UMBC
AN HONORS UNIVERSITY IN MARYLAND

Graduate Research Assistant Opportunity

1. Vibration-based piezoelectric energy harvester (PEH) design
2. Topology optimization for smart sensor structure design

Dr. Soobum Lee at the Department of Mechanical Engineering in the University of Maryland Baltimore County (UMBC) is seeking enthusiastic and highly-motivated **graduate students (Ph.D. preferred)** in two research disciplines: energy harvesting and topology optimization. Energy harvesting area will investigate relatively small-scale (mm~cm) energy harvester development considering conversion of real-world vibration or kinetic energy using piezoelectricity or electromagnetism, and integration with power management circuit and wireless sensors. Topology optimization area will study compliant mechanism design with stress constraints (global/local), postprocess for 3D printability, and application for aerospace and biosensing.

Job Descriptions:

1. Theoretical and/or numerical (FEM) analysis of piezoelectricity / electromagnetism / compliant mechanism
2. Measurement and modeling of vibration/kinetic behaviors
3. Design optimization under uncertainty / robust/reliability-based optimization
4. Prototype fabrication and experimental verification
5. PEH/EEH embedded package design (e.g., wireless sensor node, portable electronics)

Desired Skills:

1. Finite element analysis (FEA): ANSYS (some APDL experience preferred) or ABAQUS
2. MATLAB
3. NI DAQ with LabView (function generation, data acquisition) is a plus

About University and Department:

UMBC has been nationally and internationally recognized by its leadership in innovative research and teaching. In 2018, U.S. News ranked **UMBC as #9 "Most Innovative" university** (higher than CalTech #11, Michigan #12, Harvard #14) and **#8 on undergraduate teaching** (tied with Rice and higher than Duke #10, GeorgiaTech #13). The Department of Mechanical Engineering has more than 20 faculty, 46 PhD, 53 MS, and 500+ BS students. The geographical privileges close to multiple federal agencies in **Washington D.C./Baltimore** area and the successful research outcome with them have raised UMBC's reputation as prestigious research institute. The research in the department is funded through federal sources (National Science Foundation, National Institutes of Health, Army Research Lab, Office of Naval Research) as well as from industrial partners.

For more information, please contact to Dr. Lee directly **(sblee@umbc.edu)**
Research group website: **https://userpages.umbc.edu/~sblee/**