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WORDS FROM THE GENERAL CHAIR:

It is my great pleasure to welcome you to the IEEE 2024 Southern Power Electronics Conference (SPEC) in Brisbane, Australia, from December 2-5, 2024. As we gather in this vibrant city, we look forward to four days of cutting-edge research, insightful discussions, and valuable networking opportunities in the field of power electronics. This year's conference promises an exceptional program featuring eight half-day tutorials, four plenary speeches, six keynote presentations, and two invited talks. These sessions will cover a wide range of topics at the forefront of power electronics, delivered by distinguished experts from around the world. Additionally, we are proud to showcase 140 high-quality papers across 24 technical sessions, representing the latest advancements and innovations in our field.

While the conference offers a wealth of knowledge and professional growth opportunities, I encourage all attendees to take some time to explore the beautiful city of Brisbane and its surroundings. Known for its pleasant climate, stunning natural beauty, and friendly atmosphere, Brisbane provides an ideal backdrop for both intellectual stimulation and relaxation. I kindly request that all authors and participants not only actively engage in the technical sessions but also enjoy the city during their stay. We look forward to welcoming you to Brisbane for what promises to be an enriching and memorable conference. Your participation and contributions are vital to the success of SPEC 2024 and the advancement of power electronics.

Professor Mahinda Vilathgamuwa
General Chair, IEEE SPEC 2024

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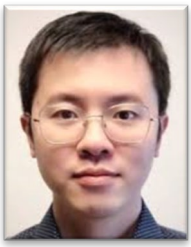

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TUTORIALS

Tutorial 1: Monday 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Queen Adelaide 1

High Density Power Converter Design – the Practical and Theoretical Challenges and Solutions to Realizing the Benefits of the Flying Capacitor Multi-Level Converter

Instructor: **Robert Pilawa**, University of California-Berkeley, USA

Abstract:

The Flying Capacitor Multi-Level Converter (FCML) promises significant theoretical advantages in dc-dc and dc-ac/ac-dc applications, owing to favorable fundamental passive and active component scaling. Despite having been invented several decades ago, it has not seen widespread use, due to the difficulty of realizing its theoretical advantages in practice. In this tutorial, we will provide background and motivation for the use of FCML, along with detailed analysis of the underlying device scaling trends that gives it an advantage over conventional two-level designs. We will highlight practical challenges associated with control, such as flying capacitor balancing, startup/shutdown, and power factor correction. We will also provide an overview of key sources of capacitor voltage imbalance, along with recent developments in active capacitor balancing to help resolve this issue. Finally, practical layout, gate drive, and component selection choices will be presented, along with demonstration of recent hardware prototypes that bring these solutions together to demonstrate record-breaking performance in dc-ac power conversion, with applications in electric drivetrains.

Biography:

Robert Pilawa-Podgurski is currently a Professor in the Electrical Engineering and Computer Sciences Department at the University of California, Berkeley. He is the founding director of the Berkeley Power and Energy Center (BPEC). Previously, he was an Associate Professor in Electrical and Computer Engineering at the University of Illinois Urbana-Champaign. He received his BS, MEng, and PhD degrees from MIT. He performs research in the area of power electronics. His research interests include renewable energy applications, electric vehicles, energy harvesting, CMOS power management, high density and high efficiency power converters, and advanced control of power converters. Dr. Pilawa-Podgurski received the Chorafas Award for outstanding MIT EECS Master's thesis, the Google Faculty Research Award in 2013, and the 2014 Richard M. Bass Outstanding Young Power Electronics Engineer Award of the IEEE Power Electronics Society, given annually to one individual for outstanding contributions to the field of power electronics before the age of 35. In 2015, he received the Air Force Office of Scientific Research Young Investigator Award, the UIUC Dean's Award for Excellence in Research in 2016, the UIUC Campus Distinguished Promotion Award in 2017, and the UIUC ECE Ronald W. Pratt Faculty Outstanding Teaching Award in 2017. He was the 2018 recipient of the IEEE Education Society Mac E. Van Valkenburg Award given for outstanding contributions to teaching unusually early in ones career. In 2023, he received the UC Berkeley EECS department Electrical Engineering Outstanding Teaching Award. He is co-author of sixteen IEEE prize papers, and is a fellow of IEEE.

TUTORIALS

Tutorial 2: Monday 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Queen Adelaide 2

Fundamentals of inductive power transfer

Instructor: **Duleepa J. Thrimawithana**, University of Auckland, New Zealand

Abstract:

Currently, there is a strong drive to electrify the transportation sector as a solution to the environmental and economic impacts of vehicles using internal combustion engines. Although, fast and extreme fast charging systems have been developed and deployed to help EV users refuel in a fraction of an hour, this is achieved at the expense of battery life and user safety. In contrast, wireless charging of stationary and in-motion electric vehicles promises a future where EVs are replenished organically, thus avoiding long charging times, range anxiety and battery degradation.

The tutorial will start with a brief discussion on the history of wireless power transfer (WPT) technology. Subsequently, the fundamental operating principles of an inductive power transfer (IPT) system will be presented. Commonly used compensation networks, power electronics converters and magnetic designs will be then reviewed. This will be followed by a discussion on more advanced IPT technologies, such as bi-directional systems, misalignment tolerance, etc., with a special focus on wireless electric vehicle (EV) charging. During this tutorial, we will also work through a few design examples and validate these designs using LTspice and Ansys Maxwell simulation models (participants will have access to these models).

Biography:

Duleepa J. Thrimawithana (M'06-SM'18), received his BE in Electrical Engineering (with First Class Honors) in 2005 and his Ph.D. in power electronics in 2009 from The University of Auckland, Auckland, New Zealand. From 2005 to 2008, he worked in collaboration with Tru-Test Ltd. in Auckland as a Research Engineer in the areas of power converters and high-voltage pulse generator design. He joined the Department of Electrical and Computer Engineering at The University of Auckland in 2009 where he currently works as an Associate Professor. He has co-authored over 100 international journal and conference publications and holds 25 patent families on wireless power transfer technologies. In recognition of his outstanding contributions to engineering as an early carrier researcher, Dr. Thrimawithana received the Jim and Hazel D. Lord Fellowship in 2014. His main research areas include wireless power transfer, power electronics, cryogenic electronics and renewable energy.

TUTORIALS

Tutorial 3: Monday, 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Atcherley

Recent Advances of Predictive Control for Energy Conversion Systems

Instructors:

Ralph Kennel,
Technical University of Munich, Germany

Zhenbin Zhang,
Shandong University, China

Ricardo P. Aguilera,
University of Technology Sydney, Australia

Abstract:

The goal of this tutorial is to provide working knowledge on the development and implementation of MPC in different application fields. The introduction teaches the basic MPC principles, including mathematical techniques and optimization methods necessary to formulate and solve the control problem. In the second part, this tutorial will focus on addressing practical challenges in MPC of electrical drives. Particularly, this tutorial introduces the recent development of predictive encoderless control for AC motor drives. In addition to the expected combination of predictive control and pulse signal injection method, the cooperation of predictive control and fundamental frequency model method will also be introduced. Finally, in the last section, applications on high-power grid-connected converters including photovoltaic inverters, battery management systems, and active power filters are presented. These case studies demonstrate practical MPC designs and evaluate and discuss their results.

Biographies:

Ralph Kennel (Senior Member, IEEE) received the Diploma and Dr.-Ing. (Ph.D.) degrees in electrical engineering from the University of Kaiserslautern, Kaiserslautern, in 1979 and 1984, respectively. From 1983 to 1999, he was with Robert Bosch GmbH, Gerlingen, Germany. Until 1997, he was responsible for the development of servo drives. From 1994 to 1999, he was a Visiting Professor with the University of Newcastle upon Tyne, Newcastle upon Tyne, U.K. From 1999 to 2008, he was a Professor of Electrical Machines and Drives with Wuppertal University, Wuppertal, Germany. From 2008 to 2021, he was a Professor of Electrical Drive Systems and Power Electronics with the Technical University of Munich, Munich, Germany. His main research interests include sensorless control of ac drives, predictive control of power electronics, and hardware-in-the-loop systems. Dr. Kennel is a Fellow of the Institution of Engineering and Technology and a Chartered Engineer in the U.K. Within IEEE, he is a Treasurer of the Germany Section.

TUTORIALS

Zhenbin Zhang (Senior Member, IEEE) received the Ph.D. degree at the Institute for Electrical Drive Systems and Power Electronics (EAL), Technical University of Munich (TUM), Germany, with “summa cum laude”. From 2016 to 2017, he worked as a Research Fellow and the group-leader for “Modern Control Strategies for Electrical Drives” group in EAL. Since 2017, he has held the position of full professor and International Collaboration Ambassador of Shandong University, China. From 2018 to 2022, he was a guest professor in TUM with the “August-Wilhelm Scheer Professorship Award.” Prof. Zhang focuses on design and (predictive) control of renewable energy and power conversion systems, including interests of power electronics and motor drives, micro-grids with energy storage, and predictive maintenance of power conversion systems. Prof. Zhang is an IET Fellow, IET Chartered Engineer, IEEE Senior Member, and World Top 2% Scientists released by Stanford University. He was awarded the “VDE-AWARD-2017” for his contributions in advanced control for wind power generation and electrical drives. He was selected for the “1000-Talent” national program of China, and granted the Science Fund for Distinguished Young Scholars of Shandong Province, China. In addition, he won the First Prize of Science and Technology Award of China Electrotechnical Society, the Second Prize of both Shandong and Anhui Provincial Science and Technology Progress Award in 2023, 2022 and 2021, respectively, for his contributions in design and control of renewable energy and power conversion systems.

Ricardo P. Aguilera (Member, IEEE) received the B.Sc. degree in electrical engineering from the Universidad de Antofagasta, Antofagasta, Chile, in 2003, the M.Sc. degree in electronics engineering from the Universidad Tecnica Federico Santa Maria, Valparaíso, Chile, in 2007, and the Ph.D. degree in electrical engineering from The University of Newcastle (UoN), Newcastle, NSW, Australia, in 2012, respectively. From 2012 to 2013, he was a Research Academic with UoN, where he was part of the Centre for Complex Dynamic Systems and Control. From 2014 to 2016, he was a Senior Research Associate with The University of New South Wales, Sydney, NSW, where he was part of the Australian Energy Research Institute. Since September 2016, he has been with the School of Electrical and Data Engineering, University of Technology Sydney, Ultimo, NSW, where he is an Associate Professor. From 2021 to 2022, he was the Vice-Chair of the IEEE NSW Joint Chapter PEL/IES/IAS. Currently, he serves as an Associate Editor of the IEEE Journal of Emerging and Selected Topics in Power Electronics. His research interests include theoretical and practical aspects of model predictive control with application to power electronics, renewable energy integration, and microgrids.

TUTORIALS

Tutorial 4: Monday, 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Jacaranda

Emerging Solid-State-Transformer based Electric-Vehicle Ultra-fast Charging Station

Instructors:

Sanjib K. Panda
National University of Singapore, Singapore

Jaydeep Saha
ST Engineering Satellite Systems, Singapore

Abstract:

Transportation electrification is one of the major energy sustainability spotlights of this decade due to the accelerated push for carbon footprint reduction by various government policies worldwide, fueled by the commitments made by governments at various environmental summits. With the rapid growth of electric-vehicle (EV) industry in the past few years, the development of EV charging infrastructure is picking up pace simultaneously. This tutorial will focus on the emerging applications of SST based EV ultra-fast charging solutions that has incredible potential for providing highly compact and efficient EV ultra-fast charging solutions in the near future (especially in space-constrained urban applications), and will highlight the state-of-the-art research and developments in this domain. The tutorial will start off with a brief introduction to the EV fast/ultra-fast charging conc, along with an overview of the SST technology and its potential in compact EV fast/ultra-fast charging solutions while providing a succinct review of the various relevant SST topologies. Secondly, the discussion will shift to the concept of medium-voltage (MV) utility-grid-connected universal EV fast/ultra-fast charging station with bidirectional fast charging capability. The multi-port universal fast/ultra-fast charging/discharging station's V2G/G2V modulation/control (while ensuring that the expectations of mimicking an existing public refueling station can be approached), implementation aspect and comparative evaluation with existing solutions would be outlined.

Biography:

Dr. Sanjib Kumar Panda (email: eleskp@nus.edu.sg) received B. Eng. Degree from the South Gujarat

University, India, in 1983 (gold medallist), M.Tech. degree from the Indian Institute of Technology, Banaras Hindu University, Varanasi, India, in 1987 (gold medallist), and the Ph.D. degree from the University of Cambridge, U.K., in 1991, all in electrical engineering. He was the recipient of the Cambridge-Nehru Scholarship and M. T. Mayer Graduate Scholarship during his Ph.D. study (1987-1991). Since 1992, he has been holding a faculty position at the Department of Electrical and

Computer Engineering, National University of Singapore and currently serving as an Associate Professor and Director of the Power & Energy Research Area. Dr. Panda has published more than 550 peer-reviewed research papers with an h-index of 60, co-authored one book and contributed to several book chapters, holds six patents and co-founder of three start-up companies. His research interests include high-performance control of motor drives and power electronic converters, renewable energy systems, condition monitoring and predictive maintenance, building energy efficiency enhancement, etc. He is serving as an Associate Editor of several IEEE Transactions e.g. Power Electronics, Industry Applications, Energy Conversion, Access and IEEE Journal of Emerging and Selected Topics in Power Electronics. He is an IEEE PELS Distinguished Lecturer and serves as the Chair of the IEEE PELS Technical Committee-12 (TC-12): Energy Access and Off-grid Systems. He has also acted as the general chair of various IEEE conferences such as IEEE PEDS, IEEE ICSET etc., the most recent one being IEEE ECCE-Asia, 2021.

