in Microgrids

Room 203A

Prof. Jiefeng Hu, *Federation University Australia*

Microgrids have emerged as a promising solution to accommodate the integration of renewable energy resources, offering localized, efficient, and resilient power systems. These decentralized energy networks can operate independently or in conjunction with the traditional power grid, enhancing energy security and reliability. However, the fluctuating outputs from renewable energy resources, such as solar and wind, coupled with variable power demand, have posed significant challenges. These challenges include voltage and frequency fluctuations, which can compromise the stability and reliability of microgrid operations. The intermittent nature of renewables requires advanced control strategies to ensure seamless energy distribution and maintain grid stability.

With the increasing penetration of renewable energy resources and the proliferation of electronic interfaces, there has been a growing interest in developing high-performance control strategies. The integration of power electronic devices, while improving efficiency and control, also introduces complexities related to harmonics, transient stability, and dynamic response. Among these control strategies, Model Predictive Control (MPC) has garnered considerable attention in both academic and industrial communities. MPC's ability to predict future system behaviors, handle multivariable control problems, and incorporate various operational constraints makes it highly suitable for microgrid applications. Its fast transient response and flexibility in adapting to dynamic changes position MPC as a powerful tool in managing the complexities associated with modern microgrids.

This tutorial will explore the recent applications of MPC in microgrids, covering a range of topics from the control of a single converter to the management of entire microgrid systems. The tutorial will delve into the specific roles MPC plays, such as:

1. Control of a Single Converter: MPC optimizes individual converter performance by predicting and adjusting their output to maintain desired voltage and frequency levels. This ensures efficient operation and contributes to overall microgrid stability.
2. Control of Parallel Converters: In systems with multiple parallel converters, MPC coordinates their outputs to balance load sharing, minimize losses, and prevent conflicts. This coordination is crucial for maintaining system efficiency and power quality.
3. Energy Management of an Entire Microgrid: MPC facilitates comprehensive energy management across the entire microgrid. It optimizes power distribution from various sources, manages energy storage systems, and responds to load variations to ensure reliable and efficient operation.

The primary objective of this tutorial is to promote research and development in the application of MPC within renewable energy and smart microgrid contexts. By addressing current challenges and showcasing innovative solutions, the tutorial aims to inspire new technologies and methodologies that can enhance microgrid performance and integration of renewable resources.

The target audience includes scholars, researchers, students, lab technicians, and engineers from both academic and industrial backgrounds. Participants will gain valuable insights into MPC's capabilities and its transformative potential in renewable energy and microgrid management.

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Monday, October 20 10:10AM – 11:50AM

Oral Session 1 | Protection Systems in AC & DC Grids

Room 102A
Chairs
Shuyan Zhao, *ABB USA*
Marius Langwasser, *Kiel University*

10:10AM | Enhanced Fault Current Supply Capability of Grid-Forming Converters Using Variable DC-Link Six-Step Operation [#1776]
Jiyu Lee[2], Jonghun Yun[2], Jisun Ham[2], Junyeol Maeng[2], Jae-Jung Jung[1], Shenghui Cui[2]
[1]Kyungpook National University, Korea; [2]Seoul National University, Korea

10:30AM | A Robust Communication-Free Protection Scheme for Islanded Microgrids with Relay Logic and Hardware-in-the-Loop Validation [#1443]
Maximiliano Ferrari, Deepika Chhetija, Emilio Piesciorovsky
Oak Ridge National Laboratory, United States

10:50AM | Ripple Analysis and Reduction for Neutral Line Current in a Single 3L-NPC Converter System for Bipolar DC Distribution [#1878]
Bowei Li, Xuesong Wu, Rui Liu, Gregory Kish, Yunwei Li
University of Alberta, Canada

11:10AM | Research on High Voltage AC Saturated Core Fault Current Limiting Technology Based on Control and Protection Cooperation [#1495]
Jiawei Liu[1], Jiaxin Yuan[2], Hang Zhou[1], Wanting Zhang[1], Feiran Xiao[1]
[1]Wuhan University, China; [2]Wuhan University / East China Jiaotong University, China

11:30AM | Research on Excitation System Transient Characteristic of High Voltage AC System Saturated Core Fault Current Limiter [#1365]
Jiawei Liu[1], Jiaxin Yuan[2], Wanting Zhang[1], Hang Zhou[1], Biao Yuan[1]
[1]Wuhan University, China; [2]Wuhan University / East China Jiaotong University, China

Oral Session 2 | Hybrid Renewable Sources

Room 103C
Chairs
Jianwu Zeng, *Minnesota State University*
Norma Anglani, *University of Pavia*

10:10AM | Consistency Model-Assisted Optimal Configuration of Integrated Energy Systems [#1394]
Hualong Liu[1], Wei Sun[2], Wenyuan Tang[1]
[1]North Carolina State University, United States; [2]University of Central Florida, United States

10:30AM | Hybrid Hydropower and Energy Storage Experimental System [#1623]
Adrian Gibson, Peidong Li, Thabiso Mabote, Abiodun Oseni, Eduardo Cotilla-Sanchez, Yue Cao, Ted K.A. Brekken
Oregon State University, United States

10:50AM | Single-Phase Transformerless Series Compensator Using a Three-Leg Converter and CHB for PV Systems [#1681]
Douglas de S. Sesion[1], Cursino Brandão Jacobina[1], João P. R. A. Méllo[1], Jean Torelli Cardoso[2], Arthur Mesquita[1]
[1]Universidade Federal de Campina Grande, Brazil; [2]Universidade Federal Rural de Pernambuco, Brazil

11:10AM | Dynamic Energy Management for Hybrid Wave-Energy Storage Systems Under Uncertainty [#2099]
Atia Tamsi, Netra Madle, Iqbal Husain, Anderson Rodrigo de Queiroz
North Carolina State University, United States

11:30AM | Multi-Port Extended-Duty-Ratio Boost Converter for Hybrid Power Sources [#1429]
Hyeongmeen Baik[2], Isha Prabhu[1], Jinia Roy[2]
[1]GE Vernova, United States; [2]University of Wisconsin–Madison, United States

Oral Session 3 | Machines for Sustainable Transportation

Room 201B
Chairs
Sarbajit Paul, *Korea Electrotechnology Research Institute*
Alireza Fatemi, *General Motors*

10:10AM | Experimental Validation and Comparison of an Electrically Excited Synchronous Motor and a Hybrid Excited Permanent Magnet Motor [#1058]
Fabio Filippini, Nicola Bianchi
Università degli Studi di Padova, Italy

10:30AM | Comparative Thermal Analysis of Mixed Hybrid Rare-Earth and Ferrite Magnet Asymmetric IPMSMs with Symmetrical Rare-Earth IPMSMs for EV Applications [#2005]
Ankan Dey[2], Z. Q. Zhu[2], Seyedmilad Kazemisangdehi[2], Dawei Liang[2], Liang Chen[1], Lei Yang[1]
[1]Midea Group Co., Ltd., China; [2]University of Sheffield, United Kingdom

10:50AM | Analysis of Bearingless Machines Capable of Actuating Forces Across All 6 DOF [#2101]
Adonay Asgodom, Takahiro Noguchi, Eric Severson
University of Minnesota, Twin Cities, United States

11:10AM | Effect of High-Strength Electrical Steels on the Electromagnetic-Mechanical Performance of High-Speed Traction Motors [#1996]
Shrutika Sawardekar, Hossain Mohammadi, Jigar Mistry
Schaeffler Technologies AG & Co. KG, United States; Schaeffler Technologies AG & Co. KG, Canada

11:30AM | Electric Vehicle Drive Unit Electric Oil Pump Motor Trends and Optimization [#1629]
Alexander Forsyth, Ajay Mehta, Jared Nathan, Michael Fannin, Shuvajit Das, Jordan Barkus, Mazharul Chowdhury, Azadeh Narimissa
General Motors Company, United States

Oral Session 4 | Modeling & Control of DC/DC Converters

Room 201C
Chairs
Ariya Sangwongwanich, *Aalborg University*
Daifei Zhang, *University of Toronto*

10:10AM | Robust Model Predictive Control for Synchronous Voltage and Current Control for DC-DC Buck Converters [#1512]
Zhengchen Guo, Robert Nelms
Auburn University, United States

10:30AM | Control Strategy to Ensure Negative Offset Current for a Four-Switch Buck-Boost Converter Using Quadrangle Modulation [#1959]
Hyunggun Jung, Sungmin Kim
Hanyang University, Korea

10:50AM | Minimizing Settling Time Under Overshoot Constraints on Buck Converters Using Convolution-Based Data-Driven Control [#1137]
Naoki Fujinaga[2], Yasutaka Fujimoto[2], Yu Hosoyamada[1], Takuya Yoshida[1], Toyoaki Suenaga[1]
[1]Kyosan Electric Manufacturing Co., Ltd., Japan; [2]Yokohama National University, Japan

11:10AM | Fixed-Time Dynamic Surface Control for DC Microgrids with Constant Power Loads [#2025]
Jiahao Sun, Jiange Jiao, Di Zheng, Hui Cai
China Jiliang University, China

11:30AM | A Hybrid Ripple-Based V2 Adaptive On-Time Control Structure for Multi-Phase Buck Converter with a Wide Duty Ratio Range [#1339]
Zhuhaobo Zhang[3], Jasper Li[1], Xunjin Dou[1], Yangwei Yu[1], Zhongbao Luo[1], Yating Lu[1], Delai Jiang[1], Ong Wee Liat[2], Hao Ma[2]
[1]Joulwatt Company, China; [2]Zhejiang University, China; [3]Zhejiang University, Joulwatt Company, China

Oral Session 5 | SiC Device Characterization

Room 202A
Chairs
Sneha Narasimhan, *North Carolina State University*
Zheyu Zhang, *Rensselaer Polytechnic Institute*

10:10AM | Optically Isolated Rogowski Coil with High dv/dt Immunity and High Insulation for WBG Devices [#1198]
Jiakun Gong, Yulei Wang, Xin Li, Senhao Liang, Mingrui Zou, Zheng Zeng
Chongqing University, China

10:30AM | Efficient Screening of Paralleled SiC MOSFETs via Sensitivity Analysis of Critical Physical Parameters [#1475]
Xuanye You[3], Yihong Hu[2], Xinlian Li[3], Yijun Ding[3], Chong Zhu[3], Fei Lu[1]
[1]Lehigh University, United States; [2]Sangdest Microelectronics (Nanjing) Co. Ltd, China; [3]Shanghai Jiao Tong University, China

10:50AM | In-Situ Measurement of Gate Switching Instability via Switching Waveforms [#1641]
Hajime Takayama[1], Takashi Sato[2], Michihiro Shintani[1]
[1]Kyoto Institute of Technology, Japan; [2]Kyoto University, Japan

11:10AM | Analysis and Modeling of Switching Dynamics in SiC Bidirectional Field-Effect Transistors [#1856]
Daixin Chen[2], Yannal Nawafleh[2], Xiang Li[2], Stephen Mancini[1], Woongje Sung[1], Xiaoqing Song[2]
[1]State University of New York at Albany, United States; [2]University of Arkansas, United States

11:30AM | Effects of Bipolar Degradation on SiC MOSFET Package Reliability Evaluation [#2325]
Yang Li[2], Yifei Wu[1], Vishal Shah[1], Jinjun Liu[2], Xu Zhang[1], Li Ran[1], Yan Zhang[2], Chunlin Lv[2]
[1]University of Warwick, United Kingdom; [2]Xi'an Jiaotong University, China

Oral Session 6 | Induction Machines

Room 202B
Chairs
Silvio Vaschetto, *Politecnico di Torino*
Osama Mohammed, *Florida International University*

10:10AM | Rotor Winding Asymmetry Diagnosis Through Low-Order Vibration Transients in Wound Rotor Induction Motors [#1530]
Jose Enrique Ruiz-Sarrió[2], Carlos Madariaga-Cifuentes[1], Pedro Llovera-Segovia[2], Angela Navarro-Navarro[2], Jose Alfonso Antonino-Daviu[2]
[1]Universidad de Concepción, Chile; [2]Universitat Politècnica de València, Spain

10:30AM | Electromagnetic Evaluation of New Axial-Flux Induction Motor with Radially Slitted Solid Rotor for High-Speed Applications [#1564]
Carlos Madariaga-Cifuentes[1], Gustavo Perez-Guirriman[1], Cesar Gallardo[3], Jose Enrique Ruiz-Sarrió[2], Felipe Santacruz[1], Juan A. Tapia Ladino[1], Jose Alfonso Antonino-Daviu[2], Michele Degano[3]
[1]Universidad de Concepción, Chile; [2]Universitat Politècnica de València, Spain; [3]University of Nottingham, United Kingdom

10:50AM | Replacing Magnetic Wedges with Non-Magnetic Wedges in Electric Motors: Case Studies [#1061]
Henk de Swardt
Timken Power Systems, United States

11:10AM | Identification of Magnetizing Inductance for Induction Motors During Sensorless Indirect Flux-Oriented Control Under Load Conditions [#1208]
Ho-Ryul Park[1], Seung-Cheol Choi[1], Chan-Ook Hong[2], Young-Doo Yoon[1]
[1]Hanyang University, Korea; [2]LS ELECTRIC Co., Ltd., Korea

11:30AM | Comparison of Single-Phase and Three-Phase Partially Superconducting Induction Machines [#2204]
Nicholas Storti, Emmanuel Agamloh
Baylor University, United States

Oral Session 7 | Advanced Power Conversion & Control Strategies for Grid-Connected Systems

Room 203A
Chairs
Vikram Chowdhury, *NREL*
Roberto Petrella, *Università degli Studi di Udine*

10:10AM | Direct-Axis Component-Based Demodulation for Variable Zero-Vector Position Modulated DC-AC Talkative Power Conversion [#1939]
Yang Leng[1], Rongwu Zhu[1], Peter Adam Hoeher[2], Marco Liserre[2]
[1]Harbin Institute and Technology, Shenzhen, China; [2]Kiel University, Germany

10:30AM | Unified Virtual Oscillator Based Grid-Forming Control for Fast Black Start [#2152]
ShumengWang[2],XuliQuan[1],UthandiSelvarasu[2],MinooMohebbifar[2], Yuan Li[3], Mahshid Amirabadi[2], Hui Li[1], Brad Lehman[2]
[1]Florida State University, United States; [2]Northeastern University, United States; [3]University of Pittsburgh, United States

10:50AM | Improved Cascaded H-Bridges PV Panels Grid Interfacing with Two Three-Leg Three-Phase Converter [#2169]
Arthur Mesquita[1], Cursino Brandão Jacobina[1], Douglas de S. Sesion[1], Jean Torelli Cardoso[2]
[1]Universidade Federal de Campina Grande, Brazil; [2]Universidade Federal Rural de Pernambuco, Brazil

11:10AM | A Simplified Three Phase PWM Current Source Rectifier for Hydrogen Electrolyzers [#1459]
Peng-Hao Huang, Fang Chen Lin, Prasad Enjeti
Texas A&M University, United States

11:30AM | Miniaturization of Inductor in Grid-Tied Inverter Utilizing a Wideband Four-Terminal Virtual Impedance Circuit [#1639]
Riki Yamazaki, Keisuke Kusaka
Nagaoka University of Technology, Japan

Oral Session 8 | Battery Health Monitoring & Safety for Transportation

Room 203B
Chairs
Rashmi Prasad, *General Motors*
Surojit Sen, *University of Nottingham, UK*

10:10AM | Hierarchical Real-Time Battery State-of-Health and State-of-Charge Estimator [#1456]
Kandler Smith, Shuofeng Zhao, Corey Randall, Juan Sun, Shivanshu Shekhar
National Renewable Energy Laboratory, United States

10:30AM | Impedance Spectroscopy-Based Detection of Internal Short Circuits in Sodium-Ion Batteries for Safer Transportation Systems [#1196]
Kailong Liu[2], Shiwen Zhao[2], Liang Du[3], Qiao Peng[1], Bin Duan[2], Chenghui Zhang[2]
[1]Queen's University of Belfast, United Kingdom; [2]Shandong University, China; [3]Temple University, United States

10:50AM | An Integrated Dual-Input Converter for Modular Reconfigurable Battery Packs with Battery Voltage Balancing and DC Bus Regulation Capability [#1729]
Kausik Biswas, Olive Ray, Chadrashekhar N. Bhende
Indian Institute of Technology Bhubaneswar, India

11:10AM | Series Resonant Dual Active Half-Bridge Converter for Multi-Cell Battery Equalization [#2406]
Sumedh Amrutrao Awathare[1], Vinod John[1], Deepak Srivastava[2]
[1]Indian Institute of Science, India; [2]Vikram Sarabhai Space Centre, India

11:30AM | Application of RLS-Based Fault Simulation Data Generation, Signal Processing Techniques, and DRT Analysis for Battery Safety Diagnosis [#2351]
Miyoung Lee[2], Minhyeok Kim[2], Jaehyuk Lee[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Korea

Oral Session 9 | Advanced Control Strategies for Induction & Synchronous Motor Drives

Room 204B
Chairs
Diego F. Laborda, *University of Oviedo*
Shih-Chin Yang, *National Taiwan University*

10:10AM | Adaptive Temperature Balancing PWM for Enhanced Stall Torque [#1402]
Tanvi Nagarale, Vinod Peddi
General Motors Company, United States

10:30AM | Model-Free-Predictive Control of Open-End Winding Synchronous Reluctance Motor Drive [#1532]
Filippo Gemma[1], Jacopo Riccio[2], Andrea Volpini[1], Giulia Tresca[1], Pericle Zanchetta[1]
[1]Università degli Studi di Pavia, Italy; [2]University of Nottingham, United Kingdom

10:50AM | Loss-Minimizing Current References for PMSMs with Arbitrary Saliency and BEMF Spectrum [#1552]
Andrés Carvajal, Annette Muetze
Graz University of Technology, Austria

11:10AM | Optimal Robust Sensorless Control of an Induction Motor Supplied via a Long Cable [#1557]
Alessandro Benevieri, Massimiliano Passalacqua, Andrea Formentini, Mario Marchesoni
Università di Genova, Italy

11:30AM | Performance Evaluation of Open-End Winding IM Drive Operated with Synchronous PWM with Even Non-Triplen Pulse Number [#2258]
Shayak Chaudhuri, Avanish Tripathi, Amit Jain
Indian Institute of Technology Delhi, India

Oral Session 10 | Wireless Power Transfer & EMI

Room 204C
Chairs
Sounak Maji, *Texas Instruments*
Sam Coday, *Massachusetts Institute of Technology*

10:10AM | Wearable and Flexible Omnidirectional Wireless Charger for Capsule Endoscopy [#1506]
Heng Zhang[1], Chi-Kwan Lee[2]
[1]University of Hong Kong, Hong Kong; [2]University of Technology Sydney, Australia

10:30AM | Loss Reduction in Pavement-Embedded Multi-MHz Capacitive Wireless Charging Systems for Electric Vehicles [#1416]
Raquel Sarabia-Soto, Syed Saeed Rashid, Dheeraj Etta, Khurram Afridi
Cornell University, United States

10:50AM | RF Dielectric Heating System with 13.56MHz GaN Switched-Mode Power Amplifier for Food Defrosting Applications [#1126]
Junhyeong Park, Sungbum Park, Daehyun Kim, Sung-Ku Yeo, Seogyong Jeong
Samsung Electronics, Korea

11:10AM | Electromagnet Transmitters for Low-Frequency Electrodynamic Wireless Power Transmission [#1381]
Vernon S. Crasto, David P. Arnold
University of Florida, United States

11:30AM | Current Balancing Using a Coupled Inductor Pair in Multi-Parallel Megahertz Wireless Power Transfer Systems [#2395]
Taiga Osada, Rintaro Kusui, Hiroki Watanabe, Jun-Ichi Itoh
Nagaoka University of Technology, Japan

Monday, October 20 2:40PM – 4:20PM

Oral Session 11 | Grid Forming Converters: Control

Room 102A
Chairs
Vikram Roy Chowdhury, *National Renewable Energy Laboratory*
Joseph Benzaquen, *Georgia Institute of Technology*

2:40PM | A Dual-Loop Controller with Virtual Oscillator and Model Predictive Control [#1936]
Sima Azizi Aghdam, Mohammed Agamy
State University of New York at Albany, United States

3:00PM | Stuart-Landau Oscillator-Based Grid-Forming Control with Gray-Box High-Gain Observer for Filter Parameter Variation [#1832]
Vikram Roy Chowdhury, Gab-Su Seo, Barry Mather
National Renewable Energy Laboratory, United States

3:20PM | A Universal Control Strategy for Smooth Operation Mode Transition Between Grid-Forming and Grid-Following Control [#1361]
Hao Ruan, Yi Xiao, Yongheng Yang, Haoze Luo
Zhejiang University, China

3:40PM | Simple Model Predictive Control for Grid-Forming Buck-Type Current-Source Inverter [#1066]
Gianni Arturo Avilan-Losee, Hang Gao
Washington State University Vancouver, United States

4:00PM | Interaction Energy-Based Transient Stability Framework for Multi-Grid-Forming Inverter Systems [#2158]
Debjyoti Chatterjee[2], Bowen Yang[1], Brian Johnson[2], Gab-Su Seo[1]
[1]National Renewable Energy Laboratory, United States; [2]University of Texas at Austin, United States

Oral Session 12 | DC Grids

Room 103C
Chairs
Shuyan Zhao, *ABB USA*
Huangjie Gong, *ABB*

2:40PM | Secondary DC Microgrid Control Through Talkative DC-DC Power Converters [#1371]
Jakob Jacobsen, Julius Maximilian Placzek, Marius Langwasser
Kiel University, Germany

3:00PM | An Ergodic CuSum Algorithm for False Data Injection Attacks Detection in DC Microgrids [#1622]
Ge Yang[2], Zhongchang Sun[2], Shaofeng Zou[1], Xiu Yao[2], Luis Herrera[2]
[1]Arizona State University, United States; [2]State University of New York at Buffalo, United States

3:20PM | A Memristor-Based Cryptographic Encryption for PDST in DC Converters [#2244]
Chiemeka L. Maxwell[1], Dongsheng Yu[1], Marek Pastor[3], Tomas Basarik[3], Rachael Akalia[4], Liang Yan[2], Tyrone Fernando[5], Herbert Ho-Ching[5]
[1]China University of Mining and Technology, China; [2]Hangzhou Dianzi University, China; [3]Technical University of Kosice, Slovakia; [4]University of Illinois, United States; [5]University of Western Austrailia, China

3:40PM | Grounding and Fault Detection Challenges in LVDC Microgrids: Real-Time Evaluation [#1256]
Mehnaz Khan, Indra Narayana Sandi Bhogaraju, James Stoupis
ABB Corporate Research Center, United States

4:00PM | Pulsating Power Processing and Voltage Balancing of Multi-Active Bridge (MAB) Converter for Single-Phase Grid-Connected EV Charging [#2401]
Md Didarul Alam, Ma Awal, Nazmul Hassan, Srdjan Lukic, Iqbal Husain
North Carolina State University, United States

Oral Session 13 | Axial Flux Machines

Room 201B
Chairs
Matthew Gardner, *University of Texas at Dallas*
Xu Yang, *Consultant*

2:40PM | High Torque Density PCB Axial Flux Permanent Magnet Motor for Micro Robots [#1377]
Jianren Wang[1], Jie Han[2], Abhinav Gupta[1], Deepak Pathak[1], Yang Zhang[2]
[1]Carnegie Mellon University, United States; [2]Microbot Motor, China

3:00PM | Design Optimization of 8-Pole/6-Slot Single-Sided Axial Flux Machine with Reduced Axial Force [#1549]
Hiroya Sugimoto[2], Yuki Yoshizawa[2], Ryuga Koyanagi[1], Akihiro Ochiai[1], Tadashi Sato[1]
[1]EBARA CORPORATION, Japan; [2]Tokyo Denki University, Japan

3:20PM | Coreless Axial Flux Permanent Magnet Machines with Concentrated Coils and Various Pole/Coil Combinations [#2075]
Matin Vatani[3], Spencer M. Goode-Kulchar[3], John F. Eastham[2], Xiaoze Pei[2], Dan M. Ionel[1]
[1]SPARK Laboratory, University of Kentucky, United States; [2]University of Bath, United Kingdom; [3]University of Kentucky, United States

3:40PM | Quasi-Halbach Array Axial Flux Rotor for High Torque Applications [#2150]
Benjamin McIntosh, David Klink, Kelvin Wong, Dean Patterson, Greg Heins, Behrooz Bahrani
Monash University, Australia

4:00PM | Electric Machine Torque Density Enhancement Using Spatial Harmonics [#2174]
Nishanth Gadiyar[2], Eric Severson[1]
[1]University of Minnesota, Twin Cities, United States; [2]University of Wisconsin–Madison, United States

Oral Session 14 | Modeling & Design of DC-DC Converters

Room 201C
Chairs
Xin Zan, *University of Maryland*
Liwei Zhou, *University of Texas at Arlington*

2:40PM | Modeling and Design of a Highly Efficient and Compact DC/DC RSCC Converter [#1801]
Sadegh Rad, Sudip Mazumder
University of Illinois Chicago, United States

3:00PM | Unified Reduced-Order and Generalized State-Space Averaging Models of the Three-Level Dual-Active-Bridge Converter [#1369]
Wei Shao, Chenchen Wang, Xingyu Feng, Kai Li, Zhibo Zhang, Changyu Gao, Minglei Zhou
Beijing Jiaotong University, China

3:20PM | Optimization of AHB Flyback Converter Based on Operation Mode Analysis [#1654]
Guoxing Zhang[2], Pengcheng Bai[3], Zan Wang[3], Deepak Veereddy[1]
[1]Infineon Technologies Americas Corp., United States; [2]Infineon Technologies Asia Pacific Pte Ltd, Singapore; [3]Infineon Technologies China Co., Ltd., China

3:40PM | Small-Signal Model of Dual-Phase Coupled-Inductor Buck Converter with Peak-Current-Mode Control Based on Describing Function Method [#1088]
Zhihao Wang, Yingyi Yan, Bo Zhang
University of Electronic Science and Technology of China, China

4:00PM | Analysis and Implementation of Transformer-Less High Voltage Gain Buck Converter [#1237]
Dinh Phuc Nguyen[4], Huang-Jen Chiu[4], Anh Dung Nguyen[2], Yu-Chen Liu[3], Trong Nha Quang[1], Thanh Nhat Trung Tran[4], Van-Quy Le[4]
[1]Advanced Energy Industries, Inc., United States; [2]Lucid Group, Inc., United States; [3]National Taipei University of Technology, Taiwan; [4]National Taiwan University of Science and Technology, Taiwan

Oral Session 15 | Gallium Nitride & Gallium Oxide Power Devices

Room 202A
Chairs
Zhou Dong, *ABB U.S. Corporate Research Center*
Jose Ortiz Gonzalez, *University of Warwick*

2:40PM | A Universal Reliability Platform for GaN HEMTs with Realistic Stress Emulation, Online Monitoring, and In-Circuit Characterization [#1158]
Dilip Rana, Tian Qiu, Zheyu Zhang
Rensselaer Polytechnic Institute, United States

3:00PM | Thermal and Structural Analysis of a Press-Pack Ga2O3 Schottky Diode [#1617]
Arindam Sircar, Xiu Yao
State University of New York at Buffalo, United States

3:20PM | Ultrafast Noise-Immune Short-Circuit Detection in Gallium Nitride Power Semiconductors via Drain-Source Voltage Pattern Recognition [#1630]
Tian Qiu, Zheyu Zhang, Annoy Kumar Das, Israel Zikpi
Rensselaer Polytechnic Institute, United States

3:40PM | Characterization of Four-Quadrant GaN Switch at Cryogenic Temperature [#1872]
Yang Xu[2], Shimul Kumar Dam[1], Ching-Hsiang Yang[2], Ruirui Chen[2], Xingyue Tian[2], Samuel Klein[2], Hua Kevin Bai[2], Fred Wang[2]
[1]Indian Institute of Technology Kharagpur, India; [2]University of Tennessee, Knoxville, United States

4:00PM | Accurate SPICE Model Development for 650V GaN Transistor Using 2-Port S-Parameter Measurements [#2085]
Pengpeng Sun[4], Torbjörn Thiringer[2], Christian Fager[1], Gregor Lasser[1], Joachim Härsjö[3]
[1]Chalmers, Sweden; [2]Chalmers Tekniska Högskola, Sweden; [3]Volvo Car AB, Sweden; [4]Volvo Car AB / Chalmers University of Technology, Sweden

Oral Session 16 | Noise, Vibration, Reliability & Diagnostics of Electrical Machines

Room 202B
Chairs
Jose Antonino-Daviu, *Universitat Politecnica de Valencia*
Athanasios Karlis, *Democritus University of Thrace (Greece)*

2:40PM | Assessing the Impact of Rotor and Stator Design Variations on a Radial Force Equalization Strategy for Large Permanent Magnet Generators [#1410]
Yanhao Zhang, Alasdair McDonald
University of Edinburgh, United Kingdom

3:00PM | Characteristic of Shaft Voltage According to Ball Bearing Geometry and Material [#1140]
Byoung-Wook Jo, Jun-Hyeok Heo, Jin Hur
Incheon National University, Korea

3:20PM | Quality Assurance Testing for Detecting Magnetization Defects in Surface PM Synchronous Machines [#1178]
Hojun Lee[1], Ye-Eun Yoon[1], Marcos Orviz Zapico[2], Seungmin Shin[1], Javier G.-A. Tiemblo[2], Diego Fernández Laborda[2], David Díaz Reigosa[2], Sang Bin Lee[1]
[1]Korea University, Korea; [2]Universidad de Oviedo, Spain

3:40PM | Leveraging Expert Knowledge with Explainable Artificial Intelligence for Electric Machine Fault Diagnosis in Industry 5.0 [#1412]
Ilias Palaiologou, Georgios Falekas, Athanasios Karlis
Democritus University of Thrace, Greece

4:00PM | Detection of Synchronous Reluctance Motor Coupling Unbalance via Vibration and Current Analysis [#1635]
Angela Navarro-Navarro, Jose Enrique Ruiz-Sarrió, Vicente Biot-Monterde, Jose Alfonso Antonino-Daviu
Universitat Politècnica de València, Spain

Oral Session 17 | Solar Energy Applications

Room 203A
Chairs
Yongheng Yang, *Zhejiang University*
Leila Chebbo, *Dominion Energy*

2:40PM | Energy Management and Control of a CHB Inverter with Battery and Supercapacitor for Zero-Grid Operation [#1312]
Douglas de S. Sesion[1], Cursino Brandão Jacobina[1], João P. R. A. Méllo[1], Jean Torelli Cardoso[2]
[1]Universidade Federal de Campina Grande, Brazil; [2]Universidade Federal Rural de Pernambuco, Brazil

3:00PM | Adaptive Gain Control for PV Systems: Ensuring Consistent Dynamic Response [#1356]
Gahyun Kim, Heehyun Yang, Kahyun Lee
Ewha Womans University, Korea

3:20PM | DC Microgrid Control with Event-Triggered Photovoltaic Power Scanning for Improved Energy Storage Utilization Under Partial Shading [#1708]
Hein Wai Yan[2], Gaowen Liang[2], Ezequiel Rodriguez[2], Glen Farivar[3], Josep Pou[1]
[1]City University of Hong Kong, Hong Kong; [2]Nanyang Technological University, Singapore; [3]University of Melbourne, Australia

3:40PM | Voltage and Reactive Power Combined Control of Utility Devices and Smart Inverters on a Distribution Grid with Solar PV [#1949]
Steven Poore[4], Rosemary Alden[3], Evan Jones[1], Thomas Morstyn[5], Aron Patrick[2], Dan M. Ionel[3]
[1]Electric Power Engineers, United States; [2]PPL Corporation, United States; [3]SPARK Laboratory, University of Kentucky, United States; [4]University of Kentucky, United States; [5]University of Oxford, United Kingdom

4:00PM | Optimization of Packing Factor for Photovoltaic Module of Hybrid Collector for Combined (E-H) Energy Generation [#1012]
Rohit Tripathi, Rachna Dhir
J C Bose University of Science and Technology YMCA, India

Oral Session 18 | Battery Management: Thermal, SOC, & Voltage Control

Room 203B
Chairs
Surojit Sen, *University of Nottingham, UK*
Marium Rasheed, *Ford Motor Company*

2:40PM | Temperature Stabilization and Capacity Retention of Packed Battery Cells Under Pulsed Loading Using Hybrid Controller [#1405]
Raymond Sepe Jr., Kyle Waterman
Electro Standards Laboratories, United States

3:00PM | Real-Time SOC Estimation Using Task-Specific Deep Neural Networks for Battery Management [#2235]
Ashraf Siddiquee[2], Ardacan Yildiz[2], Alper Uzum[2], Syed Imam Hasan[2], Yilmaz Sozer[2], Mithat John Kisacikoglu[1]
[1]National Renewable Energy Laboratory, United States; [2]University of Akron, United States

3:20PM | Multicell and Multimodule Voltage Equalizer for High Voltage Battery Packs [#2160]
Shahrukh Khan[2], Vidya Valsan[2], Sumedh Amrutrao Awathare[2], Vishnu Mahadeva Iyer[2], Vinod John[2], Saurabh Shah[1]
[1]Daimler Truck Innovation Center India Private Limited, India; [2]Indian Institute of Science, India

3:40PM | A Reduced-Order Model for Battery Thermal Management with Varying Flow Rates [#1041]
Jayandran Rao[2], Shawn Zhang[2], Shihu Ma[1], Xiao Hu[1], Guijie Chen[1]
[1]Ansys, Inc., United States; [2]Our Next Energy, United States

4:00PM | Ultra-Fast Health Estimation of Li-Ion Batteries Applying Online Internal Impedance Measurement [#2266]
Minh Tran[2], Daniel Ioan Stroe[1], Tomi Roinila[2]
[1]Aalborg University, Denmark; [2]Tampere University, Finland

Oral Session 19 | Advanced Modeling & Control Techniques for Electric Drives

Room 204B
Chairs
Juan Manuel Guerrero, *University of Oviedo*
Luigi Danilo Tornello, *University of Catania*

2:40PM | High-Fidelity Simulation Modeling of Dual Three-Phase PMSM Drive Based on Partially Linearized Flux Model [#1128]
Sangjun Na[2], Sungwon Hur[2], Jiwon Yoo[2], Jonghun Choi[1], Yunkyung Hwang[1]
[1]Hyundai Motor Company, Korea; [2]Inha University, Korea

3:00PM | Average Current Reconstruction Method for Ultra-Low Inductance Permanent Magnet Synchronous Motor with DC Link Current Sensor [#1159]
Gyeong-Sik Lee, Min-Seok Chae, Jun-Sik Hwang, Hyeon-Gyu Choi
Incheon National University, Korea

3:20PM | Minimizing Fundamental Current Errors in Ultra-Low Inductance PMSM Drive Systems Using a DC-Link Single Current Sensor Inverters [#1321]
Min-Seok Chae, Jun-Sik Hwang, Hyeon-Gyu Choi
Incheon National University, Korea

3:40PM | Analysis and Optimal Design of Phase-Error-Free Discrete-Time Model for Induction Motor Low Switching Frequency Drive [#1545]
Zhifa Fang, Shinji Doki
Nagoya University, Japan

4:00PM | Fast Determination of Feasible Torque-Speed Range for Variable Flux Machines Including Remagnetization Voltage Limit [#2060]
Chen Chen[2], Paolo Pescetto[2], Simone Ferrari[2], Gustaf Falk Olson[3], Michela Diana[3], Torbjörn Thiringer[1], Gianmario Pellegrino[2]
[1]Chalmers Tekniska Högskola, Sweden; [2]Politecnico di Torino, Italy; [3]Volvo Car AB, Sweden

Oral Session 20 | Advanced Topology & Control Strategies of DC-AC Inverters

Room 204C
Chairs
Jungwon Choi, *University of Washington*
Yunting Liu, *Penn State*

2:40PM | Energy-Based Analysis of Zero-Voltage-Switching in 6.78MHz 4N-GaN-HEMT Inverters [#1167]
Zhen Sun, Kaiyuan Wang, Yao Wang, Junming Zeng, Yun Yang
Nanyang Technological University, Singapore

3:00PM | Control Strategy for a New DC-to-AC Converter Consisting of a Multilevel Converter and a Linear Circuit [#1308]
Ryoji Tsuruta[2], Shigeki Harada[1], Takahiro Urakabe[1], Hideaki Fujita[1]
[1]Institute of Science Tokyo, Japan; [2]Mitsubishi Electric Corporation, Japan

3:20PM | A High-Frequency-Link Single-Stage Three-Phase Cyclo-Active-Bridge Inverter [#1384]
Mian Liao, Tanuj Sen, Minjie Chen
Princeton University, United States

3:40PM | Load-Independent Class-DE Inverter at 25% Duty Ratio [#1656]
Wenqi Zhu[3], Ayano Komanaka[2], Yutaro Komiyama[2], Xiuqin Wei[1], Kien Nguyen[2], Hirotaka Koizumi[3], Hiroo Sekiya[2]
[1]Chiba Institute of Technology, Japan; [2]Chiba University, Japan; [3]Tokyo University of Science, Japan

4:00PM | A Multiport Bidirectional HF-Link Split-Phase DC/DC/AC Universal Minimal Converter [#2356]
Ruomu Hao, Soham Manjrekar, Aniruddh Marellapudi, Joseph Benzaquen, Deepak Divan
Georgia Institute of Technology, United States

Tuesday, October 21 8:30AM – 10:10AM

Oral Session 21 | Hybrid AC/DC Grids

Room 102A
Chairs
Shenghui Cui, *Seoul National University*
Rasel Mahmud, *National Renewable Energy Laboratory*

8:30AM | Energy Storage Based Power Lever for More Flexibly-Interlinked Hybrid AC/DC Microgrids Community [#2057]
Lingyu Du[2], Pengfeng Lin[2], Miao Zhu[2], Xuejun Xiong[1]
[1]Power Science Research Institute State Grid Shanghai Electric Power Company, China; [2]Shanghai Jiao Tong University, China

8:50AM | Decentralized Inertia Emulation in AC/DC Microgrids Based on Small AC Signal Injection [#1186]
Julian Zhong Wei Chung[1], Fei Deng[2], Yian Guo[1], Yi Tang[1]
[1]Nanyang Technological University, Singapore; [2]Northwestern Polytechnical University, China

9:10AM | Oscillation Analysis and Damping Control for a Proposed North American AC-DC Macrogrid [#1433]
Kaustav Chatterjee, Sameer Nekkalapu, Antos Varghese, Marcelo Elizondo, Quan Nguyen, Xiaoyuan Fan
Pacific Northwest National Laboratory, United States

9:30AM | Decoupling of AC- and DC-Side Dynamics for Small-Signal Stability Analysis of DC Grid-Following Voltage-Sourced Converters [#1833]
Zexian Zeng[1], Pranjal Mathu Gajare[1], Zhi Jin Zhang[2], Deepak Divan[1], Maryam Saeedifard[1]
[1]Georgia Institute of Technology, United States; [2]University of British Columbia, Canada

9:50AM | Learning Topology of Meshed Microgrids Using Voltage Magnitude [#1487]
Mohammed Tuhin Rana, Murti Salapaka
University of Minnesota, Twin Cities, United States

Oral Session 22 | Topological Advancements in WPT Systems

Room 103C
Chairs
Jungwon Choi, *University of Washington*
Emrullah Aydin, *Oak Ridge National Laboratory*

8:30AM | Multi-Phase Wireless Power Transfer with High Power Density Inductive Coils for Electric Drone Charging [#2100]
Lucas Gastineau[2], Donovin D. Lewis[2], Omer Onar[1], Dan M. Ionel[2]
[1]Oak Ridge National Laboratory, United States; [2]SPARK Laboratory, University of Kentucky, United States

8:50AM | Wireless Power Transfer-Based Snubber with Dual-Function of Energy Recovery and Ringing Suppression [#2371]
Bowang Zhang[3], Junrui Liu[3], Binhong Cao[1], Weikang Hu[2], Youhao Hu[2], Yilin Zhang[3], Zifeng Chen[2], Dianxun Xiao[3], Wei Han[3]
[1]Arizona State University, United States; [2]Hong Kong University of Science and Technology, China; [3]Hong Kong University of Science and Technology (Guangzhou), China

9:10AM | Optimization of Fully Integrated Double-Sided LCC with Reduced Stray Field [#1683]
Peyman Darvish, Hui Cao, Muhammad Fasih Uddin, Ahmed Ismail, Yushi Yang, Zhuxuan Ma, Xianfeng Jiang, Baher Abu Sba, Yue Zhao
University of Arkansas, United States

9:30AM | A Low-Noise High-Frequency Power Supply Based on Linearly-Operated MOSFETs for EMF Reduction in WPT Systems [#1572]
Shunsaku Nomoto, Keisuke Kusaka
Nagaoka University of Technology, Japan

9:50AM | Comparative Analysis of Powertrain-Integrated Wireless Charging Receivers for Drone Applications: Single- vs. Two-Stage Topologies [#1764]
Muhammad Abdelraziq, Zeljko Pantic
North Carolina State University, United States

Oral Session 23 | PM-Assisted Synchronous Reluctance & Interior PM Synchronous Machines

Room 201B
Chairs
Narges Taran, *Ford Motor Company*
Ian Brown, *Illinois Institute of Technology*

8:30AM | Design of a Novel Hybrid Magnet Variable Flux Motor with Constrained Magnetization Current [#1173]
Bassam Abdel-Mageed, Pragasen Pillay
Concordia University, Canada

8:50AM | Study of Wye-Delta Winding Topology for Permanent Magnet Synchronous Machines [#2209]
Md Sariful Islam, Mohammad Islam
HL Mechatronics, United States

9:10AM | Testing and Characterization of a Reduced Rare-Earth PM-Assisted Synchronous Reluctance Machine Utilizing Dy-Free NdFeB and Ferrite Magnets [#1500]
Praveen Kumar, Robin Wilson, Ali Al-Qarni, Ayman EL-Refaie
Marquette University, United States

9:30AM | Impact of Temperature on the Demagnetization and Magnetization Pulses of Variable Flux Machines [#1652]
Kenneth Chinonso Odo, Akrem Mohamed Aljehaimi, Pragasen Pillay
Concordia University, Canada

9:50AM | Impact of Outer Magnet Size and Placement on the Performance of Permanent Magnet Assisted Synchronous Reluctance Motor for EV Application [#2012]
Swasti Chakrabarty, Jitendra Kumar, Baylon Godfrey Fernandes
Indian Institute of Technology Bombay, India

Oral Session 24 | Modeling & Control of Grid-interactive Converters

Room 201C
Chairs
Xiaofan Cui, *UCLA*
Xin Zan, *University of Maryland*

8:30AM | Stability Evaluation of Black-Box Grid-Forming Inverters via Physical-Informed Neural Ordinary Differential Equations [#2347]
Jialin Zheng, Zhong Liu, Xiaonan Lu
Purdue University, United States

8:50AM | Robust Optimized Pulse Patterns for Converters Connected to a Distorted Grid via LCL Filters [#1320]
Shirin Rahmanpour[3], Petros Karamanakos[3], Tobias Geyer[1], George Papafotiou[2]
[1]ABB System Drives, Switzerland; [2]Eindhoven University of Technology, Netherlands; [3]Tampere University, Finland

9:10AM | Analysis of 1 Hz Oscillations Induced by Grid-Forming Plant in Kaua'i Power System [#2421]
Shuan Dong[2], Jin Tan[2], Lizhi Ding[3], Xiaonan Lu[3], Cameron J. Kruse[1], Brad Rockwell[1], Andy Hoke[2], Benjamin Kroposki[2]
[1]Kauai Island Utility Cooperative, United States; [2]National Renewable Energy Laboratory, United States; [3]Purdue University, United States

9:30AM | A Family of Extended Range Multi-Port Uninterrupted Power Supplies Enabled by Finite Control Set Model Predictive Controllers [#1450]
Sina Vahid, Armin Ebrahimian, Seyed Iman Hosseini Sabzevari, David Serdiuk, Nathan Weise, Ayman EL-Refaie
Marquette University, United States

9:50AM | Neural Lyapunov Based Transient Stability Analysis of Networked Grid-Forming Inverters with Unknown Internal Dynamics [#2346]
Zhong Liu, Jialin Zheng, Xiaonan Lu
Purdue University, United States

Oral Session 25 | Resonant Converters

Room 202A
Chairs
Giuseppe Bossi, *Cagliari University*
Marco di Benedetto, *Roma Tre University*

8:30AM | A Three-State Switching Scheme for Efficiency Improvement of LLC Converters Operating in Burst Mode with Conversion Ratio Much Less Than Unity [#2257]
Zhenyu Shan, Jihan Shi, Xiaofeng Ding
Beihang University, China

8:50AM | 400V/50V LLC Converter with Integrated Magnetics and Enhanced Hold-Up Capability [#1867]
Pranav Raj Prakash, Qiang Li
Virginia Polytechnic Institute and State University, United States

9:10AM | Extended Modulation Strategy for Wide Input Range Flying Capacitor Based High Step-Down LLC Resonant Converter [#1263]
Aswin Palanisamy, Jamil Hassan, Dylan Lu, Ricardo Aguilera, Yam Siwakoti
University of Technology Sydney, Australia

9:30AM | Generalized Average Modeling of a CLL DC-DC Resonant Converter [#2233]
Writtik Dutta, Connor Reece, Hanqi Shao, Ayan Mallik
Arizona State University, United States

9:50AM | Capacitor Voltage Balancing Control in a Flying-Capacitor Three-Level CLLC Resonant Converter Operating at 1 MHz or Higher [#2399]
Koya Tsutsumi[2], Hidemine Obara[2], Takuro Yanagihara[1], Kohei Yoshida[1], Kenichi Nakata[1]
[1]Toyota Industries Corporation, Japan; [2]Yokohama National University, Japan

Oral Session 26 | Magnetic Gears, Actuators & Non-Conventional Machines I

Room 202B
Chairs
Ronghai Qu, *Huazhong University of Science and Technology*
Greg Heins, *Regal Beloit Corporation*

8:30AM | High Voltage-Rated, Supercritical CO2-Insulated Electrostatic Machine Concept [#1566]
Yuanhao Mo, Alfonso Cruz Feliciano, Zhiyang Jin, Lukas Graber, Baoyun Ge
Georgia Institute of Technology, United States

8:50AM | Comparison of NdFeB, Ferrite, and Hybrid Designs for a Magnetic Continuously Variable Transmission [#1614]
Sina Khalesidoost, Parisa Afsari, Salek Khan, Matthew Gardner
University of Texas at Dallas, United States

9:10AM | A Study on Scalability of Superconducting Rotating Machines with Passive Quench Protection Approach [#2003]
Uijong Bong, Thanatheepan Balachandran, Noah Salk, Sania Huq, Phoenix Bauer, Kiruba Haran
Hinetics, Inc., United States

9:30AM | Evaluation of Metal Foam Electrodes for DC and AC Magnetohydrodynamic Propulsion and Pumps [#2087]
Silvia Iordache, Daniel Ludois
University of Wisconsin–Madison, United States

9:50AM | A Partial Element Equivalent Circuit Model of a Permanent Magnet Electrodynamic Suspension [#2122]
Louis Beauloye, Bruno Dehez
Université Catholique de Louvain, Belgium

Oral Session 27 | DC/DC Converters for Renewable Applications

Room 203A
Chairs
Shuyan Zhao, *ABB USA*
Jinia Roy, *UW Madison*

8:30AM | Magnetically-Integrated High Frequency Transformer-Linked Input Series Output Parallel (ISOP) Interleaved LLC Resonant Converter for DC Microgrids [#1284]
Tomokazu Mishima
Yamaguchi University, Japan

8:50AM | Enhanced Triple Phase Shift Modulation with Loss Redistribution for Dual-Active-Bridge DC-DC Converters [#1604]
Hui Cao, Peyman Darvish, Xinze Li, Xianfeng Jiang, Yue Zhao
University of Arkansas, United States

9:10AM | Design of a 40kW/100kHz SiC-Based DAB Converter with the Flexible Commutation Busbar [#1684]
Yikang Xiao[2], Shiqi Ji[2], Mingyu Yang[2], Zhengming Zhao[2], Weitao Yang[1], Yanxu Zhang[1]
[1]China Southern Power Grid Technology Co. Ltd, China; [2]Tsinghua University, China

9:30AM | Peak Flux Density Reduction in Dual Active Bridge Converters [#1725]
Jamil Hassan[3], Aswin Palanisamy[3], Dylan Lu[3], Minsung Kim[1], Sobhi Barg[2], Yam Siwakoti[3]
[1]Dongguk University, Korea; [2]Mid Sweden University, Sweden; [3]University of Technology Sydney, Australia

9:50AM | High Efficiency Triple-Active-Bridge Converters with Optimized Inductance Design [#2306]
Hang Ren[1], Hanwen Zhang[3], Xiangchen Zhu[1], Kang Wang[1], Haoyuan Yu[2], Yanbo Wang[1], Zhe Chen[1]
[1]Aalborg University, Denmark; [2]Delft University of Technology, Netherlands; [3]University of Bath, United Kingdom

Oral Session 28 | Control & Evaluation Techniques for EV Charging

Room 203B
Chairs
Athar Hanif, *Ohio State University*
Liwei Zhou, *University of Texas at Arlington*

