



1st International Workshop 5G Wireless Technology Challenges & Opportunities (WiTCO 2016)

(in conjunction with IEEE ANTS 2016, 6-9 Nov, IISc, Bangalore-INDIA)

TENTATIVE SCHEDULE (WiTCO 2016)

Venue: TATA AUDITORIUM, IISc Bangalore

Time: 2:00 – 5:30PM, 09 Nov 2016

Date	Activities	Time	
09 November 2016	Introduction (by Workshop Organizers)	2.00-2.10	
	Mr. Prasad, Director, Samsung, “Path to 5G – Samsung’s Perspective”	2:10 – 2:45	
	Prof. A. Chockalingam, IISc, “Spatial Modulation for 5G”	2:45-3:15	
	Prof. Neelesh B. Mehta, IISc, “Multiple Access Protocol for Leveraging the Capability of Full-Duplex Communications”.	3:15- 3:45	
	Tea/Coffee (3:45 -4:00)		
	Keshav Bapat, Keysight, “Challenges in Testing 5G Systems”	4:00 – 4:30	
	Rajesh Banda, Nokia Inc, “5G in India”,	4:30-5:00	
	Jomy Jose, L&T Technology Services, “3GPP Specifications readiness for 5G”	5:00-5:30	



Speakers: Mr Prasad VTSV, Director Samsung



Title1: Path to 5G – Samsung’s Perspective

Abstract: Revisit the recent technology trends in Cellular Communication especially from 4G and beyond 4G perspective. Then, we would discuss various factors driving the need for 5G. In this context, we go on discussion about key requirements including comparison with 4G and technologies being considered for 5G and recent results from Samsung perspective.

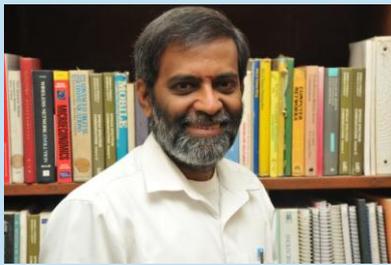
We would also take a look at mmWave frequency bands which are critical to meet the data rates envisioned for 5th generation cellular communication standard and the challenges involved in making the mmWave work for cellular communication.

Speaker Profile:

As a Director, Prasad VTSV is leading all Wireless Communication (4G, Beyond 4G, 5G & IMS) R&D efforts in Samsung India R&D, Bangalore. He did his M.Tech in "Telecommunication Systems Engineering" from IIT-Kharagpur and has about 18 years of industry experience in design, development & standardization of wireless technologies. He has built teams and mentored several engineers in these areas. He has filed about 30 patents (including Standards essential patents), have couple of publications and served as a reviewer for IEEE communication magazine articles. Prasad has received numerous awards during his career including the prestigious "Best overseas Samsung R&D employee" from the President of Samsung Electronics & "Best Technical Role Model" award from reputed consulting firm "Zinnov". He has delivered several talks on Wireless Communication technologies in Conferences and Universities.



Speaker 2: A Chokalingam, Prof IISc Bangalore



Title: Spatial Modulation for 5G

Abstract: One of the key issues in the practical realization of large scale MIMO systems is the need to have a large number of radio frequency (RF) chains, and this can increase the hardware complexity, size and the cost. Spatial modulation techniques can offer an attractive means to reduce the number of transmit RF chains. Spatial modulation uses fewer RF chains than the number of transmit antennas. In spatial modulation, information bits are conveyed through the indices of the active transmit antennas in addition to the information bits conveyed through the conventional modulation symbols like QAM/PSK symbols. This talk will introduce the basic version and some variants of spatial modulation. As an example of the application, the talk will also illustrate how spatial modulation can be beneficially employed in the uplink of a massive MIMO system.

Speaker Profile:

A. Chokalingam received his Ph.D. degree in Electrical Communication Engineering (ECE) from the Indian Institute of Science (IISc), Bangalore, India, in 1993. From 1993 to 1996, he was a post-doctoral fellow and an Assistant Project Scientist at the University of California, San Diego (UCSD), USA. From 1996 to 1998, he worked with Qualcomm, Inc., San Diego, USA as a Staff Engineer/Manager in the Systems Engineering group. He joined IISc as a faculty in the ECE Department in 1998, where he is currently a Professor working in the area of wireless communications and networking.

He served as an Editor of the IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, and as an Associate Editor of the IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY. He also served as a Guest Editor for special issues in IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS and IEEE JOURNAL OF SELECTED TOPICS IN SIGNAL PROCESSING. He is a Fellow of the Indian National Academy of Engineering, the National Academy of Sciences India, and the Indian National Science



Academy. He is an author of the recent book on LARGE MIMO SYSTEMS published by Cambridge University Press.

Speaker 3: Prof Neelesh B Mehta, IISc Bangalore



Title: Multiple Access Protocol for Leveraging the Capability of Full-Duplex Communications.

