# 13th INTERNATIONAL CONFERENCE on RENEWABLE ENERGY RESEARCH and APPLICATIONS (ICRERA 2024), Nagasaki, Japan

**November 9 - November 13, 2024**

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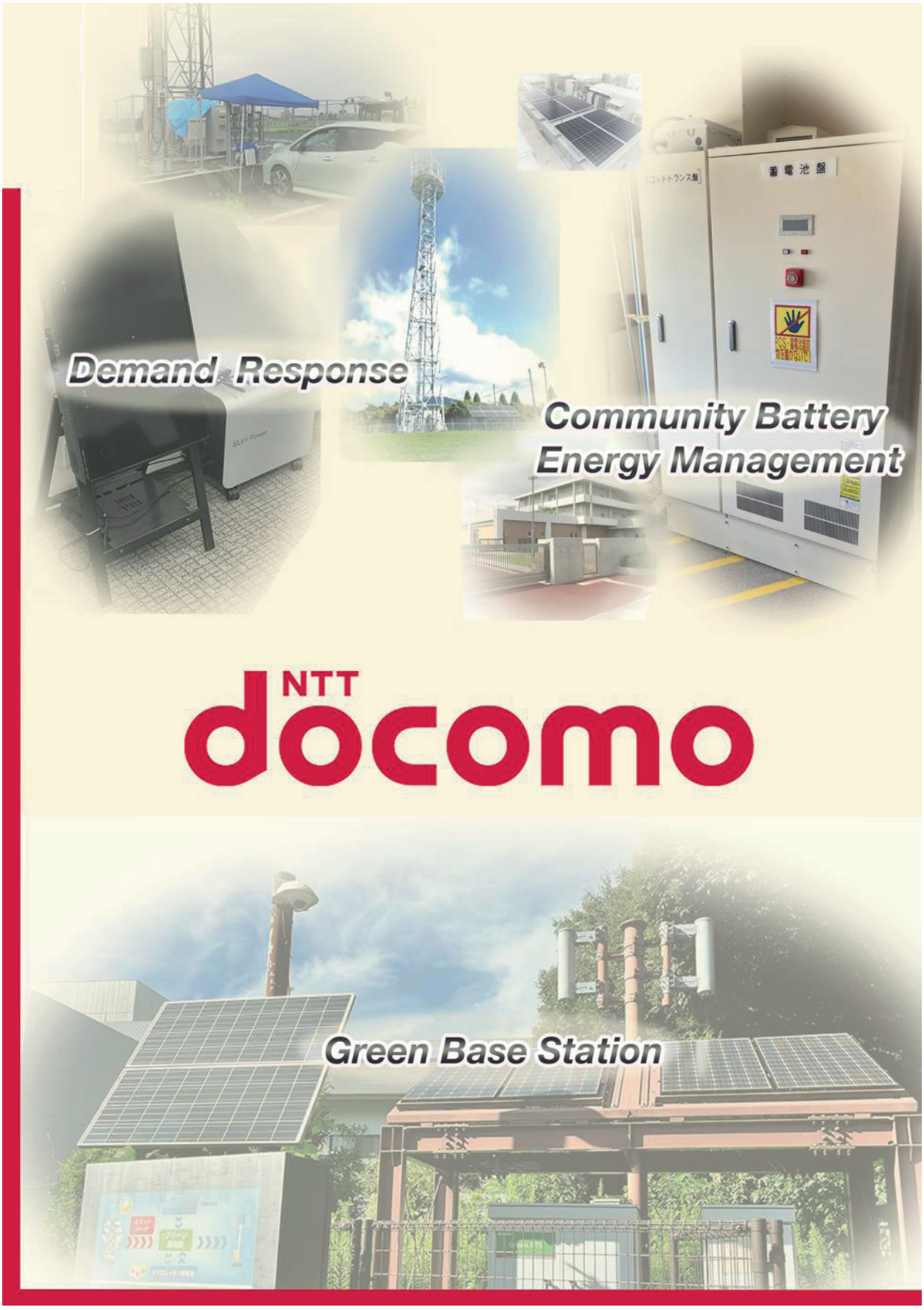

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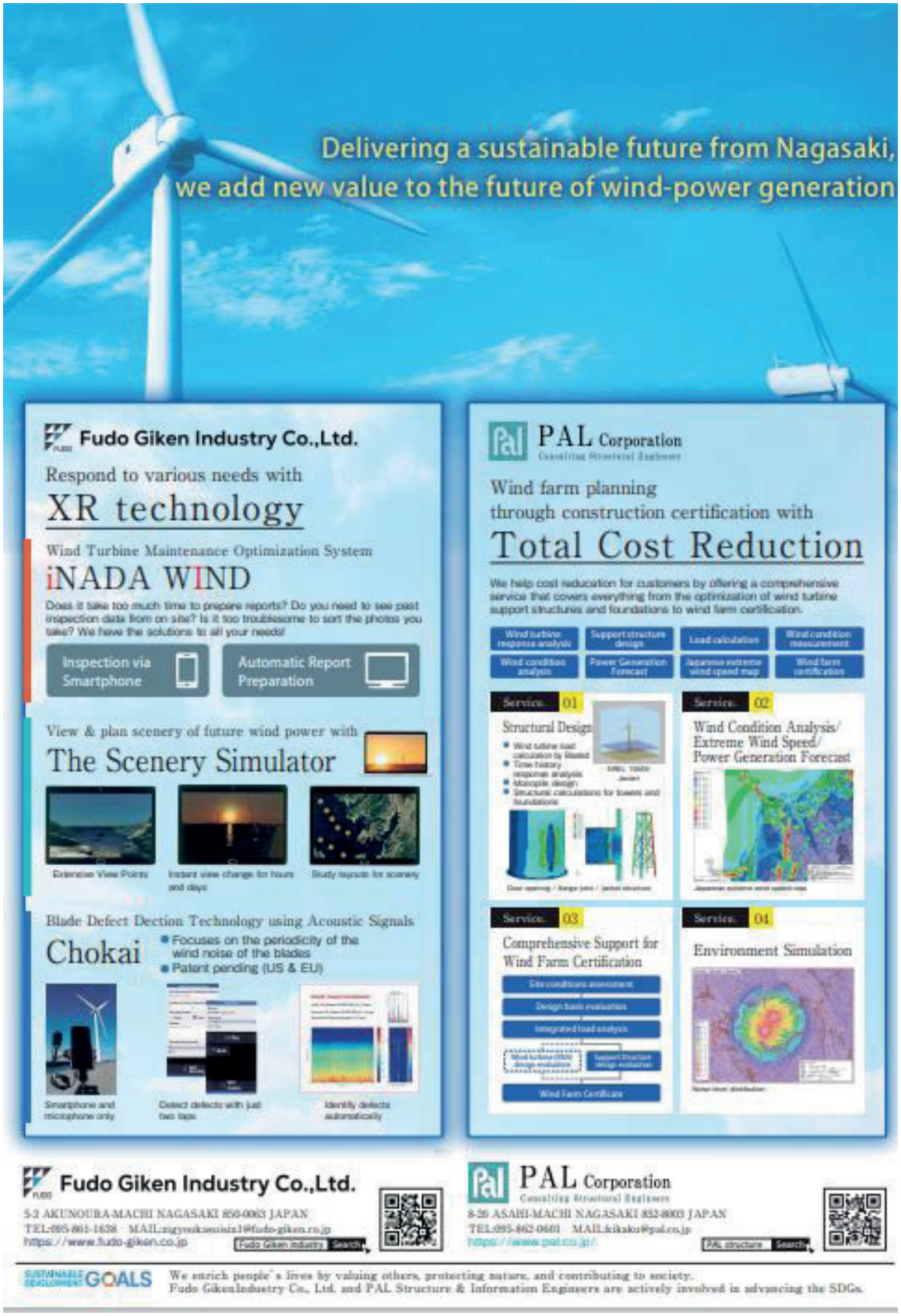

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# TOPICS

Topics within the scope of the conference include the following areas, but not limited to:

- Renewable (Green) Energy Systems and Sources (RESSs) such as Wind Power, Hydropower, Solar Energy, Biomass, Biofuel, Geothermal Energy, Wave Energy, Tidal energy, Hydrogen Power Generation, Fuel Cells, Energy Storage
- RESSs for Electric Vehicles/Hydrogen Vehicles and Components
- New Trends and Technologies for RESSs
- Policies and Strategies for RESSs
- Energy Transformation from Renewable Energy System (RES) to Grid
- Novel Energy Conversion Studies for RESs
- Power Devices and Driving Circuits for RESs
- Control Techniques for RESs
- Grid Interactive Systems Used in Hybrid RESs
- Performance Analysis of RESs
- Hybrid RESSs
- Decision Support Systems for RESSs
- Renewable Energy Research and Applications for Industries
- Green Data Center
- Carbon Neutral Port (CNP)
- Artificial Intelligence and Machine Learning Studies for RESs and Applications
- Computational Methods for RESSs
- Energy Savings for Power Electronics, Vehicular Technology, Electric Machinery and Control, etc.
- RES Motor Drive
- New Approaches in Lightings
- Reliability and Maintenance in RESSs
- Smart grids and RESSs
- Safety and Security of RESSs
- Renewable Energy Systems in Smart Cities
- Future Challenges and Directions for RESSs
- IoT for RESSs
- Energy Management, VPP (Virtual Power Plant) and ERAB (Energy Resource Aggregation Businesses) for RESSs
- Model-based Design and Digital Twin for RESSs

# LANGUAGE

The official language of the ICRERA conference is English

# WELCOME to ICRERA 2024

Dear Colleagues,

The purpose of the International Conference on Renewable Energy Research and Applications (ICRERA) 2024 is to bring together researchers, engineers, manufacturers, practitioners, and customers worldwide to share and discuss advances and developments in renewable energy research and applications.

After the successes of the first, second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth, and eleventh editions of ICRERA in Nagasaki (2012), Madrid (2013), Milwaukee (2014), Palermo (2015), Birmingham (2016), San Diego (2017), Paris (2018), Brasov (2019), Glasgow (2020), Istanbul(2021), Istanbul(2022), Oshawa(2023), the 13th ICRERA 2024 is going to be organized by the technical co-sponsorship of IEEE IES and IAS in Nagasaki, Japan on November 9 – November 13, 2024. Attending ICRERA 2024 will benefit you by allowing you to meet well-known expert keynote speakers, tutorial organizers, special session organizers, and young colleagues from more than 60 countries.

It is our happiness to share with you that 100 selected papers at ICRERA2023 have been proposed for possible publication in

- IEEE Transactions on Industrial Applications (15 papers) cited in SCI-Expended,
- International Journal of Renewable Energy Research (15 Papers) cited in ESCI,
- International Journal of Smart Grid (20 papers) cited in Google Scholar,
- International Journal of Engineering Science and Applications (14 papers),
- and
- Electric Power Components and Systems (36 papers) cited in SCI-Expended.

***Up to 2023, all papers presented by ICRERA have been cited in IEEE Xplore, SCOPUS, and Web of Science (Clarivate Analytics).***

***According to WEB of Science (Clarivate Analytics) in 2023;***

***h-index = 24***
***Average citation per item = 4.3***
***5 Years Impact Factor = 12.35***

ICRERA aims to present important results to the international renewable energy community through research, development, applications, design, and technology. It is therefore intended to assist researchers, scientists, manufacturers, companies, communities, agencies, associations, and societies in keeping abreast of new developments in their specialties and uniting in finding alternative energy solutions to current issues such as the greenhouse effect and sustainable and clean energy issues.

Professor Fujio KUROKAWA,
General Chair, ICRERA 2024

Professor Ilhami COLAK,
Co-Chair, ICRERA 2024

Professor Takashi Abe,
Co-Chair, ICRERA 2024

# KEYNOTE SPEAKERS

**Keynote 1: Professor Johann Walter Kolar, ETH Zürich, Switzerland**
**Date : November 11, 2024 10.00-10.50 AM**

**Biography:**

Johann W. Kolar joined the Swiss Federal Institute of Technology (ETH Zurich) in 2001 as the Head of the Power Electronic Systems Laboratory after spending 15 years as an international consultant and independent researcher. During his career, he has proposed numerous novel converter concepts, including the Vienna Rectifier and the Sparse Matrix Converter, spearheaded the development of x-million rpm motors, and pioneered fully automated multi-objective power electronics design procedures. He has personally supervised 90+ PhD students to completion, has extensively published in the IEEE Transactions, is named inventor in numerous granted patents, and has received several awards. As a Prof. emeritus (since 08/2024), he is actively continuing to pursue research in ultra-compact/efficient WBG converter systems, AI and ML applications in power electronics, Solid-State Transformers, and the life cycle analysis of power electronics converter systems. He is an international member of the US National Academy of Engineering (NAE) and an IEEE Fellow.

**Next-Generation SiC/GaN Variable Speed Drive Systems — "How to Handle a Double-Edged Sword"**

**Summary:** Variable speed drive (VSD) systems should feature high power density and low installation costs, offer wide input and/or output voltage/motor speed ranges, and ensure low EMI without requiring shielded motor cables. Accordingly, next-generation high-switching speed / high-switchingfrequency SiC/GaN PWM inverters should integrate dv/dt or LC output filters to prevent conducted or radiated EMI, reflections on long motor cables, high-frequency motor losses, motor insulation stresses, and bearing currents. Moreover, buck-boost capability should preferably be implemented. The talk reviews state-of-the-art filter concepts and multi-level inverter topologies and describes new three-phase buck-boost PWM inverter systems and modulation/control concepts currently under research at the Power Electronic Systems Laboratory of ETH Zurich, which are partly based on novel monolithic four-quadrant GaN switches. Finally, voltage and current DC-link all-GaN AC/AC converter systems are comparatively evaluated, and advantageous application areas for both system types are identified.

**Keynote 2: Mr. Masayuki Tobita Vice President of TMEIC, Japan**
**Date : November 11, 2024 10.50-11.40 AM**

**Biography:**

Mr. Masayuki Tobita graduated from master course of Electrical and Electronic Engineering, Tokyo Institute of Technology in 1994, where he majored in Power Electronics.

He joined Toshiba Corporation in April 1994, developed his carrier as the engineer and made excellent technical achievements in high-capacity power electronics applications. In October 2003, he moved to Toshiba Mitsubishi Electric Industrial Systems Corporation (TMEIC), Tokyo, Japan, when the joint venture between Toshiba and Mitsubishi-Electric was established. At that time, he was Specialist of Power Electronics Department. He became Senior Manager of Power Electronics Department in 2013 and Senior Manager of Energy & Environment Power Electronics Systems Department in 2014. He became Senior Manager of Planning & Administration Department in 2017. He was President & CEO of Power Electronics Products Corporation in Houston from 2019. From June 2021 to present, he is Vice President of Power Electronics System division.

## Power Electronics Contribution to Achieving Carbon-Neutral Society

**Summary:** The United Arab Emirates (UAE) hosted COP28 from the end of November 2023. There, the UAE, the US, the EU and other countries supported targets for preventing global warming, such as tripling global renewable power generation and doubling energy efficiency improvements by 2030. The targets highlight the power electronics as the essential key technology for achieving Carbon-Neutrality. In addition to these targets, to reach the goal, a revolutionary transition to clean energy is necessary by promoting electrification and Green Hydrogen application.

TMEIC continues to develop power electronics technology with the concept of "PEiE: Power Electronics in Everything." This presentation introduces Power Electronics solutions in the megawatt rang for industries striving Carbon-Neutrality.

The first topic covers the high-capacity Power Electronics technology to increase Renewable Energy. In the future, the Renewable Energy will dominate the electrical power networks in place of fossil-fueled generators, where Power Electronics technology will provide the grid-forming functions to Renewable Energy. Power Electronics also contributes to power transmission from remote Renewable Energy.

The second topic focuses on the Green Hydrogen. In heavy industries, some sectors rely on fossil fuels and are said hard to electrify. For such sectors, switching to clean fuels including Green Hydrogen can be a good solution. Mass-production of Green Hydrogen requires high-capacity Power Electronics technology, that harmonizes with the future power networks.

The third topic addresses the power supply to the digital networks for information and communication. In the future, the digital networks will dynamically manage the energy networks operation. It is important to remember that the digital networks need the electric power. The Power Electronics technology provides reliable and high-efficiency power supply solutions.

The final topics introduces the Power Electronics applications in the tens of megawatt range to electrify largescale processes. Additionally, the high-capacity Power Electronics systems improve energy efficiency by optimally managing various megawatt -rated processes.

**Keynote 3: Professor Kan Akatsu Yokohama National University, Japan**
**Date : November 12, 2024 9.00-9.50 AM**

**Biography:**

Kan Akatsu received B.S., M.S., and Ph. D degrees in electrical engineering from Yokohama National University, Yokohama, Japan, in 1995, 1997, 2000 respectively.

He joined Nissan Research Center, Yokosuka, Japan, in 2000, he contributed to the design and analysis of the new concept permanent magnet machines. In 2003, he joined the department of Electrical and Electric Engineering at Tokyo University of Agriculture and Technology, Tokyo, Japan, as an assistant professor. From 2005 to 2007, he is a JSPS Postdoctoral Fellowship for Research Abroad, visiting professor in WEMPEC (Wisconsin Electric Machines and Power Electronics Consortium), University of Wisconsin-Madison. From 2009, he was an associate professor, and he was a full professor in Shibaura Institute of Technology, Tokyo, Japan. From October 2019, he is a professor in Yokohama National University.

## High performance motor drive techniques by multiple inverters

**Summary:** Recent development of power devices leads to high power density and high efficiency in the motor drive. Especially for the EV traction motor, high power machine drive technique driven by multiple inverters have been developed. Usually the multiple inverter drive has an advantage for the fault tolerance system, however, recent motor design techniques including multi-phase motor can fully utilize the advantage of multiple inverter.

This talk summarizes motor drive systems using multiple inverters, and describes their advantages, control technology that is only possible with multiple inverters based on teeth flux density control, and applications to magnetic flux density vector control.

**Keynote 4: Dr. Hitoshi Hayashia East Japan Railway Company, Japan**
**Date : November 12, 2024 9.50-10.40 AM**

**Biography:**

1970 Born in Tokyo, Japan

1994 Graduated from the University of Tokyo

1996 Received Master Degree from graduate school of the University of Tokyo

1999 Received Doctor Degree from graduate school of the University of Tokyo

1999-2002 Assistant Professor of the University of Tokyo

2002-now East Japan Railway Company

- Jul.2002-Sep.2006 R&D Center of JR East Group

- Oct.2006-Jun.2008 Ohmiya Maintenance Depot of traction power supply system for High Speed Railway

- Jun.2008-Mar.2016 Manager of Electrical & Signal Network System Department, Railway Operations Headquarters

- Apr.2016-Jun.2018 Manager of Traction power supply of Tokyo Branch Office - Jun.2018-now General Manager of Traction power supply technology management center

2022-2024 President of industry applications society of IEEJ (Institute of Electrical Engineering, Japan)

## Trends of challenges to zero carbon by railway companies in Japan

**Summary:** Electric railways have environmental advantages compared with other transportations such as cars, aircrafts, and so on. On the other hand, electric power consumption in the railway sector is 17.5TWh/year, which corresponds to about 2% of the total consumption in Japan. Under these circumstances, many Japanese railway companies have conducted and are planning various efforts to reduce CO2 emissions aiming to achieve carbon neutrality by 2050.

This presentation will focus on some specific initiatives about decarbonization in Japanese railway, such as improvements in efficiency and energy control on rolling stock through replacements, further utilization of regenerative energy by introducing equipment such as energy storage systems or adjusting feeder voltage, energy saving efforts at stations or buildings, installing or procuring of renewable energy, implementing energy saving driving control patterns and so on.

In this keynote presentation, some specific examples of them will be explained in detail including technological prospects of electric railway. The other important issues surrounding railway industry such as labor shortage and sustainable infrastructure in the future will be also mentioned.

**Keynote 5: Professor Huang-Jen Chiu National Taiwan University of Science and Technology, Taipei**
**Date : November 12, 2024 11.10-12.00 AM**

**Biography:**

Huang-Jen Chiu has been with the Department of Electronic and Computer Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan, where he is currently a Distinguished Professor, Dean of Research and Development. He served as the Dean of Industry-academia Collaboration during 2018-2020 and the Director of Center for Power Electronic Technologies during 2014-2022. His research interests include high efficiency/ high power density bidirectional DC/DC converters, PFC topologies, PV inverters, and DSP control in renewable energy applications.

Dr. Chiu is a Fellow of the Institute of Engineering and Technology (IET), a Fellow of Taiwan Power Electronics Association (TaiPEA) and selected as the Distinguished Lecturer of IEEE Power Electronics Society (2017-2018, 2019-2020). He is currently an Editor of IEEE Journal of Emerging and Selected Topics in Power Electronics (JESTPE).

## High Power Density and High Frequency Converter Design

**Summary:** Owing to the energy shortage and the rising awareness of environment protection, not only makes people pay attention to energy saving issue, but jointly affect the development trend of power electronic industries. According to the roadmap of power electronics industries, it includes improving energy conversion efficiency, decreasing components and increasing power density. The talk particularly focuses on high power density AC-DC/ DC-DC/ DC-AC conversion techniques for information technology, electric vehicles, and renewable energy applications.

# TUTORIALS

**Tutorial 1: High efficiency switching control for power converters and motor drives**

**Date : November 9, 2024 10.00-11.30 AM**

**Organizer:** Professor Yen-Shin Lai, National Taiwan University of Science and Technology, Taipei, Taiwan

**Biography:**

Yen-Shin Lai (M'96–SM'01–F'14) received the MS degree from National Taiwan University of Science and Technology, Taipei, Taiwan, and the Ph.D. degree from the University of Bristol, Bristol, England, U.K., both in electronic engineering.

In 1987, he joined the Department of Electrical Engineering, National Taipei University of Technology, Taipei, where he served as the Chairperson during 2003–2006 and has been a Full Professor since 1999, a Distinguished Professor since 2006, and a Chair Professor since 2013. His research interests include control of power converters, inverters, and motor drives.

## High efficiency switching control for power converters and motor drives

**Summary:** The scope includes the switching control methods for efficiency improvement of power converters. AC-DC, DC-DC and DC-AC converters will be introduced. Both single and multi-phase converters will be introduced. The efficiency can be improved by changing switching control method without requiring additional hardware cost, basically. The applications of the introduced AC-DC, DC-DC and DC-AC converters include server power and motor drives.

**Tutorial 2: Onboard Energy Storage Systems for Rail Vehicles: Challenges and Perspectives**

**Date : November 9, 2024 9.00-11.30 AM**

**Organizer:** Professor Rosario MICHELI, Palermo University, Italy

**Biography:**

Rosario Miceli received the B.S. degree in electrical engineering and the Ph.D. degree from the University of Palermo, Palermo, Italy, in 1982 and 1987, respectively. He is a Full Professor of electrical machines with the Polytechnic School, University of Palermo. He is a Personnel in Charge of the Sustainable Development and Energy Savings Laboratory of the Palermo Athenaeum. His main research interests include mathematical models of electrical machines, drive system control, and diagnostics, renewable energies, and energy management. Prof. Miceli is in charge for the University of Palermo of the "European Union - NextGenerationEU – National Sustainable Mobility Center". He is a Reviewer for the IEEE Transactions on Industrial Electronics and the IEEE Transactions on Industry Applications.

## Onboard Energy Storage Systems for Rail Vehicles: Challenges and Perspectives

**Summary:** The railway sector, renowned for its relatively low carbon footprint compared to other modes of transport, has faced challenges in achieving complete electrification, particularly for medium- and low-traffic routes. While traditional electric trains offer zero local emissions, the high investment costs and infrastructure modifications associated with electrification can be prohibitive. In certain cases, physical or legal constraints may entirely preclude external electrification.

To address these limitations and contribute to global climate goals, rolling stock manufacturers have increasingly integrated onboard energy storage systems (OESS) into rail vehicles. OESS, including batteries, supercapacitors, and hydrogen fuel cells, enable trains to operate catenary-free, reducing emissions and eliminating the need for infrastructure modifications.

While OESS offer numerous benefits, such as energy efficiency through regenerative braking, reduced load on the electrical grid, and zero local emissions, their integration into rail vehicles presents significant challenges related to design, operation, reliability, safety, and cost. The demanding operational and regulatory conditions specific to the railway sector can further exacerbate these challenges.

This keynote will provide a comprehensive overview of onboard energy storage technologies for rail vehicles, exploring their current status, characteristics, and potential applications. It will discuss the various powertrain configurations and energy management strategies employed in OESS-equipped trains. Additionally, the challenges associated with OESS adoption and future trends in this field will be examined, with a focus on the transition towards climate-neutral rail transport.

**Tutorial 3: Design of Magnetic Resonance Wireless Power Transfer with Load-Independent Technology**

**Date : November 9, 2024 13.00-14.30 PM**

**Organizers:** Professor Hiroo Sekiya Chiba University, Chiba, Japan
Professor Xiuqin WEI Chiba Institute of Technology, Chiba, Japan

**Biography:**

Hiroo Sekiya received the B.E., M.E., and Ph.D. degrees in electrical engineering from Keio University, Yokohama, Japan, in 1996, 1998, and 2001, respectively. Since April 2001, he has been with Chiba University, Chiba, Japan, where he is currently a Professor in the Graduate School of Informatics. From February 2008 to February 2010, he was also with the Department of Electrical Engineering, Wright State University, Dayton, OH, USA, as a Visiting Scholar. His research interests include high-frequency high-efficiency tuned power amplifiers, resonant dc/dc power converters, dc/ac inverters, and digital signal processing for wireless communications. Dr. Sekiya is serving BoG member of IEEE CASS, Chair of PELS JJC, and Chair of TC on Energy Engineering in Electronics and Communications, IEICE. He is also Fellow of the IEICE, member of IETJ, and senior member of IEEE.

**Biography:**

Xiuqin WEI received a Ph.D. in Advanced Integration Science from Chiba University, Chiba, Japan, in 2012. She is currently a Professor in the Department of Electrical and Electronic Engineering at Chiba Institute of Technology, Chiba, Japan. Her research interests include high-frequency and high-efficiency power inverters, AC-DC converters, DC-DC converters, and wireless power transfer.

## Design of Magnetic Resonance Wireless Power Transfer with Load-Independent Technology

**Summary:** The importance of renewable energy is widely acknowledged. However, the various green energies are ultimately converted into electrical energy, and we all use the energy for our society richen. Therefore, increasing the convenience of charging terminals (the final stage of energy transfer) will directly lead to our life. In this sense, wireless power transfer is a technology that should play a significant role in enhancing convenience. The practical application of wireless power transfer will afford greater freedom in the installation of electrical and electronic equipment and will enable us to optimize the effectiveness of renewable energy.

In this talk, I will discuss the magnetic resonance type of wireless power transfer, which can provide a solution to the problems of load variations and coupling-coil misalignment, which are the essential problems of magnetic resonance type wireless power transfer, by using a special technique called load independent technology.

**Tutorial 4: Smart Grids for green and sustainable energy transition**
**Date : November 9, 2024 13.00-14.30 PM**

**Organizer:** Professor Dr. Ing. Youcef SOUFI University Echahid Larbi Tebessi, Tebessa, Algeria

**Biography:**

Youcef SOUFI received the B.Eng. (1991) and PhD degree (2012) from the University of Annaba, Algeria in Electrical Engineering. Since 2000 he has been with the Department of Electrical Engineering, Laboratory of Electrical Engineering at the University Echahid Larbi Tebessi, Tebessa, Algeria where: He is currently a full Professor in electrical engineering. His main and current major research interests include application of Artificial intelligence in electrical engineering, Renewable energy, electrical machines control, power electronics and drives. He has published and co-authored more than 200 technical papers in scientific journals and conference proceedings since 2000. He is the member of editorial board of many journals and the member of technical program committee / international advisory board/ international steering committee of many international conferences.

## Smart Grids for green and sustainable energy transition

**Summary:** Smart Grid is now the buzzword in the power industry all over the world. The rise of smart grid is a boon not only to society as a whole but to all who are involved in the electric power industry, its customers, and its many stakeholders. It presents our planet with a revolutionary way of power transmission and distribution. It has even paved the way for many advanced forms of data prediction and handling, where the increased awareness of the environmental impact and the carbon footprint of all energy sources, including electric power production, have given impetus to the growth and adopting of renewable as well as alternative energy.

The modernization of electric grids toward a smart grid is being carried out to improve reliability, facilitate integration of renewable energies, and improve power consumption management. Also, the electric power systems throughout the world are facing radical change stimulated by the pressing need to decarbonize electricity supply, to replace ageing assets and to make effective use of rapidly developing information and communication technologies. Thus, the development and the implementation of a smart grid for power supply is one of the pressing issues in modern energy economy and it is promoted by many governments as a way of handling energy independence, global warming and security of supply based on the introduction of modern communications infrastructure, sensing, metering technologies, and modern energy management techniques based on the optimization of demand, energy and network availability.

This presentation addresses critical issues on smart grid Challenges, development and Opportunities where the main objective of this presentation is to provide a contemporary look at the current state of the art in smart grid as well as to provide a better understanding of the technologies, potential advantages and research challenges of the smart grid and provoke interest among the research community to further explore this promising research area.

**Tutorial 5: Energizing Change "Unlocking Blockchain's Role in Socially Implementing the Future of Energy"**
**Date : November 9, 2024 13.00-14.30 PM**

**Organizer:** Dr. Jason Nye UPCX-Platforms. Seattle, United States

**Biography:**

Dr. Jason Nye holds a PhD from the University of St Andrews (UK) and has held teaching positions at the University of Dundee (UK), the University of St Andrews (UK) and the Johannes Gutenberg Universität Mainz (Germany). After departing academia in 2001, he joined the U.S. Department of State where he was responsible for advising the Secretary of State, the National Security Council, and the White House on global trade matters, including sensitive goods. During his government experience he contributed to the negotiation of the U.S. free trade agreement with the Republic of Korea. He also frequently served as the U.S. Department of State's representative to the National Intelligence Council and numerous interagency groups. Dr. Nye also represented the United States Government as its lead delegate to NATO committees and to the Wassenaar Arrangement, an international export controls body. Since leaving U.S. Government service in 2008, Dr. Nye has been involved in international trade and finance, with many high-profile activities in strategic sales, regulatory compliance, fundraising, and export credit finance while expanding global economic relationships. His business activities have contributed heavily to Asia-Pacific security through defense trade between the U.S. and East Asian Allies, and to energy security by assisting investments into energy production and infrastructure in East Asia and North America. Dr. Nye also contributed to the establishment of two international consulting-advisory firms, a global fund, and also served as CEO of a Japan-U.S. advanced energy technology joint venture. In his early career, Dr. Nye was enlisted as a reconnaissance infantryman in the United States Marine Corps.

## Energizing Change

## "Unlocking Blockchain's Role in Socially Implementing the Future of Energy"

**Summary:** In recent years, the energy sector has been compelled to transform due to environmental issues, resource depletion, and the rise of renewable energy. Within this context, blockchain technology holds the potential to enhance transparency and efficiency.

Blockchain serves as a decentralized ledger that prevents data tampering, improving the transparency of energy transactions and consumption data. This enables direct trading between consumers and producers, as well as automated transactions through smart contracts, leading to potential cost reductions.

However, the implementation of blockchain also faces challenges, including technical hurdles, regulatory frameworks, consumer understanding, and security concerns.

In this lecture, we will explore the impact of blockchain on the energy industry and propose specific approaches for improving existing systems by presenting several use cases. Our goal is to outline a path toward building a sustainable energy society, and we look forward to your participation.

**Tutorial 6: Supercapacitor Assisted Power Converters and Protection Systems for DC Homes and DC Appliances Based on Renewable Energy**

**Date : November 9, 2024 15.00-16.30 PM**

**Organizer:** Professor Nihal Kularatna School of Engineering Teaching and Research University of Waikato, HAMILTON, New Zealand

**Biography:**

Nihal Kularatna is an electronics engineer with over 48 years of contribution to profession and research. He has authored ten reference books for practicing electronic engineers including the two consecutive IET Electrical Measurement Series books titled Modern electronic test & measuring instruments (1996) and Digital and analogue instrumentation-testing and measurement (2003/2008) and five Elsevier (USA) titles. His latest research monograph on sustainable energy and energy storage systems, titled Energy Storage Devices for Renewable Energy Systems: Rechargeable Batteries and Supercapacitors, was published by Elsevier in June 2021, summarizing his applications-oriented research during the last five years, supervising many PhD students at the University of Waikato, New Zealand. He was the winner of New Zealand Engineering Innovator of the Year 2013 Award. In 2021, he won the Postgraduate Research Supervision Staff Excellence Award. He was the first full-time CEO of the Arthur C Clarke Institute for Modern Technologies A Fellow of the IET (London), Fellow of Engineering NZ and a Senior Member of IEEE (USA) and a graduate from the University of Ceylon, during his industrial career at the Arthur C Clarke Institute for Modern Technologies, he was a winner of Presidential Awards for Inventions-1995, the Most Outstanding Citizens Awards-1999 and a TOYP Award in 1993. In 2015, University of Waikato conferred him with a DSc degree for his thesis titled "Contributions to Power Management, Telecommunications and Telecommunications- A Three Decade Journey". He is currently active in research in non-traditional supercapacitor applications, power supply topologies, transient propagation and renewable energy. He has contributed over 175 papers to learned journals and international conferences. His work on supercapacitor assisted (SCA) circuit topologies/techniques such as SCALDO, SCASA and SCATMA culminated numerous US, NZ and PCT patents. He is presently employed as an Associate Professor in the School of Engineering, the University of Waikato, New Zealand. At international IEEE conferences and industry trade shows he frequently delivers invited tutorials, workshops and lectures on subjects he is passionate about, including the area of innovation and commercialization. His hobbies are gardening and car-grooming.

