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Invitation for a Guest Lecture

Graz, 03.04.2018

On behalf of the Signal Processing and Speech Communication Lab, I'm pleased to invite to a guest lecture by

Assoc. Prof., Dr. Ke Guan*Beijing Jiaotong University (China), Technische Universitaet Braunschweig (Germany)*entitled: **"Towards Smart Rail Mobility at mmWave and THz Bands: Challenges and Solutions"**Tuesday, April 17, 2018, 11:00,
Seminar Room IDEG134, Inffeldgasse 16c, ground floor.

Please feel free to forward this invitation to colleagues and friends!

I'm looking forward to seeing you at this talk,

Klaus Witrissal

Abstract:

In the vision of "smart rail mobility", a seamless high-data-rate wireless connectivity with up to dozens of GHz bandwidth will be required. This forms a strong motivation for exploring the underutilized millimeter wave (mmWave) and Terahertz (THz) bands. In this talk, we identify the main challenges and present the state-of-the-art solutions towards the realization of smart rail mobility. In order to cope with the challenge of involving the railway features in the channel models, we define and reconstruct the complete version and the concise version of the reference scenario modules for mmWave and THz railway channels. Simulations in the complete version of the scenarios reflect the influence of railway objects in detail; based on ray-tracing simulations in the concise version of the scenarios, two mmWave railway channel models are established. Moreover, in order to tackle the challenge of heavy computing workload, we develop an open-access high-performance ray-tracing platform -- CloudRT. Last but not least, the challenges raised by mmWave directional network under high mobility is overcome by our solutions concerning handover scheme, random access procedure, and beamforming strategies. By integrating the key enabling technologies presented in this paper, we prototyped the mobile hotspot network-Enhanced (MHN-E) system which was successfully demonstrated at the PyeongChang 2018 Olympic and Paralympic Winter Games, achieving the maximum data rate around 4 Gbps at the mobile speed of 60 km/h.

Biography:

Dr. Ke Guan (S'10-M'13) received B.E. degree and Ph.D. degree from Beijing Jiaotong University in 2006 and 2014, respectively. He is an Associate Professor in State Key Laboratory of Rail Traffic Control and Safety and School of Electronic and Information Engineering, Beijing Jiaotong University. In 2015, he has

been awarded a Humboldt Research Fellowship. He was the recipient of a 2014 International Union of Radio Science (URSI) Young Scientist Award. His papers received 6 Best Paper Awards. In 2009, he was a visiting scholar in Universidad Politecnica de Madrid, Spain. From 2011 to 2013, he has been a research scholar at the Institut fuer Nachrichtentechnik (IfN) at Technische Universitaet Braunschweig, Germany. From September 2013 to January 2014, he was invited to conduct joint research in Universidad Politecnica de Madrid, Spain. He serves as the Associate Editor of the IEEE Access, the IET Microwave, Antenna & Propagation, and Physical Communication, and a Guest Editor of the Guest Editor of the IEEE Transactions on Vehicular Technology.

Dr. Ke Guan is very active in promoting international cooperation and understanding, in particular, to disseminate the information of international research information to his region and to interact with national and local organizations. He is the pole leader of EURNEX (European Railway Research Network of Excellence) and the management committee observer of the COST actions IC1004 and CA15104. He serves as a Publicity Chair in PIMRC 2016, the Publicity Co-chair in ITST 2018, the Track Co-chair in EuCNC, the Session Convener of EuCAP 2015, 2016, 2017, and 2018, and a TPC Member for many IEEE conferences, such as Globecom, ICC and VTC.

His current research interests are in the field of measurement and modeling of wireless propagation channels, high-speed railway communications, vehicle-to-x channel characterization, and indoor channel characterization for high-speed short-range systems including future terahertz communication systems. He has authored one book, co-authored one book and one book chapter, more than 150 journal and conference papers, and one patent. He received the Huawei Excellent Student Award of China in 2013 and the First National Scholarship for Ph. D Candidates in 2012.