



Friday, March 29, 2024

11:15 am ITE 336

(Refreshments in ITE 301 at 11 am)

Architectures, Topologies and Control for High-Frequency Power Electronics

Prof. Khurram Afridi

Abstract:

Power converters designed for higher frequency operation than conventional designs can be smaller and lighter. However, to gain these benefits and maintain high reliability the converters also need to be more efficient, as smaller converters offer less surface area for heat removal. The development of efficient, small and light weight power converters can benefit from converter architectures that leverage novel topologies and control techniques. Using examples from my group's research on compact and high-efficiency power converters, this talk will highlight the opportunities and challenges at the frontiers of high-frequency 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. Another focus of the talk will be on emerging power electronic enabled applications, including wireless power transfer systems suitable for powering in-motion mobile platforms and radio-frequency power amplifiers for compact particle accelerators. The talk will also identify directions for future work in the area of high-performance power electronic converters.

Bio:

Khurram Afridi is an associate professor and the director of graduate studies at the school of electrical and computer engineering at Cornell University. He received the BS degree in electrical engineering from Caltech, and SM and PhD degrees in electrical engineering and computer science from MIT. His research interests are in high frequency power electronics. His experience includes positions at CU Boulder, MIT, LUMS, Techlogix, Schlumberger, Philips, Lutrons, and NASA/JPL. He is an associate editor of IEEE Journal of Emerging and Selected Topics in Power Electronics, and a distinguished lecturer of the IEEE Vehicular Technology Society. He has received Caltech's Carnation Merit Award, BMW Scientific Award, LUMS Werner-von-Siemens Chair, Cornell Engineering Research Excellence Award, Michael Tien '72 Excellence in Teaching Award and the NSF CAREER Award. He holds twenty-two US patents and is co-author of eight IEEE prize papers.