

# Summer 2016 Seminar Series

## TERAHERTZ NANO-COMMUNICATIONS: RECENT ADVANCES AND FUTRE DIRECTIONS

THURSDAY JULY 28, 2016  
10:30 AM – HEC 356

Recent years have witnessed exponential growth in wireless data traffic accompanied by an increasing demand for higher speed wireless communications, anywhere, anytime. Wireless Terabit-persecond (Tbps) links are expected to become a reality within the next ten years. In this context, Electromagnetic Terahertz communication is envisioned as a key wireless technology of the next decade. The THz band will help overcome the spectrum scarcity problems and capacity limitations of current wireless networks, by providing an unprecedentedly large bandwidth. In addition, THz-band communication will enable applications such as wireless massive-core computing architectures and instantaneous data transfer among non-invasive nano-devices, as well as ultra-high- definition content streaming among mobile devices and wireless high-bandwidth secure communications. In this talk an in-depth view of THz-band communications will be provided. First, the state of the art and open challenges in the design and development of THz- band devices will be presented. In particular, the limitations and possible solutions in the design of high-speed THz-band transceivers, broadband antennas and dynamic antenna arrays will be described. A special emphasis will be given to the utilization of novel materials, such as grapheme, to develop compact solid-state devices for THz communications. Then, the current progress and open research directions in terms of THz-band channel modeling will be presented. Finally, the main phenomena affecting the propagation of THz signals will be explained and their impact on the channel capacity will be assessed.



**Dr. Raed Shubair**  
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Raed Shubair is a Full Professor in the Electrical and Computer Engineering Department, Khalifa University, UAE. He is also officially affiliated with MIT as Visiting Research Scientist at the Research Laboratory of Electronics (RLE) and Department of Electrical Engineering and Computer Science (EECS) in Massachusetts Institute of Technology (MIT), USA. Raed Shubair received both his B.Sc. degree in Electrical Engineering (with Distinction and Class Honors) from Kuwait University, Kuwait in June 1989 and his Ph.D. degree in Electrical Engineering (with Distinction) from University of Waterloo, Canada in Feb 1993. His PhD thesis received the University of Waterloo Distinguished Doctorate Dissertation Award in 1993. His current research interests include advanced techniques and technologies for communications, signal processing, electromagnetics, antennas, and biomedical applications. He is recipient of Teaching Excellence Award, Khalifa University (2008); Distinguished Service Award, ACES Society (2005); Distinguished Service Award, Electromagnetics Academy (2007); Distinguished Service Award, Khalifa University (2010); IEEE IIT Best Papers Award (2015); IEEE WCNC Best Paper Award (2015); IEEE ICCSPA Best Paper Award (2015). He conducted many tutorials and workshops, has been on the editorial boards of several international journals and on the organizing committee of several international conferences. He is Chair of IEEE AP Society Educational Initiatives Committee and Outreach Chair for IEEE AP Society, Region 8 Europe, Africa, and Middle East. He currently serves as the Chair of the Technical Program Committee for IEEE MMS'2016 Conference.

Host: Dr. Raj Mittra