Dr. Jaydeep Saha (email: jaydeepsaha@u.nus.edu) received the B. Tech. degree in Electrical and Electronics Engineering from the National Institute of Technology (NIT), Warangal, India, in 2017 (silver medallist), and the Ph.D. degree from the Department of Electrical and Computer Engineering, National University of Singapore (NUS), Singapore, in 2021. He was a recipient of the prestigious DAAD-WISE scholarship (2016) for undergraduate research, the NUS research scholarship (2017-2021) for doctoral studies, best student-team award for IEEE Empower a Billion Lives, South-Asia (2018) and travel/best-paper awards at IEEE conferences. He has also received the Thesis Award by Springer Nature which recognises outstanding Ph.D. research work. He worked as a Research Fellow at the National University of Singapore (NUS), Singapore, from 2021 to 2024. He is currently appointed as an Assistant Principal Engineer at Satellite Systems (SatSys), ST Engineering, working on optimised and reliable modular power conversion onboard space-crafts. His primary research interests include electric vehicles, modular power conversion for space-crafts, high-efficiency and high-power-density power electronic converters, matrix-converter-based isolated bidirectional converter topologies, multi-objective power electronics design optimization, and solid-state-transformer architectures and their control. He has authored/co-authored more than 40 peer-reviewed journal and conference papers, and 1 book, 1 filed patent, and has an h-index of 11.

Dr. Saha has served as a frequent Reviewer for various IEEE journals, speaker at IEEE conference tutorials and IEEE Webinars, the Chair of the IEEE Jt. IAS/PELS Student Branch Chapter at National University of Singapore.

TUTORIALS

Tutorial 5: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)
Room: Queen Adelaide 1

Next Generation SiC/GaN 3-Φ Variable Speed Drive Systems

Instructor: **Johann W. Kolar**, Swiss Federal Institute of Technology (ETH) Zurich, Switzerland

Abstract:

Variable-speed drive systems should feature high power density and low installation costs, offer wide input and output voltage/motor speed ranges, and ensure low EMI without requiring shielded motor cables. Accordingly, next-generation PWM inverters utilizing fast switching SiC/GaN power semiconductors should integrate LC output filters and/or generate continuous output voltages to prevent conducted or radiated EMI, reflections on long motor cables, high-frequency motor losses, dv/dt-related motor insulation stresses and bearing currents, such that conventional low-cost motor technology can be utilized. The Tutorial first analyses different dv/dt- and full-sinewave output filter concepts and highlights the advantages of multi-level voltage DC-link converter topologies regarding filter volume minimization. Next, the integration of inverter and motor is discussed, and a new phase-modular inverter concept (Y-inverter), extending the inverter functionality from buck to buck-boost operation, is introduced and subsequently condensed into a three-phase current DC-link inverter that employs a single-bridge-leg voltage-to-current DC/DC conversion input stage and advantageously utilizes novel four-quadrant switches in the DC/AC output stage. Next, starting from the basic DC/AC current DC-link topology a three-phase DC-link AC/AC converter concept is derived and also translated into a voltage DC-link concept following duality considerations. In a final step, indirect and direct AC/AC matrix converters without intermediate energy storage elements are introduced, followed by a discussion of multi-step commutation and space vector modulation schemes. A brief comparative evaluation of voltage/current DC-link and matrix AC/AC converter approaches concludes the Tutorial.

Biography:

Johann W. Kolar is a Fellow of the IEEE, an International Member of the US NAE and a Full Professor and Head of the Power Electronic Systems Laboratory at the Swiss Federal Institute of Technology (ETH) Zurich. He has proposed numerous novel converter concepts incl. the Vienna Rectifier, has spearheaded the development of x-million rpm motors, and has pioneered fully automated multi-objective power electronics design procedures. He has supervised 90 Ph.D. students to completion, has published 1000+ IEEE journal and conference papers, 4 book chapters, and is named as inventor or co-inventor in 44 international/WO patents, 28 US patents, and 100+ patents in various European countries, filed in the course of global industry research collaborations. He has served as IEEE PELS

Distinguished Lecturer from 2012 – 2016. He has received numerous awards incl. 45+IEEE transactions and conference Prize Paper Awards, the 2016 IEEE William E. Newell Power Electronics Award, and 2 ETH Zurich Golden Owl Awards for excellence in teaching. His current research focuses on ultra-compact/efficient WBG converter systems, ANN-supported multi-objective design procedures, Solid-State Transformers, ultra-high speed drives, bearingless actuators, and life cycle analyses of power electronics converter systems.

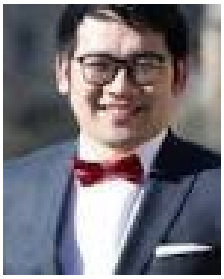
TUTORIALS

Tutorial 6: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)

Room: Queen Adelaide 2

Grid-Integration Technologies and Beyond for Solar Photovoltaic Systems

Instructors:



Yongheng YANG

Yinxiao ZHU

Dehong XU

Zhejiang University, China

Abstract:

Power electronics, as an efficient interface between the generation source and the grid, is benefiting the development of renewable energy resources (RESs). Meanwhile, driven by the continuous drop in the levelized cost of energy (LCoE), photovoltaic (PV) systems are widely integrated into the power grid towards carbon neutrality, and for greener and more sustainable society. However, the high penetration of power electronics-based PV systems raises great concerns about grid instability due to intermittent power injection, such as the frequency stability induced by the deficient mechanical inertia in PV-/RES-rich power systems. Accordingly, various attempts have been made to enhance the entire system performance, emphasizing the grid-friendly integration of PV energy, to guarantee the grid resilience, reliability, stability, and energy harvesting. Beyond conventional passive integration, recent PV systems can be controlled as active power sources, particularly, mitigating the adverse effects and simultaneously providing high controllability and flexibility. In this context, this tutorial is designed to walk through the technological challenges for grid-integration of solar PV energy, and more importantly, to look at different solutions. This tutorial provides a comprehensive approach to designing grid-friendly PV systems, covering the details from modelling, topologies, and to advanced controls (grid-following and grid-forming to enhance the friendliness). The goal is to improve the functionality and manageability of grid-connected PV systems by advanced controls to ensure the sustainability, compatibility with the power grid, efficiency, and reliability of PV systems that adhere to grid regulations and help to reduce the LCoE. It is for intermediate and advanced engineers, and researchers seeking practical solutions for grid-friendly integration of PV energy. The prerequisite is basic power electronics and control.

Biography:

Yongheng Yang (SM'17) received the B.Eng. degree in Electrical Engineering and Automation from Northwestern Polytechnical University, China, in 2009, and the Ph.D. degree in Energy Technology from Aalborg University, Denmark, in 2014. He pursued postgraduate studies at Southeast University, China, from 2009 to 2011 and was a Visiting Scholar at Texas A&M University, USA, from March to

May 2013. From 2014 to 2020, he was with the Department of Energy Technology at Aalborg University, where he achieved the rank of tenured Associate Professor in 2018. In January 2021, he joined Zhejiang University in China as a ZJU100 Professor. He became a Zhejiang Top-notch Scholar in 2023, awarded to him to tackle the issues for large-scale grid integration of renewable energy. His research focuses on grid-friendly integration of photovoltaic systems and control of power converters, specifically grid-forming technologies.

Dr. Yang was the Chair of the IEEE Denmark Section in 2019-2020 and he is an Associate Editor for several IEEE Transactions/Journals. He received the 2018 IET Renewable Power Generation Premium Award and was recognized as an Outstanding Reviewer for the IEEE TRANSACTIONS ON POWER ELECTRONICS in 2018. He was the recipient of the 2021 Richard M. Bass Outstanding Young Power Electronics Engineer Award from the IEEE Power Electronics Society (PELS) and the 2022 IEEJ Isao Takahashi Power Electronics Award. In addition, he has received three IEEE Best Paper Awards, and the Excellent Paper Award of *CSEE Journal of Power and Energy Systems* in 2023. He was included on the Highly Cited Chinese Researchers list by Elsevier in 2022-2024. He is presently a Vice Chair of the IEEE PELS Technical Committee on Sustainable Energy Systems and a Council Member of the China Power Supply Society.

Yinxiao Zhu (M'23) received the M.Sc. (with Distinction) degree in sustainable energy technology, and the Ph.D. degree in electrical and electronic engineering from the University of Liverpool, Liverpool, U.K., in 2019 and 2023, respectively. He is currently a Postdoctoral Research Fellow with the College of Electrical Engineering, Zhejiang University, Hangzhou, China. His current research interests include the grid integration of photovoltaic systems and control of power electronics, in particular, grid-supportive controls and differential power processing technologies. Dr. Zhu has authored and co-authored over 10 articles in IEEE Transactions and is also an active reviewer for several flagship IEEE journals/conferences. He is a Fellow of the Higher Education Academy. He is now leading an industrial project on the integration and control of solar PV power generation systems for commercial applications.

Dehong Xu (Fellow, IEEE) received the Ph.D. degree from the Department of Electrical Engineering, Zhejiang University, Hangzhou, China, in 1989. Prof. Xu has been a Full Professor with the Zhejiang University, since 1996. He was a Visiting Professor with the Department of Electrical Engineering, University of Tokyo, Tokyo, Japan, from May 1995 to June 1996, the Center of Power Electronics System, Virginia Tech, Blacksburg, VA, USA, from June to December of 2000, the Power Electronics Lab, ETH, Zurich, Switzerland, from February to April of 2006, respectively. He is interested in power electronics topology, control, and applications to renewable energy and energy efficiency.

Prof. Xu has authored 16 books and more than 300 IEEE Journal or Conference papers. He holds more than 50 patents. Dr. Xu was the recipient of seven IEEE transaction or conference prize paper awards. He was also the recipient of the IEEE PELS R. D. Middlebrook Achievement Award in 2016. He currently serves as a Vice-President Membership of the IEEE Power Electronics Society. He is a Co-Editor-in-Chief of the IEEE OPEN JOURNAL OF POWER ELECTRONICS and an Associate Editor of IEEE TRANSACTIONS ON POWER ELECTRONICS. He was the General Chair of IEEE International Symposium on Industrial Electronics (ISIE2012, Hangzhou), IEEE International Power Electronics and Applications Conference (PEAC2018, Shenzhen), etc. He is the Honorable President of the China Power Supply Society.

TUTORIALS

Tutorial 7: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)

Room: Jacaranda

Methods to Identify & Control Highly Non-Linear Three-Phase Machines

Instructors:




Andreas Liske | Benjamin Bachowsky | Leonard Geier | Stephan Goehner

Karlsruhe Institute of technology (KIT), Germany

Abstract:

Highly utilized three-phase machines show a highly nonlinear electromagnetic behavior, making it very challenging or even impossible to control them using standard control algorithms.

One very appropriate and well-proven method to cope with this nonlinearity is the measurement of multi-dimensional flux linkage maps for each possible operating point of the given machine. During operation a look-up-table is used to adjust the gain of the used control algorithm to the actual differential inductance in each given operating point. The flux maps are also used in non-linear model predictive control (MPC) schemes to enhance dynamics.

In this tutorial different methods to obtain multi-dimensional flux maps of permanent magnet synchronous machines (PMSM), synchronous reluctance machines (SynRM), electrically excited synchronous machines (EESM) and induction machines (IM) are presented. This includes steady state-tests, locked-rotor-tests, and a new approach that replaces flux maps with a physics informed neural network. In addition to the flux-map-identification, also one well-proven control method that makes use of these flux maps and enables for high dynamics is presented. Of course, also hands-on tips from our long-term lab-experience, dealing with several motor test-benches ranging from few hundred Watts (Pedelec/E-Bike motors) to several 100kW (automotive) for over a decade will be given in each of the described topics.

Biography:

Dr. Andreas Liske received the Dipl.-Ing. degree in electrical engineering and communication technology from the Technical University of Karlsruhe and the PhD degree in electrical engineering from the Karlsruhe Institute of technology (KIT) in 2010 and 2020 respectively. Since 2010 he was lecturer and since 2012 senior engineer at the Institute of Electrical Engineering (ETI) at the KIT. In 2020 he became assistant professor and group-leader of the research team “Control and modelling of power electronics systems” at the very same institute. Dr. Liske teaches 4 lectures in power electronics, modeling, and control of electrical machines at the KIT.

One of his research topics was an adaptive current control scheme which highly depends on the fast and precise identification of the inverter induced current slopes. In this context, he and his team developed several improvements and new methods. He was an invited speaker to present those new ideas at several international seminars and conferences, e.g. ECPE Cluster seminars, industry led Symposiums and as invited talk on the Southern Power Electronics Conference (SPEC 2022).

His recent research focuses on extending the methods and applications of real-time dx/dt measuring in the context of power electronics, modeling, and control of electrical drive systems.

Benjamin Bachowsky received the B.Sc. and M.Sc. degrees in electrical engineering from the Karlsruhe Institute of Technology (KIT), Germany, in 2016 and 2020, respectively. Since 2021, he has been working as a Research Associate at the Institute of Electrical Engineering (ETI) at KIT. His research focus is on the identification and dynamic control of electrical drives, in particular model predictive control strategies and new adaptive methods of online identification.

Leonard Geier was born in Göttingen, Germany in 1994. He received the B.Sc. and M.Sc. degrees in mechatronics engineering from the Karlsruhe Institute of Technology (KIT), Germany, in 2019 and 2022, respectively. Since 2022 he has been working as a research associate at the Institute of Electrical Engineering at KIT to receive a PhD. His research interests include power electronics and electrical drives, especially modelling, parameter identification and control strategies.

