

Data-driven Reduced Order Model of Flow-Induced Piezoelectric Energy Harvesters

Thursday, July 30, 2020 1:00 PM (1 hour)

Piezoelectric energy harvesters (PEHs) are a potential alternative to batteries in large-scale sensor networks and implanted health trackers, but the low output power and the narrow work range has been a bottleneck for its practical application.

To alleviate this problem, the present research will develop a data-driven reduced-order model for flow-induced PEHs based on the dataset obtained from a nonlinear and parametric electro-mechanical model. This model will be a high-fidelity monolithic computational model established by the weighted residuals method and corresponding numerical solutions will be calculated by the finite element method in FEniCS. Then a projection-based model order reduction will be implemented and machine learning will be introduced to address challenges resulting from nonlinearity and multi-parameters.

Once the reduced-order model is validated, a reliable and fast method to predict the performance of flow-induced PEHs will be achieved, promising real-time optimization of the design of PEHs. It will promote the further commercialization of PEHs.

Primary author: Ms SHANG, Lan (University of Luxembourg)

Presenter: Ms SHANG, Lan (University of Luxembourg)

Session Classification: Posters 3