

POWER ENGINEERING SYSTEMS FACULTY CANDIDATE SEMINAR

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WANG 1004

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Closing the Loop on the Sustainable Circular Economy with Innovative Power Conversion Systems

Abstract

As we face increasing environmental challenges, a sustainable circular economy has become an important approach to maximize the value of material resources and minimize greenhouse gas emission, waste, and resource use. The implementation of a circular economy among electrified transportation, charging infrastructure, and energy generation/storage requires energy-efficient and reliable power conversion systems that enable the closed-loop process through reusing and recycling critical components.

In this talk, I will first discuss innovative inverter and electric machine topologies for maximizing the energy conversion efficiency with less resource use, ultimately enabling electrification among a broad range of transportation systems such as heavy-duty vehicle and aircraft. I will also present efficient and high-power density DC fast charging circuit topologies with bidirectional power flow capability supporting the power grid and renewable energy generation system. Lastly, I will discuss how the innovative power conversion system can contribute to closing the loop on the sustainable circular economy by effectively reusing battery packs in power grid systems.

Biography

Matt Woongkul Lee received the M. S. and Ph. D. degrees from the University of Wisconsin-Madison, WI, USA, in 2016 and 2019 respectively both in electrical engineering. He received the B. S. degree from Yonsei University, Seoul, South Korea, in 2013. He was a postdoctoral research associate with the Wisconsin Electric Machines and Power Electronics Consortium (WEMPEC), University of Wisconsin-Madison from 2019 to 2020. In 2020, he joined Department of Electrical and Computer Engineering at Michigan State University as an assistant professor. His research interests include high-performance motor drive, power electronics, electric machines, and distributed energy resources.

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