## Supercapacitor Assisted Power Converters and Protection Systems for DC Homes and DC Appliances Based on Renewable Energy

**Summary:** Supercapacitors are typically one million larger capacitances for the same canister volume compared to electrolytic and film capacitors. Today commercial devices come in capacitance values ranging from fractional farads to 100,000 farads (per single cell) with life cycles in the range of 30 k to 1 million. They have a several orders higher power density than li-ion rechargeable batteries with a much wider operational temperature range. However, they haven't reached the energy density of rechargeable battery chemistries. Based on the low equivalent series resistance (ESR) property of supercapacitors, a unique new family of power converters and protection systems, now known as Supercapacitor Assisted (SCA) techniques was developed. These patented SCA techniques such as SCA-low dropout regulator (SCALDO), SCA-surge absorber (SCASA), SCA-temperature modification apparatus (SCATMA) and SCA-LED are based on a new theory now published as SCA loss management (SCALoM) theory. The tutorial will present how we can develop extra low frequency DC-DC converters (based on SCALDO), high performance transient surge absorbers (based on SCASA) and high efficiency DC lighting (SCALED based) in addition to how this new approach could help in new directions for DC homes and DC appliances etc.

**Tutorial 7: Modeling of Reneables and Storages in PyPSA and Julia tools: case study for electricity system of Kazakhstan**

**Date : November 9, 2024 15.00-16.30 PM**

**Organizer:** Dr. Nurkhat Zhakiyev Assoc. Prof. Senior Researcher at Astana IT University, Kazakhstan

**Biography:**

Dr. Assoc.Prof. Nurkhat Zhakiyev is a Senior Researcher of Astana IT University, Kazakhstan. His research interests include the field of advanced computer modeling of energy systems, mitigation of losses in corona discharge, Climate change mitigation expert at UNDP. Supervisor of several research projects on the energy system modelling and integration of renewables. March 2022- March 2023, Postdoctoral Researcher of Engineering Faculty, Gazi University, (Ankara, Türkiye) funded by IsDB. Participated in post 2020 NDC updating project and on linking of CGE (top-down) model of Kazakhstan with TIMES-Kazakhstan (bottom-up) energy system model (PMR/World Bank Project for Kazakhstan, 2016 and 2020). Involved in preparation of Mitigation and Projections chapters of National communications and Biennial reports of Kazakhstan on Climate change (under UNFCCC). Author of more than 35 papers published on international Journals and reviewer for many ISI journals.

## Modeling of Reneables and Storages in PyPSA and Julia tools: case study for electricity system of Kazakhstan

**Summary:** Developments in the fields of renewable energy, energy storages, and digitalization have led to a change in the trends of the components of the mix of types of energy sources: there has been a shift from the use of conventional fuel energy carriers to green energy, where renewable energy influenced with high importance. Renewables are a key energy solution against climate change. Only the development of green energy and the introduction of energy efficiency measures can reduce GHG emissions, according to the Strategy of Kazakhstan up to "Net-Zero" by 2060. Will be discussed and compared different development scenarios for allocation of high share of renewables.

Each storage system as an independent Agent of the energy system will be modeled by focusing on individual cost-benefit maximization behavior in the system. In agent modeling, the parameters of active agent objects are first set, and their behavior is determined. Regional energy service companies, generating facilities, industrial consumer companies, etc., will be represented as other agents in the system. Individual dispatching schedules of each agent will be simulated in GAMS, PyPSA, and Julia environments. Discrete-event modeling and system dynamics will show the best solution for separate scenarios.

In this tutorial session will be described research analyzing steps for different tools in using renewables with storages as a new electricity market design. The accuracy and productivity of the models also will be tested and will be presented at the conference.

**Tutorial 8: PWM Control of Three-Level Neutral Point Clamped Converters for High Power Applications**

**Date : November 10, 2024 10.00-11.30 AM**

**Organizer:** Dr. Shinzo Tamai Toshiba Mitsubishi-Electric Industrial Corporation (TMEIC), Power Electronics Systems Division, Kobe, Hyogo, Japan

**Biography:**

Dr. Shinzo Tamai is currently Senior Fellow in the Power Electronics Systems Division at TMEIC corporation, where he has held several leadership positions in power electronics projects.

He received his B. S., M. E., and Ph. D. degrees in electrical engineering from the Tokyo Institute of Technology in 1981, 1983, and 2004, respectively. He joined Mitsubishi-Electric Corporation in 1983. He has been engaging the projects of the development of largecapacity three-level NPC converters and their applications to motor drives and static synchronous compensators (STATCOMs) and back-to-back (BTB) transmission systems. In 2003, he moved to TMEIC that is the joint venture in industrial systems of Toshiba and Mitsubishi-Electric Corporation. He is a Fellow of the IEEE and a Fellow of the IEE-Japan.

## PWM Control of Three-Level Neutral Point Clamped Converters for High Power Applications

**Summary:** There are some PWM control methods proposed for three-level neutral-point-clamped (NPC) converters. In large capacity converters, the switching frequency of power semiconductors is relatively low. I will share some PWM control methods and their harmonics characteristics in the output voltage within large capacity converter constraints.

**Tutorial 9: AI, Big Data Analytics, Security and Privacy Issues in Smart Energy Systems**

**Date : November 10, 2024 10.00-11.30 AM**

**Organizer:** Professor Seref Sagiroglu Gazi University, Ankara, Turkiye

**Biography:**

Prof. Dr. Seref Sagiroglu completed his undergraduate education in 1987 at Erciyes University, Department of Electronics Engineering, and his doctoral studies at the University of Wales College of Cardiff (now Cardiff University, UK) in 1994. He continues his academic career as a full professor of software engineering at Gazi University's Computer Engineering Department.

Sagiroglu has an outstanding academic with more than 8000 citations; almost 400 articles published in SCI/SSCI indexed journals, national and international conferences, symposium and workshops, editor of more than 20 books, owns 4 patents, and has completed national and international projects on security, big data, intelligent modeling and control, biometric, etc.

Sagiroglu organized more than 50 national and international events on artificial intelligence, 5G, Big Data, Machine Learning, Deep Learning, Information and Cyber Security, Privacy, IPv6, etc., as a chairman or co-chairman. Sagiroglu had such duties as President and Executive Committee Members of those NGOs; completed the duties as the Deans of Graduation School of Science and Technology and Engineering Faculty, and Head of Computer Engineering Department at Gazi University; Editors of International Journal of Information Security Science (www.ijiss.org); International Journal of Information Security Engineering (in Turkish) (www.dergipark.gov.tr/ubgmd) and CyberMag (www.cybermag.com); Member of Cyber Security Group of Higher Education Council of Turkey; contributed to consultants to Havelsan; IT Regulatory Body of Turkey and Personal Data Protection Regulatory Body of Turkey; has delivered as invited or keynote speakers more than 500 seminars, talks, conferences at universities, schools, sectors, TV and Radio Programs, institutions and organisations in the topics of Information Security, Big and Open Data, Cyber Security and Defense, Artificial Intelligence, Computer and Software Engineering, Privacy, Biometrics, Innovation Culture Creation, IPv6, 5G, etc. He is now the director of the AI and Big Data Center of Gazi University, Ankara, Turkey, and also is the president of the Chamber of Electrical Engineering Ankara Branch.

## AI, Big Data Analytics, Security and Privacy Issues in Smart Energy Systems

**Summary:** Big data and AI have great potential to provide opportunities not only energy systems but also many other fields enhancing technical, organizational, social, and economic gains and contributions. The current potential of applying big data and AI approaches for better planning, managing, designing, and securing power grid systems and operations is a big challenge to be handled seriously. This talk will cover big data, ai, generative ai, security, privacy, cost, management, planning, and integration of those into energy and power grid systems. Recent challenges are also summarised and concluded.

**Tutorial 10: DC Microgrids: Benefits, Architectures, Perspectives and Challenges**
**Date : November 10, 2024 10.00-11.30 AM**

**Organizer:** Professor V. Fernao Pires Polytechnic Institute of Setubal, Portugal

**Biography:**

V. Fernão Pires (M'96–SM'09) received the B.S. degree in Electrical Engineering from Institute Superior of Engineering of Lisbon, Portugal, in 1988 and the M.S. and Ph.D. Degrees in Electrical and Computer Engineering from Technical University of Lisbon, Portugal, in 1995 and 2000, respectively.

Since 1991, he has been a member of the teaching staff with the Electrical Engineering Department, Superior Technical School of Setúbal—Polytechnic Institute of Setúbal. He is currently a Professor teaching power electronics and control of power converters. He is also a Researcher with the Instituto de Engenharia de Sistemas e Computadores—Investigação e Desenvolvimento em Lisboa (INESC-ID). His work has resulted in more than 300 publications. He is member of IEEE since 1996 and senior member since 2009. He is currently serving in IEEE IES Technical Committee in Power Electronics. He is an evaluator of research proposals for several international funding agencies

He was the general chair of the international conference icSmartGrids 2021, icSmartGrids 2024 and general co-chair of the IEEE CPE-POWERENG 2020. He was also one of the founders of the IEEE POWERENG conference series. He has been Program Committee and/or Track Chair member of several international conferences (IECON, ISIE, CPE, ICELIE, POWERENG, ICMLA, INTELEC, ICRERA, ICPEA, PEMC, TENSYMP, BEC, ICEEEP, SMARTGREENS, GreenCom).

## DC Microgrids: Benefits, Architectures, Perspectives and Challenges

**Summary:** One of the major paradigm shifts that will likely be observed in the energy mix is related to distribution networks. Until now, this type of electrical grids was characterized by an AC transmission. However, a new concept is emerging, as the electrical distribution networks characterized by a DC transmission begin to be considered as a promising solution due to technological advances. In fact, we are now witnessing a proliferation of DC equipment associated with renewable energy sources, storage systems and loads. Thus, such equipment started to be considered in different contexts. In this way, taking into consideration the requirement for a fast integration of these equipment's into the existing electrical network, DC networks started to become important. On the other hand, the importance of the development of these DC networks is not only due to the fact that today the number of DC equipment's started to be huge. In reality, when compared with the classical AC transmission systems, the DC networks are considered more efficient and reliability, as well as, does have any issues regarding the reactive power and frequency control and synchronization. Although much research work has been done, several technical aspects have not yet been defined as standard. This uncertainty is still an obstacle to a faster transition to this type of network. There are also other aspects that still need to be focused of study and research in order to allow this technology to become a day-to-day solution. Finally, there also many applications in which this kind of DC microgrids can be applied, but still not addressed. Thus, all these aspects are considered as important challenges that need to be addressed. This talk will address an overview of the existing and possible solutions for this type of microgrid, as well as the challenges that need to be faced now.

**Tutorial 11: A Comprehensive Microgrid Test Model Based on IEEE Distribution Test System for Smart Grid Transition Analysis**

**Date : November 10, 2024 10.00-11.30 AM**

**Organizer:** Professor I. Ewean Davidson, Cape Peninsula Univ of Technology, South Africa
Dr Elutunji Buraimoh Clemson University, USA

**Biography:**

Innocent Ewean Davidson, (Senior Member, IEEE) received the B.Sc. (Eng.) (Hons) and MSc (Eng.) degrees in Electrical Engineering from the University of Ilorin, in 1984 and 1987, respectively, Ph.D. degree in electrical engineering from the University of Cape Town, in 1998; and the PG Diploma degree in Business Management, from the University of KwaZulu-Natal, in 2004. He also received Associate Certificate in Sustainable Energy Management (SEMAC), from the British Columbia Institute of Technology, Burnaby, BC, Canada, in 2011, and the Course Certificate in Artificial Intelligence, from the University of California at Berkeley, USA in 2020. He is a Full Professor and Director, French South African Institute of Technology (F'SATI), and the African Space Innovation Center (ASIC), Cape Peninsula University of Technology (CPUT), Bellville, South Africa. He has supervised six postdoctoral research fellows and graduated 63 Ph.D./Masters' students and over 1200 engineers, technologists, and technicians. He is the author/co-author of 405 technical papers in accredited journals, and peer-reviewed conference proceedings and book chapters. He has managed over US$3 million in research funds. His current research interests include Space and CNS Innovation, smart grids, electromagnetics and applied artificial intelligence. He is a Fellow grade of the Institute of Engineering and Technology, UK, and the South African Institute of Electrical Engineers; a Chartered Engineer in the U.K.; and a registered Professional Engineer (P Eng.), of the Engineering Council of South Africa. He is a member: Western Canada Group of Chartered Engineers (WCGCE); the Institute of Engineering and Technology (IET Canada) British Columbia Chapter; IEEE Collabratec Communities on Smart Cities and IEEE (South Africa Chapter). He is a recipient of numerous international Best Paper Awards. He is a C2-rated researcher from the National Research Foundation (NRF), South Africa.

**Biography:**

Dr Elutunji Buraimoh is a Researcher who focuses on developing communication latency prediction and compensation techniques in real-time power system co-simulation, i.e., simulation of a single complex system by more than one real-time digital simulator located in geographically separated laboratories integrated virtually via a high-speed computer network.

Elutunji conducted previous doctoral research as a D.Eng. (Doctor of Engineering) at the Smart Grid Laboratory, the Durban University of Technology, and the DEEPER Research Group, University of Valladolid, Spain, with a focus on developing novel strategies to make inverterbased renewable energy sources grid code compliant, smart, and grid-interactive. Recognized with research awards, including the Durban University of Technology D.Eng. Scholarship Award (Energy Research Focus Area) 2018–2020 and the Best Paper Award (third place) at the Clemson University Power Systems Conference 2020. Received a European Union Scholarship for International Exchange at the University of Valladolid, Spain, under the Erasmus+ KA107 Project. Also, awarded citation recognition at the 2020 Durban University of Technology Research and Innovation Award. Elutunji Buraimoh holds a B.Tech. (Hons.) degree in electronic and electrical engineering from Ladoke Akintola University of Technology, Nigeria, and an M.Sc.degree in electronic and electrical engineering from Obafemi Awolowo University, Nigeria.

Elutunji served as a Guest Editor, Modern Electric Power Delivery Systems, Energies Special Issue and Editor/Publication Chair, 30th South African Universities Power Engineering Conference/Proceedings.

## A Comprehensive Microgrid Test Model Based on IEEE Distribution Test System for Smart Grid Transition Analysis

**Summary:** The transition to Smart Grids represents a significant evolution in the management and operation of electrical grids, aiming to enhance efficiency, reliability, and sustainability. To facilitate this transition, robust and versatile test models are crucial for simulating and analyzing various scenarios and challenges. In this tutorial, we will develop a Microgrid test model based on a typical IEEE distribution test system, designed to support a wide range of studies and applications related to Smart Grids. The proposed Microgrid model comprises both direct current (DC) and alternating current (AC) buses, accommodating different types of loads and distributed generation sources across two voltage levels. This dual-bus configuration enables the study of interactions between DC and AC systems, which is pivotal for the development of integrated energy systems. The Microgrid includes a variety of load types, such as residential, commercial, and industrial, along with distributed generation sources like photovoltaic panels, wind turbines, and energy storage systems. A complete model of the proposed Microgrid has been developed and simulated using the MATLAB-Simulink simulation platform. MATLAB-Simulink offers a flexible and powerful environment for modeling, simulating, and analyzing complex electrical systems.

This platform enables the integration of various components and control strategies, facilitating comprehensive studies on the performance and behavior of the Microgrid under different operating conditions. The proposed electrical system provides a robust base case for a wide array of advanced studies, including but not limited to: Investigating the dynamic stability and inertia characteristics of the Microgrid, crucial for maintaining system stability under transient conditions; Analyzing methods to manage reactive power in the Microgrid to improve voltage stability and reduce losses; Evaluating the reliability and resilience of the Microgrid in the face of component failures and external disturbances; Exploring demand response strategies to balance supply and demand, enhance grid flexibility, and reduce peak loads; Implementing and testing multi-layered control approaches to optimize the operation of the Microgrid and Applying optimization algorithms to enhance the efficiency, cost-effectiveness, and sustainability of the Microgrid; its interaction with the main grid; Developing and assessing control methods that ensure the continuous operation of the Microgrid despite faults or malfunctions; and Studying the integration and management of energy storage systems to support grid stability and reliability. A typical IEEE-based MG test model presented in this tutorial is a comprehensive and versatile tool for advancing research in the field of Smart Grids. By providing a detailed and flexible platform for simulation and analysis, this model supports a wide range of studies aimed at improving the performance, reliability, and efficiency of future electrical grids. The insights gained from these studies will contribute significantly to the development and implementation of innovative solutions for the transition to Smart Grids.

**Tutorial 12: The Neutral-Point-Clamped Inverter and Instantaneous-Power Theory: How They Emerged in the Early 1980's**

**Date : November 10, 2024 15.00-16.30 PM**

**Organizer:** Professor Hirofumi Akagi Tokyo Institute of Technology, Tokyo, Japan

**Biography:**

Hirofumi (Hiro) Akagi was born and grew up in Okayama, Japan. He received his Ph. D. degree in electrical engineering from the Tokyo Institute of Technology, Tokyo, Japan, in March 1979. Immediately, he joined the Nagaoka University of Technology as Assistant Professor, and then, Associate Professor. He moved to Okayama University as Professor in August 1991. Since January 2000, he has been Professor, currently Distinguished Professor, at the Tokyo Institute ofmTechnology. His research interests include power conversion systems and their applications to industry, transportation, and electric power utility. He has authored and coauthored 148 IEEE Transactions/Journal papers, including three invited papers published in Proceedings of the IEEE. His papers and patents 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 PELS William E. Newel Award, the 2004 IEEE IAS Outstanding Achievement Award, the 2008 IEEE Richard H. Kaufmann Award, the 2012 IEEE PES 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 world's first, 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 two years, and as the IEEE Division II Director from 2015 to 2016 for two years.

## The Neutral-Point-Clamped Inverter and Instantaneous-Power Theory: How They Emerged in the Early 1980's

**Summary:** This tutorial will disclose unknown success stories of the three-phase three-level neutral-pointclamped (NPC) inverter and the three-phase instantaneous-power theory or p-q theory. Both inverter and theory emerged from the Technological University of Nagaoka (currently the Nagaoka University of Technology), Nagaoka, Japan, in the early 1980's. Behind that, there were technical advances in power bipolar junction transistors (BJTs) all through the 1970's.

Nabae, Takahashi, and Akagi designed, built, and tested an adjustable-speed motor drive that combined the three-phase NPC inverter using 12 BJTs, 12 free-wheeling diodes, and six clamping diodes with a three-phase induction motor. They presented the world's-first short paper with experimental results at a Japanese domestic conference in March 1980. Then, they presented the full paper at the IEEE Industry Applications Society Annual Meeting in October 1980, and had the paper published in the IEEE Transactions on Industry Applications in September 1981. At the same time, Baker applied for a patent on the three-phase NPC inverter circuit in August 1979, and it was registered and published in May 1981. However, he did not include any experimental verification in his patent.

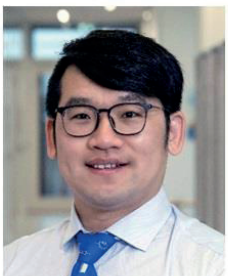
Akagi succeeded in defining and formulating a new pair of instantaneous real and imaginary powers, p and q, for three-phase circuits in November 1981. Three months later, he gave a strict mathematical proof to a clear explanation of the physical meanings of p and q. This definition and formulation made it applicable to any waveform without any restriction because both used only the information of the present voltages and currents. Thus, it was named the "p-q theory" later.

Akagi, Kanazawa, and Nabae presented the world's-first paper on the theory at an international conference in March 1983. The IEEE Transactions paper following the conference paper was published in May 1984, including experimental verification.

The emergence stories of the NPC inverter and the p-q theory would remind us of Newton's famous quote: "Necessity is the mother of invention," and Galilei's famous quote: "Doubt is the father of invention," respectively

**Tutorial 13: Grid-Integration and Beyond for Solar Photovoltaic Systems**
**Date : November 10, 2024 13.00-14.30 PM**

**Organizers:** Professor Yongheng YANG, Zhejiang University in China
Dr. Yinxiao ZHU, Zhejiang University in China
Professor Dehong XU, Zhejiang University in China



**Biography:**

Yongheng YANG (SM'17) earned his B.Eng. degree from Northwestern Polytechnical University, China, in 2009, and his Ph.D. degree 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 associated 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 Chair of the IEEE Denmark Section in 2019-2020 and is an Associate Editor for IEEE Transactions on Power Electronics and IEEE Transactions on Sustainable Energy. He received the 2018 IET Renewable Power Generation Premium Award. 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.

**Biography:**

Dehong XU (F'13) received the Ph.D. degree from the Department of Electrical Engineering, Zhejiang University, Hangzhou, China, in 1989. He 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. He 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 Transactions 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 CoEditor-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.

**Biography:**

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 have authored and co-authored over 10 IEEE Transactions paper including IEEE TPEL/TIE/TSTE and also an active reviewer for several flagship IEEE journals/conferences. He is now leading an industrial project on integration and control of solar PV power generation systems for commercial applications

## Grid-Integration and Beyond for Solar Photovoltaic Systems

**Summary:** Recently, power electronics, as an efficient power interface, is benefiting the development of renewable energy resources (RESs). Meanwhile, driven by the continuous decrease in the levelized cost of energy (LCoE), photovoltaic systems (PVSs) are widely integrated into the power grid for carbon neutrality. However, the high penetration level of PVSs raises concerns about grid instability due to intermittent power fluctuations, such as the frequency stability induced by the deficient mechanical inertia in power electronics interfacing RES systems. Accordingly, various attempts have been made to ensure grid-friendliness with a sharp proportion of PV integration to guarantee utility resilience and energy harvesting. Beyond conventional passive integration, recent PVSs are required to act as active power sources, becoming primary sources in the system, particularly, mitigating the adverse effects and simultaneously providing intelligent controllability and flexibility. In this tutorial, we will walk through the current technological challenges for grid-integration of solar PV energy as well as potential solutions. This tutorial provides a comprehensive approach to designing grid-friendly PVSs, covering the details from modelling to advanced controls. The goal is to improve the functionality and manageability of grid-connected PVSs by advanced controls to ensure the sustainability, compatibility with the power grid, efficiency, and reliability of PVSs that adhere to grid regulations and help to reduce the LCoE. The tutorial is organized for intermediate and advanced audiences, engineers, and researchers seeking practical solutions for grid-friendly power electronics for extending integration to resilience enhancement, particularly PV power conversion systems. The prerequisite is basic power electronics and control.

**Tutorial 14: Wireless Power Transfer in Offshore and Onshore Applications: Leveraging AI for Enhanced Efficiency**

**Date : November 10, 2024 13.00-14.30 PM**

**Organizer:** Dr. Mehdi Bagheri Nazarbayev University, Kazakhstan

**Biography:**

Dr. Mehdi Bagheri is Senior Member of IEEE and holds an academic background and extensive professional experience in the field of electrical and computer engineering. He obtained his Ph.D. in Electrical Engineering, specializing in energy, power systems and high voltage, from the University of New South Wales (UNSW) in Sydney, Australia. During his academic journey, Dr. Bagheri has collaborated with National University of Singapore (NUS). He also engaged in a close partnership with Rolls-Royce Pte. Ltd. in Singapore, working on a joint project that demonstrated his practical application of knowledge. Dr.Bagheri is an associate professor at Nazarbayev University currently and received Scopus Award in Engineering Research in 2022. He has successfully led and participated as a Principal Investigator (PI) and co-PI in various projects with a total funding value of 2 million dollars over the past five years. His research interests span a wide range of subjects, including energy security, high voltage engineering, wireless power transfer, diagnosis in power systems for off- and onshore, space and marine applications, electrical rotating machines, power quality, smart grid and city technologies, and smart energy systems.

## Wireless Power Transfer in Offshore and Onshore Applications: Leveraging AI for Enhanced Efficiency

**Summary:** Wireless power transfer (WPT) technology is revolutionizing how electrical energy is delivered, eliminating the need for physical connectors and addressing challenges in both offshore and onshore applications. This tutorial examines the concept and advancements in WPT systems, emphasizing their role in powering underwater vehicles, offshore platforms, electric vehicle (EV) charging stations, industrial automation, and consumer electronics.

The core principles of WPT—inductive coupling, capacitive coupling, and resonant inductive coupling—are explored, highlighting the challenges and solutions for efficient energy transfer over varying distances and through different media. Key issues such as power levels, frequency selection, and alignment are discussed to provide a comprehensive understanding of WPT mechanisms.

A focal point of this tutorial is the integration of Artificial Intelligence (AI) to optimize WPT systems. AI algorithms, utilizing machine learning and data analytics, enhance WPT by predicting optimal power transfer paths, and diagnosing potential faults. In offshore applications, AI optimizes device positioning and orientation, ensuring reliable power delivery. For onshore uses, AI enables smart grid integration and predictive maintenance, reducing downtime and extending equipment lifespan.

Emerging trends and future directions in WPT and AI integration are also covered, including the development of AI-powered adaptive control systems for self-optimizing networks. These advancements promise to enhance the scalability and adaptability of WPT solutions across various applications.

The tutorial addresses regulatory and safety considerations, emphasizing compliance with current standards to ensure safe and efficient WPT operation.

Combining AI with WPT systems significantly improves power transfer efficiency. This tutorial provides a detailed overview of the current state, challenges, and future prospects of WPT and AI and offer valuable insights for researchers, engineers and industry professionals. Thie tutorial aims to inspire innovative solutions and drive advancements in efficient, reliable, and sustainable power transfer systems.

**Tutorial 15: High Power DC-DC Converters: Developments and Challenges**
**Date : November 10, 2024 13.00-14.30 PM**

**Organizer:** Professor Khaled H. Ahmed University of Strathclyde, Glasgow, UK

**Biography:**

Prof Khaled Ahmed received the BSc and MSc degrees from Alexandria University, Egypt in 2002 and 2004, respectively. He received the PhD degree in power electronics applications from the Electronic and Electrical Engineering Department, University of Strathclyde, UK, 2008. In 2011, he was appointed as a Lecturer in Power Electronics at the University of Aberdeen, and was promoted to Senior Lecturer in 2015. Currently, He is a Professor of power electronics at the University of Strathclyde (Power Electronics, Drives and Energy Conversion Group). He has over 20 years of research experience in power electronics, renewable energy integration, solar energy systems, off-shore wind energy conversion systems, smart grids, DC/DC Converters and HVDC. He has won funding of £5.2 million as Primary and Co-Investigator on projects funded by EPSRC, the EU, KTP, the British Council, the Royal Society, the Carnegie Trust, the Scottish Funding Council, the Oil and Gas Technology Centre, and industry (Rolls-Royce, Scottish Power, and Scottish and Southern Energy). Recent funding included Orion Project (first Energy Hub in the UK), £630k, funded by BP, Shell, Equinor, Ithica Energy, SIC, and SSE, 2021-2024 and Horizon EU project, 'Reliable and resilient AC & DC grid design to accelerate the integration of renewables across Europe', £560k with 13 international academic and industrial partners 2022-2026 and Neom Ltd Project 'Grid Code Development' £748k, 2022-2023. He has supervised 25 PhD students; 15 have graduated and the others are ongoing. Prof. Ahmed has published over 180 technical papers in refereed journals and conferences, 1 book, 1 book chapter, and a patent (PCT/GB2017/051364). Total citations of 6404 and h-index of 32. Two of his journal papers are rated in the top 1% of those cited in the academic field of Engineering (Web of Science). He has led the design and delivery of continuing professional development (CPD) courses on HVDC, wind energy conversion systems for technology engineering team in Scottish Power, and Scottish and Southern Energy (SSE), UK. He is a senior member of the Institute of Electrical and Electronics Engineers (IEEE) Industrial Electronics and Power Electronics Societies, IET Fellow, Chartered Engineer, and Senior Fellow of Higher Education Academy (HEA). He serves as a Co Editor-in-Chief of Elsevier Alexandria Engineering Journal, and as an Associate Editor of IEEE Open Journal of the Industrial Electronics Society (OJIES), IET Generation, Transmission & Distribution and IEEE Access..

## High Power DC-DC Converters: Developments and Challenges

**Summary:** DC grid is a promising choice for future DC transmission system. It can be defined as a DC transmission network, which includes more than two terminals with at least one meshed DC line. With DC grids there are multiple power-flow paths between two grid terminals. Power flow between two DC grid terminals may not be affected (or partially affected) by tripping a single DC line. DC grids will require some protection technology in order to isolate faulted lines/units allowing remaining part of the grid to continue power transfer. Normally, any number of new terminals can be added to an existing DC grid. It is expected that DC grids will eventually evolve into large meshed networks, which will inevitably have multiple DC voltage levels. A DC-DC converter will be needed in order to connect two DC grids operating at different DC voltage levels. One evident DC-DC application is to connect DC cables (which have DC voltage up to 600 kV) with overhead DC lines, which may have a higher DC voltage. The existing HVDC (high-voltage direct-current) links have wide range of highly optimized DC voltage levels and their possible integration into the DC grid will require DC-DC converters. It is also expected that medium-voltage DC grids, either distribution or collection systems (like those with offshore wind farms) will rapidly develop following acceptance of DC transmission grids, or their connection to DC transmission will require high-stepping ratio DC-DC converters. This role is similar to a transformer function in traditional AC systems. Nevertheless, even in a DC grid with a single nominal DC voltage there might be a need for DC-DC converters in order to regulate the power flow in some cables or DC voltage level at some nodes. These DC-DC converters may have low stepping ratio and perform a similar function to tapchanging transformers and phase-shifting transformers in AC systems. The power flow in DC grids will be primarily controlled using AC/DC converters located at grid terminals (connecting points with external AC grids).

The main objective of the tutorial is to discuss the high power DC-DC converters with clarifying different topologies advantages and disadvantages. The current, future, and challenges of high power DC-DC converters development will be covered. The talk will discuss DC-DC converter operation, control and interactions with DC/AC systems. The connection between VSC (Voltage Source Converter) and LCC (Line Commutated Converter) DC systems will be analysed via DC-DC converters. The tutorial will cover also the latest modular multilevel converter based DC-DC converter topologies. AC and DC faults analysis for different DC-DC converter technologies will be presented. The talk is supported with simulation on MATLAB/SIMULINK software and practical prototype results.

**Tutorial 16: Bidirectional Isolated Dual-Active-Bridge (DAB) Converters: Fundamentals and Applications**

**Date : November 10, 2024 15.00-16.30 PM**

**Organizer:** Professor Hirofumi Akagi Tokyo Institute of Technology, Tokyo, Japan

**Biography:**

Hirofumi (Hiro) Akagi was born and grew up in Okayama, Japan. He received his Ph. D. degree in electrical engineering from the Tokyo Institute of Technology, Tokyo, Japan, in March 1979. Immediately, he joined the Nagaoka University of Technology as Assistant Professor, and then, Associate Professor. He moved to Okayama University as Professor in August 1991. Since January 2000, he has been Professor, currently Distinguished Professor, at the Tokyo Institute ofmTechnology. His research interests include power conversion systems and their applications to industry, transportation, and electric power utility. He has authored and coauthored 148 IEEE Transactions/Journal papers, including three invited papers published in Proceedings of the IEEE. His papers and patents 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 PELS William E. Newel Award, the 2004 IEEE IAS Outstanding Achievement Award, the 2008 IEEE Richard H. Kaufmann Award, the 2012 IEEE PES 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 world's first, 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 two years, and as the IEEE Division II Director from 2015 to 2016 for two years.

## Bidirectional Isolated Dual-Active-Bridge (DAB) Converters: Fundamentals and Applications

**Summary:** This tutorial will begin with a historical review of bidirectional isolated dual-active-bridge (DAB) converters, focusing on circuit and control, with reference 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. 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 a difference of about 20%. 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 unityturns-ratio transformer using a nanocrystalline soft-magnetic material. 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 comprehensive power-loss analysis conducted on the basis of the aforementioned experimental findings, Akagi postulates that the DAB converter will attain an exemplary 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 SiCMOSFET modules and magnetic devices. Such an elevated level of efficiency would permit the elimination of cooling fans, which are regarded as lifespan components, from heat sinks. This tutorial will conclude with an examination of some prospective applications of DAB converters in the near future, including the "solid-state transformer (SST)."

**Tutorial 17: High Power Factor IPMSM Drive System Using Electrolytic Capacitor-less Inverter**

**Date : November 10, 2024 15.00-16.30 PM**

**Organizer:** Professor Kiyoshi Ohishi, Nagaoka University of Technology,Niigata, Japan

**Biography:**

Kiyoshi Ohishi has received the B.E., M.E., and Ph.D. degrees in electrical engineering from Keio University, Yokohama, Japan, in 1981, 1983, and 1986, respectively. His research interests include motion control, mechatronics, robotics and power electronics. Since 1993, he has been with Nagaoka University of Technology, Nagaoka, Japan. He has been a full Professor from 2003 to 2023, a Vice President from 2016 to 2021 and an Executive Director from 2019 to 2021 in Nagaoka University of Technology. Now, he is a Professor Emeritus and an Academia-Industry Researcher of Nagaoka University of Technology and a Specially Appointed Professor of Nagasaki Institute of Applied Science. He is a Fellow Member of IEEE from 2015, whose contributions are the Development of Fast and Robust Motion Control based on Force Sensing Technology. Now, he is an IEEE Life Fellow member. He received the Outstanding Paper Awards at IECON' 85 and Best Paper Awards at IECON' 02, IECON' 04 from the IEEE IES. Moreover, he is a Fellow Member IEEJ from 2016.