8:30AM | Optimal Synergetic Control of Quasi-Single-Stage DC-Type EV Battery Chargers Employing Hybrid Phase-Frequency Control [#1523]
Xiyuan Shi, Kaihong Cao, Yong Wang, Yuxuan Li, Junzhong Xu
Shanghai Jiao Tong University, China

8:50AM | Enhancing Grid Frequency Regulation Performance of Electric Vehicle Load-Side Virtual Synchronous Machine via DC-Link Voltage Deviation Feed-Forward Control [#1057]
Yuechen Rui[1], Guochun Xiao[2], Pan Luo[1], Kaixuan Chen[1]
[1]Science and Technology on Reactor System Design Technology Laboratory, China; [2]Xi'an Jiaotong University, China

9:10AM | A Comprehensive Technoeconomic Evaluation of DC vs. AC-Coupled Fast Charging Solutions for Commercial Electric Vehicle Fleets [#1083]
Xi Wang, Ahmed Mohamed, Waqas Rehman, Vijay Bhavaraju
Eaton Corporation, United States

9:30AM | Feasibility Study of Rough Terrain Crane Electrification Through Testing Campaign [#1791]
Nicolo Federico Quattromini, Gaia Petrelli, Davide Barater, Stefano Nuzzo
Università degli Studi di Modena e Reggio Emilia, Italy

9:50AM | Finite Ground Plane Models in On-Board Electric Power Systems [#2291]
Ashkan Barzkar, Timothy Thacker, Rolando Burgos
Virginia Polytechnic Institute and State University, United States

Oral Session 29 | Control Techniques for Synchronous Machines

Room 204B
Chairs
Radu Bojoi, *Politecnico di Torino*
Anitra Wilson, *Management and Technology Solutions Group, LLC*

8:30AM | Zero-Sequence Current Suppression for Open-End Winding Machine with Floating Bridge Circuit [#1346]
Jun-Sik Hwang, Hyeon-Gyu Choi
Incheon National University, Korea

8:50AM | Discrete-Time Current Regulator with Virtual Impedance-Based Disturbance Rejection, Enhanced Noise Immunity, and Low Pulse Ratio Control [#1603]
Vinod Peddi, Anmol Aggarwal
General Motors Company, United States

9:10AM | Optimized Discrete-Time Super-Twisting Sliding Mode Control for Brushless Doubly Fed Reluctance Machines [#1925]
Anushree Singh, Filipe Pinarello Scalcon, Andrew M Knight
University of Calgary, Canada

9:30AM | Active Torque Capability Determination Under Varying Power Factor Operation of Biaxial Excitation Synchronous Machines [#1952]
Krishna Mpk Namburi[2], Prerit Pramod[1], Ion Boldea[4], Iqbal Husain[3]
[1]MicroVision Inc, United States; [2]Nexteer Automotive Corporation / North Carolina State University, United States; [3]North Carolina State University, United States; [4]Politehnica University of Timişoara, Romania

9:50AM | Fixed Time Model Reference Adaptive Predictive Current Control for PMSM Drivers Considering Parameter Mismatch [#2053]
Delin Kong, Haiwei Cai, Wenkai Zeng
Southeast University, China

Oral Session 30 | Control & Reliability

Room 204C
Chairs
Mausamjeet Khatua, *Intel*
Khurram Afridi, *Cornell University*

8:30AM | Maximum-Current Generalized DPWM for Enhanced Thermal Capability and Support of Grid-Tied Converters During Asymmetrical Faults [#1324]
Riccardo Sancio, Sante Pugliese
Kiel University, Germany

8:50AM | Online Estimation Method for On-State Resistance Imbalance Among MOSFETs in the DAB Converter [#2170]
Gyuhyung Lee, Suyong Chae
Pohang University of Science and Technology, Korea

9:10AM | Model Predictive Temperature Balancing Control Based on a Generalized Thermal Network Model for Lithium-Ion Battery Modules [#1007]
Yajie Jiang, Noven Lee, Xiaojun Deng, Zhao Yuan, Yun Yang
Nanyang Technological University, Singapore

9:30AM | Experimental Investigation on Instability Issues in Parallel-Connected SiC MOSFETs [#2279]
Matteo Pulvirenti[1], Maria Giorgia Spitaleri[2], Gabriele Nicolosi[1], Giacomo Scelba[2], Mario Cacciato[2], Giuseppe Scarcella[2], Rosario Scollo[1], Marco Latella[1]
[1]STMicroelectronics NV, Italy; [2]Università degli Studi di Catania, Italy

9:50AM | Experimental Validation of Hybrid Local and Remote Supervisory Control of Virtual Power Plants Over 5G Cellular Networks [#1698]
Seyedali Seif Kashani, Filipe Pinarello Scalcon, Andrew M Knight
University of Calgary, Canada

Wednesday, October 22 8:30AM – 10:10AM

Oral Session 31 | Grid-Forming Inverters Under Nonideal Conditions

Room 102A
Chairs
Gab-Su Seo, *National Renewable Energy Laboratory*
Davide Biadene, *Padova University*

8:30AM | Enhanced Virtual-Impedance-Based Fault Ride-Through Strategy Facilitating Consistent Grid-Forming Characteristics of DFIG Wind Turbines [#2124]
Zhiheng Huang, Ronghui An, Tong Wu, Boyang Shen, Ziwen Zhao, Jinjun Liu
Xi'an Jiaotong University, China

8:50AM | Transient Stability Analysis Framework for Grid-Forming Inverter-Dominated Networks Under Large Grid Disturbances [#2077]
Bowen Yang[1], Debjyoti Chatterjee[2], Brian Johnson[2], Gab-Su Seo[1]
[1]National Renewable Energy Laboratory, United States; [2]University of Texas at Austin, United States

9:10AM | Enabling Grid-Forming Control Under Unbalanced Conditions [#1283]
Yemi Ojo, Soumyadeep Nag, Temitayo Olowu
Idaho National Laboratory, United States

9:30AM | Robust Dynamic Performance and Transient Stability of Grid-Forming Inverters with Model-Free Control [#1875]
Wanrong Li[2], Huawei Yuan[1], Jiayang Wu[1], Sinan Li[2]
[1]City University of Hong Kong, China; [2]University of Sydney, Australia

9:50AM | Development of a Smart Microgrid and Validation of a Distributive Adaptive Control to Balance State of Charge of Li-Ion Batteries [#1462]
Abdul Wasay Lnu, Ali Anwar, Deepi Singh, Ryan Qu, Vyacheslav Solovyov, Fang Luo
State University of New York at Stony Brook, United States

Oral Session 32 | EMI Design in Power Electronics

Room 103C
Chairs
Giovanna Oriti, *Naval Postgraduate School*
Robert Cuzner, *University of Wisconsin-Milwaukee*

8:30AM | An Improved Design of Impedance Balancing Bridge for Three-Phase Three-Level Back-to-Back Converter Common Mode Noise Reduction [#1359]
Tonglei Wang[4], Shin-Yu Chen[3], Ripun Phukan[1], Rolando Burgos[4], Dong Dong[4], Gopal Mondal[2], Henrik Krupp[2]
[1]Delta Electronics (Americas) Ltd., United States; [2]Siemens AG, Germany; [3]Texas Instruments / Virginia Polytechnic Institute and State University, United States; [4]Virginia Polytechnic Institute and State University, United States

8:50AM | Novel Single-Phase Inverter with Reduced Common Mode EMI [#1974]
Giovanna Oriti[2], Alexander Julian[1], Christine Malong[2]
[1]Consultant / Independent Researcher, United States; [2]Naval Postgraduate School, United States

9:10AM | Investigation of Modeling Techniques for Magnetic Components in Power Electronic Converters [#2116]
Yirui Yang, Yanwen Lai, Qinghui Huang, Shuo Wang
University of Florida, United States

9:30AM | A High-Efficiency Electromagnetic Noise Weakening Circuitry for Fast Switching Device Power Converters [#1863]
Ujjwal Kumar[2], Abhijeet Prem[1], Mahima Gupta[2]
[1]Portland State University, United States; [2]University of Wisconsin–Madison, United States

9:50AM | Investigation and Mitigation of Common-Mode EMI Noise of Inverter System Due to Magnetic Coupling Between AC and DC Sides [#1873]
Qinghui Huang[2], Yanwen Lai[2], Yirui Yang[2], Fan Xu[1], Chingchi Chen[1], Shuo Wang[2]
[1]Ford Motor Company, United States; [2]University of Florida, United States

Oral Session 33 | Materials, Losses & Thermal Issues in Electrical Machines

Room 201B
Chairs
Fabio Giulii Capponi, *Sapienza University of Rome (Italy)*
Gilsu Choi, *Inha University*

8:30AM | Inverted-T In-Slot Heat Exchanger for Improved Cooling of Electric Motors [#1515]
Gokhan Cakal[1], Bulent Sarlioglu[2]
[1]University of Wisconsin–Madison, United States; [2]WEMPEC – University of Wisconsin–Madison, United States

8:50AM | A Flexible Ring-Core Measurement Set-Up for Soft Magnetic Materials [#1589]
Gabriele Puccio[1], Giampaolo Devito[1], Viviana La Russa[1], Paolo Bolognesi[2], Davide Barater[1], Stefano Nuzzo[1]
[1]Università degli Studi di Modena e Reggio Emilia, Italy; [2]Università di Pisa, Italy

9:10AM | Investigation of Multi-Tooth Dual-PM Machines Accounting for Different Cooling Strategies [#1576]
Ankan Dey[2], Z. Q. Zhu[2], Dawei Liang[2], Xu Hai[2], Liang Chen[1], Lei Yang[1]
[1]Midea Group Co., Ltd., China; [2]University of Sheffield, United Kingdom

9:30AM | Loss Model of NdFeB Magnets Considering Resistivity Variations with Magnetization State and Temperature [#2270]
Diego García de Vega Yáñez, Daniel Fernández, María Martínez, Juan Manuel Guerrero
Universidad de Oviedo, Spain

9:50AM | Analysis and Compensation of Rotor Position Measurement Errors to Improve PM Temperature Monitoring in VLF-PMSMs [#2305]
Marcos Orviz Zapico[2], Javier G.-A. Tiemblo[2], Diego Fernández Laborda[2], Keiichi Shibuya[1], Toru Matsuura[1], Kensuke Sasaki[1], Takashi Kato[1], David Díaz Reigosa[2]
[1]Nissan Motor Co., Ltd., Japan; [2]Universidad de Oviedo, Spain

Oral Session 34 | Control of DC/DC Resonant Converters

Room 201C
Chairs
Mateo Roig Greidanus, *University of Illinois Chicago*
Yanni Zhong, *Siemens Energy*

8:30AM | Compound Control Strategy of Large-Signal Frequency Compensator for Improved Dynamic Performance in LLC Resonant Converters [#1150]
Wenjun Luo, Caifeng Liu, Tianyi Zhang, Jiaao Zou, Xudong Zou, Yong Kang
Huazhong University of Science and Technology, China

8:50AM | Reference Modulation for Performance Enhancement of CLLC Resonant Converters [#1541]
Seojun Kim[1], Taeseung Jang[1], Suhyeok Lee[3], Seokjin Hong[3], Youngwoo Lee[2]
[1]Hanyang university, Korea; [2]Hanyang University ERICA, Korea; [3]LG Magna e-Powertrain Co., Ltd., Korea

9:10AM | Feedforward Control of LLC Converter: Time Domain State Trajectory-Based Analytical Formulation [#2147]
Fatama Tuz Zahura, Mark Scott
Miami University, United States

9:30AM | Two-Step Bootstrap Control for Spike Current Suppression in Switched-Capacitor Converter [#1636]
Jia-Ming Zhang[2], Le-Ren Chang-Chien[2], Ching-Ran Lee[1], Che-Min Kung[1], Wen-Tien Tsai[1]
[1]Industrial Technology Research Institute, Taiwan; [2]National Cheng Kung University, Taiwan

9:50AM | PWM-Controlled ZVS Technique for Efficiency Optimization in Boost Operation of Series Resonant Converter [#2341]
Jaehyeok Jang[2], Yujin Shin[2], Jongwoo Kim[2], Donghyuk Yang[1], Heonhee Kim[1], Younghoon Cho[2]
[1]Hyundai Mobis Co., Ltd., Korea; [2]Konkuk University, Korea

Oral Session 35 | Multilevel & Modular Converter Topologies

Room 202A
Chairs
Giulia Tresca, *University of Pavia*
Cristina Terlizzi, *University of Tor Vergata*

8:30AM | Parasitic Impact Mitigation in High-Switching-Frequency 3L-ANPC GaN-Based Converters [#1409]
Majid Adeli[1], Necmi Altin[2], Yousef Alamri[2], Adel Nasiri[2]
[1]University of South Caroina, United States; [2]University of South Carolina, United States

8:50AM | Bi-Directional Power Transfer Three-Level CLLC Resonant Converter [#1525]
Xuan-Yu Lin[2], Chuan-Chun Liang[2], Yi-Feng Lin[1], Jing-Yuan Lin[2]
[1]National Ilan University, Taiwan; [2]National Taiwan University of Science and Technology, Taiwan

9:10AM | DC-Link Capacitor Design for a Neutral-Point-Less Three-Level Dual-Phase Inverter for Traction Application [#1613]
Ilham Osman[1], Renato Amorim Torres[1], Woongkul Lee[2], Dhanya Sankaran[1], Yilun Thomas Luo[1], Khorshed Alam[1], Mohammad Anwar[1], Thomas Duhon[1]
[1]General Motors Company, United States; [2]Purdue University, United States

9:30AM | Enhanced Output Voltage Levels with Reduced Switching Frequency CVB for MMC Using Three-Level Flying Capacitor Submodules [#2163]
Jyoti Ranjan Dash, Rohit Raj, Asad Hussain, Pramod Agarwal
Indian Institute of Technology Roorkee, India

9:50AM | Single-Stage Multi-Port Electronic Transformer Using Bidirectional Switches for Energy Routing with Reactive Power Support [#2207]
Shubham Rawat, Subhashish Bhattacharya
North Carolina State University, United States

Oral Session 36 | Gate Driver Circuit Design

Room 202B
Chairs
Tanya Gachovska, *MDA*
Xiaoqing Song, *University of Arkansas*

8:30AM | A Synchronous Gate Driver System for Series-Connected SiC MOSFETs for High-Voltage Pulsed Power Supplies Based on Magnetic Pulse Compression [#1473]
Pourya Javidi, Hyeongmeen Baik, Jinia Roy
University of Wisconsin–Madison, United States

8:50AM | RF Integrated Gate Driver for Ultra-Fast Switching of 10 kV SiC MOSFETs [#1984]
Nithin Kolli[2], Shubham Rawat[2], Partha Pratim Das[2], Raj Kumar Kokkonda[1], Vignesh Kumar R C[2], Shahid Ali Khan[2], Ayush Bhatta[2], Subhashish Bhattacharya[2], David Ricketts[2], Spyridon Pavlidis[2], Brian McCabe[3]
[1]Delta Electronics (Americas) Ltd. / North Carolina State University, United States; [2]North Carolina State University, United States; [3]RTX Technology Research Center, United States

9:10AM | A Current Mode Gate Driver with Gate Ringing Suppression for GaN-Based LLC Converter [#1104]
Hsin-Tzu Chuang[2], Yen-Ming Chen[2], Yuan-Chih Lin[3], Ching-Jan Chen[2], Fu-Ming Hsu[1]
[1]Google LLC, Taiwan; [2]National Taiwan University, Taiwan; [3]Power Forest Technology, Taiwan

9:30AM | An Optically Powered Half-Bridge Gate Driver for High Voltage Applications [#1815]
Yifei Wu[2], Xu Zhang[2], Yang Li[3], Chunjiang Jia[1], Chong Ng[1], Philip Mawby[2], Tianhua Xu[2], Li Ran[2]
[1]Offshore Renewable Energy Catapult, United Kingdom; [2]University of Warwick, China; [2]University of Warwick, United Kingdom; [3]Xi'an Jiaotong University, United Kingdom

9:50AM | Light-Triggered, Ultrafast Gate Driver Empowered by GaN Buffer for High Power SiC Module [#1493]
Annoy Kumar Das[1], Shahabuddin Khan[1], Zheyu Zhang[1], Fred Wang[2], Hua Kevin Bai[2]
[1]Rensselaer Polytechnic Institute, United States; [2]University of Tennessee, Knoxville, United States

Oral Session 37 | Multilevel Inverters for Sustainable Energy Applications

Room 203A
Chairs
Fanfan Lin, *Zhejiang University*
Hongjian Lin, *University of Alberta*

8:30AM | Performance Analysis and Carrier-Based Implementation of Discontinuous Pulse-Width Modulation for Three-Phase Four-Level Inverters [#1944]
Kefan Yang[1], Li Zhang[1], Yuhang Zou[2], Xiao Shen[1]
[1]Hohai University, China; [2]Tsinghua University, China

8:50AM | High Performance Modular Multilevel Converter with High Power Density Novel Submodules [#1866]
Scott Lawton, Jinia Roy
University of Wisconsin–Madison, United States

9:10AM | Resilient Cyber-Attack Detection and Mitigation in Grid-Tied PEC9 Inverter Using A3C-Based Adaptive Control [#1879]
Soroush Oshnoei[1], Meysam Gheisarnejad[2], Arman Fathollahi[1], Mohammad Sharifzadeh[2], Eric Laurendeau[2], Kamal Al-Haddad[2]
[1]Aarhus University, Denmark; [2]École de Technologie Supérieure, Université du Québec, Canada

9:30AM | Power Generation Curtailment in Cascaded H-Bridge Converter-Based Solar Farms Under Unbalanced Generation [#1686]
Gaowen Liang[2], Enrique Nunes[2], Hein Wai Yan[2], Ezequiel Rodriguez[2], Glen Farivar[3], Josep Pou[1]
[1]City University of Hong Kong, China; [2]Nanyang Technological University, Singapore; [3]University of Melbourne, Australia

9:50AM | Multiobjective Optimization of a Single-Phase T-Type Inverter Using Bidirectional GaN Devices [#1998]
Luke Andersen, Jinia Roy
University of Wisconsin–Madison, United States

Oral Session 38 | EV Onboard Charger Topologies

Room 203B
Chairs
Emrullah Aydin, *Oak Ridge National Laboratory*
Benjamin Luckett, *Eaton Corporation*

8:30AM | A Wide ZVS Strategy for Quasi-Single-Stage AC/DC Converter with Split Inductors and Optimized Magnetizing Inductance [#1345]
Yuxuan Li, Linxiao Gong, Lingfeng Jiang, Xiyuan Shi, Yong Wang, Junzhong Xu
Shanghai Jiao Tong University, China

8:50AM | Integrated Single-Phase Onboard Charger for Dual-Motor Electric Vehicles [#1451]
Muhammad Zakariya[2], Ashraf Ali Khan[2], Jamil Muhammad Khan[2], Usman Ali Khan[1]
[1]Alfaisal University, Saudi Arabia; [2]Memorial University of Newfoundland, Canada

9:10AM | Triple Active Bridge Topology Selection and Design for Integrated On-Board Chargers [#1510]
Wesam Taha[2], Sreejith Chakkalakkal[1], Kyle Kozielski[1], Amrutha K. Haridas[1], Kamal Vaghasiya[1], Gauravkumar Prajapati[1], Yicheng Wang[2], Aniket Anand[2], Ali Emadi[1]
[1]McMaster University, Canada; [2]Schaeffler Technologies AG & Co. KG, Canada

9:30AM | Single-Phase Single-Stage Three-Port On-Board Charger with Minimum Hardware Components for EV/PHEV Application [#1521]
Keisuke Ushida[1], Keisuke Nakamura[1], Yutaka Hotta[1], Subrata Saha[1], Soumya Ghorai[2], Souvik Chattopadhyay[2]
[1]AISIN Corporation, Japan; [2]Indian Institute of Technology Kharagpur, India

9:50AM | Comparative Study on Non-Isolated Integrated On-Board Chargers for BEV/PHEV [#1592]
Kotaro Sakai[2], Kazuki Toda[2], Hiroaki Matsumori[2], Takashi Kosaka[2], Keisuke Nakamura[1], Subrata Saha[1]
[1]AISIN Corporation, Japan; [2]Nagoya Institute of Technology, Japan

Oral Session 39 | Predictive & Advanced Control Strategies for Electric Drives

Room 204B
Chairs
Michele Mengoni, *University of Bologna*
Huangjie Gong, *ABB*

8:30AM | Optimized Pulse Patterns for Five-Level Medium-Voltage Drives with DC-Link Voltage Ripple Minimization [#1337]
Ilari Hilden[2], Petros Karamanakos[2], Tobias Geyer[1]
[1]ABB System Drives, Switzerland; [2]Tampere University, Finland

8:50AM | A Novel Synchronous Phase Shifted PWM Strategy for Cascaded-H-Bridge-Fed PMSM Drive [#1645]
Gioacchino Scaglione, Claudio Nevoloso, Giuseppe Schettino, Antonino Oscar Di Tommaso, Rosario Miceli
Università degli Studi di Palermo, Italy

9:10AM | Dual High-Frequency Signal Injection for Stator and Rotor Winding Temperature Estimation in Wound Rotor Synchronous Machines [#2321]
Diego Fernández Laborda, Lidia Sánchez Alonso, Marcos Orviz Zapico, Javier G.-A. Tiemblo, David Díaz Reigosa
Universidad de Oviedo, Spain

9:30AM | Dynamic Harmonic Suppression Using Virtual Voltage Vectors in Model Predictive Control for Six-Phase Motor Drives [#1559]
João Serra, Fernando Bento, Antonio J. Marques Cardoso
CISE – University of Beira Interior, Portugal

9:50AM | Gradient-Based Predictive Pulse Pattern Control with Single-Phase Formulation [#1590]
Ilari Hilden[2], Petros Karamanakos[2], Tobias Geyer[1]
[1]ABB System Drives, Switzerland; [2]Tampere University, Finland

Oral Session 40 | Emerging Power Electronic Technologies & Applications

Room 204C
Chairs
Yuetao Hou, *Texas Instruments*
Saad Pervaiz, *Texas Instruments*

8:30AM | A Nonlinear Inductor-Based Near-Zero Current Sensing Method and Active Commutation Strategy for a Hybrid DC Circuit Breaker [#1709]
Qichen Yang[3], Andre Llanos[3], Karl Schoder[1], Lukas Graber[2]
[1]Florida State University, United States; [2]Georgia Institute of Technology, United States; [3]University of Central Florida, United States

8:50AM | Static and Dynamic Characterization of a Solid-State Multi-Terminal Selector Switch [#2255]
Theofilos Moraitis, Georgios Kampitsis
University of Patras, Greece

9:10AM | A GaN-Based Industrial Universal Auxiliary Power Supply with Ultra-Wide Input Voltage Range, High Efficiency, and High Power Density [#1616]
Zhou Dong[1], Haiguo Li[2], Dingrui Li[3], Jing Xu[1], Pietro Cairoli[1]
[1]ABB Corporate Research Center, United States; [2]ABB, Inc., United States; [3]Clemson University, United States

9:30AM | A 20-kHz Memristor-Based Pulse Width Modulation for Power Converters [#2036]
Fanfu Wu, Yunting Liu
Pennsylvania State University, United States

9:50AM | Faster-Than-Real-Time Testing of Microgrid Secondary and Tertiary Control in CHIL [#2061]
Harish Suryanarayana, Aniket Joshi, Parashar Parikh
ABB Corporate Research Center, United States

Wednesday, October 22 10:30AM – 12:10PM

Oral Session 41 | Transient Operation of Power Electronics-based Grids

Room 102A
Chairs
Hugo Villegas Pico, *Iowa State University*
Marius Langwasser, *Kiel University*

10:30AM | Transient Performance of Fault Currents in Type-3 WTs and Implications for IEEE 2800 Performance Requirements [#1153]
Brett Ross, Xue Lyu, Di Wu, Thomas McDermott
Pacific Northwest National Laboratory, United States

10:50AM | Transient Stability Study of IEEE 2800-2022 Standard Negative-Sequence Current Compliant Grid-Forming Inverter-Based Resources [#1884]
Diego Ríos-Castro[2], Soham Chakraborty[1], Jing Wang[1], Diego Pérez-Estévez[2], Jesus Doval-Gandoy[2]
[1]National Renewable Energy Laboratory, United States; [2]Universidade de Vigo, Spain

11:10AM | Control Architecture for Solid-State Transformer with Improved Transient Performance [#1743]
Surjakanta Mazumder, Harisyam P V, Kaushik Basu
Indian Institute of Science, India

11:30AM | Simulation of Grid Restoration Using Hydrogen Fuel Cells and Grid-Forming Inverters [#1179]
Meron Eyasu Tesfamichael, Hugo Villegas Pico
Iowa State University, United States

11:50 AM | Modeling Forced Oscillations in Bulk Power Grids with High Hybrid Power Plant Penetration [#1366]
Shuchismita Biswas, Xue Lyu, Quan Nguyen, Li He, Dibyendu Khan, Minghui Lu, Xiaoyuan Fan, Slaven Kincic
Pacific Northwest National Laboratory, United States

Oral Session 42 | Modeling & Mitigation of Power Converter EMI

Room 103C
Chairs
Hong Li, *Zhejiang University*
Vladimir Blasko, *University of Wisconsin - Madison*

10:30AM | A New PWM Method to Reduce Common Mode Voltage of Two-Level Voltage Source Inverter in Low MI Region [#1543]
Nuel Oh, Joon-Hee Lee
Ulsan National Institute of Science and Technology, Korea

10:50AM | A New Single Carrier 2D Random Switching Frequency PWM Method for Hybrid "Si+SiC" 3L ANPC Converter [#1598]
Mostafa Abarzadeh, Kevin Lee
Eaton, United States

11:10AM | Line-Frequency Noise Suppressor to Reduce Audible Noise in Induction Heating Systems [#1520]
Jun-Suk Lee[3], Kwang-Hyung Cha[1], Se-Un Shin[2], Jee-Hoon Jung[3]
[1]LG Electronics Inc., Korea; [2]Pohang University of Science and Technology, Korea; [3]Ulsan National Institute of Science and Technology, Korea

11:30AM | High-Frequency Modeling of Power Stage and Auxiliary Power System of 10 kV SiC MOSFET-Based Power Converters [#2296]
Ashkan Barzkar, Rolando Burgos, Dong Dong, Dushan Boroyevich
Virginia Polytechnic Institute and State University, United States

11:50 AM | Design Consideration for Minimizing Common Mode EMI Using Balancing Techniques [#1999]
Qiuzhe Yang[2], Tyler McGrew[2], Che-An Cheng[2], Xiang Li[2], Qiang Li[2], Zijian Wang[1]
[1]Monolithic Power Systems, Inc., United States; [2]Virginia Polytechnic Institute and State University, United States

Oral session 43 | Advanced Modelling of Electrical Machines

Room 201B
Chairs
Vandana Rallabandi, *Oak Ridge National Laboratory*
Giulio De Donato, *Sapienza University of Rome*

10:30AM | Modeling and Analysis of Skin Effects in Hairpin Windings Using Circuit Analysis [#1660]
Hasnain Nisar, Ali M Bazzi
University of Connecticut, United States

10:50AM | Torque-Speed Characteristic Estimation Based on Gaussian Processes and Adaptive Sampling Strategy for Permanent Magnet Synchronous Machines [#1921]
Marcelo Silva[3], Pedram Asef[2], Oluwaseun Badewa[1], Rosemary Alden[1], Dan M. Ionel[1]
[1]SPARK Laboratory, University of Kentucky, United States; [2]University College London, United Kingdom; [3]Uppsala University, Sweden

11:10AM | Equivalent Electrical Circuit Method for Calculating Circulating Current in Hairpin Windings [#2130]
Danielly Lima Bezerra[3], Tianjie Zou[3], Dmitry Golovanov[3], Hailin Huang[3], Grigorios Sergentanis[3], Antonino La Rocca[3], Jan Majer[2], Jay Al-Tayie[1], Alasdair Cairns[3], Chris Gerada[3]
[1]Ricardo plc, United Kingdom; [2]Ricardo Prague, s.r.o., Czech Rep.; [3]University of Nottingham, United Kingdom

11:30AM | Transmission-Line Modeling of High-Frequency Common-Mode Impedance for Hairpin Winding Machines [#1731]
Hans-Georg Kneidinger, Annette Muetze
Graz University of Technology, Austria

11:50 AM | Brushless Excitation System for High Current for Superconducting Motor [#1119]
Hyungkwan Jang[2], Linhua Lai[1], Byungho Min[2], Yujing Liu[1]
[1]Chalmers University, Sweden; [2]Hyundai Motor Company, Korea

Oral Session 44 | Advanced Control of Various DC/DC Converter Topologies

Room 201C
Chairs
Marium Rasheed, *Ford Motor Company*
Kaitlyn Sitch, *US Navy*

10:30AM | Simplified Implementation of Optimized Triple Phase Shift Control for DAB Converters in Electric Vehicles [#2065]
Guvanthi Abeysinghe Mudiyanselage[1], Sreejith Chakkalakkal[1], Kyle Kozielski[1], Wesam Taha[2], Yicheng Wang[2], Aniket Anand[2], Ali Emadi[1]
[1]McMaster University, Canada; [2]Schaeffler Technologies AG & Co. KG, Canada

10:50AM | Multi-Loop State-Plane Control of DAB Converters [#1432]
Matteo Sposito[2], Ignacio Galiano Zurbriggen[1]
[1]Simon Fraser University, Canada; [2]University of Calgary, Canada

11:10AM | Magnetization State Manipulation Method for Variable Magnetic Bias Reactors Suitable for Bi-Directional DC-DC Converters [#1471]
Yuri Hayashi[2], Keiichiro Kondo[2], Kensuke Sasaki[1], Hiroshi Takahashi[1], Takashi Kato[1]
[1]Nissan Motor Co., Ltd., Japan; [2]Waseda University, Japan

11:30AM | A Describing-Function-Based Modeling and Design Method for Current Mode Constant On-Time Controlled Converters [#1789]
Yuxin Yang[4], Hang Zhou[4], Yingyi Yan[3], Mingyang Zheng[2], Xiangpeng Cheng[1], John Fletcher[4]
[1]Fuzhou University, China; [2]Incosync Limited, China; [3]University of Electronic Science and Technology of China, China; [4]University of New South Wales, Australia

11:50 AM | A 48V-to-6V Multi-Resonant Switched-Capacitor Converter [#1632]
Felice Makain, Qingyun Huang
University of Missouri, United States

Oral Session 45 | Advanced Control Techniques & Modulation Stategies for Multi-level Power Converters

Room 202A
Chairs
Jeehoon Jung, *Ulsan National Institute of Science & Technology (UNIST)*
Zhou He, *Center for Power Electronics Systems, Virginia Tech*

10:30AM | Topology, Modulation, and Control of Coupled-Leg-Based Transformerless Unified Power Flow Controller [#1938]
Peng Jiang[1], Li Zhang[1], Yuhang Zou[2], Wenbo An[1], Ruisheng Shi[1]
[1]Hohai University, China; [2]Tsinghua University, China

10:50AM | Implementation of an Electric Motor Emulator with a Multilevel Power Stage Structure [#1325]
Chen-Yi Ho, Po-Cheng Chen, Yaow-Ming Chen
National Taiwan University, Taiwan

11:10AM | A Modulation Scheme for Optimal Reduction of Current Distortion in an Isolated Three-Phase AC–DC Matrix Converter [#1271]
Mei-Fang Wang, Jun-Tong Kuo, Tzung-Lin Lee
National Sun Yat-sen University, Taiwan

11:30AM | Impact of the Low-Frequency Voltage Oscillation on the Cascaded Three-Level/Three-Phase DAB and Inverters with Common Mid-Point [#2287]
Apoorv Agarwal, Nithin Kolli, Partha Pratim Das, Subhashish Bhattacharya
North Carolina State University, United States

11:50 AM | Control of a Marx Generator for Charge and Discharge a Tubular Dielectric Elastomer Actuator [#1262]
Maribel Cáceres Rivera[1], Morgan Almanza[2], Alexis Boegli[1], Yoan Civet[1], Yves Perriard[1]
[1]École polytechnique fédérale de Lausanne (EPFL), Switzerland; [2]Université Paris-Saclay, France

Oral Session 46 | Gate Driver Performance & Optimization

Room 202B
Chairs
Ratul Das, *University of Minnesota Twin Cities*
Tanya Gachovska, *MDA*

10:30AM | Exploring the Effect of Gate Loop on Switching Behaviors of Paralleled Discrete SiC MOSFETs [#1235]
Yifu Zhang, Emanuel Eni, Shashank Karanth
Infineon Technologies AG, Germany

10:50AM | A Discrete Multilevel Active Gate Driver for GaN HEMTs with a 1 ns Pulse Width Resolution [#1768]
Celine Lawniczak, Christoph Garneyer, Martin Pfost
Technische Universität Dortmund, Germany

11:10AM | Automatic Gate Pattern Optimization by Covariance Matrix Adaptation Evolution Strategy in Active Gate Control [#1122]
Masataka Ando, Hidemine Obara, Yasutaka Fujimoto
Yokohama National University, Japan

11:30AM | Performance Analysis of Matching Networks in Wireless Gate-Driver Power Supply for MV SiC MOSFETs [#2370]
Hamood Ur Rehman, Xiaoqing Song
University of Arkansas, United States

11:50 AM | Closed-Loop Slew Rate Control of Active Current Source Gate Driver with Digital Implementation for SiC MOSFET [#1111]
Guan-You Wu[1], Yi-Rong Huang[2], Yen-Ming Chen[1], Ching-Jan Chen[1]
[1]National Taiwan University, Taiwan; [2]National Taiwan University of Science and Technology, Taiwan

Oral Session 47 | Batteries for Renewables: Modelling & Management

Room 203A
Chairs
Luigi Danilo Tornello, *University of Catania*
John Lam, *York University*

10:30AM | Enhancing Energy Intelligence: Transfer-Learning-Enabled Transformer Models for Onboard SOC Estimation Using EV CAN Data [#1097]
Masood Shahverdi[2], David Robertson[1], Geoffrey Chavez[2]
[1]Argonne National Laboratory, United States; [2]California State University, Los Angeles, United States

10:50AM | Trade-Offs in Residential Energy Management: Cost Savings and Emission Reduction with Battery and PV [#1777]
Asmaa Romia, Qiuhua Huang, Paulo Cesar Tabares Velasco
Colorado School of Mines, United States

11:10AM | Adaptive Power Sharing Strategy for Grid-Connected HESS with Battery and Supercapacitor [#1805]
Sudeep Kumar Mohaney, Ankit Kumar Pratihasta, Rajeev Kumar Singh, Vivek Nandan Lal
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

11:30AM | A Circuit-Based Electro-Thermo-Mechanical Model for Hybrid Solid-State Batteries [#1304]
Noven Lee, Xiaojun Deng, Yajie Jiang, Zhao Yuan, Yun Yang
Nanyang Technological University, Singapore

11:50 AM | Capacity Estimation of Li-Ion Battery Cells Using Temperature-Based Extended Kalman Filter [#1508]
Ala Hussein[3], Basil Alattar[1], Sherif Ismail[1], Ali Wadi[2], Mamoun Abdel-Hafez[1]
[1]American University of Sharjah, U.A.E.; [2]Georgia Institute of Technology, United States; [3]Prince Mohammad Bin Fahd University, Saudi Arabia

Oral Session 48 | Onboard Chargers and Power Converters

Room 203B
Chairs
Surojit Sen, *University of Nottingham, UK*
Rishad Ahmed, *University of Nottingham*

10:30AM | A Novel Single-Phase Single-Stage Multiport Integrated Onboard Charger for EV Utilising Traction Motor Drives [#1696]
Naresh Rana[2], Keisuke Ushida[1], Keisuke Nakamura[1], Yutaka Hotta[1], Subrata Saha[1], Kaushik Basu[2]
[1]AISIN Corporation, Japan; [2]Indian Institute of Science, India

10:50AM | Design-Time and Run-Time Minimization of Device Losses in a Wide-Range Composite DC-DC Converter [#1818]
Ashwini Kumar Dubey[2], Sayan Paul[2], Yanghe Liu[1], Shailesh Joshi[1], Dragan Maksimović[2]
[1]Toyota Research Institute of North America, United States; [2]University of Colorado Boulder, United States

11:10AM | Design of a Plug-In Hybrid Electric Vehicle (PHEV) for Microgrid-on-Wheels Applications [#1826]
Hatif Bin Abdul Majeed[1], Mahmoud Kabalan[3], Camryn T. Anderson[2], Zeljko Pantic[1]
[1]North Carolina State University, United States; [2]U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory, United States; [3]University of St. Thomas, United States

11:30AM | Multifunctional Integrated Filter Solution for Isolated DC-DC Resonant Converters [#1929]
Ripun Phukan[1], Hsueh-Ju Wu[2], Tyler McGrew[1], Peter Barbosa[1], Yaow-Ming Chen[2]
[1]Delta Electronics (Americas) Ltd., United States; [2]National Taiwan University, Taiwan

11:50 AM | Development of Multifunctional On-Board Charger for Automotive Applications [#1967]
Keigo Nishimura[1], Hiroaki Matsumori[1], Takashi Kosaka[1], Kenichi Nagayoshi[2], Koki Nagae[2]
[1]Nagoya Institute of Technology, Japan; [2]Toyota Industries Corporation, Japan

Oral Session 49 | Modeling, Control, & Thermal Analysis of Electric Drives

Room 204B
Chairs
Yaser Chulaee, *Lennox International Inc.*
Huangjie Gong, *ABB*

10:30AM | Robust Adaptive Fractional-Order Model-Free Control for Linear Induction Motor Drive System via Reinforcement Learning [#2166]
Fayez El-Sousy[3], Mahmoud Amin[2], Osama Mohammed[1]
[1]Florida International University, United States; [2]Manhattan University, United States; [3]Prince Sattam bin Abdulaziz University, Saudi Arabia

10:50AM | Accurate Simulation Model of Variable Flux Machines Under Asymmetrical Demagnetization Without FEA Co-Simulation [#2104]
Raffaele Garino[1], Paolo Pescetto[1], Chen Chen[1], Simone Ferrari[1], Michela Diana[2], Gianmario Pellegrino[1]
[1]Politecnico di Torino, Italy; [2]Volvo Car AB, Sweden

11:10AM | Analysis of Magnet Temperature Distribution in Six-Phase Surface-Mounted Permanent Magnet Synchronous Motors [#2216]
Luca Vancini[1], Marco Menegon[2], Michele Mengoni[1], Gabriele Rizzoli[1], Luca Zarri[1], Angelo Tani[1]
[1]Università di Bologna, Italy; [2]University of Bologna, Italy

11:30AM | Common-Mode Voltage Elimination in Three-Level NPC Inverters for Symmetrical Six-Phase PMSM [#2191]
Pingyue Song, Tao Wang, Lijian Wu, Cheng Li
Zhejiang University, China

11:50 AM | Digital Twin Models of Multi-Three-Phase Permanent Magnet Synchronous Motors [#2055]
Nicola Macrì, Sandro Rubino, Simone Ferrari, Gianmario Pellegrino, Radu Bojoi
Politecnico di Torino, Italy

Oral Session 50 | AI-Based Design & Optimization for Efficient Energy Conversion

Room 204C
Chairs
Yang Wu, *Aalborg University*
Peng Fang, *University of Minnesota Duluth*

10:30AM | Hierarchical Data-Driven Multi-Winding Transformer Design Framework [#2062]
Kun Wang, Jiho Song, Ki-Bum Park
Korea Advanced Institute of Science and Technology, Korea

10:50AM | GNN4W: Graph Neural Network for Dual Active Bridge Converter Waveform Modeling with Operational Generalization [#1568]
Weihao Lei[2], Fanfan Lin[2], Xinze Li[1], Xin Zhang[2]
[1]University of Arkansas, United States; [2]Zhejiang University, China

11:10AM | Adaptive Control Design for Power Electronics Converters Using Kolmogorov-Arnold Networks [#2071]
Mateja Novak, Yuan Li, Shuai Zhao, Huai Wang, Frede Blaabjerg
Aalborg University, Denmark

11:30AM | Circuit-AI: An Advanced Large Language Model (LLM) Based Ai-Agent for Bill of Materials (BoM) Optimization, Circuit Simulations & Design [#1821]
Vishwam Raval, Mohamed Zeid, Prasad Enjeti
Texas A&M University, United States

11:50 AM | From Images to Inductance: Accelerating Transformer Design with Vision Transformer [#1093]
Kun Wang[1], Jiho Song[1], Qingyuan Shi[2], Haohan Zhou[2], Ki-Bum Park[1]
[1]Korea Advanced Institute of Science and Technology, Korea; [2]Tsinghua University, China

Wednesday, October 22 2:00PM – 3:40PM

Oral Session 51 | Solid State Transformers

Room 102A
Chairs
Bowen Yang, *National Renewable Energy Laboratory*
Kartavya Agarwal, *AmePower*

2:00PM | Topology and Control of a Hexagonal Hybrid Frequency Solid-State Transformer [#1234]
Yichao Sun[1], Yinyu Yan[1], Carlos Teixeira[2], Xiong Yang[1], Hao Jiang[1], Yilin Wang[1]
[1]Nanjing Normal University, China; [2]Royal Melbourne Institute of Technology, Australia

2:20PM | A Highly Modular Interphase Solid-State Transformer Architecture [#1335]
João Victor Guimarães França, Levy Ferreira Costa, George Papafotiou
Eindhoven University of Technology, Netherlands

2:40PM | Capacitive Bridge Transformer: An Isolated, Current-Stiff Dual Active Bridge Architecture [#1554]
Patrick Nowakowski, Mahima Gupta, Daniel Ludois
University of Wisconsin–Madison, United States

3:00PM | A Low-Loss Multiport Solid State Circuit Breaker Utilizing Bidirectional Common-Source SiC MOSFETs [#1611]
Yannal Nawafleh, Daixin Chen, Xiaoqing Song
University of Arkansas, United States

3:20PM | Zero-State Alignment Method for DC-Link Capacitor-Free DAB-VSI Topologies [#1693]
Yasin Abdolahi, Arya Ponnarassery Sadasivan, Behrooz Mirafzal
University of South Carolina, United States

Oral Session 52 | Power Converter Stability I

Room 103C
Chairs
Sante Pugliese, *University of Kiel*
Pengfeng Lin, *Shanghai Jiao Tong University*

2:00PM | Stability Analysis of Multiphase V^2 Cot Control with Phase Overlapping [1425]
Sundaramoorthy Sridhar, Qiang Li
Virginia Polytechnic Institute and State University, United States

2:20PM | Novel Dynamic Inverter Control Mechanism for Reliable Solar-PV Energy Access in Weak Rural Grids [#1042]
Gajendra Singh Chawda, Wencong Su, Mengqi Wang
University of Michigan-Dearborn, United States

2:40PM | An Enhanced PWM Method to Eliminate Computation Delay in Digital Average Current Mode Controlled Converters [#2177]
Heesu Shin, Suyong Chae
Pohang University of Science and Technology, Korea

3:00PM | Data-Driven Based Transmission Line SLG Fault Prediction of Fault Location and Resistance in PLL-Synchroni zed Inverter-Based Resources [#1627]
Zhiheng Lin, Xiaoting Wang, Yunwei Li
University of Alberta, Canada

3:20PM | Stability Analysis of a Three-Input Three-Output Multi-Converters for Energy Management System [#1516]
Toshiyuki Fujita[2], Masahiro Mae[2], Hiroshi Fujimoto[2], Michihiro Nakagawa[1], Yoshiki Yasuda[1], Akio Yamagiwa[1]
[1]Daikin Industries, Ltd., Japan; [2]university of Tokyo, Japan

Oral Session 53 | Interior PM Synchronous Machines

Room 201B
Chairs
Jonathan Bird, *Portland State University*
Rukmi Dutta, *University of New South Wales*

2:00PM | Analysis and Mitigation of High Coercivity Magnet's Irreversible Demagnetization in Hybrid Magnet Memory Motors [#1990]
Bassam Abdel-Mageed, Akrem Mohamed Aljehaimi, Pragasen Pillay
Concordia University, Canada

2:20PM | Torque Estimation in PMSMs Using a Search Coil [#2302]
Marcos Orviz Zapico[2], Diego Fernández Laborda[2], Javier G.-A. Tiemblo[2], Ye-Eun Yoon[1], Hojun Lee[1], Sang Bin Lee[1], David Díaz Reigosa[2]
[1]Korea University, Korea; [2]Universidad de Oviedo, Spain

2:40PM | Design of a Novel Embedded Magnet Rotor Geometry to Reduce Rotor Stress Concentration Effects in IPM Machines for EVs [#2424]
Sangwon Min, Gilsu Choi
Inha University, Korea

3:00PM | Optimization and Demagnetization Analysis of Interior Permanent Magnet Machines Using Hot-Rolled Permanent Magnets [#1401]
Joshua Lubin[2], Paul Ohodnicki[2], Ajay P.S Singh Baghel[1], Jun Cui[1], Chaochao Pan[1], Ikenna C. Nlebedim[1], Brandon M. Grainger[2]
[1]Ames Laboratory, United States; [2]University of Pittsburgh, United States

3:20PM | Design of Spoke Rotor Permanent Magnet Synchronous Machines with Compressive Magnet Retention [#1264]
Ritvik Chattopadhyay, John Tucker
Nidec Corporation, United States

Oral Session 54 | Modulation & Control Strategies for High-Performance Power Electronic Systems

Room 201C
Chair
Mahima Gupta, *University of Wisconsin-Madison*

2:00PM | N-Phase Interleaved Power Stage with Asynchronous Delta-Sigma Modulator for Dynamic Converters [#1036]
Philipp Czerwenka, Jannik Maier, Eckhard Hennig, Ertuğrul Sönmez, Gernot Schullerus
Reutlingen University, Germany

2:20PM | Data Driven Control of PMSG with an Active Rectifier for DC Microgrids [#2105]
Luis Herrera, Sarbajit Basu, Patrick Johnson
State University of New York at Buffalo, United States

2:40PM | Low-Complexity Triple-Vector Predictive Control for Five-Level Power Converters [#1665]
Yongdu Wang[2], Zhenbin Zhang[2], Yuanxiang Sun[2], Zhen Li[2], Ibrahim Harbi[2], Shuo Wang[1], Marcelo Heldwein[2]
[1]Jinan Engineering Polytechnic, China; [2]Technical University of Munich, Germany

3:00PM | Universal Neutral Point Voltage Balancing Method for Three-Level Inverter Feeding 390kW Induction Motor in Railway System [#1937]
Minseong Kim, Juyeon Lee, Do-Hyeon Kim, June-Seok Lee
Dankook University, Korea

3:20PM | Optimal Nearest-Level Modulation of MVDC-MMC with Decoupled Control for Lower Phase Current Total Harmonic Distortion [#1720]
Seungjun Lee, Jaeyeon Park, Dongjoon Kim, Shenghui Cui
Seoul National University, China; Seoul National University, Korea

Oral Session 55 | DC-DC Converters

Room 202A
Chairs
Yeonho Jeong, *The University of Rhode Island*
Davide Biadene, *Padova University*

2:00PM | Single-Stage 48V-to-1V Regulator with Half-Turn Multiple-Winding Inductors and Current-Doubler Rectifier [#1448]
Xinmiao Xu[4], Xin Lou[4], Pengfei Wang[2], Hao Gu[1], Ding-Tang Chen[3], Jie Wu[2], Taowen Chen[1], Yi-Hsiang Huang[3], Qiang Li[4]
[1]Delta Electronics, China; [2]Delta Electronics, Inc., China; [3]Delta Electronics, Inc. / Cyntec Co., Ltd., Taiwan; [4]Virginia Polytechnic Institute and State University, United States

2:20PM | An Enhanced Linear Active Disturbance Rejection Controller Based Dual Active Bridge Converters for EV Charging [#2387]
Prashant Kumar[2], Ali Arzani[1], Sohag Kumar Saha[2], Satish M. Mahajan[2]
[1]Tennessee Tech University, United States; [2]Tennessee Technological University, United States

2:40PM | A Varying Duty Cycle Based High Speed Soft Startup Method for CLLC Converters [#1098]
Kai Zhang, Huan Chen, Kai Sun
Tsinghua University, China

3:00PM | Step Up DC/DC Converter Module with Output Power Balancing and an Embedded Active Auxiliary Circuit for Extended Soft Switching Range for MVDC Grid Distribution [#1373]
Kajanan Kanathipan[2], Ali Cheema[1], John Lam[2]
[1]Northern Transformer, Canada; [2]York University, Canada

3:20PM | A Capacitive Isolated Series Stacked Dual Active Bridge Converter for Medium Voltage DC Applications [#1642]
Jenson Joseph Attukadavil, Baylon Godfrey Fernandes
Indian Institute of Technology Bombay, India

Oral Session 56 | Power Module Design

Room 202B
Chairs
Francesco Iannuzzo, *Politecnico di Torino*
Qingyun Huang, *University of Missouri*

2:00PM | A 1300 V/60 a Double-Side Cooling GaN Half-Bridge Power Module with Active Clamping Voltage Control [#1703]
Jie Deng, Binhong Cao, Guangyu Yan, Zhicheng Guo
Arizona State University, United States

2:20PM | A Symmetrical Organic Direct Bonded Copper Silicon Carbide Half Bridge Module Design with Ultra Low Loop Inductance [#1439]
Shuofeng Zhao, Joshua Major, Douglas Devoto, Sarwar Islam, Xiaoling Li, Mike Tant, Faisal Khan, Sreekant Narumanchi
National Renewable Energy Laboratory, United States

