

Abstract

Sustainable Assets of Value for Energy and Manufacturing

The Materials Testing and Integrity for Sustainable Systems and Environment (MaTISSE) Lab at the Faculty of Sustainable Design Engineering at the University of Prince Edward Island investigates novel, recycled, and repurposed metals and alloys for sustainable applications. The presentation will explore the synergy between three approaches – benchmarking, lab-scale testing, and generative AI – illustrating how their integration fosters a holistic approach to providing industry-relevant solutions. Specifically, benchmarking of direct metal laser sintering (DMLS) parameters for the optimization of 316L stainless steel components will be one example of materials science and sustainable considerations in Additive Manufacturing. As well, the modeling and characterization of leading edge blade integrity and lubricant – gear performance will be discussed as an example of materials engineering for Wind Energy Systems. The presentation will conclude by proposing a vision for the future, where the paradigm of Materials Science – performance, processing, properties, and microstructure - are integral components of a Circular Economy for critical minerals and rare earth elements recovery, and scientists and engineers espouse a sustainability mindset in our approach to R&D.



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Dr. Amy Hsiao is a Professor at the Faculty of Sustainable Design Engineering at the University of Prince Edward Island. She leads applied research where Materials Science and Engineering contributes to innovations in Sustainability, specifically for renewable energy, advanced and additive manufacturing, the circular economy, and biomedical-materials advances. She welcomes industrial collaborations related to accelerated corrosion testing, the engineering of novel coatings, and the characterization and selection of materials and optimization of material processes for various environments. Also, Dr. Hsiao's depth of scholarly service focuses on engineering education, engineering leadership, the representation of equity, inclusion, and diversity in Engineering, and the development of a sustainability mindset in engineering graduates and in the engineering workplace.