## High Power Factor IPMSM Drive System Using Electrolytic Capacitor-less Inverter

**Summary:** Home appliances such as residential air conditioners are based on the variable speed drives for AC motors such as IPMSM and IM. These variable speed drives always require the simple and low-cost system configurations without the large electrolytic capacitors, reactors, and power devices that consist of PFC converters. This tutorial surveys and analyzes the proposed and advanced control techniques to achieve high input power factor and sinusoidal source current control in electrolytic capacitor-less inverters. The investigated control methods consist of control algorithms based on the energy flow between input and output of the electrolytic capacitor-less inverter, and all of them are useful as high-power factor control methods for compressor drive motors such as air conditioners. Moreover, these techniques realize the variable speed drives for AC motors to meet power supply harmonics regulations (IEC61000-3-2).

**Tutorial 18: SiC/GaN power devices and driving technologies brings innovation to high-efficiency energy conversion for RESSs.**

**Date : November 10, 2024 15.00-16.30 PM**

**Organizer:** Mr. Tetsuo Tateishi and Mr. Ryosuke Ishido, ROHM Co., Ltd. Kyoto, Japan

**Biography:**

Tetsuo Tateishi is a Member of the Board and Senior Corporate Officer at ROHM Co., Ltd., where he oversees R&D, IT, Legal & IP, and the LSI Business. He joined ROHM in 2014 as a chief technical manager of the LSI Development Headquarters, where he led the development of cutting-edge analog power technologies. In 2019, he was appointed as a Member of the Board and Director of the LSI Development Headquarters. From 2020 to 2024, he served as the Chief Technology Officer (CTO).

He holds both master's and bachelor's degrees in electronic engineering from Kyoto University, earned in 1987 and 1985 respectively.

**Biography:**

Ryosuke Ishido is a member of System Solutions Engineering Headquarters Organization at ROHM Co., Ltd, where he is assigned to circuit design and application engineering. He received bachelor’s degree in electronic engineering from Kyoto Institute of technology in 2013 and master’s degree in electronic engineering from Kyoto University in 2015.

## SiC/GaN power devices and driving technologies brings innovation to high-efficiency energy conversion for RESSs.

**Summary:** Efforts to achieve carbon neutrality through the use of renewable energy are accelerating around the world. Power generation, energy storage, charging, electrification of mechanical power, and related power systems are being developed and improved, but the silicon semiconductors that have been used for more than 60 years are about to be replaced by new materials (wide-gap semiconductors) in power semiconductors, which are indispensable for promoting power conservation in the power conversion sections of all units. We will introduce silicon carbide (SiC) and gallium nitride (GaN), which are called next-generation power semiconductors, and the drive technologies that drive them. These innovative technologies will bring about technological innovation in the use of renewable energy, greatly accelerating the achievement of carbon neutrality.

**Tutorial 19: An Introduction to the Activities of the Eco-Electricity Research Center of the Aichi Institute of Technology.**

**Date : November 10, 2024 15.00-16.30 PM**

**Organizer:** Professor Kazuto Yukita, Aichi Institute of Technology, Japan

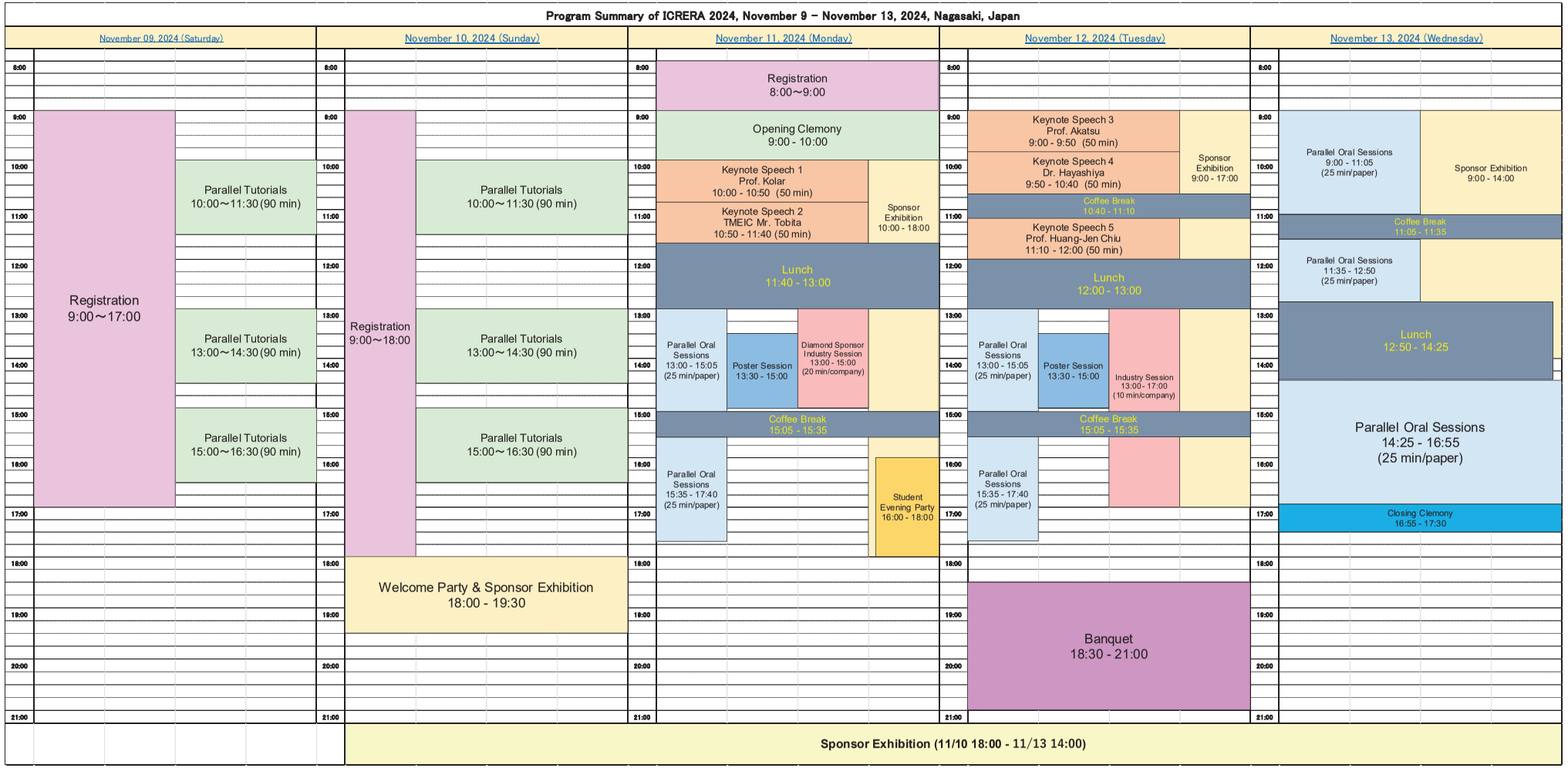
**Biography:**

Kazuto Yukita received D.E. in electrical engineering from Tokai University in 1997. He was an Associate professor at Aichi Institute of Technology. He has been a Professor of Aichi Institute of Technology since 2012. His research interests in include the power system, power engineering, smart/micro grids and DC power technology and distribution.

## An Introduction to the Activities of the Eco-Electricity Research Center of the Aichi Institute of Technology.

**Summary:** The Aichi Institute of Technology Eco-Electricity Research Center was established in 2005. The center conducts research mainly in the field of electricity related to renewable energy. In this session, we would like to introduce some of the research results.

# ICRERA2024_Program at a Glance

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|---|---|---|---|
| **Convention Hall 4** | **Opening Ceremony, Keynote Speeches 1 and 2** | **Convention Hall 1-3** | **Banquet** |
| **Room 105** | **Industrial Sessions** | **Room 102** | **Keynote Speeches 3, 4, and 5, Closing Ceremony** |
| **Event-Exhibition Hall** | **Sponsor Exhibition, Poster Sessions, Student Evening Party, Lunch, Coffee Break** | | |

# CONFERENCE PROGRAM

| Date: November, 09 2024 | | | | | |
|---|---|---|---|---|---|
| 9:00–17:00 | REGISTRATION | | | | |
| TUTORIALS | | TUTORIALS | | TUTORIALS | |
| Room | 105 | Room | 109 | | |
| 10:00-11:30 | TUTORIAL-1 Prof. Yen-Shin Lai, National Taiwan University of Science and Technology, Taiwan **"High efficiency switching control for power converters and motor drives"** | 10:00-11:30 | TUTORIAL-2: Professor Rosario MICHELI, Palermo University, Italy **"Onboard Energy Storage Systems for Rail Vehicles: Challenges and Perspectives"** | | |
| 12:00-13:00 | | | | | |
| TUTORIALS | | | | | |
| Room | 105 | Room | 109 | Room | 110 |
| 13:00-14:30 | TUTORIAL-3 Prof. Hiroo Sekiya Chiba University, Chiba, Japan Prof. Xiuqin WEI Chiba Institute of Technology, Chiba, Japan **"Design of Magnetic Resonance Wireless Power Transfer with Load-Independent Technology"** | 13:00-14:30 | TUTORIAL-4: Prof. Dr. Ing. Youcef SOUFI University Echahid Larbi Tebessi, Algeria **"Smart Grids for green and sustainable energy transition"** | 13:00-14:30 | TUTORIAL-5 Dr. Jason Nye UPCX-Platforms. Seattle, United States **Energizing Change "Unlocking Blockchain's Role in Socially Implementing the Future of Energy"** |
| 14:30-15:00 | | | | | |
| Room | 105 | Room | 109 | | |
| 15:00-16:30 | TUTORIAL-6 Prof. Dr. Nihal Kularatna School of Engineering Teaching and Research University of Waikato, New Zealand **"Supercapacitor Assisted Power Converters and Protection Systems for DC Homes and DC Appliances Based on Renewable Energy"** | 15:00-16:30 | TUTORIAL-7 Dr Nurkhat Zhakiyev, Astana IT University, Kazakhstan **"Modeling of Reneables and Storages in PyPSA and Julia tools: case study for electricity system of Kazakhstan"** | | |

| Date: November, 10 2024 | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9:00–18:00 | REGISTRATION | | | | | | |
| TUTORIALS | | TUTORIALS | | TUTORIALS | | TUTORIALS | |
| Room | 105 | Room | 109 | Room | 110 | Room | 111 |
| 10:00-11:30 | TUTORIAL-8 Dr. Shinzo Tamai Toshiba Mitsubishi-Electric Industrial Corporation (TMEIC), Power Electronics Systems Division, Japan **"PWM Control of Three-Level Neutral Point Clamped Converters for High Power Applications"** | 10:00-11:30 | TUTORIAL-9 Prof. Seref Sagiroglu, Gazi University, Ankara, Turkiye **"AI, Big Data Analytics, Security and Privacy Issues in Smart Energy Systems"** | 10:00-11:30 | TUTORIAL-10 Professor V. Fernao Pires Polytechnic Institute of Setubal, Portugal **"DC Microgrids: Benefits, Architectures, Perspectives and Challenges"** | 10:00-11:30 | TUTORIAL-11 Professor I. Ewean Davidson, Cape Peninsula Univ of Technology, South Africa Dr Elutunji Buraimoh Clemson University, USA **"A Comprehensive Microgrid Test Model Based on IEEE Distribution Test System for Smart Grid Transition Analysis"** |
| 12:00-13:00 | | | | | | | |
| TUTORIALS | | | | TUTORIALS | | | |
| Room | 105 | Room | 109 | Room | 110 | Room | 111 |
| 13:00-14:30 | TUTORIAL-12 Prof. Hirofumi Akagi Tokyo Institute of Technology, Japan **"The Neutral-Point-Clamped Inverter and Instantaneous-Power Theory: How They Emerged in the Early 1980's"** | 13:00-14:30 | TUTORIAL-13 Prof. Yongheng YANG, Zhejiang University in China Dr. Yinxiao ZHU, Zhejiang University in China Prof. Dehong XU, Zhejiang University in China **"Grid-Integration and Beyond for Solar Photovoltaic Systems"** | 13:00-14:30 | TUTORIAL-14 Dr. Mehdi Bagheri Nazarbayev University, Kazakhstan **"Wireless Power Transfer in Offshore and Onshore Applications: Leveraging AI for Enhanced Efficiency"** | 13:00-14:30 | TUTORIAL-15: Prof Khaled H. Ahmed University of Strathclyde, Glasgow, UK **"High Power DC-DC Converters: Developments and Challenges"** |
| 14:30-15:00 | | | | | | | |
| TUTORIALS | | | | TUTORIALS | | | |
| Room | 105 | Room | 109 | Room | 110 | Room | 111 |
| 15:00-16:30 | TUTORIAL-16: Prof. Hirofumi Akagi Tokyo Institute of Technology, Japan **"Bidirectional Isolated Dual-Active-Bridge (DAB) Converters: Fundamentals and Applications"** | 15:00-16:30 | TUTORIAL-17 Prof. Kiyoshi Ohishi, Nagaoka University of Technology,Niigata, Japan **"High Power Factor IPMSM Drive System Using Electrolytic Capacitor-less Inverter"** | 15:00-16:30 | TUTORIAL-18 Mr. Tetsuo Tateishi, ROHM Co., Ltd., Kyoto, Japan Mr. Ryosuke Ishido, ROHM Co., Ltd., Kyoto, Japan **"SiC/GaN power devices and driving technologies brings innovation to high-efficiency energy conversion for RESSs."** | 15:00-16:30 | TUTORIAL-19 Prof. Kazuto Yukita, Aichi Institute of Technology, Japan **"An Introduction to the Activities of the Eco-Electricity Research Center of the Aichi Institute of Technology"** |
| Date: November, 10 2024 | | | | Date: November, 10 2024 | | | |
| 18:00-19:30 | Welcome Party & Sponsor Exhibition | | | | | | |

| Date: November 11, 2024 | |
|---|---|
| **8:00-9:00** | **REGISTRATION** |
| 09:00-10:00 | Opening Ceremony and Speeches at Convention Hall 4:<br>- Honorary Chair Mr. Yoshinobu Higasi<br>- Honorary Chair Mr. Hidehiko Kikuchi<br>- General Chair Prof. Fujio Kurokawa<br>- Nagasaki Governor Mr. Kengo Oishi<br>- Nagasaki Mayor Mr. Shiro Suzuki<br>- Chairperson of Kyushu Electric Power Co.,INC. Mr. Michiaki Uriu<br>- General Co-Chair Prof. Ilhami Colak<br><br>**Chairs: Professor Nobumasa Matsui, Professor Yuichiro Shibata** |
| **KEYNOTE at Convention Hall 4** | |
| 10:00-10:50 | **Speaker: Professor Dr. Johann Walter Kolar**<br>**Next-Generation SiC/GaN Variable Speed Drive Systems — "How to Handle a Double-Edged Sword"**<br><br>**Chairs: Professor Fujio Kurokawa, Professor Rosario Miceli** |
| **KEYNOTE at Convention Hall 4** | |
| 10:50-11:40 | **Speaker: Mr. Masayuki Tobita**<br>**Power Electronics Contribution to Achieving Carbon-Neutral Society**<br><br>**Chairs: Professor Dr. Kan Akatsu, Dr. Khaled Ahmed** |
| 11:40-13:00 | **LUNCH** |

## Date: November 11, 2024

| ORAL PRESENTATIONS | | | | ORAL PRESENTATIONS | | | |
|---|---|---|---|---|---|---|---|
| OS 1: Recent research on Hydrogen Energies -From Hydrogen Generation to Its Use-<br>CHAIRS: Nobukazu Hoshi, Idit Avrahami | | OS 2: Emerging Technologies for Power Electronics Reliability: Online Monitoring and EMI, Heat, and Loss Reductions<br>CHAIRS: Hidemine Obara, Hirohito Funato | | OS 3: Energy Engineering in Renewable Energy, Electronics, and Communications -Power Converters for Grid Network-<br>CHAIRS: Hiroo Sekiya, Yu Yonezawa | | OS 4: Decarbonization Initiatives in the Railway Field<br>CHAIRS: Kota Minaminosono, Yanbo Wang | |
| **Room** | **101A** | **Room** | **101B** | **Room** | **101C** | **Room** | **102** |
| **13:00-13:25** | **ID:415 A Novel Micro-reactor For Hydrogen Production From Solid Nabh4 Hydrolysis**<br>Idit Avrahami (Ariel University), Allex Schechter (Ariel University) | **ID:337 Design and Evaluation of a Control Scheme for the Hybrid Cascaded Converter based STATCOM with Greatly Reduced Switching Losses**<br>Yu-Chen Su (National Tsing Hua University)*; Po-Tai Cheng (National Tsing Hua University) | | **ID:354 Numerical Analysis of Instability in a Power Grid with Multiple Grid-Forming Inverters**<br>Kouki Matsumoto (Kyoto University)*; Yoshihiko Susuki (Kyoto University) | | **ID:73 Load Identification Method of Urban Rail DC Traction Power Supply System**<br>Yan Li (Beijing jiaotong university)*; Zhongping Yang (Beijing jiaotong university); Fei Lin (Beijing jiaotong university); Hu Sun (Beijing jiaotong university) | |
| **13:25-13:50** | **ID:400 Current Situation and Issues of Hydrogen Generation System Fueled by Sodium Borohydride**<br>Moeko Kaku (Tokyo University of Science)*; Nobukazu Hoshi (Tokyo University of Science) | **ID:374 Conducted emission voltage reduction for multi-cell SST with current-type ACC**<br>Okura Atsutoshi (Nagaoka University of Technology)*; Hiroki Watanabe (Nagaoka University of Technology); Yuku Nakata (Nagaoka University of Technology); Jun-ichi itoh (Nagaoka University of Tec.) | | **ID:358 Cell balance control method for on-board chargers with multi-level configurations for PFC and LLC converters**<br>Susumu Ohba (Shindengen Electric Mfg. co., ltd)* | | **ID:419 Renewable Microgrid Technology for Electrified Transportation: A Review**<br>Yuyang Wan (Aalborg University); Yanbo Wang (Aalborg University)*; Pengcheng Han (Southwest Jiaotong University); Xiaoqiong He (Southwest Jiaotong University); Zhe Chen (Aalborg university) | |
| **13:50-14:15** | **ID:397 Experimental Verification of Model Reference Adaptive Control for Hydrogen Engine Generator System Fueled by Sodium Borohydride**<br>Tomoki Ono (Tokyo University of Science)*; Nobukazu Hoshi (Tokyo University of Science) | **ID:412 Diode-Clamped Linear Amplifier using Only n-channel MOSFETs Applied Separated Gate Drivers**<br>Tomoya Sasanuma (Utsunomiya University)*; Shuto Yagawa (Utsunomiya University); Hirohito Funato (Utsunomiya University) | | **ID:373 New Power Sharing Algorithm for Bi-directional Converter in AC/DC Hybrid Microgrid**<br>Rutvika Manohar (Mitsubishi Electric)* | | **ID:363 Consideration of Hydrogen Utilization By Using Railway Assets**<br>Makoto Chida (West Japan Railway Company), Haruna Hiramatsu (West Japan Railway Company) | |
| **14:15-14:40** | **ID:164 Automated Determination of Equivalent Circuit Models for Electrochemical Systems Using EIS and Machine Learning**<br>Motoya Furugori (Tokyo University of Science)*; Noboru Katayama (Tokyo University of Science) | **ID:369 Experimental Validation of H-Bridge Modular Cascaded Linear Amplifier Comprising Six Cells with 95.0% Efficiency**<br>Shunsuke ishida (Yokohama National University); Hidemine Obara (Yokohama National University)* | | **ID:360 Maximum Power Transfer of Piezoelectric Element in Vibration Power Generation System**<br>Hiroaki Yamada (Yamaguchi University)*; Naotaka Nakahigashi (Yamaguchi University) | | **ID:385 Development for Energy-efficient Railway Utilizing Wayside Energy Storage System towards Future Sustainable Society**<br>Hiroyasu Kobayashi (Chiba University)*; Yusuke ichinose (Chiba University); Daisuke Miyagi (Chiba University) | |
| **14:40-15:05** | **ID:352 Development of light-duty commercial vehicle powered by fuel cell (FCEV) in Tokyo R&D**<br>Nobuhiko Okawa (TokyoR&D)* | **ID:382 Accurate ESR Monitoring of a DC-Link Capacitor with Switching Ripple Voltage by a Leafony**<br>Yusaku Ogawa (Kyushu institute of Technology)*; Takuma Yamasoto (Kyushu institute of Technology); Kazunori Hasegawa (Kyushu institute of Technology) | | **ID:449 Variable Off-time Control for Mixed Conduction Mode Boost PFC Converter**<br>Jizhe Wang (Fukuoka University), Tadashi Suetsugu (Fukuoka University), Fujio Kurokawa (Nagasaki Institute of Applied Science) | | **ID:447 Recent Energy-saving Technologies For Railway Traction Systems**<br>Soya Kawasaki (Waseda university) | |
| **15:05-15:35** | **COFFEE BREAK** | | | | | | |

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| ORAL PRESENTATIONS | | | | ORAL PRESENTATIONS | | | |
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| OS 5: Ocean Renewable Energy and Smart Fishery<br>CHAIRS: Daisaku Sakaguchi, Kazuhiko Matsuoka | | SESSION 1<br>CHAIRS: Keiji Wada, Takanori Isobe | | SESSION 2<br>CHAIRS: Masanari Kimura, Takeo Hyodo | | SESSION 3<br>CHAIRS: Zhanying Hou, Ghiffari A. M. Nasution | |
| **Room** | **103** | **Room** | **104** | **Room** | **107** | **Room** | **108** |
| **13:00-13:25** | **ID:377 Estimation of the Technical Resource for Tidal Stream Energy in South-West Japan**<br>Patxi Garcia Novo (Nagasaki University)*; Simon Waldman (Heriot-Watt University); Yusaku Kyozuka (Nagasaki University); Daisaku Sakaguchi (Nagasaki University) | **ID:151 Determination on Equivalent Circuits and Parameters from Impedance Characteristics Using Brute Force**<br>Ryoma iki (Tokyo University of Science)*; Noboru Katayama (Tokyo University of Science) | | **ID:165 An Investigation of Frequency Control by Grid Side Converter of PMSG-based Wind Turbine Generator**<br>Masaya Inoue (Sophia University)*, Orie Sakamoto (Sophia University) | | **ID:266 Optimal Operation of Convenience Store with Electric Vehicle and Cooling Model Heat Pump**<br>Shinya Yamamoto (University of the Ryukyus)*; Akie Uehara (University of the Ryukyus); Hiroshi Takahashi (Fuji Electric Co., Ltd.); Edward Randolph Collins (Clemson University); Shriram Srinivasarangan Rangarajan (Clemson University); Tomonobu Senjyu (University of the Ryukyus) | |
| **13:25-13:50** | **ID:379 Development of Bidirectional DC/DC Converter for Energy Storage with Mixed Power Generations**<br>Shin-ichi Hamasaki (Nagasaki University)*; Tetsuji Daido (Nagasaki University); Kazuaki Miyamoto (Nagasaki University) | **ID:152 Edge-Side Data Squashing and Metric Learning for Energy Prosumer Clustering: Toward Parameter Optimization of Residential Photovoltaic Inverters**<br>Nanae Kaneko (Waseda University)*; Yu Fujimoto (Waseda University); So Takahashi (Waseda University); Akihisa Kaneko (Waseda University); Yutaka iino (Waseda University); Yasuhiro Hayashi (Waseda University) | | **ID:173 Forward Active Clamp High Step-Down Converter**<br>Chien-Ming Chen (National Cheng Kung University); Jen-Hung Wang (Department of Electrical Engineering National Cheng Kung University)*; Che-Wei Hsu (National Cheng Kung University); Jiann-Fuh Chen (National Cheng Kung University) | | **ID:271 Fast and Stable Current Control using Deadbeat PI Control with Smith Compensator**<br>Motomichi itoyama (Chiba University)*; Kenji Natori (Chiba University); Yukihiko Sato (Chiba University) | |
| **13:50-14:15** | **ID:386 Optimized Design Search of Tidal Turbine with Low Cut-in Speed for Energy Harvesting Smart Buoys**<br>Ngome Adam Mwero (Nagasaki University)*; Reiko Yamada (Nagasaki University); Patxi Garcia Novo (Nagasaki University); Yusaku Kyozuka (Nagasaki University); Daisaku Sakaguchi (Nagasaki University) | **ID:157 Integration of Solar PV with Existing Grid System to Test a Ni-Cd Battery Set for Railway Applications**<br>JiTESH KUMAR SAPAWAT (SOPHiA UNiVERSiTY)*; MASAFUMi MiYATAKE (SOPHiA UNiVERSiTY) | | **ID:174 Enhanced Virtual Power Plant Generation Forecasting in Japan Using Fuzzy Decision Support and Bidirectional Long Short-Term Memory Models**<br>Reza Nadimi (Institute of Science Tokyo)*; Mika Goto (Institute of Science Tokyo) | | **ID:249 MPC-based Optimal Operation of Smart City Considering Multi Energy Storage**<br>Takuma ishibashi (University of the Ryukyus)*; Akie Uehara (University of the Ryukyus); Narayanan Krishna (SASTRA Deemed University); Ashraf M. Hemeida (Aswan University); Hiroshi Takahashi (Fuji. electric Co., Ltd.); Tomonobu Senjyu (University of the Ryukyus) | |
| **14:15-14:40** | **ID:395 A smart buoy-integrated antenna for monitoring tidal power turbines**<br>Takafumi Fujimoto (Nagasaki University)*; Chai-Eu Guan (Nagasaki University); Kaisei inoue (Nagasaki University); Yoko Yaemura (University of Nagasaki) | **ID:255 Unlocking The Potential of Vehicle-grid Integration (vgi) In Japan: Challenges, Opportunities, and Future Directions**<br>ZHANG CHENGQUAN (Tokyo Institute of Technology), HIROSHI KITAMURA (NEC Corporation), MIKA GOTO (Tokyo Institute of Technology) | | **ID:176 Wide-Range Temperature Environment Testing for Power Converters and Their Components between +40°C and -40°C**<br>Turmandakh Bat-Orgil (Tokyo Metropolitan University)*; Ryosuke Ota (Tokyo Metropolitan University); Keiji Wada (Tokyo Metropolitan University) | | **ID:273 A Dynamic Visualization Simulator for Power Device Behavior in Power Converter Circuits**<br>Koichi Domoto (Tokyo Metropolitan University)*; Keiji Wada (Tokyo Metropolitan University); Shin-ichiro Hayashi (Chiba institute of Technolgy) | |
| **14:40-15:05** | **ID:394 Energy and Labor Saving In A Smart Fishery At Coast**<br>Kazuhiko MATSUOKA (Nagasaki Institute of Applied Science) | **ID:70 Trends In The Electric Vehicle Charging Stations and Spatial Distribution By Charger Type In Fukuoka**<br>Dongki Hong (Kyushu University) | | **ID:178 Nonlinear Load Feedforward Compensation for Dual-Output LLC Resonant Converter based on Bang-Bang Charge Control**<br>Guan-Ling Chen (National Taiwan University)*; Yuan-Chih Lin (National Taiwan University); ching-jan chen (National Taiwan University) | | **ID:279 A Hybrid Quantum-Classical Machine Learning Approach to Offshore Wind Farm Power Forecasting**<br>Batuhan Hangun (Yildiz Technical University)*; Emine Akpinar (Yildiz Technical University); Murat Oduncuoglu (Yildiz Technical University); Oguz Altun (Yildiz Technical University); Onder Eyecioglu (Bolu Abant izzet Baysal University) | |
| **15:05-15:35** | **COFFEE BREAK** | | | | | | |

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| ORAL PRESENTATIONS | | | | | |
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| **SESSION 4**<br>**CHAIRS: Hiroshi Takami, Yoshiki Matsunaga** | | **SESSION 5**<br>**CHAIRS: Maik Plenz, Andreas Stadler** | | **SESSION 6**<br>**CHAIRS: Soichiro Ueda, Rami A AL-HAJJ** | |
| **Room** | **109** | **Room** | **110** | **Room** | **111** |
| **13:00-13:25** | **ID:80 Harmonics Analysis and Evaluation for Active LC-LPF attached PMSM Drive by IRM-ILQ Control through Experiments**<br>Kazuki Abe (Shibaura institute of Technology)*; Yoshiki Sasaki (Shibaura institute of Technology); Hiroshi Takami (Shibaura institute of Technology); Fuminori ishibashi (Shibaura institute of Technology); Koji Shibasaki (Maruwa Electronic inc.); Takumi Ebara (Maruwa Electronic inc.) | **ID:92 Secure Identities for Renewable Energy Sources through Self-Sovereign Identity and Attribute-Based Access Control**<br>Moritz Volkmann (Hamburg University of Applied Sciences)* | | **ID:113 Optimization Method for Power System of a Clinic Integrating Diesel Generator and Electric Vehicles**<br>Tomoya inagata (Nagasaki institute of Applied Science)*; Yuji Mizuno (Osaka Electro-Communication University); Jiyoung Choi (Nagasaki institute of Applied Science); Kouki Kawaoka (Nagasaki institute of Applied Science); Fujio Kurokawa (Nagasaki institute of Applied Science); Nobumasa Matsui (Nagasaki institute of Applied Science) | |
| **13:25-13:50** | **ID:81 Control of a Simple High-Frequency Isolated Single-Phase AC-DC Converter**<br>Shintaro Hamada (Nagoya institute of Technology)*; Kohei Budo (Gifu University); Wataru Kitagawa (Nagoya institute of Technology); Takaharu Takeshita (Nagoya institute of Technology) | **ID:100 Simplified Equivalent Circuit Model for Battery Energy Storage System Used for Grid Frequency Response**<br>Sandro Sitompul (Hitachi, Ltd.)*; Masachika Nakatani (Hitachi, Ltd.); Tomoyuki Hatakeyama (Hitachi, Ltd.) | | **ID:115 Stability Analysis of Speed Control Systems for Variable Speed Wind Power Generation Systems Using SRG and Capacitor-less AC-AC Converters**<br>HAOZHENG JiA (Fukuoka institute of Technology)*; Ohyama Kazuhiro (Fukuoka institute of Technology) | |
| **13:50-14:15** | **ID:82 Development of an Efficient Charging Control System for Pico-Hydro Power Generation Utilizing Multiple Impact Water Wheel (MIWW) with MPPT Control**<br>Yusuke Asami (Shibaura institute of Technology)*; Hiroshi Takami (Shibaura institute of Technology); Fuminori ishibashi (Shibaura institute of Technology); Shota Kawate (Koa Electronics Co., Ltd.); Hidemi Kurita (institute of Natural Harmony Technology); Masaki Shimizu (Souken Group) | **ID:106 A Low-Carbon Charging Operation Planning Approach for Electric Buses**<br>Haruka Nakano (Waseda University)*; Yu Fujimoto (Waseda University); Nanae Kaneko (Waseda University); Soma Sugano (Waseda University); Wei-Hsiang Yang (Waseda University); Yuto ihara (Waseda University); Yasuhiro Hayashi (Waseda University) | | **ID:120 A Proposal of Speed Sensorless Control Based on IRM-ILQ Control for SPMSM Drive with Active LC Filter**<br>Ryoki Mikami (Shibaura institute of technology)*; Kazuki Abe (Shibaura institute of Technology); Hiroshi Takami (Shibaura institute of Technology); Fuminori ishibashi (Shibaura institute of Technology) | |
| **14:15-14:40** | **ID:68 Solar Energy Forecasting Using Ensemble Learning Method**<br>BetUl ERSOZ (Gazi University)*; Muhammed Cafer TaSdelen (Gazi Univesity); Sueda Eren (Gazi University); Seref SAGiROGLU (Gazi University); Ali Oter (KSU Elektronik ve Otomasyon BOlUmU) | **ID:107 Multi-Objective Load Scheduling Optimization of Cost, Renewable Energy Utilization, and Load Balance Using a Genetic Algorithm**<br>Madhu Brahmankar (National Central University)*; Cheng-i Chen (National Central University) | | **ID:134 Control Strategy for Reducing Second Harmonic Current and Enhancing Transient Response in Bidirectional V2X Systems**<br>Zhongwei Guo (Shindengen Electric Mfg. Co., Ltd.)*; Takayuki Kobayashi (Shindengen Electric Mfg. Co., Ltd.); Takashi Kinoshita (Shindengen Kumamoto Technoresearch Co., Ltd.) | |
| **14:40-15:05** | **ID:85 A Proposal of Optimal Current Control for Three-Phase Grid-Connected Inverter with LCL-Filter via IRM-ILQ Method**<br>Ryo Takahashi (Shibaura institute of Technology)*; Kazuki Abe (Shibaura institute of Technology); Hiroshi Takami (Shibaura institute of Technology); Fuminori ishibashi (Shibaura institute of Technology) | **ID:112 A Personalized Federated Learning Scheme for Operational Parameter Determination of PV Smart Inverters**<br>Yu Fujimoto (Waseda University)* | | **ID:304 Energy Management Strategies for Hybrid Electric Vehicles**<br>Cem Demiroglu (Aselsan inc.); Korhan KAYiSLi (Gazi University)* | |
| **15:05-15:35** | **COFFEE BREAK** | | | | |