2:40PM | Development of a High-Density 3.3 kV/2000 a SiC MOSFET Power Module for Offshore Wind Power Flexible HVDC Transmission Applications [#1228]
Yimin Zhou[2], Zhiqiang Wang[2], Lingqi Tan[1], Chunyang Man[2], Jialong Dou[2], Deao Shen[2], Kai Ma[1], Xiaojie Shi[2]
[1]Electric Power Research Institute of Guangdong Power Grid Company, China; [2]Huazhong University of Science and Technology, China

3:00PM | A Reduced-Order Modeling and Design Guideline for Parasitic Inductance Mitigation in Multi-Chip SiC Power Modules [#1199]
Yuxi Liang, Peng Sun, Jiakun Gong, Huayang Zheng, Senhao Liang, Zheng Zeng
Chongqing University, China

3:20PM | Heterogeneously Integrated 3.3 kV SiC MOSFET Power Module with Multi-Layer Substrate and Built-In Gate Drivers [#1883]
Qiang Wu[5], Sudharsan Chinnaiyan[5], Mohammad Dehan Rahman[5], Yuxiang Chen[5], John Fraley[3], Brian Rowden[4], Yash Singh[2], Monoj Ghosh[2], Chanyeop Park[1], Xiaoqing Song[5], Zhong Chen[5], H. Alan Mantooth[5]
[1]Arizona State University, United States; [2]Eaton, United States; [3]Missionshire LLC, United States; [4]Oak Ridge National Laboratory, United States; [5]University of Arkansas, United States

Oral Session 57 | Batteries for Renewables: Technologies & Characterization

Room 203A
Chairs
Ramanathan Thiagarajan, *NREL*
Hongjian Lin, *University of Alberta*

2:00PM | Battery Impedance Measurements at Nonstationary Conditions Using DFT Eigenvector Perturbations [#1020]
Jussi Sihvo, Daniel Ioan Stroe
Aalborg University, Denmark

2:20PM | Two-Stage Thermal Characterization and Localization for Lithium-Ion Batteries [#1746]
Luyu Tian[2], Chaoyu Dong[1], Qian Xiao[2], Yu Jin[2], Hongjie Jia[2]
[1]Nanyang Technological University, Singapore; [2]Tianjin University, China

2:40PM | Negative Pulsed Current Charging: An Approach for Battery Lifetime Enhancement [#2103]
Xinrong Huang[2], Yuechan Xiao[2], Yaqi Li[1], Jinhao Meng[3], Daniel Ioan Stroe[1]
[1]Aalborg University, Denmark; [2]Chang'an University, China; [3]Xi'an Jiaotong University, China

3:00PM | Optimized Adaptive Pulse Charging of Lithium-Ion Batteries Using Internal Impedance [#1197]
Leevi Lignell, Minh Tran, Tomi Roinila
Tampere University, Finland

3:20PM | Battery Cell Equalization Using a Resonant LC Circuit [#1650]
Nicholas Gustavo Duarte Furtado[1], Gierri Waltrich[2], Anderson Vaccari[3]
[1]Federal University of Santa Catarina, Brazil; [2]Universidade Federal de Santa Catarina, Brazil; [3]Vale SA, Brazil

Oral Session 58 | EV Chargers, Converters, & Propulsion

Room 203B
Chairs
Nishanth Gadiyar, *Oak Ridge National Lab*
Rishad Ahmed, *University of Nottingham*

2:00PM | PCB Layout Design and Optimization of a High-Performance Power Module with Paralleled Top-Side-Cooling Packaged MOSFETs [#2400]
Huanghaohe Zou, Mafu Zhang, Saleh Farzamkia, Alex Q. Huang
University of Texas at Austin, United States

2:20PM | Energy-Efficient Control Design for Ship Hybrid Propulsion Systems with Controllable Pitch [#1843]
Fan Gao, Mehdi Zadeh
Norwegian University of Science and Technology, Norway

2:40PM | Aging-Aware Hybrid Equivalent Circuit and Data-Driven Model for PEM Fuel Cells [#2167]
Bruno Masserano[2], Ignacio Ortiz[2], Constanza Ahumada[2], Marcos Orchard[2], Gonzalo Aguila[1]
[1]Universidad Andres Bello, Chile; [2]Universidad de Chile, Chile

3:00PM | Modeling of Kilohertz Wireless Power Transfer Systems with Transmitter-Side Low-Frequency Metamaterials [#1008]
Kaiyuan Wang[1], Junxiang Yang[1], Zhen Sun[1], Ching-Ming Lai[2], Yun Yang[1]
[1]Nanyang Technological University, Singapore; [2]National Chung Hsing University, Taiwan

3:20PM | High Dynamic Bi-Directional Power Flow Control in Galvanically Isolated Motor Drives [#1802]
Sachith Wijesooriya, Prabath Binduhewa, Ujala Maha Gamage, Sandun Kuruppu
Western Michigan University, United States

Oral Session 59 | High-Speed & Bearingless Machines

Room 204B
Chairs
Eric Severson, *University of Minnesota*
Minkyun Noh, *Korea Advanced Institute of Science and Technology*

2:00PM | Novel Design Solution for Minimization of Low Frequency Torque Oscillation in High-Speed Laminated Rotor Induction Motors [#2303]
Silba Mathew, R. M. Ram Kumar, Baylon Godfrey Fernandes, Ramesh Singh
Indian Institute of Technology Bombay, India

2:20PM | A Novel Winding Structure for High-Speed Permanent Magnet Machines: Comparison of Aluminum and Copper Winding [#2328]
Yuto Yamada, Jun Ebinuma, Itsuki Fukasawa, Shoichi Oaku, Hiroya Sugimoto
Tokyo Denki University, Japan

2:40PM | Effect of an Armature Winding Misalignment on Passively Levitated Self-Bearing Machines [#1979]
Joachim Van Verdeghem, Bruno Dehez
Université Catholique de Louvain, Belgium

3:00PM | Design of a Consequent-Pole Bearingless Motor with 24-Slot/8-Pole Combined Distributed Winding for High-Speed Applications [#1648]
Junichi Asama[1], Ryota Sone[1], Hiroya Sugimoto[2]
[1]Shizuoka University, Japan; [2]Tokyo Denki University, Japan

3:20PM | Design of Bearingless Motors to Unload Static Forces from Foil Bearings [#2384]
Sayed Saleh[2], Takahiro Noguchi[2], Logan Rapp[1], Eric Severson[2]
[1]Sandia National Laboratories, United States; [2]University of Minnesota, Twin Cities, United States

Oral Session 60 | Power Conversion Quality in Electric Drives

Room 204C
Chairs
Sneha Narasimhan, *North Carolina State Universit*
Ali Bazzi, *University of Connecticut*

2:00PM | Quantitative Evaluation Between Si-IGBT and SiC-MOSFET Based Adjustable Speed Drive Systems with Long Cables [#1239]
Kevin Lee, Mahesh Swamy
Eaton Corp., United States

2:20PM | Investigations on Series Resonant Converter Feeding High- Load in Three-Winding Rotary Transformer-Based Brushless Bipolar Field Excitation System for EESM/HESM [#2098]
Mitul Wankhede[1], Shovan Dey[1], Annoy Kumar Das[2], Baylon Godfrey Fernandes[1]
[1]Indian Institute of Technology Bombay, India; [2]Rensselaer Polytechnic Institute, United States

2:40PM | Active Harmonic Filtering with Low Voltage VFD for Shaft Generator [#1588]
Sang-Hyun Kim[3], Kyeon Hur[3], Se-Woon Hwang[2], Seung-Ki Sul[1]
[1]HD Hyundai, Korea; [2]HD Korea Shipbuilding & Offshore Engineering, Korea; [3]Yonsei University, Korea

3:00PM | Talkative Power Conversion in an AC System: Basic Principle and Implementation [#1106]
Qichou Yang[2], Hao Li[1], Chenhao Hu[2], Weitao Zhao[2], Sideng Hu[2]
[1]CSIC No. 705 Research Institute, China; [2]Zhejiang University, China

3:20PM | A Non-Iterative Approach for Identification and Suppression of High-Frequency Vibration in Precision Motor Control [#1754]
Yi Jen Lin[2], Po Chien Hsu[3], Po-Huan Chou[1], Hsien Hung Tseng[2], Shih-Chin Yang[2]
[1]Industrial Technology Research Institute, Taiwan; [2]National Taiwan University, Taiwan; [3]National Yunlin University of Science and Technology, Taiwan

Wednesday, October 22 4:00PM – 5:40PM

Oral Session 61 | Grid Forming Converters in Power Systems

Room 102A

Chairs
Joseph Benzaquen, *Georgia Institute of Technology*
Kartavya Agarwal, *AmePower*

4:00PM | Impact of Inertia Emulation and Droop Control on Frequency Dynamics of Inverter-Based Microgrids [#2403]
Nida Riaz, Lasse Peltonen, Sami Repo, Pertti Järventausta
Tampere University, Finland

4:20PM | Performance Evaluation of a Microgrid System with Grid-Forming and Grid-Following Inverters with Diesel Generators: Insight from Hardware Experiments [#1888]
Jing Wang, Subhankar Ganguly, Soham Chakraborty, Benjamin Kroposki
National Renewable Energy Laboratory, United States

4:40PM | A Large-Scale Hardware Experiment Demonstration of Operating High Inverter-Based Resourse Power Systems with Grid-Forming Inverters [#1889]
Jing Wang, Subhankar Ganguly, Abu Shouaib Hasan, Soham Chakraborty, Benjamin Kroposki
National Renewable Energy Laboratory, United States

5:00PM | Stabilizers for Grid-Forming Inverters to Regain Synchronism After Fault Clearing [#1279]
Hoang Dang, Hugo Villegas Pico
Iowa State University, United States

5:20PM | Four-Wire Grid-Forming Converter for Microgrid Applications [#2312]
Marcio Magri Kimpara, Rajendra Prasad Kandula, Rafal Wojda
Oak Ridge National Laboratory, United States

Oral Session 62 | Health Monitoring for Reliable Power Electronics

Room 103C

Chairs
Yicheng Zhu, *UC Berkeley*
Zhicheng Guo, *Arizona State University*

4:00PM | Real-Time Health Monitoring of Dual Active Bridge Converters for Predictive Maintenance [#1341]
Ahmed Meligy[2], Nilsu Bora[2], Rafael Coelho-Medeiros[2], Ilknur Colak[2], Seddik Bacha[1]
[1]G2ELab, Université Grenoble Alpes, France; [2]Schneider Electric SE, France

4:20PM | Autoencoder-Based Anomaly Detection for Insulation Condition Monitoring Under Power Semiconductor Switching Noise [#1238]
Tae-Yun Hong[1], Hyun-Mo Ahn[1], Ki-Dong Song[1], Jun-Kyu Park[1], Jin-Gyu Kim[2]
[1]Korea Electrotechnology Research Institute, Korea; [2]Kyungpook National University, Korea

4:40PM | A Temperature-Independent Short-Circuit Failure Warning Method for SiC MOSFET Based on Input Capacitance [#1504]
Yanyong Yang[1], Wei Liu[2], Qiuqiong Lin[2], Yifu Ren[2], Fengtao Gao[2], Pinjia Zhang[2]
[1]China University of Mining and Technology-Beijing, China; [2]Tsinghua University, China

5:00PM | Convolutional Neural Network-Based Park's Vector Trajectory Recognition for IGBT Open-Circuit Fault Diagnosis in Three-Phase Inverters [#1357]
Xiaoyi Lei, Fanfu Wu, Yunting Liu
Pennsylvania State University, United States

5:20PM | High-Integration Online Monitoring Method for DC-Link Capacitance in Electric Drive Systems Under All Operating Conditions [#1313]
Yi Liu[2], Hengkuan Li[2], Yunhui Mei[2], Zhiqiang Liu[1]
[1]China First Automobile Group Co., Ltd., China; [2]Tiangong University, China

Oral Session 63 | Advanced Manufacturing of Electrical Machines

Room 201B

Chairs
Federico Marcolini, *Sapienza University of Rome*
Federica Graffeo, *Politecnico di Torino*

4:00PM | Enhanced Torque Density in Electric Motors Through Liquid-Cooled Hollow Conductors [#1524]
Nicola Bianchi, Daniele De Gregorio, Fabio Filippini, Lino Di Leonardo, Edoardo Sech, Anna Stoppato, Francesco Tripaldi, Antonio Rossi
Università degli Studi di Padova, Italy

4:20PM | Reducing AC Joule Losses in Hairpin Windings of Electric Machines: Strategies for Minimizing Losses Due to Radial and Tangential Flux [#1261]
Yitbarek Tedla Bekele[1], Olga Korolova[2], Andreas Biebighäuser[2], Siddique Akbar[2], Amir Ebrahimi[3], Bernd Ponick[1]
[1]Leibniz University Hannover, Germany; [2]Profluxx Gmbh, Germany; [3]University of Bremen, Germany

4:40PM | Scripting-Based 3D Geometry Modelling of Hairpin Windings in EV Traction Motors: Design for Manufacturing [#1730]
Wenting Wang, Tianjie Zou, Hailin Huang, Hua Li, Mingjie Wang, Xiang Ren, Hadish Habte Tesfamikael, David Gerada, Chris Gerada
University of Nottingham, United Kingdom

5:00PM | Experimental Technique for Evaluating Impact of Cut Edges in Manufactured Segmented Stators [#2278]
Bhuvan Khoshoo[2], Anmol Aggarwal[1], John Agapiou[1], Shanelle Foster[2]
[1]General Motors Company, United States; [2]Michigan State University, United States

5:20PM | Prototyping and Optimization of 100,000 RPM Additively Manufactured SyR Rotors [#1662]
Yulong Cui[1], Chiara Gianassi[2], Gabriele Rizzoli[2], Alessandro Fortunato[2], Luca Zarri[2], Andrea Cavagnino[1]
[1]Politecnico di Torino, Italy; [2]Università di Bologna, Italy

Oral Session 64 | Modulation Methods for Power Converters

Room 201C

Chairs
Michael Harke, *Collins Aerospace*
Jialin Zheng, *Purdue University*

4:00PM | An Improved Switching Signal Split PWM for Switching Loss Reduction in Single Current Sensor Based Inverters [#1292]
Joon-Seok Kim[1], Byeong-Il Kim[1], June-Hee Lee[2], June-Seok Lee[1]
[1]Dankook University, Korea; [2]Korea Railroad Research Institute, Korea

4:20PM | An Improved Pulse Shifting PWM Method for Switching Loss Reduction in Dual Inverter with a Common DC Source [#1918]
Seung-Mu Seo, Joon-Seok Kim, June-Seok Lee
Dankook University, Korea

4:40PM | Soft Switching Inverter Design for Electrical Motors with Significant Parasitic Capacitances [#1161]
Yushi Yang[2], Nan Lin[1], Yuheng Wu[1], Zack Wehri[1], Muhammad Fasih Uddin[2], Dongyu Jin[1], Brij Singh[1], Long Wu[1], Yue Zhao[2]
[1]Deere & Company, United States; [2]University of Arkansas, United States

5:00PM | A Variable Switching Frequency Modulation Strategy for High-Efficiency SiC Converters [#1537]
Bokang Zhou[1], Dingrui Li[2], Slavko Mocevic[1]
[1]ABB Corporate Research Center, United States; [2]Clemson University, United States

5:20PM | Review and Comparison of Common Mode Voltage Mitigation in Four-Leg Inverters [#2228]
Alexander Julian[1], Giovanna Oriti[2], Keon Briscoe[2]
[1]Consultant / Independent Researcher, United States; [2]Naval Postgraduate School, United States

Oral Session 65 | Modern Control Strategies & Converter Designs for Power Electronics Systems

Room 202A
Chairs
Zhou He, *Center for Power Electronics Systems, Virginia Tech*
Yingyi Yan, *University of Electronic Science and Technology of China*

4:00PM | A Single-Stage PFC Based SEPIC-Forward Converter for LED Drivers [#1386]
Inshal Ahmed Khan, Ashraf Ali Khan, Ahmed Esfahani, Shah Nawaz Khan
Memorial University of Newfoundland, Canada

4:20PM | Comparative Analysis of Flyback and Active Clamp Flyback Converters for High Power Density and Efficiency in Compact AC/DC Applications [#1463]
Farrukh Jamshed, Navid Hadifar, Reza Mounesi, Enrico Santi, Adel Nasiri
University of South Carolina, United States

4:40PM | Arm-Energy Balance Control for Modular Multilevel Rectifer at Unity Power Factor [#1535]
Lance Wright, Di Zhang, Yuntao Xu
Naval Postgraduate School, United States

5:00PM | A Novel Transformable Multi-Mode Three-Phase AC/DC LLC Converter for Fast DC Charging Applications [#1751]
Xiaoyi Xia, Kajanan Kanathipan, John Lam
York University, Canada

5:20PM | Voltage Deviation Compensation Method for Improving Input Current THD in Vienna Rectifier with High Switching Frequency [#1519]
Juyeon Lee, June-Seok Lee
Dankook University, Korea

Oral Session 66 | Power Electronic Modules: Materials & Other Considerations

Room 202B
Chairs
Lakshmi Ravi, *ABB U.S. Corporate Research Center*
Shuo Wang, *University of Florida*

4:00PM | Liquid-Metal Interconnects on SiC MOSFETs [#2139]
Nick Baker[3], Szymon Bęczkowski[1], Kjeld Pedersen[1], Asger Bjørn Jørgensen[1], Kaichen Zhang[1], Stefan Meyer[1], Francesco Iannuzzo[2], Arthur Boutry[3]
[1]Aalborg University, United States; [1]Aalborg University, Denmark; [2]Politecnico di Torino, Italy; [3]University of Alabama, United States

4:20PM | Warpage Evaluation of Double-Sided Cooled SiC Power Modules Using Al_2O_3 Spacers [#2086]
Tarik Teker, Narayanan Rajagopal, Christina Dimarino
Virginia Polytechnic Institute and State University, United States

4:40PM | Maximizing Power Density in SiC Inverters: Copper-Diamond Composite Embedded Power Modules with Advanced Local Cooling Strategy [#1367]
Da Zhou[3], Zhiqiang Wang[3], Kangyong Li[3], Yu Liao[2], Cheng Qian[1], Neng Wang[3], Guoqing Xin[3], Xiaojie Shi[3]
[1]China Railway Rolling Stock Corporation, China; [2]Electric Power Research Institute of Guangdong Power Grid Company, China; [3]Huazhong University of Science and Technology, China

5:00PM | Characterization and Analysis of Chip Parameter Dispersion for 3.3kV SiC MOSFETs [#1229]
Yimin Zhou[2], Zhiqiang Wang[2], Lingqi Tan[1], Kai Ma[1]
[1]Electric Power Research Institute of Guangdong Power Grid Company, China; [2]Huazhong University of Science and Technology, China

5:20PM | A "Hand-in-Hand" Dynamic Current-Sharing Layout Design for GaN Power Module [#1227]
Xingyuan Yan, Zhiqiang Wang, Yunchan Wu, Yayong Yang, Xiaojie Shi, Yimin Zhou
Huazhong University of Science and Technology, China

Oral Session 67 | Energy Storage & Harvesting

Room 203A
Chairs
Shiqi Ji, *Tsinghua University*
Sangwhee Lee, *ORNL*

4:00PM | Hybrid Neural-Kalman Filtering for Robust Battery Health Estimation [#1269]
Islam Sayed, Yousef Mahmoud
Kennesaw State University, United States

4:20PM | A Cost-Effective Wave Energy Harvesting System with Maximum Power Point Tracking Capability [#1841]
Pranav Chandran[2], Vikram Roy Chowdhury[1], Gab-Su Seo[1], Brian Johnson[2], Barry Mather[1]
[1]National Renewable Energy Laboratory, United States; [2]University of Texas at Austin, United States

4:40PM | An Energy Harvesting Converter for Low-Power Dielectric Elastomer Generator [#1837]
Yuhao Qiu[1], Olivier Bourdin[2], Clement Puech[2], Cheng Zhang[1]
[1]University of Manchester, United Kingdom; [2]Wave Mining Solutions Limited, France

5:00PM | Degradation Minimization of Utility-Scale Li-Ion BESS Through Operational Optimization Employing an Equivalent Circuit Model [#2039]
Kwabena Kyeremeh[3], Grant Fischer[3], Donovin D. Lewis[2], Aron Patrick[1], Dan M. Ionel[2]
[1]PPL Corporation, United States; [2]SPARK Laboratory, University of Kentucky, United States; [3]University of Kentucky, United States

5:20PM | Pack U-Clamped Cell (PUCC): A New Multifunctional Multilevel Inverters for Energy Storage Application [#2300]
Omid Zolfagharian[2], Mohsin Jamil[1]
[1]Brock University, Canada; [2]Memorial University of Newfoundland, Canada

Oral Session 68 | Aircraft Electrification

Room 203B
Chairs
AKM Arafat, *Drive Systems Design*
Liwei Zhou, *University of Texas at Arlington*

4:00PM | Electromagnetic and Mechanical Modeling of Medium Voltage PMSM for Hybrid Regional Aircraft in Faulty Conditions [#2151]
Paolo Pescetto, Federico Cocuzza, Fahimeh Mashayekhi, Simone Ferrari, Stefano Zucca, Christian Maria Firrone, Gianmario Pellegrino
Politecnico di Torino, Italy

4:20PM | Design Optimization of Ćuk Inverters with Low di/dt of Input Current and Sinusoidal Output Voltage for Electric Aircraft [#1742]
Lukas Antonio Budiwicaksana, Dong-Choon Lee
Yeungnam University, Korea

4:40PM | eVTOL Propulsion Comparison Between Axial Flux and Radial Flux Motors [#1547]
Francesco Tripaldi, Daniele De Gregorio, Nicola Bianchi
Università degli Studi di Padova, Italy

5:00PM | Development and Testing of a Fault-Tolerant Modular Motor Drive Using Current-Source Inverters [#2032]
Xiaoyuan Zhang[1], Pengkun Tian[1], Ken Chen[1], Antonio Parra[1], Thomas Jahns[2], Bulent Sarlioglu[2]
[1]University of Wisconsin–Madison, United States; [2]WEMPEC – University of Wisconsin–Madison, United States

5:20PM | A 44.3-kW High Performance Multi-MHz Capacitive Wireless Power Transfer System for Electric Vehicle Charging [#2048]
Dheeraj Etta, Syed Saeed Rashid, Khurram Afridi
Cornell University, United States

Oral Session 69 | Switched Reluctance & Flux Switching Machines

Room 204B
Chairs
Mohammad Sedigh Toulabi, *University of Alberta, Canada*
Yuting Gao, *Wuhan University*

4:00PM | Proposal and Operation Verification of Doubly-Excited Flux-Modulating Synchronous Motors [#1120]
Hiroshi Mitsuda[2], Tadashi Fukami[1], Masato Koyama[1], Eigo Totoki[2]
[1]Kanazawa Institute of Technology, Japan; [2]Mitsubishi Electric Corporation, Japan

4:20PM | An Approach for RMS Capacitor Current Reduction in Current-Controlled Switched Reluctance Generators [#1514]
Filipe Pinarello Scalcon[2], Gustavo Xavier Prestes[1], Rodrigo Padilha Vieira[1], Andrew M Knight[2]
[1]Federal University of Santa Maria, Brazil; [2]University of Calgary, Canada

4:40PM | Performance Balancing Design Method for 12-Pole 20-Slot Five-Phase Multi-Mode Reluctance Motor [#1717]
Ryo Kokubu, Kyohei Kiyota
Institute of Science Tokyo, Japan

5:00PM | Reduction of Third Harmonic Components of Radial Forces in SRMs Across All Torque Operating Regions via Torque-Dependent Parameter Modeling [#1732]
Muhammad Fabio, Kyohei Kiyota
Institute of Science Tokyo, Japan

5:20PM | Hybridization of Magnetic Configurations: Quest for Higher Performance in Electrical Machines [#1898]
Babak Fahimi[2], Mohammad Rastegar[2], Ion Boldea[1]
[1]Politehnica University of Timișoara, Romania; [2]University of Texas at Dallas, United States

Oral Session 70 | Data-Driven Monitoring, Diagnostics, & Fault Analysis

Room 204C
Chairs
Taesic Kim, *The University of Missouri*
Gaowen Liang, *Nanyang Technological University*

4:00PM | Multiscale Temporal Dependency-Based Transfer Learning with Degradation Stage Calibration for Remaining Useful Life Prediction of Energy Systems [#2232]
Xuefei Xu, Wei Qiao, Liyan Qu
University of Nebraska–Lincoln, United States

4:20PM | Converter Dynamics Prediction Beyond Training Data Using Heterogeneous-Physics-Informed GNN [#1932]
Ahmed Khamis, Mohammed Agamy
State University of New York at Albany, United States

4:40PM | Robust Data-Light Parameter Estimation for DAB Converters with Physics-Informed Neural Network [#1052]
Tanjing Xie, Yinxiao Zhu, Xiyun Wang, Yongheng Yang
Zhejiang University, China

5:00PM | Prediction Accuracy Enhancement of Transformer Core Loss Under Complex Excitation Based on Pre-Trained Foundation Model [#1062]
Bowen Su, Jiahua Ying, Huan Chen, Bo Liu, Kai Sun
Tsinghua University, China

5:20PM | Physics-Guided Domain Alignment for Condition Monitoring of Three-Phase Inverters [#1348]
Youssof Fassi[2], Shuai Zhao[1], Jacopo Ferretti[4], Xing Wei[1], Vincent Heiries[3], Jérôme Boutet[3], Sébastien Boisseau[3], Huai Wang[1]
[1]Aalborg University, Denmark; [2]CEA-Leti, France; [3]CEA-Leti, Université Grenoble Alpes, France; [4]Univeristà di Bologna, Italy

Thursday, October 23 8:30AM – 10:10AM

Oral Session 71 | Microgrids Control

Room 102A
Chairs
Vikram Roy Chowdhury, *National Renewable Energy Laboratory*
Huangjie Gong, *ABB*

8:30AM | Optimizing Microgrid Resiliency with a Robust Control Framework [#1752]
Deepak Kumar[3], Mohamed Alkhatib[3], G. Lloyds Raja[2], Omar Al Zaabi[1], Khalifa Al Hosani[1], Utkal Ranjan Muduli[1]
[1]Khalifa University, U.A.E.; [2]National Institute of Technology Patna, India; [3]United Arab Emirates University, U.A.E.

8:50AM | Lie Group-Based Control of Grid-Connected Solar Microinverters [#1946]
Arpan Laha, Abirami Kalathy, Praveen Jain, Majid Pahlevani
Queen's University at Kingston, Canada

9:10AM | Neural Network Approach to BESS Placement and Transient Performance in Microgrids [#2027]
Shweta Meena, Ayman AlZawaideh, Srdjan Lukic
North Carolina State University, United States

9:30AM | Optimal Placement of DERs in a Microgrid Based on Dynamic Performance [#2028]
Ayman AlZawaideh[1], Shweta Meena[1], Scott Eisele[2], Srdjan Lukic[1]
[1]North Carolina State University, United States; [2]Vanderbilt University, United States

9:50AM | A Frequency-Domain Stability Margin Indicator for Grid-Connected Converter Systems [#1716]
Jin Wang[1], Amir Zamani[1], Mebtu Beza[1], Massimo Bongiorno[1], Anant Narula[1], Jan Svensson[2]
[1]Chalmers University of Technology, Sweden; [2]Hitachi Energy, Sweden

Oral Session 72 | Fault-tolerant Methods for Reliable Power Electronics

Room 103C
Chairs
Zhicheng Guo, *Arizona State University*
Xiaoqing Song, *University of Arkansas*

8:30AM | A Ride-Through Strategy to DC Fault for a Modular Multilevel Converter [#1273]
Mei-Fang Wang, Pei-Wen Lee, Tzung-Lin Lee
National Sun Yat-sen University, Taiwan

8:50AM | Topology, Hybrid Frequency, and Fault Ride-Through Control Strategy of a Novel MMC-SST with Integrated Switch Pairs [#1347]
Yinyu Yan[1], Yichao Sun[1], Carlos Teixeira[2], Xiong Yang[1], Hailong Zhang[1]
[1]Nanjing Normal University, China; [2]Royal Melbourne Institute of Technology, Australia

9:10AM | DC Fault Ride-Through Control of a Hexagonal Hybrid-Frequency Solid-State Transformer [#1350]
Xiong Yang[1], Yichao Sun[1], Yinyu Yan[1], Carlos Teixeira[2], Huiru Hu[1]
[1]Nanjing Normal University, China; [2]Royal Melbourne Institute of Technology, Australia

9:30AM | Control & Communication Architecture for a Fault-Tolerant Integrated Modular Motor Drive [#1914]
Armin Ebrahimian, Seyed Iman Hosseini Sabzevari, Nathan Weise
Marquette University, United States

9:50AM | Evaluating the Impact of Fault Current Limiter Schemes of IBRs on Transmission Line Protection Elements [#1657]
Soham Chakraborty[2], Paulo Henrique Pinheiro[4], Romulo Goncalves Bainy[4], Hangtian Lei[4], Brian K. Johnson[4], Scott Manson[3], Jing Wang[2], Rasel Mahmud[2], Andy Hoke[2], Cameron J. Kruse[1]
[1]Kauai Island Utility Cooperative, United States; [2]National Renewable Energy Laboratory, United States; [3]Schweitzer Engineering Laboratories, United States; [4]University of Idaho, United States

Oral Session 73 | Synchronous Machines

Room 201B
Chairs
Nicola Bianchi, *University of Padova*
Ian Brown, *Illinois Institute of Technology*

8:30AM | Design and Stability of an Integrated Geared Grid-Strengthening Slip-Synchronous Wind Turbine System [#1251]
Ryno Gerber, Maarten Jan Kamper
Stellenbosch University, South Africa

8:50AM | Analysis and Design of Brushless Wound Field Synchronous Generator with Optical Power Transfer for High Speed Applications [#1664]
Hyunwoo Kim[1], Woongkul Lee[1], Dae-Kyong Kim[2]
[1]Purdue University, United States; [2]Sunchon National University, Korea

9:10AM | Variable-Pole Electrically Excited Synchronous Machine for EV Drive [#1886]
Peng Peng, Le Chang, Alireza Fatemi, Derek Lahr, Jorge Cintron-Rivera, Thomas Nehl
General Motors Company, United States

9:30AM | A Novel Separated Teeth and Yokes Structure Motor [#1338]
Xinying He, Zhen Zhang, Huimin Wang, Hao Chen, Tingna Shi
Zhejiang University, China

9:50AM | A Simplified Magnetic Circuit for Surface-Mounted PM Motors Considering Stator Segmentation [#1116]
Cesar Gallardo[3], Carlos Madariaga-Cifuentes[2], Juan A. Tapia Ladino[2], Werner Jara[1], Michele Degano[3]
[1]Pontificia Universidad Católica de Valparaíso, Chile; [2]Universidad de Concepción, Chile; [3]University of Nottingham, United Kingdom

Oral Session 74 | Optimal Control Methods for Power Electronic Systems

Room 201C
Chairs
George Papafotiou, *Eindhoven University of Technology*
Petros Karamanakos, *Tampere University*

8:30AM | A Harmonic-Reduced Vector-Sequence-Variable Predictive Control for Power Converters [#1210]
Yuanxiang Sun, Yongdu Wang, Zhen Li, Zhenbin Zhang
Technical University of Munich, Germany

8:50AM | Optimized Control of a CHB EV Charging Station with Integrated Bes [#1904]
Muhammad Azhar Ghauri, Andrea Formentini, Massimiliano Passalacqua, Mario Marchesoni
Università di Genova, Italy

9:10AM | Optimal IMC-Based Control Design of a 3-Phase Buck Power Factor Correction Converter [#2112]
Simone Palazzo, Giovanni Busatto, Enzo de Santis, Annunziata Sanseverino, Francesco Velardi
University of Cassino and Southern Lazio, Italy

9:30AM | A Modulated Model-Free Predictive Control of a Double-Stage AC-DC Converter for Energy Storage Applications [#2201]
Andrea Volpini, Filippo Gemma, Giulia Tresca, Pericle Zanchetta
Università degli Studi di Pavia, Italy

9:50AM | A Decentralized Controller for Zonal Nanogrid Build Blocks [#2276]
Mark Vygoder[2], Giovanna Oriti[1], Soheil Malekshah[2], Robert Cuzner[2]
[1]Naval Postgraduate School, United States; [2]University of Wisconsin-Milwaukee, United States

Oral Session 75 | Multi-port & High-step DC-DC Converters

Room 202A
Chairs
Yingyi Yan, *University of Electronic Science and Technology of China*
Angelo Di Cataldo, *Universita di Catania*

8:30AM | Hardware Design Optimization and Testing of an Interleaved DC-DC Converter with Asymmetric Phase-Leg Structure for Reversable Solid Oxide Fuel Cell Applications [#1827]
Ahmed Saafan, Timothy Thacker, Dong Dong, Rolando Burgos
Virginia Polytechnic Institute and State University, United States

8:50AM | Design of a Two-Channel, Integrated, Planar Inductor with PCB Windings for Bidirectional Converters with Low Parasitic Winding Capacitance [#1829]
Ahmed Saafan[2], Andrés Nader-Hernández[1], Timothy Thacker[2], Dong Dong[2], Rolando Burgos[2]
[1]Universidad Técnica Federico Santa María, Chile; [2]Virginia Polytechnic Institute and State University, United States

9:10AM | Design of a High Step-Up Single-Input Dual-Output DC-DC Converter with Enhanced Voltage Gain and MOSFET Stress Mitigation [#2182]
Vafa Marzang[3], Shuo Wang[3], Hasan Mehrjerdi[1], Atif Iqbal[2]
[1]George Washington University, United States; [2]Qatar University, United States; [3]University of Florida, United States

9:30AM | High Power Density Fault-Tolerant Three-Port Boost Converter with Advanced Cooling for Truck Auxiliary Power Unit Applications [#2273]
Pouya Zolfi, Salar Koushan, Ahmad Alzahrani, Ayman EL-Refaie
Marquette University, United States

9:50AM | Development and Reliability Assessment of a Non-Isolated Three-Port DC-DC Converter for Fixed-Wing Remotely Piloted Aerial Vehicle [#2402]
Pouya Zolfi, Mobina Pourmoshir, Ayman EL-Refaie
Marquette University, United States

Oral Session 76 | Magnetic Components: Materials and Design

Room 202B
Chairs
Adam Skorek, *Université du Québec à Trois Rivières*
Jose Ortiz Gonzalez, *University of Warwick*

8:30AM | Using Infinite Split Cores and Sub-Micrometer Coating to Push Resonant Frequency (fR) to Beyond 50 MHz [#1105]
Rongrong Zhang[2], Shuai Ding[3], Hui Zhao[2], Shuo Wang[5], Teng Long[4], Chaoqiang Jiang[1], Jian Qiu[2], Kefu Liu[2]
[1]City University of Hong Kong, China; [2]Fudan University, China; [3]Shanghai Institute of Space Power-Sources, China; [4]University of Cambridge, United Kingdom; [5]University of Florida, United States

8:50AM | Optimization of Inductor High-Frequency Performance Through EPC Cancellation Techniques [#1477]
Yanwen Lai[2], Yiming Li[1], Qinghui Huang[2], Yirui Yang[2], Shuo Wang[2]
[1]Monolithic Power Systems, Inc., United States; [2]University of Florida, United States

9:10AM | Optimal Interphase Transformer Design Applied to an Interleaved Vienna Rectifier [#1767]
Bruno Bertoldi[1], Lucas Andrade Militão[1], Márcio Ortmann[2], Marcelo Heldwein[3]
[1]Federal University of Santa Catarina, Brazil; [2]Instituto Federal de Santa Catarina, Brazil; [3]Technical University of Munich, Germany

9:30AM | A Simple Data-Driven Machine Learning-Based Software Package for Accurate Magnetic Core Loss Computation [#1779]
Emmanuel Havugimana, Mike Ranjram
Arizona State University, United States

9:50AM | A Battery Charging System Using Ultra-Thin Nanocrystalline Laminated Magnetic Sheets [#2186]
Guangyu Yan, Jie Deng, Binhong Cao, Zhicheng Guo
Arizona State University, United States

Oral Session 77 | Wind Energy Applications

Room 203A
Chairs
Yunting Liu, *Penn State*
Esin Ilhan Caarls, *Eindhoven University of Technology*

8:30AM | Nonlinear SDRE Control of Permanent Magnet Synchronous Generator Based WECS [#1184]
Hashim Alnami
Jazan University, Saudi Arabia

8:50AM | Tip Speed Ratio-Based MPPT and Backstepping Control of PMSG with Disturbance Observer [#1277]
Naithan Peter[4], Dhirendran Munith Kumar[4], Adriano Fagiolini[3], Marcello Pucci[2], Maurizio Cirrincione[1]
[1]Charles Darwin University, Australia; [2]Consiglio Nazionale delle Ricerche, Italy; [3]Università degli Studi di Palermo, Italy; [4]University of the South Pacific, Australia

9:10AM | Data-Driven MPC for Variable-Speed Variable-Pitch Wind Turbines [#1820]
Mostafa Soliman[2], Morcos Metry[2], Mohammad Tayyab[2], Robert S Balog[1]
[1]Texas A&M University, United States; [2]University of Doha for Science and Technology, Qatar

9:30AM | Wind Turbine Rotor Speed and Generator Power Control Based on Centralized Multivariable PID Controller with Anti-Windup Strategy [#2380]
René Pereira[2], Juan Moreira[3], Felipe Do Nascimento[3], Márcio Limaverde[3], Clauson Rios[1], Cláudio Vale[2], Marcus Costa[2], Victor Aguiar[2], Ricardo Pontes[3]
[1]Federal Institute of Education, Science, and Technology of Ceara, Brazil; [2]Federal Rural University of the Semi-Arid Region, Brazil; [3]Federal University of Ceara, Brazil

9:50AM | Ripple Compensator Circuit for LCL Voltage-Controlled PHIL PMSM Emulation [#1976]
Nícolas Eugênio Lima Baschera, Marco di Benedetto, Alessandro Lidozzi, Luca Solero
Università degli Studi Roma Tre, Italy

Oral Session 78 | Electric Traction & Propulsion

Room 203B
Chairs
Eric Severson, *University of Minnesota*
Thomas Luo, *General Motors*

8:30AM | xEV Charging Using Electric Drive [#1880]
Peng Peng, Lei Hao, Renato Amorim Torres, Suresh Gopalakrishnan
General Motors Company, United States

8:50AM | Topology Comparison of GaN-Based Sine-Wave Inverters for 400V Electrified Vehicles [#1233]
Simone Giuffrida, Fabio Mandrile, Radu Bojoi
Politecnico di Torino, Italy

9:10AM | Equivalent Circuit Modeling for Electric Propulsion Systems with Environmental Effects [#1378]
Yeojin Hyun, Mehdi Zadeh
Norwegian University of Science and Technology, Norway

9:30AM | Design and Comprehensive Performance Analysis of Axial Flux Permanent Magnet Synchronous Machines for Traction Applications [#2239]
Md Khalid Mahmud Bin Azam[2], Afsana Dristy[2], Anik Chowdhury[1], Alejandro Pina Ortega[1], Aquib Ahmed[2], Yilmaz Sozer[2]
[1]Nexteer Automotive Corporation, United States; [2]University of Akron, United States

9:50AM | A High-Density Medium-Voltage Three-Level Interleaved DC/DC Converter for Off-Road Vehicles [#1188]
Baher Abu Sba, Ahmed Ismail, Muhammad Fasih Uddin, Peyman Darvish, Yue Zhao
University of Arkansas, United States

Oral Session 79 | Sensorless Control for Electric Drives

Room 204B
Chairs
Paolo Pescetto, *Politecnico di Torino*
Marcos Orviz Zapico, *Uiversity of Oviedo*

8:30AM | Initial Position and Speed Estimation for Flying Start of a Synchronous Reluctance Motor Using Stationary-Frame Current Control [#1103]
Daiki Kato[2], Keiichiro Kondo[2], Takumi Ito[1]
[1]TMEIC Corporation, Japan; [2]Waseda University, Japan

8:50AM | Full-Speed-Range Position Sensorless Control for Dual Three-Phase Motors with an Extended Electromotive Force Observer Configured on the VSD Coordinate [#1518]
Rongjiao Hao, Shinji Doki
Nagoya University, Japan

9:10AM | A Robust Sensorless Control for Induction Motor Drives Using Sliding Mode Observer [#1747]
Van-Quy Le, Tsung-Ting Tu, Yu-Chen Chang, Huang-Jen Chiu, Dinh Phuc Nguyen
National Taiwan University of Science and Technology, Taiwan

9:30AM | A Unified Sensorless MTPA Scheme for Solar Water Pumps [#1855]
Abirami Kalathy, Arpan Laha, Praveen Jain, Majid Pahlevani
Queen's University at Kingston, Canada

9:50AM | Adaptive Unscented Kalman Filter with Augumented States for Robust Sensorless Control of PMSMs [#2045]
Goeun Jeon, Kahyun Lee
Ewha Womans University, Korea

Oral Session 80 | Digital Twins for Energy Conversion

Room 204C
Chairs
Gaowen Liang, *Nanyang Technological University*
Athar Hanif, *Ohio State University*

8:30AM | DNN-Based Digital Twin Framework of a DC-DC Buck Converter Using Spider Monkey Optimization Algorithm [#2298]
Tahmin Mahmud, Euzeli Cipriano Dos Santos Jr.
Purdue University, United States

8:50AM | Enhancing Survivability in Multi-Zonal Electrical Power Distribution Systems Using Digital Twin with Machine Learning-Based Fault Detection [#1625]
Soheil Malekshah, Mark Vygoder, Jacob Zuehl, Kevin Michael Monahan, Robert Cuzner
University of Wisconsin-Milwaukee, United States

9:10AM | Novel Low Cost Digital Twin Testbed for Microgrid Technology Transition [#2227]
Jorge Rivas[2], Yongsung Andrew Cho[2], Jacob Burns[2], Richard Alves[2], Alexander Julian[1], Giovanna Oriti[2]
[1]Consultant / Independent Researcher, United States; [2]Naval Postgraduate School, United States

9:30AM | Development of a Digital Twin Model for Electric Vehicles: Real-Time Battery Management and Performance Optimization [#1065]
Mohammed Elsayed[1], Lea Manglicmot[1], Khairy Sayed[2], Ahmed Mohamed[1]
[1]City College of the City University of New York, United States; [2]Sohag University, Egypt

9:50AM | Machine Learning-Enabled Digital Twin for Converter System Parameter Identification [#2404]
Yihao Wan, Qianwen Xu
KTH Royal Institute of Technology, Sweden

Thursday, October 23 10:30AM – 12:10PM

Oral Session 81 | Distributed Energy Resource Integration

Room 102A
Chairs
Soham Chakraborty, *National Renewable Energy Laboratory*
Majid Fard, *GE Aerospace*

10:30AM | Power Curve Modeling and Maximum Power Point Tracking of a Paddle-Type Wave Energy Converter [#2285]
Amiya Haque, Samuel Osei Fobi, Zeljko Pantic, Iqbal Husain
North Carolina State University, United States

10:50AM | Soft Actor-Critic for Optimal Integrated Energy System Operation [#1909]
Hualong Liu, Wenyuan Tang
North Carolina State University, United States

11:10AM | Data-Driven Reduced-Order Modeling and Prediction of Synchronous Generator Under Pulse Loads [#1114]
Emad Sadeghi, Emerson Miller, Kerry Sado, Adel Nasiri
University of South Carolina, United States

11:30AM | Converter for Forming the Neutral in an Islanded Split-Phase System [#1025]
Mahesh Swamy, Andy Schroedermeier, Sandy Jimenez
Eaton Corp., United States

11:50 AM | Active Distribution Network Reconfiguration with High Renewable Penetration Considering Uncertainty and Demand Response [#1499]
Hualong Liu, Wenyuan Tang
North Carolina State University, United States

Oral Session 82 | Reliability & Protection of Power Electronics

Room 103C
Chairs
Xiaoqing Song, *University of Arkansas*
Yicheng Zhu, *UC Berkeley*

10:30AM | Lifetime Extension of SiC MOSFET Using Hybrid PWM Control Under Dynamic Environment [#2088]
Md Zakir Hasan, Subarto Kumar Ghosh, Seungdeog Choi
Mississippi State University, United States

10:50AM | Reliability Analysis of SiC MOSFETs for Solid-State Circuit Breaker Application [#1926]
Xiaoling Li, Joshua Major, Sarwar Islam, Shuofeng Zhao, Sreekant Narumanchi, Faisal Khan
National Renewable Energy Laboratory, United States

11:10AM | A Short-Circuit Failure Detection Strategy for Series-Connected SiC MOSFETs in Direct-Switched Pulsed Power Supplies [#1775]
Pourya Javidi, Jinia Roy
University of Wisconsin–Madison, United States

11:30AM | Design of a Bidirectional Solid-State Relay for Electric Vehicles [#2020]
Rashmi Prasad, Chandra Namuduri, Ronald Grover
General Motors Company, United States

11:50 AM | Load-Independent Class-E Synchronous Rectifier with Passive Feedforward Network [#1211]
Yutaro Komiyama, Akihiro Konishi, Kien Nguyen, Hiroo Sekiya
Chiba University, Japan

Oral Session 83 | Analysis & Optimized Design of Electrical Machines

Room 201B
Chairs
Stefano Nuzzo, *University of Modena and Reggio Emilia*
Baoyun Ge, *Georgia Institute of Technology*

10:30AM | Multiphysics Design and Optimization of High-Speed Traction Motors [#1989]
Jigar Mistry, Hossain Mohammadi, Shrutika Sawardekar, Reza Nasiri Zarandi
Schaeffler Technologies AG & Co. KG, Canada

10:50AM | Assessment of Irreversible Demagnetization in Permanent Magnet EV Motors [#2015]
Alireza Fatemi, Peng Peng, Brian Gallert, Ahmed Hembel
General Motors Company, United States

11:10AM | Comparative Study of Pole-Changing Memory Machines with Hybrid-Pole Configurations [#1295]
Yu-An Lu[3], Hui Yang[3], Rui Tu[3], Jiyao Wang[3], Heyun Lin[3], Shuhua Fang[3], Shuilian Xue[2], Liang Chen[1]
[1]Midea Group Co., Ltd., China; [2]Nanjing Moral Testing and Certification Co., Ltd., China; [3]Southeast University, China

11:30AM | Optimal Design of Electric Machines Based on Surrogate Model with Active Learning [#1225]
Zhenyu Yan, Hao Chen, Jianqi Qiu, Cenwei Shi, Tingna Shi
Zhejiang University, China

11:50 AM | Emulation of Induction Machine Eccentricity Faults Using a Voltage Behind Reactance Model [#1174]
Solihah Sharief Shiekh, Pragasen Pillay
Concordia University, Canada

Oral Session 84 | Control & Modulation Aspects in Power Electronics

Room 201C
Chairs
Sangwhee Lee, *ORNL*
Andrea Formentini, *University of Genova*

10:30AM | An Effective Current Harmonic Suppression Strategy for Three-Phase Vienna Rectifiers [#1483]
Milad Bahrami-Fard, Mohammad Rastegar, Babak Fahimi
University of Texas at Dallas, United States

10:50AM | Simple Active Damping Solution for Industrial Grid-Tied Inverters Using LCL Filters [#1147]
Alessia Camboni[1], Alessandro Roveri[2], Fabio Mandrile[1], Radu Bojoi[1]
[1]Politecnico di Torino, Italy; [2]Prima Electro S.p.A, Italy

11:10AM | Systematic Small-Signal Modeling of a Three-Phase Cyclo-Active-Bridge Grid Interface Inverter [#1927]
Tanuj Sen, Mian Liao, Minjie Chen
Princeton University, United States

11:30AM | Communication-Free Carrier Synchronization Method for Autonomously Operated Single-Phase Inverters in Parallel [#2047]
Takumi Iwamoto, Hiroki Watanabe, Yuki Nakata, Jun-Ichi Itoh
Nagaoka University of Technology, Japan

11:50 AM | Overlap Time Compensation in Current Source Inverter – A Generalized Approach [#2261]
Salvatore Morello Baganella, Gaetano Turrisi, Luigi Danilo Tornello, Giacomo Scelba, Giuseppe Scarcella
Università degli Studi di Catania, Italy

Oral Session 85 | Resonant & Switched-capacitor DC-DC Converters

Room 202A
Chairs
Yue Wu, *Lehigh University*
Thomas Luo, *General Motors*

10:30AM | Design of a Power-Sharing Resonant Switched-Capacitor Module with a Dynamic Voltage Actuator [#1177]
Shuye Shang, Xiaodong Yang, Ka Wai Eric Cheng
University of California, Merced, United States

10:50AM | Regulated 48-V to 6-V ZVS-Bus Buck Converter for xPU Power Supply [#1221]
Xinnuo Xu, Wendi Fan, Yenan Chen, Dehong Xu
Zhejiang University, China

11:10AM | Hybrid GaN-Si MHz Buck Converter for High-Current VRM Applications [#1223]
Wendi Fan, Xinnuo Xu, Yenan Chen
Zhejiang University, China