Stephan Goehner was born in 1998 in Hannover, Germany. He studied electrical engineering and information technology at Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany, where he received his B.Sc. (2020) and M.Sc. (2022). Since 2023 he is research assistant in the research group for control of power electronics systems at Institute of Electrical Engineering (ETI) at KIT. His main research topics are modeling, parameter identification and control of electric drives with focus on synchronous machines. In his recent work, he examined flux linkage identification of permanent magnet and electrically excited synchronous machines using steady state and locked rotor tests.

TUTORIALS

Tutorial 8: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)

Room: Atcherley

Condition and Health Monitoring of Power Electronic Components and Converters

Instructor: **Huai Wang,** Aalborg University, Denmark

Abstract:

With the increasing use of power electronic converters for electrical energy generation, conversion, transmission, and utilization, our society is moving forward to a fully electrical-driven chapter. From e-mobility, industrial drive, and energy storage to data analytics, information management, and digital transformation, power electronics technology services as a precise and efficient electrical energy conversion unit. They are all heavily electricity-dependent applications and require electrical energy with proper type. However, power electric converters are subject to frequent operational and environmental strains, which can induce failures. The prediction of these failures is difficult but important, so the operation of a system can be halted before a catastrophic failure occurs. Hence, it demands cost-effective and robust condition and health monitoring solutions for operation optimization and predictive maintenance, facilitating life-cycle-reduction and performance boost of power electronic converters.

This tutorial aims to present the state-of-the-art condition and health monitoring methods for power electronic components and converters. It starts with a brief introduction to the reliability and availability challenges of power electronics in different applications, underlining the importance, function, and benefits of condition monitoring, and their demands on field applications. Then, it discusses the condition monitoring methods for power semiconductor switches, capacitors, and power electronic converters. A few case studies for converters with silicon, SiC, and GaN devices, and electrolytic and film capacitors are used to illustrate the principles and associated practical considerations. Finally, it gives perspectives on the challenges and the gap between academic research and industrial applications in condition and health monitoring in power electronic converters.

Biography:

Huai Wang is a Professor at the Department of Energy (AAU Energy), Aalborg University, Denmark. He leads the Reliability of Power Electronic Converters (ReliaPEC) group and chairs the Mission of Digital Transformation and AI at AAU Energy. His research focuses on efficient, reliable, and cognitive power electronic converters. Prof. Wang collaborates with companies across the value chain, from materials and components to systems. Moreover, part of his research outcomes has become the underpinning technologies of three start-up companies. Over the past decade, he has initiated five short-term industrial/PhD courses, attended by over 800 PhD students and industry engineers. Prof. Wang received his PhD from the City University of Hong Kong in 2012 and a B.E. degree from Huazhong University of Science and Technology in 2007. He has conducted short-term research at MIT, ETH Zurich, and ABB Corporate Research Center in Switzerland. He received the Richard M. Bass Outstanding Young Power Electronics Engineer Award in 2016 from the IEEE Power Electronics Society and the IEEE Transactions on Power Electronics 1st Prize paper award in 2021. He served as Chair of the IEEE IAS/IES/PELS Chapter in Denmark from 2018 to 2020 and currently serves on the editorial boards of four journals from IEEE, Springer Nature, and Elsevier. In 2023, he was elected as a member of the Danish Academy of Technical Sciences.

PLENARY/KEYNOTE/INVITED SPEAKERS

Plenary 1: Tuesday 3rd December | 9:00 am – 9:45 am (UTC +10)

Room: Grand Ballroom

Bidirectional Isolated Dual-Active-Bridge (DAB) Converters: Yesterday, Today, and Tomorrow

Lecturer: **Hirofumi Akagi,** Tokyo Institute of Technology, Tokyo, Japan

Chair: Junwei Lu, Griffith University, Australia

Abstract:

This plenary speech begins with a historical review of bidirectional isolated dual-active-bridge (DAB) converters, referring to some seminal research papers. The technical term "dual-active-bridge" is derived from the circuit topology, whereas the term "bidirectional isolated" is derived from the functionality. Due to its simpler naming, the DAB converter would be preferable to the bidirectional isolated dc-dc converter. De Doncker, Divan, and Kheraluwala proposed the converter topology, and did experimental verification of the 1-kW 20-kHz DAB converter using power bipolar junction transistors (BJTs) in 1991. However, few power electronics experts had paid attention to it before 2005 because of low levels of conversion efficiency. Inoue and Akagi presented a revived paper on the 10-kW 20-kHz DAB converter using trench-gate IGBTs, in which they experimentally verified an acceptable efficiency level as high as 97% in 2006.

Circuit configurations classify it as either single-phase or three-phase and either resonant or non-resonant. In addition, applications allow it to be divided into the following two groups: One group is that the voltage ratio of the dc input to output terminals is always equal to the turns ratio of the transformer installed to achieve galvanic isolation between the dc input and output terminals. This situation occurs when the DAB converter is integrated into a converter cell of a multilevel converter. The other group is that the voltage ratio is not equal to the transformer's turns ratio with acceptable levels of difference. This situation occurs when the DAB converter is connected directly to a battery pack or system. It is known that the former has a higher conversion efficiency than the latter.

Haneda and Akagi designed, built, and tested the 850-Vdc, 100-kW, 16-kHz DAB converter consisting mainly of two 1.2-kV 400-A SiC-MOSFET/SBD quad (4-in-1) modules and a unity-turns-ratio transformer using the latest nanocrystalline soft-magnetic material in 2018. The 100-kW DAB converter, which underwent experimental verification, demonstrated the attainment of high levels of efficiency from the dc input to output terminals under three distinct yet meaningful operating conditions. The efficiency levels attained were 99.2% at 100 kW, 99.5% (peak efficiency) at 34 kW, and 99.2% at 10 kW. These results were achieved while maintaining "zero-voltage switching (ZVS)" in all the operating regions.

In light of the power-loss breakdown conducted on the basis of the aforementioned experimental findings, Akagi believes that the DAB converter will attain an extremely high level of efficiency, reaching 99.6% or above at the rated power, by 2035. This is a consequence of the ongoing advancement in the performance of SiC-MOSFET modules and magnetic devices. Such a high level of efficiency would not only allow us to eliminate cooling fans from heat sinks, but also to completely seal the converter against the ingress and egress of ambient air.

PLENARY/KEYNOTE/INVITED SPEAKERS

Biography:

Hirofumi (Hiro) Akagi was born and grew up in Okayama, Japan. He received his B. S. degree from the Nagoya Institute of Technology, Nagoya, Japan, in 1974, and his M. S. and Ph. D. degrees from the Tokyo Institute of Technology, Tokyo, Japan, in 1976 and 1979, respectively, all in electrical engineering. In April 1979, he joined the Technological University of Nagaoka, (currently the Nagaoka University of Technology), Nagaoka, Japan, as Assistant Professor, and then, Associate Professor. In August 1991, he moved to Okayama University, Okayama, Japan, with a promotion to Professor. Since January 2000, he has been Professor, currently Distinguished Professor, at the Tokyo Institute of Technology.

His research interests include semiconductor-based power conversion systems and their applications to industry, transportation, and electric power utility. He has been well-known amongst the power electronics community as an inventor of the three-level neutral-point-clamped (NPC) inverter in 1981, and a pioneer of the instantaneous-power theory in three-phase circuits, or p-q theory in 1984. He has authored or co-authored 148 papers in the IEEE Transactions or Journal, including three invited, single-author papers published in the esteemed Proceedings of the IEEE in 2001, 2005, and 2017. His lifetime publications have garnered more than 67,000 citations with an h-index of 106, according to Google Scholar.

Dr. Akagi received many awards, including IEEE Fellow and Life Fellow recognitions in 1996 and 2020, respectively, the 2001 IEEE Power Electronics Society William E. Newel Award, the 2004 IEEE Industry Applications Society Outstanding Achievement Award, the 2008 IEEE Richard H. Kaufmann Award, the 2012 IEEE Power & Energy Society Nari Hingorani Custom Power Award, 2018 IEEE Medal in Power Engineering, and the 2020 EPE (European Power Electronics and Drives Association) Gaston Maggetto Medal. He is the inaugural and currently sole recipient of both IEEE and EPE Medals. He served as the President of the IEEE Power Electronics Society from 2007 to 2008 for a two-year term, and as the IEEE Division II Director from 2015 to 2016 for a two-year term.

PLENARY/KEYNOTE/INVITED SPEAKERS

Plenary 2: Tuesday 3rd December | 9:45 am – 10:30 am (UTC +10)

Room: Grand Ballroom

Emerging Challenges and Advanced Solutions for DC Faults in HVDC, PV, EV, and Hybrid Power Systems

Lecturer: **Brad Lehman,** Brad Lehman (IEEE Fellow), President IEEE PELS, Northeastern University, USA
Chair: Patrick Palmer, Simon Fraser University, Canada

Abstract:

The rapid growth of high-voltage direct current (HVDC) systems, photovoltaic (PV) installations, electric vehicles (EVs), and hybrid AC/DC grids has introduced new challenges in managing direct current (DC) faults. These faults are often harder to detect and isolate, posing significant risks to system reliability and safety. This talk explores the unique issues associated with DC faults, including undetected line-to-line faults in PV systems, insulation breakdowns in EVs, and fault management in hybrid AC/DC grids. It will also highlight cutting-edge solutions utilizing advanced power electronics, fault detection systems, and DC circuit breaker technology. Special attention will be given to ongoing research, including new approaches to fault detection in PV systems, offering a pathway to improved system resilience. This presentation will provide attendees with a comprehensive understanding of the emerging role of power electronics in addressing these critical issues, along with practical solutions to enhance fault tolerance in modern power systems.

Biography:

Brad Lehman is President of the IEEE Power Electronics Society (PELS). He previously was VP of Products since 2019 – 2022 and Editor-in-Chief of the IEEE Transactions on Power Electronics (TPEL) from 2013-2018. He is currently a Professor at Northeastern University (NU), Boston. Dr. Lehman has been the recipient of the 2015 IEEE (PELS) Modeling and Control Technical Achievement Award, a 2016 IEEE Standards Medallion, the 2018 IEEE Award for Achievement in Power Electronics Standards, and the 2019 IEEE PELS Harry A. Owen, Jr. Distinguished Service Award. He has been listed in the inaugural edition of the book The 300 Best Professors, Princeton Review, 2012. He performs research in power electronics and renewable energy, with emphasis on the modeling, design, and control of high-density converters.

PLENARY/KEYNOTE/INVITED SPEAKERS

Plenary 3: Tuesday 3rd December | 10:45 am – 11:30 am (UTC +10)

Room: Grand Ballroom

Advances in Reliability of Power Electronic Components and Systems

Lecturer: **Huai Wang,** Aalborg University, Denmark
Chair: Sanjib K. Panda, National University of Singapore, Singapore

Abstract:

As an increasing percentage of electricity is processed through power electronic converters, optimizing their efficiency and reliability is essential for creating affordable, secure, and sustainable energy systems. Industry-leading companies are shifting from being solely product providers to also offering services, making the life-cycle performance of power electronic systems is increasingly critical. This keynote will explore the latest advancements and challenges in reliability design, testing of power electronic components and converters, and condition monitoring for predictive maintenance and operational optimization. The talk will cover: 1) a brief overview of the background and key research activities from the past decade; 2) detailed case studies that illustrate reliability design, testing, and condition monitoring of power electronic components and converters; and 3) an exploration of AI's potential in reliability research, particularly in computationally efficient dynamic thermal modeling, early wear-out prediction for testing time reduction, and condition monitoring.

Biography:

[Provided in the tutorial section.]

PLENARY/KEYNOTE/INVITED SPEAKERS

Plenary 4: Tuesday 3rd December | 11:30 am – 12:15 pm (UTC +10)

Room: Grand Ballroom

Power Supplies Design for Data Center Power System Stability

Lecturer: **Jian Sun,** Rensselaer Polytechnic Institute, USA
Chair: Dylan Lu, University of Technology Sydney, Australia

Abstract:

Data centers have evolved from serving dedicated customers and functions to being the hub of a growing IT infrastructure that people, businesses and institutions in many parts of the world rely on for everyday life and operation. A modern data center employs an advanced power distribution system to ensure high reliability, efficiency and power quality. With >100 MW power consumption at each site and virtually every watt of electricity processed by power converters at least 2-3 times, data centers have a very high concentration of power electronics, creating the potential for new types of instability that other industries have faced in recent years. This presentation reviews practical data center power system stability problems, introduces frequency-domain methods to identify instability, and presents power supplies design to guarantee system stability.

Biography:

Dr. Jian Sun joined the faculty at Rensselaer Polytechnic Institute (RPI) in 2002, where he is currently a Professor in the Department of Electrical, Computer and Systems Engineering. He is also Director of the Center for Future Energy Systems (CFES) funded by New York State government. His research interests are in the general area of power electronics and energy conversion. He is credited for creating the small-signal sequence immittance theory and leading/promoting its practical applications to different industries internationally.

Dr. Sun received his doctorate from University of Paderborn, Germany. Prior to joining RPI, he spent five years at Rockwell Collins working on power electronics for aircraft power systems, and was a Post-Doc Fellow at Georgia Tech from 1996 to 1997. As Director of CFES, he is responsible for the strategic directions and development of the Center's research, industry collaboration, education, and outreach programs. His professional activities in the power electronics community included serving as Editor-in-Chief of IEEE Power Electronics Letters from 2008 to 2014, Treasurer of IEEE Power Electronics Society (PELS) from 2013 to 2020, and as PELS Vice President of Conferences since 2021.

Dr. Sun received the IEEE PELS Modeling and Control Technical Achievements Award in 2013 and the R. David Middlebrook Outstanding Achievement Award in 2017. He is a Fellow of IEEE.

