



# CALL FOR PAPERS:

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

## Special Issue on

### Response analysis and optimization of dynamic energy harvesting systems under the presence of uncertainties

(Special Issue number SI039B)

**Background:** Harvesting kinetic energy from vibrating structures of different scales has captured considerable attention within the scientific community and gained popularity in various engineering applications during the last decades. For small-to-medium scale vibrating structures, piezoelectric material-based configurations coupled with energy harvesting circuitry are widely considered for transforming kinetic energy to usable electric energy. At medium-to-large scale structures, electromagnetic motors are commonly act as the interface between structures and energy harvesting circuits to enable kinetic energy scavenging from relatively low-frequency large-amplitude oscillations. Regardless of scale and underlying technology, the efficiency of kinetic energy harvesters relies on their careful design and dynamic tuning of their properties in both the mechanical/structural and the electrical/circuit domains which is heavily dependent on the attributes of the vibrating structures and of the dynamic excitation. In this regard, accounting for the uncertainty to these attributes becomes an important aspect in the efficient design of energy harvesting systems as well as the dependable assessment/prediction of their efficiency during their operational life. This uncertainty stems partly from the natural randomness of dynamic excitation in time, as in the case of sea waves and wind fields, and partly from imprecise knowledge of the properties of the anticipated dynamic excitation as well as the properties of the vibrating structures, the energy harvesting materials or motors, and the electric circuit components and energy storage means.

**Scope:** This special issue focuses on the analytic/mathematical modelling, optimal design/tuning, and performance assessment, through simulations or experimental/field testing, of kinetic energy harvesting systems in the presence of uncertainty to dynamic excitation and/or to system properties. Contributions may discuss mathematical uncertainty modelling aspects for dynamic energy harvesting systems, computational and analytical methods for assessment and/or design of such systems under uncertainty, experimental field or lab testing aiming to capture or to quantify the behavior of such systems in uncertain environments. Both theoretical studies as well as work related on practical engineering problems and focused applications are welcome.

### Contributions addressing the following topics are especially welcome

- Stochastic dynamics methods for the response analysis and performance assessment of randomly excited energy harvesting systems
- Monte Carlo-based methods and surrogate models for the analysis and reliability assessment of energy harvesting systems to dynamic loads
- Optimization and reliability-based design of energy harvesting systems with uncertain properties and/or under random excitation

#### Guest Editors & Contact Info

- **Agathoklis Giaralis** [agathoklis@city.ac.uk](mailto:agathoklis@city.ac.uk)  
City, University of London, UK
- **Ioannis A. Kougioumtzoglou** [ikougioum@columbia.edu](mailto:ikougioum@columbia.edu)  
Columbia University, USA
- **PoI D. Spanos** [spanos@rice.edu](mailto:spanos@rice.edu)  
Rice University, USA

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Upon submitting, please select the **Special Issue SI039B**, and then assign the paper type as **Research Paper**.

#### Important Dates

- **31 January 2020:** *Deadline for Manuscript Submission*
- **January 2021:** *Special Issue Publication Target*

**Prior to formal submission, please send a copy of your manuscript to the guest editors, to ensure the work falls within the scope of the SI and is otherwise appropriate for peer review!**