11:30AM | Optimization of Excitation Inductance for ZVS in 1-MHz Non-Isolated Resonant Converter [#1489]
Yu-Chen Liu, Yu-Chun Lee
National Taipei University of Technology, Taiwan

11:50 AM | Bidirectional Multilevel Boost DC-DC Converter Based on a Switched-Capacitor Architecture [#1340]
Tearlach Horn, Dax Blackhorse-Hull, Alton Horsfall
Durham University, United Kingdom

Oral Session 86 | Thermal Management in Power Electronic Applications

Room 202B
Chairs
Adam Skorek, *Université du Québec à Trois Rivières*
Zihan Gao, *Delta Electronics (U.S.)*

10:30AM | A Dualized Dimensionality Transformation Method for 3D to Design of Air-Natural-Cooled Heat Sinks in Power Modules [#1330]
Gaojia Zhu[1], Dingguo Cai[1], Hanyu He[2], Longnv Li[2], Yunhui Mei[2]
[1]PEARL Electric Ltd., China; [2]Tiangong University, China

10:50AM | Design and Evaluation of Enhanced Cooling for Planar Magnetic Cores with Ceramic Inserts [#1509]
Ismail Recepi, Jacob Reynvaan, Patrick Nagelmaier, Stefan Mollov
Silicon Austria Labs GmbH, Austria

11:10AM | Immersion Cooling for Power Electronic Converters [#1773]
Yimeng Gou, Yuqi Wang, Caisheng Wang, Morgan Li
Wayne State University, United States

11:30AM | Advanced Thermal Model for Inverter Power Module Protection in Electric Vehicles Under Normal and Abnormal Cooling Conditions [#1962]
Jehwan Lee, Youngjoo Ko, Sungmin Lee, Sangchul Shin
Hyundai Motor Company, Korea

11:50 AM | Thermal Investigation of SiC Die-Top Layers Under Short-Circuit Operation [#2340]
Youssef Abotaleb, Ekaterina Muravleva, Jun Wang
University of Nebraska–Lincoln, United States

Oral Session 87 | Realtime Simulation & HIL Technologies for Renewable Energy Systems

Room 203A
Chairs
Ramanathan Thiagarajan, *NREL*
Norma Anglani, *University of Pavia*

10:30AM | Real-Time Simulation Model of a Vanadium Redox Flow Battery Energy Storage System with Power Electronics Integration [#1152]
Renata Kimpara, Michael Starke
Oak Ridge National Laboratory, United States

10:50AM | HIL Based Hydrogen Generation Converter Parameters Optimization Methodology [#1164]
Valdecir Junior De Paris[3], Lorenzo Bellomo[2], Marco di Benedetto[2], Gierri Waltrich[1], Alessandro Lidozzi[2], Luca Solero[2]
[1]Universidade Federal de Santa Catarina, Brazil; [2]Università degli Studi Roma Tre, Italy; [3]Università degli Studi Roma Tre / Universidade Federal de Santa Catarina, Italy

11:10AM | A High-Fidelity Controller Hardware-the-Loop (CHIL) Platform for Design and Testing of Novel Energy Storage Control Strategies [#1682]
Niranjan Bhujel, Ujjwol Tamrakar, Tu Nguyen, Raymond Byrne
Sandia National Laboratories, United States

11:30AM | Online Re-Tuning of Inverters Based on Impedance Estimation [#2080]
José Ferrada-Díaz[2], Javier Aguirre-Mejías[2], Patricio Mendoza-Araya[1]
[1]Universidad de Chile, Chile; [2]University of Chile, Chile

11:50 AM | Flexible, Scalable FPGA-Based Real-Time Simulation Model for Solid-State Transformer Studies [#1986]
Zerui Dong, Levi-John Lewis, Juan Paez-Alvarez, Aditya Ashok, Wei Li
OPAL-RT TECHNOLOGIES, Inc., United States; OPAL-RT TECHNOLOGIES, Inc., Canada

Oral Session 88 | Modeling & Control of WPT Systems

Room 203B
Chairs
Zeljko Pantic, *NC State University*
Rashmi Prasad, *General Motors*

10:30AM | Load Voltage Control with Estimation Technique Using Primary Side Parameters for WPT Systems [#2242]
Takaya Sekiguchi[1], Yuki Kawaguchi[1], Hiroyuki Shoji[1], Hikaru Karo[2], Terunobu Funatsu[2], Hiroshi Touda[2]
[1]Hitachi, Japan; [2]Hitachi High-Tech, Japan

10:50AM | A New Non-Invasive Front-End Coupling Factor Estimation Method for Series-Series Wireless Power Transfer Systems Without Communication Link [#2376]
Sayed Amir Hashemi[2], Arsalan Rasoolzadeh[2], Chris Botting[1], Majid Pahlevani[2]
[1]Delta-Q Technologies, Canada; [2]Queen's University at Kingston, Canada

11:10AM | Semi-Analytical Modeling of Litz Wire Built WPT Coils for AC Resistance Calculation [#1712]
Poonam Chand, Avanish Pandey, Suvendu Samanta
Indian Institute of Technology Kanpur, India

11:30AM | Precise Coil Inductance Modeling with Compensated Image Current Method in WPT Systems [#1275]
Delin Zhao[2], Yue Wu[1], Yaohua Li[2], Renjie Zhang[2], Yongbin Jiang[2], Yi Tang[2]
[1]Lehigh University, United States; [2]Nanyang Technological University, Singapore

11:50 AM | Magnetic Concrete for Road-Embedded Wireless Power Transfer: A Review [#1288]
Xiuhu Sun, Shen-En Chen, Qiang Mu, Jiale Zhou, Tiefu Zhao
University of North Carolina at Charlotte, United States

Oral Session 89 | Reliability in Motor Drives

Room 204B
Chairs
Di Pan, *ALSO*
Luca Zarri, *University of Bologna*

10:30AM | Startup Failure Detection Method for Hydrogen Recirculation Blower Under Cold Start Conditions [#1916]
Neulpureunhaneul Lee[1], Eun-Sol Oh[1], Hyun-Jun Lee[2], Sung-Jin Yoo[2], Young-Doo Yoon[1]
[1]Hanyang University, Korea; [2]Hyundai Motor Company, Korea

10:50AM | Voltage Ripple Analysis and Variable Frequency PWM Strategy Design for Three-Phase Current Source Inverters [#1565]
Bingwei Jing, Ravneel Prasad, Guoyu Chu, Rukmi Dutta
University of New South Wales, Australia

11:10AM | Comprehensive Classification of Motor Winding Insulation Aging Scenarios Based on Transient Current Oscillations [#1024]
Eduardo Rodriguez Montero[2], Markus Vogelsberger[1], Thomas Wolbank[2]
[1]ALSTOM Transport Austria GmbH, Austria; [2]Technische Universität Wien, Austria

11:30AM | Position Sensor Offset Error Quantification in Extremum-Seeking Self-Healing PMSM Drives [#1011]
Ramitha Dissanayake, Sandun Kuruppu
Western Michigan University, United States

11:50 AM | Increased Bearing Current Due to Parasitic Loop Inductances in SiC Motor Drive [#1631]
Abhishek Bose, Qingyun Huang
University of Missouri, United States

Oral Session 90 | Data Center Power Supply & UPS Systems

Room 204C
Chairs
Peng Fang, *University of Minnesota Duluth*
Bowen Yang, *National Renewable Energy Laboratory*

10:30AM | A Novel Combined Variable On-Time and Fixed-Frequency Control for GaN-Based Single-Phase Online Uninterruptible Power Supply (UPS) [#1270]
Xuancen Wu, Syed Saeed Rashid, Abdullah Saboor, Khurram Afridi
Cornell University, United States

10:50AM | A Multi-Switched-Bus Buck Converter for High-Peak-Current 48-V VRM Applications [#1328]
Yanqing Wu, Huaqiao Liu, Yenan Chen, Dehong Xu
Zhejiang University, China

11:10AM | A Novel GaN-Based High-Power-Density AC-DC-AC Converter for Transformerless Online Uninterruptible Power Supply [#1770]
Syed Saeed Rashid, Xuancen Wu, Abdullah Saboor, Khurram Afridi
Cornell University, United States

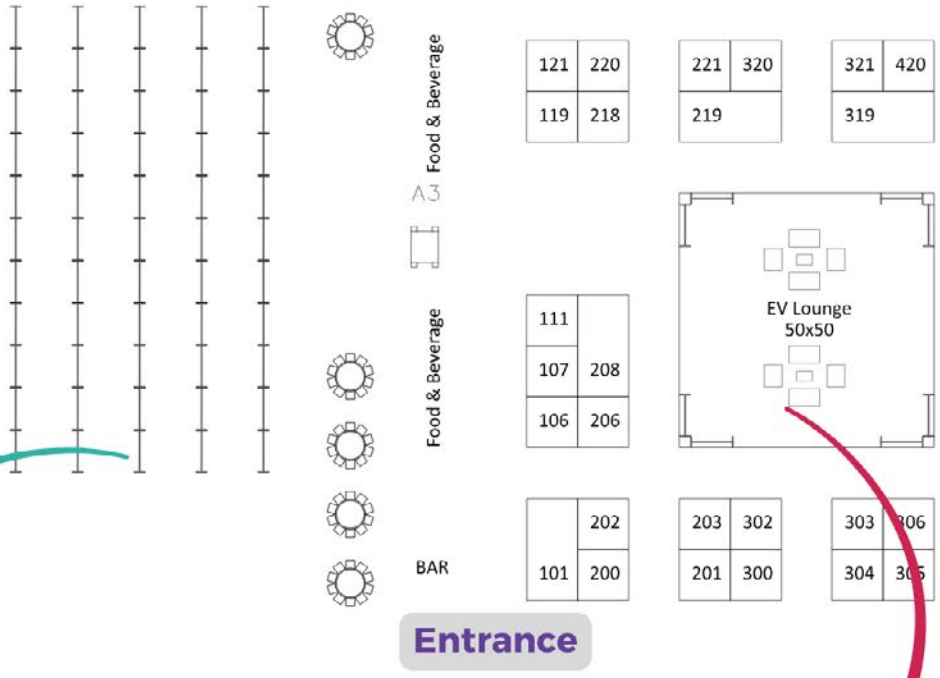
11:30AM | Design of a High-Performance Single-Stage Impedance Control Network-Based 48-V-to-1.8-V Point-of-Load Converter [#2050]
Abdullah Saboor, Khurram Afridi
Cornell University, United States

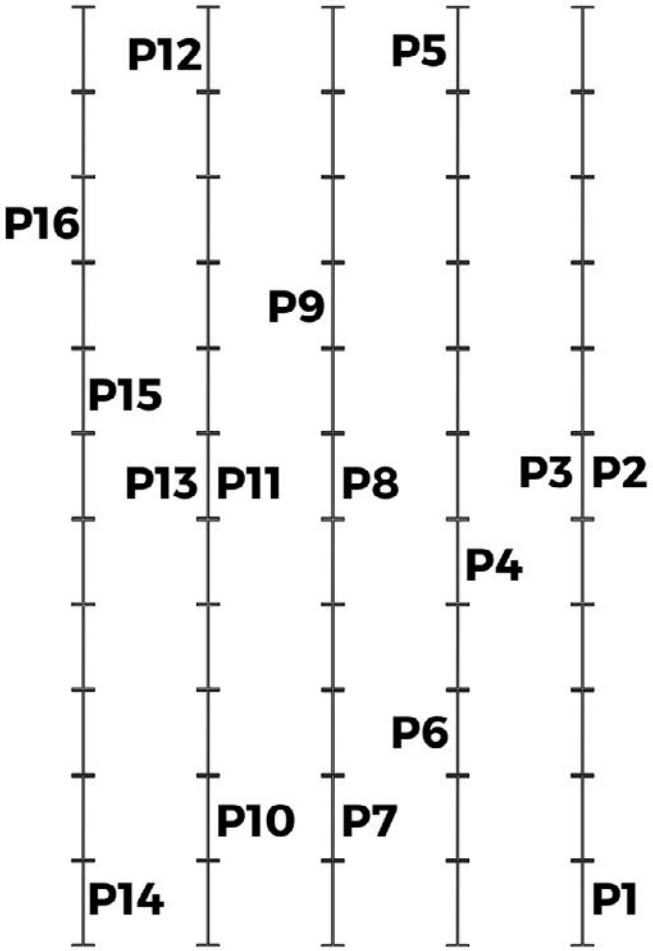
11:50 AM | Design Optimization of GaN-Based Dual-Active-Bridge Converters for Datacenter Applications [#2237]
Syed Imam Hasan[2], Alper Uzum[2], Ashraf Siddiquee[2], Yilmaz Sozer[2], Mithat John Kisacikoglu[1]
[1]National Renewable Energy Laboratory, United States; [2]University of Akron, United States

Poster Session 1
Monday, 5:00pm-6:40pm

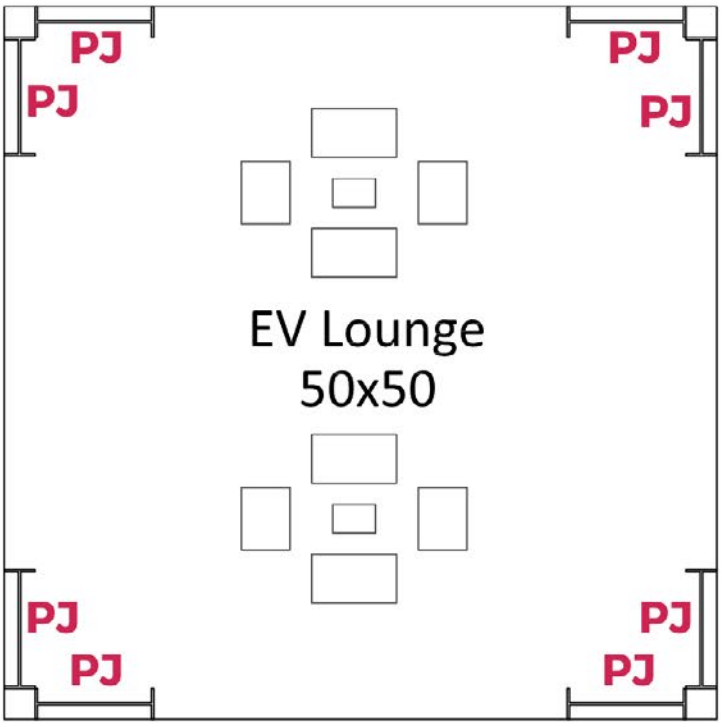
Poster Session 2
Tuesday, 10:30am-12:10pm

Poster Session 3
Tuesday, 2:10pm-3:50pm





Post Journal Poster Session
Monday 5:00pm - 6:40pm
Meet the Authors: Tuesday, 10:30am-12:10pm
Tuesday, 2:10pm - 3:50pm



Please see web pdf program for a detailed list of poster sub-sessions

Monday, October 20 5:00PM – 6:40PM

POSTER SESSION 1

Exhibit Hall A

P1: Solar Applications

Chair
Vidhi Patel, *ABB Inc.*

#1015 | Universal Decentralized Control Scheme for Inverters: Integrating Grid-Forming and Grid-Following Features for Low-Inertia Power Systems [P1 Posterboard #1]
Sally Sajadian
Lafayette College, United States

#2176 | Novel Primary Control Strategy for Off-Grid Green Hydrogen Production Without Short-Term Energy Storage [P1 Posterboard #2]
Ignacio Ortiz[1], Pablo García[2], Cristian Blanco[2], Ángel Navarro-Rodríguez[2], Constanza Ahumada[1]
[1]Universidad de Chile, Chile; [2]Universidad de Oviedo, Spain

#1154 | Design of a High Step-Up Partial-Power Quadratic DC-DC Converter for Wide-Voltage Range Photovoltaic Applications [P1 Posterboard #3]
Federico Emir Ricci, Stefano Cerutti, Francesco Musolino, Paolo Stefano Crovetti
Politecnico di Torino, Italy

#1329 | A Novel Technique for Simultaneous EIS Measurements in Solar-Battery Hybrid Systems Using a Boost Converter [P1 Posterboard #4]
Simisi Mosamane[2], Paul Barendse[2], Pragasen Pillay[1]
[1]Concordia University, Canada; [2]University of Cape Town, South Africa

#1714 | Electrical Characteristics Analysis of a Reconfigurable Series-Parallel PV Array Based on Fixed-Load P2H System Considering Regional Seasonal Solar Irradiance and PV Module Temperature in Korea [P1 Posterboard #5]
Kuk-Tai Chang[4], Cheol-Woong Choi[4], Gi-Tae Park[3], Jae-Sub Ko[1], Jong-Gyeum Kim[1], Woongkul Lee[2], Dae-Kyong Kim[4]
[1]Gangneung-Wonju National University, Korea; [2]Purdue University, United States; [3]SEL SYSTEM Co., Ltd., Korea; [4]Sunchon National University, Korea

#2265 | Design Analysis and Control Optimization of Solar PV Powered Aem Electrolyzer with DAB Converter [P1 Posterboard #6]
Gaurav Bhansali[2], Shreepooja Singh[2], Deepi Singh[2], Samuel Defaz[2], Amirthagunaraj Yogarathnam[1], Rebecca Trojanowski[1], Fang Luo[2], Meng Yue[1]
[1]Brookhaven National Lab, United States; [2]State University of New York at Stony Brook, United States

#1059 | Design of Lossless Nanoparticle Configurations for Light Harvesting in GaAs Solar Cells [P1 Posterboard #7]
Rongheng Li[1], Zichao Wei[2], Duncan Tyree[1], Ben Q Li[1], Xuan Zhou[1]
[1]University of Michigan-Dearborn, United States; [2]Wayne State University, United States

#1913 | Design and Implementation of a Hybrid Microinverter for Single-Panel PV Systems [P1 Posterboard #8]
Mohammad Nilian, Reza Rezaii, Issa Batarseh
University of Central Florida, United States

P2: Power Converters in Renewable & Sustainable Energy Applications I

Chair
John Lam, *York University*

#1016 | Ultrahigh Step-Up Cubic Semi-SEPIC Converter [P2 Posterboard #1]
Mohammadreza Mamashli[2], Mohsin Jamil[1], Soroush Esmaeili[2]
[1]Brock University, Canada; [2]Memorial University of Newfoundland, Canada

#1250 | A Novel LMSVM Method for Leakage Current Suppression in Transformerless T-Type Three-Level Inverters [P2 Posterboard #2]
Ziyi Ning, Chang Liu, Zhaonan Li, Xiangyang Xing
Shandong University, China

#1399 | A Triple-Phase Shift Modulation Strategy for a Dual-Active Bridge Modular Conversion System for Electrolysers [P2 Posterboard #3]
Giuseppe Bossi[2], Ariya Sangwongwanich[1], Frede Blaabjerg[1], Alfonso Damiano[2]
[1]Aalborg University, Denmark; [2]University of Cagliari, Italy

#1615 | Modular Multilevel Series Parallel Converter Based Battery Energy Storage System with Completely Decentralized Control [P2 Posterboard #4]
Rishab Anand, Peng Han, Alex Q. Huang
University of Texas at Austin, United States

#1643 | Optimized MPPT in Electrolytic Capacitor-Less Two-Stage Isolated Converter for Induction Motor Drive Applications [P2 Posterboard #5]
Aman Kumar, Vivek Nandan Lal, Rajeev Kumar Singh
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

P3: Power Converters: Control & Applications

Chair
Vikram Roy Chowdhury, *National Renewable Energy Laboratory*

#1051 | Stability Analysis of Grid-Following Inverter with Sinusoidal Compensator and Symmetrical PLL in αβ Domain [P3 Posterboard #1]
Shota Tanaka, Yoshio Tamari, Toshiji Kato, Kaoru Inoue
Doshisha University, Japan

#1053 | Stability Analysis of Grid-Following Inverter with Complex Vector Control and Lyapunov-Based Power Tracking Schemes [P3 Posterboard #2]
Atsuhiro Sakuragi, Hiroki Ogawa, Toshiji Kato, Kaoru Inoue
Doshisha University, Japan

#1166 | A Method of Determining Ratio of GFM Converters Using Impedance Scan [P3 Posterboard #3]
Dong Li, Yi Qi, Hui Ding, Arunprasanth Sakthivel, Yi Zhang
RTDS Technologies Inc., Canada

#1282 | Power Synchronization Control of Modular Multilevel Converter for a 2 GW/525 kV HVDC System [P3 Posterboard #4]
Mahnoor Fatima[2], Omid Beik[1]
[1]Colorado School of Mines, United States; [2]North Dakota State University, United States

#1414 | Comparison of Optimal Control Mitigation Techniques for E3 Hemp Insults Utilizing the Transformer Neutral Path [P3 Posterboard #5]
Connor Lehman[2], Rush Robinett III[1], David Wilson[2], Wayne Weaver[1]
[1]Michigan Technical University, United States; [2]Sandia National Laboratories, United States

#1430 | Robust H∞ AC-Grid-Forming Electrolytic Capacitor-Free Fully Soft-Switched AC/DC On-Board Charger for Vehicle-to-Home Application [P3 Posterboard #6]
Siamak Derakhshan, John Lam
York University, Canada

#1445 | Multifunction Grid Forming Inverter for Harmonics Mitigation in AC Microgrid Systems [P3 Posterboard #7]
Mohammed Alsubaie, Vasishta Burugula, Hamdan Alosaimi, Hadhlul Aladhyani, Osamah Aljumah, Subhashish Bhattacharya
North Carolina State University, United States

#1452 | A Novel Control Method for Cascaded H-Bridge Converters to Supply Unbalanced DC Loads [P3 Posterboard #8]
Reza Mounesi, Saban Ozdemir, Necmi Altin, Adel Nasiri
University of South Carolina, United States

#1485 | Quantitative Evaluation of Minimum Technical Requirements for Synthetic Inertia [P3 Posterboard #9]
Ye-Chan Kim, Seung-ho Song
Kwangwoon University, Korea

#1688 | An Improved Coordinated Strategy of PV-ESS-SVG for Voltage Quality Enhancement in LV Distribution Networks [P3 Posterboard #10]
Qiang Bi, Kai Sun
Tsinghua University, China

#1757 | Delay Compensation with Direct Synthesis Based Frequency Controller for Thermal Power System [P3 Posterboard #11]
Deepak Kumar[3], Mohamed Alkhatib[3], G. Lloyds Raja[2], Omar Al Zaabi[1], Khalifa Al Hosani[1], Utkal Ranjan Muduli[1]
[1]Khalifa University, U.A.E.; [2]National Institute of Technology Patna, India; [3]United Arab Emirates University, U.A.E.

#1811 | Passivity Enhancement Using Positive Active Damping for LCL-Type Grid-Connected Inverters with Inverter-Side Current Feedback [P3 Posterboard #12]
Deokyong Woo[2], Sungmin Kim[1]
[1]Hanyang University, Korea; [2]Hanyang University ERICA Campus, Korea

#1849 | Continuous Control Set Model Predictive Control with Nestorov Accelerated Gradient for Power Converters [P3 Posterboard #13]
Joao Victor Lopes Rosa, Fernanda de Morais Carnielutti, Humberto Pinheiro
Federal University of Santa Maria – UFSM, Brazil

#2001 | Ultra-Low Frequency Oscillation Caused by Doubly-Fed Wind Turbines in Thermal Power Generation Systems [P3 Posterboard #14]
Yanjun Liu[1], Wei He[1], Yifan Fang[1], Jiabing Hu[1], Meng Zhan[1], Wei Huang[2], Xiaojie Zhang[1]
[1]Huazhong University of Science and Technology, China; [2]Kunming Power Supply Bureau of Yunnan Power Grid Co. , Ltd., China

#2064 | Dynamic Power Sharing Control Strategy for Hybrid Hydrogen Electrolyzer–Supercapacitor System in Frequency Regulation [P3 Posterboard #15]
Guangjie Gao, Pengfeng Lin, Miao Zhu, Tiantian Ji, Qingzuo Meng
Shanghai Jiao Tong University, China

#2113 | Optimized Design and Control Strategy of Flexible DC Chopper with Concentrated Braking Resistor [P3 Posterboard #16]
Jiaqi Chen, Zhanqing Yu, Lu Qu, Jiahao Guo, Yushuo Chen, Kangsheng Cui, Sihang Wu, Changbing Liu
Tsinghua University, China

#2131 | Grid Impact Assessment of DC Microgrid Interfaced Grid-Supporting Rectifier Compliant with IEEE Standard 1547 [P3 Posterboard #17]
Biqi Wang[2], Naresh N. Nandola[1], Xiaofan Wu[1], Rolando Burgos[2]
[1]Siemens Technology, United States; [2]Virginia Polytechnic Institute and State University, United States

#2360 | Dual-Loop Based Small-Signal Analysis of MMC Based on Grid Forming Control [P3 Posterboard #18]
Harshit Nath, Sulaiman Alshammari, Hadhlul Aladhyani, Hamdan Alosaimi, Subhashish Bhattacharya
North Carolina State University, United States

#2377 | Stability Region Analysis of Parallel MMC-HVDC Systems for Offshore Wind Energy Integration [P3 Posterboard #19]
Hadhlul Aladhyani, Hamdan Alosaimi, Mohammed Alsubaie, Harshit Nath, Subhashish Bhattacharya
North Carolina State University, United States

P4: Data Driven Control & Monitoring

Chair
Maryam Alibeik, *Temple University*

#1423 | Data-Driven Voltage Regulation of Distribution Grid Using Nonlinear Autoregressive Model with Exogenous Inputs (NARX) [P4 Posterboard #1]
Vrushabh Donge, Joao Pinto, Aswad Adib, Radha Moorthy, Madhu Chinthavali
Oak Ridge National Laboratory, United States

#1692 | Large Language Models for Solving Economic Dispatch Problem [P4 Posterboard #2]
Sina Mohammadi, Ali Hassan, Rouzbeh Haghighi, Van-Hai Bui, Wencong Su
University of Michigan-Dearborn, United States

#1726 | Optimization-Based Parameter Identification for Lumped Parameter Modeling of High-Frequency Characteristics in Electric Machines [P4 Posterboard #3]
Ravneel Prasad, Bingwei Jing, Guoyu Chu, Rukmi Dutta
University of New South Wales, Australia

#1958 | Explainable Hybrid Deep Learning Model for State of Charge Estimation in Real-World Driving Cycles [P4 Posterboard #4]
Anantha Padmanabhan N K, Ankit Kumar Pratihasta, Sanjay Kumar Singh, Rajeev Kumar Singh, Rakesh Kumar Misra
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

#2029 | An AdaDelta-Based Maximum Power Point Tracking Algorithm for a PV System [P4 Posterboard #5]
Jianwu Zeng
Minnesota State University, United States

#2185 | Real-Time Charging and Routing for Electric Long-Haul Trucks via Reinforcement Learning [P4 Posterboard #6]
Luis Barba, Sara Ahmed, Miltiadis Alamaniotis, Nikolaos Gatsis, Athanasios Arvanitidis
University of Texas at San Antonio, United States

#2331 | ICA-RP Image Conversion Based Autoencoder for Abnormal Cell Detection in Battery Module [P4 Posterboard #7]
Dongcheol Lee[2], Minju Sim[2], Heechan Lee[2], Okemakinde Femi[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Ghana; [2]Chungnam National University, Korea

#2357 | Multi-Fault Diagnosis of Lithium-Ion Batteries Using DTW-Transformed EIS Data and CNN [P4 Posterboard #8]
Eunjin Kang[2], Jaea Lee[2], Yuxin Zhang[2], Taegeon Ahn[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Korea

#2301 | AI-Driven Reduced-Order Modeling for Torque and Efficiency Prediction of Sensor-Less PMSM Control [P4 Posterboard #9]
Lavanya Vadamodala, Farid Zidat, Charishma Modem
Altair Engineering Inc., United States

#2320 | Deep Reinforcement Learning for Mixed Integer Programing Problems in Static Voltage Control of Power Systems with PV Sources and EVs Load [P4 Posterboard #10]
Boya Wang, Matthias Preindl
Columbia University, United States

P5: EV Chargers, Converters, & Powertrains

Chairs
Thomas Luo, *General Motors*
Abdullah Al Hadi, *CNH*

#1085 | Phase-Frequency Hybrid Control of CLLC Resonant Converter-Based Bi-Directional LDC for Electric Vehicles [P5 Posterboard #1]
Seung-Jun Lee, Issac Kim, Won-Yong Jang, Jung-Wook Park
Yonsei University, Korea

#1160 | AC Battery in a Cascaded H-Bridge Topology for Electric Vehicles [P5 Posterboard #2]
Elie Libbos, Sombuddha Chakraborty
Texas Instruments, United States

#1396 | Transformer Design Method Containing the Resonant Inductance with Reducing AC Copper Loss Using Separated Gap on CLLC Converter [P5 Posterboard #3]
Geun Wan Koo[2], Jun-Youl Ryu[2], Jun Young Lee[2], Hyun-Soo Seol[2], Jeonghun Lee[2], Jun-Ho Kim[1]
[1]Keimyung University, Korea; [2]Korea Automotive Technology Institute, Korea

#2120 | 4-DoF Control and Efficiency Oriented Co-Optimization of a 15-kW Multilevel Series Resonant DAB (MI-SRDAB) Converter [P5 Posterboard #4]
Rachit Pradhan, Guvanthi Abeysinghe Mudiyanselage, Kyle Kozielski, Shreyas B. Shah, Ali Emadi
McMaster University, Canada

#2137 | A Power Decoupling Control Method for a Matrix Converter-Based DAB AC-DC Converter [P5 Posterboard #5]
Makoto Ishii[2], Shohei Komeda[2], Shunsuke Takuma[1], Yoshiya Ohnuma[1]
[1]Nagaoka Power Electronics Co., Ltd., Japan; [2]Tokyo University of Marine Science and Technology, Japan

#1597 | High-Power Density 210 kW Fuel Cell DC-DC Converter with Adaptive Duty Control for ZVT-PRC Topology [P5 Posterboard #6]
Sang Min Park, Hyoung-Kyu Yang, Dae Yeon Hwang, Dongmyoung Joo, Joon Sung Park
Korea Electronics Technology Institute, Korea

#2128 | Optimal Torque Distribution Integrated with an ARCP Inverter for Dual-Motor All-Wheel Drive Electric Vehicles [P5 Posterboard #7]
Mingi Oh, Junyeong Jung, Iqbal Husain
North Carolina State University, United States

#2294 | Modeling and Impedance-Based Stability Analysis of On-Board DC Electric Power Systems [P5 Posterboard #8]
Ashkan Barzkar, Qing Lin, Mohammad Nair Aalam, Timothy Thacker, Rolando Burgos
Virginia Polytechnic Institute and State University, United States

#2074 | A Low-Voltage DC-DC Converter with Integrated Vehicle-to-Load (V2L) Circuit for Hybrid Electric Vehicles (HEVs) [P5 Posterboard #9]
Gyeong-Hyun Kwon[1], Dong-In Lee[1], Yeonho Jeong[2], Han-Shin Youn[1]
[1]Incheon National University, Korea; [2]University of Rhode Island, United States

P6: Bidirectional & Multiport Converters for Grid & Mobility Applications

Chair
Massimiliano Passalacqua, *Università degli Studi di Genova*

#1457 | Single-Stage Multiport AC-DC Conversion with Embedded DC-DC Stages for Three-Phase Systems [P6 Posterboard #1]
Asad Hameed, Gerry Moschopoulos
Western University, Canada

#1596 | Structure and Controls for a MV-Scalable Solid State Transformer [P6 Posterboard #2]
Jesse Leonard, Ravisekhar Raju, Jian Dai
Fastwatt LLC, United States

#1761 | Solid State Transformer Based Bidirectional AC-DC Converter for Traction Applications [P6 Posterboard #3]
Shalini Deshmukh, Moumita Das
Indian Institute of Technology Mandi, India

#1763 | Parallel-Series Six-Leg Single-Phase AC-DC-AC Converter [P6 Posterboard #4]
Fábio Xavier Guedes Filho[2], Cursino Brandão Jacobina[2], Alan Santana Felinto[1], Jean Torelli Cardoso[2]
[1]Universidade Federal da Paraíba, Brazil; [2]Universidade Federal de Campina Grande, Brazil

#1797 | Modified Discontinuous Modulation for Mitigating Distortions at Phase Clamping in Y-Converter [P6 Posterboard #5]
Ahmed Yahia Farag Abdelfattah, Davide Biadene, Tommaso Caldognetto, Paolo Magnone, Paolo Mattavelli
Università degli Studi di Padova, Italy

#1948 | Isolated Y-Connected Multiport Converter for Interconnecting DC Systems with the AC Grid [P6 Posterboard #6]
Khaled Awadallah Mohammed, Ahmed Yahia Farag Abdelfattah, Davide Biadene, Tommaso Caldognetto, Paolo Magnone, Paolo Mattavelli
Università degli Studi di Padova, Italy

#2411 | A New Three-Phase Buck-Boost Current-Source Converter with Bidirectional Switches [P6 Posterboard #7]
Yan Figueiredo[1], Vinicius Freire Bezerra[2], Montiê Alves Vitorino[1], Jens Friebe[2]
[1]Universidade Federal de Campina Grande, Brazil; [2]University of Kassel, Germany

#2309 | An H-Bridge-Multiplexed Single-Stage Isolated AC-DC Converter with a Fifth-Order Resonant Tank [P6 Posterboard #8]
Taiming Chen[2], Junwei Liu[2], Xiaobiao Wang[2], Gaoxiang Chen[2], Wenjie Xu[2], Hai Xu[2], Kerui Li[1], Yi Zhang[2]
[1]City University of Hong Kong, China; [2]Hong Kong Polytechnic University, China

P7: DC-DC Converter Designs & Analysis

Chair
Wenkang Huang, *Infineon Technolofies*

#1043 | Design and Validation of a Three-Phase Current-Fed Triple-Active Bridge for Fuel-Cell Electric Vehicles [P7 Posterboard #1]
Paul Kowalewski, André Thönnessen, Niklas Fritz, Laurids Schmitz, Rik W. De Doncker
ISEA – RWTH Aachen University, Germany

#1055 | High-Power-Density Capacitively Isolated Three-Phase LLC Resonant Converter for 380 V DC Power Supply Systems [P7 Posterboard #2]
Keigo Arita[2], Yusuke Hayashi[3], Tatsunori Sakano[1]
[1]Toshiba Corporation, Japan; [2]Toshiba Electronic Devices & Storage Corporation, Japan; [3]Toshiba Infrastructure Systems & Solutions Corporation, Japan

#1072 | Design and Implementation of a 1000V Input SiC/Si Hybrid LLC Resonant Converter with Asymmetrical Input and Paralleled Output Structure [P7 Posterboard #3]
Yue Liu[1], Chaoqiang Jiang[1], Chen Chen[1], Tianlu Ma[1], Sheng Ren[1], Junhui Yang[1], Hongfei Wu[2]
[1]City University of Hong Kong, China; [2]Nanjing University of Aeronautics and Astronautics, China

#1131 | Power Flow Analysis of Dual Active Bridge Converter with Series Capacitors for Topology Morphing [P7 Posterboard #4]
Jiho Song, Jeongbae Park, Ki-Bum Park
Korea Advanced Institute of Science and Technology, Korea

#1364 | Phase Shift Compensation Method for a DAB Converter Considering Parasitic Capacitance and Diode Forward Voltage Using SiC-MOSFETs [P7 Posterboard #5]
Cheol-Woong Choi[3], Jae-Sub Ko[1], Jong-Gyeum Kim[1], Woongkul Lee[2], Dae-Kyong Kim[3]
[1]Gangneung-Wonju National University, Korea; [2]Purdue University, United States; [3]Sunchon National University, Korea

#1449 | Investigating the Impact of Transformer Parasitic Capacitance at High Frequencies on ZVS Performance in Ultra-Compact Active Clamp Flyback Converters [P7 Posterboard #6]
Navid Hadifar[2], Farrukh Jamshed[2], Xuan Wang[1], Ali Haji Ali Biglo[2], Reza Mounesi[2], Enrico Santi[2], Mark G. Allen[1], Adel Nasiri[2]
[1]University of Pennsylvania, United States; [2]University of South Carolina, United States

#1890 | Medium Voltage Insulated MHz Wireless Power Transfer Coils Based Auxiliary Power Supply System [P7 Posterboard #7]
Abhinav Soni, Dong Dong, Rolando Burgos
Virginia Polytechnic Institute and State University, United States

#1897 | Regenerative Efficiency Evaluation of Dual Active Bridge Converters in Medium-Voltage Applications [P7 Posterboard #8]
Mohammad Mahinur Rahman, Wensong Yu, Iqbal Husain, Srdjan Lukic
North Carolina State University, United States

#1930 | GaN Based Ultra-High-Density Wide-Voltage-Range Auxiliary Power Module for Electric Vehicles [P7 Posterboard #9]
Ripun Phukan, Randy Beckemeyer, Peter Barbosa
Delta Electronics (Americas) Ltd., United States

#1983 | Adaptive Switching Technique for DC-DC Dual Active Bridge Integrating Diverse Charging Methods [P7 Posterboard #10]
Priyatosh Jena, Rajeev Kumar Singh, Vivek Nandan Lal
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

#2092 | Load-Independent Modulation Method for Isolated DC/DC Bridge Converters [P7 Posterboard #11]
Ashwin Shejwalkar, Mahima Gupta
University of Wisconsin–Madison, United States

#2202 | Multiobjective Optimization of an Input-Series-Output-Parallel LLC Converter [P7 Posterboard #12]
Andrea Volpini, Giulia Tresca, Behrouz Mohammadzadeh, Filippo Gemma, Pericle Zanchetta
Università degli Studi di Pavia, Italy

#2262 | Open-Circuit Switch Fault Detection Method Using Resonant Capacitor Voltage for Full-Bridge LLC Resonant Converters [P7 Posterboard #13]
Sujin Kang, Suyong Chae
Pohang University of Science and Technology, Korea

#2311 | 10 kV Class 14 MHz Isolated Power Supply [P7 Posterboard #14]
Elvey Tessaro Andrade, Rajendra Prasad Kandula, Marcio Magri Kimpara
Oak Ridge National Laboratory, United States

P8: Power Converter Stability II

Chair
Sante Pugliese, *University of Kiel*

#1086 | Grid Impedance Estimation for Single-Phase PFC Converter in OBC Based on Complex Coefficient Filter [P8 Posterboard #1]
Chaeyeon Lee, Won-Yong Jang, Jihyeon Yun, Hyeonwoo Jung, Issac Kim, Jung-Wook Park
Yonsei University, Korea

#1145 | Unsupervised Instability Detection Method Based on Siamese Network Framework in DC Microgrid with Consideration of Background Harmonics [P8 Posterboard #2]
Xueqi Liu[2], Xin Zhang[2], Xia Chen[1]
[1]Huazhong University of Science and Technology, China; [2]Zhejiang University, China

#1204 | An Adaptive Oscillation Suppression Strategy Based on SOGI-FLL for Cascaded DC Systems [P8 Posterboard #3]
Youlin Fan[2], Tonglu Wang[2], Bi'an Zhao[2], Yue Wang[2], Xinyang Su[1]
[1]Hong Kong Polytechnic University, China; [2]Xi'an Jiaotong University, China

#1593 | Robust Stability Analysis and Optimal Control Design Method of Grid-Forming Converter Considering Source-Grid Parameters Uncertainty [P8 Posterboard #4]
Qiong Chen, Xiaojie Shi, Lei Lin
Huazhong University of Science and Technology, China

#1578 | Enhancing Stability of DC Cascaded System by Using Nonlinear Inductor and Virtual Inductor Resistance Control in Source-Interface Converter [P8 Posterboard #5]
Shaocong Wang[2], Henry Shu-Hung Chung[2], Ruihua Shen[2], Hongjian Lin[2], Weimin Wu[1]
[1]Anhui University of Science and Technology, China; [2]City University of Hong Kong, Hong Kong

#1799 | dq-Frame Small-Signal Impedance Modeling of a Synchronous Machine [P8 Posterboard #6]
Mohammad Nair Aalam, Ye Tang, Timothy Thacker, Rolando Burgos
Virginia Polytechnic Institute and State University, United States

#2079 | Mixed Potential Theory-Based Large-Signal Stability Analysis Method for Multi-Port Dual DC Buses Power Router [P8 Posterboard #7]
Bingjie Liu, Yaopeng Huang, Xianzhe Pang, Alian Chen, Wei Wang, Shijie Cheng
Shandong University, China

#2206 | A Novel Grid Impedance Estimation Method for Grid-Connected Inverter Systems Using LSTM Neural Networks [P8 Posterboard #8]
Simone Cossu, Farnoush Shamsazad, Samuela Rokocakau, Oriana Benfatto, Giulia Tresca, Norma Anglani, Pericle Zanchetta
Università degli Studi di Pavia, Italy

P9: Toward More Reliable Power Electronics

Chair
Shuai Zhao, *Aalborg University*

#1124 | Condition Monitoring of DC-Link Capacitors of Three-Level NPC Inverters Based on Charge-Discharge Time [P9 Posterboard #1]
Kyu-Jin Min, Ui-Min Choi
Seoul National University of Science and Technology, Korea

#1302 | Analysis of Inverter Input Current for Five-Phase PMSM Considering Third Harmonic Back-EMF [P9 Posterboard #2]
Xinyi Hu[4], Bin Li[4], Feng Xu[3], Yong Li[1], Guidan Li[4], Tong He[2]
[1]China Three Gorges University, China; [2]State Grid Hebei Electric Power Company Ltd, China; [3]State Grid Zhejiang Electric Power Company Ltd, China; [4]Tianjin University, China

#1389 | DC-Link Harmonic Suppression for Five-Phase Inverters Under Unbalanced Conditions Based on Carrier Phase Shift [P9 Posterboard #3]
Xinyi Hu[4], Bin Li[4], Feng Xu[3], Yong Li[1], Guidan Li[4], Tong He[2]
[1]China Three Gorges University, China; [2]State Grid Hebei Electric Power Company Ltd, China; [3]State Grid Zhejiang Electric Power Company Ltd, China; [4]Tianjin University, China

#1400 | A Modified Fractional-Order Approach to Model Capacitors as a Constant Phase Element [P9 Posterboard #4]
Douglas W. L. Silva[1], Rafael Silva[1], Ricardo Lúcio De Araujo Ribeiro[1], Thiago De Oliveira Alves Rocha[1], Jean Torelli Cardoso[2]
[1]Universidade Federal do Rio Grande do Norte, Brazil; [2]Universidade Federal Rural de Pernambuco, Brazil

#1507 | Online Monitoring and Control of Power Converter Junction Temperature in Wave Energy Systems Using Finite Control Set Model Predictive Control [P9 Posterboard #5]
Qiang Mu, Jiale Zhou, Zaheen Mustakin, Lucas Pereira, Babak Parkhideh, Tiefu Zhao
University of North Carolina at Charlotte, United States

#1574 | Reliability Evaluation of SiC MOSFET Module Developed for Electric Vehicles Based on Mission Profiles [P9 Posterboard #6]
Taerim Ryu[2], Ui-Min Choi[2], Min-Ki Kim[1], Jangmuk Lim[1]
[1]Hyundai Mobis Co., Ltd., Korea; [2]Seoul National University of Science and Technology, Korea

#1582 | Toward Robust Condition Monitoring of SiC MOSFETs Using Switching Delay Measurements [P9 Posterboard #7]
Laurids Schmitz, Xin Yen Woon, Paul Kowalewski, Rik W. De Doncker
ISEA – RWTH Aachen University, Belgium; ISEA – RWTH Aachen University, Germany; ISEA – RWTH Aachen University, Malaysia

#1595 | DC-Link Capacitor Current Analysis for Five-Phase Inverters with Third Harmonic Current Injection [P9 Posterboard #8]
Xinyi Hu[4], Bin Li[4], Feng Xu[3], Yong Li[1], Guidan Li[4], Tong He[2]
[1]China Three Gorges University, China; [2]State Grid Hebei Electric Power Company Ltd, China; [3]State Grid Zhejiang Electric Power Company Ltd, China; [4]Tianjin University, China

#1658 | A Bayesian Network Framework for Boost Converter Reliability Assessment and Component Correlation Analysis [P9 Posterboard #9]
Mahdi Ghavaminejad, Van-Hai Bui, Mengqi Wang, Wencong Su, Niccolò Meneghetti, Duc Dung Le
University of Michigan-Dearborn, United States

#1893 | Mechanism Analysis and Mitigation Strategy for SSCB's False Triggering in Voltage Source Inverters with Decoupling Capacitors [P9 Posterboard #10]
Da Zhou, Zhiqiang Wang, Yimin Zhou, Xiaojie Shi, Neng Wang, Yanqiu Li
Huazhong University of Science and Technology, China

#2022 | Positional Embedding Comparison for Improved 1-D Convolutional Transformer Hybrid Neural Network Fault Diagnosis on Power Converters [P9 Posterboard #11]
Samuela Rokocakau[1], Farnoush Shamsazad[1], Giulia Tresca[1], Pericle Zanchetta[1], Giansalvo Cirrincione[2], Maurizio Cirrincione[3]
[1]Università degli Studi di Pavia, Italy; [2]University of Picardie Jules Verne, France; [3]University of the South Pacific, Fiji

#2252 | Online Condition Monitoring of Bond Wire Degradation Using Temperature Compensated ON-State Resistance [P9 Posterboard #12]
Bhanu Pratap Singh, Hans-Peter Nee, Staffan Norrga
KTH Royal Institute of Technology, Sweden

#2374 | Noise-Immune Desaturation Protection for SiC MOSFETs Using Commercial Gate Drivers with Configurable Voltage Margins [P9 Posterboard #13]
Nazmul Hassan, Md Didarul Alam, Srdjan Lukic
North Carolina State University, United States

P10: Advanced Modeling & Control of DC/DC Converters I

Chair
Shuai Zhao, *Aalborg University*

#1077 | Model Predictive Control of Dual Active Bridge Converter Based on Backflow Power Optimization [P10 Posterboard #1]
Jize Zhu[1], Bingle Liu[1], Jie Gan[1], Gaoxiang Ye[2], Siyu Huang[1], Pan Wang[1]
[1]Hubei University of Technology, China; [2]State Grid Hebei Electric Power Company Ltd, China

#1296 | An Optimal DC-Link Control Strategy for Multi-Phase Cascaded Boost Converter [P10 Posterboard #2]
Seungmin Kim, Seungjin Jo, Yeongseon Lee, Seungsoo Kim, Gwang-Su Park, Dong-Hee Kim
Chonnam National University, Korea

#1408 | Power Flow Control of the DC-DC-DC Triple Active Bridge Converter [P10 Posterboard #3]
Lauryn Morris, Thomas Francois, Jonathan Saelens, Jacob Byers, Arnold Fernandes, Praneeth Uddarraju, Jonathan Kimball
Missouri University of Science and Technology, United States

#1895 | Modulated-Model Predictive Control for Interleaved Boost Converters [P10 Posterboard #4]
Jacopo Riccio[2], Henry Mauricio Zapata Fonseca[1], Luca Tarisciotti[1], Michele Degano[2], Andrew Trentin[2]
[1]Universidad Andrés Bello, Chile; [2]University of Nottingham, United Kingdom

#2197 | Adaptive Control of MMC-Like with Unevenly Degraded Supercapacitors [P10 Posterboard #5]
Cristina Terlizzi[4], Stefano Bifaretti[4], Alberto Ferro[1], Thomas Franke[3], Alessandro Lampasi[2]
[1]Consorzio RFX, Italy; [2]ENEA DTT S.c.ar.l., Italy; [3]Max-Planck-Institute for Plasma Physics, Germany; [4]Università degli Studi di Roma Tor Vergata, Italy

#2208 | Boundary Control for Power Hardware-in-the-Loop Applications [P10 Posterboard #6]
Troy Eskilson, Carl Ngai Man Ho
University of Manitoba, Canada

P11: Materials, Losses, Thermal, & Manufacturing Issues

Chair
Silvio Vaschetto, *Politecnico di Torino*

#1082 | Inductive Crimping of Flat Wire Conductors [P11 Posterboard #1]
Alexander Kuehl
Friedrich-Alexander-Universitaet Erlangen-Nürnberg, Germany

#1089 | Effects of Motor Bench System Characteristics on Motor and Inverter Efficiency Measurement Using a Precision Wide-Band Power Analyzer [P11 Posterboard #2]
Masakazu Akahane[1], Miyuki Nakamura[1], Kazunobu Hayashi[1], Shuhei Yamada[1], Hidemine Obara[2]
[1]HIOKI E.E. CORPORATION, Japan; [2]Yokohama National University, Japan

#1112 | Optimal Cost-Effective Solutions Considering Power Factor in Fractional-Slot Concentrated Windings [P11 Posterboard #3]
Seong Been Bae[2], Hyo Jeong Gong[2], Sung Hoon Cho[1], Bulent Sarlioglu[3], Seun Guy Min[2]
[1]Justek, Inc, Korea; [2]Soongsil University, Korea; [3]WEMPEC – University of Wisconsin–Madison, United States

#1207 | Characteristics Investigation of Nanocrystalline Core as Power Inductor [P11 Posterboard #4]
Chen Chen, Tianlu Ma, Yue Liu, Hao Guo, Ben Zhang, Junhui Yang, Zhaozheng Zhu, Chaoqiang Jiang
City University of Hong Kong, China