PLENARY/KEYNOTE/INVITED SPEAKERS

Keynote 1: Wednesday 4th December | 8:30 am – 9:15 am (UTC +10)

Room: Grand Ballroom

Angels and Board Rooms: Commercialising Power Electronics in Australia

Lecturer: **Gunilla Burrows,** Australian Academy of Technology and Engineering

Chair: Kosala Gunawardane, University of Technology Sydney, Australia

Abstract:

Australia's power electronics sector stands at the cusp of tremendous growth, driven by the surging demand for advanced technologies in renewable energy, electric vehicles, and smart grids. Yet, scaling up these innovations from lab to market requires strategic collaboration between the inventors, the early-stage investors, entrepreneurs, and industry. In this talk, we'll delve into the unique role of angel investors in bridging the gap between research and the market. As early supporters, angels provide not only capital but also mentorship and access to networks, making them essential in navigating market entry and establishing appropriate business models as well as helping in structuring boards that can foster robust growth and strategic direction.

With real-life case studies and insights tailored to the Australian context, this session will provide a deeper understanding of how effective board governance and angel involvement can accelerate the commercialisation of power electronics, ultimately positioning Australia as a global leader in this essential field.

Biography:

Dr Gunilla Burrowes is a recognised electrical engineer, entrepreneur, gender equity advocate, angel investor and a driving force in the Newcastle technology startup ecosystem. As an electrical engineer (UNSW), Gunilla has completed a Master of Philosophy in Engineering Education and a Doctorate in Underwater Swarm Sensor Networks (University of Newcastle). She is a Fellow of the Australian Academy of Technology and Engineering and an Honorary Fellow of Engineers Australia. In 2000, Gunilla co-founded an underwater technology company, BlueZone Group, in the Hunter Region, which now has two offices around Australia. This experience of starting a tech company underpins Gunillas leadership in pro-actively fostering innovation across the Hunter Region which includes being the Founding Chair of Eighteen04, a co-working and incubator space for CleanTech and SmartCity based startups in the Hunter area, a Founding Chair of Rights House an Angel investment group, a Founding member of Hunter iF and a past director of the Hunter Angels. She has graduated from the AICD Directors Course and is on numerous company boards including the Blue Economy and SmartCrete CRC's. She has been a director of Engineers Australia's (EA's) Board and Congress and President of EA's Newcastle Division.

Along with Gunilla's industrial expertise in renewable energy, she's also dedicated to several gender equity projects. She is the co-founder of Gender Matters, a consultancy with a focus on cognitive bias mitigation, and has managed diversity programs at a number of research institutions, and was an instigator of EA's Year of Women in Engineering in 2007.

PLENARY/KEYNOTE/INVITED SPEAKERS

Keynote 2: Wednesday 4th December | 9:15 am – 10:00 am (UTC +10)

Room: Grand Ballroom

Powering the AI Revolution – Circuit Topologies, Control Techniques, and Packaging for High- Density, High-Efficiency Data Center Power Delivery

Lecturer: **Robert Pilawa,** University of California-Berkeley, USA

Chair: Geoff Walker, Queensland University of Technology, Australia

Abstract:

Data centers represent one of the fastest growing loads on the electric grids, with ever-increasing power needed to fuel the servers and chips that perform machine learning and artificial intelligence computation. Advanced GPUs require power at less than 1V, and more than 1000A, and the power converters tasked with delivering this must do so at high efficiency, and in small form factors with stringent size and height limitations. In this talk, I will provide an overview of the critical data center power delivery challenges, with a high-level overview of the system architecture, including thermal management and ac-dc power conversion, and a more detailed look at the challenges associated with 48V to point-of-load (PoL) dc-dc power delivery. In recent years, a number of innovations in circuit topologies, control techniques, and advanced packaging/integration has enabled dramatic improvements in power density and efficiency in this area, greatly reducing the power conversion losses of modern servers. I will provide details around some of these recent developments, along with the areas of continued research to usher in the next generation of data center power delivery solutions.

Biography:

[Provided in the tutorial section.]

PLENARY/KEYNOTE/INVITED SPEAKERS

Keynote 3: Wednesday 4th December | 1:00 pm – 1:45 pm (UTC +10)

Room: Grand Ballroom

Marinised Aiot-Enabled Energy Storage System (ESS) And Digital Solution for Carbon Neutral Shipyard

Lecturer: **Sanjib Panda,** National University of Singapore, Singapore

Chair: Dezso Sera, Queensland University of Technology, Australia

Abstract:

The integration of Energy Storage Systems (ESS) into modern energy infrastructure has become increasingly critical as the world shifts towards sustainable energy solutions. ESS plays a pivotal role in enhancing reliability, efficiency, and flexibility of power systems, especially in the context of renewable energy sources such as solar and wind, which are inherently variable and intermittent. By storing excess energy during periods of low demand and discharging it during peak times, ESS mitigates the imbalance between energy supply and demand, thus stabilizing the grid and reducing reliance on fossil fuel-based peaker plants.

In maritime environments, such as the proposed Floating Living Lab (FLL) for carbon-neutral shipyards, ESS is essential for ensuring continuous and resilient energy supply. The FLL concept, which integrates LNG, solar PV, and ESS, aims to provide a sustainable power solution for shipyard operations while addressing the challenges of harsh offshore environments.

Moreover, ESS supports implementation of advanced digital solutions and AI-driven contingency analysis, essential for managing power systems under varying operational conditions. They enable rapid response to power contingencies and optimize energy usage through intelligent algorithms, significantly enhancing the overall resilience and efficiency of the energy system. In particular, Corrective Contingency Analysis (CCA) plays a pivotal role by evaluating the impact of contingency events on ESS performance and optimizing corrective actions to bolster system resilience. Leveraging Holomorphic Embedded Power-Flow (HEPF) techniques and Differential Evolution (DE) for AI-assisted optimization, CCA ensures that ESS can effectively handle unexpected disruptions and maintain operational integrity.

In conclusion, the deployment of ESS in both onshore and offshore applications is not only a technological advancement but also a strategic necessity in the global transition towards sustainable and resilient energy systems. The ability of the ESS to integrate with renewable energy sources, provide grid stability, and support advanced digital solutions underscores its importance in the future of energy management.

Biography:

[Provided in the tutorial section.]

PLENARY/KEYNOTE/INVITED SPEAKERS

Keynote 4: Thursday 5th December | 8:30 am – 9:15 am (UTC +10)

Room: Grand Ballroom

Encoderless Control of AC Drives - Concepts and Realistic Expectations

Lecturer: **Ralph Kennel,** Technische Universitaet Muenchen**,** Germany

Chair: Tian Hao, Shandong University, China

Abstract:

Field-oriented control of AC drives requires knowledge of the mechanical rotor position. Generally, this is detected by a position encoder, which has to be mounted on the shaft of the servo motor. In cost sensitive applications, however, when maximum performance is not required (for instance in traction drives), it is desirable to save this expensive sensor. Besides the cost advantage, encoderless control convinces with high mechanical robustness, as no sensitive electronic components are present in the machine.

There are two main methods for encoderless position detection, the first is based on using the basic equations of the electrical machine (evaluating the back-EMF), whereas the second is based on additional signal injection. The back-EMF based methods typically detect the mechanical position by integration of the induced voltage, which is estimated with an asymptotic observer at nonzero speed. Around zero frequency, however, this method does not work in practice – here it is necessary to use a different method using high frequency signals to detect the rotor position. The resulting amplitude modulated information in the HF current is used to find what is called the anisotropy position, from which the rotor position may be estimated.

High frequency injection methods are becoming more and more attractive. These methods generally interact with the saliencies (magnetic anisotropies) of an electrical machine obtaining the desired rotor position by demodulation methods. Saliencies are well-known when using Interior Permanent Magnet Machines or Synchronous Reluctance Machines. The most recent progress in this area is the encoderless control of synchronous machines with surface mounted permanent magnets. The saliency to be detected in this type of electrical machine is very small (< 5 %). In spite of that difficulty it is possible to design a encoderless control without the need of additional voltage sensors and with a behavior independent from any parameters of the electrical machine.

A rather novel method is to use predictive control schemes within sensorless operation of AC drives. This concept will be shown with experiments.

Biography:

[Provided in the tutorial section.]

PLENARY/KEYNOTE/INVITED SPEAKERS

Keynote 5: Thursday 5th December | 9:15 am – 10:00 am (UTC +10)

Room: Grand Ballroom

Are We Falling Off the «Net Energy Cliff» and Running Out of Critical Raw Materials?

Lecturer: **Johanne Kolar,** Swiss Federal Institute of Technology (ETH) Zurich
Chair: Feng Gao, Shandong University, China

Abstract:

Since the industrial revolution, economic growth has been enabled by fossil fuels, which remain indispensable in applications like long-haul transport or the production of chemicals, steel, and cement. Any energy supply system must provide sufficient surplus energy after accounting for the energy required to build and maintain that system, i.e., the energy return on energy invested (EROEI) must be higher than about 5…10 for supporting complex industrial societies. This is easily achieved by burning fossil fuels, which, however, causes global warming. Therefore, a clean energy transition towards renewable energy is mandatory and underway. This transition comes with challenges such as the need for energy storage and new long-distance power transmission lines; if accounted for these, a 100% renewable energy system might show EROEI values of less than 5. Further, the transition requires substantial amounts of critical minerals, which exceed known reserves in some cases and/or whose sourcing and processing is geopolitically constrained. These aspects motivate, first, a “do-more-with-less” approach in power electronics, i.e., highly compact and highly efficient power converters, and second, the need to follow a zero-waste paradigm towards fully circular economy compatible power electronics.

Biography:

[Provided in the tutorial section.]

PLENARY/KEYNOTE/INVITED SPEAKERS

Keynote 6: Thursday 5th December | 1:00 pm – 1:45 pm (UTC +10)

Room: Grand Ballroom

Sensorless Condition & Health Monitoring- A Key Technology to More Sustainable Power Electronics?

Lecturer: **Andreas Liske,** Karlsruhe Institute of technology (KIT), Germany

Chair: Junwei Lu, Griffith University, Australia

Abstract:

Future Grids will largely be permeated by power electronic components. This is due to the expansion of renewable energies, but also because consumers will increasingly be connected to the grid with power converters. Also in applications as e.g. electric drive systems, industry applications, tools and IT technology power electronics have become an essential part of an optimized and efficient operation. To prevent these power electronic components from becoming a permanent maintenance task and investment trap, they need to work reliably for as long as possible. Condition and Health Monitoring (CHM) is hereby an effective measure for improving the availability of power electronic components, converters and systems: The reliable prediction of possible failures ensures timely maintenance and replacement.

In addition, unnecessary replacement of components that are still healthy (e.g. as part of standard maintenance intervals) can be avoided. This not only reduces the amount of e-waste to be expected, but also improves the lifetime costs. Many CHM solutions have been developed in recent years, but their adoption in industrial applications still requires considerable development work.

This keynote highlights state-of-the-art and new “sensorless” CHM techniques, showing their respective potential, limitations and the major crucial points to trigger interest and research activity in this field.

Biography:

[Provided in the tutorial section.]

PLENARY/KEYNOTE/INVITED SPEAKERS

Invited Speech 1: Wednesday 4th December | 1:45 pm – 2:30 pm (UTC +10)

Room: Grand Ballroom

Improving Grid-Forming Inverter Performance under Varying Grid Conditions

Lecturer: **Lasantha Meegahapola,** RMIT University, Australia

Chair: Duleepa Thrimawithana, Auckland University, New Zealand

Abstract:

Power grids are transitioning to low-carbon grids by integrating converter-interfaced renewable energy sources. This transition has resulted in various stability issues due to low inertia and system strength, particularly under high penetration of converter-interfaced sources. The grid-forming inverters (GFMIs) offer a wide-range of functionalities to improve power grid stability, including frequency, voltage, and system strength support. Therefore, GFMIs are becoming one of the cornerstone technologies of the future low-carbon power grids. Since the GFMIs are deployed in different grid contexts, such as transmission to distribution and low to high short-circuit strength conditions, their stability should be ensured under all grid conditions. This talk will cover some control strategies to overcome the stability challenges of GFMIs operating under different network conditions. More specifically, virtual power (VP)-based and virtual impedance (VI)-based strategies are discussed in the context of power synchronisation control (PSC) based GFMI.

Biography:

A/Prof. Lasantha Meegahapola received the PhD from the Queen's University of Belfast, UK, in 2010. He received the BSc. Eng. degree in Electrical Engineering (First Class, Honours) from the University of Moratuwa, Sri Lanka in 2006. A/Prof. Meegahapola is currently with the Department of Electrical and Electronic Engineering, School of Engineering, RMIT University, Australia. He has more than 17 years of research experience in power system dynamics & stability with renewable power generation, and microgrid dynamics, stability & control. A/Prof. Meegahapola has been involved with seminal research and industry projects, such as technical feasibility analysis of super-capacitors for providing frequency regulation services in wind farms and the characterisation of the combined-cycle gas-turbine lean blowout phenomenon. He has published more than 200 peer-reviewed journal and conference articles and has supervised 17 PhD students to completion to date. He is a Senior Member of IEEE (SMIEEE), a Member of the IEEE Power Engineering Society (PES) and a Member of the IEEE Industry Applications Society (IAS). He is an active member of the IEEE Power and Energy Society (PES), Power System Dynamic Performance (PSDP) committee task forces on microgrid stability analysis and microgrid dynamic modelling. A/Prof. Meegahapola also serves as an associate editor of the IEEE Transactions on Power Systems, IEEE Power Engineering Letters, IEEE Transactions on Industry Applications and IET Renewable Power Generation journals.

