



**The 47th Annual Conference of the IEEE
Industrial Electronics Society**
October 13-16, 2021, Sheraton Centre, Toronto, Canada



IECON'2021 Special Session Proposal

POWER ELECTRONICS AND ENERGY MANAGEMENT FOR RENEWABLES, STATIONARY STORAGE AND ELECTRIC TRANSPORTATION

Organized by

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Sertac Bayhan (IEEE Senior Member), Qatar Environment and Energy Research Institute and Sustainable Division of the College of Science and Engineering at Hamad Bin Khalifa University Doha, 34110, Qatar (e-mail: sbayhan@hbku.edu.qa).

Sheldon Williamson (IEEE Fellow), Department of Electrical and Computer Engineering, The University of Ontario Institute of Technology, Oshawa, ON L1G 0C5, Canada (e-mail: sheldon.williamson@uoit.ca)

Jacek Rabkowski (IEEE Senior Member), Faculty of Electrical Engineering, Warsaw University of Technology, Koszykowa 75, 00-660 Warsaw, Poland (e-mail: jacek.rabkowski@pw.edu.pl)

Technical Outline of the Issue and Topics:

The higher penetration of renewables and e-mobility in the power system increases the need of improved dynamic performance, flexibility, and resilience of the electrical grid. Various energy storages, such as stationary or electric vehicle batteries together with power electronic interface converters that feature advanced energy management algorithms will play a key role in addressing these requests.

The researchers from Academia and Industry are invited to exchange novel ideas and solutions to address mentioned challenges and present their R&D results related to power electronic systems, control, energy management, communication and protection algorithms.



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Topics of interest include, but are not limited, to the following:

- Solutions for energy-efficient systems and buildings
- DC-DC and hybrid AC/DC power electronic converters for integration of EV, energy storages and renewable sources
- Active thermal control, fault tolerant operation, robustness for harsh operating conditions
- High-performance converter design methodologies enabled by new materials and semiconductor device technologies
- Energy management algorithms allowing advanced interactions with the grid
- Smart energy communities performing informed decisions and collective actions
- Integration and operation of e-mobility, energy storage and renewable sources in the power grid
- Forecasting, ancillary services, demand-response and flexibility in energy systems

▪ **IES Technical Committee Sponsoring the Special Session (if any):**

Power Electronics Technical Committee: Inverters/Rectifiers subcommittee, Impedance Source Converters subcommittee, Electric Machines and Drives subcommittee, DC-DC Converters subcommittee.

Brief CV of SS Organizers (photo, name, email, and short CV)

Organizer 1: **Andrei Blinov**, andrei.blinov@taltech.ee, Tallinn University of Technology, Estonia (Corresponding organizer).



Andrei Blinov (M'13–SM'18) received the M.Sc. degree in electrical drives and power electronics and the Ph.D. degree, with a dissertation devoted to the research of switching properties and performance improvement methods of high-voltage IGBT-based dc–dc converters, from Tallinn University of Technology, Tallinn, Estonia, in 2008, and 2012, respectively. After the PhD studies he has spent two years in Sweden working as a postdoctoral researcher at KTH Royal Institute of Technology. He is currently a Senior Researcher in the Department of Electrical Power Engineering and Mechatronics, Tallinn

University of Technology. His research interests are in research of switch-mode power converters, new semiconductor technologies, and energy storage systems.



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Organizer 2: **Sertac Bayhan**, sbayhan@hbku.edu.qa, Qatar Environment and Energy Research Institute and Sustainable Division of the College of Science and Engineering at Hamad Bin Khalifa University Doha, 34110, Qatar



Sertac Bayhan (Senior Member, IEEE) received the MS and PhD degrees in electrical engineering from Gazi University, Ankara, Turkey, in 2008 and 2012, respectively. His undergraduate studies also at the same university and he graduated as valedictorian. In 2008, he joined the Electronics and Automation Department, Gazi University, as a Lecturer, where he was promoted to Associate Professor in 2017. From 2014 to 2018, he worked at Texas A&M University at Qatar as Associate Research Scientist. Dr. Bayhan is currently working in Qatar Environment and Energy Research Institute (QEERI) as a Senior Scientist and he is a faculty member with the rank of Associate Professor in Sustainable Division of College of Science and Engineering at Hamad Bin Khalifa University. Dr. Bayhan is the recipient of many prestigious international awards, such as the Research Fellow Excellence Award in recognition of his research achievements and exceptional contributions to the Texas A&M University at Qatar in 2018. He has acquired \$13M in research funding and published more than 150 papers in mostly prestigious IEEE journals and conferences. He is also the coauthor of two books and four book chapters. Dr. Bayhan has been active Senior Member of IEEE. Because of the visibility of his research, he has been recently elected as Chair of IES Power Electronics Technical Committee. He currently serves as Associate Editor for IEEE TRANSACTIONS on INDUSTRIAL ELECTRONICS, IEEE Journal of Emerging and Selected Topics in Industrial Electronics, and IEEE Industrial Electronics Technology News, and Guest Editor for the IEEE TRANSACTIONS on INDUSTRIAL INFORMATICS.

Organizer 3: **Sheldon Williamson**, sheldon.williamson@uoit.ca, Department of Electrical and Computer Engineering, The University of Ontario Institute of Technology, Oshawa, ON L1G 0C5, Canada



Sheldon S. Williamson (Fellow, IEEE) received the Ph.D. degree (Hons.) in electrical engineering from the Illinois Institute of Technology, Chicago, IL, USA, in 2006. He is currently a Professor with the Smart Transportation Electrification and Energy Research Group, Department of Electrical, Computer, and Software Engineering, University of Ontario Institute of Technology, Oshawa, ON, Canada. He holds the prestigious Natural Sciences and Engineering Research Council Canada Research Chair position in Electric Energy Storage Systems for Transportation Electrification. His current research interests include advanced power electronics, electric energy storage systems, and motor drives for transportation electrification.



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Organizer 4: **Jacek Rabkowski**, jacek.rabkowski@pw.edu.pl, Faculty of Electrical Engineering, Warsaw University of Technology, Koszykowa 75, 00-660 Warsaw, Poland



Jacek Rabkowski (M10-SM14) received the M.Sc. and Ph.D. degrees both in electrical engineering from Warsaw University of Technology, Poland, in 2000 and 2005, respectively. In 2004, he joined the Institute of Control and Industrial Electronics at this university where he is currently a Professor in Power Electronics. During the years 2010–2013 he was also with the Laboratory of Electrical Energy Conversion at KTH Royal Institute of Technology in Stockholm, Sweden and 2015-16 with the Power Electronics Group at Tallin University of Technology, Tallin, Estonia. His current research interests include power converters based on wide band-gap devices: topologies, design aspects, pulse width modulation techniques, and, especially, gate and base drivers. Moreover, he also works in area of medium voltage power conversion and advanced EV charging systems.
