

DISTINGUISHED SEMINAR SERIES

PHILIP KREIN

GRAINGER ENDOWED CHAIR EMERITUS
EXECUTIVE DEAN, ZHEJIANG UNIVERSITY
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3 PM @ CAPS

“Rethinking massive electric car charging infrastructure from the user side: The 90% energy challenge”

THE SHIFT TO more-electric cars and transportation brings opportunities for control, extreme performance, energy reduction and flexibility, cheaper operation, and lower emissions. Customers see limited range, battery performance limits, slow refueling, and lack of charging facilities as big drawbacks. This presentation shows how to simplify infrastructure requirements, based on actual usage data. The energy needs of electric and plug-in hybrid passenger cars can be met with conventional single-phase electrical outlets. Safety protection, metering, billing, and other functions can be supported by a car to turn a “dumb” electrical outlet into a smart vehicle charge point. Actual driver needs are discussed, showing how more advanced chargers fit in and why “slow charging” is a fallacy most of the time. Flexibility supported within a vehicle can minimize carbon impact and enhance environmental benefits. The talk explores how to think differently about electric cars, energy, and how infrastructure interaction can work.

DR. PHILIP KREIN has been working on electric and hybrid cars for more than 30 years. He works on high-performance motors, circuits and systems for chargers, and interconnections to the power grid. He is the Grainger Endowed Chair Professor Emeritus in Electric Machinery and Electromechanics at the University of Illinois at Urbana-Champaign and was the founding Executive Dean of the Zhejiang University/ University of Illinois at Urbana-Champaign Institute in China. His startup company, SolarBridge Technologies, Inc., developed long-life integrated inverters for solar energy. He holds 42 U.S. patents and is a past President of the IEEE Power Electronics Society and a past Chair of the IEEE Transportation Electrification Community. He is a Fellow of the IEEE, a Fellow of the U.S. National Academy of Inventors, and a member of the U.S. National Academy of Engineering. He received IEEE William E. Newell Award in 2003 and the IEEE Transportation Technologies Award in 2021.