PLENARY/KEYNOTE/INVITED SPEAKERS

Invited Speech 2: Thursday 5th December | 1:45 pm – 2:30 pm (UTC +10)

Room: Grand Ballroom

Power Electronics Empowered EV Charging

Instructor: **Zian Qin,** Delft University of Technology, Netherlands

Chair: Dezso Sera, Queensland University of Technology, Australia

Abstract:

E-mobility is essential for the global carbon-neutral climate goal. The charger is an enabling technology in E-mobility, which determines the charging time as well as the impact on the grid network. As the battery capacity keeps increasing for a longer range, the power rating of the charger is pushed higher so that the charging can be done in a relatively short time. Nowadays, passenger EV chargers rated more than 300 kW can be found at rest stops near the way. For heavy-duty e-transportation, the chargers typically have to deliver multi-MW charging power. However, a major part of the grid was built decades ago and, thereby, is not prepared for the spread out of the chargers in terms of both grid capacity and stiffness. To tackle these challenges, we need advanced power electronics technologies, energy storage integration, as well as power quality and stability analysis of the charging network based on dynamic modelling, etc. All these will be addressed in the talk.

Biography:

Zian Qin (IEEE Senior Member) received the B.Sc. degree from Beihang University, Beijing, China, in 2009; M.Sc. degree from Beijing Institute of Technology, Beijing, China, in 2012; and Ph.D. degree from Aalborg University, Aalborg, Denmark, in 2015; all in electrical engineering. He is currently an associate professor with the Department of Electrical Sustainable Energy at Delft University of Technology, the Netherlands. In 2014, he was a Visiting Scientist at RWTH Aachen University, Aachen, Germany. His research interests include power quality and stability of power electronics-based grids, solid-state transformers, and battery energy storage. He has more than 100 journals/conference papers, 4 book chapters, and 4 international patents. He is an associate editor of IEEE TIE and JESTPE. He is the founding chair of IEEE Benelux Transportation Electrification Council Chapter. He served as the technical program chair of IEEE-PEDG 2024 & 2023, IEEE-ISIE 2020, IEEE-COMPEL 2020, etc.

IEEE WOMEN IN ENGINEERING COCKTAIL EVENT

Tuesday 3rd December | 5:30 pm – 6:30 pm (UTC +10)

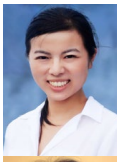
Room: Petrie 2

Empowering Currents: Women Leading the Charge in Power Engineering

Discussion on challenges and opportunities for women in power engineering, diversity and inclusion, educational pathways and mentorship, work-life balance in engineering careers, and future outlook for women in power engineering.

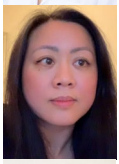
Moderator: **Assoc Prof. Kosala Gunawardane,**
School of Electrical and Data Engineering
University of Technology Sydney

Panelist: **Dr. Gunilla Burrowes,**
Entrepreneur, Angel Investor



Panelist: **Dr. Feifei Bai,**
Senior Lecturer,
University of Queensland

Panelist: **Prof. Brad Lehman,**
President, IEEE Power Electronics Society



Panelist: **Ms. Ruth Poon, General Manager**,
Wurth Electronics

Panelist: **Ms. Emily Marschke,**
Program & Operations Manager, The Australian Power Institute

Panelist: **Ms. Anika Ensinger,**
Electronics Engineer,
Prohelion

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Scan QR to Register for the event

IEEE YOUNG PROFESSIONAL COCKTAIL EVENT

Wednesday 4th December | 5:00 pm – 6:00 pm (UTC +10)

Room: Petrie 2

This cocktail event gives an opportunity for young engineers attending the conference to meet and network. There would be a few young engineers delivering talks during the event.

YOUR GUIDE TO SESSIONS, SPEAKERS, AND VENUES

MONDAY, 2ND OF DECEMBER

MORNING TUTORIALS:	**8:30 AM**	**TO**	**10:00 AM**	**|**	**Pages 6 – 11**
TEA BREAK:	**10:00 AM**	**TO**	**10:30 AM**		
MORNING TUTORIALS:	**10:30 AM**	**TO**	**12:30 PM**	**|**	**Pages 6 – 11**
LUNCH:	**12:30 PM**	**TO**	**1:30PM**	**|**	**Motion Dining Restau.**
AFTERNOON TUTORIALS:	**1:30 PM**	**TO**	**3:00 PM**	**|**	**Pages 12 – 17**
TEA BREAK:	**3:00 PM**	**TO**	**3:30 PM**		
AFTERNOON TUTORIALS:	**3:30 PM**	**TO**	**5:30 PM**	**|**	**Pages 12 – 17**
WELCOM RECEPTION:	**6:00 PM**	**TO**	**8:00 PM**	**|**	**Grand Ballroom**

TUESDAY, 3RD OF DECEMBER

OPENING CEREMONEY **8:30 AM TO 9:00 AM | Grand Ballroom**

PLENARY 1 **9:00 AM TO 9:45 AM | Grand Ballroom**

Bidirectional Isolated Dual-Active-Bridge (DAB) Converters: Yesterday, Today, and Tomorrow

Hirofumi Akagi, Tokyo Institute of Technology, Tokyo, Japan

PLENARY 2 **9:45 AM TO 10:30 AM | Grand Ballroom**

Emerging Challenges and Advanced Solutions for DC Faults in HVDC, PV, EV, and Hybrid Power Systems

Brad Lehman, (IEEE Fellow), President IEEE PELS, Northeastern University

TEA BREAK **10:30 AM TO 10:45 AM**

PLENARY 3 **10:45 AM TO 11:30 AM | Grand Ballroom**

Advances in Reliability of Power Electronic Components and Systems

Huai Wang, Aalborg University, Denmark

PLENARY 4 **11:30 AM TO 12:15 PM | Grand Ballroom**

Power Supplies Design for Data Center Power System Stability

Jian Sun, Rensselaer Polytechnic Institute

LUNCH: **12:15 PM TO 1:00 PM | Motion Dining Restau.**

TECHNICAL SESSION (1) **1:00 PM TO 3:00 PM**

Session No. 1;	Room: Grand Ballroom;	Title: DC/DC Converters I
Session No. 2;	Room: Queen Adelaide 1;	Title: Devices
Session No. 3;	Room: Atcherley;	Title: AC Machines
Session No. 4;	Room: Queen Adelaide 2;	Title: WPT Systems

TEA BREAK: **3:00 PM TO 3:15 PM**

TECHNICAL SESSION (2) **3:15 PM TO 5:15 PM**

Session No. 5;	Room: Grand Ballroom;	Title: DC/AC Converters I
Session No. 6;	Room: Atcherley;	Title: Energy Storage Systems
Session No. 7;	Room: Queen Adelaide 1;	Title: Cryogenic PE systems
Session No. 8;	Room: Queen Adelaide 2;	Title: Emerging topics I

WOMEN IN ENGINEERING **5:30 PM TO 6:30 PM | Petrie 2**

WEDNESDAY, 4TH OF DECEMBER

KEYNOTE (1) **8:30 AM TO 9:15 AM | Grand Ballroom**

Angels and Board Rooms: Commercialising Power Electronics in Australia

Gunilla Burrowes, Australian Academy of Technology and Engineering

KEYNOTE (2) **9:15 AM TO 10:00 AM | Grand Ballroom**

Powering the AI Revolution – Circuit Topologies, Control Techniques, and Packaging for High- Density, High-Efficiency Data Center Power Delivery

Robert Pilawa, University of California-Berkeley, USA

TEA BREAK: **10:00 AM TO 10:15 PM**

TECHNICAL SESSION (3) **10:15 PM TO 12:15 PM**

Session No. 9;	Room: Grand Ballroom;	Title: DC/DC Converters II
Session No. 10;	Room: Atcherley;	Title: Advanced Modulation & Ctrl
Session No. 11;	Room: Queen Adelaide 1;	Title: Renewable Energy
Session No. 12;	Room: Queen Adelaide 2;	Title: Emerging topics 2

LUNCH: **12:15 PM TO 1:00 PM | Motion Dining Restau.**

KEYNOTE (3) **1:00 PM TO 1:45 PM | Grand Ballroom**

Marinised Aiot-Enabled Energy Storage System (ESS) And Digital Solution for Carbon Neutral Shipyard

Sanjib Panda, National University of Singapore, Singapore

INVITED SPEECH (1) **1:45 PM TO 2:30 PM | Grand Ballroom**

Improving Grid-Forming Inverter Performance under Varying Grid Conditions

Lasantha Meegahapola, RMIT University, Australia

TEA BREAK: **2:30 PM TO 2:45 PM**

TECHNICAL SESSION (4) **2:45 PM TO 4:45 PM**

Session No. 13;	Room: Grand Ballroom;	Title: DC/AC Converters II
Session No. 14;	Room: Queen Adelaide 1;	Title: Transportation systems
Session No. 15;	Room: Queen Adelaide 2;	Title: AC/DC Converters 1
Session No. 16;	Room: Atcherley;	Title: Misc. issues in PE I

YOUNG PROFESSIONAL EV. **5:00 PM TO 6:00 PM | Petrie 2**

DINNER **6:45 PM TO 9:00 PM | Grand Ballroom**

THURSDAY, 5TH OF DECEMBER

KEYNOTE (4) **8:30 AM TO 9:15 AM | Grand Ballroom**

Encoderless Control of AC Drives - Concepts and Realistic Expectations

Ralph Kennel, Technische Universitaet Muenchen, Germany

KEYNOTE (5) **9:15 AM TO 10:00 AM | Grand Ballroom**

Disruptive Innovations in Power Electronics

Johanne Kolar, Swiss Federal Institute of Technology (ETH) Zurich

TEA BREAK: **10:00 AM TO 10:15 AM**

TECHNICAL SESSION (5) **10:15 AM TO 12:15 PM**

Session No. 17;	Room: Grand Ballroom;	Title: DC/DC Converters III
Session No. 18;	Room: Queen Adelaide 1;	Title: Grid.-Form. Converters
Session No. 19;	Room: Atcherley;	Title: Misc. in Conv. & Drives
Session No. 20;	Room: Queen Adelaide 2;	Title: High-Power Converters

LUNCH: **12:15 PM TO 1:00 PM | Motion Dining Restau.**

KEYNOTE (6) **1:00 PM TO 1:45 PM | Grand Ballroom**

Sensorless Condition & Health Monitoring- A Key Technology to More Sustainable Power Electronics?

Andreas Liske, Karlsruhe Institute of technology (KIT), Germany

INVITED SPEECH (2) **1:45 PM TO 2:30 PM | Grand Ballroom**

Power Electronics Empowered EV Charging

Zian Qin, Delft University of Technology, Netherlands

TEA BREAK: **2:30 PM TO 2:45 PM**

TECHNICAL SESSION (6) **2:45 PM TO 4:45 PM**

Session No. 21;	Room: Grand Ballroom;	Title: DC/AC Converters III
Session No. 22;	Room: Queen Adelaide 1;	Title: AC/DC Converters II
Session No. 23;	Room: Queen Adelaide 2;	Title: WP Applications
Session No. 24;	Room: Atcherley;	Title: LBR & Post-Journal Pres.

TECHNICAL SESSIONS

Technical Session 1: Tuesday, 3rd December | 1:00 pm – 3:00 pm

Session Title: DC/DC Converters I

Room: Grand Ballroom

Chair: Dylan Lu, Sydney University of Technology, Australia

No.	Paper Details
0916	**Novel Adjustable Isolated Converter for Enhanced Photovoltaic System Performance**
	Hwa-Dong Liu, Chang-Hua Lin, Bushra Sabir and Jyun-Wei Shih
1911	**Innovative High Step-Up Converter for Improved Photovoltaic Efficiency**
	Chun-Hsin Chang, Hwa-Dong Liu, Chang-Hua Lin, Rashid Ahmed Khan, and Yi-Jie Zeng
9375	**Design and Implementation of a Half-Bridge Resonant Converter with Light Load Efficiency Improvement**
	Jia-Jen Yang, Tsorng-Juu Liang, Kai-Hui Chen, Xue-Yi Chen and Wei-Chiang Kuo
2337	**Using ChatGPT for the Knowledge and Design of Power Electronics Converters**
	Quanrui Liu, Xibo Yuan, Sergio Busquets-Monge, Jiang Feng, Yonglei Zhang and Kai Wang
2544	**A Comparative Analysis of GaN, SiC, and Si Transistors in kW-range Synchronous Converters**
	Lars van Eeuwijk, Bart Bokmans and Bas Vermulst

TECHNICAL SESSIONS

Technical Session 2: Tuesday, 3rd December | 1:00 pm – 3:00 pm

Session Title: Devices

Room: Queen Adelaide 1

Chair: Chi Kwan Lee, Sydney University of Technology, Australia

No.	Paper Details
1886	**Enhanced EMI Mitigation in High-Frequency DC-DC Converters through Hybrid Filtering Approaches** Abdelmoumin Allioua, Daniel Großmann and Gerd Griepentrog
0597	**Thermal Vulnerability Evaluation of Semiconductor Switching Devices: Testing of Selected Si, SiC MOSFETs and GaN HEMTs** Sadeeshvara Silva Thotabaddadurage, Hamish Avery and Andrew Lapthorn
8286	**Thermal Vulnerability Evaluation of Semiconductor Switching Devices: Testing of Selected Si, SiC MOSFETs and GaN HEMTs** Ke Li, Cyril Buttay, Angel Pena Quintal and Paul Evans
9276	**Method for Determining Optimum Time in Time-Domain Stop-and-Go Active Gate Driving** Yohei Sukita, Katsuhiro Hata, Kenichi Morokuma, Yukihiko Wada, Yuta Yamaoka, Yasushige Mukunoki and Makoto Takamiya
1917	**High-Efficiency Operating Conditions for DC 400V Direct-Coupled PV-Battery Systems Using SiC MOSFETs Circuit Breaker** Zhuli Liu, Yuichi Kado, Yasuyuki Kanai, Moriyasu Shiozawa and Hironari Nishino
6920	**Measurement of GaN HEMT Dynamic Rds(on) at Cryogenic Temperatures** Charley Shi, Suzanne Lo, Duleepa Thrimawithana, Francesca Adams, Aaron Wadsworth, Matthew Pearce and Rachel Oliver