Abstract: In-band full-duplex (FD) wireless communication is a new technique that promises to significantly improve the throughput of wireless local area networks (WLANs) and cellular systems. By using self-interference cancellation, it enables simultaneous transmission and reception on the same frequency band. However, it requires a redesign of the medium access control (MAC) protocols, which have conventionally been designed for half-duplex nodes. We propose a new MAC protocol called asymmetric full-duplex MAC (AFD-MAC), for a practically-motivated model in which the access point (AP) has FD capability, while the other lower-complexity nodes are half-duplex. The protocol is designed to facilitate an efficient coexistence between the full-duplex AP and half-duplex nodes, handle hidden nodes, and also leverage existing MAC mechanisms that have led to the wide spread adoption of the 802.11 standard. We observe that AFD-MAC can improve the saturation throughput by a factor as large as two, even in the asymmetric scenario. The extent of improvement depends on the number of hidden nodes in the system, the asymmetry in the packet lengths transmitted by the AP and the nodes, and the extent by which the self-interference is cancelled by the AP.

Speaker Profile:

Neelesh B. Mehta received his B. Tech degree in Electronics and Communications Engineering from the Indian Institute of Technology (IIT) Madras, in 1996, and M.S. and Ph.D. degrees in Electrical Engineering from the California Institute of Technology, Pasadena, USA, in 1997 and 2001, respectively. He is a Professor in the Department of Electrical Communication Engineering at the Indian Institute of Science (IISc), Bangalore. Prior to joining IISc, he served as a research scientist in



USA from 2001 to 2007 in AT&T Research Labs, Broadcom Corporation, and Mitsubishi Electric Research Labs (MERL).

His research focuses on wireless communications. He has worked on topics related to 3G, 4G, and 5G cellular communication standards, energy harvesting and green wireless sensor networks, cognitive radio, cooperative communications, multi-antenna technologies, and multiple access protocols. He has published 60+ papers in IEEE journals, 3 book chapters, and 70+ conference papers. He is a co-inventor of 30 issued US patents on these topics.

He served on the Board of Governors of the IEEE Communications Society as a Member-at-Large during 2014-15 and as the Director of Conference Publications during 2012-13. He is a Fellow of the Indian National Academy of Engineering (INAE) and the National Academy of Sciences India (NASI). He is a recipient of the Swarnajayanti Fellowship, NASI-Scopus Young Scientist award, and the INAE Young Engineer award. He serves as an editor of the IEEE Transactions on Communications and IEEE Wireless Communication Letters, and as an Executive Editor of the IEEE Transactions on Wireless Communications.

Speaker 4: Keshav Bapat: KeySight Technology



Title: Measurement techniques for Testing and validation of 5G Technologies

Abstract: This talk is about various measurement techniques and performance evaluation for testing and validation of 5G technologies. Some background about the challenges and different options available, will also be considered. In addition, testing equipments from Keysight like companies will be highlighted.

Speaker Profile:

Mr Keshav obtained his B Tech degree in Electronics and Communication engineering in 84 and Post Graduate Diploma in International business Management, International Business in 2003 – 2004 from Helsinki School of Economics.



He has worked as general manager with Agilent , Manager application engineering with HP, Senior engineer Bharat Electronics. He has over 20 years of working experience. He is a senior member IEEE and currently hold chair of membership development at IEEE Bangalore section.

Speaker 5: Rajesh Banda, Nokia Inc.

Title: 5G in India

Abstract: Overview of the certain problems in India and how 5G Technology can be an enabler to address the same.

Speaker Profile:

Rajesh obtained his B Tech from Bangalore university and M Tech from BITS Pilani. He has over 16 years of industry experience working with Wipro and Nokia. He had worked with Wipro as System Architect until 2007 and then with Nokia.

Rajesh Banda is the Head of 5G Office for Emerging Markets in Nokia. He has many years of experience in Telecommunications and has extensive experience on network technologies, cellular protocols standardization, Systems Engineering and Design.

Rajesh currently focuses on business and product development of 5G technologies. He has worked on radio and core technologies with a system analysis and Go-to-Market strategies.

He has multiple patent filings in wireless communication technologies.

Speaker 6: Mr Jomy Jose (L & T Technology Services)



Title: 3GPP Specifications readiness for 5G



Speaker Profile:

Mr Jomy has completed his B Tech from NIT Calicut and currently working as Deputy Head – Delivery at L& T Technology responsible for solutions for Telecom, Consumer electronics and semiconductor. He has over 25 years of industry experience. He is Wireless (GSM/GPRS/3G) Protocol expert with 22 years' experience in Delivery and Program Management for both UE and Network Protocol stack. He is also 3GPP GERAN Delegate, contributing to GSM/GPRS specifications. Rapporteur for multiple Work Items on specifications in the Standardization body for 3 years.