#1331 | Variable Leakage Flux Permanent Magnet Synchronous Machines Loss Distribution for PM Temperature Control [P11 Posterboard #5]
Javier G.-A. Tiemblo[2], Marcos Orviz Zapico[2], Diego Fernández Laborda[2], Toru Matsuura[1], Kensuke Sasaki[1], Takashi Kato[1], David Díaz Reigosa[2]
[1]Nissan Motor Co., Ltd., Japan; [2]Universidad de Oviedo, Spain

#1854 | Validation of Additive Silicon Steel in Inverter Fed Applications [P11 Posterboard #6]
Kenneth Johnson, Ali M Bazzi
University of Connecticut, United States

#1919 | Evaluation of Superconducting AC Losses in a Simplified Induction Machine Rotor Cage [P11 Posterboard #7]
Nicholas Storti, Emmanuel Agamloh
Baylor University, United States

#1951 | Iron Losses in Non-Oriented Electrical Steels Excited by Three-Level GaN PWM Inverter [P11 Posterboard #8]
Angelo Di Cataldo[2], Luigi Danilo Tornello[2], Giacomo Scelba[2], Silvio Vaschetto[1], Andrea Cavagnino[1]
[1]Politecnico di Torino, Italy; [2]Università degli Studi di Catania, Italy

#2288 | Thermal System Identification of Electric Machine Stators Using ARX Methods [P11 Posterboard #9]
Nicholas Krause, Dominick Sossong, Ian P. Brown
Illinois Institute of Technology, United States

#2168 | Reduced-Order Modeling of PM Motors for PWM Loss Estimation in VSI, T-Type MVSI and CSI Drives [P11 Posterboard #10]
Immanuel Williams, Maheep Bhatt, Bulent Sarlioglu, Thomas Jahns
WEMPEC – University of Wisconsin–Madison, United States

#2125 | Impact of Hairpin End Winding Geometry on Spray Cooling Performance [P11 Posterboard #11]
Danielly Lima Bezerra[3], Antonino La Rocca[3], Tianjie Zou[3], Salvatore La Rocca[3], Hailin Huang[3], Jan Majer[2], Jay Al-Tayie[1], Alasdair Cairns[3], Chris Gerada[3]
[1]Ricardo plc, United Kingdom; [2]Ricardo Prague, s.r.o., Czech Rep.; [3]University of Nottingham, United Kingdom

P12: Axial Flux Machines II

Chair
Matthew Gardner, *University of Texas at Dallas*

#1391 | Non-Rare-Earth Hybrid Radial-Axial Permanent Magnet Synchronous Motor with Aligned Torque Components [P12 Posterboard #1]
Mohamed Ahmed Madboly, Maged Ibrahim
German International University, Egypt

#1505 | Designing for Simplicity: A Novel Segmented-Stator Axial Flux Permanent Magnet Motor with Tape-Wound Cut Cores [P12 Posterboard #2]
Waiyan Chan, Lei Zhou
University of Wisconsin–Madison, United States

#1638 | Optimal Design of Axial Flux Motors with Housing Loss Consideration Based on Transfer Learning Using Quasi-3D and 3D FEA [P12 Posterboard #3]
Byeong-Cheol Bae[1], Jae-Hyeon Kim[1], So-Yeon Im[1], Jae-Woong Jung[2], Myung-Seop Lim[1]
[1]Hanyang University, Korea; [2]Samsung Electronics, Korea

#1823 | Enhancing the Performance of Axial Flux Motors Using Multiphase Windings for Aerospace Applications [P12 Posterboard #4]
Ahmed Aldandan, Hussain Hussain
Kuwait University, Kuwait

#2002 | Radial-Yoke Axial-Flux Switched Reluctance Motors for Light-Weight and Short-Length In-Wheel Traction Applications [P12 Posterboard #5]
Alireza Sohrabzadeh[1], Solmaz Kahourzade[3], Amin Mahmoudi[1], Wen Soong[2]
[1]Flinders University, Australia; [2]University of Adelaide, Australia; [3]University of South Australia, Australia

#2030 | High Torque Density Dual-Stator Vernier Motors with Flux Concentrating Rotors [P12 Posterboard #6]
Esmaeil Mohammadi[3], Ali Mohammadi[4], Mohammad Amin Jalali Kondelaji[3], Pedram Asef[3], Ion Boldea[1], Dan M. Ionel[2]
[1]Politehnica University of Timişoara, Romania; [2]SPARK Laboratory, University of Kentucky, United States; [3]University College London, United Kingdom; [4]University of Kentucky, United States

#2238 | FEA Based Multi-Objective Optimization of Axial Flux Induction Machine for Wide Speed Operation Using High-Fidelity Model [P12 Posterboard #7]
Aquib Ahmed[2], Md Khalid Mahmud Bin Azam[2], Yilmaz Sozer[2], Alejandro Pina Ortega[1]
[1]Nexteer Automotive Corporation, United States; [2]University of Akron, United States

#2334 | Design Optimization and Scaling of Coreless AFPM Machines Using Hybrid FEA-Based Differential Evolution and Machine Learning [P12 Posterboard #8]
Matin Vatani[2], David R. Stewart[2], Donovin D. Lewis[1], Dan M. Ionel[1]
[1]SPARK Laboratory, University of Kentucky, United States; [2]University of Kentucky, United States

#1181 | Dual-Rotor Machine Structure with Axial-Assist Halbach Array Permanent Magnet [P12 Posterboard #9]
Soheil Yousefnejad[2], Ebrahim Amiri[1], Parviz Rastgoufard[2]
[1]California State University, Long Beach, United States; [2]University of New Orleans, United States

P13: Induction & Synchronous Machines, Transformers

Chair
Eric Severson, *University of Minnesota*

#1661 | Equivalent Circuit-Based Analysis of Current Sharing in Planar Transformer Parallel Windings [P13 Posterboard #1]
Yan Liang, Yi-Hsun Hsieh, Qiang Li
Virginia Polytechnic Institute and State University, United States

#2089 | Methodology for Determining the Number of Rotor Bars in Induction Motors Considering Synchronous Torque and Vibration [P13 Posterboard #2]
Tae-Gun Lee, Yun-Jae Won, Hyun-Su Kim, Jin-Cheol Park, Myung-Seop Lim
Hanyang University, Korea

#1067 | Hybrid Flux Type Magnet-Assisted Wound Field Motor Combining Axial and Radial Flux Path [P13 Posterboard #3]
Yuki Hidaka[2], Shunsuke Yamamoto[1]
[1]Nagaoka University of Technology, Japan; [2]Ritsumeikan University, Japan

#1182 | Optimization of a Wound Field Synchronous Machine Using Surrogate Models: A Comparative Study of Support Vector Regression and Neural Networks [P13 Posterboard #4]
Ahmed Shoeb, Vedanadam Mudambai Acharya, Dheeraj Bobba, Ryoko Imamura, Anvar Khamitov, Sainan Xue
Powersys, Inc., United Kingdom; Powersys, Inc., United States

#1187 | Stator Temperature Rise of Synchronous Condenser Affected by Air Volume Allocation [P13 Posterboard #5]
Meihong Song[1], Guorui Xu[2]
[1]CUCDE Environmental Technology Co. Ltd., China; [2]North China Electric Power University, China

#1189 | Inertial Support Capability of Dual-Excited Synchronous Condenser Using Adaptive Control Strategy in Renewable Energy Systems [P13 Posterboard #6]
Guorui Xu[2], Guangliang Yang[2], Zhongcheng Cao[2], Zhiqiang Li[1], Yang Xiao[1]
[1]China Electric Power Research Institute, China; [2]North China Electric Power University, China

#1317 | Optimal Sizing of Slot Concentrated PM Synchronous Motors Using Loading Separation Theorem [P13 Posterboard #7]
Jeonghan Lee, Byungtaek Kim
Kunsan National University, Korea

#1342 | Early Diagnosis and Evaluation of Stator Turn Open Fault in PMSM Using Zero-Sequence Voltage and Phase Analysis [P13 Posterboard #8]
Jiyeh Song, Kahyun Lee
Ewha Womans University, Korea

#1728 | Detection and Discernment of Asymmetric Fault Based on Zero-Sequence Voltage Component in PMSM Under Flux-Weakening Control [P13 Posterboard #9]
Haolan Zhan, Wei Liu, Xiaotian Xie, Zekai Lyu, Kwok-Tong Chau
Hong Kong Polytechnic University, Hong Kong

#2282 | Loss Characterization and Optimal Switching Frequency Selection in Low-Inductance High-Speed PMSMs Driven by a Wide Bandgap GaN Inverter [P13 Posterboard #10]
Theophilus Wakemeh, Junyeong Jung, Iqbal Husain
North Carolina State University, United States

#2418 | Novel Rotor Surface Profile Control Method for Minimizing Position Error in VR Resolvers by Harmonic Injection [P13 Posterboard #11]
Ju-Yeoung Shin, Gilsu Choi
Inha University, Korea

P14: Control, Diagnosis, & Modulation in AC Motor Drives

Chairs
Luca Vancini, *University of Bologna*
Stefano Nuzzo, *University of Modena and Reggio Emilia*

#1100 | A Sensorless Control Scheme of Switched Reluctance Motor Using Unsaturated Inductance Reconstruction and Newton-Raphson Method [P14 Posterboard #1]
Dexu Lv[2], Haizhi Sun[1], Wen Ding[2], Zhanyuan Su[2], Da Wang[2]
[1]Xi'an Aerospace Propulsion Institute, China; [2]Xi'an Jiaotong University, China

#1192 | Advanced DPWM Method for Reducing Overvoltage Based on P&O Algorithm in Motor Drive Systems [P14 Posterboard #2]
Byung-Woo Kang, Kyo-Beum Lee
Ajou University, Korea

#1193 | DPWM Method for Reducing Switching Losses in Single Inverter Dual Parallel PMSM Drives [P14 Posterboard #3]
Kyo-Beum Lee, Sang-Jun Lee, Hyung-Woo Lee
Ajou University, Korea

#1194 | Stability Control via Phase Lead Compensation for Single Inverter Dual Parallel PMSM Drives [P14 Posterboard #4]
Jae-Seong Kim, Hyung-Woo Lee, Kyo-Beum Lee
Ajou University, Korea

#1214 | Position Estimation Errors Analysis of Back-Emf-Based Sensorless SynRM Control Method Under Multi Parameter Mismatch [P14 Posterboard #5]
Fengtao Gao[1], Yifu Ren[1], Yatai Ji[1], Wei Liu[1], Zhonggang Yin[2], Pinjia Zhang[1]
[1]Tsinghua University, China; [2]Xi'an University of Technology, China

#1247 | Metric Learning-Based Open-Circuit Fault Diagnosis Method for Three-Phase Inverters [P14 Posterboard #6]
Weiqian Li, Huanyu Li, Xiangyu Sun, Xiao Chen, Antonio Griffo
University of Sheffield, United Kingdom

#1419 | SOGI-Based Switch Fault Identification for a Multiple BLDC Motor Drive System [P14 Posterboard #7]
Van-Nam Nguyen[2], Quang-Manh Hoang[2], Van-Hai Bui[2], Leila Parsa[1], Taehyung Kim[2]
[1]University of California, Santa Cruz, United States; [2]University of Michigan-Dearborn, United States

#1569 | Low Speed Sensorless Control Performance Improvement Using Dynamic Range ADC [P14 Posterboard #8]
Kaito Watanabe, Sari Maekawa
Meiji University, Japan

#1628 | Optimizing Resolver Lobe Count for Enhanced Motor Control Performance: A Comprehensive Study [P14 Posterboard #9]
Prathima Nuli, Tanvi Nagarale, Vinod Peddi, Brian Gallert
General Motors Company, United States

#1721 | Mixed-Error-Based ADRC Speed Control for PMSM [P14 Posterboard #10]
Benkang Tan[1], Yanfei Cao[1], Zhiqiang Wang[2], Tingna Shi[1]
[1]Zhejiang University, China; [2]Zhejiang University Advanced Electrical Equipment Innovation Center, China

P15: Power Devices

Chair
Francesco Iannuzzo, *Politecnico di Torino*

#1070 | Optimization of Electric Field Distribution in Wide-Bandgap Semiconductor Power Modules via cBN-PI Composite Coating [P15 Posterboard #1]
Lantian Bi, Hong Zhang, Ying Han, Tianshu Yuan, Dingkun Ma, Hongyan Xia, Laili Wang
Xi'an Jiaotong University, China

#1209 | Impact of Material Anisotropy on Thermal Concentration in SiC MOSFETs During Avalanche Breakdown Faults [P15 Posterboard #2]
Yifan Wu, Yuhzi Chen, Chi Li, Zedong Zheng
Tsinghua University, China

#1232 | Discrete GaN HEMTs Experimental Characterization and Comparison for the Design of Power Converters in Traction Applications [P15 Posterboard #3]
Simone Giuffrida, Fabio Mandrile, Radu Bojoi
Politecnico di Torino, Italy

#1316 | Loss Analysis of Si/SiC Hybrid Switch Inverter for 150 kW EV Motor Under Driving Cycles [P15 Posterboard #4]
Ji-Heon Kim[1], Gyeong-Ho Park[1], Bon-Gwan Gu[1], Jung-Gi Lee[2]
[1]Kyungpook National University, Korea; [2]LG Magna e-Powertrain Co., Ltd., Korea

#1376 | Failure Phenomenon of Integrated Gate Commutated Thyristors Under Surge Current [P15 Posterboard #5]
Jianhong Pan[2], Fucheng Liu[2], Chen Yang[2], Chunpin Ren[2], Jiapeng Liu[2], Jingbo Wu[2], Chunying Zhang[1], Jinpeng Wu[2]
[1]Sichuan Energy Internet Research Institute of Tsinghua University, China; [2]Tsinghua University, China

#1621 | Parallel MOSFET Module with Low Parasitic Inductance and Balanced Dynamic Current [P15 Posterboard #6]
Ge Yang, Arindam Sircar, Wei Liu, Xiu Yao
State University of New York at Buffalo, United States

#1970 | Switching Speed Comparison of Medium-Voltage SiC MOSFETs (3.3 kV – 10 Kv) [P15 Posterboard #7]
Nianzun Qi, Masaki Takahashi, Morten Rahr Nielsen, Zhixing Yan, Gao Liu, Stefan Meyer, Hongbo Zhao, Asger Bjørn Jørgensen, Stig Munk-Nielsen
Aalborg University, Denmark

#2081 | Cathode-Localized Defects Structure: Enhancing Turn-Off Capability of IGCTs via Carrier Lifetime Engineering [P15 Posterboard #8]
Chunpin Ren, Yiying Zhu, Jiapeng Liu, Aowei Shi, Jianhong Pan, Jinpeng Wu
Tsinghua University, China

#2109 | Wide Bandgap Power Semiconductors Evaluations Based on Operating Condition Figure of Merits [P15 Posterboard #9]
Vafa Marzang[2], Shuo Wang[2], Dong Cao[1]
[1]University of Dayton, United States; [2]University of Florida, United States

#2127 | Design and Characterization of GaN Bidirectional Switches Enabled Commutation Cell for Three-Phase Current Source Converter Applications [P15 Posterboard #10]
Srijan Singh[2], Vignesh Kumar R C[2], Ramandeep Narwal[2], Sneha Narasimhan[1], Subhashish Bhattacharya[2]
[1]ABB Corporate Research Center, United States; [2]North Carolina State University, United States

#2230 | Novel DPT-Based SPICE Modeling Approach for Enhanced Prediction of Parallel SiC MOSFET Switching Dynamics [P15 Posterboard #11]
Dimitrios Deldimos, Fausto Stella, Gianmario Pellegrino
Politecnico di Torino, Italy

#2292 | Smart IGBT Driver with Passive and Self-Adjusting Gate Resistor in EV Traction Inverter Application [P15 Posterboard #12]
Yongchun Ni, Euzeli Cipriano Dos Santos Jr., Haitham Kanakri, Eric Jaebker
Purdue University, United States

#1454 | Comparative Analysis of High-Power Transient Voltage Suppression Diodes [P15 Posterboard #13]
Yang Xu, Xingyue Tian, Ruirui Chen, Ching-Hsiang Yang, Samuel Klein, Hua Kevin Bai, Fred Wang
University of Tennessee, Knoxville, United States

P16: Thermal Management, Insulation and Magnetics

Chair
Jose Ortiz Gonzalez, *University of Warwick*

#1224 | A Hybrid Thermal Network Model for Evaluating the Junction Temperature of Power Semiconductor Devices [P16 Posterboard #1]
Xin Wang, Yingzhou Peng, Wen Huang, Kaichun Wang
Hunan University, China

#1301 | Optimized Magnetic Integration Design and Performance Analysis of Single-Stage Half-Bridge DAB Series-Resonant Microinverters [P16 Posterboard #2]
Xinyu He[1], Hao Chu[1], Wenzhe Xu[2], Xuchen Sun[1], Jiajia Guan[1], Tianxi Li[1], Cai Chen[1], Yong Kang[1]
[1]Huazhong University of Science and Technology, China; [2]NOVOSENSE Microelectronics Co., Ltd., China

#1333 | Application of a Novel Nanocrystalline Ribbon-Based Integrated Inductive-Capacitive Core in LLC Resonant Converters [P16 Posterboard #3]
Taiming Chen[2], Zhichao Luo[3], Zhihuang Liang[3], Wenke Mao[3], Junwei Liu[2], Kerui Li[1], Wei Liu[2], Yi Zhang[2]
[1]City University of Hong Kong, China; [2]Hong Kong Polytechnic University, China; [3]South China University of Technology, China

#1420 | Aluminum Litz Wire: Experimental Analysis of a Low-Cost Alternative to Copper Litz Wire [P16 Posterboard #4]
Allen Nguyen, Jenna Lee, Sebastian Sahlman, Charles Sullivan
Dartmouth College, United States

#1667 | Analytic iGSE Solution for Core Loss Calculation in Single-Phase VSI or Totem-Pole PFC for Hysteresis Control [P16 Posterboard #5]
Mateus Orige, Bruno Bertoldi, Roberto Coelho, Lenon Schmitz
Federal University of Santa Catarina, Brazil

#1727 | Evaluation of Insulation Lifetime for Automotive Motor Windings Using SiC/GaN Power Device [P16 Posterboard #6]
Matsumori Hiroaki, Kazuki Kobayakawa, Takashi Kosaka
Nagoya Institute of Technology, Japan

#1845 | Additive Manufactured Vapor-Chamber-Based Two Phase Modular Cold Plate for To-247-Packaged Power Semiconductor [P16 Posterboard #7]
Ishfaqur Rahman, Jason Auduong, Scott Thompson, Qingyun Huang
University of Missouri, United States

#1876 | Design and Evaluation of Direct-Oil-Cooled SiC Power Modules [P16 Posterboard #8]
Tobias Kamp[1], Jonas Genz[1], Hakim El Bahi[2], Dounia Oustad[2], Tianlong B. Albert[1], Rik W. De Doncker[1]
[1]ISEA – RWTH Aachen University, Germany; [2]TotalEnergies One Tech, France

#2058 | Planar Permanent Magnet Biased Inductor with Improved Current Density Distribution [P16 Posterboard #9]
Andres Revilla Aguilar[1], Binyu Cui[2], Jun Wang[2], Hongbo Zhao[1]
[1]Aalborg University, Denmark; [2]University of Bristol, United Kingdom

#1997 | Immersive Direct Impingement Cooling for Modular Power Electronics [P16 Posterboard #10]
Peng Han, Rishab Anand, Junhong Tong, Chen Chen, Alex Q. Huang
University of Texas at Austin, United States

#2179 | Compact Busbar Design Strategy for a 100 kW, 300 kHz Dual Active Bridge Converter Topology [P16 Posterboard #11]
Shovan Deb, Weiping Fu, Liyang Du, Yuxiang Chen, David R. Huitink, H. Alan Mantooth
University of Arkansas, United States

#1830 | Thermal Analysis of Ceramic-Based and FR4-Based Planar Coils [P16 Posterboard #12]
Shaokang Luan, Masaki Takahashi, Zhixing Yan, Hongbo Zhao
Aalborg University, Denmark

Tuesday, October 21 10:30AM – 12:10PM

POSTER SESSION 2

Exhibit Hall A

PJ: Post Journal Presentations *Meet the Authors*

#2442 | Adjustable High Current Low Profile Sandwich Inductor Using Nanocrystalline Flake Ribbon Core [PJ Posterboard #1]
Xinru Li[1], Mingxiao Li[4], Luke Shillaber[4], Borong Hu[4], Zhichao Luo[3], Chaoqiang Jiang[2], Teng Long[4]
[1]CBMM Technology Suisse SA, United Kingdom; [2]City University of Hong Kong, China; [3]South China University of Technology, China; [4]University of Cambridge, United Kingdom

#2444 | An Ultrawide Range Pulse Width Modulated LLC Converter with Voltage Multiplier Rectifiers [PJ Posterboard #2]
Zhengming Hou, Dong Jiao, Jih-Sheng Lai
Virginia Polytechnic Institute and State University, United States

#2445 | A 500kHz Wide Output LLC-T Resonant Converter with Narrow Frequency Range, Reduced Circulating Energy, and Low Voltage Stress [PJ Posterboard #3]
Zhengming Hou, Dong Jiao, Jih-Sheng Lai
Virginia Polytechnic Institute and State University, United States

#2446 | Low-Voltage Ride-Through Operation of the SDBC Based STATCOM Integrated with One Single-Phase Converter Through Medium-Frequency Transformer [PJ Posterboard #4]
Yu-Chen Su[2], Makoto Hagiwara[1]
[1]Institute of Science Tokyo, Japan; [2]National Tsing Hua University, Taiwan

#2448 | A Review on Weighting Factor Design of Finite Control Set Model Predictive Control Strategies for AC Electric Drives [PJ Posterboard #5]
Emrah Zerdali[1], Marco Rivera[2], Patrick Wheeler[2]
[1]Ege University, Turkey; [2]University of Nottingham, United Kingdom

#2449 | Grid-Forming Controller with Enhanced Disturbance Rejection [PJ Posterboard #6]
Pranjal Mathu Gajare, Joseph Benzaquen, Deepak Divan
Georgia Institute of Technology, United States

#2450 | Instantaneous Pulse Pattern Control for Optimized Dynamic Performance of Three-Phase Dual-Active Bridge Converter [PJ Posterboard #7]
Jonghun Yun, Shenghui Cui, Seung-Ki Sul
Seoul National University, Korea

#2453 | Extremum-Seeking Approach for Real-Time Self-Healing of Position Sensor Offset Error in PMSMs [PJ Posterboard #8]
Ramitha Dissanayake, Sandun Kuruppu
Western Michigan University, United States

#2454 | The Harmonically Partitioned Power Converter Architecture: Single-Stage Single-Phase AC/DC Power Conversion Using Bidirectional Switches [PJ Posterboard #9]
Jacob Anderson, Mike Ranjram
Arizona State University, United States

#2455 | Physics-Aware Regression for DER Dispatch with Topological Reconfigurations of Radial Feeder [PJ Posterboard #10]
Rahul Chakraborty[1], Md Salman Nazir[3], Aranya Chakrabortty[2]
[1]Dominion Energy Virginia, United States; [2]North Carolina State University, United States; [3]University of Michigan-Dearborn, United States

#2456 | Health-Conscious Fast Charging for Electrified Aircraft Batteries Using a Multistage-Constant-Current Temperature-Controlled Strategy [PJ Posterboard #11]
Chandan Chetri, Sheldon Williamson
University of Ontario Institute of Technology, Canada

#2457 | New Printed-Circuit-Board Resonators with High Quality Factor and Transmission Efficiency for Mega-Hertz Wireless Power Transfer Applications [PJ Posterboard #12]
Kerui Li[1], Jiayang Wu[1], Abdulkadir C. Yucel[2], Shu Yuen Ron Hui[1]
[1]City University of Hong Kong, Hong Kong; [2]Nanyang Technological University, Singapore

#2459 | Rapid Magnetic, Thermal, and Structural Scaling of Synchronous Machines Based on Flux and Loss Maps [PJ Posterboard #13]
Simone Ferrari[2], Gaetano Dilevrano[2], Paolo Ragazzo[2], Gianmario Pellegrino[2], Timothy Burress[1]
[1]Oak Ridge National Laboratory, United States; [2]Politecnico di Torino, Italy

#2460 | Overvoltage Suppression in Initial Charge Control for DC Capacitor Using Multiple Leg Short-Circuits with SiC-MOSFETs in Power Converters [PJ Posterboard #14]
Tomoyuki Mannen[2], Keiji Wada[1]
[1]Tokyo Metropolitan University, Japan; [2]Utsunomiya University, Japan

#2461 | An Empirical Model Informed Neural Network Core Loss Predictor for Soft Magnetic Materials [PJ Posterboard #15]
Neha Rajput, Himanshu Bhusan Sandhibigraha, Neeraj Agrawal, Vishnu Mahadeva Iyer
Indian Institute of Science, India

#2462 | Rare-Earth Free Unity Power Factor Bi-Axial Excitation Synchronous Machine for Traction Applications [PJ Posterboard #16]
Ritvik Chattopadhyay[2], Junyeong Jung[2], Md Sariful Islam[1], Ion Boldea[3], Iqbal Husain[2]
[1]HL Mechatronics, United States; [2]North Carolina State University, United States; [3]Politehnica University of Timişoara, Romania

#2463 | Modulated Model Free Predictive Current Control with Constrained Optimization for Permanent Magnet Synchronous Motor Drives [PJ Posterboard #17]
Samuel Osei Fobi[2], Sodiq Agoro[1], Iqbal Husain[2], Rajib Mikail[1]
[1]ABB Corporate Research Center, United States; [2]North Carolina State University, United States

#2464 | Transformer-Less Converters Using Capacitive Isolated Network [PJ Posterboard #18]
Pasan Gunawardena, Yuzhuo Li, Yunwei Li
University of Alberta, Canada

#2467 | Current-Oriented Phase-Locked Loop Method for Robust Control of Grid-Connected Converter in Extremely Weak Grid [PJ Posterboard #19]
Ki-Hyun Kim[1], Shenghui Cui[2], Jae-Jung Jung[1]
[1]Kyungpook National University, Korea; [2]Seoul National University, Korea

#2468 | 100 MHz Symmetric Current-Mode Class D Wireless Power Transfer [PJ Posterboard #20]
Xin Zan[1], Al-Thaddeus Avestruz[2]
[1]University of Maryland, College Park, United States; [2]University of Michigan-Dearborn, United States

#2470 | Multi-Level Selective Gate Driver with Real-Time Feedforward Control for SiC Inverters [PJ Posterboard #21]
Luowei Wen[2], Wensong Yu[1], John Geiger[2], Iqbal Husain[1]
[1]North Carolina State University, United States; [2]Texas Instruments, United States

#2473 | Analysis and Modeling of Transient Voltage Overshoot Behaviors in Bidirectional Phase-Shift Full-Bridge Converters [PJ Posterboard #22]
Tien-Sheng Li, Minh Ngo, Rolando Burgos, Dong Dong
Virginia Polytechnic Institute and State University, United States

#2474 | A Unified Modeling Approach for Steady State and ZVS Analysis of a Triple Active Bridge Converter [PJ Posterboard #23]
Vishwabandhu Uttam[2], Vishnu Mahadeva Iyer[1]
[1]Indian Institute of Science, India; [2]Mathworks India Private Limited, India

#2476 | PWM for Simultaneous Minimization of Switching Losses and CM Voltage in Current Source Inverters [PJ Posterboard #24]
Sangwhee Lee[1], Feida Chen[2], Thomas Jahns[3], Bulent Sarlioglu[3]
[1]Oak Ridge National Laboratory, United States; [2]University of Wisconsin–Madison, United States; [3]WEMPEC – University of Wisconsin–Madison, United States

#2479 | Current Ripple Reduction and ZVS Realization with Optimized DCM Modulation Based on Off-Time Discrete Control for Grid-Tied Inverters [PJ Posterboard #25]
Cheng Huang[1], Tomoyuki Mannen[2], Takanori Isobe[1]
[1]University of Tsukuba, Japan; [2]Utsunomiya University, Japan

#2480 | Optimized Air-Gap Configuration for an Integrated Coupled Inductor with Lower Height and Reduced Core/Winding Losses [PJ Posterboard #26]
Yue Liu, Hongfei Wu, Guosheng Ji, Shuo Ni, Yu Zhang, Junyu Chen, Yan Xing
Nanjing University of Aeronautics and Astronautics, China

#2481 | Heterogeneous Integration of Transformer Windings — Fundamentals, Principles and Implementations [PJ Posterboard #27]
Hongfei Wu, Yufeng Song, Yue Liu, Guosheng Ji
Nanjing University of Aeronautics and Astronautics, China

#2482 | Holistic Small-Signal Stability Analysis for Large-Scale Inverter-Intensive Power Systems with Coupled and Full-Order Dynamics from Control Systems and Power Networks [PJ Posterboard #28]
Lizhi Ding[2], Yuzhu Ouyang[2], Xiaonan Lu[2], Junjie Qin[2], Shuan Dong[1], Andy Hoke[1], Jin Tan[1]
[1]National Renewable Energy Laboratory, United States; [2]Purdue University, United States

#2483 | Inverter Intensive Hybrid Power Plant Modeling with Small-Signal Stability Augmentation Through Flexible Operation Mode Transition [PJ Posterboard #29]
Lizhi Ding[2], Junhui Zhang[2], Xiaonan Lu[2], Shuan Dong[1], Andy Hoke[1], Jin Tan[1]
[1]National Renewable Energy Laboratory, United States; [2]Purdue University, United States

P1: Energy Storage & Harvesting II

Chair
Xinze Li, *University of Arkansas*

#1081 | Battery-Friendly Model Predictive Control for Direct-Drive Wave Energy Converters with Hybrid Energy Storage System [P1 Posterboard #1]
Xuanyi Zhu[3], Zechuan Lin[2], Xuanrui Huang[1], Xi Xiao[3]
[1]Beijing Sifang Automation Co.,Ltd., China; [2]Maynooth University, Ireland; [3]Tsinghua University, China

#1363 | A Novel Staircase Modulation Method for Power Loss Balancing of Cascaded H-Bridge Converters in Energy Storage Systems [P1 Posterboard #2]
Kaiyu Chen, Yufei Li, Laili Wang
Xi'an Jiaotong University, China

#1783 | Dynamic Response Enhancement with Minimized Battery Current Stress in HESS [P1 Posterboard #3]
Ankit Kumar Pratihasta, Rajeev Kumar Singh, Rakesh Kumar Misra
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

#1907 | Neural Network-Integrated Kalman Filtering for Supercapacitor SOC Estimation [P1 Posterboard #4]
Islam Sayed, Yousef Mahmoud
Kennesaw State University, United States

#2316 | Fast, Controllable, and Modular Solid State Circuit Breaker Design for Battery Management Systems [P1 Posterboard #5]
Vaibhav Pawaskar, Mithat John Kisacikoglu, Marco Gaxiola
National Renewable Energy Laboratory, United States

#2388 | Optimal Energy Management Strategies for Grid-Connected Hybrid Fuel Cell–Battery–Electrolyzer Systems [P1 Posterboard #6]
Utkal Ranjan Muduli, Khalifa Al Hosani
Khalifa University, U.A.E.

#1318 | Design and Performance Evaluation of a Multi-Stack Membrane Capacitive Deionization System with High-Efficiency Cell-to-Cell Energy Recovery [P1 Posterboard #7]
Jae-Won Kim[1], Yumee Kim[2], Sung Pil Hong[2], Changhoon Oh[2], Rae-Young Kim[1]
[1]Hanyang University, Korea; [2]Samsung Electronics, Korea

#2063 | A Framework for Assessing the 2nd Life Potential of End-of-Life Electric Vehicle Power Electronics for a More Circular Economy [P1 Posterboard #8]
Olayiwola Alatise[3], Jose Ortiz-Gonzalez[3], Saeed Jahdi[2], Burhan Etoz[1], Arkdeep Deb[3]
[1]Sakarya University, Turkey; [2]University of Bristol, United Kingdom; [3]University of Warwick, United Kingdom

#1899 | 100W Energy Harvesting from a Medium Voltage Motor [P1 Posterboard #9]
Rajib Mikail, Marius Rutkevicius, Sodiq Agoro, Zhou Dong
ABB Corporate Research Center, United States

#1902 | Cost-Effective Power Conversion for Wave Energy Harvesting Using Doubly-Fed Induction Generator [P1 Posterboard #10]
Vikram Roy Chowdhury, Gab-Su Seo, Barry Mather
National Renewable Energy Laboratory, United States

P2: Power Converters in Renewable & Sustainable Energy Applications II

Chairs
Marina Perdigao, *Polytechnical Institute of Coimbra (IPC-ISEC) / Instituto de Telecomunicações*

#1846 | Design and Modulator Optimization for C3L3 DC-AC-DC Triple Active Bridge Converters [P2 Posterboard #1]
Payam Morsali, Ayan Mallik
Arizona State University, United States

#2049 | A Linear Time-Invariant Approach to DC-DC Boost Converter Control for Two-Stage Grid-Connected Photovoltaic Systems [P2 Posterboard #2]
Ong Jing Xian[2], Ezequiel Rodriguez[2], Gaowen Liang[2], Hein Wai Yan[2], Amer M. Y. M. Ghias[2], Josep Pou[1]
[1]City University of Hong Kong, Hong Kong; [2]Nanyang Technological University, Singapore

#2141 | Dual-Loop FCS-MPC with Online Grid Impedance Estimation for PV System Operating as STATCOM [P2 Posterboard #3]
Hamdan Alosaimi, Hadhlul Aladhyani, Mohammed Alsubaie, Sulaiman Alshammari, Osamah Aljumah, Subhashish Bhattacharya
North Carolina State University, United States

#2154 | Multiport Converter to Balance Power in Cascaded H-Bridge Converters for Large-Scale Photovoltaic Integration [P2 Posterboard #4]
Ajith K A, Baylon Godfrey Fernandes
Indian Institute of Technology Bombay, India

#2372 | Enabling Medium Voltage MTDC Systems Through Parallel HVDC Tapping Using MMC Converters with Medium-Frequency [P2 Posterboard #5]
Sulaiman Alshammari[2], Mohammed Alharbi[1], Vasishta Burugula[2], Hamdan Alosaimi[2], Harshit Nath[2], Subhashish Bhattacharya[2]
[1]King Saud University, Saudi Arabia; [2]North Carolina State University, United States

#1881 | Comparative Analysis of Failure Mechanisms in SiC MOSFETs: Insights from Power Cycling and Inverter-Like Accelerated Testing [P2 Posterboard #6]
Clifton Buxbaum[2], Nanditha Gajanur[1], Mohammad Abbaszada[1], Sudip Mazumder[1], F. Patrick McCluskey[2]
[1]University of Illinois Chicago, United States; [2]University of Maryland, College Park, United States

#1940 | Hybrid Discontinuous Pulse-Width Modulation Based DC-Link Capacitor Voltage Balance Scheme for Three-Phase Four-Level Inverters [P2 Posterboard #7]
Xiao Shen[1], Li Zhang[1], Yuhang Zou[2], Kefan Yang[1]
[1]Hohai University, China; [2]Tsinghua University, China

#2438 | Digital Twin for Power Converters Using Convolutional Neural Network and State Observer [P2 Posterboard #8]
Zhipeng Li, Qianwen Xu
KTH Royal Institute of Technology, Sweden

P3: Power Converters: Architecture & Protection

Chairs
Davide Biadene, *Padova University*
Hugo Villegas Pico, *Iowa State University*

#1046 | Energy Conversion Unit for a Novel Riverine Hydrokinetic Energy Harvesting System [P3 Posterboard #1]
Kawsar Ahammed[2], Richard Wies[2], Maher Al-Badri[1], Ben Loeffler[2]
[1]Norwich University, United States; [2]University of Alaska Fairbanks, United States

#1071 | Analysis and Design of an Open-Type Common-Mode Leakage Current Sensor for Power Cables [P3 Posterboard #2]
Hongyu Zhu[2], Ziyu Wei[2], Hongguang Dong[1], Xinjian Jiang[2], Dayong Zheng[2], Pinjia Zhang[2]
[1]Huadian Xinjiang Power Generation Co., Ltd, China; [2]Tsinghua University, China

#1203 | A Novel Flux-Shunt DC-Saturated Magneto-Controlled Transformer [P3 Posterboard #3]
Jiayang Zheng[4], Shiqi Ji[4], Yuanxin Zhang[4], Chunchen Li[4], Yongjie Nie[2], Xuntao Shi[1], Xincheng Liu[3]
[1]Electric Power Research Institute, CSG, China; [2]Electric Power Research Institute, Yunnan Power Grid Co., Ltd., China; [3]Sichuan Energy Internet Research Institute Tsinghua University, China; [4]Tsinghua University, China

#1309 | A Hybrid Wireless Power Sharing Control of DAB and LLC Converters in Parallel in DC Microgrids [P3 Posterboard #4]
Zhongxiu Xiao[3], Wei Mu[1], Ye Heng Hor[1], Youlin Fan[2]
[1]University of Cambridge, United Kingdom; [2]Xi'an Jiaotong University, China; [3]Xi'an Jiaotong University / École Polytechnique Fédérale de Lausanne, United Kingdom

#1374 | A Novel Thyristor-Based Solid-State Circuit Breaker with Reclosing Capability for DC Microgrids [P3 Posterboard #5]
Hans Vincent Lianto, Amer M. Y. M. Ghias
Nanyang Technological University, Singapore

#1760 | High-Efficiency Single-Stage Three-Phase AC-AC Solid State Transformer [P3 Posterboard #6]
Chi Zhang[1], Jian Liu[1], Rudy Wang[1], Peter Barbosa[1], Ravisekhar Raju[2], Mafu Zhang[3]
[1]Delta Electronics (Americas) Ltd., United States; [2]Fastwatt LLC, United States; [3]University of Texas at Austin, United States

#1945 | Modular Interline Power Flow Controller: A Node Compensation Approach to Power Flow Control [P3 Posterboard #7]
Ghanshyamsinh Gohil, Debrup Das
Hitachi Energy, United States

#1975 | 25kV AC Railway Catenary Power Supply Based on Virtual Synchronous Machines [P3 Posterboard #8]
Lorenzo Bellomo, Giovanni Marini, Marco di Benedetto, Alessandro Lidozzi, Luca Solero
Università degli Studi Roma Tre, Italy

#2034 | Transformation from Inductive Transformer to Active and Resistive Transformer for Inverter-Based Resources Against Transient and Resonance [P3 Posterboard #9]
Jinli Zhu, Yuan Li, Jeonghun Kim, Brandon M. Grainger, Fang Z. Peng
University of Pittsburgh, United States

#2308 | 3 kV-Class Scalable SCR-Based Solid State Circuit Breaker [P3 Posterboard #10]
Marcio Magri Kimpara, Rajendra Prasad Kandula, Elvey Tessaro Andrade
Oak Ridge National Laboratory, United States

#2315 | A 50kW-Class Fast Charging Power Module for Electric Vehicles with a Wide Output Range [P3 Posterboard #11]
Bonggook Kim[1], Jongwoo Kim[1], Sang Keun Ji[2], Dongkyun Ryu[2], Younghoon Cho[1]
[1]Konkuk University, Korea; [2]SOLUM Co Ltd., Korea

#1200 | Hybrid Distribution Transformer with Integrated Magnetic Core and Split Secondary Windings [P3 Posterboard #12]
Yuanxin Zhang[4], Shiqi Ji[4], Chunchen Li[4], Jiayang Zheng[4], Jia Zhou[3], Yongjie Nie[2], Xuntao Shi[1]
[1]Electric Power Research Institute, CSG, China; [2]Electric Power Research Institute, Yunnan Power Grid Co., Ltd., China; [3]Sichuan Energy Internet Research Institute Tsinghua University, China; [4]Tsinghua University, China

#1851 | Leveraging IoT, Big Data and AI Capabilities for Technological Regenerative Innovation in Commercial and Industrial Energy Management [P3 Posterboard #13]
Nouman Ahmed[2], Guido Canti[1], Giacomo Cassetta[3], Yuemin Ding[4], Norma Anglani[5]
[1]ALENS SRL, Italy; [2]Istituto Universitario di Studi Superiori di Pavia, Italy; [3]SIMBIOSI, Giulio Natta Innovation Center, Italy; [4]Universidad de Navarra, Spain; [5]Università degli Studi di Pavia, Italy

P4: Land & Aerial Vehicles Propulsion & Electrification

Chairs
Athar Hanif, *Ohio State University*
Liwei Zhou, *University of Texas at Arlington*

#1169 | Thermal Modelling of EV Inverters: Physical Models to Thermal Networks for Advanced Power Modules [P4 Posterboard #1]
Abir Chatterjee[1], Mohammad Anwar[1], Ramkumar Shivshankar[2], Vaibhav Bhaskar[2], Viswanath Nukala[2], Nishtha Bajoria[2]
[1]General Motors Company, United States; [2]Tata Consultancy Services, India

#1172 | Powertrain Design for Noise Mitigation: Addressing EMC/EMI Challenges in Electrified Vehicles [P4 Posterboard #2]
Arash Bavili[1], Abir Chatterjee[1], Mohammad Anwar[1], Brian Gallert[1], Rebecca Tjoelker[1], Rahul R[2], Nishtha Bajoria[2], Yilun Thomas Luo[1], Khorshed Alam[1]
[1]General Motors Company, United States; [2]Tata Consultancy Services, India

#1476 | Motor Design Considerations for Supersonic Electric Aircraft [P4 Posterboard #3]
Mahzad Gholamian[2], Omid Beik[2], Garret Reader[1]
[1]Colorado School of Mines, United States; [2]Michigan State University, United States

#1548 | Aerodynamically Driven Model-Based Approach to eVTOL Motor Design [P4 Posterboard #4]
Francesco Tripaldi, Nicola Bianchi
Università degli Studi di Padova, Italy

#1619 | Performance Evaluation of Heat-Pipe-Based Thermal Management System for a 250 kW GaN-Based Integrated Modular Motor Drive [P4 Posterboard #5]
Seyed Iman Hosseini Sabzevari, Salar Koushan, Armin Ebrahimian, Nathan Weise, Ayman EL-Refaie
Marquette University, United States

#1786 | Topology Evaluation and Design of Three-Phase GaN Inverter for Unmanned Aerial Vehicle Propulsion [P4 Posterboard #6]
Tianyu Zhao[2], Zhou He[2], Woonjung Hong[2], Rolando Burgos[2], Dong Dong[2], Tausif Husain[1], Calen Ostroot[1]
[1]Amazon Prime Air, United States; [2]Virginia Polytechnic Institute and State University, United States

#1838 | An Automatic Neutral Section Power Supplier Based on Partial Capacity Converter with Continuous Railway Power Conditioner Function [P4 Posterboard #7]
Zhibo Zhang, Kai Li, Hangqi Ye, Minglei Zhou, Xingyu Feng
Beijing Jiaotong University, China

#1968 | Oil Rotor Cooling Comparison for Electrically Excited Synchronous Machine [P4 Posterboard #8]
Chengyang Ye[2], Irving S. Aguilar-Zamorate[3], Andrea Tonoli[2], Renato Galluzzi[3], Edoardo Lagorio[2], Federica Graffeo[2], Simone Ferrari[2], Silvio Vaschetto[2], Gianmario Pellegrino[2], Vittorio Ravello[1], Raffaele Bonavolontà[1]
[1]CRF-Stellantis N.V., Italy; [2]Politecnico di Torino, Italy; [3]Tecnológico de Monterrey, Mexico

#1982 | Performance Analysis of High Power Density Propulsion Motors Under Various PWM Strategies [P4 Posterboard #9]
Hadish Tesfamikael, Mostafa Ahmadi Darmani, Mukhammed Murataliyev, Meiqi Wang, Chris Gerada, Michele Degano
University of Nottingham, United Kingdom

#2091 | Thyristor Switched Capacitor and Modular Based Traction Power Conditioner for Co-Phasal Railway Systems [P4 Posterboard #10]
Ananya Nayak, Shambhu Sau
Indian Institute of Technology Kharagpur, India

#2175 | Multi Electric Machines with Series and Parallel Electromechanical Combinations for Aircraft [P4 Posterboard #11]
David R. Stewart[2], Donovin D. Lewis[1], Matin Vatani[2], Diego Lopez-Guerrero[2], Dan M. Ionel[1]
[1]SPARK Laboratory, University of Kentucky, United States; [2]University of Kentucky, United States

#2348 | Reduction of Low-Frequency Leakage Current in EV Traction Inverter-Based Chargers with an Additional Switching Leg [P4 Posterboard #12]
Yujin Shin[2], Jaehyeok Jang[2], Taeyeong Lee[1], Younghoon Cho[2]
[1]Hyundai Motor Company, Korea; [2]Konkuk University, Korea

#2297 | A Novel Permanent Magnet Assisted Switched Reluctance Motor with Bipolar Excitation for In-Wheel Electric Vehicular Applications [P4 Posterboard #13]
Aprameya Karthik S R[1], Deepak Ronanki[1], Abdul R. Beig[2]
[1]Indian Institute of Technology Madras, India; [2]Khalifa University, U.A.E.

