Department of Electrical and Computer Engineering

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr.
College *of* Engineering

Fall 2024 Seminar Series

Seminar Title: ***Empowering Sustainability:***
Advanced Packaging and Integration of Wide-Bandgap Power Semiconductors

Time: 3:00-3:50 PM, Monday, Nov 18, 2024
Location: Holden Hall 104

Speaker:
Christina DiMarino
Virginia Tech

Abstract:
Power electronics play a crucial role in enabling the transition toward net-zero climate goals by optimizing the efficiency and integration of renewable energy sources, facilitating electrification in transportation sectors across land, air, and sea, and enhancing the energy efficiency of data centers and other critical technologies and infrastructure, thus reducing carbon emissions and fostering sustainability on a global scale. To achieve these goals, power electronics systems with higher power density, lower losses, and improved performance are needed. Wide-bandgap (WBG) power semiconductors, such as silicon carbide (SiC) and gallium nitride (GaN), enable power electronics systems that meet these demands due to their faster switch speed, lower conduction losses, and higher voltage ratings than conventional silicon power devices. However, new approaches to the packaging and integration of WBG devices are essential to unleashing their full potential. This talk delves into the evolving landscape of WBG power semiconductor packaging and integration. The unique packaging challenges posed by WBG devices, including their sensitivity to parasitic elements, thermal management, and electrical insulation, will be discussed, as well as industry trends and opportunities for further improvement. By the end of the presentation, attendees will gain insights into the pivotal role of packaging and integration in unlocking the full potential of WBG power semiconductors, driving advancements in energy efficiency and sustainability across various industries.

Speaker Bio:
Dr. Christina DiMarino is an assistant professor at Virginia Tech in the Center for Power Electronics Systems (CPES). She received her M.S. and Ph.D. degrees in electrical engineering from Virginia Tech in the USA in 2014 and 2018, respectively. Her research interests include power electronics packaging and high-density integration of wide- and ultra-wide bandgap power semiconductors and medium-voltage power modules. Dr. DiMarino currently serves as a Member-at-Large for the IEEE Power Electronics Society (PELS), Chair of the PELS Technical Committee on Power Components, Integration, and Power ICs (TC2), Associate Editor for the IEEE Transactions on Power Electronics, and is a member of the PCIM Europe Advisory Board and the IEEE PELS Women in Engineering steering committee. She has received five best paper and presentation awards at international conferences, the Outstanding New Assistant Professor Award at Virginia Tech in 2022, and the IEEE PELS Richard M. Bass Outstanding Young Power Electronics Engineer Award in 2024.