TECHNICAL SESSIONS

Technical Session 3: Tuesday, 3rd December | 1:00 pm – 3:00 pm

Session Title: AC Machines

Room: Atcherley

Chair: Junwei Lu, Griffith University, Australia

No.	Paper Details
2412	**Combining Locked Rotor and Steady State Tests for EESM Flux Linkage Identification** Stephan Goehner, Johannes Stoss, Matthias Brodatzki, Benjamin Bachowsky, Andreas Liske, Johannes Kolb and Marc Hiller
6681	**A Novel Highly Dynamic Torque Control Scheme for Electrically Excited Synchronous Machines** Leonard Geier, Stephan Göhner, Johannes Stoss, Andreas Liske and Marc Hiller
4591	**Application of High Frequency Rotary Transformer for Separately Excited Synchronous Generator in Offshore Wind Turbine** Junwei Lu, Xiaokun Li and Frank Cole
0531	**Recursive Moving Lean Instant Slope Constant Estimator for Online Measurement of Derivative and Absolute Value of Oversampled Signals** Benjamin Bachowsky, Benedikt Schmitz-Rode, Jonathan Sattler and Andreas Liske
7187	**Sensitivity Analysis in High-Frequency Modeling of Traction Motors with Hairpin Windings** Silvan Scheuermann, Matthias Brodatzki and Martin Doppelbauer
9818	**Impact of Permanent Magnets Demagnetization on Line-Start Permanent Magnet Synchronous Motors: Feasibility Study of Protection for Mains and Inverter Operation** Nijan Yogal and Christian Lehrmann

TECHNICAL SESSIONS

Technical Session 4: Tuesday, 3rd December | 1:00 pm – 3:00 pm

Session Title: Wireless Power Transfer Systems

Room: Queen Adelaide 2

Chair: Cancan Rong, China University of Mining and Technology, China

No.	Paper Details
0790	**Transmission Performance Analysis of Three-coil WPT System with Relay Coils Based on Parity-Time Symmetric Principle** Cancan Rong, Junhao Wu, Haoyang Wang, Lizhou Liu, Xiaolin Mou, Yefei Xu and Wei Han
4829	**An Integrated Anti-Misalignment WPT-Based Charging Equalizer for Series-Connected Energy Storage Systems** Tianhao Zhang, Lizhou Liu, Yefei Xu, Yi Zhou, Huan Luo and Cancan Rong
6006	**A Double-sided Current-sharing Method for Dual-channel Wireless Power Transfer** Chengxuan Tao, Lifang Wang, Yuan Yue, Fang Li and Chengliang Yin
7247	**A Comprehensive Research on Eddy Current Loss, Frequency Optimization, and Efficiency Maximization in UWPT Systems** Chaolai Da, Lifang Wang, Fang Li, Ziyuan Lin, Junqiao Huang and Chengliang Yin
7839	**Design and Comparison of Vertical DD Coil and Planar DD Coil for Wireless Charging System** Jiaqi Zeng, Zhenhao Zhang, Shouxiang Li, Cancan Rong, Liqun Chen and Xiaolin Mou
8632	**Study on the effect of cone angle variation on the performance of conical underwater wireless charging coupler** Yuze Zhao, Xiandong Xu, Longfei Liu, Zhuo Chen, Lingxiao Xue, Xiaolin Mou and Lidong Zhang

TECHNICAL SESSIONS

Technical Session 5: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: DC/AC Converters I

Room: Grand Ballroom

Chair: Feng Gao, Shandong University, China

No.	Paper Details
0222	**Analysis and Enhancement of Transient Synchronization Stability for Grid-Forming Converters Considering Reactive Power Control** Hanxu Diao and Jinming Xu
3655	**Self-Tuning ANN Controller for Grid-Connected Parallel-Inverter** Kaizhe Nie, Feng Gao and Kangjia Zhou
6382	**Non-isolated Three-port Boost H-bridge Inverter With Hybrid Modulation for Single-Phase renewable power Systems** Shuaiwen Feng, Dylan Dah-Chuan Lu, Yam Siwakoti, Muhammad Mubashir Alam and Waqas Hassan
5637	**Virtual Vector Optimal Switching Sequence Model Predictive Control for Computational Burden Reduction** Baldomero Araya, Cristian Garcia, Pablo Acuna, Ricardo Aguilera, Cristian Castillo, Daniel Sanchez and Jose Rodriguez
9805	**Influence of RDSon and VTH Deviations in Silicon Carbide MOSFETs on the Peak Current of Traction Inverters** Fabian Hohmann and Stefan Hain
5705	**Battery Management System Integrated Matching Control of Grid-Forming System under Black-Start** Yunuo Yuan, Lingjun Yao and Yongheng Yang

TECHNICAL SESSIONS

Technical Session 6: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: Energy Storage Systems

Room: Atcherley

Chair: Kosala Gunawardane, University of Technology Sydney, Australia

No.	Paper Details
7817	**A DAB-based Partial Power Processing Converter for Sodium-ion Batteries Featuring Wide Voltage Range** Pingchuan Li, Hao Tian, Min Wei, Zhengwei Zhao and Feng Gao
8210	**Simulation and Verification of Battery Voltage Sampling Compensation Technique** Wei-Ren Chen, Jenn-Jong Shieh, Hwa-Dong Liu and Chang-Hua Lin
5617	**Low-carbon Dispatching Strategy of Virtual Power Plant based on CNN-LSTM Load Forecasting** Lu Zhang, Chenzhuo Yang, Xiang Wang, Zhiyuan Cai, Honghao Li and Rui Fan
0601	**Analysis of the Performance of Proportional Integral Current Controllers in A Parallel Multi-Inverter Structure** Saleh Forouhari, Chris Townsend and Hossein Dehghani Tafti
0871	**Fuel Cell and Supercapacitor Hybrid Power Supply for DC Microgrid Applications** Nisitha Padmawansa, Kosala Gunawardane and Kasun Subasinghage

TECHNICAL SESSIONS

Technical Session 7: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: Cryogenic power electronic systems

Room: Queen Adelaide 1

Chair: Farzad Farajizadeh, The University of Western Australia

No.	Paper Details
4123	**Design for additive manufacturing and thermal management in GaN-based power electronics systems**
	Sarat Singamneni, Yifan Lv, Malaya Behera, Rod Badcock, Grant Lumsden, Alan Caughley, Sangkwon Jeong, Duleepa Thrimawithana, Stijn Tissink, Eloise Cameron-Smith and Aaron Wadsworth
4916	**Leakage current and Capacitance Measurements of GaN HEMTs in a Cryogenic Environment**
	Reece Cateley, Jeoff Antony, Andrew Lapthorn and Bill Heffernan
5451	**Experimental Evaluation of an HTS Double Pancake Coil for Cryogenic Power Electronics**
	Aaron Wadsworth, Yueming Sun, Charley Shi, Matthew Pearce, Zhenan Jiang and Duleepa Thrimawithana
6620	**Cryogenic cooling of motor armature windings for aircraft applications**
	Grant Lumsden, Alan Caughley, Rodney Badcock and Swarn Kalsi
7130	**The Design of a Lightweight Inductive Power Coupler for eVTOLs**
	Duleepa J Thrimawithana, Kai-Yeung Li, Didier Chassaigne, Olivier Crepel, Madalina Pascaru, Antoine Van Der Laan, Julien Gosteau, Jackman Lin and Grant Covic
8553	**Ancillary Circuitry for a Cryogenic GaN Half-Bridge**
	Charley Shi, Aaron Wadsworth, Duleepa Thrimawithana and Matthew Pearce

TECHNICAL SESSIONS

Technical Session 8: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: Emerging topics in power electronics I

Room: Queen Adelaide 2

Chair: Jaydeep Saha, ST Engineering Satellite Systems, Singapore

No.	Paper Details
2409	**Development of Next-Generation Compact and Radiation-hardened GaN-based Power Converters for Small Satellite Applications** Jaydeep Saha, Xiaoliang Wang, Yi Hui Doo, Sishi Li, Zhenyi Zheng, Hean Ming Kang, Yeh Ting and Ying Fu
9880	**Quantitative Performance Comparison of Commercial Small Satellite Electrical Power System Architectures** Hean Ming Kang, Jaydeep Saha, Yeh Ting, Sanjib Kumar Panda and Dipti Srinivasan
6489	**Influence of Fast Temperature Variation on NCM Lithium-ion Batteries Aging in Low-Temperature Environment** Xiaofan Wei, Zhenhao Liu, Furong Liu and Changjun Xie
4367	**A fast switching half bridge using GaN transisors** Stewart Marchant
5475	**A Time-Skew Resilient Online Condition Monitoring Technique for Power MOSFETs Based on ON-State Resistance Estimation** Mohsen Asoodar, Mehrdad Nahalparvari, Hans-Peter Nee and Iman Shafikhani
9401	**Parameter identification of lithium-ion battery electrochemical model using sensitivity analysis and neural networks** Xiang Cheng, Wenxuan Yin, Furong Liu and Changjun Xie

TECHNICAL SESSIONS

Technical Session 9: Wednesday, 4th Dec. | 10:15 am – 12:15 pm

Session Title: DC/DC Converters II

Room: Grand Ballroom

Chair: Saman Gorji, Deakin University, Australia

No.	Paper Details
6522	**CLLC Converter Resonant Tank Design for Minimized Power Derating** Igor Alves Maronni, Alex Sander Sebaje, Robson Mayer, Jose Antenor Pomilio and Joel F. Guerreiro
8546	**Modeling of Isolated Bidirectional Symmetrical Full-Bridge CLLC Resonant Converter** Robson Mayer, Alex Sander Sebaje, Igor Alves Maronni, Jose Antenor Pomilio and Joel F. Guerreiro
7613	**An Advanced Virtual DC Machine Control Strategy for management of Energy Storage System in a Standalone DC Microgrid** Mahdis Haddadi, Saman Asghari Gorji, Samson Yu and Hieu Trinh
9504	**Reliability Assessment of Cascaded Two-stage Boost-converter-based Three-Port Converters** Dylan D.-C. Lu
2384	**A 5 kW Gallium Nitride (GaN) Photovoltaic (PV) DC-DC Converter with a Power Density of 4.73 W/cm³ and Efficiency of 98%** Jiang Feng, Xibo Yuan, Quanrui Liu, Chuanjie Zhao, Yonglei Zhang, Kai Wang and Yunting Ma

TECHNICAL SESSIONS

Technical Session 10: Wednesday, 4th Dec. | 10:15 am – 12:15 pm

Session Title: Advanced Modulation and Control

Room: Atcherley

Chair: Lasantha Meegahapola, Royal Melbourne Institute of Technology, Australia

No.	Paper Details
0379	**First Order Sliding Mode Control Based Active/Reactive Power Control of Grid-Following Voltage Source Inverter in an AC Microgrid.** Janith Wijesingha, Lasantha Meegahapola and Xinghuo Yu
1765	**SMO-Based Field-Oriented Control for Electrically Power-Assisted Bike System** Che-Yu Lu and Tzu-Ping Cheng
6118	**Single-Path High-Resolution Digital Pulse Width Modulator (HRDPWM) without SR Latch** Marziyeh Hajiheidari, Joel Fushekati, Mohammad Emad, Bas Vermulst and Jeroen Van Duivenbode
9123	**Verification of Effectiveness of Power Reduction Ratio and Instantaneous Wind Speed Feedback Control** Masaya Mitsuhashi, Hidehito Matayoshi, Toshimitsu Morizane and Soma Jinno
9798	**A New Distributed Model Predictive Control for DC Microgirds: Adaptively-Varying Slew-Rate Based Solution** Yafei Yin, Zhenbin Zhang and Zhen Li
6859	**Selective Harmonic Elimination Model Predictive Control for a Five-Level Active NPC Converter** Cristian Castillo, Cristian Garcia, Pablo Acuna, Ricardo Aguilera, Baldomero Araya, Victor Cabezas and Daniel Sanchez

TECHNICAL SESSIONS

Technical Session 11: Wednesday, 4th Dec. | 10:15 am – 12:15 pm

Session Title: Renewable Energy Systems

Room: Queen Adelaide 1

Chair: Dezso Sera, Queensland University of Technology

No.	Paper Details
6065	**Innovative Droop-Controlled Power Controller for PV Systems: Enhancing Stability and Increasing PV Penetration** Naief Almatrafi, Dylan Lu, Li Li, Afaq Hussain and Adel Tatish
7318	**Test results of ROCOF and system split for a Grid Forming ESS converter** Ruben Inzunza, Shivalika Sharma, Chieko Umeno, Yasuaki Mitsugi, Daisuke Kanda and Kenta Yamabe
8497	**Degradation modelling of PEM electrolysers under fluctuating input power for long-term performance optimisation** Yeonju Choi, Yateendra Mishra, Jonathan Love and Dezso Sera
1945	**Decentralized Master-Slave Control Strategy for Current Sharing in islanded DC Microgrids** Fei Deng, Huizhong Wang, Ziheng Xiao, Lei Zhang, Zhigang Yao and Yi Tang
6050	**Multi-Agent Graph Reinforcement Learning for Inverters-Based Distributed Energy Resources Real-Time Decentralized Volt-Var Control in Distribution Grids** Iman Ramezani and Qianwen Xu

