

# **Automation, Intelligent Control and Predictive Maintenance for Distributed Renewable Energy Systems**

**Iulia Stamatescu and Sorina Costinaş and Nicoleta Arghira and Ioana Făgărăşan and Sergiu Stelian Iliescu**

**Keywords:** renewable power systems, power systems control, energy system control, predictive maintenance intelligent control and monitoring for renewable power system, smart substation, smart grid integration, fault detection

The increasing energy demand, continuous drawback of the existing sources of fuels and increasing concern about environmental pollution pushed researchers to explore new technologies for the production of electricity from clean sources, renewables such as solar, wind etc. Recent advances in large scale monitoring, real time computing and advanced communication infrastructure are applied to distributed renewable energy systems and hybrid power systems nowadays and it can help mitigate this issues towards reliable and efficient operation of the various power grid architecture. The special session aims to provide a forum discussing the state-of-art and recent advances on this topic, addressing both theoretical and applied implemented approaches, with representatives from academia and industry along with establishing a strong context of international research projects and future collaborations.

Topics include, but are not limited to:

- methods and tools for modeling and simulation of energy systems including distributed renewable energy systems and hardware-in-the-loop type approaches;
- computational intelligence and intelligent control structures for power systems with distributed generation e.g. fuzzy systems, artificial neural networks, genetic algorithms, etc.;
- predictive maintenance and control;
- control of distributed renewable energy storage;
- substations, smart grid integration, fault detection and protection systems;
- consumer-side techniques for load forecasting and balancing;
- new paradigms applied to energy systems monitoring and control e.g. multi-agent systems (MAS), cyberphysical systems (CPS).