

Special Session on

**“Real-Time Simulations for the Systems Level Validation of Smart Power and
Energy Networks”**
Organized by

- **Mazher Syed,**
Institute for Energy and Environment, University of Strathclyde, Glasgow, UK
email: mazheruddin.syed@strath.ac.uk
- **Thomas I. Strasser,**
Austrian Institute of Technology, Vienna, Austria
email: thomas.i.strasser@ieee.org
- **Peter Palensky,**
Delft University of Technology (TU Delft), Netherlands
email: palensky@ieee.org
- **Graeme Burt,**
University of Strathclyde, Glasgow, UK
email: graeme.burt@strath.ac.uk
- **Georg Lauss,**
Austrian Institute of Technology, Vienna, Austria
email: georg.lauss@ait.ac.at

Call for Papers

Real-time simulation has been an effective approach to validate and de-risk power and energy system equipment and control. Supported by controller hardware-in-the-loop (CHIL) and power hardware-in-the-loop (PHIL) techniques, these novel technologies are appraised to higher technology readiness levels (TRL) in close to real-world, flexible, and repeatable conditions, thereby accelerating their widescale deployment.

With the increasing complexity of an integrated cyber-physical energy system, incorporating multiple domains such as, power system, automation, protection, information and communication technology (ICT), the traditional component-oriented approaches to validation no longer suffice. A systems-level approach that captures the interaction of multiple domains is a necessity to enable sustainable and secure transition to a future smart power and energy grid with higher complexity and innovation. This special session welcomes innovative contributions, including industrial relevant experiences, to cyber-physical systems design, validation and testing.

Topics of the Session:

A few topics (not limited to) of interest include:

- Theory and application of real-time simulation for electrical power systems
- Holistic methods for facilitating systems level validation
- Advances in real-time CHIL and PHIL techniques for high-fidelity experimental validations
- Digital twins for accelerated validations and IP protection
- Aggregated component modelling for large-scale real-time simulations: model validation and uncertainty quantification
- Geographically distributed real-time simulations: challenges, interfaces and experiences
- Incorporation of cyber-security assessment in real-time validations