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Special Issue on Probabilistic Approaches for Robust Structural Health Monitoring of Wind Energy Infrastructure

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ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering

Special Issue on Probabilistic Approaches for Robust Structural Health Monitoring of Wind Energy Infrastructure (SI047B)

Structural Health Monitoring (SHM) relies on the premise of collection of sensory information primarily pertaining to the structural response of engineered systems. For wind energy infrastructure, and wind turbine structures in particular, this information can in turn be exploited for early stage performance verification, for investigation of uncertainties related to the design and manufacturing process, for diagnostics and prognostics on degradation, damage and abnormal operation, as well as provide input for optimization of future designs.

The types of information extracted from SHM systems deployed on wind turbines include measurements of the environmental inflow conditions, operational conditions, structural load effects, system dynamics, mode shapes, natural frequency and damping characteristics, stress "hot-spots", and more. Proper utilization of this data, able to account for the underlying epistemic and aleatory uncertainties, allows for condition-based maintenance, life cycle and remaining useful lifetime assessment, and optimization of operational/control conditions. A major challenge in carrying out these tasks stems from the uncertainties that are underlying not only the data, but also the system models, which are often fused into the estimation and assessment process. In view of this, recent research has focused on the development of tools able to tackle or describe these uncertainties.

Within this context, this Special Issue aims to gather contributions presenting recent advances and challenges in probabilistic approaches for life cycle assessment, diagnosis, prognosis, and fault detection/localization in the context of SHM for wind energy infrastructure.

Topic Areas:

- Novel tools for reliability, risk and resilience analysis
- Advanced uncertainty quantification, e.g. copula models, surrogate models, Bayesian approaches
- Joint adoption of random and imprecise uncertain parameters
- Multi-fidelity, multi-model aggregation, and ensemble approaches to modeling
- Machine learning and artificial intelligence schemes
- Physics constrained/informed deep learning, with relation to the handling of time series
- Methods accounting for assessment on the wind farm level, including wake effects
- Fusion of data and models in hybrid or grey box modeling tools
- Novel sensing technologies contributing to reduction of uncertainty and verification of simulations
- Field applications on data extracted from full-scale systems

Publication Target Dates

Deadline for abstract	**September 15, 2020**
Paper submission deadline	**June 14, 2021**
First reviews completed	**October 11, 2021**
Second reviews completed	**December 13, 2021**
Special Issue finalized	**June, 2022**

Submission Instructions

Papers should be submitted electronically to the journal at journaltool.asme.org. If you already have an account, log in as author and select **Submit Paper** at the bottom of the page. If you do not have an account, select **Submissions** and follow the steps. In either case, at the **Paper Submittal** page, select the *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering* and then select the Special Issue **Probabilistic Approaches for Robust Structural Health Monitoring of Wind Energy Infrastructure (SI047B)**.

Papers received after the deadline or papers not selected for inclusion in the Special Issue may be accepted for publication in a regular issue.

Guest Editors

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