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Plenary Session Title

“Power Semiconductor Technologies for Future Grid Needs”

Abstract

Technological advances in power electronics have enabled unprecedented growth of renewable energy sources in the electrical power grid. Moreover, decarbonization efforts rely on the electrification of everything from transportation to industrial processes, causing a dramatic increase in demand for electricity. Power electronics have the potential to minimize the increased demand, but new approaches are needed to improve the performance and actuation speeds. ARPA-E has an extensive power electronic portfolio with significant efforts in key technology enablers to improve grid control, resilience, and reliability. Its recent program - Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of power Semiconductor Technologies (ULTRAFast) seeks to advance the performance limits of silicon, wide bandgap, and ultrawide bandgap semiconductor devices and significantly improve their actuation methods to support a more capable, resilient, and reliable future grid.

This talk will focus on ARPA-E perspective on power electronics for the future grid and its resiliency and reliability, as well as other applications. Selected past and current power electronics programs at ARPA-E will be reviewed and some example activities will be discussed.

Keynote Biography

Dr. Olga Spahn

Program Director

Advanced Research Projects Agency – Energy (ARPA-E)

Dr. Olga Spahn currently serves as a Program Director at the Advanced Research Projects Agency-Energy (ARPA-E). Her focus at ARPA-E is on grid resiliency, power management and distribution, aviation and instrumentation for harsh environments leveraging optical and semiconductor device technologies. Before joining ARPA-E, Dr. Spahn managed Advanced and Exploratory Systems at Sandia National Laboratories where she oversaw new system development and technology maturation activities for Nuclear Deterrence applications. Prior to that, she managed the Semiconductor Material and Device Sciences department where she focused on advancement of wide- and ultrawide- bandgap semiconductor devices and applications, which earned an R&D 100 Award. Her experience as a principal investigator spans technology development for nuclear non-proliferation, photonics and optoelectronics, optical MEMS, and laser material processing.

Dr. Spahn holds her B.S. in Electrical Engineering from University of Illinois Urbana-Champaign, M.S. and Ph.D. in Electrical Engineering from University of California, Berkeley. She has published more than 90 publications, holds 3 patents, and is a co-author of several book chapters.