#1075 | Practical Design Strategies for Efficient and Cost-Effective Traction Inverters in EV Applications [P4 Posterboard #14]
Khorshed Alam, Yilun Thomas Luo, Mohammad Anwar, Suresh Gopalakrishnan, Aparna Saha, Dhanya Sankaran, Thomas Duhon
General Motors Company, United States

P5: Charging Techniques, SOC Estimation, & Thermal Management for EV Batteries

Chairs
Nishanth Gadiyar, *ORNL*
Abdullah Al Hadi, *CNH*

#1151 | Leakage Current for Electric Vehicle Batteries [P5 Posterboard #1]
Reuben St John[2], Cheng Zhang[2], Qiang Liu[2], Tanya Batchellier[1]
[1]BP p.l.c., United Kingdom; [2]University of Manchester, United Kingdom

#1274 | A Conditional Gaussian Mixture Model for Battery SOH Estimation with Uncertainty Quantification [P5 Posterboard #2]
Isaiah Oyewole, Meriam Chelbi, Wael Hassanieh, Youngki Kim, Abdallah Chehade
University of Michigan-Dearborn, United States

#1492 | Current Sensor Error Auto-Calibration Algorithm for the Battery Disconnect Unit in Electrified Vehicles [P5 Posterboard #3]
Kunwoo Na[1], Youngseoung Kim[1], Do Hyeong Kim[2], Ki-Chul You[2], Ho-Jun Lee[2], Wooyong Kim[1]
[1]Incheon National University, Korea; [2]LS e-Mobility Solutions, Korea

#1561 | High-Precision Modeling and Measurement of Core Temperature in Lithium-Ion Battery Cells [P5 Posterboard #4]
Changseok Kim[3], Steve Kowalewski[2], Satadru Dey[1], Yeonho Jeong[3]
[1]Pennsylvania State University, United States; [2]Schneider Electric USA, United States; [3]University of Rhode Island, United States

#1580 | Integrated Management of PTO/PTI and Storage Systems for the Reduction of Fuel Consumptions and Polluting Emissions in a Cargo Ship [P5 Posterboard #5]
Angelo Accetta[1], Maria Carmela Di Piazza[1], Marcello Pucci[1], Nikolaos Tsoulakos[2], Alessandro Iafrati[1]
[1]Consiglio Nazionale delle Ricerche, Italy; [2]Laskaridis Shipping Co. LTD, Greece

#1608 | Mitigation of Nonlinear Distortions in Online Li-Ion Battery Impedance Measurement [P5 Posterboard #6]
Minh Tran, Leevi Lignell, Tomi Roinila
Tampere University, Finland

#1624 | Exploring the Mitigation of Temperature Impacts on Electric Vehicle Charging Rates Using EVI-EnSitePy [P5 Posterboard #7]
Derek Jackson, Emin Ucer, Namrata Kogular, Mithat John Kisacikoglu
National Renewable Energy Laboratory, United States

#2054 | Single-Stage DC-DC Converter for Battery Balancing and Power Transfer Operation for EVs [P5 Posterboard #8]
Namrata Narayan, Moumita Das
Indian Institute of Technology Mandi, India

#2076 | A Capacitor-Isolated Equalization Topology Operates in DCM for Series-Connected Cells [P5 Posterboard #9]
Zheng Cao[3], Shaocong Wang[2], Ruihong Zhang[1], Jian Guan[3], Peng E[3]
[1]BYD Company Ltd., China; [2]City University of Hong Kong, China; [3]Harbin Institute of Technology, China

#2107 | Impedance Based Stability Analysis of Cascaded Dual Active Bridge Converter for Battery Charging Applications [P5 Posterboard #10]
Harshal Talur Lokesha, Vasishta Burugula, Shubham Dhiman, Partha Pratim Das, Subhashish Bhattacharya
North Carolina State University, United States

#2299 | A New Boost Charging Mechanism for Next-Generation Extremely Fast DC Chargers [P5 Posterboard #11]
Tiago Oliveira[2], André Mendes[2], Marina Perdigão[1], Luís Caseiro[3]
[1]Polytechnic Institute of Coimbra, ISEC / Instituto de Telecomunicações, Portugal; [2]University of Coimbra / Instituto de Telecomunicações, Portugal; [3]University of Coimbra / Instituto de Telecomunicações / Eneida.io, Portugal

#2317 | A Three-Level AC-DC Converter for Three-Phase and Single-Phase Compatible EV Fast Chargers [P5 Posterboard #12]
Hongseok Choi[2], Seongeun Lee[2], Younghoon Cho[2], Sunghun Kim[1], Jongyoon Chae[1]
[1]Hyundai Motor Company, Korea; [2]Konkuk University, Korea

#2358 | Discrete Preisach-EKF Framework for Accurate SOC Estimation in LFP Batteries with Hysteresis Compensation [P5 Posterboard #13]
Jongchan An[2], Minwoo Song[2], Mohamed J.M.A. Rasul[2], Minseo Jeong[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Korea

#2365 | Enhanced Temperature Estimation for Lithium-Ion Batteries Using a Distribution of Relaxation Times [P5 Posterboard #14]
Jaehyeong Lee[2], Yura Kim[2], Barancira Ted Doral[2], Vincent Masabiar Tingbari[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Ghana; [2]Chungnam National University, Nigeria; [2]Chungnam National University, Korea

#2385 | Quad-Operative Fractional Processor for Wide Battery Voltage EV Charging Applications [P5 Posterboard #15]
Warda Matin Khan, Souvik Karmakar, Rajeev Kumar Singh, Ranjit Mahanty
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

P6: Advanced Topology, Modeling & Control of DC-DC Converters

Chair
Xu Yang, *Consultant*

#1387 | Analysis and Implementation of a Transformer-Less Wide-Input High-Efficiency Inverting Converter [P6 Posterboard #1]
Yingchao Chi, Zhenshuai Rong, Teng Long
University of Cambridge, United Kingdom

#1599 | Novel High-Current Switched-Capacitor Buck-Boost Converters [P6 Posterboard #2]
Hang Zhou, Yuxin Yang, John Fletcher
University of New South Wales, Australia

#1685 | Novel Battery Interface Converter with Bi-Directional Current Flow Utilizing Partial Power Processing [P6 Posterboard #3]
Seok-Jin Jeong, Nguyen-Anh Nguyen, Mwangi Andrew Ngini, Sung-Jin Choi
University of Ulsan, Korea

#1842 | Modeling and Control of a Single-Inductor SIDO DC-DC Converter Used in Auxiliary Power Units [P6 Posterboard #4]
Pengwei Li, Ali M Bazzi
University of Connecticut, United States

#2187 | Comparison of Modulation Techniques for Capacitively Blocked Dual-Active Half-Bridge Converter for 48V PoI Applications [P6 Posterboard #5]
Nithyadas P V[1], Utsab Kundu[2], Vinod John[1]
[1]Indian Institute of Science, India; [2]Indian Institute of Technology Kanpur, India

#1586 | A Scalable Interline Power Flow Controller for Meshed HVDC Grids [P6 Posterboard #6]
Hao Guo, Chen Chen, Zhaozheng Zhu, Junhui Yang, Yibo Wang, Liping Mo, Chaoqiang Jiang, Jingchun Xiang
City University of Hong Kong, Hong Kong

P7: AC-AC Converter Design & Analysis

Chair
Zhou He, *Center for Power Electronics Systems, Virginia Tech*

#1092 | FPGA-Based FCS-MPC with Space Vector Preselection and Online Parameter Identification for Matrix Converter [P7 Posterboard #1]
Huawen Yao, Henry Shu-Hung Chung
City University of Hong Kong, Hong Kong

#1127 | A Class-Phi-2 Based Single-Stage AC-AC Converter with a Half-Cycle PWM Control for Wireless Power Transfer [P7 Posterboard #2]
Zanfeng Fang[3], Shousheng Han[3], Fangyu Mao[1], Yan Lu[2]
[1]Light Semibucks (Wuxi) Company Limited, China; [2]Tsinghua University, China; [3]University of Macau, Macau

#1784 | Four-Leg Single-Phase to Three-Phase AC-DC-AC Converter [P7 Posterboard #3]
Manoel Severino de Oliveira Neto[2], Cursino Brandão Jacobina[2], Alan Santana Felinto[2], Jean Torelli Cardoso[2], Isaac Soares de Freitas[1], Ricardo Lúcio De Araujo Ribeiro[3]
[1]Universidade Federal da Paraíba, Brazil; [2]Universidade Federal de Campina Grande, Brazil; [3]Universidade Federal do Rio Grande do Norte, Brazil

P8: Converter Power Quality

Chair
Tzung-Lin Lee, *National Sun Yat-sen University*

#1474 | Reconfigurable Single-Phase Series Active Power Filter with Improved Compensation to Mitigate Grid Voltage Disturbances [P8 Posterboard #1]
Gilielson F. da Paz[2], Cursino Brandão Jacobina[2], Isaac Soares de Freitas[1], Jean Torelli Cardoso[2], Victor F. M. B. Melo[1], Marcos Vinicius N. Pompeu[1]
[1]Universidade Federal da Paraíba, Brazil; [2]Universidade Federal de Campina Grande, Brazil

#2013 | Three-Phase Transformerless Series Active Power Filter Based on a Six-Leg Converter [P8 Posterboard #2]
Lucas Lucena[2], Cursino Brandão Jacobina[2], Jean Torelli Cardoso[3], Manoel Neto[2], Victor F. M. B. Melo[1], Alan Santana Felinto[1]
[1]Universidade Federal da Paraíba, Brazil; [2]Universidade Federal de Campina Grande, Brazil; [3]Universidade Federal Rural de Pernambuco, Brazil

#2056 | Performance Assessment of Multi-Frequency State Feedback and Pr Controllers in Apf Current Control [P8 Posterboard #3]
Lidia Sánchez Alonso[2], David Díaz Reigosa[2], Rayane Mourouvin[1], Tuure Nurminen[1], Marko Hinkkanen[1], Fernando Briz[2]
[1]Aalto University, Finland; [2]Universidad de Oviedo, Spain

#2293 | Harmonic Voltage Control Using APFs Considering Communications Delays [P8 Posterboard #4]
Lidia Sánchez Alonso[2], David Díaz Reigosa[2], Javier Sola[1], Juan Luis Agorreta[1], Julian Balda[1], Fernando Briz[2]
[1]Ingeteam Power Technology, Spain; [2]Universidad de Oviedo, Spain

P9: Advanced Control & Optimization Techniques in Power Converters

Chair
Daifei Zhang, *University of Toronto*

#1048 | Valley Voltage Switching Control for MHz-Driven GaN-Based Totem-Pole PFC Converter Drive [P9 Posterboard #1]
Shota Katayama[1], Ken-Ichi Takagi[1], Koji Shiozaki[1], Kaoru Torii[2]
[1]Nagoya University, Japan; [2]Toyota Motor Corporation, Japan

#1076 | Optimization of Reverse Recovery Period Characteristics of Hybrid Commutated Converter Based on RB-IGCT [P9 Posterboard #2]
Zongze Wang[2], Zhanqing Yu[2], Lu Qu[2], Biao Zhao[2], Chaoqun Xu[1], Rong Zeng[2]
[1]State Grid Corporation of China, China; [2]Tsinghua University, China

#1125 | Circulating Current Suppression DPWM for Two Parallel NPC Inverters [P9 Posterboard #3]
Dong-Jin Lee, Ui-Min Choi
Seoul National University of Science and Technology, Korea

#1165 | Deep Reinforcement Learning-Aided Modulation Optimization for Single-Stage Interleaved Totem-Pole Bidirectional AC-DC DAB Converter [P9 Posterboard #4]
Kun Wang, Ian Laird, Jun Wang, Kesheng Wang, Yiyuan Liu, Yuyang Wang
University of Bristol, United Kingdom

#1190 | Comparative Analysis of RLC and LC Filters for dv/dt Mitigation in SiC Inverter Systems with High-Frequency Cable Modeling [P9 Posterboard #5]
Kyo-Beum Lee, Yun-Jin Lee
Ajou University, Korea

#1215 | An Accurate Large-Signal Model of DDV-PLL [P9 Posterboard #6]
Yazhao Yang, Li Zhang, Xiaoqi Huang, Qi Liu
Hohai University, China

#1231 | Unified Circulating Current Mitigation Strategy in Paralleled High-Power Adjustable Speed Drives [P9 Posterboard #7]
Kevin Lee[1], Zhihao Song[2], Wenxi Yao[2], Bo Wei[2]
[1]Eaton, United States; [2]Zhejiang University, China

#1241 | A Voltage Balancing Method for Uncontrolled Pre-Charging in Modular Multilevel Converters [P9 Posterboard #8]
Ming Jia[1], Rik W. De Doncker[2]
[1]Flexible Electrical Networks GmbH, RWTH Aachen University, Germany; [2]ISEA – RWTH Aachen University, Germany

#1526 | A Standby Power Optimization Method for Active-Clamp Flyback Converter with Hybrid Switching Control [P9 Posterboard #9]
Chong Wang, Hao Cheng, Yongchao Huang, Daying Sun, Wenhua Gu
Nanjing University of Science and Technology, China

#1533 | Predictive Control with Reduced Computational Burden in Cascaded H-Bridge Motor Drives [P9 Posterboard #10]
Filippo Gemma, Giulia Tresca, Andrea Volpini, Behrouz Mohammadzadeh, Pericle Zanchetta
Università degli Studi di Pavia, Italy

#1570 | PWM Switching Pattern for Reducing Voltage Spike on Common-Mode Voltage in Three-Phase Inverters [P9 Posterboard #11]
Suji Seo[1], Cheewoo Lee[2], Jaesuk Lee[1]
[1]Jeonbuk National University, Korea; [2]Pusan National University, Korea

#1626 | An Adaptive PWFM Control Method for Single-Stage Boost-LLC Converter with Enhanced Power Factor [P9 Posterboard #12]
Daying Sun, Wenfei Zuo, Zhongyu Wang, Hao Cheng, Chong Wang, Wenhua Gu
Nanjing University of Science and Technology, China

#2110 | Optimal Switching Pattern Selection for AC-DC Matrix Converters [P9 Posterboard #13]
Dmytro Rodkin, Massimiliano Passalacqua, Andrea Formentini, Mario Marchesoni
Università di Genova, Italy

#2200 | Improvement of Current Distortion in Coupled Inductor CRM Based Totem-Pole PFC [P9 Posterboard #14]
Gibum Yu, Xingyu Chen, Rahul Rajendran, Qiang Li, Liyan Zhu
Virginia Polytechnic Institute and State University, United States

#2271 | A Novel Control Strategy for Single-Stage Isolated AC-DC Converter with Active Damping [P9 Posterboard #15]
Surjakanta Mazumder, Harisyam P V, Kaushik Basu
Indian Institute of Science, India

#1567 | Random Spread Spectrum Modulation Employed for Boost PFC Circuit [P9 Posterboard #16]
Young-Joon Song, Jun-Suk Lee, Jingook Kim, Jee-Hoon Jung
Ulsan National Institute of Science and Technology, Korea

#2440 | A Virtual Brake to Improve Fault Ride-Through Capability of Virtual Synchronous Machine [P9 Posterboard #17]
Shuan Dong[2], Jin Tan[2], Cameron J. Kruse[1], Brad Rockwell[1], Andy Hoke[2], Benjamin Kroposki[2]
[1]Kauai Island Utility Cooperative, United States; [2]National Renewable Energy Laboratory, United States

#2438 | Digital Twin for Power Converters Using Convolutional Neural Network and State Observer [P9 Posterboard #18]
Zhipeng Li, Qianwen Xu
KTH Royal Institute of Technology, Sweden

P10: Advanced Modeling & Control of DC/DC Converters II

Chair
Mateja Novak, *Aalborg University*

#1107 | Design and Implementation of Underwater Wireless Power Transfer System with Constant Power Output [P10 Posterboard #1]
Jin Zhao, Zuomin Sun, Jianzhong Zu, Yiming Jiang
Jiangsu University of Science and Technology, China

#1393 | Closed-Loop Control Implementation of a 50 W Grid Adapter with Capacitive Isolation [P10 Posterboard #2]
Mateo Sardi[1], Stefano Cerutti[1], Mario Giuseppe Pavone[2], Francesco Musolino[1], Paolo Stefano Crovetti[1]
[1]Politecnico di Torino, Italy; [2]STMicroelectronics NV, Italy

#1675 | One-Step Dead Time Correction with Fault Protection Using Parasitic Components [P10 Posterboard #3]
Hongming Zhao[3], Joachim Joos[2], Valentijn De Smedt[1]
[1]Katholieke Universiteit Leuven, Belgium; [2]Robert Bosch GmbH, Germany; [3]Robert Bosch GmbH & Katholieke Universiteit Leuven, Germany

#1896 | Model Predictive Control of Four-Switch Buck-Boost Converter for Fast Dynamics with Realization of ZVS Across Wide Load Range [P10 Posterboard #4]
Gaoxiang Chen, Ka-Hong Loo
Hong Kong Polytechnic University, Hong Kong

#2108 | Accurate Cyclic Synchronization on Bandwidth-Limited Data Links for Hard Paralleling of Power Electronic Converters [P10 Posterboard #5]
Vishal Chani[3], Patrick Lampl[1], Roberto Petrella[3], Sai Guduguntla[3], Christian Steger[2]
[1]FH JOANNEUM Gesellschaft mbH, Austria; [2]Graz University of Technology, Austria; [3]Silicon Austria Labs GmbH, Italy; [3]Silicon Austria Labs GmbH, Austria

P11: Modelling & Analysis of Electrical Machines I

Chair
Vandana Rallabandi, *Oak Ridge National Laboratory*

#1928 | Towards Quantitative Eccentricity Fault Modeling for Interior Permanent Magnet Motors [P11 Posterboard #1]
Mohammad ErfaniMatin, Lei Zhou
University of Wisconsin–Madison, United States

#1956 | Nonlinear Design Scaling of Electric Machines Based on Hybrid De and Meta-Modeling – Application to Synchronous Motors with Combined PM Stator and Reluctance Rotor Excitation [P11 Posterboard #2]
Oluwaseun Badewa, Dan M. Ionel
SPARK Laboratory, University of Kentucky, United States

#1969 | Optimal Estimation of the Parameters and Losses of Induction Motors Working in Full-Wave [P11 Posterboard #3]
Alessandro Ionta[1], Francesca Righetto[3], Mariam Saeed[2], Nicola Bianchi[3], Radu Bojoi[1], Fernando Briz[2]
[1]Politecnico di Torino, Italy; [2]Universidad de Oviedo, Spain; [3]Università degli Studi di Padova, Italy

#2010 | Modular Dynamic Model for Multi-Three-Phase Electrically Excited Synchronous Machines [P11 Posterboard #4]
Lorenzo Perilli, Federica Graffeo, Sandro Rubino, Alberto Tenconi, Silvio Vaschetto
Politecnico di Torino, Italy

#2011 | System-Level Optimization of Flux-Switching Machines with Multiple Excitation Sources in a Long-Term Flywheel Energy Storage System [P11 Posterboard #5]
François Boulanger, Bruno Dehez
Université Catholique de Louvain, Belgium

#2019 | Development of the Bearingless AC Homopolar Motor as an Electrodynamic Bearing [P11 Posterboard #6]
Niloofar Ramroodi[2], Benmaan Jawdat[1], Eric Severson[2]
[1]Revterra Corporation, United States; [2]University of Minnesota, Twin Cities, United States

#2332 | Modeling in DQ Framework and Operational Analysis of Counter-Rotating Electric Machines [P11 Posterboard #7]
Mohammadhossein Arianborna[4], Amin Mahmoudi[1], Solmaz Kahourzade[3], Wen Soong[2]
[1]Flinders University, Australia; [2]University of Adelaide, Australia; [3]University of South Australia, Australia; [4]University of Tehran, Iran

#2363 | Design of a 10-Phase Bearingless Induction Motor [P11 Posterboard #8]
Anvar Khamitov[2], Eric Severson[1]
[1]University of Minnesota, Twin Cities, United States; [2]University of Wisconsin–Madison, United States

#2397 | Un-Terminated Terminal Behavior Model for Balanced and Unbalanced Electric Machines [P11 Posterboard #9]
Xinliang Yang, Vladimir Mitrovic, Xiaotian Xiang, Rolando Burgos
Virginia Polytechnic Institute and State University, United States

#2419 | Analysis of Demagnetization-Induced Torque Ripple in Permanent Magnet Synchronous Machines [P11 Posterboard #10]
Abdur Rahman, Rukmi Dutta, Guoyu Chu, Minghao Gao, Muhammed Fazlur Rahman
University of New South Wales, Australia

#1950 | Design of Slotless PMSMs Considering Winding Eddy Current Loss [P11 Posterboard #11]
Junyeong Jung, Iqbal Husain
North Carolina State University, United States

P12: Magnetic Gears, Actuators & Non-Conventional Machines II

Chair
Reza Yazdanpanah, *University of Strathclyde (UK)*

#1040 | High Torque Density Motor Solutions for Exoskeleton Joint Integration [P12 Posterboard #1]
Daniele De Gregorio, Nicola Bianchi
Università degli Studi di Padova, Italy

#1079 | Modulator Topology Innovation of Brushless Doubly-Fed Machine [P12 Posterboard #2]
Zhengzhou Ma[3], Ming Cheng[3], Wei Qin[3], Peng Han[1], Christopher H. T. Lee[2]
[1]Ansys, Inc., United States; [2]Nanyang Technological University, Singapore; [3]Southeast University, China

#1397 | Remedying Co-Energy Method for Homopolar Machines Using Kron's Tensor Analysis Framework [P12 Posterboard #3]
Kennedy McAuley[2], Baoyun Ge[1]
[1]Georgia Institute of Technology, United States; [2]University of Florida, United States

#1464 | Comparative Analysis of Permanent Magnet Eddy Current Losses in Conventional and Alternating-Flux-Barrier Spoke-Type Vernier Machine [P12 Posterboard #4]
John Mushenya[2], Mehdi Moradi[2], Azeem Khan[2], Pragasen Pillay[1]
[1]Concordia University, Canada; [2]University of Cape Town, South Africa

#2040 | End-Winding Effects on the Performance of Rare-Earth Free Brushless Wound-Field Synchronous Machine [P12 Posterboard #5]
S. Mehdi Seyedi, Dorsa Talebi, Hamid A. Toliyat
Texas A&M University, United States

#2333 | A LSTM-NN-Based Reference Trajectory Compensation Algorithm for the Maglev Planar Motor Control System [P12 Posterboard #6]
Chao Wang[1], Hong-Li Li[1], Hong-Jin Hu[1], Su-Dan Huang[1], Guang-Zhong Cao[2]
[1]Guangdong Key Laboratory of Electromagnetic Control and Intelligent Robots, Shenzhen University, China; [2]Shenzhen University, China

P13: IPMSM, Synchronous Reluctance & Switched Reluctance Machines

Chair
Greg Heins, *Regal Beloit Corporation*

#1069 | A Novel Restart Strategy Based on Short-Circuit Current for Sensorless Rail Traction PMSM Drive [P13 Posterboard #1]
Yanhong Chu, Minglei Zhou, Chenchen Wang, Junhao Lv, Kai Li
Beijing Jiaotong University, China

#1319 | Zero-Sequence Current Suppression Based on a Refined Flux Linkage Model of an Open-End Winding IPMSM [P13 Posterboard #2]
Ji-Heon Kim[2], Bon-Gwan Gu[2], Sungyong Park[1], Jongkyong Lim[1]
[1]Hyundai Motor Company, Korea; [2]Kyungpook National University, Korea

#1501 | A Novel Stator/Rotor Dual-Three-Phase Matrix-Torque-Machine with Asymmetric Rotor Winding [P13 Posterboard #3]
Pengcheng Sun[3], Shaofeng Jia[3], Dongxu Yang[3], Jun Lin[3], Yonghong Xia[1], Yuting Gao[2], Deliang Liang[3]
[1]Nanchang University, China; [2]Wuhan University, China; [3]Xi'an Jiaotong University, China

#1869 | Carrier Harmonics Iron Loss Estimation and Minimization for Dual Three-Phase PMSM with Current Phase-Shift and Carrier Phase-Shift [P13 Posterboard #4]
Yoshihiro Miyama[1], Kan Akatsu[2]
[1]Mitsubishi Electric Corporation, Japan; [2]Yokohama National University, Japan

#1894 | Winding Comparison of Symmetrical Dual-Three Phase PMSMs with PWM Carrier Phase Shift Considering Leakage Inductance [P13 Posterboard #5]
Ye-Na Bai, Seung-Hun Lee, So-Yeon Im, Hyun-Jeong Hong, Myung-Seop Lim
Hanyang University, Korea

#2006 | Performance Comparison Between IPMSMs with Rare-Earth PM and Rare-Earth-Free PM According to Driving Cycle of Electric Vehicles [P13 Posterboard #6]
Geun-Ho Park[2], Jeong-Hoon Kim[2], Jae-Hun Kim[2], Kyoung-Soo Cha[1], Young-Hoon Jung[2]
[1]Korea Institute of Industrial Technology, Korea; [2]Yeungnam University, Korea

#2243 | Sensitivity of Iron Nitride Magnet Grades on the Performance of High-Speed Reduced Rare-Earth PMaSynRM for Traction Application [P13 Posterboard #7]
Robin Wilson, Praveen Kumar, Ayman EL-Refaie
Marquette University, United States

#2289 | A Torque-Dense Modular PM-Assisted SRM: Operating Principles, Design, and Prototyping [P13 Posterboard #8]
Gholamreza Davarpanah[1], Sajjad Mohammadi Yangijeh[2]
[1]Amirkabir University of Technology, Iran; [2]Massachusetts Institute of Technology, United States

#2344 | Integrated Analysis of Maximum Mechanical Stress and Deformation on the V-Shaped Rotor of High-Speed IPMSM [P13 Posterboard #9]
Dongxiong Wang[2], Wenbin Yang[2], Yi Liu[1], Yuting Gao[3], Xianju Yuan[2], Baohua Wang[2]
[1]Huazhong University of Science and Technology, China; [2]Hubei University of Automotive Technology, China; [3]Wuhan University, China

#1705 | Performance and Generating Characteristics Comparison of Inner Rotor and Outer Rotor Counter-Rotating Integrated Flux Modulated Machine [P13 Posterboard #10]
Wasiullah Khan[1], Faisal Khan[1], Udochukwu Bola Akuru[2], Syed Toqeer Haider[1]
[1]COMSATS University Islamabad, Pakistan; [2]Tshwane University of Technology, South Africa

#1741 | Variable Magnetomotive Force Memory Motor with Magnetization Coils That Utilize Power Semiconductor Devices in Parallel [P13 Posterboard #11]
Manari Mizuno[1], Sari Maekawa[1], Tomoyuki Seya[2]
[1]Meiji University, Japan; [2]Sanden Corporation, Japan

P14: Electric Drive Topologies & Control Strategies

Chairs
Jae Suk Lee, *Jeonbuk National University*
Ali Bazzi, *University of Connecticut*

#1901 | SiC Four-Leg Inverter for CMV and EMI Mitigation in Advanced Motor Drive Systems [P14 Posterboard #1]
Annette von Jouanne[1], Francisca Oseghale[1], Giovanna Oriti[3], Alexander Julian[2], Emmanuel Agamloh[1], Alex Yokochi[1]
[1]Baylor University, United States; [2]Consultant / Independent Researcher, United States; [3]Naval Postgraduate School, United States

#1030 | Magnet Eddy-Current Loss to Change DC Voltage and Inverter Switching Frequency in Permanent Magnet Synchronous Motor [P14 Posterboard #2]
Takafumi Hara, Masahiro Hori
Hitachi, Ltd., Japan

#2234 | 100+ krpm Open-End Winding Reluctance Motor Drive with a Floating Capacitor Bridge [P14 Posterboard #3]
Deekshitha Nayak[2], Gabriele Rizzoli[2], Michele Mengoni[2], Luca Zarri[2], Angelo Tani[2], Andrea Cavagnino[1]
[1]Politecnico di Torino, Italy; [2]Università di Bologna, Italy

#1305 | Optimized Third-Harmonic Current Injection for Torque Ripple Mitigation in MV Drives Under Single-Phase Open Fault [P14 Posterboard #4]
Taeyun Kim, Yongsug Suh
Jeonbuk National University, Korea

#1497 | Overvoltage Suppression Method for Single-Inverter Dual-Parallel PMSM Drives Using a PWM Scheme [P14 Posterboard #5]
Sung-Oh Kim, Hye-Won Choi, Kyo-Beum Lee
Ajou University, Korea

#1307 | Discontinuous Pulse-Width Modulation Scheme for Loss Reduction in OEW-PMSM with a 2-Leg Open-Circuit Fault [P14 Posterboard #6]
Donghyuk Kim, Hojoong Kim, Hyeonseong Kim, Kibok Lee
Korea University, Korea

#2373 | Current Control of a Brushless Doubly-Fed Reluctance Machine [P14 Posterboard #7]
Alford Sibanda, Stefan Botha, Nkosinathi Gule
Stellenbosch University, South Africa

#2042 | A Copper-Loss-Optimized Full-Speed Control Algorithm for EESMs [P14 Posterboard #8]
Zhixun Ma, Ruolin Wang, Haichuan Niu
Tongji University, China

#2379 | Sizing of the Suspension Converter Power Electronics for Bearingless Motors [P14 Posterboard #9]
Mohamadhasan Mokhtarabadi, N V Prasad Kamisetti, Takahiro Noguchi, Eric Severson
University of Minnesota, Twin Cities, United States

P15: Power Electronic Packaging

Chair
Jose Ortiz Gonzalez, *University of Warwick*

#1049 | An HTCC-Based Chip-on-Chip Packaging Structure of SiC Power Modules for High-Temperature High-Power-Density Applications [P15 Posterboard #1]
Baihan Liu, Yipeng Liu, Jianwei Lv, Yifan Zhang, Zexiang Zheng, Weishan Lv, Jiaxin Liu, Cai Chen, Yong Kang
Huazhong University of Science and Technology, China

#1095 | Surrogate Modeling of Parameterized SiC Power Module Thermal Fields with Physics-Informed Neural Networks [P15 Posterboard #2]
Yayong Yang[2], Zhiqiang Wang[2], Yu Liao[1], Wubin Kong[2], Xiaojie Shi[2], Run Hu[2], Yonggang Yao[2], Xingyuan Yan[2]
[1]Electric Power Research Institute of Guangdong Power Grid Company, China; [2]Huazhong University of Science and Technology, China

#1306 | Practical Measurement Method for Parasitic Inductance in Wiring Networks of Multichip Power Modules [P15 Posterboard #3]
Naoya Okamura[2], Masataka Ishihara[2], Kazuhiro Umetani[1], Eiji Hiraki[2]
[1]Kyushu University, Japan; [2]Okayama University, Japan

#1542 | Wireless High-Precision Time Synchronization for QZSS-Integrated Power Modules [P15 Posterboard #4]
Keiji Wada, Satoshi Mikami, Ryosuke Ota, Shigeyoshi Goka
Tokyo Metropolitan University, Japan

#1601 | Thermal Analysis and Modeling of Gallium Oxide Diode-Based Half Bridge Power Module [P15 Posterboard #5]
Tanzila Akter, Mohammad Dehan Rahman, Abu Shahir Md Khalid Hasan, Yuxiang Chen, H. Alan Mantooth, Xiaoqing Song
University of Arkansas, United States

#1795 | Layout Impact on Current Sharing in SiC Power Modules: Modeling and Experimental Validation [P15 Posterboard #6]
Maria Giorgia Spitaleri[2], Francesco Iannuzzo[1], Giacomo Scelba[2], Mario Cacciato[2], Giuseppe Scarcella[2]
[1]Politecnico di Torino, Italy; [2]Università degli Studi di Catania, Italy

#2059 | Low-Inductance Optimization of EasyPACK 1B Six-Pack SiC Power Module [P15 Posterboard #7]
Menglin Li, Xiaofeng Ding, Gang Lyu, Yang Sun, Zhenyu Shan
Beihang University, China

#2437 | Design, Simulation and Analysis of a 1200 V 4H-SiC Lateral MOSFET [P15 Posterboard #8]
Jiayu Li[2], Borong Hu[2], Jingping Zhang[1], Liang Wang[1], Teng Long[2]
[1]Chongqing University, China; [2]University of Cambridge, United Kingdom

P16: Emerging Architectures, Topologies & Components

Chairs
Saad Pervaiz, *Texas Instruments*
Ashish Kumar, *Tau Motors*

#1037 | A Novel Integrated Charger Inverter Topology for EVs [P16 Posterboard #1]
Ujala Maha Gamage[2], Sachith Wijesooriya[2], Prabath Binduhewa[2], Jiangbiao He[1], Sandun Kuruppu[2]
[1]University of Tennessee, Knoxville, United States; [2]Western Michigan University, United States

#1236 | Multi-Resolution Harmonic Feature Mapping-Based Parameter Estimation for Inductive Power Transfer Systems [P16 Posterboard #2]
Josiah Edebiri, Cheng Zhang
University of Manchester, United Kingdom

#1388 | Electric Machine Design: An Attempt to Apply Artificial Intelligence [P16 Posterboard #3]
Giada Sala[1], Claudio Bianchini[1], Nicola Bianchi[2], Alberto Bellini[3], Elena Macrelli[3]
[1]Università degli Studi di Modena e Reggio Emilia, Italy; [2]Università degli Studi di Padova, Italy; [3]Università di Bologna, Italy

#1436 | Flexible Laminated Liquid Metal Pumps [P16 Posterboard #4]
Taiji Endo[2], Yi Chen Mazumdar[1], Poul Nielsen[2], Bryan Ruddy[2]
[1]Georgia Institute of Technology, United States; [2]University of Auckland, New Zealand

#1612 | Active EMI Filter in GaN-Based Inverter Application [P16 Posterboard #5]
Abir Ihsan, Mohamed Youssef, Sheldon Williamson
University of Ontario Institute of Technology, Canada

#1915 | Analysis and Design Optimization of Paralleled Class-Φ2 Inverters for High-Frequency and High-Power Applications [P16 Posterboard #6]
Manas Palmal, Jinyuan Hu, Ghovindo Siadari, Elliot Kim, Jungwon Choi
University of Washington, United States

#1935 | Characterization of MEMS Relay Module in Continuous Operation [P16 Posterboard #7]
Mohammed Agamy[2], Maja Harfman Todorovic[1], Ahmed Khamis[2], Saman Rezazade[2]
[1]Menlo Microsystems Inc., United States; [2]State University of New York at Albany, United States

#1942 | Characterization of Current-Carrying Capacity in Printed Circuit Board Traces [P16 Posterboard #8]
Alessandro Lieto, Angelo Di Cataldo, Maria Giorgia Spitaleri, Luigi Danilo Tornello, Giacomo Scelba, Antonio Testa
Università degli Studi di Catania, Italy

#2423 | Analysis of the Desaturation Circuit Behaviour Under Paralleled GaN Devices Including the Effects of Parasitic Parameters [P16 Posterboard #9]
Guido Rubino, Rahul Kumar, Fabio Giulii Capponi, Giulio De Donato
Sapienza University of Rome, Italy

Tuesday, October 21 2:10PM – 3:50PM

POSTER SESSION 3

Exhibit Hall A

P1: Applications for Renewables: Power to X & Storage

Chair
Ibukun Korede, *Dominion Energy*

#1311 | Minimum Data Requirements for Data-Driven Reliability-Oriented Design by Active Learning [P1 Posterboard #1]
Xinyue Zhang[3], Xiaohua Wu[3], Jiacheng Sun[3], Ping Wang[2], Yi Zhang[1]
[1]Hong Kong Polytechnic University, China; [2]Hong Kong University of Science and Technology, China; [3]Northwestern Polytechnical University, China

#1912 | Machine Learning-Based AC Resistance Prediction for High-Frequency Litz Wire in HFAC Microgrid [P1 Posterboard #2]
Gajendra Singh Chawda, Wencong Su, Mengqi Wang, Van-Hai Bui
University of Michigan-Dearborn, United States

#1226 | A High-Performance Impedance Estimator for High-Capacity Li-Ion Cells [P1 Posterboard #3]
Olga Sokolaki, Ioannis Botas, Emmanuel Tatakis
University of Patras, Greece

#2102 | Optimizing Household Energy Management Using Fuzzy Logic for Enhanced Electricity Cost Reduction [P1 Posterboard #4]
Leon Carlos Stegman, Daniel Ioan Stroe, Florin Iov
Aalborg University, Denmark

#2322 | State-of-Health Estimation for Lithium-Ion Batteries Based on Incremental Capacity Features and Sparse Gaussian Process Regression While Considering Cycling Temperature [P1 Posterboard #5]
Zhe Zhou, Taek Keun Lyu, Peter Nguyen, Jae Wan Park
University of California, Davis, United States

#2338 | Improving SOC and SOT Estimation Using Time-Dependent Reversible Heat Generation Analysis and Kalman Filtering [P1 Posterboard #6]
Seongkyu Lee[2], Youngwoo Son[2], Seunghyun Lee[2], Umar Jamil[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Korea

#2349 | Hybrid State of Charge Estimation for Lithium-Ion Batteries Using Data-Driven and Model-Based Fusion [P1 Posterboard #7]
Faiz Majeed[2], Dania Batool[2], Youngmin Bae[2], Seunghee Kim[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Korea

#2366 | Optimized SOH Estimation for Reused Battery Packs via Pack-Cell Fusion Methodology [P1 Posterboard #8]
Sungjun Lee[2], Dongho Han[2], Jiwoong Kim[2], Asad Abbas[2], Woonki Na[1], Jonghoon Kim[2]
[1]California State University, Fresno, United States; [2]Chungnam National University, Pakistan; [2]Chungnam National University, Korea

#1633 | Optimization-Based Data-Driven Approach for Detecting Fault Location in Power Systems [P1 Posterboard #9]
Sunil Subedi, Yonghao Gui, Yaosuo Xue
Oak Ridge National Laboratory, United States

P2: Power Electronics-based Grids: Control & Applications

Chairs
Rasel Mahmud, *National Renewable Energy Laboratory*

#1010 | A Novel Low-Cost Load Control Scheme for Microgrids Using Data-Driven Algorithms [P2 Posterboard #1]
Weisong Tian[2], Chengwei Lei[1]
[1]California State University Bakersfield, United States; [2]Widener University, United States

#1064 | Utilizing Second Life Batteries in Islanded DC Microgrids: Enhanced Droop Control Approach [P2 Posterboard #2]
Osama Saadeh[2], Anas Alswaeer[2], Zakariya Dalala[1]
[1]Abdullah Al Salem University, Kuwait; [2]German Jordanian University, Jordan

#1118 | Enabling Reactive Power Support in Unidirectional End-Use Loads with Power Factor Correctors [P2 Posterboard #3]
Yeongrack Son, Michael Blonsky, Barry Mather
National Renewable Energy Laboratory, United States

#1144 | A Non-Selective Fault Clearing of Bipolar HVDC Grids Using a Series Connected Transformer [P2 Posterboard #4]
Masaya Shimizu[1], Kenichiro Sano[1], Takahiro Ishiguro[2], Takuro Arai[3], Naofumi Madoiwa[3]
[1]Institute of Science Tokyo, Japan; [2]Toshiba Energy Systems & Solutions Corporation, Japan; [3]Toshiba Infrastructure Systems & Solutions Corporation, Japan

#1185 | Transient Synchronization Stability Improvement Control of Renewable Power Systems via Reinforcement Learning [P2 Posterboard #5]
Haijin Wang, Meng Huang, Yushuang Liu, Xiaoning Zhang, Wanqing Qiu, Xiaoming Zha
Wuhan University, China

#1255 | Adaptive Droop Control for LVDC Systems with Battery SOC Consideration: A Comprehensive Analysis [P2 Posterboard #6]
Indra Narayana Sandi Bhogaraju, Mehnaz Khan, Aniket Joshi, James Stoupis
ABB Corporate Research Center, United States

#1368 | Transient Performance of Tomia Island Microgrid with Pumped Storage Hydropower: A Simulation-Based Study [P2 Posterboard #7]
Yunita Muharram[2], Shreyasee Mandal[1], Eduard Muljadi[1], Gavin McCormick[1], Robert Nelms[1]
[1]Auburn University, United States; [2]Pontianak State Polytechnic, Indonesia

#1563 | Modeling and Control for the Charging of EV Fleet in a Power System with Residential Loads [P2 Posterboard #8]
Huangjie Gong, Samy Mohamed, Amanuel Melese, Mehnaz Khan
ABB Corporate Research Center, United States

#1668 | Joint Optimization of Renewable Capacity and Inverter Oversizing for Voltage Regulation in Distribution Systems [P2 Posterboard #9]
Li Ting Rachel Lim, Yan Xu, Yunyang Zou
Nanyang Technological University, Singapore

#1676 | Optimal Protection Coordination of Microgrids Powered by Synchronverters During Unbalanced Faults [P2 Posterboard #10]
Parinaz Montazeri[2], Saad Pola[2], Maher Azzouz[1]
[1]Qatar University, Qatar; [2]University of Windsor, Canada

#1711 | Microgrid Systems with Interior Permanent Magnet Synchronous Motor Using Intelligent Control [P2 Posterboard #11]
Ling-Jyun Liao, Li-Zhen Cheng, Wei-Ru Lin, Yuan-Chih Chang
National Tsing Hua University, Taiwan

#1738 | Architecture and Coordinated Control of Large-Scale MVDC-Coupled Grid-Forming PV System [P2 Posterboard #12]
Haonan Shi, Yinyu Yan, Yichao Sun, Hailong Zhang, Chenyu Wang, Shang Chen
Nanjing Normal University, China

#1748 | A Generic FSC Wind Park EMT Model with IEEE Std 2800-Compliant Fault Ride-Through Capability [P2 Posterboard #13]
Rasel Mahmud[2], Lina He[3], James Cale[1]
[1]Colorado State University, United States; [2]National Renewable Energy Laboratory, United States; [3]University of Illinois Chicago, United States

#1831 | Efficient Power Management of a Nanogrid Using the Nash Bargaining Solution [P2 Posterboard #14]
Shadi Zargari, Javad Ebrahimi, Suzan Eren
Queen's University at Kingston, Canada

#1871 | Advanced Hierarchical Control Strategies in Multi-Building Microgrids [P2 Posterboard #15]
Lidya Mussie Weldehawaryat[3], Ángel Navarro-Rodríguez[2], Wajiha Shireen[3], Subhajyoti Mukherjee[1]
[1]Oak Ridge National Laboratory, United States; [2]Universidad de Oviedo, Spain; [3]University of Houston, United States

#1887 | Safety-Critical Control for AC Microgrids with Constant Power Loads During Unintended Islanding via Control Barrier Functions [P2 Posterboard #16]
Xitong Niu[3], Chuanlin Zhang[3], Pengfeng Lin[2], Zhongkun Cao[1], Jianliang Mao[3], Peifeng Hui[3], Chenggang Cui[3]
[1]Shandong University, China; [2]Shanghai Jiao Tong University, China; [3]Shanghai University of Electric Power, China

#2024 | Optimizing GFMC/GFLC Capacity Configuration for Stability Enhancement in RES-Dominated Weak Grids [P2 Posterboard #17]
Shufen Situ, Rui Liu, Zhiheng Lin, Yunwei Li
University of Alberta, Canada

#2038 | Hardware-Integrated Cyber-Physical DC Multi-Microgrids Framework for Resilient Operation Under Load Stress and Cyber Threats [P2 Posterboard #18]
Ola Ali, Ahmed Aghmadi, Osama Mohammed
Florida International University, United States

#2392 | Novel Aggregated Control Method of Grid Integrated Charging Station for Electric Vehicles Powered by PV-Wind Hybrid System [P2 Posterboard #19]
Utkal Ranjan Muduli, Khalifa Al Hosani
Khalifa University, U.A.E.

#2434 | Control Parameter Sensitivity Study for Inverter-Based-Resource Dominated Grids: A Small Signal Stability Approach and Framework [P2 Posterboard #20]
Soham Chakraborty, Bhagyashree Umathe, Jing Wang
National Renewable Energy Laboratory, United States

#1496 | Multi-Time-Scale Scheduling for Integrated Energy Systems with Hydrogen Energy [P2 Posterboard #21]
Hualong Liu, Wenyuan Tang
North Carolina State University, United States

#1995 | Navigating the Path to Commercial Vehicle-to-Grid for Heavy-Duty Electric Vehicle–A Systematic Literature Review [P2 Posterboard #22]
Rafi Zahedi, Rajit Gadh
University of California, Los Angeles, United States

P3: Data-Driven Learning & Design Techniques

Chair
Athar Hanif, *Ohio State University*

#1099 | LLM-Driven Circuit Simulator-Based Multi-Objective Parameter Optimization System for Power Converter Circuit Design [P3 Posterboard #1]
Qingyang Tan, Keiji Wada
Tokyo Metropolitan University, Japan

#1265 | Hybrid Autoencoder–LSTM Augmentation for Improved Arc Fault Classification Under Data Scarcity [P3 Posterboard #2]
Shangze Chen, Kamal Chandra Paul, Tiefu Zhao
University of North Carolina at Charlotte, United States

#1287 | ANN-Based Grid Impedance Estimation for Adaptive Gain Scheduling in VSG Under Dynamic Grid Conditions [P3 Posterboard #3]
Quang-Manh Hoang, Van-Nam Nguyen, Taehyung Kim, Guilherme Hollweg, Wencong Su, Van-Hai Bui
University of Michigan-Dearborn, United States

#1351 | An Electrical Signal Based Anomaly Detection Method for Motor Bearing Faults Under Varying Operating Conditions [P3 Posterboard #4]
Chen-Pei Yi[3], I-Haur Tsai[2], Po-Huan Chou[1], Wei-Der Chung[1], Shih-Chin Yang[3]
[1]Industrial Technology Research Institute, Taiwan; [2]National Taipei University of Technology, Taiwan; [3]National Taiwan University, Taiwan

#1375 | Real-Time Hardware-in-the-Loop Malware Compromised Smart Inverters and Grid Co-Simulation [P3 Posterboard #5]
Bohyun Ahn[2], Ahhyun Lee[2], Hee-Yong Kwon[2], Seohyun Kim[2], Taesic Kim[2], Kyoung-Tak Kim[1]
[1]Soongsil University, United States; [2]University of Missouri, United States

#1382 | Single-Stage VRM Based on Hybrid Coupled Inductor Current Doubler Rectifiers [P3 Posterboard #6]
Zhenshuai Rong, Jinfeng Zhang, Xufu Ren, Yingchao Chi, Teng Long
University of Cambridge, United Kingdom

#1392 | High Power Density LLC Designed 10:1 Ratio Bus Converter for 48V Applications [P3 Posterboard #7]
Bin Wang, Yang Cao, Min Xu
Fudan University, China

#1444 | Comparative Analysis of AI Models for Capacitor Current Prediction in Power Factor Correction Topologies [P3 Posterboard #8]
Mohamed Zeid, Vishwam Raval, Prasad Enjeti
Texas A&M University, United States

#1540 | Modeling of Magnetic Component with Low Permeability Core and its Application to Machine Learning-Based High-Frequency Converter Designs [P3 Posterboard #9]
Wenying Xu[1], Hiroshi Osawa[1], Daisuke Miyagi[1], Ayano Komanaka[1], Akihiro Konishi[1], Wenqi Zhu[2], Kien Nguyen[1], Hiroo Sekiya[1]
[1]Chiba University, Japan; [2]Tokyo University of Science, Japan

#2313 | PCB Thermal Layout Optimization for Power Electronics: Integrating Large Language Models with NSGA-II for Enhanced Energy Efficiency [P3 Posterboard #10]
Yang Li[2], Youliang Zhu[1], Jiaze Kong[2], Bangli Du[2], Wilmar Martinez[2]
[1]Chalmers University of Technology, Sweden; [2]Katholieke Universiteit Leuven-EnergyVille, Belgium

#2121 | Reinforcement Learning Control of Two-Phase Cooling Systems for Next Generation Power Converters [P3 Posterboard #11]
Lorenzo Bellomo, Giulia Di Nezio, Marco di Benedetto, Alessandro Lidozzi, Luca Solero
Università degli Studi Roma Tre, Italy

P4: Inductive Wireless Power Transfer for Transportation

Chair
Athar Hanif, *Ohio State University*

#1212 | Novel Integrated HVB/LVB EV Charger Based on Inductive Power Transfer [P4 Posterboard #1]
Seungjin Jo, Seungmin Kim, Yeongseon Lee, Seungsoo Kim, Gwang-Su Park, Dong-Hee Kim
Chonnam National University, Korea

#1276 | A Convenient Harmonic State Space Model for ZVS Analysis in Wireless Power Transfer Systems [P4 Posterboard #2]
Delin Zhao[2], Yue Wu[1], Yaohua Li[2], Renjie Zhang[2], Ziheng Xiao[2], Yi Tang[2]
[1]Lehigh University, United States; [2]Nanyang Technological University, Singapore

#1290 | Novel Compensation Topology for IPT System in V2G Applications Using Switched Controlled Capacitors [P4 Posterboard #3]
Yeongseon Lee, Seungmin Kim, Seungjin Jo, Seungsoo Kim, Gwang-Su Park, Dong-Hee Kim
Chonnam National University, Korea

#1467 | An Efficient Multi-Objective Coil Design Method with Adaptive DNN-Improved PSO in Wireless Power Transfer Systems [P4 Posterboard #4]
Yue Wu[1], Delin Zhao[2], Renjie Zhang[3], Yaohua Li[2], Haonan Song[1], Yucheng Shen[1], Yongbin Jiang[2], Yi Tang[2], Fei Lu[1]
[1]Lehigh University, United States; [2]Nanyang Technological University, Singapore; [3]Xi'an Jiaotong University, China

#1581 | A Dual CC/CV Outputs Wireless Power Transfer System with Anti-Misalignment Capability for Automated Guided Vehicles [P4 Posterboard #5]
Yuanchao Wu, Io-Wa Iam, Zongrui Yang, Chi-Seng Lam
University of Macau, Macau

#1640 | Efficiency Enhancement of Dynamic Wireless Power Transfer Considering the Impact of Magnetic Field Reconfiguration [P4 Posterboard #6]
Tianlu Ma, Chen Chen, Yue Liu, Ben Zhang, Jiaqi Huang, Chaoqiang Jiang
City University of Hong Kong, Hong Kong

#2008 | Modeling, Design and Optimization of a Misalignment-Tolerant Wireless Charging System for E-Micromobility [P4 Posterboard #7]
Josiah Edebiri, Cheng Zhang
University of Manchester, United Kingdom

#2037 | Single-Phase Matrix Converter-Based Wireless Power Transfer Using Bidirectional GaN-FETs [P4 Posterboard #8]
Chang Liu[2], Wei Liu[2], Yuchen Wei[2], Jian Guo[3], Qi Zhu[1], Kwok-Tong Chau[2]
[1]Beijing Xiaomi Mobile Software Co., Ltd, China; [2]Hong Kong Polytechnic University, Hong Kong; [3]University of Hong Kong, Hong Kong

#2156 | A Tapped Transmitter with Mixed-Frequency Architecture for Diverse WPT Standards [P4 Posterboard #9]
Xiaodong Yang, Shuye Shang, Ka Wai Eric Cheng
University of California, Merced, United States

#2164 | Optimal Placement of Large-Scale DWPT Networks in Distribution Grid [P4 Posterboard #10]
Travis Newbolt[1], Paras Mandal[1], Hongjie Wang[2], Regan Zane[2]
[1]University of Texas at El Paso, United States; [2]Utah State University, United States

#2381 | Design Methodology of Wireless Power System Based on LLC Compensation Network for Low-Gap Battery Charger Application [P4 Posterboard #11]
Sayed Amir Hashemi[2], Arsalan Rasoolzadeh[2], Chris Botting[1], Majid Pahlevani[2]
[1]Delta-Q Technologies, Canada; [2]Queen's University at Kingston, Canada

#2410 | A Novel Two-Phase Bipolar Coil-Based Bidirectional Wireless Power Transfer System [P4 Posterboard #12]
Lindemberg Luna[1], Montiê Alves Vitorino[1], Vinicius Freire Bezerra[2], Jens Friebe[2]
[1]Universidade Federal de Campina Grande, Brazil; [2]University of Kassel, Germany

P5: Multilevel & Modular Inverter Topologies for High-Performance Power Conversion

Chair
Giulia Tresca, *University of Pavia*

#1206 | A Comparative Study of Hybrid SiC-GaN and All-SiC Configuration for T-Type Inverters [P5 Posterboard #1]
Rupak Chakraborty, Sumanta Biswas, Markus Makoschitz
Austrian Institute of Technology, Austria

#1258 | A Single-Phase Seven-Level Inverter with Asymmetrical DC-Link Voltage [P5 Posterboard #2]
Tuan Vu Le, Kelum Lokugamage, Yuqi Wang, Morgan Li, Caisheng Wang
Wayne State University, United States

#1286 | Bidirectional Nine-Level Hybrid Converter with Capacitor Voltage Balancing Control [P5 Posterboard #3]
Dohyeon Kim, Beomki Cho, Jungmin Kwon
Hanbat National University, Korea

#1694 | Intelligent Switching Optimization Using Quantum Differential Evolution in 13-Level Switched-Capacitor Inverter [P5 Posterboard #4]
Arya Singh, Ranjit Mahanty, Vivek Nandan Lal, Rajeev Kumar Singh
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

#1713 | Counters Design for OC Switch Fault Diagnosis Conjunct with SVM Concept in CHBMCs [P5 Posterboard #5]
Hongjian Lin[2], Zhiheng Lin[2], Dong Xie[1], Yunwei Li[2]
[1]Southwest Jiaotong University, China; [2]University of Alberta, Canada