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| ORAL PRESENTATIONS | | | | ORAL PRESENTATIONS | | | |
|---|---|---|---|---|---|---|---|
| OS 6: Integrated Technologies of Circuit, Device, and Control for High-Performance Solid State Transformers (SSTs)<br>CHAIRS: Keiji Wada, Takanori Isobe | | OS 7: Green Chemistry & Carbon Neutralization<br>CHAIRS: Masanari Kimura, Takeo Hyodo | | SESSION 7<br>CHAIRS: Hiroo Sekiya, Yu Yonezawa | | SESSION 8<br>CHAIRS: Kota Minaminosono, Yanbo Wang | |
| Room | 101A | Room | 101B | Room | 101C | Room | 102 |
| 15:35-16:00 | **ID:416 Solid-State Transformers Connected to 6.6-kV Distribution System in Japan**<br>Keiji Wada (Tokyo Metropolitan University)*; Ryosuke Ota (Tokyo Metropolitan University); Yuto Saito (Tokyo Metropolitan University) | **ID:332 Highly Sensitive Hydrogen-Sensing Characteristics of Diode-Type Gas Sensors at Elevated Temperatures**<br>Takeo Hyodo (Nagasaki University)*; Takahiro Kurano (Nagasaki University); Misaki Hamano (Taiyo Nippon Sanso Corporation); Yasuhiro Shimizu (Nagasaki University); Taro Ueda (Nagasaki University) | | **ID:232 Comparative Analysis of The Control Algorithms for The Capacitor Charging Power Supplies**<br>Furkan Demirbas (Gazi University); Korhan KAYiSLi (Gazi University)*; Nurkhat K Zhakiyev (Astana iT University) | | **ID:138 Impact Analysis of Sea Environment on Capacitive Power Transfer Systems: Equivalent Circuit Parameters and Performance Analysis**<br>Adilkhan Kapanov (Nazarbayev University)*; Seyed Saeid Heidari Yazdi (Nazarbayev University); Sadjad Shafiei (Nazarbayev university); Askat Kural (Nazarbayev University); Mehdi Bagheri (Electrical and Computer Engineering Department, Nazarbayev University) | |
| 16:00-16:25 | **ID:384 Design and Material Choice of High Frequency Transformers for Solid State Transformer**<br>Kan Akatsu (Yokohama National University)* | **ID:350 Advancements in Carbon and Hydrogen Recycling Systems at Nagasaki University**<br>Masanari Kimura (Nagasaki University)* | | **ID:69 Roles of PV+Storage at Community Centers in Achieving A Level of Distribution Network Resilience After Extreme Weather Conditions**<br>Zhihua Qu (University of Central Florida); Bo Tu (University of Central Florida)* | | **ID:194 Impacts of the Sampling Interval of Economic Load Dispatching Control on the Performance of Automatic Generation Control**<br>Reo Yamaguchi (Aichi institute of Technology)* | |
| 16:25-16:50 | **ID:417 Design Consideration of Mmc-based Ac-dc Converter With 3.3 Kv Sic-mosfets For Ssts**<br>Hidemine Obara (Yokohama National University), Yuki Okamura (Yokohama National University) | **ID:366 Reductive Conversion of Small Molecules on Transition Metal Complexes**<br>Yasuhiro Arikawa (Nagasaki University)*; Kenichiro Omoto (Nagasaki University); Eri Sakuda (Nagasaki University); keisuke Umakoshi (Nagasaki University); Motoki Yamada (Nagasaki University) | | **ID:74 Experimental Harmonic Evaluation for Induction Motor Drive with Active LC Low-Pass-Filter via IRM-ILQ Control**<br>Yoshiki Sasaki (Shibaura institute of Technology)*; Kazuki Abe (Shibaura institute of Technology); Okado Hiromu (Shibaura institute of Technology); Hiroshi Takami (Shibaura institute of Technology); Fuminori ishibashi (Shibaura institute of Technology); Masashi Nakamura (Toshiba Mitsubishi-Electric industrial Systems Corporation); Toshiaki Oka (Toshiba Mitsubishi-Electric industrial Systems Corporation) | | **ID:196 Optimizing Solar Flat Plate Collector Performance with Pebbles as Thermal Mass in Arid Climate Conditions**<br>KASHiF iRSHAD (Center of Research Excellence in Renewable Energy (CoRE-RE) King Fahd University of Petroleum and Minerals)*; Mohammad Uzair (Aligarh Muslim University ); Shafiqur Rehman (King Fahd University of Petroleum and Minerals & Research institute) | |
| 16:50-17:15 | **ID:443 Design and Control Strategy of Dab Converter With 3.3 Kv Sic-mosfets For Ssts**<br>Takanori Isobe (University of Tsukuba), Cheng Huang (University of Tsukuba), Tomoyuki MANNEN (University of TSUKUBA) | **ID:387 Designing of CO2 Adsorbent for a Pressure-temperature Swing Adsorption Process**<br>Koki Urita (Nagasaki University)* | | **ID:142 Household energy management under incentive-based and price-based DR considering electricity charges**<br>Ryo Tanimoto (NTT DOCOMO, iNC.)*; Masaki Nakamura (NTT DOCOMO, iNC.) | | **ID:198 Prevention Oscillatory False Triggering of Two Paralleled GaN-HEMTs by Optimization Parasitic Capacitance and Common-Source Inductance**<br>Ryoma Yoshida (Okayama University)*; Eiji Hiraki (Okayama University); Kazuhiro Umetani (Okayama University); Masataka ishihara (Okayama University) | |
| 17:15-17:40 | **ID:444 Fault-Ride-Through Operation of Solid-state-Transformer Equipped with Ultra Small Capacitors in H-Bridge Cells**<br>Tomoyuki MANNEN (University of TSUKUBA)* | **ID:409 Fault-Tolerant Fixed-Time Super Twisting Control for Quadrotors with Disturbances**<br>Ferhat Bodur (Gazi Universty); Orhan KAPLAN (Gazi University)* | | **ID:67 Performance Analysis and Optimization of Vapor Injection Refrigeration Cycle**<br>Jidong Li (Beihang University)*; Maolin Cai (Beihang university); Weiqing Xu (Beihang university); Guanwei Jia (Henan University) | | **ID:159 A Study on the Compensation Calculation Model for Utilizing Residential Storage Batteries to Alleviate Grid Congestion**<br>Satoshi izumiya (KYOCERA Corporation)*; Takashi Furukawa (KYOCERA Corporation); Kenta Okino (KYOCERA Corporation) | |

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| ORAL PRESENTATIONS | | | | ORAL PRESENTATIONS | | | |
|---|---|---|---|---|---|---|---|
| | | OS 8: Robots & Mobility with Sustainable Energy Systems<br>CHAIRS: Takahiro Suzuki, Masanori Sato | | SESSION 9<br>CHAIRS: Nobukazu Hoshi, Idit Avrahami | | SESSION 10<br>CHAIRS: Motomichi Itoyama, Halil Ibrahim Bulbul | |
| Room | 103 | Room | 104 | Room | 107 | Room | 108 |
| 15:35-16:00 | | **422: Development of an AI-based detection system for cherry tomato skin splitting and cracking**<br>Masanori Sato (Nagasaki Institute of Applied Science)*; Zhaohui Tan ( Nagasaki Institute of Applied Science); Takahiro Naruse (Nagasaki Institute of Applied Science); Masaharu Tanaka (Nagasaki Institute of Applied Sciece); Ryuki Ogawauchi (Nagasaki Agriculture and Forestry Technical Development Center); Riho Tasaki (Nagasaki Agriculture and Forestry Technical Development Center) | | **ID:182 Efficiency and Accuracy for Partial Shading Detection in Series-Parallel Configuration of Photovoltaic Generation Systems**<br>Han-Cheng Wu (National Sun Yat-sen University); Chun-Wei Cheng (National Sun Yat-sen University); Jen-Hao Teng (National Sun Yat-sen University)* | | **ID:93 Evaluation of Phase Shift Application in Bidirectional Chopper with Single-Cell Auxiliary Full-Bridge Converter**<br>Ghiffari A. M. Nasution (institute of Science Tokyo)*; Makoto Hagiwara (institute of Science Tokyo) |
| 16:00-16:25 | | **ID:425 Applications of Image Recognition Using Deep Learning and Its Challenges**<br>Kosei Yamasaki (Nagasaki Institute of Applied Sciece), Masaharu Tanaka (Nagasaki Institute of Applied Sciece)* | | **ID:189 Performance Optimization Strategies for Totem Pole PFC Under Light Load DCM Operation**<br>yu chen liu (National Taipei University of Technology, Taipei Tech)*; TZU CHiEH HSU (National Taipei University of Technology, Taipei Tech) | | **ID:333 Design and Control of a Two Switch Forward Converter with Supertwisting Sliding Mode**<br>Korhan KAYiSLi (Gazi University)*; Ruhi Zafer Caglayan (TED University); Resul COteli (Firat University); Mariacristina Roscia (Universita di Bergamo); Harrouz Abdelkader (Department of Hydrocarbon and Renewable Energy, Laboratory (LEESi), University of Adrar, Algeria); Abdelhakim Belkaid (Bejaia University) |
| 16:25-16:50 | | **448: Sustainable EV system for next-generation reginal society**<br>Takahiro Suzuki (Reitaku University)* | | **ID:125 Benchmarking of existing and new technologies in hydrogen value chain and related business models**<br>Mariapia Martino (Denerg - Politecnico di Torino)*; Massimo Santarelli (Politecnico di Torino); Evren Unsal (Shell Global Solutions international BV) | | **ID:411 A Brief Overview of Future Mobility and Energy Management Strategies with Vehicle-to-Everything (V2X) Concept on Smart Grid**<br>ilhami Colak (istinye University); Erdal irmak (Gazi University)*; izviye Fatimanur Tepe (Gazi University) |
| 16:50-17:15 | | **ID:426 Challenge To Build Sustainable Goto Islands**<br>Ichiro Masaki (Masaki Shoten Ltd.) | | **ID:315 SOC-Based Mode Switching in Hybrid Battery Systems for Electric Motorcycles**<br>Momoe Sakai (Nagoya institute of Technology)*; Takaharu Takeshita (Nagoya institute of Technology) | | **ID:265 Magnet Temperature Detection of PMSM with Wireless Power Transfer**<br>Ryo Hamba (Nagaoka University of Technology)*; Keisuke Kusaka (Nagaoka University of Technology); Yoshihisa Hojo (Toyo Denki Seizo K.K.) |
| 17:15-17:40 | | | | **ID:163 Prediction from 3D Pictogram Drawing using AR technology for Digital Twin**<br>Kaoru Mitsuhashi (Teikyo University)* | | **ID:27 Research on Short-Term Wind Power Prediction Based on an ICEEMDAN-FullLinear-TSMixer-CNN Combined Model**<br>Zhanying Hou (Beihang university); Weiqing Xu (Beihang university)*; Guanwei Jia (Henan University); Maolin Cai (Beihang university) |

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| ORAL PRESENTATIONS | | | | | |
| SESSION 11<br>CHAIRS: Kazuki Abe, Yusuke Asami | | SESSION 12<br>CHAIRS: Moritz Volkmann, Madhu Brahmankar | | SESSION 13<br>CHAIRS: Tomoya Inagata, Zhongwei Guo | |
| Room | 109 | Room | 110 | Room | 111 |
| 15:35-16:00 | **ID:214 SOLARUX WIRELESS MESH NETWORKS and APPLICATION for MONITORING PHOTOVOLTAIC SYSTEMS**<br>OzgU iNCESU (Dokuz Eylul University)*; Evren M Toygar (Dokuz Eyll University); Tufan Bayram (Solarux Alternative Energy Systems) | **ID:221 Mitigating Grid Peaks in E-Mobility Charging**<br>Maik Plenz (Helmut-Schmidt University)*; Andreas Stadler (Helmut Schmidt University); Detlef Schulz (Helmut Schmidt University) | | **ID:241 Energy Management of Aquaculture Considering Load Unit Commitment Under Different Contract Power**<br>Soichiro Ueda (University of the Ryukyus)*; Jane Wambui Chege (University of the Ryukyus); Takuma ishibashi (University of the Ryukyus); Shinya Yamamoto (University of the Ryukyus); Akie Uehara (University of the Ryukyus); Tomonobu Senjyu (University of the Ryukyus) | |
| 16:00-16:25 | **ID:217 Improvement of Power Efficiency of Stirling Engine Power Supply Vehicle Based on Temperature Control**<br>Yan Zhao (Shibaura institute of Technology)*; Jingfan Zhang (Shibaura institute of Technology); Masashi Monoro (Shibaura institute of Technology); Hiroshi Takami (Shibaura institute of Technology) | **ID:408 Eco-Friendly Energy Storage Systems based Demand Side Management for Rural Microgrid by Dandelion Optimization Algorithm**<br>izviye Fatimanur Tepe (Gazi University); Mehmet Demirtas ("Faculty of Technology, Gazi University"); Erdal irmak (Gazi University)*; Ramazan Bayindir (Gazi University) | | **ID:246 A Wind Speed Interval Prediction Framework based on Machine Learning Models and Kernel Density Estimation Method**<br>Rami A AL-HAJJ (American University of the Middle East)*; Gholamreza OsKrochi (American University of the Middle East); ALi ASSi (SMiEEE – Renewable Energy); Mohamad Fouad (Mansoura University); ilhami Colak (istinye University) | |
| 16:25-16:50 | **ID:218 Digitally Controlled Peak Current Mode DC-DC Converter for Plasma Thruster in Satellite System**<br>Yoshiki Matsunaga (Japan Aerospace Exploration Agency)*; Kazuhiro Kajiwara (Nagasaki institute of Applied Science); Fujio Kurokawa (Nagasaki institute of Applied Science) | **ID:311 The Impact of LCL Filter on the Crest Factor in Hybrid Power Systems**<br>Emre Tunç (Bolu Abant Izzet Baysal University), Murat Fidan (Bolu Abant Izzet Baysal University), Erdal Bekiroglu (Gazi University), Halil İbrahim Bülbül (Gazi University) | | **ID:247 Analysis on Subsynchronous Oscillation of a Multi-Loop Grid Forming Converter**<br>Yasuaki Mitsugi (The University of Tokyo)*; Jumpei Baba (The University of Tokyo) | |
| 16:50-17:15 | **ID:219 LVRT performance improvement of a PV power plant for asymmetric faults**<br>Yoshihiro Tawada (TMEiC)*; Shivalika Sharma (TMEiC Japan); Yamabe Kenta (TMEiC); Ruben inzunza (TMEiC); Yasuaki Mitsugi (TMEiC) | **ID:236 A High-Frequency Flying-capacitor Linear Amplifier for Wireless Power Transfer Systems**<br>Shunsaku Nomoto (Nagaoka University of Technology)*; Keisuke Kusaka (Nagaoka University of Technology) | | **ID:248 Loss of Grid Behavior for a Grid Forming ESS Inverter**<br>Shivalika Sharma (TMEiC Japan)*; Ruben inzunza (TMEiC); Umeno Chieko (TMEiC Corporation); Yasuaki Mitsugi (TMEiC); Daisuke Kanda (TMEiC Corporation); Kenta Yamabe (TMEiC Corporation) | |
| 17:15-17:40 | **ID:209 Design of High-Frequency Single-Input Multiple-Output Wireless Power Transfer System with Parasitic Capacitance of Coupled Coils**<br>Tomoya Akasaka (Chiba institute of Technology)*; Xiuqin Wei (Nil) | **ID:220 Fleet Characteristics Analysis for the Generation of a Generic Commercial Fleet Model**<br>Andreas Stadler (Helmut Schmidt University)*; Maik Plenz (Helmut-Schmidt University); Detlef Schulz (Helmut Schmidt University) | | **ID:240 High Frequency Half-Bridge Resonant Converter with Synchronous Rectification for High Input Voltage Applications**<br>Pin-Xiang Huang (National Cheng-Kung University); Tsorng-Juu Liang (National Cheng-Kung University); Kai-Hui Chen (National Cheng-Kung University)* | |

| Date: November 12, 2024 | |
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| KEYNOTE at Room 102 | |
| 9:00-9:50 | **Speaker: Professor Dr. Kan Akatsu**<br>**High performance motor drive techniques by multiple inverters**<br><br>**Chairs: Professor Kiyoshi Ohishi, Dr. Mehdi Bagheri** |
| KEYNOTE at Room 102 | |
| 9:50-10:40 | **Speaker: Dr. Hitoshi Hayashia**<br>**Trends of challenges to zero carbon by railway companies in Japan**<br><br>**Chairs: Professor I. Ewean Davidson, Professor Seref Sagiroglu** |
| 10:40-11:10 | COFFEE BREAK |
| KEYNOTE at Room 102 | |
| 11:10-12:00 | **Speaker: Prof. Dr. Huang-Jen Chiu**<br>**High Power Density and High Frequency Converter Design**<br><br>**Chairs: Professor Nihal Kularatna, Professor V. Fernao Pires** |
| 12:00-13:00 | LUNCH |

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| ORAL PRESENTATIONS | | | | ORAL PRESENTATIONS | | | |
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| OS 9: Power Conversion Technologies that Contribute to the Modernization of Power Distribution Systems<br>CHAIRS: Keiichi Hirose, Nihal Kularatna | | OS 10: Advancements in Power Electronics for Flexible DC Transmission Systems<br>CHAIRS: Jinbin Zhao | | SESSION 14<br>CHAIRS: Kun-Che Ho, Yi-Feng Luo | | SESSION 15<br>CHAIRS: Wataru Kitagawa, Takaharu Takeshita | |
| **Room** | **101A** | **Room** | **101B** | **Room** | **101C** | **Room** | **102** |
| **13:00-13:25** | **ID:437 Supercapacitor Assisted Multilevel Inverter Topology for Off-grid Renewable Energy Systems**<br>Chamila Anuradha Naligama (University of Waikato)* | **ID:9 M3c-based Bipolar Dc Transmission Scheme For Offshore Wind Power**<br>Lijun Zhang (Shanghai University of Electric Power), Jiajun Qin (Shanghai University of Electric Power), Feng Jia (Shanghai University of Electric Power), Jinbin Zhao (China), Xiangxiang Wei (Shanghai University of Electric Power) | | **ID:287 Enhancing Renewable Energy Utilization: Performance Analysis of Hydrogen-Natural Gas Blending with KSM Static Mixer**<br>Jun Zheng (Beihang University)*; Weiqing Xu (Beihang university); Xiang Zhou (Jiangsu Vocational College of information Technology Jiangsu) | | **ID:253 A Novel Approach to Sustainable Energy Trading Optimizing Prosumer Incentives and Carbon Footprint**<br>Mayank Mr Arora (La Trobe University)*; Gururaj M Vishwanath (indian institute of Technology Kanpur); Prof. Ankush Sharma (iiT Kanpur); Naveen Chilamkurti (La Trobe University) |
| **13:25-13:50** | **ID:381 Key Technologies for High-Efficiency and Reliable Solid-State Transformers for DC Microgrids**<br>Keita Ohata (Nagaoka University of Technology)*; Naoto Kikuchi (Nagaoka University of Technology); Hiroki Watanabe (Nagaoka University of Technology); Keisuke Kusaka (Nagaoka University of Technology); Yushi Miura (Nagaoka University of Technology); Jun-ichi itoh (Nagaoka University of Technology); Shota Urushibata (Meidensha Corporation); Shinichiro Nagai (Pony Electric Co., Ltd); Tsuyoshi Funaki (Osaka University) | **ID:124 Active Support Control Strategy For Virtual Flux In Offshore Wind Power Flexible Direct-current Transmission**<br>chao pan (Shanghai University of Electric Power), Jinbin Zhao (China), zhiwei zeng (Shanghai Electric Power University), Yuanjun Hou (Shanghai University of Electric Power ) | | **ID:296 Design of Dual-Frequency Rectifier in Wireless Power Transfer Systems**<br>Yinchen Xie (Chiba university)*; Wenqi Zhu (Tokyo University of Science); Yutaro Komiyama (Chiba University); Ayano Komanaka (Chiba university); Akihiro Konishi (Chiba University); Kien Nguyen (Chiba University); Hiroo Sekiya (Chiba University) | **ID:254 A Numerical Study on Periodic Rotation in a Rotating Pendulum Wave Energy Converter**<br>Yu Nishihara (Nagasaki University)* |
| **13:50-14:15** | **ID:158 Voltage Control in Distribution Systems with Solid-State Transformers Using Online Particle Swarm Optimization**<br>Zihang Gao (Yokohama National University)*; Takao Tsuji (Yokohama National University) | **ID:154 Analysis of Dc Building Flexible Capacity Optimization Configuration Based On Pedf Microgrid**<br>Yuanjun Hou (Shanghai University of Electric Power ), Jinbin Zhao (China), chao pan (Shanghai University of Electric Power) | | **ID:293 A Study High Voltage PCB Litz Wire Concept for Solid-State Transformer**<br>Che-Wei Hsu (National Cheng Kung University)*; Jiann Fuh Chen (National Cheng Kung University) | | **ID:256 Adaptive Controlled Parallel DC-DC Converter for Edge Server**<br>Kazuhiro Kajiwara (Nagasaki institute of Applied Science); Takato Suzuta (Nagasaki institute of Applied Science)*; Yudai Furukawa (Nagasaki institute of Applied Science); Fujio Kurokawa (Nagasaki institute of Applied Science) |
| **14:15-14:40** | **ID:436 Galvanic Isolation Switch Activation Mechanism for Hybrid DC Circuit Breakers Using Very High Current Capability of Supercapacitors**<br>Chamara Dassanayake (University of Waikato)*; Nihal Kularatna (University of Waikato); D. Alistair Steyn-Ros (The University of Waikato); nicoloy Gurusinghe (Sri Lanka Technological Campus) | **ID:263 Dynamic voltage operating strategy of offshore wind farm with flexible transmission techniques**<br>Lingyu Guo (State Grid Shanghai Municipal Electric Power Company); Xingang Yang (State Grid Shanghai Municipal Electric Power Company); Yang Du (State Grid Shanghai Municipal Electric Power Company); Qiming Wang (Shanghai University of Electric Power); Zhongguang Yang (State Grid Shanghai Municipal Electric Power Company); Feng Jia (Shanghai University of Electric Power)* | | **ID:297 Intelectual Methods for Analysis of Renewables in the Energy Balance for Low Emission Strategy**<br>Ruslan Omirgaliyev (Astana iT University)*; Svetlana S Zhakiyeva (L.N. Gumilyov Eurasian National University); Korhan KAYiSLi (Gazi University); ideyat Bapiyev (Zhangir khan West Kazakhstan Agrarian - technical university); Zhanserik Nurlan (L.N. Gumilyov Eurasian National University); Aidos Satan (Astana iT University) | **ID:410 Design and Comparative Analysis of Synchronous Reference Frame based Enhanced Power Quality Management with Metaheuristic Algorithms**<br>izviye Fatimanur Tepe (Gazi University); Orhan KAPLAN (Gazi University); Erdal irmak (Gazi University)*; Ramazan Bayindir (Gazi University) |
| **14:40-15:05** | **ID:290 Three-Level Neutral-Point Clamped CLLC Resonant Tank Design for MVDC Systems**<br>Che-Wei Hsu (National Cheng Kung University); Min-Han Wen (National Cheng Kung University)*; Jiann-Fuh Chen (National Cheng Kung University) | **ID:305 De-loading control and grid frequency support of the dynamic low frequency wind power system**<br>Lingyu Guo (State Grid Shanghai Municipal Electric Power Company); Yang Du (State Grid Shanghai Municipal Electric Power Company); Zhongguang Yang (State Grid Shanghai Municipal Electric Power Company); Ningqian Yuan (State Grid Shanghai Municipal Electric Power Company); Xu Zhang (State Grid Shanghai Municipal Electric Power Company); Feng Jia (Shanghai University of Electric Power)* | | **ID:299 200kHz 3kW SiC-MOSFET Single-Ended WPT System with a New Switching-Loss Reduction Method**<br>Masahito Tsuno (Nichicon Co. Ltd.); HiDEKi OMORi (Nagasaki institute of Applied Science)*; Taku Nakamoto(Mitsubishi Electric); hiroshi sato (AiST); Fujio Kurokawa (Nagasaki institute of Applied Science) | **ID:33 Predictive Modeling of Electric Vehicle Charging Sessions: An empirical Validation of an Italy-France route**<br>Alessandro Saldarini (Politecnico di Milano)*; Sofia Borgosano (Politecnico di Milano); Michela Longo (Politecnico di Milano); Dario Zaninelli (Politecnico di Milano); Paolo Perani (ABB) |
| **15:05-15:35** | **COFFEE BREAK** | | | | | | |

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| SESSION 16<br>CHAIRS: Ramazan Bayindir, Onder Eyecioglu | | OS 11: Advancements DC Microgrids: Architecture, Topology, Control and Applications-1<br>CHAIRS: Vitor Fernão Pires, Armando Cordeiro | | SESSION 17<br>CHAIRS: Ching-Jan Chen, Kuo-Yuan Lo | | SESSION 18<br>CHAIRS:Elmira Jamei, Mehdi Seyedmahmoudian | |
| **Room** | **104** | **Room** | **109** | **Room** | **110** | **Room** | **111** |
| **13:00-13:25** | **ID:324 ADAPTATION and IMPLEMENTATION of A BUILDING MANAGEMENT SYSTEM for A LITERATURE MUSEUM**<br>Harrouz Abdelkader (Department of Hydrocarbon and Renewable Energy, Laboratory (LEESi), University of Adrar, Algeria)*; Hayat Bensoudan (Department of Hydrocarbon and Renewable Energy, Laboratory (LEESi), University of Adrar, Algeria) | **ID:39 A Single-Switch DC-DC Converter with a High Voltage Gain Capability and Reduced Voltage Stress of the Switch for Renewable Energy Applications**<br>V. Fernao Pires (ESTSetubal/iPS)*; Armando Cordeiro (iSEL - iPL); Daniel Foito (ESTSetubal - iPS); Joaquim Monteiro (iSEL); José Silva (iNESC-iD, iST, Universidade de Lisboa) | | **ID:103 Roles of Photovoltaic Generation Systems in Microgrid Forming with Large Induction Motors**<br>i-Sheng Lai (National Sun Yat-sen University); Che-Min Lin (China Steel Corporation); Ming-Hsiang Huang (China Steel Corporation); Cheng-Chieh Shen (China Steel Corporation); Jen-Hao Teng (National Sun Yat-sen University)* | | **ID:339 Expansion of Switched Reluctance Motor Driving Range by Flux-weakening Control under Current Vector Control**<br>Keitaro Kawarazaki (Tokyo University of Sceince)*; Nobukazu Hoshi (Tokyo University of Science) | |
| **13:25-13:50** | **ID:137 Transmission Expansion Planning with Photovoltaic Generation Penetration**<br>Patricia Pasmay (ESPOL); Gomer Abel Rubio (Escuela Superior Politécnica del Litoral (ESPOL))*; Homero Ojeda (ESPOL); Sixifo Falcones (ESPOL) | **ID:75 Isolated Quasi-Switched Boost Integrated T-Type DC-DC Converter for DC Microgrid**<br>Daniel Ferreira (iSEL - instituto Superior de Engenharia de Lisboa); Armando Cordeiro (iSEL - iPL)*; Luis EncarnaCão (iSEL-iPL); Prof. Enrique Romero-Cadaval (University of Extremadura, Spain); Carlos Roncero-Clemente (University of Extremadura); José Silva (iNESC-iD, iST, Universidade de Lisboa); Daniel Foito (ESTSetubal - iPS); J. F. Martins (FCT/UNL); V. Fernao Pires (ESTSetubal/iPS) | | **ID:331 An 18-kW Wide-Output-Range Bidirectional DC Power Supply with 80V, 600A using Totem-Pole Bridgeless PFC**<br>Hidenori Tanaka (TAKASAGO, LTD.)*; Satoshi Tanaka (TAKASAGO, LTD.); Masanori Tsuruike (TAKASAGO, LTD.); Shohei Kon (TAKASAGO, LTD.) | | **ID:343 Strategic Green Marketing for Smart Grids: Boosting Consumer Adoption of Sustainable Energy Technologies**<br>Hafize Nurgul Durmus Senyapar (Gazi University); ilhami Colak (istinye University); Ramazan Bayindir (Gazi University)* |
| **13:50-14:15** | **ID:145 Implementation of Proton Exchange Membrane Fuel Cells in Agricultural Areas: Technical and Economic Benefits**<br>Eduardo Marcelo Benavides (ESPOL); Gomer Abel Rubio (Escuela Superior Politécnica del Litoral (ESPOL))*; wilton edixon Agila (ESPOL); Luis Muñoz (Escuela Superior Politécnica del Litoral(ESPOL )) | **ID:49 Diagnosing Power Transistor Faults in Multilevel T-Type Based Nine Switch Inverter Using Center of Mass Indexes**<br>Joaquim Monteiro (iSEL)*; V. Fernao Pires (ESTSetubal/iPS) | | **ID:312 Energy Management Strategy for Smart Homes Based on Deep Reinforcement Learning**<br>Kuangpu Liu (Aalborg university)*; Hanwen Zhang (Aalborg University); Yanbo Wang (Aalborg University); Kaiqi Ma (Aalborg University); Zhe Chen (Aalborg university) | | **ID:334 Digital Marketing Strategies for Smart Grids: Utilizing Online Platforms to Drive Awareness and Adoption**<br>Hafize Nurgul Durmus Senyapar (Gazi University); ilhami Colak (istinye University); Ramazan Bayindir (Gazi University)* |
| **14:15-14:40** | **ID:76 North Atlantic Offshore Wind Characteristics: Modeling and Comparison With Field Measurements and Industry Standards**<br>Tiffany S Wang (Cinco Ranch High School), Ryan Tang (Lexington High School) | **ID:53 Total Harmonic Distortion Reduction in Three-Phase PV Inverters**<br>Harun Fecri ASLAN (istanbul Aydin University)*; Harun ASLAN (istanbul Aydin University); Murtaza Farsadi (istanbul Aydin University) | | **ID:306 Investigation of Innovative Battery Storage Systems for Shipboard Applications**<br>Michele Pastorelli (Politecnico di Torino)*; Mariapia Martino (Denerg - Politecnico di Torino); Fabio Mandrile (Politecnico di Torino); Salvatore Musumeci (Politecnico Torino) | | **ID:355 Comparative Analysis Among Multisampling Methods for Three-Phase Grid-Connected Cascaded H-Bridge Multilevel Inverters**<br>Giuseppe Sorrentino (University of Palermo); Claudio Nevoloso (University of Palermo); Gioacchino Scaglione (University of Palermo); Giuseppe Schettino (University of Palermo); Michele Pastorelli (Politecnico di Torino); Rosario Miceli (University of Palermo)* |
| **14:40-15:05** | **ID:438 Spatiotemporal Wind Energy Assessment for Transmission Network Integration Considering the Location of Electrical Substations and Loads**<br>Kwabena A. Kyeremeh (University of Kentucky)*; Rosemary E. Alden (University of Kentucky); Aron Patrick (PPL Corporation); Dan M. ionel (University of Kentucky) | **ID:43 Startup-based Induction Motor Fault Detection and Diagnosis Using Feature Extraction of the S-Transform Image**<br>Tito Amaral (ESTSetubal/iPS)*; Daniel Foito (ESTSetubal - iPS); Armando Pires (Polytechnical institute of Setubal); Rosario Miceli (University of Palermo); Fabio Viola (Università di Palermo); V. Fernao Pires (ESTSetubal/iPS) | | **ID:336 Energy Management of DC microgrid-based Photovoltaic/battery and Super capacitor**<br>Abdelhakim Belkaid (Bejaia University)*; Ali BERBOUCHA (Bejaia University); said aissou (université of Béjaia ); ilhami Colak (istinye University); Kamel Djermouni (Bejaia University); Elyazid AMiROUCHE (Bejaia University); Korhan KAYiSLi (Gazi University) | | **ID:356 Comparison Between LCL Filter Design Methods for Grid-Connected Cascaded H-Bridge Multilevel Inverters**<br>Giuseppe Sorrentino (University of Palermo); Giuseppe Schettino (University of Palermo); Claudio Nevoloso (University of Palermo); Stanimir Valtchev (FCT/UNL); Gioacchino Scaglione (University of Palermo); Rosario Miceli (University of Palermo)*; Aqeel Ur Rahman (University of Palermo) |
| **15:05-15:35** | **COFFEE BREAK** | | | | | | |

