

EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

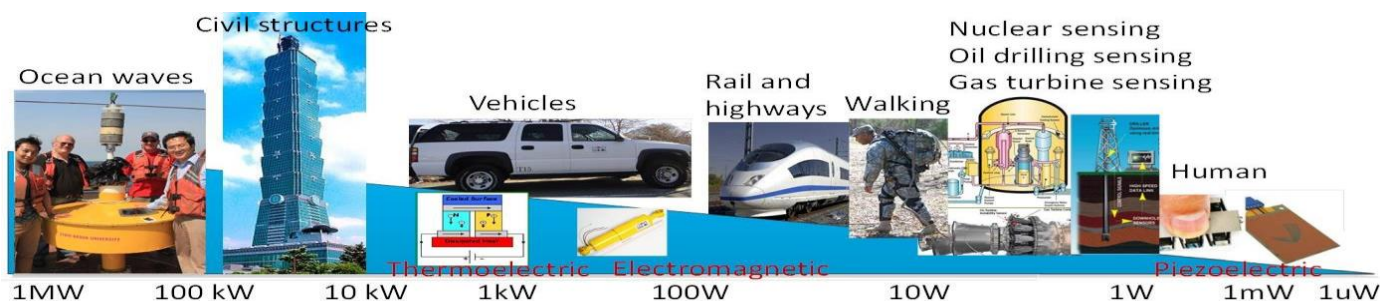
Energy Harvesting: From Self-Powered Sensing and Control to Blue Energy and Advanced Manufacturing

ABSTRACT - By converting environmental energy into electricity, energy harvesting research has attracted extensive attention in the past decade, and enabled many promising applications like self-powered wireless sensors and wearable electronics. The energy harvesting is also being extended to large power scale. In this talk, I will briefly overview the energy harvesting at micro and milli watts scale from historical perspective, then present our unique efforts and recent results on large-scale energy harvesting, focusing on interdisciplinary challenges in intelligent materials, vibration dynamics, mechatronics design, control systems, and power electronics. The topics include energy-harvesting tuned mass dampers for tall buildings, regenerative vehicle suspensions, energy harvesting from human motions, blue energy from ocean wave using mechanical motion rectification. I will also discuss passive adaptive energy harvesting for IoTs and advanced manufacturing for thermoelectric materials. Finally, I will summarize the talk with my vision of energy harvesting research in four promising directions.



Dr. Lei Zuo
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Lei Zuo's Energy Harvesting Research: from mW to MW



SPEAKER BIO – Dr. Lei Zuo completed his PhD in Mechanical Engineering from MIT in 2004 and BS from Tsinghua University in 1997. He returned to academia in 2008 after working on industry for four years and was promoted to the full professor rank in 2017. He currently serves as the Director of NSF Industry-University Collaborative Research Center (IUCRC) for Energy Harvesting Materials and Systems at Virginia Tech. Zuo's research interests include energy harvesting, mechatronics design, vibration control, clean energy manufacturing, ocean renewable energy, and thermoelectricity. He has published 110 papers in journals and over 150 papers in conferences, including 5 with best paper awards. He advised 10 PhD, 19 MS, and 24 ME to completion, and is currently advising 12 PhD and 7 MS students. His research has been funded by NSF, DOE, ONR, Army, EPA and NY/VA state funding agencies as well as industry. The ASME recognized him as “a pioneering researcher in energy harvesting, especially at larger energy scale” with its 2015 Thar Energy Design Award and named him as an ASME Fellow in 2016. Zuo is also the sole recipient of the 2017 ASME Leonardo da Vinci Award. He also won R&D 100 Awards twice (2015 and 2011) from R&D Magazine. He has taken leadership roles in serving professional communities, as the chair for ASME Technical Committees on Mechatronics, Vehicle Design, Energy Harvesting and as one of the two general chairs for the ASME 2019 IDETC/CIE Conferences. He currently serves as a technical editor for IEEE/ASME Transactions on Mechatronics and associate editor for ASME Journal of Vibration and Acoustics and IFAC journal Mechatronics.

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3:30 PM – 4:50 PM

USC ANDRUS GERONTOLOGY CENTER (GER), Room 206