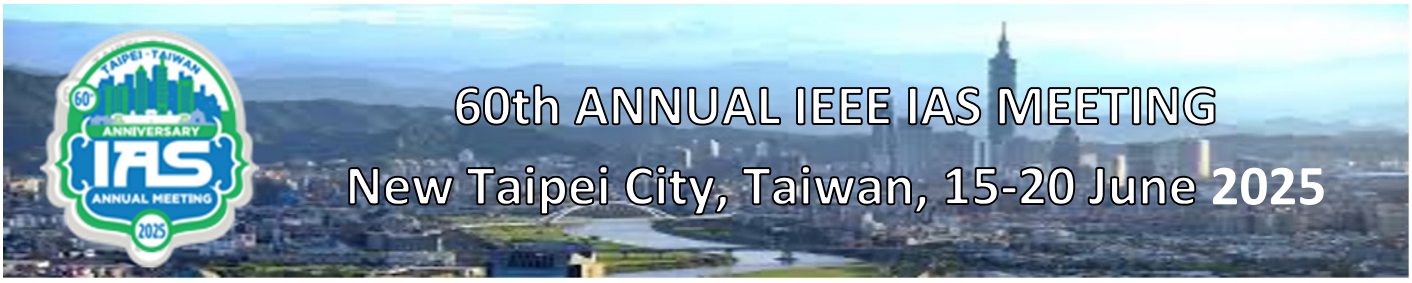

Special Panel Session on

Advanced Design & Manufacturing for Future Electric Motors and Power Electronics

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Christopher H. T. Lee, Nanyang Technological University, Singapore (chtlee@ntu.edu.sg)
Christopher Gerada, University of Nottingham, United Kingdom (chris.gerada@nottingham.ac.uk)
Kenji Nakamura, Tohoku University, Japan (kenji.nakamura@tohoku.ac.jp)

Moderator Short Bio

Po-Wei Huang received his B.S. degree in Mechanical Engineering from National Cheng Kung University in 2008 and his Ph.D. degree in 2014. He previously served as a Postdoctoral Researcher at the Motor Technology Center. He is currently an Assistant Professor in the Department of Mechanical Engineering at National Cheng Kung University and also serves as the Deputy Director of the Motor Technology Center. His research interests include electric machine and actuator design, as well as magnetic additive manufacturing technology.

Speakers' Short Bios

Christopher H. T. Lee (M'12-SM'18) received his B.Eng. (First Class Honours) degree in 2009, and Ph.D. degree in 2016 both in electrical engineering from Department of Electrical and Electronic Engineering, The University of Hong Kong, Hong Kong. He is currently an Associate Professor at Nanyang Technological University, Singapore. He was a Postdoctoral Fellow and then a Visiting Assistant Professor at Massachusetts Institute of Technology, United States. He is an Associate Editor for IEEE Transactions on Industrial Electronics, IEEE Transactions on Energy Conversion, and IET Renewable Power Generation. He is currently the Chair of Motor Subcommittee of IEEE PES Electric Machinery Committee. He was the Chair of IEEE Vehicular Technology Society Singapore Section Chapter in 2023 – 2025. He is a Chartered Engineer in Hong Kong. His research interests include Electric Machines and Drives, Renewable Energies, and Electromechanical Propulsion Technologies. In these areas, he has published 2 books, 4 books chapters, and over 270 referred papers.

Dr. Lee is a Fellow of the Institution of Engineering and Technology, U.K. He was a recipient of the 10th Nagamori Award in 2024, IAS Myron Zucker Student-Faculty Grant in 2023, JSPS Fellowship in 2023, MDPI Energies Young Investigator Award in 2022, NRF Fellowship in 2020, Nanyang Assistant Professorship in 2019, Li Ka Shing Prize (the best Ph.D. thesis prize) in 2017 and Croucher Foundation Fellowship in 2016, and 8 best paper awards, including Best Paper Awards in IEEE Transactions on Energy Conversion in 2022 and 2024.

Chris Gerada is a professor of electrical machines and leads the University of Nottingham's Zero Carbon Cluster of research. He currently also leads on a number of MW-class aerospace electric propulsion development projects including high voltage and cryogenically cooled systems and has also led the development of extensive open-access test and validation facilities.

Chris Gerada has over 20 years' experience in high performance machines and drives, securing >£100 million funding through major industrial, European, and UK grants. He has published c.700 papers with 10 best paper awards, 2 book chapters, and 6 patents. Core research interests include design, modelling and manufacture of high-performance electric drives/machines including those for cryogenic propulsion.

Chris is the recipient of The Grand Nagamori Award (2020) – (Award by Nagamori Foundation – presided by Shigenobu Nagamori – founder of Nidec Corporation) for his contribution to the industrialisation of research.

Kenji Nakamura is a full Professor at the Graduate School of Engineering, Tohoku University. He received his B.E. and M.E. degrees from Tohoku University in 1998 and 2000, respectively. Since 2000, he has been with the Graduate School of Engineering, Tohoku University. In 2007, he received a Ph.D. degree in electrical engineering from Tohoku University. His current research interests include electric power apparatus and rotating machinery, and their application systems, such as electric vehicles, advanced air mobility, and wind power generation.

Prof. Nakamura is a member of IEEE, the Institute of Electrical Engineers of Japan (IEEJ), and the Magnetic Society of Japan (MSJ). He has received several awards, including the Paper Award from MSJ in 2008, 2021, and 2022; the Young Researcher Award from the Asian Union of Magnetics Societies (AUMS) in 2014; and the General Education Award from Tohoku University in 2014. He has served on the Technical Committee and the Administrative Committee of the IEEE Magnetics Society, and he was also a ProCom co-chair of the International Magnetics Conference (INTERMAG) held in Sendai in May 2023.

Abstract of the Presentation:

The performance limits of future electric vehicle systems will be determined by innovations and integrations in motor system design, gearing technologies, and advanced manufacturing techniques. This panel will explore topics ranging from **high-power-density motor design** and **harmonic motor development** to **contactless transmission mechanisms** and **magnetic additive manufacturing technologies**. The core discussion will focus on the latest advancements in these emerging technologies and their practical applications in modern industries, providing academia and industry with more diverse design and manufacturing solutions for the future.

Topics for Discussion:

- **Positive-Mutual-Coupling Vernier Machine with Enhanced Power Factor and Field-Weakening Performances**
- **Electrical Propulsion Systems for Future Aircraft**
- **Recent Advances in Contactless Magnetic gears and Magnetic-geared Machines**
- **Applications of Additive Manufacturing for Improved Electrical Machine Design and Performance.**

Other information

Any additional information (optional)