TECHNICAL SESSIONS

Technical Session 12: Wednesday, 4th Dec. | 10:15 am – 12:15 pm

Session Title: Emerging topics in power electronics 2

Room: Queen Adelaide 2

Chair: Amir Taghvaie, Queensland University of Technology

No.	Paper Details
1677	**From Packaging to Power Converter: Holistic Design and Implementation of a 60 kW/L Ceramic Based SiC Converter**
	Zhaobo Zhang, Wenzhi Zhou and Xibo Yuan
1255	**A Review of Current Control Schemes in Grid Connected Inverters**
	Muhammad Ehab, Chris Townsend and Hossein Dehghani Tafti
2537	**A Comparative Study of Machine Learning Models for Estimating Current Harmonic in Distribution Networks**
	Nilani Ranasinghe, Amir Taghvaie, Firuz Zare and Simon Denman
4496	**Planning and Verification of a Cloud-Based Monitoring DC Microgrid System Using the Greedy Algorithm**
	Chia-Wei Lu, Hwa-Dong Liu, Jenn-Jong Shieh and Chang-Hua Lin
5182	**Parameter Optimization for Active Gate Drivers in Silicon Carbide Applications**
	I-Chan Tsai, Chung-Chia Wu and Le-Ren Chang-Chien
6473	**A MIMO Self-Tuning Data-Driven Control Application for Power Electronic Converters Robustness Operation**
	Lucas Elias dos Santos, Jesus Flores Huaman, Eliabe Duarte Queiroz, Daniel Dotta and José Antenor Pomilio

TECHNICAL SESSIONS

Technical Session 13: Wednesday, 4th Dec. | 2:45 pm – 4:45 pm

Session Title: DC/AC Converters II

Room: Grand Ballroom

Chair: Geoff Walker, Queensland University of Technology

No.	Paper Details
5671	**Discrete-time model based controller design and stability analysis for grid connected converters considering time delay** Kamil Swiderski, Yang Zhang and Qianwen Xu
5626	**Current and dc-link voltage-drift Active Hysteresis Control of a four level Quasi Nested Converter** Carlos Reusser, Ramón Herrera, Felipe Alvarado and Ramon Zamora
9832	**Active Control of 9-Level Flying-Capacitor-Based Active Neutral-Point-Clamped Inverters** Vahid Dargahi
2627	**Evaluation of Possible Traction Inverter Topologies for Heavy-Duty Electric Vehicles** Enes Ayaz, Marcus Jackson, Shahriar Sarmast, Bhanu Singh, Staffan Norrga and Hans-Peter Nee
3118	**Control of VSIs using Sub-rate MAF and Kalman Filter** Daniel Tacken, Geoffrey Walker and Mark Broadmeadow
7584	**Sensitivity Enhancement of Virtual Synchronous Machine-Based Grid Forming Inverters in Degraded Condition** Chamanie Welmillage Don, Mahinda Vilathgamuwa and Yateendra Mishra

TECHNICAL SESSIONS

Technical Session 14: Wednesday, 4th December | 2:45 pm – 4:45 pm

Session Title: Transportation systems

Room: Queen Adelaide 1

Chair: Gamini Jayasinghe, Australian Energy Market Authority

No.	Paper Details
6021	**Modeling and Simulation of Fuel Cell Battery Hybrid Electric Ship** Minyung Cha, Hossein Enshaei, Hung Nguyen and Shantha Gamini Jayasinghe
6839	**Investigating Safe Operation Boundaries of Single Isolation Stage Based Multi-Outlet EV Fast Charging Architecture** Indrashis Haldar, Bas Vermulst, Dongsheng Yang, Xinwei Xu and Thomas Gerrits
9685	**Characteristic variations between commercial GaN HEMTs at cryogenic temperatures down to 4K** Vedang Gaikwad, Bill Heffernan, Andrew Lapthorn, Reece Cateley, Adam Hyndman and Roger Reeves
9440	**An Optimization Method for Multi-Channel LCC-S Wireless Power Transfer System Based on Multi-Island Genetic Algorithm and Splitting Coils** Xuke Chen, Jianghan Yu and Wenxing Zhong
7403	**Energy Storage for Electric Passenger Aircraft** Kathrin Schulte and Sascha Stegen
4568	**Hybrid Electric Vehicle Simulation Operation Across Distributed Laboratories using Hardware Integrated Virtual Environment Concept** Laxman Timilsina, Elutunji Buraimoh, Ali Moghassemi, Grace Karimi Muriithi, Ali Arsalan, Gokhan Ozkan, Behnaz Papari, Christopher S. Edrington and Okan Ciftci

TECHNICAL SESSIONS

Technical Session 15: Wednesday, 4th December | 2:45 pm – 4:45 pm

Session Title: AC/DC Converters 1

Room: Queen Adelaide 2

Chair: Dylan Lu, University of Technology Sydney, Australia

No.	Paper Details
4266	**A study on the feasibility of using SiC devices in realising highly power dense matrix converters** Zaid Parry, Lee Empringham and Liliana de Lillo
0846	**MPC Strategy Applied to Modular Multilevel Matrix Converters for Low-Frequency AC Transmission Systems** Rodrigo H. Cuzmar, Ricardo P. Aguilera, Javier Pereda, Pablo Poblete, Andrés Mora and Dylan Lu
1817	**Improved THD in ac/ac modular multilevel converters through phase-optimization of PWM** Kaveh Pouresmaeil, Maurice Roes, Nico Baars and George Papafotiou
9667	**Analysis and comparison of transient stabilities of current-controlled and voltage-controlled VSGs** Xiaochen Jin, Jinming Xu and Shanshui Yang
3735	**Performance of Top-Side Cooled WBG Transistors in ANPC Converter With Passive Cooling and Automated Manufacturing** Michael Glashauser and Otto Kreutzer
0671	**A Symmetric Unipolar Pulse Width Modulation for Dual Active Bridge Converters** Jamil Hassan, Aswin Palanisamy, Dylan D.-C. Lu and Yam Siwakoti

TECHNICAL SESSIONS

Technical Session 16: Wednesday, 4th December | 2:45 pm – 4:45 pm

Session Title: Miscellaneous issues in power electronics I

Room: Atcherley

Chair: Minella Bezha, Doshisha University, Japan

No.	Paper Details
2798	**Long-Term Techno-economic Effects of Optimal STATCOMs to Address System Strength Shortfall in A Renewable Energy-integrated Building Management System** Md Ohirul Qays, Iftekhar Ahmad and Daryoush Habibi
3832	**Comparison of Various Model-Based Sensorless Control Strategies for small-size high-speed PMSMs** Aaron Laufs, Xinyi Yu and Rik W. De Doncker
5983	**A Novel Balancing Strategy for SiC Based Bipolar Solid State Switch for Particle Accelerator Applications** Lars Dresel and Gerd Griepentrog
6105	**Smart Power Balancing with Machine Learning: Optimizing Storage and Managing System Stability Between Fluctuating and Controllable Devices** Iacovos Ioannou, Minella Bezha, Saher Javaid, Naoto Nagaoka and Vasos Vassiliou
6127	**A solvability condition of decoupled reactive power flow based on Banach's fixed-point theorem** Ziqing Xia, Mei Su and Zhangjie Liu
6715	**Evaluation of the Common-Mode Current Propagation Paths in Motor Drive Systems** Andrea Zingariello, Zhaoqing Zhang and Gerd Griepentrog

TECHNICAL SESSIONS

Technical Session 17: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: DC/DC Converters III

Room: Grand Ballroom

Chair: Saman Gorji, Deakin University, Australia

No.	Paper Details
2295	**A Customised Low-voltage Power Supply for a Formula SAE Electric Racing Vehicle**
	Paul Archer, Robert Anthoney, Michael McCaffrey, Kenan Hafeel, Carlos Teixeira, Richardt Howard Wilkinson and Brendan Peter McGrath
5257	**Power Electronic Converter for Portable Electric Stimulators**
	Kumar Joy Nag and Aleksandar Prodic
9256	**A Nonlinear Model Predictive Control for Bidirectional Dual Active Bridge Converter**
	Hossein G. Sahebi, Saman A. Gorji, Samson Yu and Hieu Trinh
7074	**Impedance-based Stability Analysis of DC Microgrid Feedforward-Controlled Connected Converters**
	Debora Damasceno, Mateus Dias, Jose Carlos Ugaz Pena and Jose Pomilio
9753	**DAB with Switched Inductor (DAB-SI) for Reduced Effective Currents at Ligh-load Operation**
	Camilo Suarez, Diego Bernal Cobaleda and Wilmar Martinez
8563	**An Isolated Three-port Forward Converter for Low Power Applications**
	Nurhakimah Mohd Mukhtar and Dylan Dah Chuan-Lu

TECHNICAL SESSIONS

Technical Session 18: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: Grid Forming Converters

Room: Queen Adelaide 1

Chair: Lasantha Meegahapola, Royal Melbourne Institute of Technology

No.	Paper Details
0076	**Comparison of DC/AC Grid-Following and Grid-Forming Converters in Weak Power Systems** Thai Vo and Chandana Samarasinghe
0750	**Impact on System Strength and Frequency from Different Grid-Forming Inverter Control Strategies** Louis Rahal Goonasekara, Lasantha Meegahapola and Shuo Yan
1448	**Continuous Abstraction Modelling and Control of Grid-Forming Inverters** Elnaz Firouzmand, Farhad Farokhi, Iman Sharifi and H.A. Talebi
2597	**Distributed Neural Network-based Control of Grid-Forming Converter Against Adversarial Data** Mohammad Raeispour, Shou Yan and Lasantha Meegahapola
6563	**Comparison of Virtual Synchronous Generator and Matching-based Control for High-Power Direct-Drive Wind Turbine Systems** Yantao Xu, Yongheng Yang, Yexiang Yu and Xiaotian Wu
6541	**Stabilization of 100% Inverter-Based Power Systems with Grid Forming Controls in Positive Sequence RMS Simulation Platforms** Tamojit Chakraborty, Bikiran Guha and Anamitra Pal

TECHNICAL SESSIONS

Technical Session 19: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: Miscellaneous Issues in Converters and Drives

Room: Atcherley

Chair: Duleepa Thrimawithana, Auckland University, New Zealand

No.	Paper Details
1347	**Stator Inter-Turn Fault Detection and Classification in Permanent Magnet Synchronous Machines Using High-Frequency Voltage Injection** Xinyi Yu, Duc Huu Pham, Lukas Braun and Rik W. De Doncker
4777	**Long-term Unsupervised Prediction of Proton Exchange Membrane Fuel Cells Considering Voltage Recovery** Xue Jiarui, Wenchao Zhu and Changjun Xie
4781	**A Fast Diagnosis Method for Multiple Open-Circuit Faults in MMC Based on Multi-Feature Fusion: An Approach Integrating Switching State Information** Wenchen Zhao, Zhenbin Zhang and Zhen Li
5519	**Impact of Switching Behavior on the Noise Emission of Power Semiconductors** Robert Kragl, Karl Oberdieck, Konstantin Spanos, Steffen Beushausen and Ingmar Kallfass
6918	**A High Step-Down Flying Capacitor Resonant Converter with Quadruple frequency at the Resonant Tank** Aswin Palanisamy, Jamil Hassan, Dylan Lu, Ricardo Aguilera and Yam Siwakoti
7534	**Development and Evaluation in Solid State Switchgear Technology for the International Space Station Electrical Power Systems** Masaaki Komatsu

TECHNICAL SESSIONS

Technical Session 20: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: High-Power Converters

Room: Queen Adelaide 2

Chair: Patrick Palmer, Simon Fraser University, Canada

No.	Paper Details
2302	**Current Imbalance Test in Asymmetrical Parallel Connected IGBTs for High Inverter Current Applications**
	Patrick Palmer and Danielle Jaye Agron
2493	**A Scalable Interline Power Flow Controller**
	Viktor Hofmann
2598	**A High-Power Medium-Voltage Medium-Frequency Transformer Design Methodology**
	Fabian Herzig and Rik W. De Doncker
7437	**Discrete Inductor Free Phase Shifted Dual Active Bridge Converter for DC Fast EV Charging Application**
	Nafis Subhani, Junwei Lu, Simon Yao and Yong Zhu
6748	**Volume and weight comparison of 2-Level and 5-Level E-Type 3-Phase 4-Wire STATCOM Converter**
	Petar Grbović, Vladan Durković and Zoran Miletić
9748	**A Sensorless Active Snubber Circuit for Series Connection of Semiconductor Devices in Modular Multilevel Converters**
	Mohsen Asoodar, Mehrdad Nahalparvari and Hans-Peter Nee