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| **OS 12: Innovations in Renewable Energy and Energy Efficiency: Advancing Control Systems and Optimization Techniques**<br>**CHAIRS: Kun-Che Ho, Yi-Feng Luo** | | **OS 13: Advanced Power Conversion Technologies for Sustainable Energy Systems**<br>**CHAIRS: Wataru Kitagawa, Takaharu Takeshita** | | **OS 14: Control and Operation Techniques for Microgrids**<br>**CHAIRS: Keiichi Hirose, Ryuichi Yokoyama** | | **OS 15: Advanced Power Conversion Techniques and Controls for High Performance and Efficiency**<br>**CHAIRS: Ching-Jan Chen, Kuo-Yuan Lo** | |
| **Room** | **101A** | **Room** | **101B** | **Room** | **101C** | **Room** | **102** |
| **15:35-16:00** | **ID:230 Load Frequency Control of Hybrid Power System using Marine Predator Algorithm tuned Cascaded Controller**<br>Muhammad Shahzad (King Fahd University of Petroleum and Minerals)； Muhammad Majid Gulzar (King Fahd University of Petroleum and Minerals)*; Aqsa Shahzad (3Comsats institute of information Technology); Adnan Shakoor (King Fahd University of Petroleum and Minerals)； Salman Habib (King Fahd University of Petroleum and Minerals) | **ID:389 Long-Term Trends and Disruption in Medium Voltage Power Electronics**<br>Uwe Drofenik (TU Wien)*; Johann Kolar (TU Wien) | | **ID:50 Procedures of Analysis and Design For Microgrid Supplied Power By An Inverter With Battery**<br>Yasuhiro Taguchi (Energy and Environment Technology Research Institute), Shigeyuki Tsuji (Isuzu Ltd.), Junichi Arai (Energy and Environment Technology Research Institute), Ryuichi Yokoyama (Energy and Environment Technology Research Institute), Daiki Yamashita (Pacific Consultants Co., LTD) | | **ID:37 Switching Instants Optimization for MHz CrM Totem-Pole PFC without Real-Time Calculations**<br>Yong-Yi Huang (National Taipei University of Technology); Yen-Shin Lai (NTUT)* | |
| **16:00-16:25** | **ID:245 Optimal Control Method for LLC Resonant Convertor of EV Battery Chargers**<br>Abdullah Memon (King Fahd University of Petroleum and Minerals)； Muhammad Majid Gulzar (King Fahd University of Petroleum and Minerals)*; Noman Bashir (King Fahd University of Petroleum and Minerals)； Salaman Habib (King Fahd University of Petroleum and Minerals)； Adnan Shakoor (King Fahd University of Petroleum and Minerals)； Farheen Ehsan (Shanghai Jiao Tong University) | **ID:375 Constant DC Current Control of Unidirectional High-Frequency Isolated Medium-Voltage AC-DC Modular Matrix Converter**<br>Kohei Budo (Gifu University)*; Hiroki ishikawa (Gifu University); Takaharu Takeshita (Nagoya institute of Technology) | | **ID:388 An Experimental Approach to DC Voltage Stabilization in a Hybrid Microgrid System**<br>Guohong WU (Tohoku Gakuin University)*; Hayato igarashi (Tohoku Gakuin University) | | **ID:149 Multilevel PFC Converter Based on Flying-Capacitor**<br>i-Yu Huang (National Kaohsiung University of Science and Technology)*; Cheng-Han Cai (National Kaohsiung University of Science and Technology)； KUOYUAN LO (National Kaohsiung University of Science and Technology) | |
| **16:25-16:50** | **ID:344 Implementation of Heating System for Lithium-ion Batteries in Low Temperature Environments**<br>Po-En Lai (National Taiwan Ocean University); Sheng-Chieh Chang (National Taiwan Ocean University); YU SHAN CHENG (National Taiwan Ocean University)* | **ID:413 Y-Inversion based DC-link-less multi-source power networks**<br>Yonghwa Lee (Kyoto University of Advanced Science); Alberto Castellazzi (Kyoto University of Advanced Science)* | | **ID:442 Renewable energy-powered BLDC motor-based appliances based on supercapacitor-assisted converters for DC homes**<br>Nirashi Polwaththa Gallage (University of Waikato)*; Nihal Kularatna (University of Waikato); Dulsha Kularatna-Abeywardana (The University of Auckland); D. Alistair Steyn-Ros (The University of Waikato) | | **ID:338 A single-phase totem-pole converter with four quadrants active and reactive power control by using the direct-quadrature control**<br>Cheng-Yu Tang (National Taipei University of Technology)*; Da-De Shih (National Taipei University of Technology) | |
| **16:50-17:15** | **ID:348 An Active Bidirectional Balancer with Maximum Value Balancing Control Algorithm**<br>Yi-Feng Luo (NTUST)*, Ya-Shuo Chen (NTUST), Guan-Jhu Chen (National Changhua University of Education Changhua), Chun-Liang Li (Department of Electrical Engineering National Yunlin University of Science and Technology), Yu-Fang Hsueh (NTUST) | **ID:406 Mitigation of 180Hz Midpoint Voltage Ripple in Vienna Rectifiers for Water Electrolysis Using a Parallel Configuration**<br>Haein Kim (KNUT(Korea National Universiy of Transportation ) ); Hag-Wone Kim (Korea National Univ. of Transportation)* | | **ID:445 Status and challenges of energy efficiency & conservation using DC power technologies in Japan**<br>Keiichi Hirose | | **ID:340 Analysis and Efficiency Improvement of Quasi-Resonant Flyback Converter with Adaptive Valley Detection and Variable Frequency Control**<br>Lin Ting Jia (National Taiwan University); you shiang tseng (national taipei of University technology); Chun-Cheng Shih (National Yunlin University of Science and Technology); ching-jan chen (National Taiwan University)* | |
| **17:15-17:40** | **ID:357 An Optimized Dimming Technique for High-Brightness LEDs Based on Variable Voltage Commands**<br>Kun-Che Ho (National Formosa University)*; Yi-Jun Lai (Taiwan Power Research institute); Yu-Ching Kao (National Taiwan Ocean University); YU SHAN CHENG (National Taiwan Ocean University) | **ID:420 Fuel Cell-battery Power Management System For Evtol Drones**<br>Jungcheol Kang (Gyeongsang National University), Se-Kyo Chung (Gyeongsang National University) | | **ID:51 Renewable Power Generation Maximization for UAVs with Adaptive Sliding Mode Control**<br>Khalid Mohammad Al-Fuwail (KFUPM)*; Ali Nasir (KFUPM ); Md Shafiullah (King Fahd University of Petroleum and Minerals); Ayman Abdallah (KFUPM) | | **ID:393 Design of Modularized High Step-Up Converter with Improved Light-Load Efficiency for Power Semiconductor Testing**<br>Kai-Wei Lin (National Taiwan University); Chi-Yuan Huang (National Taiwan University); Yaow-Ming Chen (National Taiwan University)* | |

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| SESSION 19<br>CHAIRS: Keiichi Hirose, Nihal Kularatna | | OS 15: Advancements DC Microgrids: Architecture, Topology, Control and Applications-2<br>CHAIRS: Vitor Fernão Pires, Armando Cordeiro | | SESSION 20<br>CHAIRS: Jinbin Zhao, Kuangpu Liu | | SESSION 21<br>CHAIRS: Ramazan Bayindir, Onder Eyecioglu | |
| Room | 104 | Room | 109 | Room | 110 | Room | 111 |
| 15:35-16:00 | **ID:329 Digital Predictive-based Interleaving Control Scheme for Critical Conduction Mode Boost PFC Converter**<br>Jizhe Wang (Fukuoka University)*; Shuai Yang (Meraki integrated); Shanghua Feng (Guangdong Carrier Heating, Ventilation and Air Conditioning Company Ltd.); Tadashi Suetsugu (Fukuoka University); Fujio Kurokawa (Nagasaki institute of Applied Science) | **ID:61 Fluctuation Mitigation Control of Wind Farm with Battery Energy Storage System and Wind Turbines' Curtailment Function**<br>Shinya Ohara (Kitami institute of Technology)*; Shin'ya Obara (Kitami institute of Technology); Rion Takahashi (Kitami institute of Technology); Kazuo Suzuki (Hitachi Power Solutions Co., Ltd.); Hiroshi Hikiji (Hitachi Power Solutions Co., Ltd.) | | **ID:376 Design Method of a 400 Vdc Direct Coupled PV Battery Systems for High Efficiency Operation**<br>Yasuyuki Kanai (Exeo Group, inc.)*; Fujio Kurokawa (Nagasaki institute of Applied Science) | | **ID:439 Combined 3D FEA and Machine Learning Design of Inductive Polyphase Coils for Wireless EV Charging**<br>Lucas A Gastineau (University of Kentucky)*; Donovin D Lewis (University of Kentucky); Dan M. ionel (University of Kentucky) |
| 16:00-16:25 | **ID:64 Configuration Optimization of Dual Active Bridge Converter Systems for Interfacing Large-Scale Water Electrolyzer with Stand-Alone Renewables**<br>Thibaut Runser (Siemens Energy )*; Sebastian Arend (Reverion ); Tim Karsten (RWTH Aachen University); Amandus Bach (RWTH Aachen University); Rik W. De Doncker (RWTH Aachen University) | **ID:308 Loss Analysis of AC/DC Isolated Converter Module of Solid-State Transformer**<br>Adel Nasiri (University of South Carolina)*; Necmi Altin (University of South Carolina); Saban Ozdemir (University of South Carolina) | | **ID:399 Current Status of Medium-Term and Long-Term Wind Power Forecasting in the Literature**<br>Mehmet Yesilbudak (Nevsehir Haci Bektas Veli University)*; Mustafa Benli (Nevsehir Haci Bektas Veli University) | | **ID:440 Smart Systems Employing IoT Devices for Monitoring and Control of Electric Vehicle Residential Charging**<br>Grant M Fischer (University of Kentucky)*; Steven Poore (University of Kentucky); Rosemary E. Alden (University of Kentucky); Donovin D Lewis (University of Kentucky); Dan M. ionel (University of Kentucky) |
| 16:25-16:50 | **ID:126 An European-based Erasmus Mundus pathway for the higher education in the Hydrogen sector**<br>Mariapia Martino (Denerg - Politecnico di Torino)*; Massimo Santarelli (Politecnico di Torino); Gianluca Valenti (Politecnico di Milano); Attila Usar (Universitat Politecnica de Catalunya); Nicola Paltrinieri (Norwegian University of Science and Technology); Thijs de Grot (Technical University of Eindhoven) | **ID:59 Feature Selection Approaches for Short-Term Solar Photovoltaic Power Forecasting**<br>Nattha Thipwangmek (Chiang Mai University); Kampol Woradit (Chiang Mai University); Nopparuj Suetrong (Chiang Mai University); Natthanan Promsuk (Chiang Mai University)* | | **ID:171 Research on continuous operation of active gate driver combining current source and active gate resistor**<br>Kiyotaka Ono (Nagoya University)*; Sihoon Choi (Nagoya University); Yu Yonezawa (Nagoya University); Jun imaoka (Nagoya University); MASAYOSHi YAMAMOTO (Nagoya University) | | **ID:441 Combined Machine Learning and Differential Evolution for Optimal Design of Electric Aircraft Propulsion Motors**<br>David R Stewart (University of Kentucky)*; Matin Vatani (University of Kentucky); Rosemary E. Alden (University of Kentucky); Donovin D Lewis (University of Kentucky); Pedram Asef (University College London); Dan M. ionel (University of Kentucky) |
| 16:50-17:15 | **ID:316 Efficiency and cost analysis of solar production by Fixed and Tracking systems: a prospective study for AI using**<br>Mmaduabuchukwu Chidiebere Kanu (Univer. Paris Est Creteil)*; Abdou Tankari Mahamadou (University of Paris Est Creteil, Certes Lab.); Pierre-Olivier Logerais (Université Paris Est, CERTES, iUT de Sénart-Fontainebleau); Lefebvre Gilles ( University of Paris Est Creteil, Certes Lab.); Ramazan Bayindir (Gazi University) | **ID:234 Transformerless Ultra-High Gain Buck Boost DC-DC Converter with Single Switch and Reduced Voltage Stress**<br>Armando Cordeiro (iSEL - iPL)*; Paulo Gambôa (iSEL-iPL); Ricardo Luís (iSEL); Pedro Fonte (iSEL); Joaquim Monteiro (iSEL); J. F. Martins (FCT/UNL); José Silva (iNESC-iD, iST, Universidade de Lisboa); Daniel Foito (ESTSetubal - iPS); V. Fernao Pires (ESTSetubal/iPS) | | **ID:341 A Sliding Mode Controller for the Detection of Voltage Problems in Dynamic Voltage Restorers**<br>Seyfettin Vadi (Gazi University)*; ilhami Colak (istinye University); Ramazan Bayindir (Gazi University) | | **ID:84 Collectivist and Individualist End-user Values in the Digital Energy Community Ecosystem**<br>Sanna Tuomela (University of Vaasa)*; Jouni K. Juntunen (University of Vaasa) |
| 17:15-17:40 | **ID:327 Resilience and Frequency Control in Low-Inertia Power Systems: Challenges and Solutions**<br>Ayse Colak (University of Strathclyde)*; Mohamed Abouyehia (university of strathclyde); Dr K Ahmed (Strathclyde) | **ID:285 Fault Diagnosis Scheme Based on the Stockwell Transform for a Multilevel Converter of a Switched Reluctance Motor Drive**<br>José-inácio Rocha (ESTSetubal/iPS)*; Tito Amaral (ESTSetubal/iPS); Daniel Foito (ESTSetubal - iPS); Armando Pires (Polytechnical institute of Setubal); V. Fernao Pires (ESTSetubal/iPS) | | **ID:310 Design and Optimization of a Forced-Air Cooling System for a Compact Medium Voltage Solar PV Inverter**<br>Adel Nasiri (University of South Carolina)*; Hooman Taghavi (University of South Carolina); Parthkumar Bhuvela (University of South Carolina); Jamil Khan (University of South Carolina) | | **ID:227 Wind-to-Hydrogen and Battery-Based Microgrid Systems for Residential Building Applications: A Feasibility Study in Canada**<br>Wahiba Yaici (CanmetENERGY Research Centre / Natural Resources Canada)*; Evgueniy Entchev (CanmetENERGY Research Centre / Natural Resources Canada); Michela Longo (Politecnico di Milano); Heejin Cho (University of Nevada Las Vegas); Jian Zhang (University of Wisconsin-Green Bay); Andres Annuk (Estonian University of Life Sciences) |

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| **OS 16: Report on Research Results of Renewable Energy at Aichi Institute of Technology Eco Power Research Center**<br>**CHAIRS: Kazuto Yukita, Toshiya Nanahara** | | **OS 17: Energy Engineering in Renewable Energy, Electronics, and Communications - Power Network Management and Control**<br>**CHAIRS: Hiroo Sekiya, Yoshiyasu Nakashima** | | **OS 18: Power Electronics for Highly Efficient Computing**<br>**CHAIRS: Yuichiro Shibata, Yoichi Ishizuka** | | **SESSION 22**<br>**CHAIRS: Yongheng Yang, Yinxiao Zhu** | |
| **Room** | **101A** | **Room** | **101B** | **Room** | **102** | **Room** | **111** |
| **09:00-09:25** | **ID:404 Minimal Short Circuit Ratio for Inverter-Based Resources Considering Transmission Loss -- Impact of Resistance to Reactance Ratio of Looking-Back Impedance --**<br>Toshiya Nanahara (Aichi institute of Technology)*; Yasuaki Yamada (Aich institute of Technology); Akihiro Tsusaka (Aichi institute of Technology); Kazuto YUKiTA (Aichi institute of Technology) | **ID:345 Calcination condition dependence of the passivation properties of sol-gel deposited alumina thin films on silicon substrates**<br>Ryosuke Watanabe (Hirosaki University)*; Mizuho Kawashima (Seikei University); Yoji Saito (Seikei University) | | **ID:162 Proposal of a Method for Applying Digital LDOs to Current Measurement of CPUs**<br>Asahi Honda (Nagasaki University)*; Miyu Kobayashi (Nagasaki University); Tatsunosuke Shiota (Nagasaki University); Takumi OBAYASHi (Nagasaki University); Yoichi ishizuka (Nagasaki University); Yuichiro Shibata (Nagasaki University) | | **ID:371 Design, Analysis, and Validation of High-Level Three-Phase dc/ac Converter with Dual Source/Phase Configuration**<br>Marif Daula Siddique (Swinburne University of Technology)*; Mehdi Seyedmahmousian (School of Software and Electrical Engineering, Swinburne, Victoria); Saad Mekhilef (Swinburne University of Technology); Alex Stojcevski (School of Software and Electrical Engineering, Swinburne, Victoria) | |
| **09:25-09:50** | **ID:428 A Study on DC Power Distribution Using Transformer with Special Winding Structure in Renewable Energy-Integrated Grid**<br>Takuya Goto (Aichi institute of Technology); Akihiro Tsusaka (Aichi institute of Technology); Akari Matsunaga (Aichi institute of Technology); Dinh Nguyen (Hanoi University of Science and Technology); Kazuto YUKiTA (Aichi institute of Technology)* | **ID:359 Time and Day-Based Peak Electricity Demand Forecasting: A Comparative Analysis of Machine Learning Models for Peak Cut and Decarbonization**<br>DiFEi MiYAO (NTT DOCOMO, iNC.)*; Masaki Nakamura (NTT DOCOMO, iNC.) | | **ID:180 Energy Efficiency Analysis of Vector Extension for a Processor Tightly Coupled with Power Supply**<br>Tatsunosuke Shiota (Nagasaki University); Takumi OBAYASHi (Nagasaki University); Asahi Honda (Nagasaki University); Miyu Kobayashi (Nagasaki University); Taito Manabe (Nagasaki University); Yoichi ishizuka (Nagasaki University); Yuichiro Shibata (Nagasaki University)* | | **ID:8 ENHANCEMENT of BATTERY ENERGY EXTRACTION FROM LEAD-ACID and LITHIUM-POLYMER BATTERIES by PULSE DISCHARGING and SOURCE MULTIPLEXING in AN EFFICIENT OPERATING POINT**<br>Hasith K Liyanage (Lanka Electricity Company )*; Dilan Wijekoon (Post Graduate institute of Science, University of Peradeniya) | |
| **09:50-10:15** | **ID:429 A Study on Locate Method of Series Arc Fault Point in Photovoltaic Generation System**<br>Akihiro Tsusaka (Aichi institute of Technology)*; Sora Hasegawa (Aichi institute of Technology); Toshiya Nanahara (Aichi institute of Technology); Yasuyuki Goto (Aichi institute of Technology); Akinori Kato (Kawamura Electric inc.) | **ID:396 Model-based development of energy management systems for renewable energy**<br>Yoshiyasu Nakashima (NTT Devices Cross Technologies Corp.)* | | **ID:207 Energy Efficiency Analysis of Branch Prediction for a Processor Tightly Coupled with Power Supply**<br>Takumi OBAYASHi (Nagasaki University); Tatsunosuke Shiota (Nagasaki University); Asahi Honda (Nagasaki University); Miyu Kobayashi (Nagasaki University); Taito Manabe (Nagasaki University); Yoichi ishizuka (Nagasaki University); Yuichiro Shibata (Nagasaki University)* | | **ID:89 Analyzing of Electrospray Modes for Catalyst Layer Formation in Polymer Electrolyte Membrane Fuel Cells**<br>Hikaru Arai (Tokyo University of Science)*; Noboru Katayama (Tokyo University of Science) | |
| **10:15-10:40** | **ID:431 A Study of Rectifier Circuit Failure with Special Winding Type Twenty-four-phase Transformer**<br>Akari Matsunaga (Aichi institute of Technology); Kazuto YUKiTA (Aichi institute of Technology)*; Takuya Goto (Aichi institute of Technology); Toshiya Nanahara (Aichi institute of Technology); Akinori Kato (Kawamura Electric inc.) | **ID:378 Near-field antenna analysis using source-potential energy**<br>Souma Jinno (Osaka institute of Technology)*; Hiroshi Toki (Osaka University); Masayuki Abe (Osaka University) | | **ID:243 Development of a Power Supply for Optogenetic Devices Used in Continuous Mouse Experiments with Renal Sympathetic Nerve Stimulation**<br>Yuri Kabashima (Nagasaki University)*; Yoichi ishizuka (Nagasaki University); Yuichiro Shibata (Nagasaki University); Tsuyoshi inoue (Nagasaki University); Ryusuke Umene (Nagasaki University); Eri Sakuda (Nagasaki University); Gen Onodera (Nagasaki University); Tomohiro Furusato (Nagasaki University) | | **ID:71 Comparison of Rapid Charging Performance for Lithium-Ion Batteries with Various Positive Electrode Active Materials**<br>Kota Kojima (Kanazawa institute of Technology)*; Akihiko Kono (Kanazawa institute of Technology); Yoji Fujita (Kanazawa institute of Technology); Noriaki ikenaga (Kanazawa institute of Technology) | |
| **10:40-11:05** | **ID:430 Development Of Pole-changing Generator For Small Wind Power Generation**<br>Tadashi HOSOE (Aichi Institute of Technology); Takuya Goto (Aichi Institute of Technology); Sena Yamashita (Aichi Institute of Technology); Omi Muto (Aichi Institute of Technology); Keiichi Hirose (NEDO); Kazuto YUKITA (Aichi Institute of Technology) | **ID:367 Wind-Lens Effect in Micro Wind Power Plant Installed in Airflow Duct**<br>Toshihiko ishiyama (Hachinohe institute of Technology)*; Fujio Akinaga (TOMOE SHOKAi Co. Ltd.) | | **ID:172 Common Mode Noise Reduction with Balance Technique Considering Soft Saturation Characteristics**<br>Yota Omizu (Nagoya University)*; Sihoon Choi (Nagoya University); Jun imaoka (Nagoya University); MASAYOSHi YAMAMOTO (Nagoya University) | | **ID:77 Modeling and Gain Design for Multi-Cycle Controlled LLC Resonant Converter**<br>Hideaki Funaki (Kyushu University)*; MASAHiTO SHOYAMA (Kyushu University); Takashi Yoshida (Kyushu University); Yu Yonezawa (Nagoya University); Akihiko Miyazawa ( Model Core Laboratories LTD.) | |
| **11:05-11:35** | **COFFEE BREAK** | | | | | | |

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| ORAL PRESENTATIONS | | | |
| SESSION 23<br>CHAIRS: Hannah Merrigan, Victor U Karthik | | SESSION 24<br>CHAIRS: Kazuhiro Kajiwara, Toshifumi Konishi | |
| Room | 110 | Room | 112 |
| 09:00-09:25 | **ID:110 Tensor Network-Based Lightweight Energy Forecasting for Virtual Power Plant**<br>Daichi Watari (KYOCERA Corporation)*; Hiroki Tanimoto (KYOCERA Cooperation); Tsuyoshi Okubo (University of Tokyo); Synge Todo (University of Tokyo); Kaoru Nishiyama (KYOCERA Cooperation) | **ID:403 A Study on Locate Method of Series Arc Fault Point in Photovoltaic Generation System**<br>Akihiro Tsusaka (Aichi institute of Technology)*; Sora Hasegawa (Aichi institute of Technology); Toshiya Nanahara (Aichi institute of Technology); Yasuyuki Goto (Aichi institute of Technology); Akinori Kato (Kawamura Electric inc.) | |
| 09:25-09:50 | **ID:114 Assessment for Suitable Distributed Energy Resource Utilization to Mitigate Impact on Voltage under Congestion Management**<br>Ryuji Shitara (Waseda University)*; Akihisa Kaneko (Waseda University); Yu Fujimoto (Waseda University); Yutaka iino (Waseda University); Yasuhiro Hayashi (Waseda University) | **ID:323 Modeling of A H2 Generation System Pilot Through Wastewater Electrolysis and Pv Solar Energy For Water Resource Valorization In O&g Fields**<br>Hayder Rincón (Universidad del Rosario), Juan Carlos Rozo (Universidad del Rosario), DAVID CELEITA (UNIVERSIDAD DE LA SABANA), Andrés Mauricio Pérez Gordillo (Universidad del Rosario), Jorge Castellanos (UNIVERSIDAD DE LA SABANA) | |
| 09:50-10:15 | **ID:116 Research of the PV Power Plant Installed in Electric Railway Power Supply Grid**<br>Kasumi Taike (East Japan Railway Company)*; Kota Minaminosono (East Japan Railway Company); Junichi Shiraishi (East Japan Railway Company); Takashi Ozaki (East Japan Railway Company); Takashi Suzuki (East Japan Railway Company); Hitoshi Hayashiya (East Japan Railway Company) | **ID:326 Forecasting of Solar Irradiance Using ARIMA**<br>Medine Colak (Gazi University)* | |
| 10:15-10:40 | **ID:119 Application of Temperature Balancing in Paralleled Power Supply Systems with Current-sharing Control**<br>Chien-Chih Hung (National Tsing Hua University)*; Tsai-Fu Wu (National Tsing Hua University); Jui-Yang Chiu (National Tsing Hua University); Yun-Hsiang Chang (National Tsing Hua University) | **ID:123 JR East's Renewable Energy Development Projects in Tohoku area**<br>Kenichi Yamamori (East Japan Railway Company)*; Seiichi Chida (East Japan Railway Company); Masayo Hatae ( East Japan Railway Company) | |
| 10:40-11:05 | **ID:121 Anomaly Detection and Factor Estimation using Graph Neural Network with Storage Battery**<br>Yuta Shinozaki (kyocera-minatomirai)* | **ID:18 A Simplified Fuzzy Sliding Mode Controller for PV Emulation**<br>Saba Javed (The University of Edinburgh)*; Jonathan Shek (The University of Edinburgh); Max Malyi (The University of Edinburgh) | |
| 11:05-11:35 | COFFEE BREAK | | |

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| ORAL PRESENTATIONS | | | | ORAL PRESENTATIONS | | | |
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| SESSION 25<br>CHAIRS: Kazuto Yukita, Toshiya Nanahara | | SESSION 26<br>CHAIRS: Hiroo Sekiya, Yoshiyasu Nakashima | | SESSION 27<br>CHAIRS: Yuichiro Shibata, Yoichi Ishizuka | | OS 19: Emerging Technologies for Renewable-Rich Power Grids: Design, Modeling and Control<br>CHAIRS: Yongheng Yang, Yinxiao Zhu | |
| **Room** | **101A** | **Room** | **101B** | **Room** | **102** | **Room** | **111** |
| **11:35-12:00** | **ID:150 Rocof Threshold-based Gain Scheduling For Ffr Implementation In High Renewable Power Systems**<br>Meng-Yun Lee (National Taiwan University), Chih-Wen Liu (National Taiwan University) | **ID:38 Impactful driving performances for e-Bus service operations: assessment through virtual environment**<br>Andrea Di Martino (Politecnico di Milano)*; Michela Longo (Politecnico di Milano); Stefano Rossi (Autoguidovie S.p.A.); Dario Zaninelli (Politecnico di Milano) | | **ID:418 Evaluation of Power Quality and Losses in Single-Phase H-Bridge Inverters: A Comparative Study of IGBT and GaN Devices**<br>Marif Daula Siddique (Swinburne University of Technology)*; Mehdi Seyedmahmousian (School of Software and Electrical Engineering, Swinburne, Victoria); Saad Mekhilef (Swinburne University of Technology); Alex Stojcevski (Curtin Singapore) | | **ID:261 Automating Substation Modeling using Labeled Images**<br>Arjun Kumar Madhusoodhanan (Karlsruhe institute of Technology (KiT))*; Julian Hoffmann (Karlsruhe institute of Technology (KiT)); Pascal Emanuel Schmidt (Karlsruhe institute of Technology (KiT)); Marco Schott (Karlsruhe institute of Technology (KiT)); Uwe KUhnapfel (Karlsruhe institute of Technology); Veit Hagenmeyer (Karlsruhe institute of Technology (KiT)) | |
| **12:00-12:25** | **ID:175 Development of High-quality High-efficiency High-reliability 6.6kv 12mva Multiple Power Compensator**<br>Chen Xiao Zhang (TMEIC Corporation), Kenta Takei (株式会社TMEIC), Tatsuya Takami (株式会社TMEIC) | **ID:202 EVs Wireless Charging in Urban Context: a Model for Optimal Transmitter Positioning**<br>Cristian G Colombo (Politecnico di Milano)*; Michela Longo (Politecnico di Milano); Ryosuke Ota (Tokyo Metropolitan University); Harutaka Suzuki (Tokyo Metropolitan University) | | **ID:407 Comparative Analysis of Fuzzy Logic and PI Control for Harmonic Suppression in Shunt Active Power Filter**<br>Rukiye GOk (Gazi University); Alperen Mustafa M Colak (Nagasaki Universiy); Erdal irmak (Gazi University)*; Nihat Ozturk (Gazi University) | | **ID:370 Artificial Intelligence-Aided Optimization Strategy for Three-Level DAB Converters Modulated with Five DoFs**<br>Zhichen Feng (Xi'an Jiaotong-Liverpool University)*; Huiqing Wen (XJTLU); xu han (xi'an jiaotong-liverpool university); Guangyu Wang (Xi'an Jiaotong-Liverpool university ); Yinxiao Zhu (Zhejiang University) | |
| **12:25-12:50** | **ID:22 A multi-criteria decision-making approach to implement renewable energy system into sport facilities -A feasibility study applied on a wakeboard cable park**<br>Niko Nagengast (University Bayreuth)* | **ID:392 Open Interface System Protocols for Space Based Power Systems**<br>Innocent Davidson; Ayodele Periola | | **ID:133 Research On Urban Surplus Energy Calculation and Utilization Methods**<br>Jewon Oh (Sojo University) | | **ID:190 Maximum Power Point Tracking of Series-Parallel Connected Bifacial PV Modules**<br>Aidha Muhammad Ajmal (Zhejiang University)*; Yongheng Yang (Zhejiang University); Bikash Gyawali (Zhejiang University) | |
| **12:50-14:25** | **LUNCH** | | | | | | |

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| ORAL PRESENTATIONS | | | |
| SESSION 28<br>CHAIRS: Ryuji Shitara, Chien-Chih | | SESSION 29<br>CHAIRS: Akihiro Tsusaka, Kenichi Yamamori | |
| Room | 110 | Room | 112 |
| 11:35-12:00 | **ID:380 Optimising Electric Vehicle Wireless Charging Systems Using Neural Networks to Enable Free-Position Parking.**<br>Hannah Merrigan (Nagoya University)* | **ID:29 Leveraging synthetic data to empower AI models to predict photovoltaic energy production to aid in the decarbonization of buildings**<br>youssef JOUANE (CESi LiNEACT )*; imad SADDiK (CESi LiNEACT); iLYASS ABOUELAZiZ (CESi LiNEACT ); Nathalie ROLLiNG (CCCA-BTP); Franck LENUELLEC (CCCA-BTP) | |
| 12:00-12:25 | **ID:325 Control Algorithm for IoT-Enabled Dual-Axis Solar Tracking System**<br>Victor U Karthik (Spring Arbor University)*; Sebastian Smith (Spring Arbor University); Noah Waldron (Spring Arbor University) | **ID:30 An Optimal Resilience Dispatch Method Integrating Hybrid Energy Resources for a Steel Factory Campus**<br>yi-syuan wu (National Cheng Kung University); Jiantang Liao (National Cheng Kung University); Hong-Tzer Yang (Research Center for Energy Technology and Strategy, Department of Electrical En)* | |
| 12:25-12:50 | **ID:28 From Data to Energy Management: Evaluating and Analysis of Univariate and Multivariate AI Models for Photovoltaic Systems in Smart Grids**<br>Mame Cheikh SOW (CESi LiNEACT)*; youssef JOUANE (CESi LiNEACT ); Mourad ZGHAL (CESi LiNEACT) | **ID:32 Design of Solar Tracking Solarux Fresnel CSP System and Manufacturing Small Scale Model of the System by 3D Printer**<br>OzgU iNCESU (Dokuz Eylul University)*; Evren M Toygar (Dokuz Eyll University); Tufan Bayram (Solarux Alternative Energy Systems); Alihan Metin (Dokuz Eylul University); Mehmet Sahap San (Dokuz Eylul University); Onurcan GUneS (9 EylUl Universitesi) | |
| 12:50-14:25 | LUNCH | | |