#1723 | Failed Submodule Localization in a Cascaded Multilevel Converter Using Phase Voltage Waveforms and Sawtooth Carriers [P5 Posterboard #6]
Yosuke Aoki, Yushi Miura
Nagaoka University of Technology, Japan

#1736 | A Seven-Level Simplified Active Neutral-Point Clamped Inverter Using Single Flying Capacitor [P5 Posterboard #7]
Dinh Du To, Lukas Antonio Budiwicaksana, Dong-Choon Lee
Yeungnam University, Korea

#2097 | Design of Arm Inductor in NLC-Based MMC Considering Ripple Factor of the Phase Current [P5 Posterboard #8]
Dongjin Lee[1], Dongho Choi[3], Yeongsu Bak[2], June-Seok Lee[1]
[1]Dankook University, Korea; [2]Keimyung University, Korea; [3]Korea Railroad Research Institute, Korea

#2217 | Effects of Stator Winding Configuration on the Voltage Balancing of DC-Link Capacitor of Six-Phase Three-Level NPC Inverters [P5 Posterboard #9]
Gabriele Boico, Luca Vancini, Michele Mengoni, Gabriele Rizzoli, Luca Zarri, Angelo Tani
Università di Bologna, Italy

#2329 | A Novel Hybrid Modular Multilevel Converter with Reduced Capacitor Requirement [P5 Posterboard #10]
Chao Wang, Kui Wang, Zedong Zheng, Yongdong Li
Tsinghua University, China

#2433 | Dead-Time and Forward-Voltage Compensation for a Neutral-Point-Clamped Voltage-Source Inverter with Space-Vector Modulation [P5 Posterboard #11]
Arno Claes, Johan Gyselinck
Université libre de Bruxelles, Belgium

#1988 | A Comprehensive Analysis of DC-Link Voltage Ripple of Three-Level Inverter-Based Symmetrical and Asymmetrical Six-Phase Drives [P5 Posterboard #12]
Partha Pratim Das[1], Subhransu Satpathy[2], Subhashish Bhattacharya[1]
[1]North Carolina State University, United States; [2]Texas Instruments, United States

#2263 | Capacity Ratio Optimization for the MMC in the DR-MMC Hybrid HVDC Topology [P5 Posterboard #13]
Lu Chen[2], Wenjie Chen[2], Zhixiang Li[2], Delin Kong[1], Haonan Li[2], Yu Cheng[2]
[1]Southeast University, China; [2]Xi'an Jiaotong University, China

#1653 | Design Methodology of Centralized Partial-Inductance Configuration for MMC-Based Power Conditioning System [P5 Posterboard #14]
Ziyan Xiong, Tianxiang Yin, Shutong Wu, Lei Lin
Huazhong University of Science and Technology, China

P6: DC-AC Inverters for Renewable Applications: Topology, Control, & Reliability Analysis

Chairs
Xiaoqing Song, *University of Arkansas*
Zeljko Pantic, *NC State University*

#1353 | A Neutral Point-Clamped Five-Level Inverter for Renewable Energy Applications [P6 Posterboard #1]
Kuo-Yuan Lo[1], Cheng-Han Cai[2]
[1]National Cheng Kung University, Taiwan; [2]National Kaohsiung University of Science and Technology, Taiwan

#1395 | A Simple Control for Full Range Soft Switching in Single-Stage Microinverter [P6 Posterboard #2]
Xipei Yu, Tianyi Jiang, Qiang Li, Liyan Zhu
Virginia Polytechnic Institute and State University, United States

#1424 | Comparison of 50 MHz Single-Ended and Isolated Push-Pull Class-E Amplifiers [P6 Posterboard #3]
Aobo Yang, Xuan Wang, Sida Chen, Lei Gu
University of Pennsylvania, United States

#1577 | Enhanced Stability Analysis of Parallel Connected GaN-Transistors in Half-Bridge Circuits [P6 Posterboard #4]
Julien Hönschel, Jordan Sorge, Martin März
Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany

#2021 | Capacitorless Active Output Power Filter (CLAOF) for Enhanced Reliability in Three-Phase DC-AC Inverters [P6 Posterboard #5]
Haitham Kanakri, Euzeli Cipriano Dos Santos Jr., Maher Rizkalla
Purdue University, United States

#1994 | Comparison and Discussion of 10 kV SiC Modules for Medium Voltage Applications: Current Source Inverter vs Voltage Source Inverter [P6 Posterboard #6]
Sneha Narasimhan[1], Subhashish Bhattacharya[2]
[1]ABB Corporate Research Center, United States; [2]North Carolina State University, United States

#2157 | Instantaneous Transition Detection for Zero Voltage Switching in ARCP Converters [P6 Posterboard #7]
Eddy Aeloiza, Weiqiang Chen, Vidhi Patel, Christopher Kammer
ABB Corporate Research Center, United States

#2398 | Hybrid MPC-SHE Technique for Capacitor Voltage Balancing in Single DC-Source Three-Phase Modified PUC Inverter [P6 Posterboard #8]
Mohammad Sharifzadeh[2], Arman Fathollahi[1], Soroush Oshnoei[1], Meysam Gheisarnejad[2], Eric Laurendeau[2], Kamal Al-Haddad[2]
[1]Aarhus University, Denmark; [2]École de Technologie Supérieure, Université du Québec, Canada

P7: Power Converter EMI

Chair
Jialin Zheng, *Purdue University*

#1090 | Active Voltage Probe for Direct Measurement of EMC-Relevant Noise of Power Semiconductors [P7 Posterboard #1]
Robert Kragl[1], Konstantin Spanos[1], Karl Oberdieck[1], Steffen Beushausen[1], Ingmar Kallfass[2]
[1]Robert Bosch GmbH, Germany; [2]Universität Stuttgart, Germany

#2119 | An EMI Shielding Ring Technique in Power Electronics Modules Package for Near-Field and Far-Field EMI Mitigation [P7 Posterboard #2]
Yirui Yang, Yanwen Lai, Qinghui Huang, Shuo Wang
University of Florida, United States

#2135 | Investigation and Mitigation of dv/dt Switching Noise Issue in Zero Crossing Detection Circuit in Totem-Pole CRM PFC [P7 Posterboard #3]
Rahul Rajendran, Gibum Yu, Xingyu Chen, Qiang Li
Virginia Polytechnic Institute and State University, United States

#1360 | Multi-Stage Passive EMI Filter Parasitics Characterization for cm Dm Noise Reduction [P7 Posterboard #4]
Tonglei Wang[4], Shin-Yu Chen[3], Ripun Phukan[1], Rolando Burgos[4], Dong Dong[4], Gopal Mondal[2], Henrik Krupp[2]
[1]Delta Electronics (Americas) Ltd., United States; [2]Siemens AG, Germany; [3]Texas Instruments / Virginia Polytechnic Institute and State University, United States; [4]Virginia Polytechnic Institute and State University, United States

#1947 | Impact of Diode Bridge in Discontinuous Conduction Mode on EMI Propagation Path [P7 Posterboard #5]
Bayan Hamami[2], Genevieve Frantz[1], Roger Franchino[2], Jean-Luc Schanen[1]
[1]G2Elab, Université Grenoble Alpes, CNRS Grenoble INP, France; [2]Schneider Electric SE, France

P8: Modeling & Design Methods for Power Electronics

Chair
Shuai Zhao, *Aalborg University*

#1031 | Advancing Dynamic Modeling of Grid-Connected PV Inverter Using Bi-LSTM-Based AI Model [P8 Posterboard #1]
Sunil Subedi, Yonghao Gui, Yaosuo Xue
Oak Ridge National Laboratory, United States

#1068 | Modeling, Design, and Control of Modular Second Life Batteries Storage Converter [P8 Posterboard #2]
Zakariya Dalala[1], Amy Alkhalifi[2], Zaka Ullah Zahid[3], Osama Saadeh[2]
[1]Abdullah Al Salem University, Kuwait; [2]German Jordanian University, Jordan; [3]University of Engineering and Technology, Peshawar, Pakistan

#1666 | ZVS Region Expansion for Three-Phase Dual Active Bridge Based on Design of Wye-Asymmetric Extended Delta Transformer [P8 Posterboard #3]
Mohamed Mansour, Joseph Olorunfemi Ojo
Tennessee Technological University, United States

#1828 | Design Optimization Method of MHz-Frequency Planar Magnetics [P8 Posterboard #4]
Zahra Saadatizadeh[1], Pedram Chavoshipour Heris[2], H. Alan Mantooth[2]
[1]Mississippi State University, United States; [2]University of Arkansas, United States

#2345 | Data-Driven Adaptive Gain Tuning for Stability Assurance in Islanded Microgrids with Diesel Generators and Grid-Forming Inverters [P8 Posterboard #5]
Ram Shankar Yallamilli, Xiaonan Lu
Purdue University, United States

#2165 | Phase Current Harmonic Causes, Mitigation, & Effects on Inverter Loss Estimation [P8 Posterboard #6]
Josiah Haruna[1], Ujjwal Kumar[2], Caleb Secrest[2]
[1]Borgwarner, United States; [2]BorgWarner Inc., United States

#2430 | Interactive Oscillation Visualization of Grid Interactive Inverter-Based Resources [P8 Posterboard #7]
Zihao Qin[2], Prajesh Sivakaran[2], Lizhi Ding[2], Xiaonan Lu[2], Shuan Dong[1], Andy Hoke[1], Jin Tan[1]
[1]National Renewable Energy Laboratory, United States; [2]Purdue University, United States

#1465 | Modular Controllable Transformer — A 5-MVA, 24-kV Field Power Flow Control Demonstration [P8 Posterboard #8]
Decheng Yan[2], Joseph Benzaquen[2], Deepak Divan[2], Moazzam Nazir[1], Gokhan Ozkan[1], Johan Enslin[1], Satish Belkhode[3], Emre Durna[4]
[1]Clemson University, United States; [2]Georgia Institute of Technology, United States; [3]Indian Institute of Technology Roorkee, India; [4]Maschinenfabrik Reinhausen GmbH, Germany

P9: Modern Control Strategies for Grid-Connected & Multilevel Converters

Chairs
Suyong Chae, *Pohang University of Science and Technology*
Yeonho Jeong, *The University of Rhode Island*

#1056 | Multifunctional Control of Grid-Connected Converters with Model Predictive Control and Disturbance Observer [P9 Posterboard #1]
Arttu Ruusila[2], Petros Karamanakos[2], Marko Hinkkanen[1]
[1]Aalto University, Finland; [2]Tampere University, Finland

#1646 | An Indirect Model Predictive Control for Matrix Converters [P9 Posterboard #2]
Baiqi Dai[2], Massimiliano Passalacqua[2], Petros Karamanakos[1], Andrea Formentini[2], Mario Marchesoni[2]
[1]Tampere University, Finland; [2]Università di Genova, Italy

#1697 | GFM Controlled PEBB-Based Multi-Port Converter for District Energy Systems [P9 Posterboard #3]
Dongsen Sun[2], Nathaniel Hawes[1], Hanchao Liu[2], Philip Hart[2], Ibrahima Ndiaye[2]
[1]GE Aerospace, United States; [2]GE Vernova Advanced Research Center, United States

#1836 | Inverse Nyquist Stability Analysis for Parallel-Connected Wave Energy Converters Under Weak Grid Conditions [P9 Posterboard #4]
Vikram Roy Chowdhury, Kumaraguru Prabakar, Ben McGilton
National Renewable Energy Laboratory, United States

#2068 | An Improved Model-Free Adaptive Control Method to Enhance Dynamic Performance of VOC Grid Forming Inverters [P9 Posterboard #5]
Pengfei Qi[1], Hang Zhang[1], Alian Chen[1], Cheng Cheng[1], Yan Wang[2], Kun Qin[2]
[1]Shandong University, China; [2]State Grid Shandong Electric Power Company, China

#2072 | Seamless Switching Strategy Between Grid-Following and Grid-Forming Control Methods for Grid-Connected Inverters [P9 Posterboard #6]
Jiao Du[1], Hang Zhang[1], Alian Chen[1], Cheng Cheng[1], Hong Tang[1], Jinghua Li[2], Minglin Liu[2], Jianxiu Li[2]
[1]Shandong University, China; [2]State Grid Shandong Electric Power Company, China

#2073 | Accelerating Online Optimization with Differentiable Predictive Control in Power Electronics [P9 Posterboard #7]
Yuan Li, Shuai Zhao, Mateja Novak, Yongjie Liu, Huai Wang, Frede Blaabjerg
Aalborg University, Denmark

#2078 | Disturbance Observer-Based Neutral-Point Voltage Balance Control for Three-Level Grid-Forming Inverter [P9 Posterboard #8]
Hong Tang, Cheng Cheng, Yaopeng Huang, Alian Chen, Tong Liu
Shandong University, China

#2162 | A Current-Sensorless Quasi-Resonant Control for Flyback Inverters with Low Switching Losses [P9 Posterboard #9]
Julio Dias, Victor Gruner, Luiz Gili, Matheus de Lima, Eduardo Behr, Roberto Coelho, Lenon Schmitz
Federal University of Santa Catarina, Brazil

#2193 | A Central-Controller-Contained, (Equivalent) Fully Distributed Control Scheme for Two-Stage Controlled Grid-Tied Power Inverters with Delay [P9 Posterboard #10]
Boya Wang, Navid Rahbariasr, Matthias Preindl
Columbia University, United States

#2196 | Computationally Efficient Multistep Model Predictive Control for Multilevel Converters [P9 Posterboard #11]
Alberic Benjamin[4], Pablo Poblete[4], Majid Farhangi[3], Rodrigo Cuzmar[4], George Papafotiou[2], Tobias Geyer[1], Ricardo Aguilera[4]
[1]ABB System Drives, Switzerland; [2]Eindhoven University of Technology, Netherlands; [3]University of New South Wales, Australia; [4]University of Technology Sydney, Australia

#1527 | Unified Modulation Strategy for Leakage Current Suppression in Three-Phase Transformerless Grid-Connected Converter [P9 Posterboard #12]
Juwon Lee, Dongsu Lee, Jung-Ik Ha
Seoul National University, Korea

#1480 | Enhanced Neutral Point Voltage Control in ANPC Inverters via System Identification [P9 Posterboard #13]
Shaozhe Wang[2], Ankit Vivek Deshpande[2], Rolando Sandoval[2], Erick Pool-Mazun[2], Enrique Garza-Arias[1], Prasad Enjeti[2]
[1]Tecnológico de Monterrey, Mexico; [2]Texas A&M University, United States

#1756 | A Single PWM Controlled Li-Ion Based Bidirectional Battery Charger for Household Applications [P9 Posterboard #14]
Manish Kumar, Vivek Nandan Lal, Rajeev Kumar Singh
Indian Institute of Technology (Banaras Hindu University) Varanasi, India

#2144 | Adaptive Fault-Tolerant Data-Driven Control of Multilevel Pec Inverter via Soft Reinforcement Learning Under Switching-Level Transition [P9 Posterboard #15]
Arman Fathollahi[1], Mohammad Sharifzadeh[2], Soroush Oshnoei[1], Meysam Gheisarnejad[2], Eric Laurendeau[2], Kamal Al-Haddad[2]
[1]Aarhus University, Denmark; [2]École de Technologie Supérieure, Université du Québec, Canada

#2214 | Online Voltage Measurement Error Compensation Method for Three-Phase Voltage Source Inverters [P9 Posterboard #16]
Xiaochen Wu[1], Zeng Liu[1], Wenchen Wang[1], Jiayu Shang[1], Jinjun Liu[1], Qingbin Wang[2], Ming Ma[2], Huabao Zhu[2]
[1]Xi'an Jiaotong University, China; [2]Yunfu Power Supply Bureau of Guangdong Power Grid Co., Ltd., China

P10: High-Speed Machines, Bearingless Machines & Machines for Sustainable Transportation

Chair
Stefano Nuzzo, *University of Modena and Reggio Emilia*

#1494 | An Improved Discontinuous PWM Scheme for MMC in AC Machine Drive Applications [P10 Posterboard #1]
Duc Dung Le, Shahid Aziz Khan, Shivam Chaturvedi, Mahdi Ghavaminejad, Mengqi Wang
University of Michigan-Dearborn, United States

#1571 | Optimization of a Permanent Magnet Shaft Generator System for Large Vessels [P10 Posterboard #2]
Hyeon-Jeong Bak[2], Min-Jun Cho[2], Ruzsa János[3], Sang-Hyun Kim[4], Seung-Ki Sul[1]
[1]HD Hyundai, Korea; [2]HD Hyundai Electric, Korea; [3]HD Hyundai Electric Hungary Kft., Hungary; [4]HD Korea Shipbuilding & Offshore Engineering, Korea

#1781 | Vehicle Driving Energy Consumption Analysis Using Real-World Data [P10 Posterboard #3]
Md. Mizanur Rahman, Daniela Wolter Ferreira Touma
University of South Alabama, United States

#1977 | Speed Sensorless Control for a Bearingless Permanent Magnet Synchronous Machine [P10 Posterboard #4]
Laura Homiller, Lei Zhou
University of Wisconsin–Madison, United States

#1980 | Sensorless Stabilization of Electrodynamic Thrust Self-Bearing Machines [P10 Posterboard #5]
Adrien Robert, Joachim Van Verdeghem, Bruno Dehez
Université Catholique de Louvain, Belgium

#2009 | Proposal of High-Power Bearingless Machines for Flying Cars and eVTOLs [P10 Posterboard #6]
Hisato Nakamura, Hiroya Sugimoto
Tokyo Denki University, Japan

#2231 | Novel Five-Axis Actively Positioned Multi-Monopole Bearingless Motor with Two Three-Phase Combined Windings [P10 Posterboard #7]
Shoma Kono, Masahisa Sakai, Riku Wakida, Hiroya Sugimoto
Tokyo Denki University, Japan

P11: Modelling & Analysis of Electrical Machines II

Chair
Alireza Fatemi, *General Motors*

#1175 | Integrated Induction Machine Eccentricity Modeling for Linear Amplifier Based Emulation [P11 Posterboard #1]
Solihah Sharief Shiekh, Pragasen Pillay
Concordia University, Canada

#1183 | Performance Study of a Surrogate Model-Assisted Optimization for Electric Machines [P11 Posterboard #2]
Hiroyuki Sano, Shogo Asahino, Kenta Kato, Koji Tani, Takashi Yamada
JSOL Corporation, Japan

#1217 | Inductance Modeling and Harmonic Compensation of a Symmetric Dual Three-Phase PMSM with Distributed Windings Under Single Three-Phase Operation [P11 Posterboard #3]
Yongtae Kim[2], Bon-Gwan Gu[2], Sungyong Park[1], Jongkyong Lim[1], Honnyong Cha[2], Jaeseong Lim[2]
[1]Hyundai Motor Company, Korea; [2]Kyungpook National University, Korea

#1222 | Hybrid Magnetic Circuit Modeling for Interior Permanent Magnet Synchronous Motors [P11 Posterboard #4]
Kangyeon Kim, Sungwon Cho, Minkyun Noh
Korea Advanced Institute of Science and Technology, Korea

#1249 | Development of Real-Time Temperature Prediction Technology for LPIT [P11 Posterboard #5]
Jun-Kyu Park[1], Francesco Toso[2], Ki-Dong Song[1], Yeonho Oh[1], Hyun-Mo Ahn[1]
[1]Korea Electrotechnology Research Institute, Korea; [2]Newtwen s.r.l., Italy

#1315 | Design and Analysis of a Novel Asymmetric-Magnet-Layer Variable Flux Memory Machine [P11 Posterboard #6]
Qichu An[3], Hui Yang[3], Rui Tu[3], Dabin Liu[3], Yixian Wang[4], Shuhua Fang[3], Heyun Lin[3], Shuilian Xue[2], Liang Chen[1]
[1]Midea Group Co., Ltd., China; [2]Nanjing Moral Testing and Certification Co., Ltd., China; [3]Southeast University, China; [4]State Grid Anhui Electric Power Company, China

#1385 | Dynamic Phasor Model of Synchronous Generator in Islanded Condition [P11 Posterboard #7]
Pallavi Ghimire[3], Samip Poudel[3], Mariko Shirazi[2], Donald Hummels[3], Reinaldo Tonkoski[1]
[1]Technical University of Munich, Germany; [2]University of Alaska Fairbanks, United States; [3]University of Maine, United States

#1758 | Performance Comparison of Stator Windings in Permanent Magnet Motors for Submerged Liquid Hydrogen Pumps [P11 Posterboard #8]
Yan Zhang, Yuanzhi Zhang, Dawei Li, Chang Wang, Ronghai Qu, Zhenglin Li, Fulang Liu
Huazhong University of Science and Technology, China

#1917 | Optimized Design of a High-Torque-Density Permanent Magnet Synchronous Motor with Asymmetric Consequent Poles [P11 Posterboard #9]
Yuka Kobayashi, Kazuhisa Iwata, Hidenori Sasaki
Hosei University, Japan

P12: Noise, Vibration, Reliability, Machine Diagnostics & Protection

Chair
Jose Antonino-Daviu, *Universitat Politecnica de Valencia*

#1139 | Parasitic Capacitance and Shaft Voltage Characteristics According to Rotor Types in Motors [P12 Posterboard #1]
Jun-Hyeok Heo[1], Byoung-Wook Jo[1], Jun-Kyu Kang[2], Jin Hur[1]
[1]Incheon National University, Korea; [2]SGP Co., Ltd, Korea

#1141 | Effect of FPCB-Based Shield Material on Shaft Voltage Considering Skin Effect [P12 Posterboard #2]
Dae-Hyeon Kim, Jun-Hyeok Heo, Jin Hur
Incheon National University, Korea

#1326 | Vibration Monitoring of PM Motors Using Electromagnetic Stress Harmonic Excitation [P12 Posterboard #3]
Supratap Sengupta, Baylon Godfrey Fernandes
Indian Institute of Technology Bombay, India

#1481 | Fault-Tolerant Control of Interturn Short-Circuits in SPMSM by Using MTPCC [P12 Posterboard #4]
Shaopo Huang[1], Jun Su[1], Anmol Aggarwal[3], Jose Bernardes Jr.[2]
[1]Beijing Institute of Petrochemical Technology, China; [2]Centro Universitário da FEI, Brazil; [3]Michigan State University, United States

#1707 | Simulation-Based Shaft Voltage Reduction Through Structural Modifications for Bearing Electrical-Erosion Prevention [P12 Posterboard #5]
Ji-Hyeon Lee[1], So-Yeon Im[1], Du-Ha Park[1], Jae-Woong Jung[2], Myung-Seop Lim[1]
[1]Hanyang University, Korea; [2]Samsung Electronics, Korea

#2224 | Induction Motor Machine Learning-Based Eccentricity Fault Detection Using Magnetic Flux Measurement [P12 Posterboard #6]
Obinna Onodugo, Gordon Asante, Emmanuel Agamloh
Baylor University, United States

#1461 | Integrated Zero-Sequence Current Filter for Open-End Winding Permanent Magnet Synchronous Motor [P12 Posterboard #7]
Junhyuk Im, Mostafa Fereydoonian, Woongkul Lee
Purdue University, United States

P13: Predictive & Fault-Tolerant Control Strategies for AC Motor Drives

Chairs
Liwei Zhou, *University of Texas at Arlington*
Yaser Chulaee, *Lennox International Inc.*

#1109 | Frequency-Varying Harmonic Domain Control for PMSMs with Current Harmonic Mitigation [P13 Posterboard #1]
Maxime Grosso[3], Pierre Riedinger[2], Jamal Daafouz[2], Sergie Pierfederici[2], Hicham Janati Idrissi[1], Blaise Lapôtre[1]
[1]Safran Electronics & Defense, France; [2]Université de Lorraine, France; [3]University of Lorraine / Safran Electronics & Defense, France

#1130 | Gradient-Based Predictive Pulse Pattern Control with Optimal Active Neutral Point Potential Balancing for Five-Level Medium-Voltage Drives [P13 Posterboard #2]
Ilari Hilden[2], Petros Karamanakos[2], Tobias Geyer[1]
[1]ABB System Drives, Switzerland; [2]Tampere University, Finland

#1218 | Natural Fault-Tolerant Performance Comparison of Symmetrical Six-Phase Vernier PM Motor with Single and Isolated Neutral Points [P13 Posterboard #3]
Yicen Tian, Xianglin Li, Jun Dai, Wenbo Dai
Qingdao University, China

#1220 | A Novel Double-Vector Model-Free Predictive Current Control for Symmetrical Six-Phase Surface Vernier PM Motor [P13 Posterboard #4]
Jun Dai[2], Xianglin Li[2], Yicen Tian[2], Wenbo Dai[2], Kai Wang[1]
[1]Nanjing University of Aeronautics and Astronautics, China; [2]Qingdao University, China

#1293 | Linear Modulation Range Extension for Five-Phase Motor Drives Under Fault-Tolerant Operation [P13 Posterboard #5]
Xinyi Hu[3], Bin Li[3], Feng Xu[2], Yong Li[1], Guidan Li[3], Xiaochen Ma[3]
[1]China Three Gorges University, China; [2]State Grid Zhejiang Electric Power Company Ltd, China; [3]Tianjin University, China

#1314 | Model-Free Predictive Control of PMSMs Assisted by Modified Cascaded Extended State Observers [P13 Posterboard #6]
Zhaoyi Wang[2], Chaewon Jo[2], Heewon Koo[2], Hyunwoo Kim[3], Donghoon Jung[1], Ju Lee[2]
[1]Gyeongguk National University, Korea; [2]Hanyang University, Korea; [3]Purdue University, United States

#1862 | Comparative Analysis of CHIL, PHIL, and Dyno Testing for ePowertrain and System Validation [P13 Posterboard #7]
Akm Arafat, Davis Trapp, Mitch Ober, Raef Aidibi
Drive System Design Inc., United States

#2277 | A Frequency-Adaptive Space Vector PWM Control Method for PMSMs Based on Real-Time Torque and Current Ripple Prediction [P13 Posterboard #8]
Theophilus Wakemeh[2], Sodiq Agoro[1], Samuel Osei Fobi[2], Iqbal Husain[2]
[1]ABB Corporate Research Center, United States; [2]North Carolina State University, United States

#1323 | Improved Fault-Tolerant Control of Open-End Winding Induction Motor for Electric Vehicle Applications [P13 Posterboard #9]
Kaif Ahmed Lodi[2], Khaled Ali Al Jaafari[2], Majid Poshtan[1], Apparao Dekka[3], Abdul R. Beig[2]
[1]California Polytechnic State University, United States; [2]Khalifa University, U.A.E.; [3]Lakehead University, Canada

#1074 | Active Damping Method for Drive Cycle Testing of Small Laboratory PMSMs [P13 Posterboard #10]
Pawan Kumar Dhakal, Roland Seebacher, Kourosh Heidarikani, Annette Muetze
Graz University of Technology, Austria

#1556 | Impact Analysis of FCS-MPC on Power Losses of IPMSM Drive Fed by Cascaded H-Bridge Multilevel Inverter [P13 Posterboard #11]
Claudio Nevoloso, Gioacchino Scaglione, Giuseppe Schettino, Antonino Oscar Di Tommaso, Rosario Miceli
Università degli Studi di Palermo, Italy

P14: Modulation & Sensorless Control Strategies for AC Motor Drives

Chairs
David Diaz Reigosa, *Universityt of Oviedo*
Luigi Danilo Tornello, *University of Catania*

#1129 | Three-Level Optimized Pulse Patterns with Eliminated Torque Harmonics [P14 Posterboard #1]
Isavella Koukoula[2], Petros Karamanakos[2], Tobias Geyer[1]
[1]ABB System Drives, Switzerland; [2]Tampere University, Finland

#1138 | Highly Accurate and Stable Position Sensorless Control at Ultra-Low-Speed in IPMSM Drives by Compensating for Dead Time and 6th Harmonic Distortion [P14 Posterboard #2]
Naoto Shibano, Hisao Kubota
Meiji University, Japan

#1156 | Sensorless Speed Control of Brushed DC Motor Using High-Frequency Signal Injection [P14 Posterboard #3]
Nam-Su Kim, Jun-Sik Hwang, Hyeon-Gyu Choi
Incheon National University, Korea

#1421 | DPWM Based ZSV Elimination Strategy for Open-End Winding PMSM Fed by Dual Inverter with Common DC Bus [P14 Posterboard #4]
Elena Macrelli[2], Hyeonseong Kim[1], Kibok Lee[1]
[1]Korea University, Korea; [2]Università di Bologna, Italy

#1803 | Power Ripple Suppression for Double-Phase Open-Circuit Fault-Tolerant Operation of Five-Phase Motors [P14 Posterboard #5]
Xinyi Hu[3], Bin Li[3], Feng Xu[2], Yong Li[1], Guidan Li[3], Xiaochen Ma[3]
[1]China Three Gorges University, China; [2]State Grid Zhejiang Electric Power Company Ltd, China; [3]Tianjin University, China

#2018 | Modulation Strategies for Performance Enhancement of Rare–Earth–Free PM–Assisted SynRMs for EVs [P14 Posterboard #6]
Aiswarya Balamurali, Hossain Mohammadi
Schaeffler Technologies AG & Co. KG, Canada

#2173 | Performance Evaluation of MOS-Gated Thyristors as Auxiliary Switches in the ARCP Inverter [P14 Posterboard #7]
Vignesh Kumar R C[3], Raj Kumar Kokkonda[2], Sneha Narasimhan[1], Shubham Rawat[3], Subhashish Bhattacharya[3]
[1]ABB Corporate Research Center, United States; [2]Delta Electronics (Americas) Ltd. / North Carolina State University, United States; [3]North Carolina State University, United States

#2407 | Switching-Frequency Voltage Injection Method for Low-Speed Sensorless Control Using Three-Shunt Current Sensors in IPMSM Drives [P14 Posterboard #8]
Minha Kim, Byung Ryang Park, Jung-Ik Ha
Seoul National University, Korea

#1905 | Torque Ripple Compensation to Mitigate Electric Machine Harmonics in IPMSM Electric Drives [P14 Posterboard #9]
Arslan Qaiser[2], Biao He[1], Siddharth Ballal[1], Caleb Secrest[2]
[1]BorgWarner, United States; [2]BorgWarner Inc., United States

P15: Gate Drivers & Reliability

Chair
Tanya Gachovska, *MDA*

#1108 | Experimental Comparison of Active Gate Drivers for Drive Inverters Using SiC MOSFETs [P15 Posterboard #1]
Jan Niclas Laumann, Julius Wiesemann, Axel Mertens
Leibniz University Hannover, Germany

#1285 | Driving WBG Bidirectional Power Switches with Universal Drain-Centered Bootstrap Gate Driver [P15 Posterboard #2]
Fei Zhou[2], Orlando Lazaro[1], Tim Merkin[1], Lei Chen[1], Dongsheng Brian Ma[2]
[1]Texas Instruments, United States; [2]University of Texas at Dallas, United States

#1349 | Concentric Circular Coil-Based Coreless PCB Coupler for Medium Voltage Gate Drivers with an Ultra Low Parasitic Capacitance [P15 Posterboard #3]
Wenjie Xu[2], Junwei Liu[2], Hai Xu[2], Taiming Chen[2], Xiaobiao Wang[2], Kerui Li[1], Yi Zhang[2]
[1]City University of Hong Kong, China; [2]Hong Kong Polytechnic University, China

#1583 | Adaptive Gate Driver Enabling Thermal Control of GaN GITs by Device Loss Manipulation [P15 Posterboard #4]
Tianlong B. Albert, Tudor Sechel, Tobias Kamp, Rik W. De Doncker
ISEA – RWTH Aachen University, Germany

#2153 | Evaluation of Power Cycling-Induced Degradation in High-Power GaN HEMTs and Identification of a Reliable Failure Indicator [P15 Posterboard #5]
Khandaker Lubaba Bashar, Md Rishad Ahmed, Fatma Khera, Liliana De Lillo, Lee Empringham, Pearl Agyakwa
University of Nottingham, United Kingdom

#2359 | Self-Powered Gate Drive for Series Connected SiC MOSFETs in MV Applications [P15 Posterboard #6]
Junghoon Kim, Taewoo Kim, Woongkul Lee
Purdue University, United States

#2435 | Dynamic Redistribution of Switching Losses in Parallel Connected SiC MOSFETs for Active Thermal Balance [P15 Posterboard #7]
Dimitrios Deldimos, Fausto Stella, Gianmario Pellegrino
Politecnico di Torino, Italy

#1113 | Detection of Bond Wire Lift-Off Using a Parallel Resonant Tank Circuit During Gate Turn-Off [P15 Posterboard #8]
Keqi Song, Henry Shu-Hung Chung
City University of Hong Kong, Hong Kong

P16: Sensing & Control

Chairs
Mark Scott, *Miami University*
Jessica Boles, *University of California, Berkeley*

#1478 | A Generic Isolated Energy Probe for High-Side Switching Loss Measurement [P16 Posterboard #1]
Chi-Yuan Huang, Yaow-Ming Chen
National Taiwan University, Taiwan

#1522 | A Novel Voltage Balance Method Based on Drive Delay Control for IGCT Series Application [P16 Posterboard #2]
Jiahao Guo[2], Shibin Wang[1], Bin Cui[2], Xiangcheng Zhang[1], Lu Qu[2], Liantao Liu[1], Zongze Wang[2], Zhanqing Yu[2]
[1]State Grid Qinghai Electric Power Co., Ltd., China; [2]Tsinghua University, China

#1558 | An Open-Ended Flexible Printed Circuit Board Rogowski Coil with High Bandwidth [P16 Posterboard #3]
Xingyue Tian[2], Hua Kevin Bai[2], Fred Wang[2], Jason Swaim[1], Michael Zimmermann[1], Hal Paver[1]
[1]Keysight Technologies, United States; [2]University of Tennessee, Knoxville, United States

#1618 | Fault Current Limiting Control of Solid-State Circuit Breakers for Protection Coordination in DC Distribution [P16 Posterboard #4]
Zhou Dong, Govind Chavan, Chunmeng Xu, Abhinav Patni, Pietro Cairoli
ABB Corporate Research Center, United States

#1663 | Si IGBT and SiC MOSFET Hybrid Solid-State Circuit Breaker-Based Motor Control Center [P16 Posterboard #5]
Jiale Zhou, Xiuhu Sun, Qiang Mu, Tiefu Zhao
University of North Carolina at Charlotte, United States

#1695 | Synthesis of Different Controllers in a Latent Linear Subspace for Power Converter [P16 Posterboard #6]
Jianwu Zeng
Minnesota State University, United States

#2205 | Sensitivity Analysis and Control of Induction Cooktop for Non-Ferromagnetic Cookware [P16 Posterboard #7]
Subhajyoti Mukherjee, Vandana Rallabandi
Oak Ridge National Laboratory, United States

#1710 | A Breakerless Solid-State Protection Scheme for VSC-Based DC Microgrids [P16 Posterboard #8]
Jinzhuo Bai, Li Qi, Ting Wang, Yeji Jiang, Xuemeng Zhang, Zhiguo Hao
Xi'an Jiaotong University, China

#1244 | Flying Capacitor Voltage Control with Delta-Sigma Modulation to Reduce the Flying Capacitor and the Switching Frequency for a Three-Level Flying Capacitor Topology [P16 Posterboard #9]
Jannik Maier, Philipp Czerwenka, Eckhard Hennig, Ertuğrul Sönmez, Gernot Schullerus
Reutlingen University, Germany

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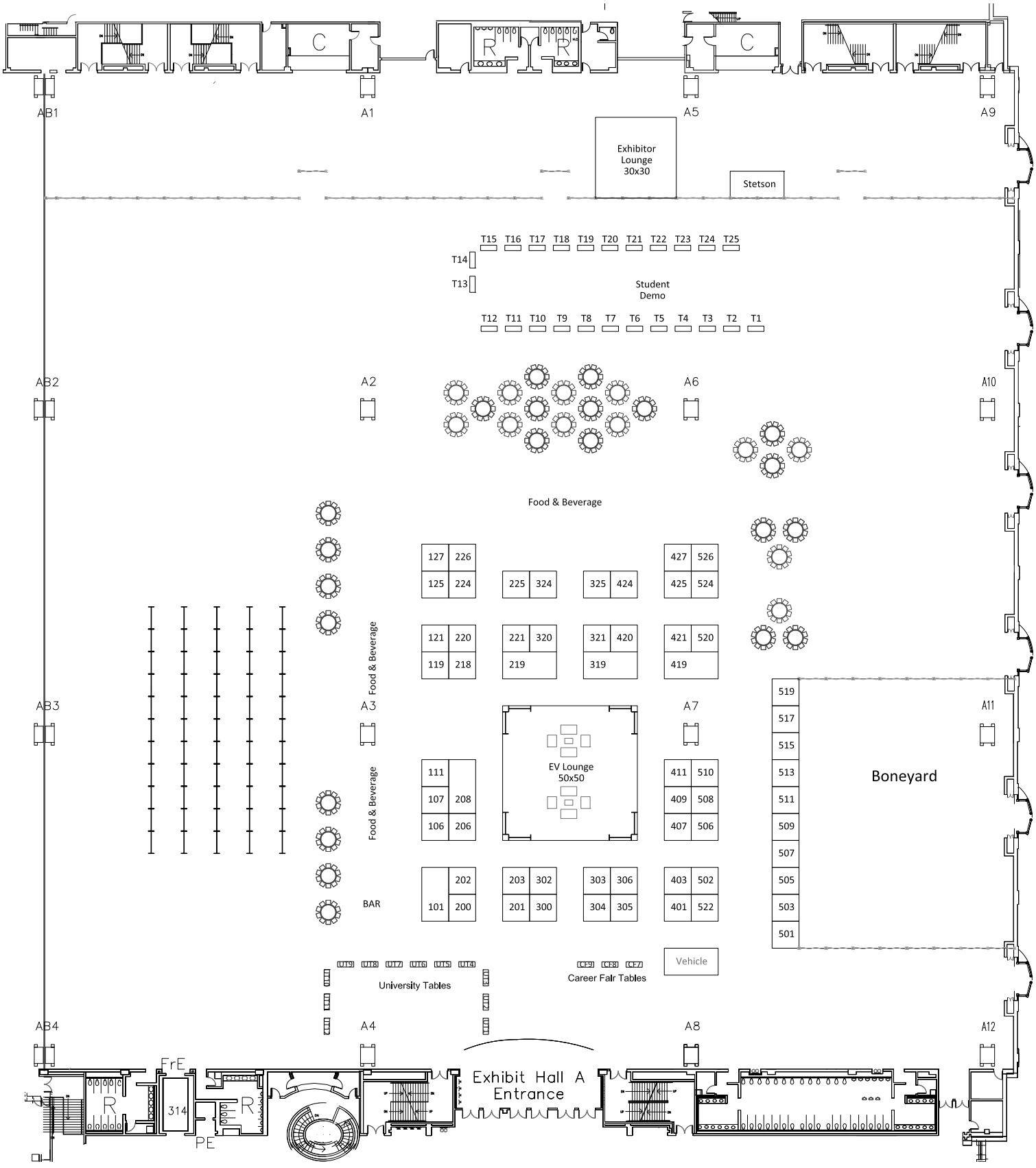

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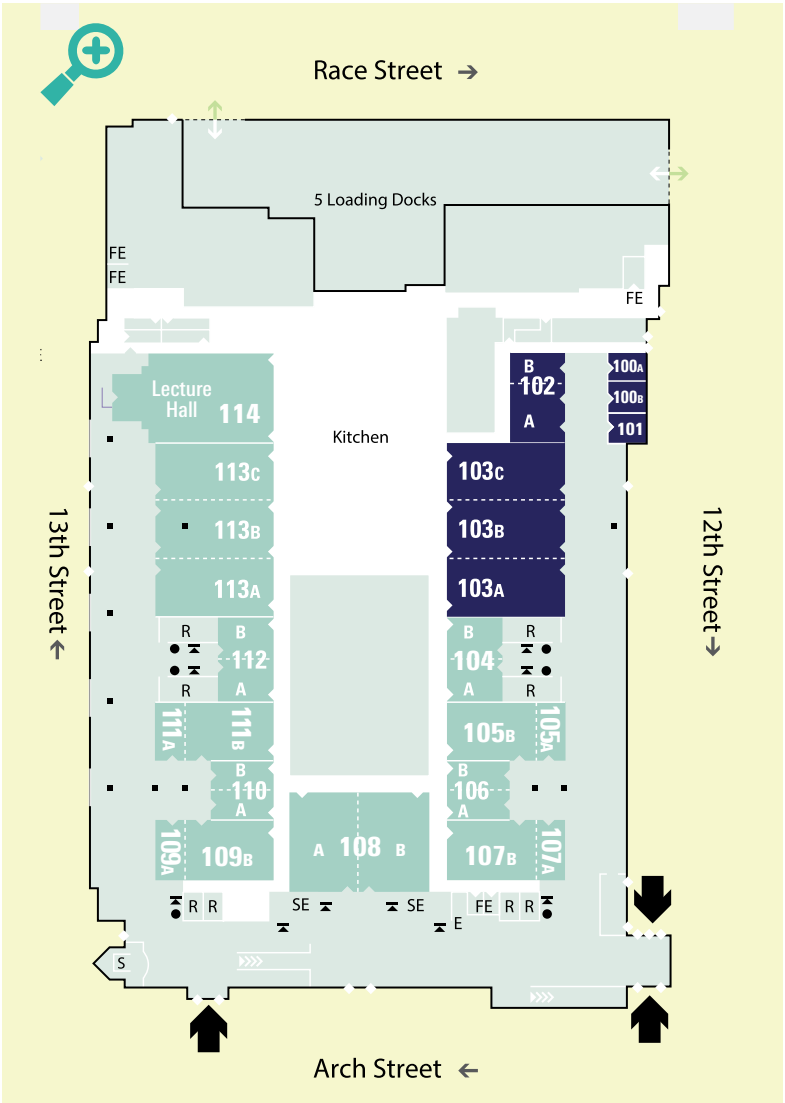

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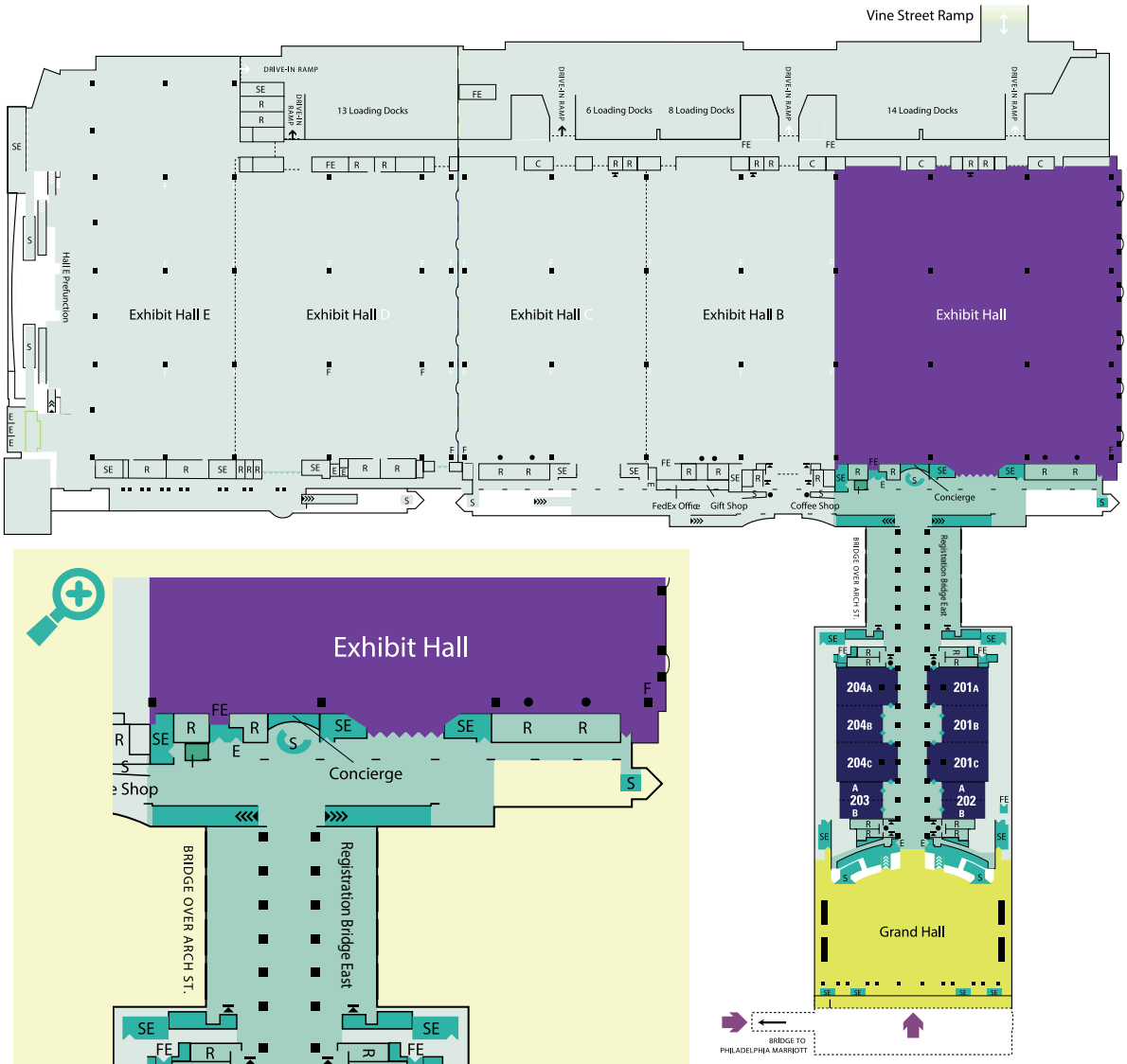
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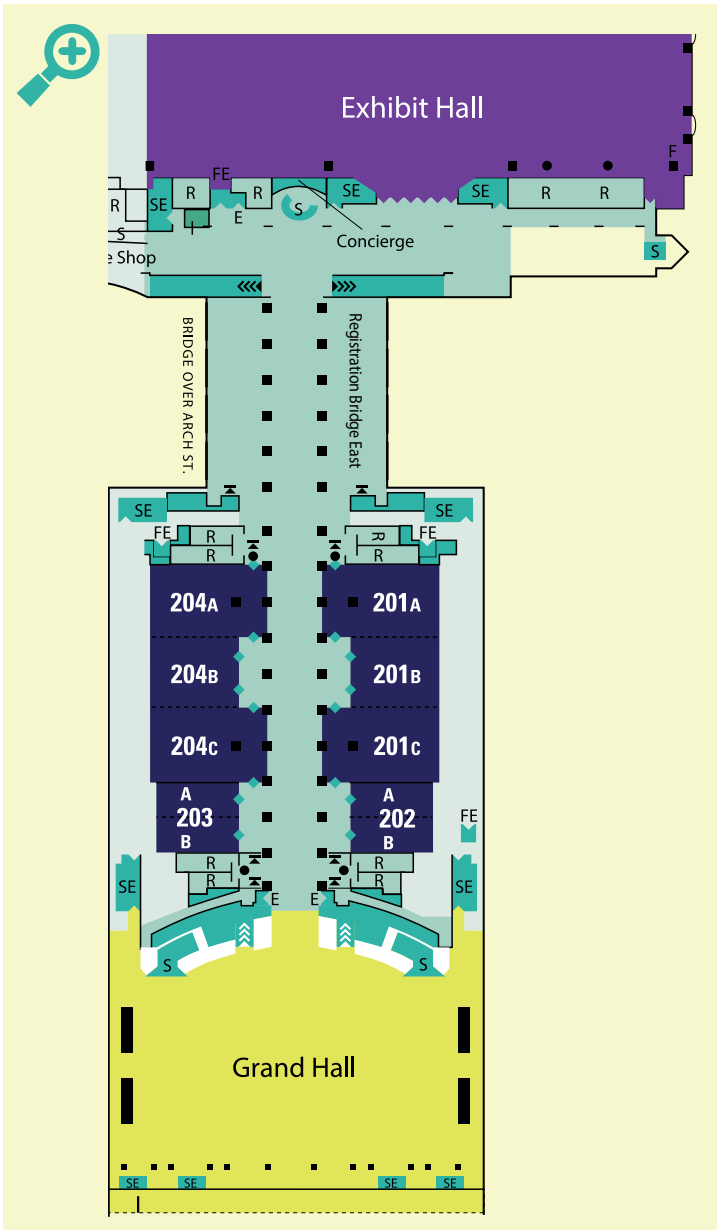
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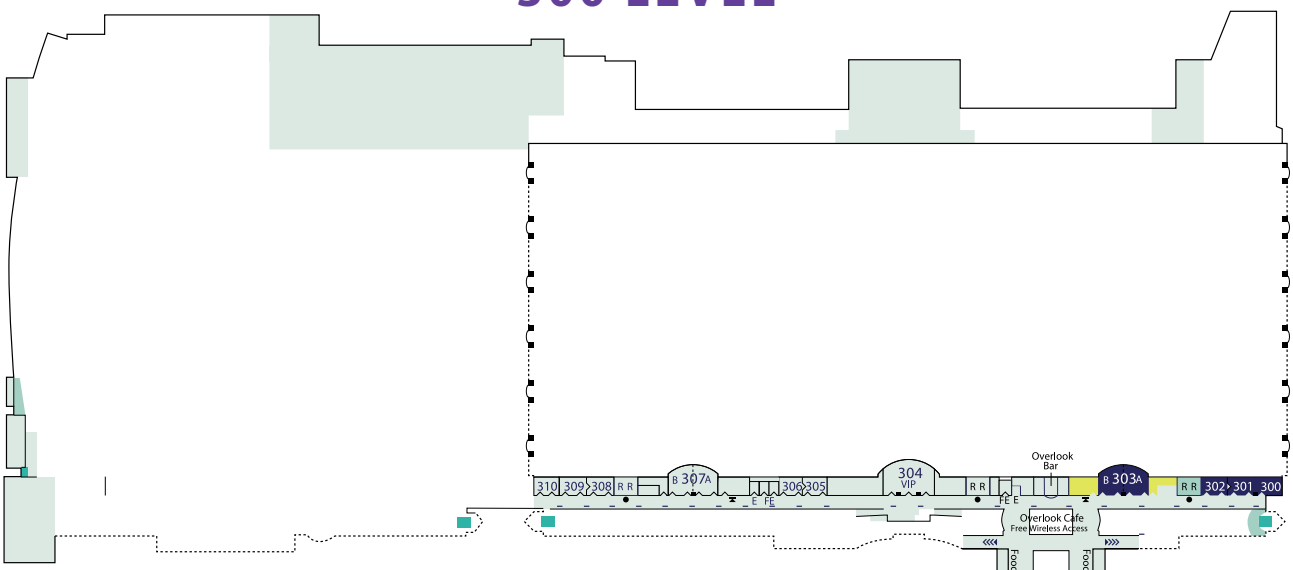
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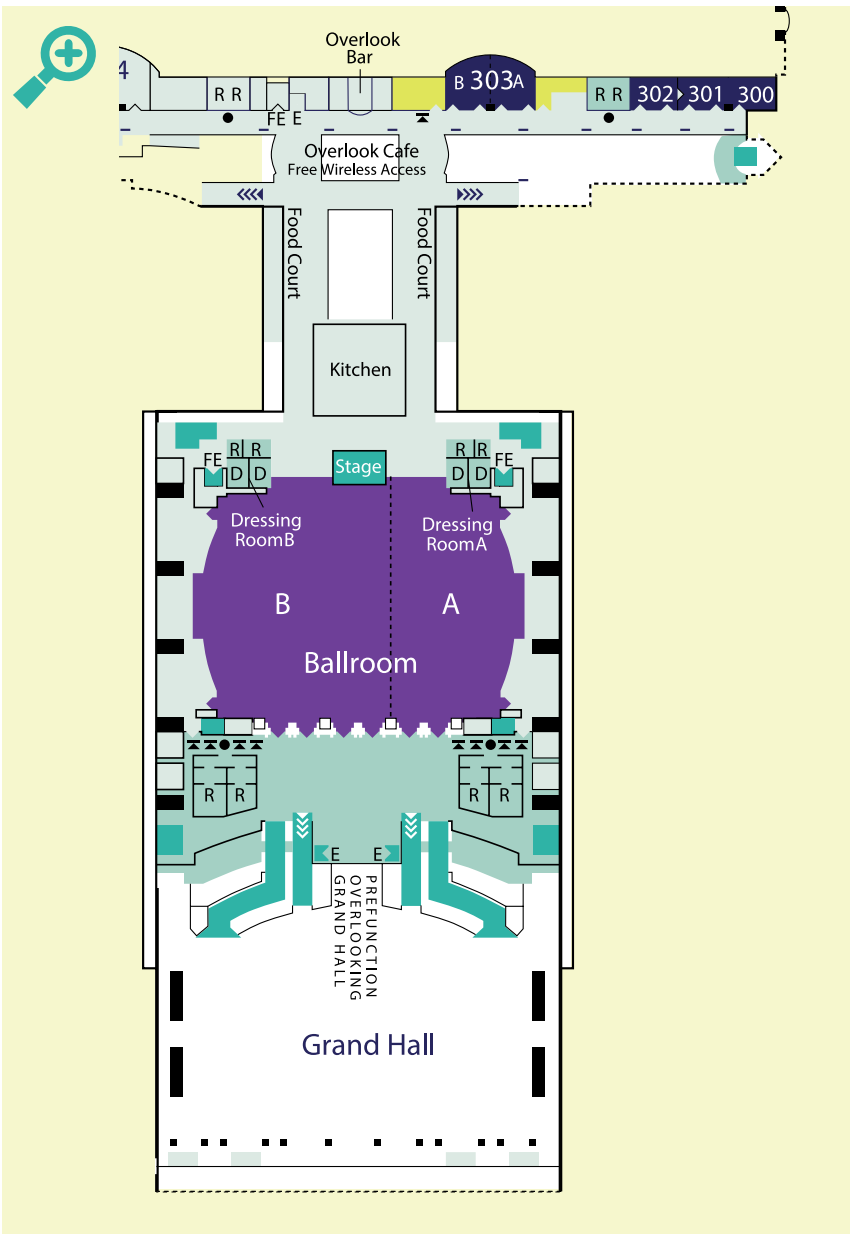
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Stage
Dressing RoomB
Dressing RoomA
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Ballroom
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Student Demonstrations

Open – Monday, October 20 **5:00PM – 7:00PM**
Judging – Tuesday, October 21 **1:00PM – 3:00PM**

Exhibit Hall A

Student Demonstrations provide an opportunity for students from various universities and countries to showcase their emerging technology research outcomes and interact with academia and industry.

