ICIT 2021 Special Session

Industrial and Power Electronics for Transactive Energy Systems

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He received the M.Sc. degree in Industrial Electronic Engineering from the Escuela Técnica Superior de Ingeniería Industrial (ICAI), Universidad Pontificia de Comillas, Madrid, Spain, in 1992, and the Ph.D. degree from the Universidad de Extremadura, Badajoz, Spain, in 2004. In 1995, he joined the University of Extremadura where he teaches power electronics and researches within the Power Electrical and Electronic Systems (PE&ES) R&D Group in the School of Industrial Engineering. He is the Coordinator of the Energy Group for the Intelligent Specialization (RIS3) of the Extremadura Region (Spain). He is Senior Member, Past-President of the Power Electronics and Industrial Electronics Jointed Spanish Chapter and Chapter-coordinator of Spanish Section of IEEE. His areas of interest are power electronics applied to power systems covering power quality, active power filters, electric vehicles, smart grids, and renewable energy resources. He is a Senior Member of the IEEE.

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He received the Dipl.Eng., M.Sc., and Dr.Sc.techn. degrees in electrical engineering from the Tallinn University of Technology, Tallinn, Estonia, in 1999, 2001, and 2005, respectively. He is currently the Research Professor and the Head of the Power Electronics Group, Department of Electrical Power Engineering and Mechatronics, Tallinn University of Technology. He is also the Head of Research and Development and the Co-Founder of Ubik Solutions LLC—Estonian start-up company dedicated to innovative and smart power electronics for renewable energy systems. Moreover, he is one of the founders and leading researchers of ZEBE—Estonian Centre of Excellence for zero energy and resource efficient smart buildings and districts. He has authored or coauthored two books, five monographs, and one book chapter as well as more than 200 published articles on power converter design and development and is the holder of numerous patents and utility models in this field. His research interests include applied design of power electronic converters and control systems, renewable energy conversion systems (photovoltaic and wind), impedance-source power converters, and implementation of wide bandgap power semiconductors. He is the Chair of the IES/PELS Joint Societies Chapter of the IEEE Estonia Section.

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He received the Ph.D. and D.Sc. degrees in electrical engineering from the Institute of Control and Industrial Electronics, Warsaw University of
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and the Higher Education Awards, in 2003 and 2008; the Prime Minister of Poland Award for Habilitation, in 2013; and the IEEE Industrial Electronics Society (IES) David Irwin Early Career Award, in 2011, and the Bimal Bose Energy Systems Award, in 2015. His industry application received several awards and medals.

-Technical Outline of the Session and Topics:

Nowadays the increasing presence of distributed generation based on renewable energies in the Distribution Grid, required new operation strategies than can be established based on Transactive Energy principles, that can improve its efficiency and management, and requires new devices with new control and monitoring capabilities. This Special Session is launched with the aim to joint researchers to discuss subjects related with Transactive Energy Systems, Power Quality, Reliability, Reactive power control, Active power control and Energy management, and related other advance active functions; in the next topics:

- Transactive Energy strategies and associated Converters
- Power Electronic Transformers or Active Transformers.
- Smart Converters for integrating Distributed Generation Plants.
- Energy Storage Systems (including the use of Electrical Vehicles for this function).
- Intelligent Protection and Monitoring Systems.
- New fault detection, self-test and self-diagnostics methods.

-IEEE IES Technical Committee Sponsoring the Special Session

- Power Electronics
- Smart Grids