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| ORAL PRESENTATIONS | | | | ORAL PRESENTATIONS | | | |
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| **OS 20: Intelligence in Renewable Power Systems: Multi-Domain Perspective for Future Design and Analysis**<br>**CHAIRS: I. E. Davidson, A. A. Periola** | | **SESSION 30**<br>**CHAIRS: Ugwu Jude Okwudili, Cristian G Colombo** | | **SESSION 31**<br>**CHAIRS: Asahi Honda, Yuri Kabashima** | | **SESSION 32**<br>**CHAIRS: Marif Daula Siddique, Zhichen Feng** | |
| **Room** | **101A** | **Room** | **101B** | **Room** | **102** | **Room** | **111** |
| **14:25-14:50** | **ID:42 Design of Bi-Directional DC/ DC Converter System with Adjustable Current and Voltage Profile**<br>Oluwafemi OE ONi (University of Zululand)*; innocent E. Davidson (Cape Peninsula University of Technology); Ndivhuho Nathaniel Muronga (University of Zululand) | **ID:63 Dynamic Determination for Voltage Regulators Parameters by Monitoring Power Flow and Three-Phase Unbalance**<br>TATSUKi OKUNO (Waseda University)*; Akihisa Kaneko (Waseda University); Yu Fujimoto (Waseda University); Yasuhiro Hayashi (Waseda University) | | **ID:48 Coordinated controlled of distributed thermostatically controlled load for frequency regulation and impact on voltage profile of a microgrid**<br>Divine A Okeke (Skolkovo institute of Science and Technology)*; Federico M ibanez (Skolkovo institute of Science and Technology); Elena Gryazina (Skolkovo institute of Science and Technology); Abdullatif Albaseer (Hamad Bin Khalifa University); Mohamed Abdallah (Hamad Bin Khalifa University) | | **ID:96 Imbalance and ICA monitoring for multiple battery-electrolyser cells in series**<br>Hwanil im (Loughborough University); Matthew Beatty (Loughborough University); Matthew Brenton (Loughborough University); Elizabeth Ashton (Loughborough University); Dani Strickland (Loughborough University)* |
| **14:50-15:15** | **ID:65 Performance Improvement Prospect of Electric Distribution in Sub-Saharan Africa Networks**<br>Patrick T Ogunboyo (Olusegun Agagu University of Science and Technology, Okitipupa, Ondo State, Nigeria)*; innocent E. Davidson (Cape Peninsula University of Technology) | **ID:35 ENHANCED SWITCHING SPEED of ELECTROCHROMIC ENERGY STORAGE DEVICES: APPLICATION in SMART WINDOWS**<br>Firoz Khan (King Fahd University of Petroleum & Minerals)*; Masoud Al-Rasheidi (King Fahd University of Petroleum & Minerals); KASHiF iRSHAD (Center of Research Excellence in Renewable Energy (CoRE-RE) King Fahd University of Petroleum and Minerals); M. Abdul Majid (King Fahd University of Petroleum & Minerals) | | **ID:57 Assessing the factors that drive effective decentralized mini-grids deployment in rural Ghana – A case study**<br>Kofi Nyarko (Murdoch University)* | | **ID:97 Durability testing of battery-electrolysers for hydrogen cooking and microgrid applications**<br>Matthew Brenton (Loughborough University); Elizabeth Ashton (Loughborough University); Jonathan Wilson (Loughborough University); Richard Wilson (Loughborough University); Dani Strickland (Loughborough University)* |
| **15:15-15:40** | **ID:66 Impact of DVR in Power Quality Disturbances Mitigation in Sub-Saharan Africa Distribution Systems**<br>Patrick T Ogunboyo (Olusegun Agagu University of Science and Technology, Okitipupa, Ondo State, Nigeria)*; innocent E. Davidson (Cape Peninsula University of Technology) | **ID:321 Advancements In Time-domain-based Protection and Dynamic State Estimation For Power Systems With Inverter-based Resources**<br>Sergio Turizo (Universidad de los Andes), DAVID CELEITA (UNIVERSIDAD DE LA SABANA), Gustavo Ramos (Universidad de los Andes) | | **ID:72 Implementing a High-Frequency Digital SMPS with Microcontroller Hardware Accelerator**<br>Wenhao Lin (imperial College); GUANYiNG CHU (Xi'an Jiaotong-Liverpool University)*; Muyang Li (University of Liverpool); qinglei bu (Xi'an Jiaotong-Liverpool University) | | **ID:101 Grid-Connected Converter Test System with Single DC Power Supply**<br>Tsai-Fu Wu (National Tsing Hua University); Yun-Hsiang Chang (National Tsing Hua University)*; Jui-Yang Chiu (National Tsing Hua University); Chien-Chih Hung (National Tsing Hua University) |
| **15:40-16:05** | **ID:390 Unlocking Energy Stability: An Approach to Managing Load Shedding in eThekwini Municipality by Leveraging the Potential of Battery Energy Storage Systems**<br>innocent E. Davidson (Cape Peninsula University of Technology)*; Leshan Moodliar (Cape Peninsula University of Technology) | **ID:319 A Case Study For Energy Management In Food Production Facilities Through Data Analysis**<br>DAVID CELEITA (UNIVERSIDAD DE LA SABANA), Ivan Rivera (Universidad del Rosario), Daniel Zorrilla (Universidad del Rosario), Juan Martínez (Universidad Militar Nueva Granada) | | **ID:88 State-of-charge Balancing Control Utilizing the Circulating Current for Battery Energy Storage System**<br>Tsuyoshi Omi (HiTACHi,LTD.)*; Tomoyuki Hatakeyama (HiTACHi,LTD.) | | **ID:102 Effect of Surface Texturing on Sliding of Adhered Snow and Ice**<br>Ryo SUZUKi (Kumamoto university)*; Yuchao LiU (Kumamoto University); Yuta NAKASHiMA (Kumamoto University); Yoshitaka NAKANiSHi (Kumamoto University) |
| **16:05-16:30** | **ID:391 In-orbit Performance Evaluation of the MDASat-1 CubeSat Power System**<br>Innocent E. Davidson (Cape Peninsula University of Technology)*; Sinamandla Magina (Cape Peninsula University of Technology); Lilie N Leopold (Cape Peninsula University of Technology); Nyameko Royi (Cape Peninsula University of Technology); Ayodele Periola (Cape Peninsula University of Technology); gunjan Gupta (Cape Peninsula University of Technology); Balyan Vipin (Cape Peninsula University of Technology); Janvier Kamanzi (Cape Peninsula University of Technology); Oluwaseyi Babalola (Cape Peninsula University of Technology); Ayokunle Ayeleso (Cape Peninsula University of Technology) | **ID:95 Battery-electrolyser low-pressure management system**<br>Freddie Wollen (Loughborough University); Richard Wilson (Loughborough University); Elizabeth Ashton (Loughborough University); Paul Holland (Loughborough University); Jonathan Wilson (Loughborough University); Dani Strickland (Loughborough University)* | | **ID:94 Economic Viability of a Battery-electrolyser System for Frequency Response and Hydrogen Production**<br>Callum Reed (Loughborough University); Elizabeth Ashton (Loughborough University); Dani Strickland (Loughborough University)* | | **ID:269 Assessment of large-scale solar photovoltaic potential on building roofs and facades using geo-aware graph attention networks**<br>Zheng Li (The university of Hong Kong); jun ma (HKU)* |
| **16:30-16:55** | | **ID:394 Energy and Labor Saving In A Smart Fishery At Coast**<br>Kazuhiko MATSUOKA (Nagasaki Institute of Applied Science) | | **ID:179 Challenges Toward Commercializing Tidal Power Technology Outcomes and Prospects from Japan's First Large-Scale Demonstration Project**<br>Katsuhiro Henzan (Kyuden Mirai Energy Company, incorporated)*; Toshihiko Furue (Kyuden Mirai Energy Company, incorporated) | | **ID:105 Novel Model of Reverse Transfer Capacitance for Gate Driver Optimization**<br>Seiya Abe (Kyushu institute of Technology); Gen ishibashi (Kyushu institute of Technology)*; Hiroki ishibashi (Omron Corporation); Noriyuki Nosaka (Omron Corporation); Takeshi Uematsu (Omron Corporation) |
| 16:55-17:30 | **CLOSING CEREMONY (Room:102)** | | | | | | |

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| ORAL PRESENTATIONS | | | |
| O 21: Energy Engineering in Renewable Energy, Electronics, and Communications - Power Electronics in Electronics and Communication<br>CHAIRS: Hiroo Sekiya, Yu Yonezawa | | SESSION 33<br>CHAIRS: Youssef JOUANE, Yi-Syuan Wu | |
| Room | 110 | Room | 112 |
| 14:25-14:50 | **ID:347 Enhancing Power Efficiency by Integrating Processor Performance Metrics with Power Supply Phase Control**<br>Shinichi Kawaguchi (Kanagawa institute of Technology)* | **ID:127 LVDC Sourced Ultra-Low-Profile LED Drivers Using GaN Power Transistors**<br>Satoshi ikeda (Panasonic)*; Maeda Natsuki (Panasonic industry Co., Ltd.); Kimihiro Nishijima (Sojo University) | |
| 14:50-15:15 | **ID:401 Unbalanced Three-phase Flying-capacitor Converter for Current Ripple Reduction**<br>Keisuke Kusaka (Nagaoka University of Technology); Shinjiro Shimura (Nagaoka University of Technology)* | **ID:129 Feasible Sub-Network Enumeration and Combination Approach for Loss Minimization in Locally PV-Dense Distribution Networks**<br>Erina Sato (Waseda University)* | |
| 15:15-15:40 | **ID:361 Development of Sinusoidal Converter and Inverter with Active LC Filter by Optimal Voltage Control Based on IRM-ILQ Control Method**<br>Hiroshi Takami (Shibaura institute of Technology)* | **ID:19 Efficient Green Hydrogen Production From Wind Power: A System Design Perspective Regarding Optimal Operating Pressure For Alkaline Electrolyzers**<br>Lisa Marie Dannappel (Technical University of Denmark), Lucas Cammann (Norwegian University of Science and Technology), Yi Zong (Technical University of Denmark), Johannes Jäschke (Norwegian University of Science and Technology) | |
| 15:40-16:05 | **ID:353 Estimating the Switching Lifetime of GaN HEMT under Soft-Switching Operation**<br>HiROKAZU OKi (ROHM)*; HiROSHi YAMASHiTA (ROHM); TOSHiYUKi ZAiTSU (ROHM); WARNAKULASOORiYA THiYU (Nagoya University); SiHOON CHOi (Nagoya University); YU YONEZAWA (Nagoya University) | **ID:144 Evaluation of the Impact of Uncertainty on Reactive Power Reduction through Fixed Power Factor Adjustment of PV Systems in Medium-Voltage Distribution Network**<br>Satoru Akagi (Tokyo Electric Power Company Holdings, inc.)*; Sayaka Kaburagi (Tokyo Electric Power Company Holdings, inc.); Kazunari ishibashi (Tokyo Electric Power Company Holdings, inc.); Kazuki Okumura (TEPCO Power Grid, incorporated); Ryo Maeda (TEPCO Power Grid, incorporated) | |
| 16:05-16:30 | **ID:205 A Novel Estimation Method for Equivalent Series Resistance of Film Capacitors Considering Frequency Characteristics**<br>Yusuke Sawada (Nagoya University)*; Sihoon Choi (Nagoya University); Yu Yonezawa (Nagoya University); Jun imaoka (Nagoya University); MASAYOSHi YAMAMOTO (Nagoya University); Toshiumi Tatsuki (Toray industries, inc.); Masatoshi Ohkura (Toray industries, inc.) | **ID:257 Design and Lag compansated control of a GaN based Phase Shifted Full Bridge Converter**<br>Selim Bayram (Gazi University, Roketsan); Korhan KAYiSLi (Gazi University)*; Abdelfatah Nasri (Tahri Mohamed Bechar University) | |
| 16:30-16:55 | | **ID:23 The role and benefits of residential photovoltaic prosumers on rooftops and contribution towards the energy transition. Galapagos case study**<br>Daniel Icaza (Catholic University of Cuenca, Cuenca, Ecuador)* Fernando González Ladrón de Guevara ( Universitat Politècnica de València) | |
| 16:55-17:30 | CLOSING CEREMONY (Room:102) | | |

## Date: November 11, 2024 13:30-15:00

## POSTER SESSION PS1 at Event-Exhibition Hall

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| PS1-1 | **ID:46 Impact of key technological parameters on sulfur production processes**<br>Batyr Orazbayev (L.N.Gumilyov Eurasian National University); Ainur Zhumadillayeva (L.N.Gumilyov Eurasian national universit)*; Kulman Orazbayeva (L.N.Gumilyov Eurasian national universit); Nazgul Kurbangalieva (L.N.Gumilyov Eurasian national universit) |
| PS1-2 | **ID:83 Hybrid Renewable Energy Systems and Their Optimization for Remote Community Applications**<br>Kuanrong Qiu (CanmetEnergy-Ottawa)* |
| PS1-3 | **ID:91 Optimal Planning of Water-Energy Nexus on DC Island Microgrid with RESs**<br>Qingjie Le (University of Macau)*; Hongcai Zhang (The State Key Laboratory of internet of Things for Smart City and the Department of Electrical and Computer Engineering, University of Macau, Macao, 999078 China.) |
| PS1-4 | **ID:117 Artificial Neural Network-based Grid Impedance Identification Method of Grid-connected Converter with Grid-following and Grid-forming Control**<br>Yuan Qiu (Aalborg University); Yanbo Wang (Aalborg University)*; Zhe Chen (Aalborg university) |
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| PS1-6 | **ID:136 Field-Oriented-Control of a Reduced Order Model of a Nine-Phase PMSM in Healthy and Faulty Case**<br>Michael Mangels (Technical University of Munich), Michael Ebnicher (Technical University of Munich), Thomas Egerbacher, Jörg Kammermann (Technical University of Munich), Hans-Georg Herzog (Technical University of Munich) |
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| PS1-9 | **ID:181 Grid Voltage Control of Energy Storage System using Dual Active Bridge Converter**<br>Kazuaki Miyamoto (Nagasaki University); Shin-ichi Hamasaki (Nagasaki University)*; Tetsuji Daido (Nagasaki University) |
| PS1-10 | **ID:188 Impact of Grid Faults on Grid-Following Converter Controller Operation and Phase Instability**<br>Yeuntae Yoo (Myongji University)*; inChan Hong (Myongji University) |
| PS1-11 | **ID:204 Position Sensorless Control of Switched Reluctance Generator using State Observer**<br>Yoshihiro Nakazawa (Kanagawa University)*; Yoshiaki Shinoda (Kanagawa University); Hirotsugu Kinoshita (Kanagawa University) |
| PS1-12 | **ID:206 Transient Stability Data Driven Special Protection Scheme using Deep Reinforcement Learning**<br>Yoongun Jung (Korea Univ)*; Seokjun Kang (Korea Univ); Kwanghyun Kim (Korea Univ); Hyeon Woo (Korea Univ); Sungyoon Song (Tech University of Korea); Minhan Yoon (Kwangwoon Univ); Sungyun Choi (Korea Univ); Gilsoo Jang (Korea Univ) |
| PS1-13 | **ID:148 PV Power Generation System Recently Installed on Railway Station Platforms**<br>Junichi Obama (East Japan Railway Company)*; Masayo Hatae ( East Japan Railway Company); Ushio Otogawa (East Japan Railway Company) |
| PS1-14 | **ID:167 Design of Phase-Shifted Full-Bridge DC-DC Converter for Micro EV**<br>Keisuke Tokuyasu (Aisan industry Co., Ltd.)*; Kazuhiro Kajiwara (Nagasaki institute of Applied Science); Yudai Furukawa (Nagasaki institute of Applied Science); Hideo Fukumori (Aisan industry Co., Ltd.); Fujio Kurokawa (Nagasaki institute of Applied Science) |
| PS1-15 | **ID:168 A Common-Signal Driven Split Output Gate Driver for Si/SiC Hybrid Switches to Realize Zero-Voltage Switching**<br>Yohei Nakamura (ROHM Co., Ltd.)*; Atsushi Yamaguchi (ROHM Co., Ltd.); Junichi Kashiwagi (ROHM Co., Ltd.); Ken Nakahara (ROHM Co., Ltd.) |
| PS1-16 | **ID:169 Continuous Operation of GFM Inverter with Carrier Frequency Reduction and One-Pulse Modulation Under Overcurrent Condition**<br>Ryota Nakanami (Nagaoka University of Technology)*; Yushi Miura (Nagaoka University of Technology); Yoshinobu Ueda (Meidensya Corp); Toshiya inoue (Meidensya Corp) |
| PS1-17 | **ID:177 Electric Power Control of a Heat Generation System using a Rotating Heater**<br>Hiroki Saito (Nagaoka University of Technology)*; Yushi Miura (Nagaoka University of Technology); Satoshi imamori (Fuji Electric Co., Ltd.); Hideki Ohguchi (Tokai University); Toru Okazaki (The institute of Applied Energy) |
| PS1-18 | **ID:185 Bidirectional Charging Systems in Industrial DC Microgrids – Outlook and Modeling**<br>Lucas E. Marra de Lima (Fraunhofer-institut fUr Produktionstechnik und Automatisierung iPA)*; Janosch Christian Hecker (Fraunhofer institute for Manufacturing Engineering and Automation) |
| PS1-19 | **ID:351 Estimated Energy Balance for Shuttle Service of Nursing Home-Collaborated Hospital Assuming EVs**<br>Koki Kumaoka (Osaka Electro-Communication University); Tomoya inagata (Nagasaki institute of Applied Science); Nobumasa Matsui (Nagasaki institute of Applied Science); Choi Jiyoung (Nagasaki institute of Applied Science); Fujio Kurokawa (Nagasaki institute of Applied Science); Yuji Mizuno (Osaka Electro-Communication University)* |
| PS1-20 | **ID:199 Evaluation of Monopolar Fault-Tolerant Operation Capability of Multi-Active-Bridge Converters in Bipolar DC Systems**<br>Yijia Chen (Shanghai Jiao Tong University); ma jianjun (Shanghai Jiao Tong University); Miao Zhu (Shanghai Jiao Tong University)*; Zhengmei Lu (Shanghai Jiao Tong University) |
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| PS1-23 | **ID:398 Bidirectional DC-DC Converter Based on Degradation Characteristics of GaN FET**<br>Kazuhiro Kajiwara (Nagasaki institute of Applied Science)*; Toshifumi Konishi (NTT Advanced Technology Corporation); Tohru Kodaira (NTT Advanced Technology Corporation); Ryo ishikawa (NTT Advanced Technology Corporation); Kazuhiro Takahashi (NTT Advanced Technology Corporation); Yoshiharu Akiyama (NTT Advanced Technology Corporation); Nobumasa Matsui (Nagasaki institute of Applied Science); Fujio Kurokawa (Nagasaki institute of Applied Science) |

## Date: November 12, 2024 13:30-15:00

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| | |
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| PS2-1 | **ID:210 Experimental Validation of the Simulation Scheme Estimating the Freewheeling Transistor Surge Voltage During the Switching-Side One Turn-on Transient in a Half-Bridge Circuit**<br>Toshikazu Harada (ROHM Co., Ltd.)*; Tatsuya Miyazaki (ROHM Co., Ltd.); Yuta Okawauchi (ROHM Co., Ltd.); Ryosuke ishido (ROHM Co., Ltd.); Ken Nakahara (ROHM Co., Ltd.) |
| PS2-2 | **ID:262 Optimization of Substation Transformer Tap Adjustment Control Using Digital Twin Database**<br>Byeong Chang Lim (Myongji University); Yeuntae Yoo (Myongji University)* |
| PS2-3 | **ID:268 Phase-Shifted Full-Bridge Converter with High Efficiency**<br>HANBiN KiM (Jeonbuk National University)* |
| PS2-4 | **ID:286 Fast-Responding and Flexible Energy Storage Systems for Renewable Integration: Challenges and Opportunities**<br>Alperen Mustafa Colak (TMEiC)* |
| PS2-5 | **ID:294 Reinforcement Learning-Based HVAC System Operation Under Limited Data Acquisition**<br>Ye-Eun Jang (Electronics and Telecommunications Research (ETRI))*; Wan-Ki Park (Electronics and Telecommunications Research (ETRI)) |
| PS2-6 | **ID:302 Impact of Demand-Solar Irradiance Correlation on the Optimal Sizing of ESS for PV Generators**<br>Seungyeop Baek (Myongji University); Yeuntae Yoo (Myongji University)* |
| PS2-7 | **ID:307 A 2LLC2L Filter Design and Optimization for Grid-Connected Solar PV Inverters**<br>Adel Nasiri (University of South Carolina)*; Mohammad Vafadar (University of South Carolina); Hossein Vafadar (islamic Azad university Jouybar branch) |
| PS2-8 | **ID:313 Core Loss Measurement Method for Magnetic Materials Using Boost Converter**<br>hyeon jung kim (Jeonbuk National University)* |
| PS2-9 | **ID:335 A Soft-Switching Modular Three-Phase Dynamic Voltage Restorer with Fictitious DC-Link**<br>Maoh Chin Jiang (National ilan University)*; Ya-Chi Chien (National ilan University); Rong Jun Ma (National ilan University) |
| PS2-10 | **ID:195 A hydrogen-driven technology mapping for future energy systems**<br>Saiyam Marahatta (University of South-Eastern Norway); Amir Safari (University of Southeast Norway (USN))* |
| PS2-11 | **ID:432 Assessment of Reliability Indicators of Power Supply Systems with Two-Transformer Substations During Technical and Economic Calculations**<br>Stanimir Valtchev (FCT/UNL)*; Rosario Miceli (University of Palermo); Renata Petrova (Kazan State Power Engineering University); Elena Gracieva (Kazan State Power Engineering University); ilhami Colak (istinye University); Fujio Kurokawa (Nagasaki institute of Applied Science) |
| PS2-12 | **ID:433 Assessment of Reliability Indicators of In-Plant Power Supply Systems with Two-Transformer Substations**<br>Stanimir Valtchev (FCT/UNL)*; Rosario Miceli (University of Palermo); Renata Petrova (Kazan State Power Engineering University); Elena Grachieva (Kazan State Energy University); ilhami Colak (istinye University); Fujio Kurokawa (Nagasaki institute of Applied Science) |
| PS2-13 | **ID:434 Investigation of Cable Line Heat Mode Parameters in Power Supply Systems**<br>Stanimir Valtchev (FCT/UNL)*; Rosario Miceli (University of Palermo); Elena Gracheva (Kazan State Power Engineering University); Almaz Petrov (Kazan State Power Engineering University); ivan Tsitson (Kazan State Power Engineering University); ilhami Colak (istinye University) |
| PS2-14 | **ID:435 Method for Estimating Power Losses in Low-Voltage Networks**<br>Stanimir Valtchev (FCT/UNL)*; Rosario Miceli (University of Palermo); Almaz Petrov (Kazan State Power Engineering University); Elena Gracheva (Kazan State Power Engineering University); ilhami Colak (istinye University); Fujio Kurokawa (Nagasaki institute of Applied Science) |
| PS2-15 | **ID:216 Extracting an experimental formulation for power loss prediction in a laboratory-scale grid-forming converter**<br>Kazem Pourhossein (Helmut Schmidt University)*; Edgar Diego Gomez Anccas (Helmut Schmidt University); Detlef Schulz (Helmut Schmidt University) |
| PS2-16 | **ID:222 High boost-ratio multi-source inverter based on sinusoidally modulated floating-output series-interleaved GaN converter**<br>Tenshin Kamahara (Kindai University)*; Hinano Ushiba (Kindai University); Masataka Minami (Kindai University); Alberto Castellazzi (Kyoto University of Advanced Science) |
| PS2-17 | **ID:224 Current-Limiting Vector Control for Pulse-Load Power Supply**<br>Lixian Zhang (Shanghai Jiao Tong University); ma jianjun (Shanghai Jiao Tong University); Miao Zhu (Shanghai Jiao Tong University)*; Shuli Wen (Shanghai Jiao Tong University) |
| PS2-18 | **ID:228 Efficient integration of industrial sector coupling systems in DC distribution grids**<br>Janosch Christian Hecker (Fraunhofer institute for Manufacturing Engineering and Automation)* |
| PS2-19 | **ID:242 Suitability of a Permanent Magnet Synchronous Generator with Magnetic Gear for Wind Power Generation**<br>Daniel Fodorean (Technical University of Cluj-Napoca)*; claudia violeta pop (Technical University of Cluj Napoca) |
| PS2-20 | **ID:131 Self-Excited Synchronous Machines used for Small Wind Power Applications**<br>Daniel Fodorean (Technical University of Cluj-Napoca)* |
| PS2-21 | **ID:272 Steady State Characteristics of Push-Pull Converter with Asymmetric Operation for Wide Input Voltage Range**<br>Atsushi Fujii (Kyushu institute of Technology)*; Seiya Abe (Kyushu institute of Technology) |
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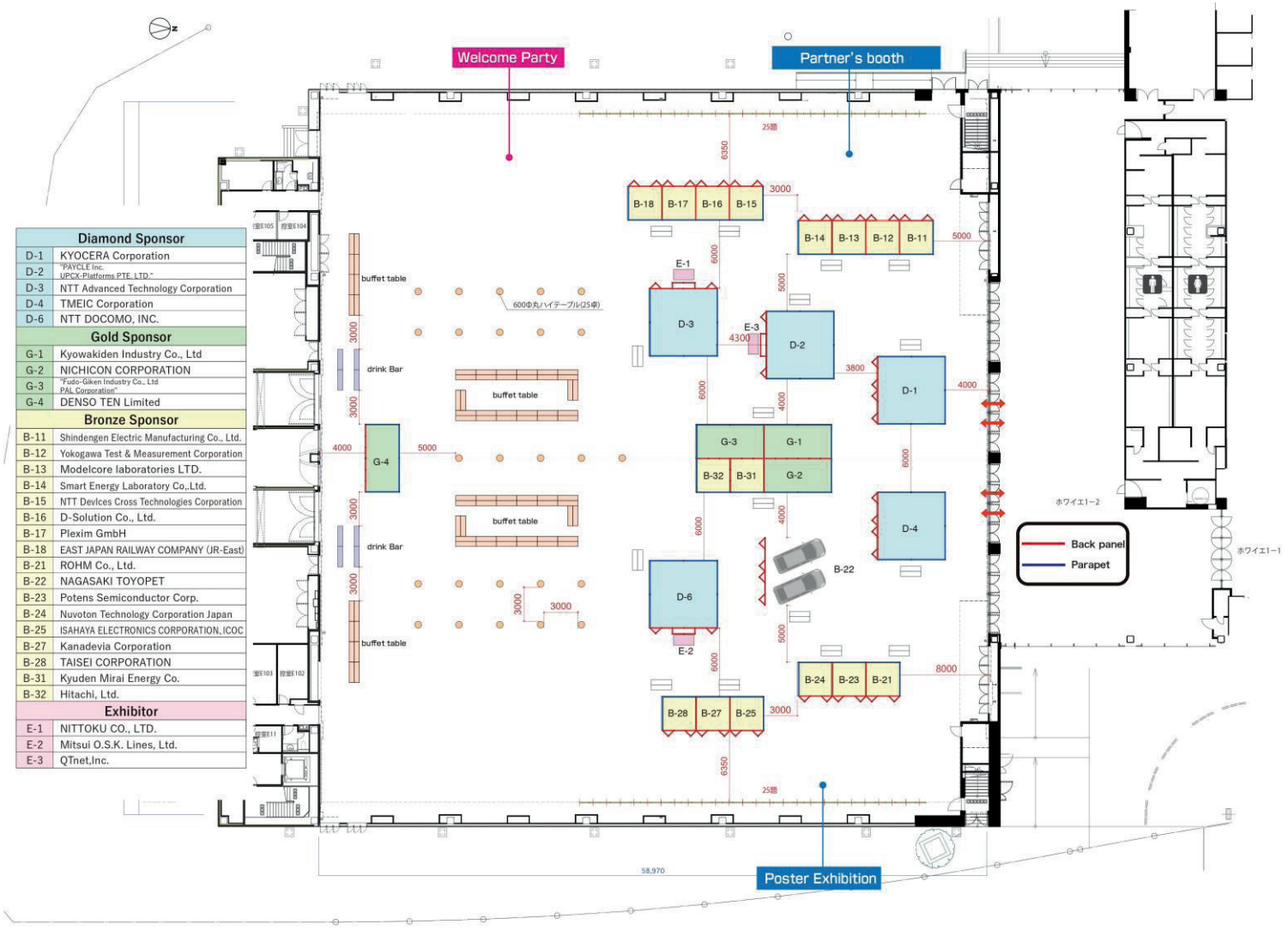
| PS2-25 | **ID:301 DC Microgrid Reliability Enhancement with Adaptive Converter Thermal Management**<br>Xiangchen Zhu (Aalborg university)*; Pengxiang Huang (National Renewable Energy Laboratory); Yanbo Wang (Aalborg University); Hanwen Zhang (Aalborg university); Ruizhi Wei (University of Alberta); Yunwei(Ryan) Li (University of Alberta); Zhe Chen (Aalborg university) |

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## Exhibition layout

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| No. | Sponsor Company | Exhibition No. | Class |
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| 1 | KYOCERA Corporation | D-1 | Diamond |

Since Kyocera was founded in 1959, we have grown our business based on the Management Rationale developed by our founder, Dr. Kazuo Inamori: “To provide opportunities for the material and intellectual growth of all our employees, and through our joint efforts, contribute to the advancement of society and humankind.”

Changes in societal and economic structures are progressing rapidly, on a larger scale, and based on new perspectives, unlike anything we have seen before. As a result, we expect many new business opportunities, but as a truly global company, we also have a responsibility to tackle a broad range of issues facing society.

For the Kyocera Group to contribute to society, continuously improve our corporate value, and uphold our Management Rationale, we believe it is necessary to continue taking on new challenges rather than being bound by traditional ways of thinking.

With a sense of urgency in response to our changing times, we aim to enhance Kyocera's corporate value and achieve a sustainable society by applying all of our technological capabilities and management resources, and by helping every employee reach their full potential.

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| 2 | Paycle Inc. & UPCX-Platforms PTE. LTD. | D-2 | Diamond |

Paycle Inc. is engaged in blockchain, fintech, AI, and quantum-resistant cryptography research. We aim to combine these technologies to provide sustainable services addressing environmental and economic challenges. We maximize this knowledge, technology, and experience to contribute to a more robust global economy through secure and efficient environmentally sound solutions. We strive to bridge the gap between technological development and environmental protection to deliver long-term value for businesses and society.

UPCX-Platforms PTE. LTD. has a mission to provide payment systems that meet the evolving needs of society, making transactions more enjoyable and exciting. To this end, we are developing "UPCX," an open-source payment system that leverages high-speed blockchain technology.

UPCX achieves performance and scalability comparable to credit cards and mobile payments, enabling quick transactions. By delivering a user experience that is on par with existing payment solutions, users can utilize blockchain technology unconsciously. Based on such blockchain and applications that offer high-speed transactions and user experiences at the level of existing financial systems, a diverse ecosystem is formed, providing a payment system that anyone can easily use.

Furthermore, UPCX-Platforms PTE. LTD. will develop a high-performance blockchain to process vast amounts of information belonging to an unspecified large number of users, originating from IoT and sensing devices, leveraging the experience and knowledge accumulated during the development of UPCX. When you handle such massive data, it is necessary to improve software aspects like algorithms and explore eco-friendly methods suitable for the coming era in infrastructure development, such as reducing power consumption.

UPCX-Platforms PTE. LTD. intends to engage in various initiatives, including developing advanced data processing methods that combine both software and hardware aspects, by collaborating not only within our company but also with prominent external partners.

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| 3 | NTT Advanced Technology Corporation | D-3 | Diamond |

NTT Advanced Technology Corporation continues to take on the challenge of creating new value to solve your various issues.
Here we would like to introduce you following our several solutions related to renewable energy and energy harvesting.
These solutions are expected to contribute carbon neutrality.

a. SQPV (Solar Quartz Photovoltaic) glass
   SQPV glass is one of a future glass allows light to pass through and generates electricity. Thermal barrier effect is also expected.
b. Energy management system in a specific area (ENEPILOT)

ENEPILOT aggregates renewable energy resources and energy storage operated in specific areas such as municipalities, and contributes to local production for local consumption of energy by controlling the renewable energy resources to maximize their output power.

Portable lithium-ion batteries are also used for an example of energy storage.

c. Hydrogen fuel cell *reference exhibition

An Alkaline Fuel Cell which is rugged, reliable, and resilient, leverages hydrogen to output 48 V direct current power of long-duration, zero-emission.

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| 4 | TMEIC Corporation | D-4 | Diamond |

The main theme of TMEIC's exhibition booth is "Sunlight and Hydrogen," and it introduces new carbon-neutral initiatives.

In addition to dioramas, videos, and panel displays, the booth is also full of interesting information, including green hydrogen, a carbon-neutral initiative that uses solar power to generate hydrogen, unusual gravity and microbial energy storage, carbon-neutralization of port-related facilities, and an electric propulsion ship.

In addition, panels about the motors and drive devices that are the basis of these systems are also on display.

At our booth, we have created a carbon-neutral town using Lego blocks, and our TMEIC man is waiting for you at the front of the booth.

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| 5 | NTT DOCOMO, INC. | D-6 | Diamond |

NTT DOCOMO Group (DOCOMO Group) announced its “Net-Zero by 2040” plan for achieving Net-Zero carbon emissions across the company's entire supply chain by 2040. The plan builds on DOCOMO Group's existing 2030 Carbon Neutrality Declaration, which commits the company to effectively reducing greenhouse gas emissions from its business operations to Net-Zero by 2030. NTT DOCOMO, INC. (DOCOMO) has been developing DOCOMO Energy Management System (DOCOMO EMS) to achieve Net-Zero.

DOCOMO constructs green base stations with solar panels to reduce greenhouse gas emissions from base stations, which account for about 70% of its total power consumption. DOCOMO EMS controls batteries to use renewable energy effectively.

Also, DOCOMO implements Demand Response (DR) with batteries installed in base stations and DOCOMO shops for disaster use. DOCOMO EMS controls batteries optimally to meet the DR amount required from utilities.

DOCOMO conducts battery management for schools, applying the above technology outside the company. DOCOMO EMS monitors the batteries to ensure their use in disasters and control them to reduce electricity cost.

DOCOMO tries to apply its power monitoring and control technology to households as well. It is developing algorithms to reduce household electricity cost through scheduled operation of electric vehicles, storage batteries, and appliances in price-based DR, which sets flexible electricity usage charges depending on market demands. Also, DOCOMO studies how to encourage users to save power, using an agent that analyzes their lifestyle data and offering tailored energy-saving tips easy to execute.

DOCOMO predicts power demand to manage energy considering the future. It uses past power demand data, weather condition data, and human flow data based on location information acquired from smartphones.

DOCOMO thus aims to realize optimal energy management for a whole society, consolidating energy resources within and outside the company with its technology.

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| 6 | Kyowakiden Industry Co., Ltd | G-1 | Gold |

Title: "Nanostep®, Real-Time Simulation for SiC/GaN Devices with 1.5 MHz Switching Frequency."

The high switching frequencies of converters with GaN and SiC components pose a challenge for real-time simulators used for hardware-in-the-loop testing of control systems. To overcome this issue, Plexim has developed Nanostep®. The new Nanostep® solver enables real-time simulations on the RT Box with step sizes as low as 4ns, making it the perfect technology for WBG converters.

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| 7 | NICHICON CORPORATION | G-2 | Gold |

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| 8 | Fudo-Giken Industry Co., Ltd<br>& PAL Corporation | G-3 | Gold |

Delivering a sustainable future from Nagasaki, we add a new value to the future of wind-power generation.

Fudo-giken industry can respond to various needs with XR technology.

- iNADA WIND: used for DX of Operation and Maintenance
  iNADA WIND is maintenance optimization system for wind turbine, in this system the inspection is done on the smartphone and a report is prepared automatically.
- Scenery Simulator: Simulate a Wind Farm Scene using VR and AR Technology
  The scene of wind farm is easily changed by view point, time, season, weather and layout of wind turbine.
- Chokai: Blade defect Detection Technology using Acoustic Signals
  This technology is focusing on the 1N component of time-frequency analysis of acoustic signal. And the technology is implemented to smartphone. Blade defect is detected by just two taps.

Pal corporation can provide the services of structural design and analysis for various structures as structural consulting engineers. And for spread of renewable energy we have engaged in the services of wind condition analysis and wind condition measurement as well as structural design and analysis of tower and foundation.

Based on these experiences and development of technologies, we provide the following services for supporting the construction of wind power generation facilities. We try to optimize the tower and foundation for reduction of the construction costs. The wind resource is calculated and the best site of wind power generation facility is selected by analysis and measurement of wind speeds and directions. In addition, we provide the services of environmental impact assessments such as noise level and shadow flicker, and obtaining Wind Farm Certification.