Table 1 | A 2 kV, 20 kVA SiC Based H-bridge Inverter Module

Demonstrator: Jenson Joseph Attukadavil

Indian Institute of Technology Bombay, India

Table 2 | Forecast-Driven Stochastic MPC for Cost- and Emission-Aware Home Energy Management Systems

Demonstrator: Asmaa Romia

Colorado School of Mines, USA

Table 3 | A 1300 V/60 A Double-side Cooling GaN Half-bridge Power Module with Active Clamping Voltage Control

Demonstrators: Jie Deng, Guangyu yan

Arizona State University, USA

Table 4 | 15kW Ultrahigh Efficiency Bidirectional dc-dc Converter for Energy Storage and Super Charger Applications

Demonstrators: Zhengming Hou, Dong Jiao

Virginia Tech, USA

Table 5 | 800V/6.6kW Single Stage On-board Charger

Demonstrator: Xiaozhou Wang

Hefei University of Technology, China

Table 6 | Magnetic Concrete for Wireless Power Transfer

Demonstrator: Xiuhu (Mason) Sun

The University of North Carolina at Charlotte, USA

Table 7 | Design of a 48 V-to-6 V 2 kW high power density LLC resonant Converter for Data Center Applications

Demonstrators: Li-Chen Yu, Shang-Syun Wu, Yu chun Lee

National Taipei University of Technology, Taiwan

Table 8 | Reliability Characterization Platform with In-Circuit Characterization and Online Monitoring of GaN HEMTs

Demonstrators: Dilip Rana, Tian Qiu

Rensselaer Polytechnic Institute, USA

Table 9 | Grid-Interface Second-Life Battery Energy Storage System Equipped with Reconfigurable Partial Power Processing Network

Demonstrator: Rupeng Duan

University of California, Los Angeles, USA

Table 10 | Visual SLAM with OCR Integration for Indoor Semantic Mapping on Raspberry Pi 5

Demonstrators: Joseph Fatoye, Ayomiposi Laide-Muibi, Joshua Bassey

Bowen University, Nigeria

Table 11 | EMI-Self-Contained Power Module Design

Demonstrators: Yirui Yang, Qinghui huang, Yanwen Lai

University of Florida, USA

Table 12 | Single-Stage Three-Phase Cyclo-Active-Bridge Inverter with Decoupled Control and Multi-Inverter Mini-Grid Power Sharing

Demonstrators: Mian Liao, Tanuj Sen

Princeton University, USA

Table 13 | A Magnetically Integrated Machine Drive with Stator Field-Excited Electric Machines

Demonstrators: Mostafa Fereydoonian, Avinash Dornala

Purdue University, USA

Table 14 | Compact Capacitive Wireless Charger for Electric Vehicles

Demonstrators: Raquel Sarabia-Soto, Dheeraj Etta, Syed Saeed Rashid

Cornell University, USA

Table 15 | PCB Windings with Integrated Power Electronics for Radial-Flux Electric Machines

Demonstrator: Immanuel Williams

University of Wisconsin - Madison, USA

Table 16 | Modular Multilevel Series Parallel Converter based Grid-Connected Battery Energy Storage System

Demonstrators: Rishab Anand, Peng Han

University of Texas at Austin, USA

Table 17 | An Integrated Dual-Input Converter for Modular Reconfigurable Battery Packs with Battery Voltage Balancing and DC Bus Regulation Capability

Demonstrator: Kausik Biswas

Indian Institute of technology Bhubaneswar, India

Table 18 | Dynamic Charging in Electric Vehicle Battery

Demonstrators: Rohith Mandepudi, Pavani Nellutla, Shiva Bhargavi

Vardhaman College of Engineering , India

Table 19 | Efficient and Lightweight Wireless Energy Harvesting System for Unmanned Aerial Vehicle

Demonstrators: Chen Chen, Ben Zhang, Tianlu Ma

City University of Hong Kong, China

Table 20 | New Techniques for Electric Machine Diagnostics Using Advanced Signal Processing and Machine Learning

Demonstrator: Obinna Onodugo

Baylor University, USA

Table 21 | High Step-down Multifactorial Isolated DC-DC Converter

Demonstrator: Aswin Palanisamy

University of Technology Sydney, Australia

Table 22 | Embedded KalmanNet for Real-Time Supercapacitor SOC and Battery SOH Estimation

Demonstrator: Islam Sayed

Kennesaw State University, USA

Table 23 | High Density dc/dc Resonant Switched Capacitor Converter (RSCC)

Demonstrator: Sadegh Esmaeili Rad

University of Illinois Chicago, USA

Table 24 | Towards the True Zero-Voltage-Switching Boundary

Demonstrator: Wucheng Ying

University of Cambridge, UK

Table 25 | Technological Regenerative Innovation (TRI) Framework

Demonstrator: Nouman Ahmed

IUSS Pavia, Italy

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How2power.com is a free power electronics website for engineers. Great source of practical power design information. Read in-depth technical articles on power supply design, plus power component news and more in our e-newsletter, How2Power Today. Browse our special sections on Power Magnetics, SiC & GaN technology, EMI/EMC, Space Power and other topics. Find power electronics experts in the Consultants Corner directory. Browse or search our Industry Events calendar with over 500 events listed for 2025!

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SILVER

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Austria
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United States
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JMAG Business Company, JSOL Corp. — BOOTH 506

Japan
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United States
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Canada
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United States
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Typhoon HIL is the market leader in ultra-high-fidelity Hardware-in-the-Loop (HIL) solutions, that accelerate innovation in power electronics, e-Mobility, and grid modernization applications. Our vertically integrated solutions unlock value stacking, enabling customers to accelerate time to market while reducing costs and enhancing quality. Committed to technical and business excellence, our mission is to engineer and promote environmentally sustainable power technologies that scale.

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United States
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UNIVERSITY TABLETOPS

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United States
www.uconn.edu

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Concordia University — UNIVERSITY TABLETOP 7

Canada
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The Power Electronics and Energy Research (PEER) Group was initiated at Concordia University in 1986. The research of the group is supported by various grants from Federal and Provincial Agencies, as well as industry. The PEER Group offers a program in static power converters, electric machines, drives and renewable energy that serves students at the university as well as engineers already established in the industry.

Lehigh University — UNIVERSITY TABLETOP 2

United States
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SUNY University at Stony Brook — UNIVERSITY TABLETOP 8

United States
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Texas A&M University — UNIVERSITY TABLETOP 3

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United States
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University of Wisconsin – Madison/WEMPEC

UNIVERSITY TABLETOP 5

United States
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United Kingdom
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Center for Power Electronics Systems, Virginia Tech

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United States
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United States
www.corepowermagnetics.com

CorePower Magnetics™ manufactures advanced magnetic components for high-power, medium-frequency applications across data centers, grid, microgrid, EV infrastructure, and industrial systems. Our production-ready, nanocrystalline-core standard inductors deliver higher efficiency, lower losses, and a smaller footprint. In addition to our standard CPMLMAX™ inductors, we offer engineered-to-order transformers, inductors, and rare-earth-free motors from our ISO 9001-certified, vertically integrated U.S. facility.

Delta Electronics

BOOTH 321

United States
www.deltaww.com/en-US/index

Delta, founded in 1971, is a global provider of power and thermal management solutions. Its mission statement, "To provide innovative, clean and energy-efficient solutions for a better tomorrow," focuses on addressing key environmental issues such as global climate change. As an energy-saving solutions provider with core competencies in power electronics and automation, Delta's business categories include Power Electronics, Mobility, Automation, and Infrastructure.

DEWETRON, Inc.

BOOTH 224

United States
www.dewetron.com

Welcome to DEWETRON. We are a pioneering force in the world of measurement systems, committed to pushing the boundaries of what's possible. At DEWETRON, we don't just deliver data – we provide insights that drive progress. Our cutting-edge technology, exceptional quality, and dedicated team make us the measurable difference.

Discrete Signal Power Systems, LLC. BOOTH 111

Unite States
www.dsps-llc.com

DISCRETE SIGNAL POWER SYSTEMS

DSPS LLC is debuting our elegant bidirectional isolated power converter technology. Our architecture enables simple and robust harmonically controlled buck boost voltage regulation. Data for the technology is available for DC/DC and multiport applications evaluated using our single stage synchronous generalized (AC&DC/DC&AC) regulator. Our team is prepared to discuss opportunities across a wide range of applications with emphasis on performance, parts count, and efficiency. Please come visit if you share our passion for the science and engineering behind data driven power converter design.

dSPACE Inc. BOOTH 409

United States
www.dspace.com/en/inc/home.cfm

dSPACE

dSPACE is a leading provider of simulation and validation solutions worldwide for developing connected, autonomous, and electrically powered vehicles. The company's range of end-to-end solutions are used particularly by automotive manufacturers and their suppliers to test the software and hardware components in their new vehicles long before a new model is allowed on the road. Not only is dSPACE a sought-after partner in vehicle development, engineers also rely on our know-how at dSPACE when it comes to aerospace and industrial automation. Our portfolio ranges from end-to-end solutions for simulation and validation to engineering and consulting services as well as training and support.

e4usa + XRP BOOTH 225

United States
e4usa.org

engineering 4 us all
XRP experiential robotics platform

e4usa partners with PELS to provide hands-on, research-based instructional materials in power electronics for use in high school classrooms as well as the professional learning need to implement these well. e4usa also provides year-long engineering courses and teacher professional learning that PELS members can support.

EGSTON Power Electronics BOOTH 420

Austria
www.egstonpower.com

EGSTON POWER

Austrian-based EGSTON Power Electronics offers a revolutionary power electronic test bench based on P-HIL technology (Power – Hardware in the Loop). Our unique Compiso system offers a high voltage bandwidth of 5 kHz at 440 VRMS which can generate harmonics of up to 15 kHz with a power range of 100kW up to 1.2 MW. Based on a modular design, the Compiso P-HIL System offers full flexibility and can be used as an AC source/sink, DC source/sink, smart grid, aerospace grid, PV-panel, battery or electrical machine emulator.

Electronic Concepts, Inc BOOTH 403

United States
www.ecicaps.com

Electronic Concepts EST. 1969

Established in 1969, Electronic Concepts is a Veteran-owned, American-made leader in the electronic component industry. With facilities in the U.S. and Ireland, we combine advanced technology, vertically integrated production, and engineering expertise to design film capacitors that set the standard. Our products are "Capacitors Built to Endure the Extreme," delivering quality, innovation, and reliability for evolving industry demands.

ELECTRONICON Kondensatoren GmbH BOOTH 306

Germany
www.electronicon.com

ELECTRONICON always in charge

ELECTRONICON is a globally recognized specialist in high-quality capacitors for power factor correction, harmonic filters, energy transmission, drive technology and DC links, as well as many other AC and DC applications. With its capacitor production, ELECTRONICON is the largest company within the SYSTEM ELECTRIC Group from Gelnhausen. To this day, production is almost entirely concentrated in Gera (Eastern Thuringia, Germany)

FREEDM Center at NC State BOOTH 200

United States
www.freedm.ncsu.edu

FREEDM SYSTEMS CENTER

The Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center at North Carolina State University is an NSF Engineering Research Center focused on medium voltage power electronics, power systems and electric transportation technologies. Our research extends from wide bandgap device design to packaging to application development. Results include a medium voltage solid state transformer, high power DC fast chargers, microgrid controllers, novel electric machine topologies, and machine learning applications for grid stability.

General Motors BOOTH 522

United States
www.gm.com

gm

At General Motors, we're driven by a passion to create the one for every purpose and journey. Since 1908, we've been continually advancing the automotive industry, raising the bar for excellence with every innovation and moving people forward. Today, we're working toward a future with zero crashes, zero emissions, and zero congestion—for every driver, every purpose, and every road ahead.

GMW Associates — BOOTH 106

United States
gmw.com

GMW has been solving customer problems with expertise in magnetics, focusing on non-contact current sensors, transducers, and measurement instrumentation for over 40 years. Featuring: PEM Rogowski Coils with high bandwidth (up to 50MHz), ultra-thin (down to 1.2mm), and exceptional peak di/dt capability (up to 100kA/µs) coils. See the newer even thinner coils and novel 'Forked' form-factor for even easier installation with less interference on densely populated electronic circuits. Danisense Current Transducers: ±2A to 11kA, dc accuracy 5ppm, ac (1kHz) accuracy 0.01% amplitude / 0.05° phase, for power conversion efficiency measurements. GMW CPC and CPCO Clip-on/Clamp-on DC/AC Current Probes: ±250A to ±16kA in harsh environments -40 to +100°C.

Hammond Power Solutions — BOOTH 407

Canada
www.hammondpowersolutions.com

HPS is one of the largest manufacturers of dry-type transformers in North America. We engineer and manufacture a wide range of standard and custom transformers that are exported globally in electrical equipment and systems. We support solid industries such as oil and gas, mining, steel, waste and water treatment, commercial construction, data centers and wind power generation. HPS leads the industry in these markets through its technical design strength, breadth of product, and manufacturing capabilities, making HPS a stronger company both fundamentally and financially.

Hioki USA Corporation — BOOTH 119

United States
www.hioki.com/us-en

Hioki USA delivers precision test and measurement solutions that empower engineers to solve today's toughest energy conversion challenges. From EVs to power electronics, our analyzers, sensors, and testers provide actionable insights, enabling smarter design decisions, faster development, and more reliable systems for a safer, more efficient energy future.

How2Power.com — BOOTH 325

United States
www.how2power.com

How2power.com is a free power electronics website for engineers. Great source of practical power design information. Read in-depth technical articles on power supply design, plus power component news and more in our e-newsletter, How2Power Today. Browse our special sections on Power Magnetics, SiC & GaN technology, EMI/EMC, Space Power and other topics. Find power electronics experts in the Consultants Corner directory. Browse or search our Industry Events calendar with over 500 events listed for 2025!

HVR Advanced Power Components Inc. — BOOTH 121

United States
hvrapc.com

We provide cost-effective, engineered solutions for difficult, high-stress resistor applications. Chances are that one of our unique, pre-engineered solutions will fit the bill. If not, we can tap our decades of experience and unique materials approach to engineer an application-specific solution at low cost

IEEE Foundation — BOOTH 505

United States
www.ieeefoundation.org

IEEE PELS is one of the fastest growing technical societies within IEEE. Our 13,000+ members, representing both academia and industry, span the globe and drive our success. Mission-focused, we strive to build knowledge and awareness of the latest technologies and other advances in power electronics, all to make the world a better place! With access to a wide array of benefits and resources, both technical and professional, our members can stay current and competitive in the workplace. We invite you to join us!

IEEE IAS — BOOTH 419

United States
ias.ieee.org

IAS is a source of professional power to its 11,000+ worldwide members. Through a network of over 370 chapters globally, regional events and national and international conferences, the society keeps members abreast of current developments in the area of technology in electricity and electronics.

IEEE PELS — BOOTH 319

United States
www.ieee-pels.org

The Power Electronics Society (PELS) is one of the fastest-growing technical societies of the Institute of Electrical and Electronics Engineers (IEEE). For over 35 years, the Society has facilitated and guided the development and innovation in power electronics technology, which includes the application of circuit theory and design techniques, the development of analytical tools for efficient conversion, control, and condition of electric power, and the effective use of electronic components.

Impedyme Inc. — BOOTH 201

United States
impedyme.com

IMPEDYME Inc. is a technology developer and manufacturer of advanced multi-modular power electronics test and emulation systems used in power electronics, drives, smart grid, and related fields. We are on a mission to democratize Power Hardware-In-the-Loop (PHIL) as a robust solution across diverse industries. We work with EV, eVTOL, aerospace, marine industries, and other renewable energy sectors such as wind, solar, and hydropower. Our vision is to make cutting-edge Combined HIL and PHIL (CHP) technologies accessible, affordable, and scalable for innovators and researchers worldwide.

imperix Ltd. — BOOTH 206

Switzerland
imperix.com

imperix develops high-end control equipment and prototyping hardware for power electronics, drives, smart grids, and related topics. Its products are designed to enable cutting-edge innovation in corporate and academic environments. They are especially valued for their ability to accelerate the implementation of laboratory-scale power converters and facilitate the derivation of high-quality experimental results.

Infineon — BOOTH 303

Canada
www.infineon.com

Driving decarbonization and digitalization. Together. The world must reduce carbon emissions and use energy much more efficiently to secure quality of life for future generations. With our power system solutions, we are a key enabler in the move to harness renewable energy resources and deliver energy-efficient solutions along the entire electrical energy chain. Together with our customers and partners, we make more out of less to actively shape a greener future.

JMAG Business Company, JSOL Corp. — BOOTH 506

Japan
www.jmag-international.com
/aboutus/members

JMAG is simulation software for electric device design and development. It accurately models the complex electromagnetic phenomena in a wide range of equipment. Since being released in 1983, JMAG has been used in industries and universities world-wide and has contributed to the development of thousands of products. Continuous communication with our users has made JMAG a world class analysis tool. It is our wish that JMAG continues to grow and develop with its users.

Leidos — BOOTH 401

United States
www.leidos.com

Leidos is an industry and technology leader serving government and commercial customers with smarter, more efficient digital and mission innovations. Headquartered in Reston, Virginia, with 48,000 global employees. We're hiring innovative professionals for engineering, IT, cyber, and healthcare roles. Come to Leidos for a job and stay for a career, where you're empowered to break limits and solve the world's most complex challenges. Visit careers.leidos.com today!

Magna-Power Electronics — BOOTH 220

United States
magna-power.com

Magna-Power designs and manufactures robust programmable power products in the USA that set industry standards for quality, size, and control. Our experience in power electronics is reflected in our 1.25 kW to 3,000 kW+ product line, 150,000+ product configurations, quality service, and reputation for reliability.

MagneForce Software Systems, Inc — BOOTH 517

United States
www.magneforcess.com

Our engineers are first and foremost electric machine focused with a passion for numerical simulation. We only work on rotating machine problems and our roots are from an industrial perspective and we know that a successful design must bring together performance, manufacturability and economics. MagneForce's dedicated all-encompassing simulator has many advantages over general purpose magnetic solvers and general purpose multi-physics approaches. Output parameters in the terms necessary for motor engineers. MagneForce's standard output are the lumped motor parameters and time domain waveforms that motor engineers need. Magnetic results are present but that is not where the analysis ends.

MathWorks — BOOTH 425

United States
www.mathworks.com

The MATLAB and Simulink product families are fundamental applied math and computational tools adopted by more than 6,500 universities and colleges. MathWorks products help prepare students for careers in industry, where the tools are widely used for data analysis, mathematical modeling, and algorithm development in collaborative research and new product development.

Mitsubishi Electric US, Inc.

BOOTH 302

United States
us.mitsubishielectric.com/en

Mitsubishi Electric power modules are at the forefront of the latest energy innovations that seek to solve global environmental issues while creating a more affluent and comfortable society for all. Some of these innovations are photovoltaic and wind power generation from renewable energy sources, smart grids realizing efficient supply of power, hybrid/electric vehicles that take the next step in reducing carbon emissions and fuel consumption, and home appliances that achieve ground-breaking energy savings. Mitsubishi power modules are key elements in changing the way energy is used.

Nayak Corporation, Inc.

BOOTH 509

United States
www.nayakcorp.com

Nayak Corporation is the representative of PSCAD and RTDS in the United States. PSCAD is a simulation tool for analyzing power systems transients, and RTDS consists of parallel processing hardware and software optimized to perform electromagnetic transient simulation in hard real time. Our expertise is in power system modeling, simulation and studies which covers a wide range of power engineering disciplines. We provide studies and testing services in addition to sales, technical support and training for power system simulators.

NREL

BOOTH 320

United States
www.nrel.gov

NREL is the U.S. Department of Energy's primary national laboratory for energy systems. With a focus on security and reliability, NREL leads energy systems innovation and integration—enhancing existing technologies and developing new, cutting-edge solutions that unlock economic opportunity and fuel America's global competitiveness. NREL bridges foundational research with practical applications to integrate various energy sources, storage, buildings, transportation, and emerging technologies.

Omicron Lab

BOOTH 519

United States
www.omicron-lab.com

OMICRON Lab was established in 2006 and is meanwhile serving customers in more than 60 countries. Offices in America, Europe, East Asia and an international network of distributors enable a fast and extraordinary customer support. OMICRON Lab products stand for high quality offered at the best price/value ratio on the market. The products' reliability and ease of use guarantee trouble-free operation. Close customer relationship and more than 30 years in-house experience enable the development of innovative products close to the field.

OPAL-RT Technologies

BOOTH 502

Canada
www.opal-rt.com

OPAL-RT is a global leader in real-time simulation and Hardware-in-the-Loop (HIL) testing. Since 1997, we've provided engineers and researchers with advanced, customizable real-time simulation tools to accelerate product development and improve energy transmission reliability. Real-time simulation helps reduce costs and time to market by enabling quick testing, early error correction, and optimization during development. At OPAL-RT, our mission is to turn innovative ideas into reality, empowering users to create better products and solutions for a better world.

Payton America Inc.

BOOTH 219

United States
www.paytongroup.com
/payton-america-inc

Payton is the world leader in Planar Magnetics Custom designs. Few watts to over 300kWatts in a single conduction cooled package. All SMPS topologies up to few Mhz. Designs in less than 24 hours and samples in few weeks. Full technical support from power supply design engineers.

PCIM

BOOTH 507

Germany
pcim.mesago.com/
nuernberg/en.html

Connecting industry and academia, the PCIM – Hub for Power Electronics is your inspiring gateway to excel in power electronics. Benefit from a holistic offering that links you with the knowledge and experts you need to drive power electronics forward – all year round. As part of the Hub, the PCIM Expo & Conference in Nuremberg, Germany, is the leading international event for Power Electronics, Intelligent Motion, Renewable Energy and Energy Management. It connects experts from industry and academia dedicated to driving forward products, research and development along the entire value chain.

Plexim

BOOTH 208

United States
www.plexim.com

Plexim provides three solutions to design and test power electronic systems and their associated controls. The PLECS simulation software is extremely fast and robust, and includes component libraries for thermal, magnetic, and mechanical aspects. The RT Box is the fastest real-time simulator for power electronics with the Nanostep® solver. It offers controller HIL testing for converters switching into the MHz range, and rapid control prototyping. The PLECS Coder is used to graphically program the code and easily configure peripherals for common microcontrollers, such as TI C2000, STM32 and XMC.

PINK GmbH Thermosysteme — BOOTH 503

Germany
www.pink.de/en

PINK GmbH Thermosysteme is located in Wertheim/Germany and offers: ▪ Equipment and systems for void-free soldering of wafer bumps and power electronic components with high demands to reliability ▪ Sintering systems for extraordinarily reliable, highly thermally conductive bonds ▪ Low-pressure plasma systems for surface activation, cleaning and coating ▪ Technical support for process and packaging development of soldered and sintered power modules

PJM Interconnection — BOOTH 511

United States
www.pjm.com

PJM is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia.

PMK IWATSU AMERICA — BOOTH 101

United States
pmkamerica.com

With over 30 years of experience, PMK & IWATSU develops and manufactures world-class probing and measurement solutions for the latest test and measurement challenges in electronics designs. All PMK branded probes have an universal BNC interface to ensure the re-use of our probes also when the oscilloscope vendor changes in the lab. IWATSU provides a wide range of test and measurement solutions, specializing in semiconductor curve tracers & magnetics B-H analyzers.

Regatron AG — BOOTH 221

Switzerland
www.regatron.com

REGATRON offers a wide range of programmable DC and AC power supplies for applications such as power conversion, energy storage, renewable energy, e-mobility, and smart grids. With over 50 years of expertise, we provide modular and scalable solutions from 10 to 5000+ kW, including advanced testing and simulation capabilities, application software, and flexible cabinet integration. Whether standard or customized, our solutions are versatile, reliable, and intelligent.

Rohde & Schwarz — BOOTH 411

United States
www.rohde-schwarz.com

Incorporated in the United States since 1978, Rohde & Schwarz USA, Inc. is a leading manufacturer of Test & Measurement, Secure Communications, Monitoring and Network Testing, and Broadcasting equipment. We have a large team of sales and application engineers throughout North America with regional offices in Maryland, Texas, California, and Oregon. With world-class service facilities in Columbia, Maryland and Milpitas, California, our customers can expect extensive after-sales support, including training, free technical support and close personal contact from our engineers out in the field.

RTDS Technologies, Inc. — BOOTH 202

Canada
www.rtds.com

RTDS Technologies is the world leader in real-time digital power system simulation. Our RTDS Simulator is a trusted tool used by major protection and control equipment manufacturers, leading electric utilities, educational institutions, research facilities, and consultants worldwide. The RTDS Simulator enables hardware-in-the-loop testing, which allows for de-risking technologies by testing them in a safe lab environment before deployment on the grid.

Rubadue Wire Company — BOOTH 305

United States
rubadue.com

Rubadue Wire wire the premier manufacturer of extruded Triple Insulated Winding Wires and Insulated Litz Wire conductors. Based in Loveland, Colorado, we are a US manufacturer with a global service network. We support our customers success through rapid prototyping, small minimum orders, and the ability to tailor production schedules to meet product demands across all phases of your product's lifecycle. We look forward to the opportunity to collaborate with you on your program.

Speedgoat GmbH — BOOTH 524

Switzerland
www.speedgoat.com

At Speedgoat, we specialize in state-of-the-art real-time systems for real-time testing using Simulink® and Simulink® Real-Time™, the real-time operating system from MathWorks®. Together, our solutions allow our customers to continuously verify and validate their designs along a complete Model-Based Design workflow, including requirements specification, simulation, rapid control prototyping, hardware-in-the-loop (HIL) simulation, and deployment.

Standex Electronics

BOOTH 520

United States
standexelectronics.com

Standex Electronics is a worldwide market leader in the design, development and manufacture of custom electro-magnetic components, including magnetics products. Our approach is to strategically partner with customers, conquer unique challenges, and deliver reliable high-quality solutions through our engineering and components. These parts serve an array of markets globally, and through our customer driven innovation – improve the overall performance and efficiency at which end products operate.

STS Spezial-Transformatoren-Stockach GmbH & Co. KG

BOOTH 526

Germany
sts-trafo.de/en/company

STS – Experts In Customised Mf Power Transformers And Inductors.
Our portfolio: P 30 kW to 10 MW V up to 60 kV I up to 10,000 A F 1 kHz to 10 MHz GLOBAL SUCCESS – MADE IN GERMANY Innovative expertise in customized inductors and transformers. From industry and medicine to railway technology and smart grid applications, our customers place their trust in the quality offered by STS. Since 1973, we have been developing, testing and manufacturing inductive components with a high power density, high efficiency and very demanding insulation and cooling requirements. We cover power outputs of up to 10 MW, voltages of up to 60 kV, currents of up to 10 kA and frequencies of 1 kHz to 10 MHz.

TDK Lambda Americas

BOOTH 421

United States
www.us.lambda.tdk.com

TDK-Lambda Americas, Inc. is a leading manufacturer of high reliability Low/High Voltage Programmable DC Power Supplies, AC Sources, High Voltage Capacitor Chargers and DC Electronic Loads. Programmable DC products include the GENESYS™ Series, the GENESYS+™ Series, the ALE Series and the SFL Series. For more information, please visit https://www.us.lambda.tdk.com.

Teledyne LeCroy

BOOTH 300

United States
www.teledynelecroy.com

Teledyne LeCroy is at the forefront of innovation, delivering state-of-the-art oscilloscopes, probes, and software analysis solutions. Our expertise spans power integrity, power electronics, power conversion, three-phase power, and motor testing. We empower engineers and technicians with the tools they need to design, test, and optimize their systems with precision and confidence.

Typhoon HIL

BOOTH 510

United States
www.typhoon-hil.com

Typhoon HIL is the market leader in ultra-high-fidelity Hardware-in-the-Loop (HIL) solutions, that accelerate innovation in power electronics, e-Mobility, and grid modernization applications. Our vertically integrated solutions unlock value stacking, enabling customers to accelerate time to market while reducing costs and enhancing quality. Committed to technical and business excellence, our mission is to engineer and promote environmentally sustainable power technologies that scale.

Wafios Machinery Corporation

BOOTH 218

United States
www.wafios.us/us/home

WAFIOS was established in 1893 and is today the world's largest supplier of precision machinery for wire, tube and formed parts. The North American headquarters is in Branford, CT and the Chicago-area Midwest Technical Center located in Mokena, Illinois provides additional resources as a service center, for machine demos, trials, sample production for prototyping. The WAFIOS range of machine types include those for the production of hairpins, axial flux coils, busbars, spring coiling and forming, spring end-grinding, wire/tube bending and forming, wire straightening, cutting and end-working.

Yokogawa

BOOTH 324

United States
www.yokogawa.com/us

Yokogawa Test&Measurement, the world's most trusted measurement partner, helps engineers and researchers accelerate the transition to clean energy with confidence. For more than a century, Yokogawa has advanced the science of measurement to deliver precision power analyzers, waveform measuring instruments, and data acquisition systems that set the standard for accuracy and reliability. In renewable energy applications, from generation and conversion to storage and distribution, our solutions enable customers to optimize efficiency, validate compliance, and ensure power quality with traceable, standards-based accuracy. Backed by deep technical expertise and practical application resources, we empower innovation in areas such as MPPT charge controller evaluation, harmonic and flicker analysis, and transient power testing. At ECCE 2025, we look forward to engaging with the community and sharing how precise measurement drives sustainable progress.

CALL for PAPERS

ECCE 2026

IEEE ENERGY CONVERSION CONGRESS & EXPO VANCOUVER, BC, CANADA OCT. 4-8

The Eighteenth Annual IEEE Energy Conversion Congress and Exposition (ECCE 2026) will be held in Vancouver, Canada, from October 4th to October 8th, 2026. ECCE is a pivotal international event on energy conversion. ECCE 2026 will feature both industry-driven and application-oriented technical sessions as well as an exposition. The conference will bring together practicing engineers, researchers and other professionals for interactive and multidisciplinary discussions on the latest advances in areas related to energy conversion. Technical papers are solicited on any subject pertaining to the scope of the conference including, but not limited to, the following major topics:

Component, Converter and Subsystem Technologies

- Passive components and innovative alternative materials
- Power conversion topologies, modulation, and control
- Power electronic devices, gate drivers, and integrated circuits
- Power electronic packaging integration
- Reliability, advanced diagnostics, prognostics, and health management
- Rotating/linear electric machines
- Thermal management and advanced cooling technologies
- Electromagnetic interference and electromagnetic compatibility
- Cyber-physical security for power electronics systems
- Digital twins, cloud design, and simulation techniques for energy conversion systems

IMPORTANT DATES

FEBRUARY	MAY	JULY
27	22	10
Digest Submission	Author Notification	Final Paper with IEEE Copyright Forms

2026

Digest Submission:

Prospective authors are requested to submit a single column digest, according to the provided template, no longer than five (5) pages (including references) summarizing the proposed paper. The digest should include key equations, figures, tables, and references as appropriate, but no author names or affiliations. **Digests not conforming to these requirements will be rejected without review.** The digests must clearly state the objectives of the work, its significance in advancing the state of the art, and the methods and specific results in sufficient detail. All digests will go through a double-blind peer review process to ensure a confidential and fair review. The papers presented at the conference will be included in the IEEE Xplore Digital Library. Please refer to the conference website for detailed instructions regarding the digest submission and any future changes to the important dates.

Energy Conversion Systems and Applications

- Renewable and alternative energy systems
- Critical power systems
- Energy storage systems
- Energy efficiency for commercial, industrial, and transportation applications
- Aerospace energy conversion systems
- Big data and artificial intelligence in energy conversion
- Electric vehicles and charging infrastructure
- Off-grid systems
- Energy conversion for information technology and communication systems
- Grid-forming technologies
- Wireless power transfer
- High power/voltage conversion systems (HVDC, FACTS, and multi-terminal systems)
- Industrial motor drives
- Medical, IoT, and energy harvesting
- Microgrids, hybrid grids, and active distribution networks
- Power electronics for agriculture
- Sustainability evaluation and sustainable recycling for power electronics

www.ieee-ecce.org/2026 ecce2026tpc@gmail.com

General Chair
Michael Harke
Collins Aerospace, United States

General Co-Chair
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Navid Zargari
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University of Oviedo, Spain

Behrooz Mirafzal
Kansas State University, United States

Mahshid Amirabadi
Northeastern University, United States

Tanya Gachovska
MDA, Canada

IEEE IAS IEEE INDUSTRY APPLICATIONS SOCIETY Linking Research to Practice pels IEEE POWER ELECTRONICS SOCIETY Powering a Sustainable Future

CALL for TUTORIALS

IEEE ENERGY CONVERSION CONGRESS & EXPO 2026 VANCOUVER, BC, CANADA OCT. 4-8

The **IEEE Energy Conversion Congress & Exposition (ECCE)** is the leading international event dedicated to the advancement of energy conversion technologies. ECCE brings together practicing engineers, researchers, and industry experts from around the world to engage in insightful discussions, technical sessions, and collaborative exchanges on the latest innovations and practical applications in energy conversion.

The ECCE organizing committee invites proposals for tutorials to be presented at ECCE 2026. Each tutorial is three hours long, excluding break times. **Each accepted tutorial will receive one conference registration together with an honorarium of $1,000.** Please note that publication of a technical paper will still require a paid full registration.

All tutorial proposals should be submitted via the ECCE 2026 web portal under "Call for Tutorials." Please follow the Tutorial Proposal Form on the website as a submission template. The proposals will be reviewed by a panel of subject matter experts.

IMPORTANT DATES

MARCH 1	MAY 31	JUNE 19
Tutorial Proposal Due	Notice of Acceptance	Final Tutorial Materials Due

2026

One or more of the following elements are strongly encouraged in the tutorial proposals:

a) Application-focused sessions on tools or methods for practicing engineers
b) ECCE 2026 topics relevant to the host city, e.g., smart mobility, clean energy, and sustainable infrastructure
c) Collaborative cross-disciplinary topics, industry-led or co-hosted lectures
d) Engaging topics and formats that effectively communicate with the audience and involve the attendees.

Tutorials considered less attractive to the audience include:

a) Lectures that are not balanced between theory and application
b) Tutorial topics presented previously in immediate past ECCE
c) Tutorials that narrowly focus on the presenter's research that is already publicly available
d) Solicitation of a particular product or service.

Potential topic areas include but are not limited to:

Energy Conversion Systems and Applications

- Renewable energy, including under-represented ocean-wave, tidal, and geothermal
- Smart grids, microgrids, nanogrids
- Electrical energy storage, and battery charging technologies
- Energy conversion for information and communications technology
- Energy harvesting and conversion
- Smart, energy-efficient buildings
- Energy efficiency for advanced manufacturing
- Big data and machine learning in energy conversion
- Digital twins for energy conversion systems
- Resilience and cybersecurity in energy conversion systems
- Transportation electrification
- HVDC and HVDC grids
- Power electronics dominated low-inertia grids, especially grid-forming strategies and protection
- AI-assisted optimization of energy management systems
- Intelligent fault detection and predictive maintenance using AI/ML
- Co-optimization of energy conversion and robotic task execution in autonomous systems
- AI-driven demand forecasting and dynamic load balancing in grids

Component, Converter & Subsystem Technologies

- Power electronics devices and conversion topologies
- Modeling and control of power converters
- Electric machines and drives
- Passive components, magnetics, and materials–particularly for high frequency
- Packaging, integration, and advanced manufacturing
- EMI and EMC
- Thermal management and advanced cooling technologies
- Wireless power transfer
- High-voltage power conversion, including insulation technologies
- Design automation and optimization
- Reliability, diagnostics, prognostics, and health management
- Fault-tolerant converters, drives and systems
- Protection and advanced gate drives for converters
- AI-enabled control algorithms for adaptive converters
- Neuromorphic computing in converter and drive control loops
- Edge AI deployment in embedded converter platforms
- Collaborative power converters for swarm robotics and distributed robotics power systems

Others

- Pedagogy for undergraduate learning and online education innovations
- Entrepreneurship, technology transfer, business management
- Development and use of standards for specific applications
- Curriculum development for AI and power electronics integration
- Standards for AI safety and ethics in power-critical robotic systems
- Policy and regulatory frameworks for autonomous energy systems

General Chair
Michael Harke
Collins Aerospace, USA

General Co-Chair
Shanelle N. Foster
Michigan State University, USA

Tutorial Chairs
Anant Singh
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IEEE IAS IEEE INDUSTRY APPLICATIONS SOCIETY Linking Research to Practice pels IEEE POWER ELECTRONICS SOCIETY Powering a Sustainable Future

CALL for SPECIAL SESSIONS

ECCE 2026

IEEE ENERGY CONVERSION CONGRESS & EXPO VANCOUVER, BC, CANADA OCT. 4-8

The **18th Annual IEEE Energy Conversion Congress and Exposition (ECCE)** will be held in Vancouver, Canada, from October 4 – 8, 2026.

This year, Special Sessions will spotlight emerging technologies and industry-driven topics, emphasizing perspectives beyond academia. We especially welcome contributions from manufacturers, government labs, start-ups, and industry professionals.

To broaden participation, Special Session presenters are not required to submit written papers, and presented materials will not be included in the official conference proceedings. Each session will be scheduled for one or two 100-minute slots, which may occur on the same or different days, depending on the overall program.

IMPORTANT DATES

MARCH 2 — Proposal Deadline

MAY 25 — Notice of Acceptance

2026

Session Formats

We invite proposals in a variety of styles, including but not limited to:

1. Formal presentations
2. Informal talks (with or without slides)
3. Interactive Q&A panels
4. Panel debates
5. Hybrid or creative formats (e.g., demos, live polling, virtual tours)

Highly Encouraged Proposal Features

Successful proposals will likely include one or more of the following:

- Strong engagement from industry or government
- Focus on industrial applications
- Emphasis on regional or localized topics
- Cross-disciplinary collaborations or topics
- Innovative and engaging session formats

Discouraged Elements

The following types of proposals are considered less appealing to ECCE attendees:

- Topics that are not emerging or timely
- Academic-style lectures
- Repeat sessions from past ECCE programs
- Sessions promoting specific products

All proposals must follow the posted guidelines and will be reviewed by a panel of experts.

Suggested Topic Areas (not limited to):

Defense & Aerospace

- Radar and laser power systems
- Directed energy weapons
- Submarine integrated power (SIP)
- UAVs and drones
- Electric maritime systems (reliability, suppression, quality)

Transportation

- All-electric aircraft & eVTOL
- Autonomous systems with safety-centric design
- Grid & wireless charging
- Battery protection and management

Automation, AI, and Robotics

- Advanced drives and power electronics
- Fault detection and quality inspection
- Robotic battery systems

Manufacturing Processes

- Electric smelting and arc welding
- Electric discharge machining
- Hydrogen: fuel cells and electrolyzers

Infrastructure

- Renewable energy integration
- Smart grids, microgrids, and nanogrids
- Energy conversion for IT
- Cybersecurity in energy systems

Components & Subsystems

- Ultra-wide-bandgap semiconductors
- Power devices, magnetics, and capacitors
- Machines and drives
- EMI, EMC, and packaging
- High-voltage systems and insulation
- Reliability, diagnostics, and prognostics
- Thermal and cooling innovations
- Design automation with machine learning

Other Areas

- Standards and regulatory development
- Education, workforce, and career pathways
- Entrepreneurship, tech transfer, and business management
- Innovations in online education

General Chair
Michael Harke
Collins Aerospace, United States

General Co-Chair
Shanelle N. Foster
Michigan State University, United States

Special Sessions Chairs
Sara Roggia
Magnix, United States

Matt Woongkul Lee
Purdue University, United States

Special Session Proposal Template

Format: Max 5 pages, letter/A4 size, 1" margins, single-spaced, Times New Roman, 11–12 pt font. A Word® template will be available on the ECCE website under "Call for Special Sessions."

Recommended Sections:

- **Session Title**
- **Session Format:** Choose from formats listed above; describe any creative elements (e.g., demos, polls, tours)
- **Timing:** Choose "100 minutes" or "2 × 100 minutes"
- **Session Organizers:** List name(s), title(s), affiliation(s), and email(s)
- **Speakers/Panelists:** List name, title, affiliation; mark each as "confirmed" or "tentative"
- **Abstract:** Max 500 words. Will appear in the program and website
- **Session Outline:** List topics/titles/activities, including time and speaker breakdown if available
- **Organizer Biography:** Max 200 words per person
- **Speaker/Panelist Biography:** Max 200 words per person

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SAVE THE DATE

October 4-8, 2026

www.ieee-ecce.org/2026

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ECCE 2025

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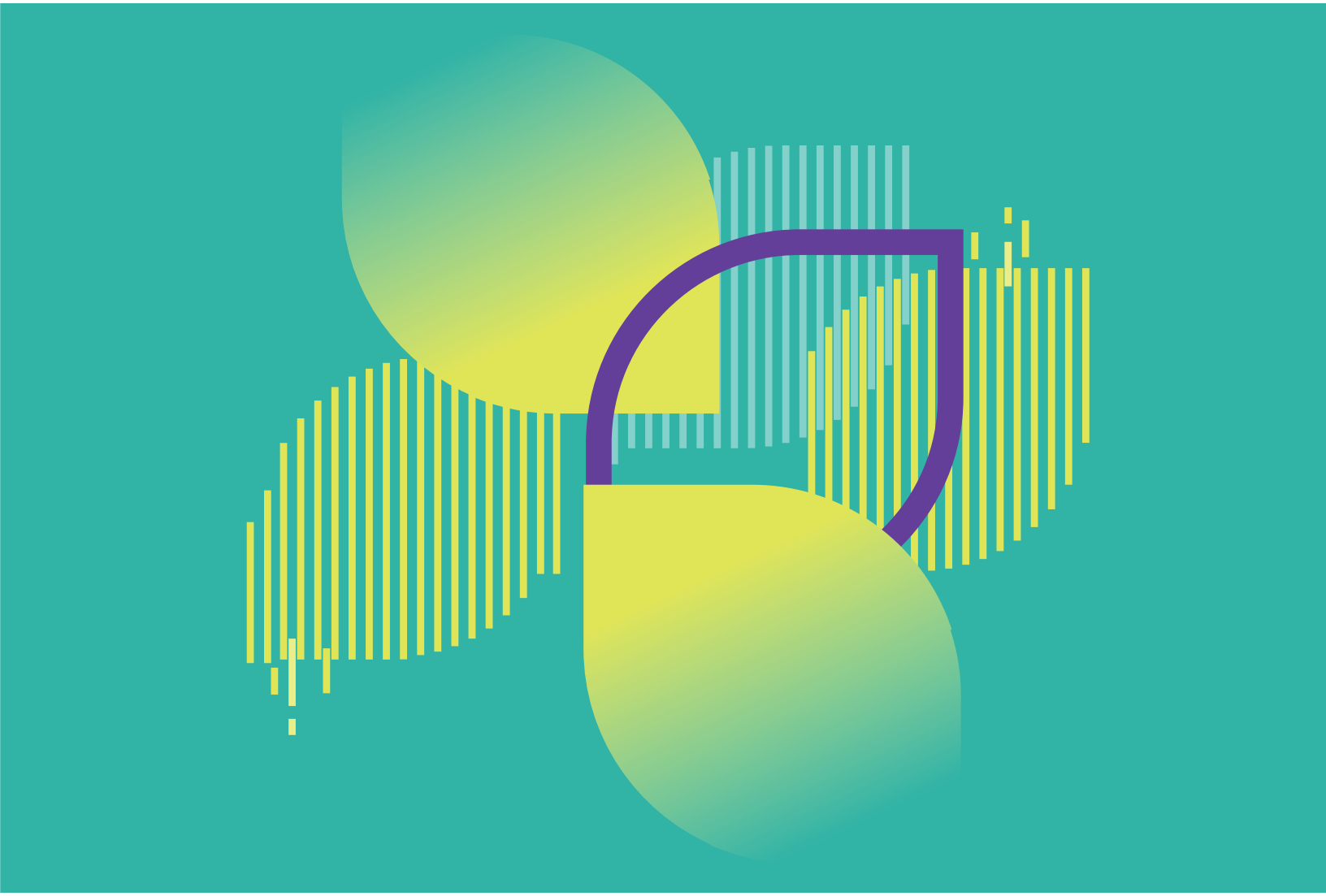

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