Frontiers in Power Electronics: From Clean Energy to Wireless Powering of Vehicles

Abstract: Performance improvements in power electronics coupled with expanded use can lead to dramatic reductions in energy consumption and curtail greenhouse gas emissions. However, this will require power electronics technology that is well beyond current capabilities in terms of efficiency, size, reliability and cost. Using examples from my group’s research on power electronic converters and systems that aim to achieve these goals, this talk will highlight the opportunities and challenges at the frontiers of power electronics. One focus of the talk will be on new power electronic converter architectures that target high power densities and high efficiencies for wide operating range applications, such as solar micro-inverters, telecom power supplies, building-level dc distribution and LED lighting. Another focus of the talk will be on power electronic enabled capacitive wireless power transfer systems suitable for powering electric vehicles from the roadway. The talk will also identify directions for future work in the area of high performance power electronic converters and systems.

Biography: Khurram Afridi is an Assistant Professor of ECEE and the Goh Faculty Fellow at the University of Colorado (CU) Boulder. He received the BS degree in EE from Caltech (1989), and SM (1992) and PhD (1998) degrees in EECS from MIT. His research interests are in power electronics and energy systems incorporating power electronic controls. Prior to joining CU Boulder he was a visiting faculty at MIT’s EECS Department (2009-2013) and the COO (2000-2010) and CTO (1997-2000) of Techlogix. From 2004 to 2008 he led the development of LUMS School of Science and Engineering (SSE) as Project Director. He has also worked for JPL, Lutron, Philips, and Schumberger. He is an associate editor of the IEEE Transactions on Transportation Electrification and IEEE Journal of Emerging and Selected Topics in Power Electronics, and was the Technical Program Committee (TPC) chair for the IEEE Wireless Power Transfer Conference (WPTC) 2015.
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