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| 9 | DENSO TEN Limited | G-4 | Gold |

DENSO TEN is a global comprehensive car electronics manufacturer. Up until now, we have been involved in products that improve the value of cars, such as car navigation systems, drive recorders, and electronic control units for hybrid systems.

Currently, we are expanding our business in two areas: the "HMI Solution Business" and the "Electronics and Electrification Business." In the HMI Solution Business, we aim to achieve a human-friendly HMI optimized for each individual by utilizing in-vehicle edge AI and information communication technology to analyze the driver's condition and the surrounding environment of the vehicle. Furthermore, by collaborating with

advanced driver assistance systems (ADAS), we contribute to maximizing the safety, comfort, and excitement of drivers and passengers.

Next is the Electronics and Electrification Business. For next-generation vehicles, we provide core products (ECUs) utilizing control system technology, aiming to contribute to the realization of carbon neutrality and safe, secure mobility.

Through our in-vehicle electronic devices and services that are friendly to people and the environment, DENSO TEN contributes to society in the areas of "environment" and "security" We continue to challenge ourselves towards the realization of a carbon-neutral society and a society where everyone can enjoy safe and secure mobility without traffic accidents.

During the conference period, we will be exhibiting in-vehicle multimedia devices, in-vehicle sound system, home audio systems, and more.

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| 10 | Shindengen Electric Manufacturing Co., Ltd. | B-11 | Bronze |

Shindengen will showcase our newly developed Bidirectional Power Conditioner for V2G: EVS010T200A in upcoming ICRERA. This product can supply power from EVs to three-phase loads.

Shindengen is one of the few manufacturers making all three core technologies necessary for power supplies: power semiconductor manufacturing, circuit design technology, and system mounting technology for in-vehicle electrical components, and other products. These core technologies combine to streamline and optimize the entire power supply manufacturing process, making Shindengen unparalleled in the industry.

Shindengen's 14 domestic and 16 international bases make us a truly global company, with overseas sales accounting for more than 60% of total sales. We boast the world's top share of the regulator market for motorcycles, which is mainly popular in Asia. We also have a top share of bridge diodes, one of the most-used power semiconductors in home appliances.

Throughout our history, we have listened closely to our customers, tried to foresee what's coming in society, and played a significant role in cultivating expertise in our field. This has always been the spirit of our company. Today and tomorrow, we will continue striving to integrate leading technology and our extensive experience into our company spirit so that we can deliver optimum value.

By rising to the challenge of realizing ever greater energy efficiency, we will help protect the natural environment. Through ever better products and systems, we will contribute to the growth of society and create a future that solves problems and benefits people.

True innovation happens when the power supplies become smaller and lighter, improving power conversion efficiency and reducing the environmental impact in the process. The sooner we innovate power supplies, the sooner we realize the dream products of the future.

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| 11 | Yokogawa Test & Measurement Corporation | B-12 | Bronze |

Yokogawa Test & Measurement is committed to the development and manufacturing of high-precision measuring instruments for accurately measuring power conversion efficiency in the generation, transmission, distribution, and storage of electrical energy, as well as for monitoring the behavior of power conversion devices. These efforts are aimed at contributing to the realization of a sustainable society. In the field of renewable

energy, improving the efficiency of inverters that convert DC to AC while minimizing power loss is crucial.

We will exhibit the DLM5000HD high-resolution oscilloscope to evaluate whether inverters are switching at the correct timing. This model features 8-channel input and 12-bit high resolution in a single unit. If needed, the number of channels can be expanded by precisely synchronizing two units.

To contribute to improving power conversion efficiency through precise power measurement, we will also exhibit the WT5000, a 7-channel input high-precision power analyzer that achieves world-class measurement accuracy. It allows for the easy connection of current sensors for measuring large currents with a single dedicated cable. Additionally, the WT5000 can continuously output waveform data input to the device to a PC at up to 2MS/s.

The DL950 ScopeCorder, an integrated measuring instrument, captures and records large voltages from low to 1000V, drive currents, rotation angles, vibration, strain, and temperature simultaneously. It is optimal for multi-channel measurements and capturing transient phenomena in motors and inverters that were previously difficult to observe.

By combining the WT5000, the DL950, and the IS8000 software, it is possible to precisely synchronize and display reliable power measurement values, high-speed voltage/current waveforms, and motor torque waveforms as integrated measurement data, enabling comprehensive analysis.

Yokogawa Test & Measurement serves as a bridge to a better future through advanced measurement technologies, supporting the realization of a sustainable society from the perspective of measurement as an essential infrastructure.

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| 12 | Modelcore laboratories LTD. | B-13 | Bronze |

Modelcore Laboratories solves power electronics problems using modeling technology. We provide detailed modeling and analysis of power circuits using SPICE (LTspice, Qspice), control design using the MATLAB/Simulink and software implementation using model-based technology, and analysis using the Scideam and the PLECS. At the exhibition booth, The totem-pole PFC model-based development kit and noise analysis by the Scideam will be demonstrated. Please feel free to stop by our booth.

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| 13 | Smart Energy Laboratory Co,.Ltd. | B-14 | Bronze |

Scideam is a Japanese high-speed circuit simulator specialized in power generation and power electronics development. With over 30 years of experience in computational algorithms, along with a newly developed circuit editor and waveform viewer, Scideam offers a comfortable simulation environment. Scideam has been trusted by switching power supply manufacturers, power electronics manufacturers, home appliance manufacturers, and automobile manufacturers in Japan.

Key Features:

- Fast and Stable Analysis: Automatically resolves both analysis time and convergence issues.
- Loss Analysis: Fully automated and fast, capable of analyzing losses in any component.
- Motor Control: Achieve high-speed motor system simulations with Scideam.

At our booth, we will be demonstrating Scideam, including its free version, and showcasing our product lineup.

Experience the speed and stability of our advanced analysis firsthand!

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| 14 | NTT DevIces Cross Technologies Corporation | B-15 | Bronze |

NTT Device Cross Technology Corporation supports customers' manufacturing by synergizing optical communication device technology and ICT hardware technology.

- Design services for analog ASICs, high-speed signal boards, and energy management systems.
- Analysis and evaluation services that visualize before production to predict effects and improve quality by visualizing the actual product.
- Prototyping and mass production support services that quickly turn ideas into reality and extract issues.

Based on our extensive analysis and testing technologies, our specialized engineers provide total support for customers' product development to improve design reliability, reduce costs, and shorten development times.

In this exhibition, as an example of energy management system development, we will demonstrate a DC-DC power converter for a photovoltaic power generation and hydrogen production system that applies the model-based development method. The demonstration system consists of a pseudo solar cell power supply, a DC-DC power converter, and a diode load for a pseudo-water electrolysis cell. Our original DC-DC power conversion device is configured in parallel, and maintains high power conversion efficiency at all times by controlling the number of parallel operations of the DC-DC power conversion device according to the intensity of solar radiation as well as the maximum power point tracking (MPPT) operation of the solar cells.

Please see the system verification and optimization through model simulation, the operation of the DC-DC power converter in response to changes in solar cell output, and the actual operation of the water electrolysis cell to see changes in the amount of hydrogen produced. We will also introduce our other services.

We look forward to seeing you at our exhibition booth.

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| 15 | D-Solution Co., Ltd. | B-16 | Bronze |

We are D-sol. D-Sol is an IT and paper solutions company. The founder of D-sol is from Nagasaki Prefecture and we are really looking forward to participating in this event. This time, we would like to introduce two D-sol's carbon dioxide reduction proposals.

The first is a "plastic-free" proposal. We made a new file folder with paper without polypropylene. By replacing polypropylene with paper, CO2 will be significantly reduced. First of all, CO2 emissions in the process of manufacturing paper materials to files have been reduced to one-third. In addition, paper is a wooden product. Trees fix CO2 during their growth process. The material of the paper is pulp. The material of the pulp is wood. We can say that CO2 is reduced in the manufacturing process of paper materials.

As a result of the above process, CO2 emissions can be reduced in both the paper manufacturing process and the paper material manufacturing process.

These paper files are available in the market. If polypropylene files are replaced by paper files, it will have a huge effect on reducing CO2. We launched this product four years ago and have sold 2.3 million copies so far. The reduction of CO2 in production per piece is 85.8 (g-CO2). When calculated, it was reduced by 450 million (t-CO2).

The second is "Agricultural Initiatives." We aim for IT agriculture. Here, we evaluate CO2 positively as nutrient.

We are focusing on photosynthesis. Good photosynthesis improves the quality of crops.

In order to maximize the effect of plant photosynthesis, we monitor the plant environment in order to determine the amount and timing of CO2input.

Monitoring is carried out on "CO2 concentration, air temperature, soil temperature, humidity, underground moisture content, and crop growth status". Each is measured in real time and observed off-site.

Input CO2 in the right amount at the right time.

So far, we have cooperated in experiments at our farm in Nagasaki Prefecture. When CO2 was efficiently input, strawberry yields increased by 20%. It has been found that right CO2 input is effective for agriculture.

However, due to the environment of the Goto Islands, the ways to obtain CO2are limited.

Currently, the cheapest way is to burn oil. This method is classic and has a high environmental impact. However, technological advances allow for a variety of procurement methods. In the future, we will consider various methods such as combustion facilities in the island and methods for extracting CO2 with the newest technology.

We at D-sol use paper to reduce CO2 emission. In addition, CO2will be utilized in agriculture using IT.

Thank you very much.

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| 16 | Plexim GmbH | B-17 | Bronze |

Title : "Nanostep®, Real-Time Simulation for SiC/GaN Devices with 1.5 MHz Switching Frequency."

The high switching frequencies of converters with GaN and SiC components pose a challenge for real-time simulators used for hardware-in-the-loop testing of control systems. To overcome this issue, Plexim has developed Nanostep®. The new Nanostep® solver enables real-time simulations on the RT Box with step sizes as low as 4ns, making it the perfect technology for WBG converters.

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| 17 | EAST JAPAN RAILWAY COMPANY (JR-East) | B-18 | Bronze |

East Japan Railway Company (JR East), the largest railway company in Japan, has set a long-term environmental goal called “Zero Carbon Challenge 2050” in 2020. The goal is set at a 50% reduction in CO2 emissions by 2030 compared to 2013, and net zero CO2 emissions by 2050. While electric railways have environmental advantages, we think that railway companies need to make more efforts to contribute to decarbonized society, so we have set that goal. In ICRERA 2024, we will introduce about summary of “Zero Carbon Challenge 2050” in Poster and industry session, for example, including renewable energy such as windfarm and solar power plant, introducing energy saving rolling stock, energy saving driving, and so on. Furthermore, we also introduce about hydrogen hybrid train, called “HYBARI”. Some of the railway company in Japan are also interested in using hydrogen as environmental measures, and “HYBARI” is one of main measure related to hydrogen.

There is one more highlight this year. TAKANAWA GATEWAY CITY will partially open in March 2025. Takanawa gateway station is located in center of the city, so the city and the station are so closely related. TAKANAWA GATEWAY CITY will conduct various demonstrations and experiments to create innovations that solve social and environmental issues with the aim of creating a spiritually rich lifestyle 100 years from now. In ICRERA 2024, we will also introduce about “TAKANAWA GATEWAY CITY” focused on summary of city and environmental measures by poster and industry session.

Please let it know and we hope to see you in Nagasaki, thank you.

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| 18 | ROHM Co., Ltd. | B-21 | Bronze |

ROHM is a manufacturer of semiconductors and electronic components headquartered in Kyoto, a city of traditional culture. Through its global development and sales network, ROHM supplies LSIs, power devices, discrete devices, and other electronic components.

We have always put quality first and have always strived to contribute to the advancement of culture through a consistent supply, under all circumstances, of high-quality products in large volumes to the global market. Based on this philosophy, we have refined our electronics technology with an indefatigable spirit of challenge.

ROHM was founded in 1958 as a manufacturer of small resistor products, entered the semiconductor business in 1967, and became the first Japanese company to establish a presence in Silicon Valley in 1971. In 2000, ROHM began research and development of SiC, and in 2010, became the firstest company in the world to begin mass production of SiC products. With a frontier spirit that does not fear failure and solid technical capabilities, ROHM has produced a series of products that lead the industries and has grown into a comprehensive semiconductor manufacturer.

Today's society faces various social issues. ROHM is also placing importance on activities that lead to the resolution of social issues. Especially now, with the urgent issue of realizing a carbon neutral society, expectations are rising for ROHM's semiconductors and electronic components. ROHM supports innovative manufacturing with an Integrated Device Manufacturing system (IDM) that manages everything from material procurement to assembly and packaging within the group companies, accelerating the pursuit of energy saving, miniaturization, and safety and security. These activities contribute to solving issues for society and our customers.

ROHM's technology and manufacturing continues to evolve even today, based on the company name ROHM, which combines the company's founding product, resistor (R), and its unit Ω (ohm).

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| 19 | Potens Semiconductor Corp. | B-23 | Bronze |

Potens Semiconductor was established in Taiwan in 2012 by members with 30 years of experience in the industry, specializing in the design and sales of high-efficiency power semiconductors and ICs. Our product portfolio includes low to high-voltage MOSFETs, next-generation GaN (Gallium Nitride) and SiC (Silicon Carbide) devices, as well as DC-DC ICs, Sensor ICs, DrMOS, and advanced power design technologies, all of which play an essential role in enhancing energy efficiency and sustainability.

Potens drives innovation with a focus on renewable energy applications, delivering high-efficiency and highly reliable devices through cutting-edge manufacturing techniques and rigorous quality control systems. In particular, our GaN and SiC technologies enable optimized power conversion and energy storage, contributing significantly to sustainable energy solutions. Additionally, our power design technologies, DC-DC ICs, DrMOS, and Sensor ICs support a wide range of applications in the industrial and automotive sectors, helping to realize high-performance and robust energy solutions.

As Potens continues to expand in global markets, we remain committed to providing expert engineering knowledge and comprehensive support to meet the challenges of competitive markets. For more information, please visit https://www.potens-semi.com/, and let's work together to build a sustainable future.

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| 20 | Nuvoton Technology Corporation Japan | B-24 | Bronze |

For 70 years, Nuvoton Technology Corporation Japan(NTCJ) has been addressing the challenges of people's lives and supporting them with semiconductor technology.

Among these, efforts to combat global warming will become increasingly important in the future, and efforts to realize a carbon-neutral world.

Effective use of renewable energy is a key technology for achieving carbon neutrality, but because renewable energy has large fluctuations in output, its effective use requires coordination with storage systems, etc. In addition, motor control technology for using this energy effectively will also become important.

NTCJ will contribute to the realization of a carbon-neutral society by developing microcontrollers that are optimal for controlling the power electronics used in the conversion and utilization of this energy.

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| 21 | ISAHAYA ELECTRONICS CORPORATION & ICOC | B-25 | Bronze |

For over 50 years since its establishment in 1973, ISAHAYA ELECTRONICS CORPORATION has focused on creating products that enrich and make people's lives more comfortable through semiconductors and electronic components.

In the power module products, we offer high-performance custom power supplies/inverters, gate drivers, and DC/DC converters, while in the discrete products, we offer diodes, bipolar transistors, MOSFETs, and semi-custom ICs, and we are sequentially expanding our product lineup.

We have discrete products as well as hybrid IC technology and products, and by using these key components we can ultimately provide standard and custom power supplies.

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| 22 | Kanadevia Corporation | B-27 | Bronze |

As of October 1st, 2024, Kanadevia Corporation has just changed its name from Hitachi Zosen Corporation which has been beloved for more than 80 years, going back to 1943. We are committed to the fields of environment and energy as our main business to achieve a sustainable world and are taking on challenges in various fields by the technology of infrastructure, disaster prevention systems and carbon neutrality.

++Contents++

1) Renewable energy storage system
2) Lithium iron phosphate (LiFePO4) battery
3) Battery Management Unit for Lithium iron phosphate battery (BMU)
4) Hydrospring(R) (Hydrogen Generator)

At our Maizuru Works (Kyoto, Japan), we develop and manufacture the Battery Management Units (BMU) equipped with the lithium iron phosphate battery (LFP battery) unit, which is the solution to energy problems. Our LFP battery has the following three features: (1)Long-life, (2)High safety and (3)High-Power discharge. These products are used for renewable energy storage systems, UPS, reefer containers and golf carts. Moreover, regardless of whether the battery capacity is small or large, our products are expected to be used for the various usage such as disaster resilience, off-grid system, supply and demand adjustment and industrial machinery.

HYDROSPRING(R) is an onsite hydrogen generator that electrolyzes water to generate and supply high-purity hydrogen gas. In recent years, hydrogen has been attracting attention as a form of next-generation energy. It is expected to be used as clean energy by combining it with CO2-free electricity such as renewable energy and Power to Gas.

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| 23 | TAISEI CORPORATION | B-28 | Bronze |

Taisei Corporation is one of Japan's major general construction companies. Since its founding in 1873, as a pioneer in the construction industry, the company has been involved in numerous construction projects amid social changes such as Japan's modernization, postwar reconstruction, economic growth, and globalization.

Our company has already been at the forefront of sustainability management aimed at sustainable growth and improved corporate value, and we have set a mission of "contributing to the creation of a resilient society where people can live richly and culturally." Currently, the company is leading the way with technology, such as the implementation of zero-carbon buildings toward carbon neutrality and the use of digital twins, AI, and remote technologies to solve various social issues.

At this exhibition, we will introduce our technology that is worthy of being shown at the International Conference on Renewable Energy Research and Application. We will be introducing a variety of technologies, including floating foundations for offshore wind power generation, decarbonization technology, and wireless power supply from roads to electric vehicles currently under development. We look forward to seeing you there.

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| 24 | Kyuden Mirai Energy Co. | B-31 | Bronze |

Our company was established in July 2014, inheriting the technologies, know how, and frontier spirit related to renewable energy cultivated by the Kyushu Electric Group over more than 100 years.

The Kyushu Electric Group has set the goal of achieving carbon neutrality by 2050 and beyond, striving for carbon negativity, in order to realize the “low carbon and decarbonization of power sources” and “promotion of electrification”.

Therefore, in order to grow the renewable energy business as a core segment of the Kyushu Electric Power Group, we are taking over Kyushu Electric Power's geothermal and hydroelectric power generation business in stages from April 2024 onward to strengthen the business foundation and operating structure. Leveraging our ownership of five major renewable energy sources, we will meet society’s diversifying energy needs and create new value in renewable energy.

As part of this effort, we are working on the Ministry of the Environment's tidal power generation demonstration project in Naru strait as a new attempt, off the coast of Goto City, Nagasaki Prefecture. Naru strait, which has a maximum current velocity potential of over 3 meters per second, has been designated as a national demonstration field. A generator was installed in the 40m seabed area of that Naru strait, and in January 2021, a British generator was adopted for the first commercial scale (500kW) demonstration operation in Japan. In 2023, the existing 500 kW generator was salvaged, and in 2024, it will be converted to a 1,000 kW Class generator and connected to the power grid for demonstration operation.

The understanding and cooperation of the local community is essential for renewable energy to make effective use of local resources. We will continue to take on the challenge of realizing a sustainable society as a responsible energy provider based on our corporate philosophy of “Toward a Bright Future Powered by Nature.”

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| 25 | Hitachi, Ltd. | B-32 | Bronze |

Since its founding in 1910, Hitachi has been helping customers and society grow and evolve through business operations based on the corporate philosophy of "Contributing to society through the development of superior, original technology and products."

Today, we are committed to developing new solutions and technologies that address the entire energy value chain to help customers decarbonize and enhance corporate value, with the goal of achieving carbon neutrality by 2050.

In our exhibition, advanced efforts to realize a decarbonized society will be showcased on a four-panel monitor.

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| 26 | NAGASAKI TOYOPET | D-5 | Bronze |

Nagasaki Toyopet Co., Ltd. will exhibit Toyota's world-first mass-produced fuel cell vehicle, "MIRAI," at the 13th International Conference on Renewable Energy Research and Applications (ICRERA 2024), organized by IJRER and co-hosted by Nagasaki Institute of Applied Science.

The MIRAI generates electricity through a chemical reaction between hydrogen and oxygen, and this electricity powers the vehicle's motor. As a result, no $CO_2$ or other emissions from combustion are produced, and the only emission is water. We invite you to experience this environmentally friendly vehicle firsthand.

In addition, we will be showcasing the "MIRAI Cut Model" under the theme "Revealing the Mechanism of MIRAI," which will allow you to see the internal components and devices that are rarely visible. Nagasaki Toyopet, as a company dedicated to solving societal challenges, is committed to contributing to the achievement of the Sustainable Development Goals (SDGs). Our aim is to promote sustainable development and contribute to the realization of a safe and prosperous community where people, society, and the planet are interconnected.

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| 27 | NITTOKU CO., LTD. | E-1 | Exhibitor |

NITTOKU is the manufacturer of coil-winding machinery that has the largest market share in the industry throughout the world. Thanks to the rapid sales growth in overseas markets, now we have more than 20 overseas branches including factories and a great number of foreign customers worldwide. We have pursued a business model of providing a production system that helps users improve their competitive advantage in the global market. To this end, we offer a system that integrates multiple processes such as winding, handling, assembly, and inspection through a transfer system and that enables high-performance multi-axis synchronous control using our proprietary OS. We must promptly cater to individual users' unique and diverse needs and wants. In doing so, we have not only deep-dived into our existing business domains but also continued to proactively explore peripheral business domains by globally promoting our Blue Lake strategy—a strategy to promote collaboration and co-creation with users and suppliers through open innovation. As a result of such efforts, the Company has expanded its capabilities in the mechatronics business into areas not involving a winding process, such as construction of assembly lines for vehicle-mounted capacitors and modules. In recent years, with the rapid progress of digitalization, devices and tools have become more sophisticated and advanced. In this business, the Company has successfully transformed itself from conventional "production facility manufacturer" to "line builder." This involves providing technologies and ideas to the design and building of overall production systems of users as well as contributing to the production efficiency and quality improvements for the entire process, including the pre- and post-process of winding.

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| 28 | Mitsui O.S.K. Lines, Ltd. | E-2 | Exhibitor |

The sea occupies 71.1% of the earth's surface. It connects countries around the globe and has given rise to economic activities that have become the foundation of humankind's development. The earth's very potential lies in its oceans. Our home is indeed an "ocean planet." If you look at the world from an ocean perspective, you can see a completely different future. As a company that has always moved forward with the sea, Mitsui O.S.K. Lines (MOL) believe its potential more than anyone. As a Group, our mission is to draw forth this immense value shared by humankind and create sustainable growth for societies. Now is the time for us to think and act outside the box. MOL will utilize the knowledge we have gained through shipping to expand the field to

social infrastructure companies that originate from the oceans. When opportunity presents itself, we should take full advantage of it. Let's build new hope for tomorrow, together.

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| 29 | QTnet, Inc. | E-3 | Exhibitor |

QTnet, Inc., wholly owned subsidiary of Kyushu Electric Power Co., Inc., has been engaged in network and data center operations as a telecommunications operator in the Kyushu area for over 30 years. This time, we are holding a panel exhibition about our "Renewable Energy Supply Service" provided at our three data centers located in central Fukuoka.

Recently, various efforts are being made nationwide to reduce CO2 emissions towards achieving 46% reduction in greenhouse gases by 2030 (compared to 2013 levels) and carbon neutrality by 2050.

As part of such efforts, our company offers the "Renewable Energy Supply Service" to our data center customers.

By using this service, customers can offset the CO2 emissions produced by their use of the data center.

Specifically, by combining this service with a non-fossil certificate — which certifies the environmental value of electricity generated from renewable energy sources such as solar and wind — the electricity used at the housing racks or colocation spaces in the data center can also be regarded as "virtually renewable energy."

Additionally, the service addresses RE100, RE Action Declaration for 100% Renewable Energy, and the Act on Promotion of Global Warming Countermeasures, thus contributing to our customers' environmental initiatives.

For more details about this service, please feel free to contact us.

# Industrial Session at Room 105

# Program

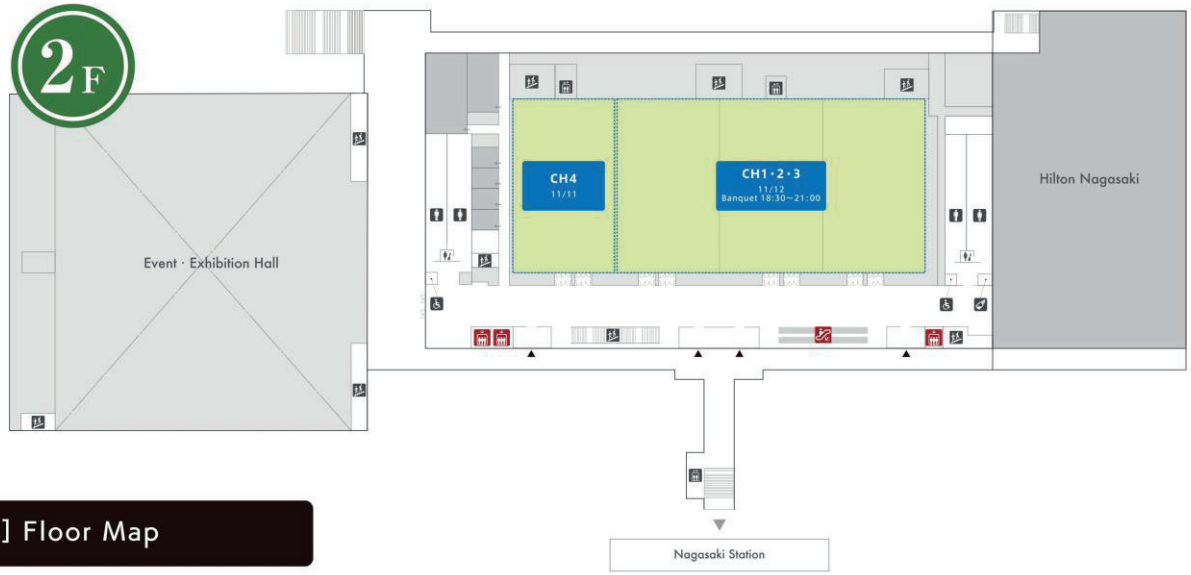
| Industrial Session of ICRERA 2024, November 11 – November 12, 2024, Nagasaki, Japan@Meeting Room105 | | | |
|---|---|---|---|
| 2024/11/11 Diamond Partners 13:00～15:00 | | 2024/11/12 Gold, Bronze Partners 13:00～17:00 | |
| 13:00 | NTT Advanced Technology Corporation<br>Mr.Kei Tomooka<br>13:00～13:20 | 13:00 | Fudo-Giken Industry Co., Ltd<br>PAL Corporation<br>Mr.Hirofumi Nakamura<br>13:00～13:10 |
| 13:25 | NTT DOCOMO, INC.<br>Mr.Yuuta Toyama<br>13:25～13:45 | 13:15 | Plexim GmbH<br>Mr.Hideki Kagawa<br>13:15～13:25 |
| 13:50 | PAYCLE Inc.<br>UPCX-Platforms PTE. LTD.<br>Mr.Joerg Alexander Weisshaar<br>13:50～14:10 | 13:30 | Potents Semiconducter Corp.<br>Ms.Akari Noda<br>Mr.Ph. D. Tim Chen<br>13:30～13:40 |
| 14:15 | KYOCERA Corporation<br>Mr.Takashi Ono<br>14:15～14:35 | 13:45 | Yokogawa Test & Measurement Corporation<br>Mr.Akihiko Ito<br>13:45～13:55 |
| | | 14:00 | Kyowakiden Industry Co., Ltd<br>Mr.Makabe Ryo<br>14:00～14:10 |
| | | 14:15 | EAST JAPAN RAILWAY COMPANY (JR-East)<br>Mr.Kota Minaminosono<br>14:15～14:25 |
| | | 14:30 | D-Solution Co., Ltd.<br>Mr.Yutaro Maruyama<br>14:30～14:40 |
| | | 14:45 | ISAHAYA ELECTRONICS CORPORATION<br>ICOC<br>Mr.Akio Segami<br>14:45～14:55 |
| | | 15:00 | Nuvoton Technology Corporation Japan<br>Mr.Inoue Ikunori<br>15:00～15:10 |
| | | 15:15 | DENSO TEN Limited<br>Mr.Hiroki Ikehara<br>15:15～15:25 |
| | | 15:30 | Smart Energy Laboratory Co,.Ltd.<br>Mr.Soichiro Nakamura<br>15:30～15:40 |
| | | 15:45 | NTT Devices Cross Technologies Corporation<br>Mr.Yasuyuki Umezaki<br>15:45～15:55 |
| | | 16:00 | Kanadevia Corporation<br>Mr.Hiroaki Kobayashi, Ms.Tomoka Nakai<br>16:00～16:10 |
| | | 16:15 | Hitachi, Ltd.<br>Mr. Kenji Urase<br>16:15～16:25 |
| | | 16:30 | Modelcore laboratories LTD.<br>Prof.Yu Yonezawa<br>16:30～16:40 |
| | | 16:45 | ROHM Co., Ltd.<br>Mr.Asuma Imamura<br>16:45～16:55 |

Venue : Dejima Messe Nagasaki

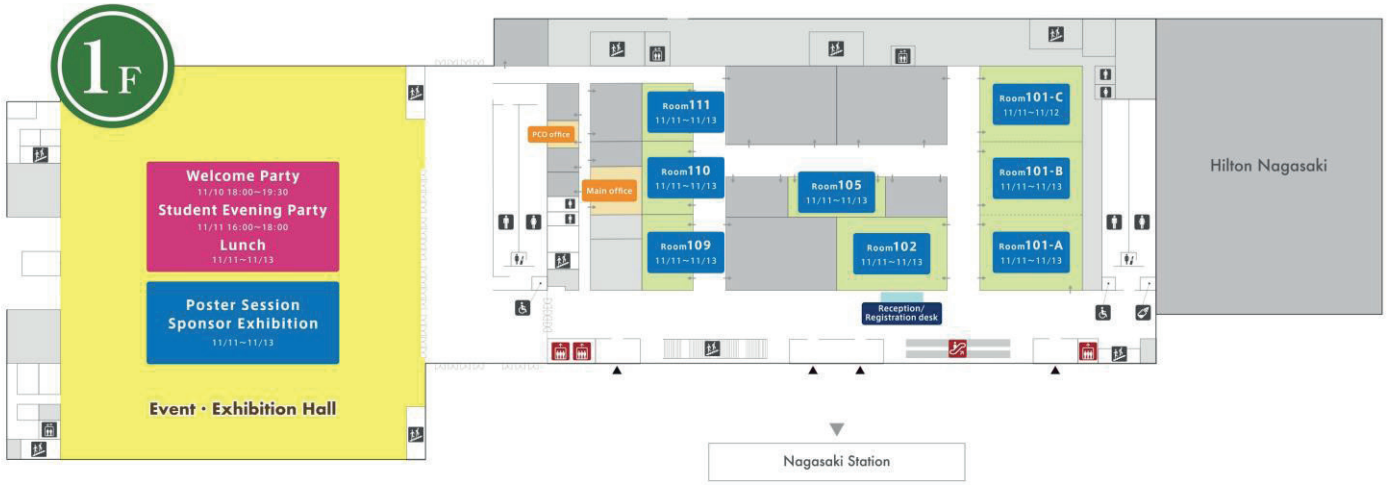

Dejima Messe Nagasaki in Nagasaki, Japan

Address: 4-1, Onoue-machi, Nagasaki City, Nagasaki Prefecture, Japan

# Dejima Messe Nagasaki Floor Map




## [ICRERA 2024] Floor Map



## Presentation Instruction for ICRERA 2024 Presenters

- Total time is 25 min, including 20 minutes of presentation and 5 minutes of question and discussion.
- Please use your PC with an HDMI connection for your presentation.
- Please enter the room 10 minutes before your session.
- No-show papers will NOT be uploaded to IEEE Xplore.

## Notes for Participants

- At the closing ceremony, the awards winners will be announced.
- Foods are halal, and the tableware and cooking utensils are halal-friendly.

## Restaurant Guide Map


The voucher that will be given for lunch on November 13 is non-refundable and cannot be used at McDonald's.

