

# Call for Papers for Special Issue: Modeling and Simulation of Sustainable Energy Systems

This Special Issue of SIMULATION aims at highlighting the most recent advances in modeling and simulation of sustainable energy systems.

Standing at the center of climate change, sustainable energy systems present themselves as one of the greatest challenges and opportunities of this century. Sustainable energy systems are becoming increasingly complex as they are characterized by various sources of uncertainties across different subdomains including production (decentralized or centralized), storage, carbon mitigation, resilience, security, sustainability, innovation and entrepreneurship, and societal impact. This call for papers provides a venue to bring forth the findings of novel data driven approaches on these critical energy systems and infrastructures. More specifically, the primary interests of this call comprise explorations of new and unique holistic modeling and simulation approaches for monitoring, control, and overall decision making at different energy domains.

This call will feature methodologies developed for different aspects of energy systems, including but not limited to production, self-healing capabilities of distributed power grids, decision making under uncertainty, communication, and cyber and data challenges against natural or human-made hazards and disasters as well as other abnormalities in the system. We also welcome collaborative works with different and disjoint disciplines such as computer and data sciences, energy, applied math, social sciences, environmental sciences, and chemical engineering; and explorations of problems around new electricity consumers such as heat pumps and electric vehicles as well as energy storage systems.

Focusing on the broader Modeling and Simulation concepts, methods, recent advances, toolkits, and platforms addressing the pressing challenges of sustainable future energy systems, select topics for consideration include the following:

- Smart and innovative modeling approaches for decision making in energy systems
- Concepts and methods of decision support systems utilized for the design of sustainable energy systems
- Concepts and methods for innovative operation management and planning strategies for sustainable energy systems (e.g., distribution and planning for smart charging strategies, demand response scheduling, interruptible load management, load shifting)
- Concepts and methods for heterogeneous simulation frameworks in the context of energy systems
- Environmental and emerging simulation challenges of sustainable energy systems
- Appropriate architectures for digital twins of complex energy systems
- Performance and validation of large-scale energy system simulations
- Distributed monitoring and control of power grids and microgrids via modeling and simulation
- Simulation-based decision making for cyber security of sustainable energy systems
- Simulation-based innovation assessment and policy making for new sustainable energy systems
- Modeling to understand the future climate health impacts of sustainable energy systems (or lack thereof)
- Modeling and simulation to understand different carbon mitigation strategies

The authors can focus on high-impact innovations in the application of modeling and simulation to concepts, methods, applications, toolkits and environments, promoting advances in all facets of modeling and simulation that led to novel solutions of sustainable energy systems.

### **Instructions for Manuscript Preparation**

For manuscript formatting and other guidelines, please visit the Author Guidelines for SIMULATION page at <http://www.scs.org/pubs/simulation/submissionGuidelines.html>. Manuscripts should be prepared and submitted online at <http://mc.manuscriptcentral.com/simulation>. Please note in your cover letter that the paper is submitted for the Special Issue: Modeling and Simulation of Sustainable Energy Systems.

**Note:** Manuscripts must not have been previously published or be submitted for publication elsewhere. Each submitted manuscript must include title, names, authors' affiliations, postal and email addresses, an extended paper, and a list of keywords. For multiple author submission, please identify the corresponding author.

### **Submission deadline**

April 15<sup>th</sup>, 2023

### **Guest Editors**

Marco Pruckner, University of Würzburg, Germany

Jie Xu, George Mason University, USA

Nurcin Celik, University of Miami, USA