TECHNICAL SESSIONS

Technical Session 21: Thursday, 5th December | 2:45 pm – 4:45 pm

Session Title: DC/AC Converters III

Room: Grand Ballroom

Chair: Tian Hao, Shandong University, China

No.	Paper Details
5279	**A Dispatchable Virtual Oscillator Controller in the dq Frame**
	Zheran Zeng, Dongsheng Yang and Songda Wang
1008	**Extended Control Set Model Predictive Control for Three-phase Three-level NPC Converters**
	Wei Jiang, Yonglei Zhang, Xibo Yuan, Xiang Guo, Ruijie Zhu and Yi Li
7291	**A Novel Seven-Level (7L) Hybrid-Clamped (HC) Topology with Variable Stair Edge PWM (VSEPWM)**
	Kexin Bu, Hao Tian and Feng Gao
1691	**Floquet Stability Analysis of Alternative Synchronization Strategies for Parallel Grid-following Distributed Generators**
	Raunak Agrawal, Brendan McGrath, Carlos Teixeira, Richardt Wilkinson, Sante Pugliese and Marco Liserre
3207	**Estimation of Stability Boundaries of Grid Connected Virtual Synchronous Generator Using Vector Perturbation Method**
	Khalil Algarny, Ahmed Sheir, Mahinda Vilathgamuwa and Dezso Sera
4468	**A Current Sensorless Method for Online Condition Monitoring of DC-Link Capacitors in FACTS and HVDC applications**
	Mohsen Asoodar, Mehrdad Nahalparvari, Christer Danielsson and Hans-Peter Nee

TECHNICAL SESSIONS

Technical Session 22: Thursday, 5th December | 2:45 pm – 4:45 pm

Session Title: AC/DC Converters II

Room: Queen Adelaide 1

Chair: Chi Kwan Lee, University of Technology Sydney, Australia

No.	Paper Details
5441	**Multilevel Digital Twin of Power Electronics based on Degradable Wide-Bandgap Semiconductors for State-of-Health Estimation** Oleksandr Solomakha, Valentyna Afanasenko and Ingmar Kallfass
5793	**Enabling grid voltage and frequency support with islanding detection in V2G capable electric vehicle charging stations** Victor Cordeiro de Arruda, Eliabe Duarte Queiroz and Joel Filipe Guerreiro
2167	**Optimal Sizing of Battery Energy Storage System and Interlink Converter in an Energy Constraint Hybrid AC/DC Microgrid** Ali Mahmoudian, Foad Taghizadeh, Mohammad J Sanjari, Rasoul Garmabdari, Mirsaeed Mousavizade and Junwei Lu
4366	**Instantaneous Circulating Current Reference Design Strategy for Inter-arm Power Imbalance Control in Delta-connected CHB Converters** Pablo Poblete, Ricardo P. Aguilera, Javier Pereda, Rodrigo H. Cuzmar, Dylan Dah-Chuan Lu and Yam P. Siwakoti

TECHNICAL SESSIONS

Technical Session 23: Thursday, 5th December | 2:45 pm – 4:45 pm

Session Title: Wireless Power Applications

Room: Queen Adelaide 2

Chair: Farzad Farajizadeh, The University of Western Australia

No.	Paper Details
2132	**Implementation of a Multi-MHz Wireless Charging System for Agricultural Drones** Hongjian Zhou, Alexander Bailey, Brian Gu, Seho Kim and Ho Seok Ahn
3078	**An Asymmetrical Amplitude Digitized Modulation Scheme for TP-IBMC in Unbalanced Three-Phase IPT Systems** Zhihao He, Duleepa Thrimawithana, Grant Covic and Martin Neuburger
4795	**Design and Implementation of a 200 kW Inductive Wireless Power Transfer System using a Modular Approach** Daniel Fritz, Lukas Elbracht, Jannis Noeren, Marco Zimmer and Prof. Dr. Nejila Parspour
5223	**A Study of Leakage Magnetic Field Reduction by Active Shielding for Receiver Coil Moving in DWPT Using Air-core Coils** Kaito Takashima, Takehiro Imura and Yoichi Hori
5488	**Power Level Sizing of In-Motion Wireless Power Transfer for Electric Vehicle Charging** Brian Gu, Harshana Senanayake, Seho Kim, Michael O'Sullivan and Grant Covic

TECHNICAL SESSIONS

Technical Session 24: Thursday, 5th December | 2:45 pm – 4:45 pm

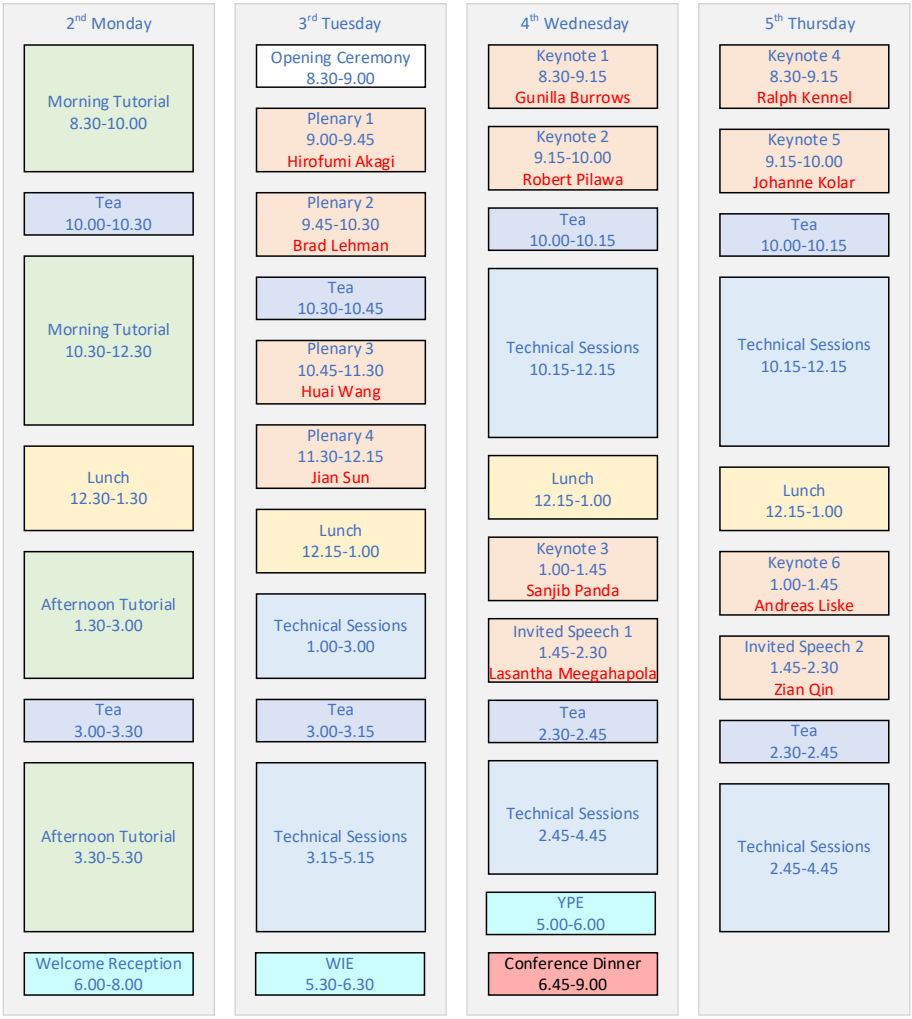
Session Title: Late Breaking Research and Post Journal Presentations

Room: Atcherley

Chair: Sanjib K. Panda, National University of Singapore

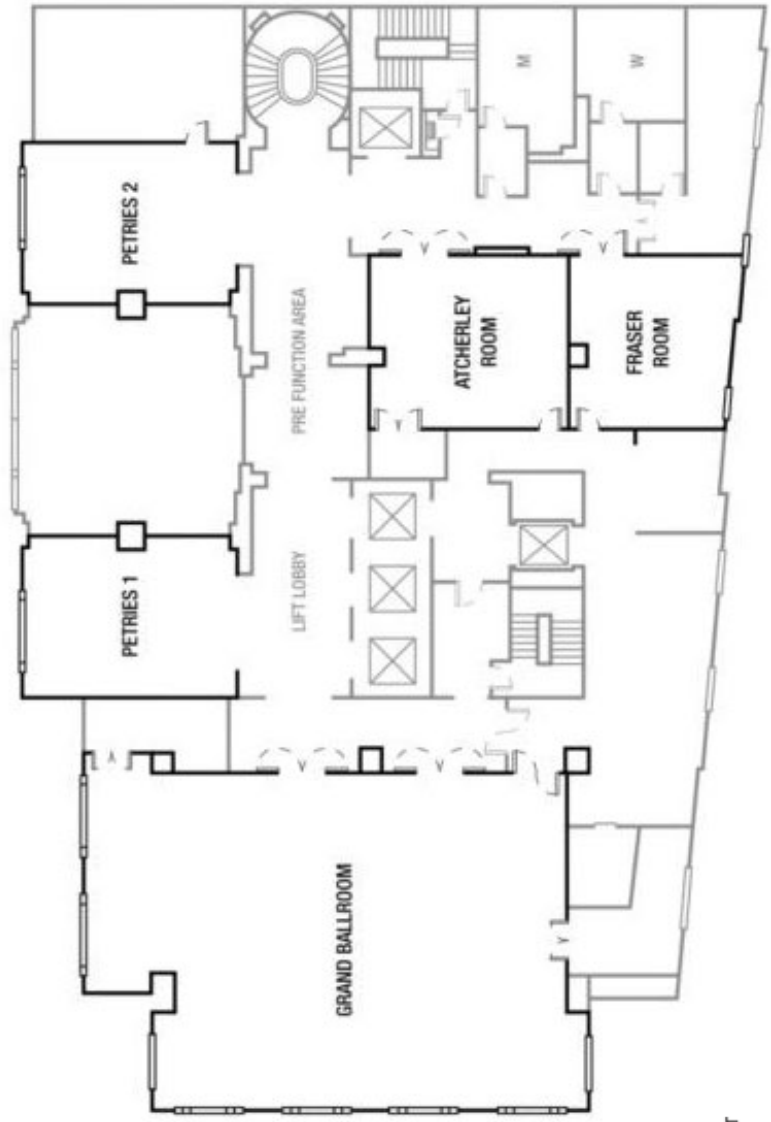
No.	Paper Details
3775	**A Bidirectional Autonomous High-Frequency Wireless Power Transfer System With Constant Voltage Output Against Load and Coupling Variations** Dai Bui, Guoxing Wang, Lei Zhao and Patrick Hu
6146	**A 13-Level Switched Capacitior Boost MLI With Dual Configurability** Shadab Murshid, Prasanth Sundararajan, Mrutyunjaya Sahani and Sanjib Kumar Panda
6855	**Design of High-Density and High-Efficiency SiC-based Drive-train Inverter** Prasanth Sundararajan, Dharani Kolantla, Jaydeep Saha and Sanjib Kumar Panda
7570	**Capacity Optimization of Hybrid Energy Storage System based on Hysteresis Energy Management Strategy** Wenlong Yang, Minwang Wang, Wenchao Zhu and Changjun Xie

EVENT ITINERARY



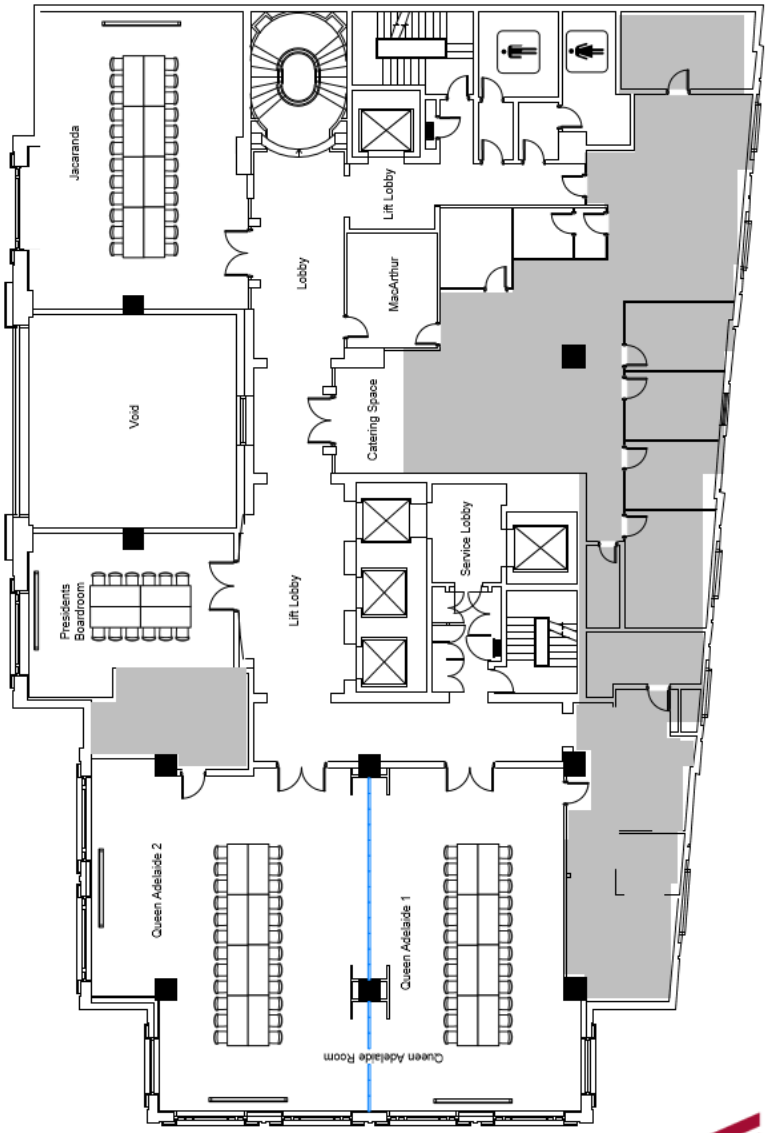
VENUE LOCATION MAP

LEVEL 2



VENUE LOCATION MAP

LEVEL 3



MARRIOTT BRISBANE

VENUE LOCATION MAP

THE CONFERENCE VENUE IS THE BRISBANE MARRIOTT HOTEL. IT'S LOCATED AT 515 QUEEN STREET, BRISBANE.

THERE ARE DIRECT TRAINS FROM BRISBANE AIRPORT TO BRISBANE CITY.