# Nagasaki Kaido Kamome Ichiba

Souvenirs
Local Restaurants
Kamome Yokocho
Daily Convenient Services


- Restroom
- Accecible Restroom
- Nursing Space
- Baggage Locker
- Smoking Room *All stores are non-smoking at all times
- ATM ATM Service
- Easy Exchange
- Cafés
- Eat-in Space

## Souvenirs 8:30 am - 8:00 pm

01 Bon Patty (Japanese and Western sweets)
02 Hakusuido (Japanese sweets, Peach castella)
03 Nagasaki Meihingura (General souvenirs) TAXFREE
04 Bunmeido Sohonten (Castella, Japanese and Western sweets)
05 I LOVE CUSTARD NEUFNEUF (Custard sweets)
06 KAHO KARAKUSA (Japanese and Western sweets)
07 Chocolate House (Chocolate)
08 Nagasaki China Town Soshurin (Chinese sweets)
09 Ijindo (Castella, Japanese and Western sweets)
10 Nakashima (Dashi products)
11 Irohaya (Pottery, Food products) TAXFREE
12 Unzen Kinoko Honpo (Local noodles, Processed mushroom products)
13 BERRY CUTE ! (Western sweets)
14 Mirokuya (Local noodles)
15 Izumiya (Castella, Japanese and Western sweets)
16 Fukusaya (Castella, Japanese and Western sweets)
17 Shooken (Castella, Japanese and Western sweets)
18 Nagasaki Souvenirs Sumiya (General souvenirs)
19 DRAGON SEA (General souvenirs and goods)
20 Nagasaki Butaman Momotaro (Pork buns)
21 Iwasaki Honpo (Fold-over pork buns)
22 Iroriya (Ekiben, Delicatessen)
23 Taiwan Tianpin Hua (Taiwanese sweets)
24 Nagasaki Kanboko Kimifuku (Fish cakes, Seafoods)
25 Chaidelica (Nagasaki Chinese delicatessen)
26 Isana (Whale and marine products)
27 SUN UMINO (Coffee stand, Fruits sandwiches)

## Daily Convenient Services

28 TRANDOR (Bakery) (7:00 am - 8:00 pm)
Nagasaki Tabenba Labo. (Bakery) (8:30 am - 8:00 pm)
29 McDonald's (Hamburgers) (7:00 am - 10:00 pm)
30 Family Mart (Convenience store) open 24 hrs
31 Yamato Transport (Delivery service) (8:30 am - 8:00 pm)
32 Smartphone Clinic (Smartphone repairs) (10:00 am - 8:00 pm)
33 Kinko's Print Marché (Business services) (9:00 am - 8:00 pm)
34 CINNABON SEATTLE'S BEST COFFEE (Café) (7:00 am - 9:00 pm)

## ATM Services

35 Seven Bank 7:00 am - 11:00 pm
36 Kyushu Rokin Weekdays 8:00 am - 9:00 pm, Sat, Sun, holidays 9:00 am - 8:00 pm
37 Nagasaki Mitsubishi Shinyo Kumiai 8:00 am - 9:00 pm
38 Nagasaki Bank 8:00 am - 9:00 pm
39 Tachibana Shinkin Bank 8:00 am - 9:00 pm
40 The Juhachi-Shinwa Bank Weekdays 7:00 am - 11:00 pm, Sat, Sun, holidays 8:00 am - 9:00 pm
41 easy exchange (Foreign currency exchange machine) 7:00 am - 11:00 pm

## Local Restaurants 11:00 am - 10:00 pm

42 Tanya (Beef tongue)
43 Nicky Austin (Nagasaki-style tonkatsu, pilaf and spaghetti)
44 MINORI CAFE (Locally sourced products)
45 Chanpon Soshurin (Chanpon noodles, Sara udon)
46 Uomaru Asa (Seafood bowls)
47 Goto Udon Dashibonzu (Goto udon noodles)

* Please ask about last orders at each restaurant.

## Kamome Yokocho 11:00 am - 11:00 pm

48 BABAKE (Ramen)
49 Kushikatsu Tanaka (Kushikatsu)
50 Fukubukuro (Seafood izakaya)
51 Tatanbaa (Standing bar)
52 Taiwanese Boiled Dumplings LAO LEE (Taiwanese bar)
53 Ibukichi (Broiled seafood and fish skewers)
54 Hakata Guruguru Torikawa Takenoya (Yakitori)
55 Osakaya (Wagyu beef cuisine)

* Please ask about last orders at each restaurant.


## Food Products / Supermarket / Convenience Store

54 Family Mart Amu Plaza Nagasaki branch (Convenience store)
26 Seiyu (Supermarket) (7:00 am - 12:00 am)

## Sweets

40 Manneken (Waffles)
42 Aunt Stella's Cookies (Cookies)
44 Festivalo (Sweet potato confectionery)
45 Nagasaki Minami-Yamate Pudding (Custard puddings)
46 Ebisudo (Almond jelly, Dumplings)
47 Fukusaya (Castella)
48 Senjuan Nagasakiya (Premium fresh Japanese sweets, Luxury fresh dorayaki)
49 Paris Parisiennes (Pastries)
50 Les Primeur Hamats (Fruits tart, Fresh fruits)
51 Bonsoir (Western sweets)
53 Godiva (Chocolate)

## Food Court 9:00 am - 8:00 pm

35 Mister Donut (Donuts)
36 Kentucky Fried Chicken (Fried chicken)
37 Lotteria (Hamburgers)
38 Takobayashi (Takoyaki, Okonomiyaki, Yakisoba)
39 Yogorino (Yogorino parfaits, Crepes)
41 Tully's Coffee (Specialty coffee)

## Prepared Foods, Delicatessen

13 Wakatakemaru (Sushi, Fish delicatessen/Eat-in) (Takeout: 10:00 am - 8:00 pm, Eat-in: 11:00 am - 8:00 pm)
14 Omedetaiyaki Honpo (Taiyaki)
15 Steak Monogatari (Meat delicatessen)
16 Higuchi (Karaage, Bento)
17 Gangnam Deli (Korean delicatessen)
18 Yakitori Torimura (Yakitori)
19 Chobei (Rice balls)
20 Macrobiotic Deli Evah Dining (Macrobiotic delicatessen)
21 S Dining (Chinese delicatessen)
22 Umegaeso (Omura sushi, Rolled sushi)
23 Green Gourmet (Salad, Delicatessen)
24 Tonkatsu Shinjuku Saboten (Tonkatsu)
Okowa no Tagosaku (Steamed sticky rice)

## Bakery, Cafés

01 Hinosabo (Hoji tea, Japanese café)
02 Karin (Fresh juice)
03 Dong/MiniOne (Bakery)
04 Starbucks (Tea & Café) (7:30 am - 8:00 pm)
34 Grain D'or (Bakery) (9:00 am - 8:00 pm)
52 Gong cha (Asian tea café)

## Groceries, Specialty Stores

05 Kaldi Coffee Farm (Coffee beans, Imported food products)
07 Naturals Kodama (Health food products)
08 Hokkaido Umaimono-kan (Groceries)
09 Kuzefuku Shoten (Groceries)
10 Nagasaki Select Sumiya (Nagasaki local food products)
11 Nuts Dom (Bean sweets)
12 Lupicia (World teas)
33 Sake no Hiradogoya (Sake and other liquors/Standing bar)
* Open only on Fri, Sat, and the day before holidays

## Daily Services

06 Cocokara Fine (Drug stores) TAXFREE
27 Comple (Herb, Body care) TAXFREE
28 Kinko's (Office, Print center, Internet) (9:00 am - 9:00 pm)
29 Eco (Shoe and bag repair, Key duplication)
30 Cleaning Service Asunaro (Cleaning)
31 Reform Boutique (Clothing repair)
32 Nagasaki Bank (Consultation desk, ATM)
Weekdays: 12:00 pm - 8:00 pm,
Sat, Sun, holidays: 10:00 am - 8:00 pm
* ATM only: 8:00 am - 9:00 pm

## ATM Services

Seven Bank (Money service)
Open year-round (7:00 am - 12:00 am)

# Amu Plaza Nagasaki Main Building 5F

**Restaurants**
**Cafés**

- Restroom
- Accecible Restroom
- Restroom for Ostomates
- Nursing Room (For women only)
- Smoking Room *All stores are non-smoking at all times
- Main Building Parking Lot
- Parking lot pre-payment machine
- Escalator
- Elevator
- Cafés


**OPEN 11:00 am CLOSE 10:00 pm**
Last orders at 9:15 pm * Time may vary by store.

Explanation of icons in the restaurant
Wheelchair accessible | TAKE OUT Takeout available

## Asian Cuisine

### 01 Milan — Indian Cuisine

This restaurant serves authentic Indian dishes in a leisurely atmosphere infused with a mouth-watering spicy aroma while our naan is baked in an in-house charcoal kiln.
TEL 808-1582
**Reservations available**
TAKE OUT

### 08 Bibim' — Korean Cuisine

Here you can casually enjoy Korean specialties, particularly hot stone bibimbap and sundubu-jjigae (spicy soft tofu stew).
TEL 801-1833

### 11 Shiruri — Chinese Cuisine

An authentic Chinese eatery that has inherited the flavors perfected in a long-established Nagasaki restaurant. On offer are traditional Chinese dishes such as champon and sara udon (crispy noodles), as well as healthy Chinese delicacies with a fresh twist.
TEL 893-8989

## Japanese Cuisine

### 03 Maruni Miso Ramen — Ramen

A restaurant specializing in miso ramen produced by a miso shop. We hope you relish the taste of our long-established business, which has been running for more than 100 years, as found in our ramen dishes.
TEL 825-1789

### 04 Oyama — Tripe hotpot, Set meals, Izakaya

The delicious savory soup, which is a result of combining the plump texture of Kagoshima black wagyu beef tripe and vegetable extracts, is exquisite. It also pairs excellently with beer and shochu!
TEL 808-1530
**Reservations available**

## Japanese Cuisine

### 05 Umaya — Beef tongue, Soba, Yakitori

The yakitori, made with free-range chickens raised in Mitsusemura in Mt. Sefuri is rich on the palate, and the juices overflow in the mouth.
TEL 808-1512
**Reservations available**
**Semi-private rooms**
(Sunken table seating)

### 06 Asajiro — Izakaya

This izakaya uses local fresh fish and carefully selected vegetables from Nagasaki.
TEL 818-3356
**Reservations available**
**private rooms**
(Floor-level seating)
(Sunken table seating)
5th floor only

### 10 Hamakatsu — Japanese Cuisine/Tonkatsu

With a focus on each and every ingredient based on the concept of "even more hospitality," we offer a special lunch menu available only on weekdays with freshly fried tonkatsu pork cutlets.
TEL 893-5543

### 12 Kineya — Udon, Soba

Kineya's signature homemade noodles are handmade daily in the restaurant using only unbleached wheat flour and common salt. Take advantage of our seasonal menu that boasts the finest ingredients.
TEL 808-1503

### 14 Tenjin Horumon — Offal Teppanyaki

A taste that has endured for more than 20 years in Fukuoka. An original teppan-yaki restaurant offering as much meat and offal as you desire in the form of set meals, which is neither yakiniku bbq nor high-class griddle-style cooking.
TEL 822-8811

### 17 Tsumigi — Japanese-style cafe

August 28 NEW OPEN

Tsumugi is a new style Japanese-style cafe with a cozy space incorporating Japanese motifs and colors (indigo) and a selection of Japanese-style drinks, food, and sweets.
TEL 893-5510
TAKE OUT

## Western Cuisine

### 07 Pietro — Italian Cuisine

September 18 NEW OPEN

Enjoy a wide variety of pastas, salads with pietro dressing, pizzas, and sweets in a warm and casual atmosphere.
TEL 895-5505

### 09 Kamakura Pasta — Fresh Pasta Specialty Restaurant

Fresh pasta made daily from 100% durum flour of the highest grade, delivers a fresh, doughy texture that cannot be experienced with dry noodles.
TEL 818-1511

### 13 Cheese & Doria.Sweets — Specialty Doria Restaurant

Specializing in doria and sweets. Doria, gratin, baked omelet doria, and other dishes all made with various cheeses are served for your culinary pleasure.
TEL 893-5309

### 15 Bull's Kitchen — Hamburg & Steak

A grill-style restaurant with an early American vibe, typical of restaurants originating from Sasebo. Juicy steaks and hamburgers top the menu.
TEL 808-1505

### 16 Pomunoki — Western cuisine, Omurice

From over 30 different kinds of fluffy and melt-in-the-mouth omurice, pasta, doria, and desserts to choose from, we welcome our customers with the highest quality dishes and service.
TEL 895-8896

## Café

### 02 Umino — Café & Bar

Café Umino, founded in 1955 as Nagasaki's first Torys whiskey bar, is now newly reinvented as a café bar after half a century!
TEL 829-4607
**Reservations available**
Sandwiche only
TAKE OUT

Nagasaki City Area Code (095)

# BRONZE SPONSORS

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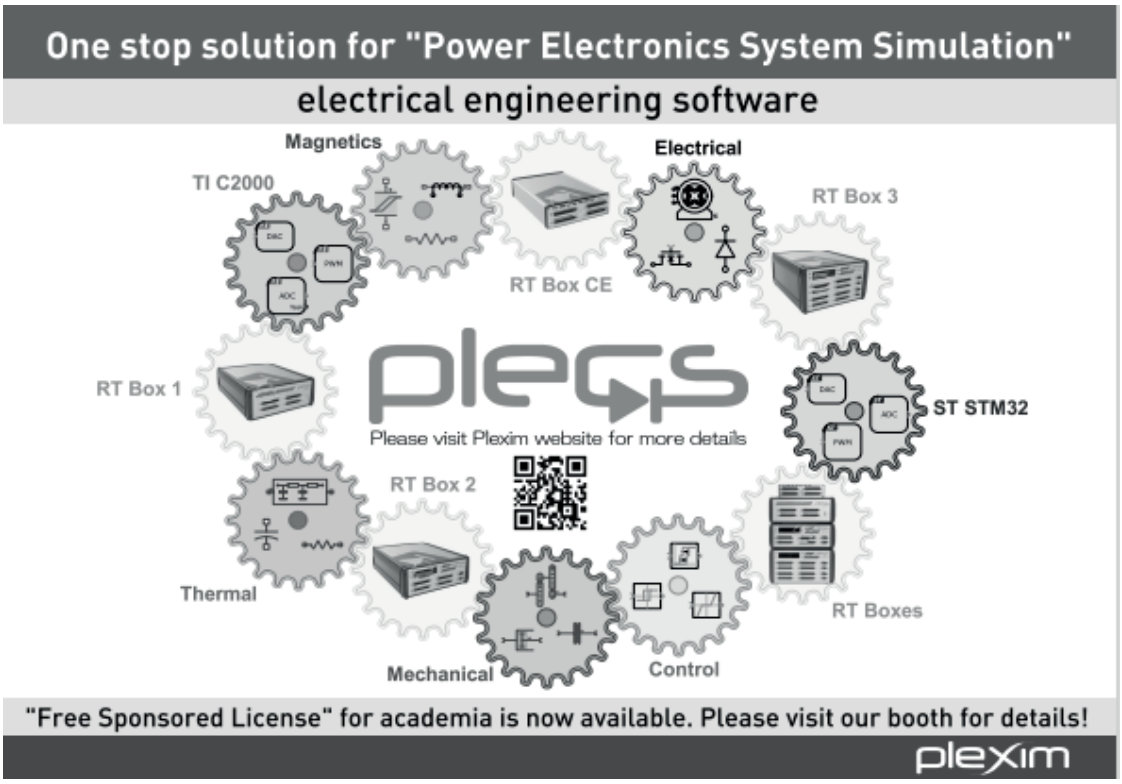


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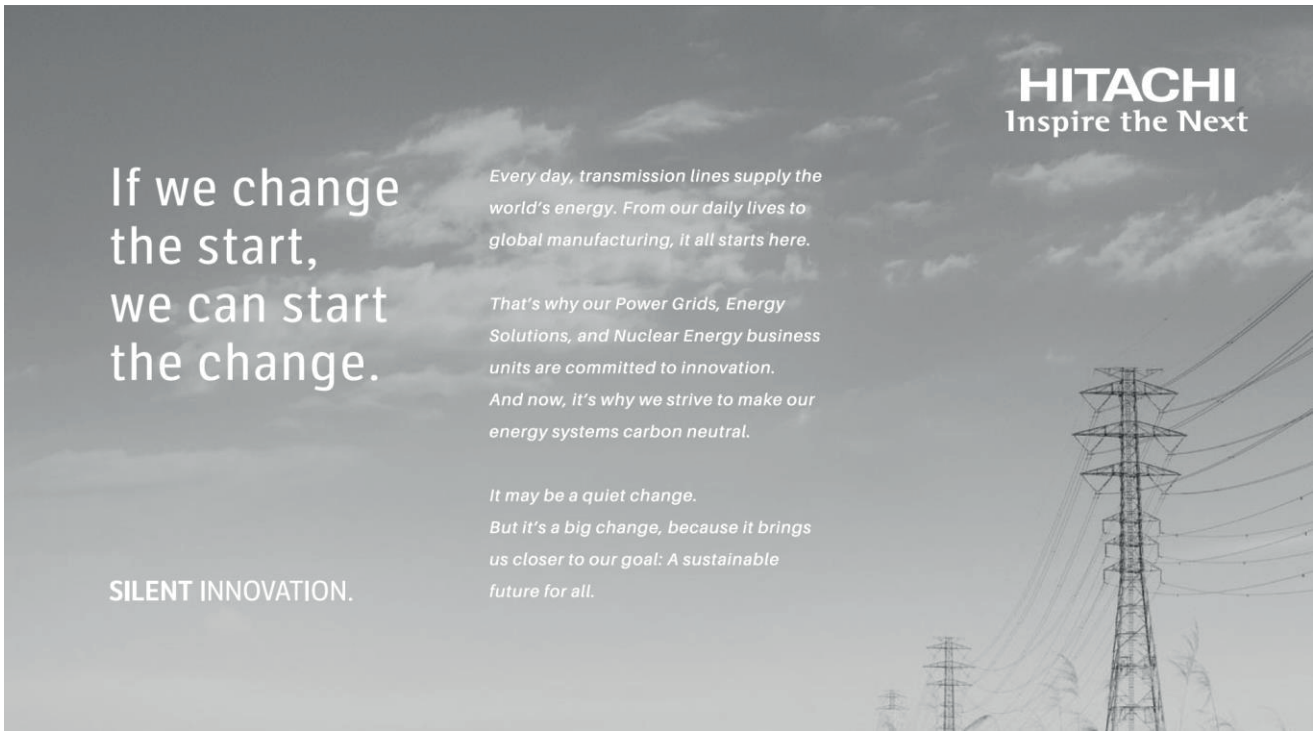


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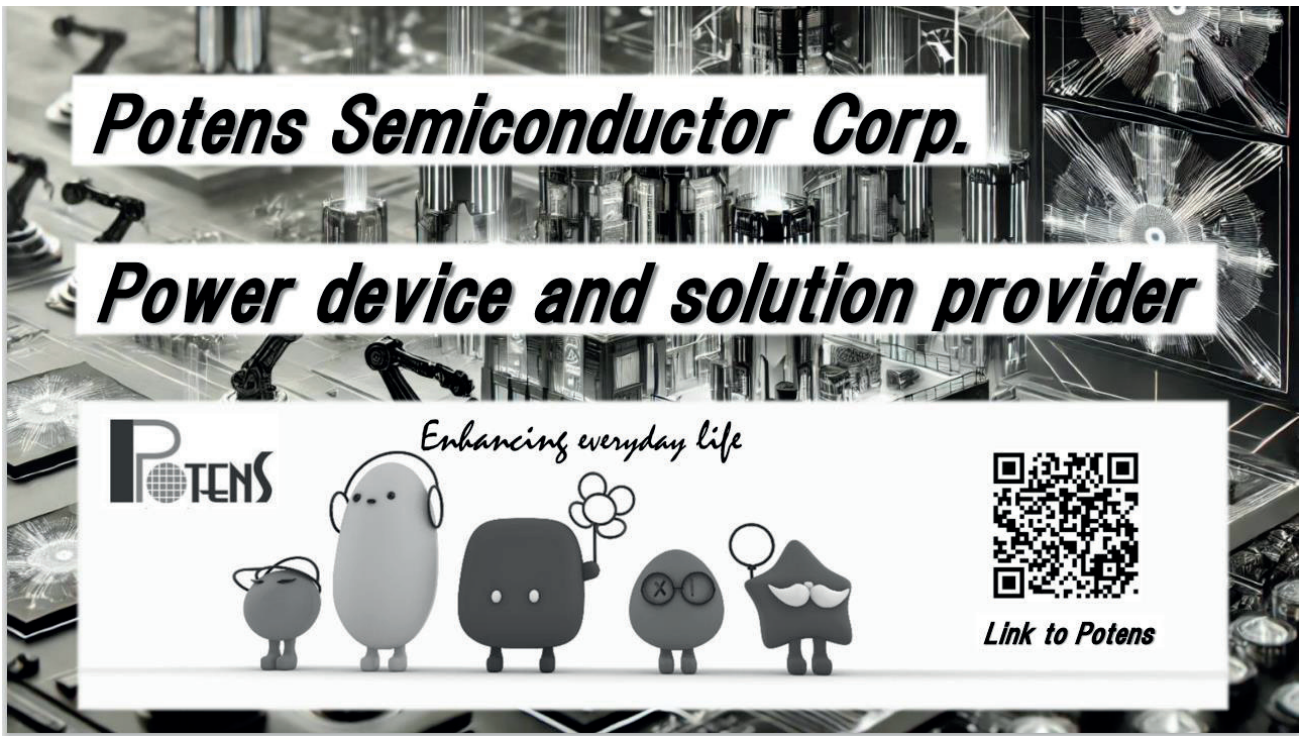

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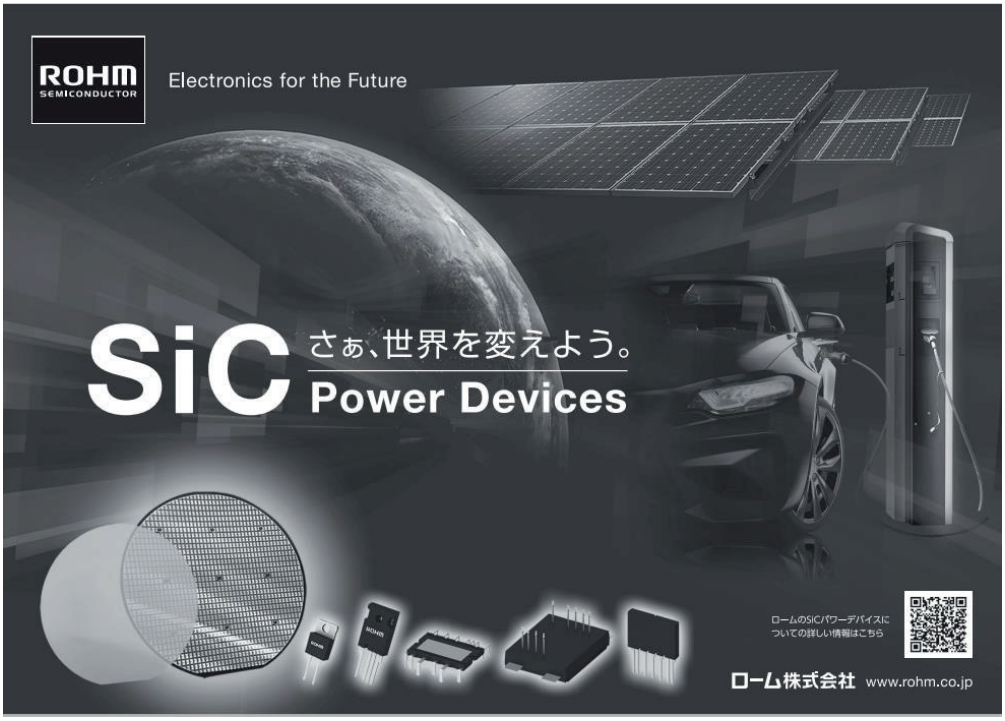


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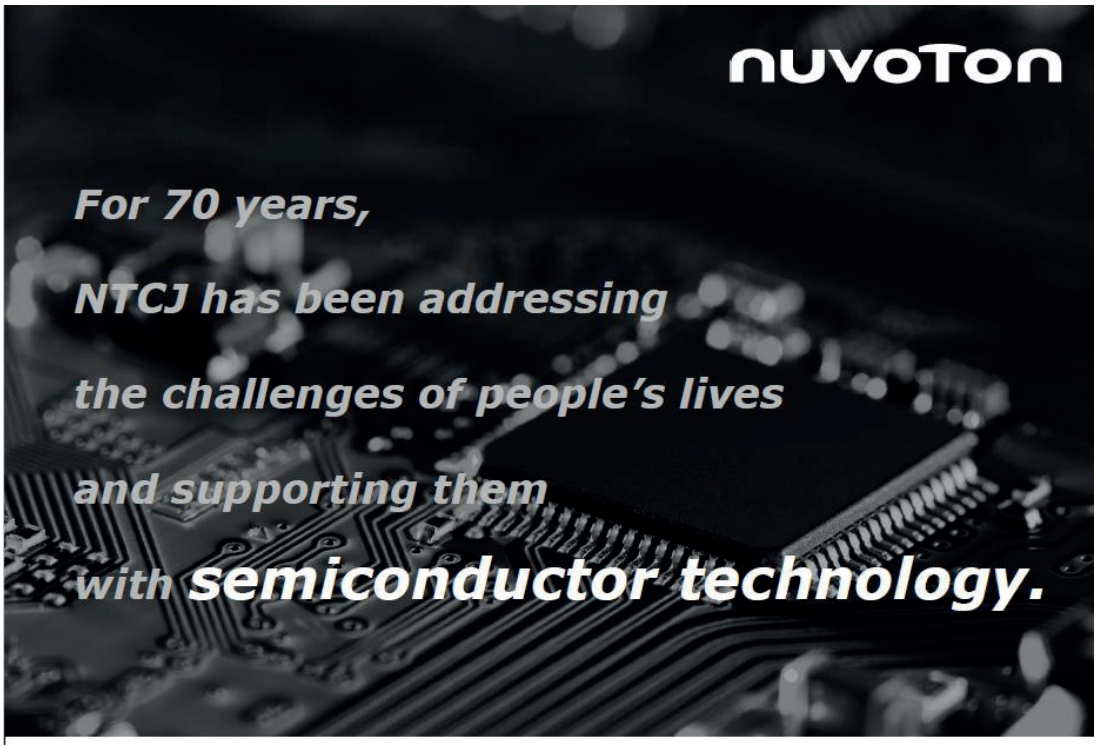


Nuvoton Technology Corporation Japan

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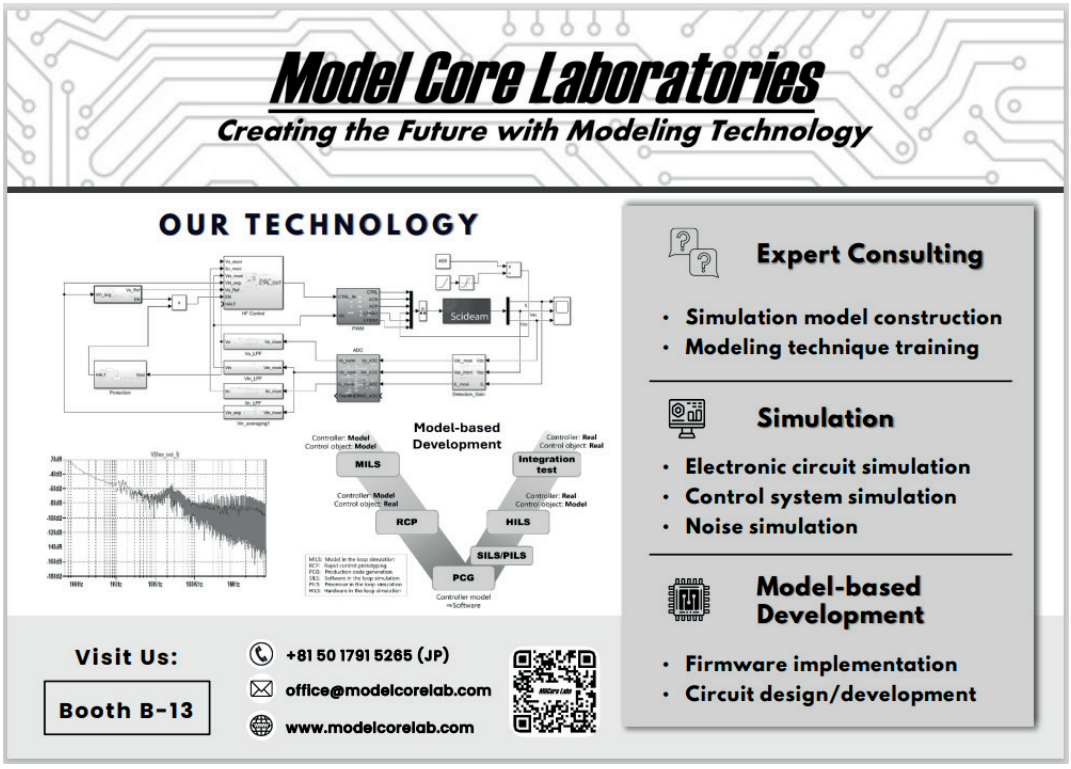

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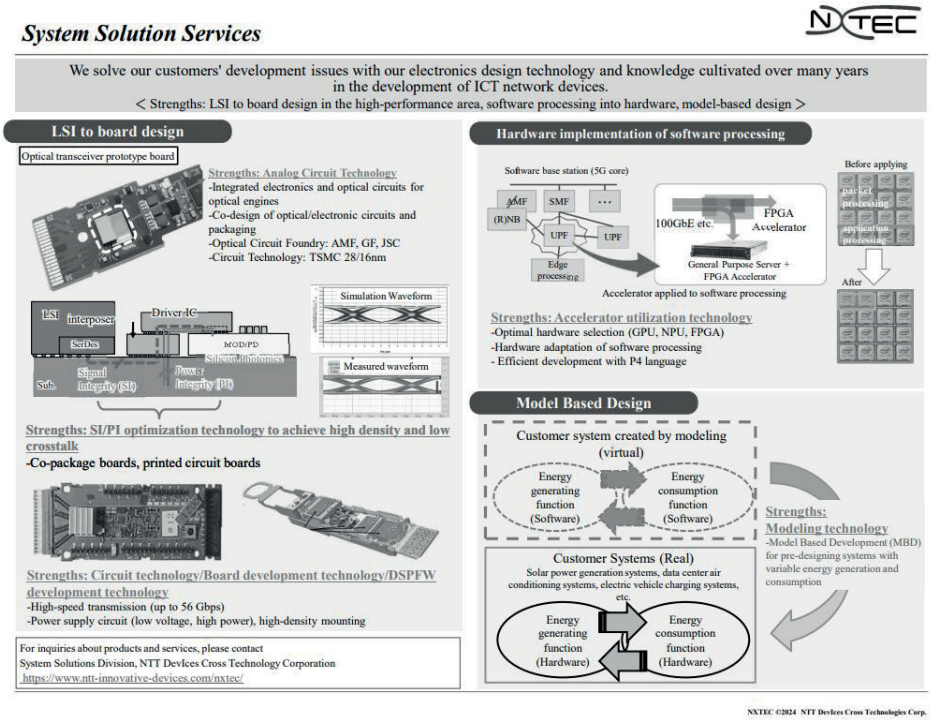

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# EXHIBITORS



【NITTOKU CO., LTD.】

NITTOKU is a Saitama-based coil-winding machine manufacturer founded in 1972. We have pursued a business model of providing a production system that helps users improve their competitive advantage in the global market. To this end, we offer a system that integrates multiple processes such as winding, handling, assembly, and inspection through a transfer system and that enables high-performance multi-axis synchronous control using our proprietary OS. Thanks to the rapid sales growth in overseas markets, now we have more than 20 overseas branches including factories and a great number of foreign customers worldwide.
Please contact us with any inquiries about us.
Global Sales HQ : https://nittoku.co.jp/english/contact/business-n/

【Mitsui O.S.K. Lines, Ltd.】

The sea occupies 71.1% of the earth's surface. It connects countries around the globe and has given rise to economic activities that have become the foundation of humankind's development.
The earth's very potential lies in its oceans. Our home is indeed an "ocean planet." If you look at the world from an ocean perspective, you can see a completely different future. As a company that has always moved forward with the sea, Mitsui O.S.K. Lines (MOL) believe its potential more than anyone. As a Group, our mission is to draw forth this immense value shared by humankind and create sustainable growth for societies. Now is the time for us to think and act outside the box. MOL will utilize the knowledge we have gained through shipping to expand the field to social infrastructure companies that originate from the oceans. When opportunity presents itself, we should take full advantage of it. Let's build new hope for tomorrow, together.
(Contact)Mitsui O.S.K. Lines, Ltd.Address: 1-1, Toranomon 2-Chome, Minato-ku, Tokyo 105-8688
https://www.mol-service.com/en/contact

【QTnet,Inc.】

QTnet, Inc., wholly owned subsidiary of Kyushu Electric Power Co., Inc., has been engaged in network and data center operations as a telecommunications operator in the Kyushu area for over 30 years. This time, we are holding a panel exhibition about our "Renewable Energy Supply Service" provided at our three data centers located in central Fukuoka.

Recently, various efforts are being made nationwide to reduce CO2 emissions towards achieving 46% reduction in greenhouse gases by 2030 (compared to 2013 levels) and carbon neutrality by 2050.

As part of such efforts, our company offers the "Renewable Energy Supply Service" to our data center customers.

By using this service, customers can offset the CO2 emissions produced by their use of the data center.

Specifically, by combining this service with a non-fossil certificate — which certifies the environmental value of electricity generated from renewable energy sources such as solar and wind — the electricity used at the housing racks or colocation spaces in the data center can also be regarded as "virtually renewable energy."

Additionally, the service addresses RE100, RE Action Declaration for 100% Renewable Energy, and the Act on Promotion of Global Warming Countermeasures, thus contributing to our customers' environmental initiatives.

For more details about this service, please feel free to contact us.

<Address>[ Tenjin Head Office ]12-20, Tenjin 1-chome, Chuo-ku, Fukuoka 810-0001, Japan
[ Akasaka Head Office ]9-39, Maizuru 3-chome, Chuo-ku, Fukuoka 810-0073, Japan
[ Branch Offices ]Kitakyushu, Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima,Tokyo
[ Service Operation Center ]Fukuoka [ Customer Center ]Fukuoka[ Data Centers ]Fukuoka（QD1, QD2, QD3）
<President>Yoshio Ogura <Shareholders>Kyushu Electric Power Co., Inc. (100%)
<Business>1.Telecommunications - Network services (for enterprises / for consumers) - Data centers / cloud - ICT solutions 2.Cable broadcasting 3.Electric power retailing 4.e-sports
<Contact>QTnet,Inc. Corporate Sales Department, Sales Promotion Group
TEL: 092-981-7571 FAX: 092-981-7599 MAIL: info@qtnet.co.jp