

INVITED TALK - 1



Name: Dr. Iti Saha Misra, Professor, Department of ETCE, Jadavpur University, IEEE ComSoc Chairperson, Kolkata Chapter

Talk Title: Cognitive Radio: A Prospect for 5G Communication and IOT Services

Timings: 14:00-14:30 | **Venue:** C.V. Raman College of Engineering, Auditorium 4

Abstract:

The mobile technology has undergone several generations since inception with target towards Fifth Generation (5G) to achieve more throughput with much lower latency to support real time mobile communication and control, including Internet of Things (IOT) with enhanced QoS. The mobile and internet technologies have now become the part and parcel of our daily life. Apart from usual voice communication people are getting acquainted with online entertainment, money transfer, payments, booking of air as well as railway tickets, hotel booking, transfer of medical information including imaging – all are part of ‘digital media’. However, all these applications demand high data rate and bandwidth to establish satisfactory QoS to the end users. The 5G cellular networks is the promise to support new such services and business by 2020. 5G is considered to be the convergence of internet services and IoT enabled, with legacy mobile networking standards over heterogeneous networks (HetNets), requiring high connectivity speeds and connecting billions of machines, thus creating severe resource limitations. Though ubiquitous nature of cellular networks make them the preferred choice for access networks, but lack of communication resources is the problem. Here lies the significance of using Cognitive Radio (CR) in some way. Cost of leasing the spectrum is expected to be much lower than the cost of purchasing a licensed band, offering a natural solution to cope up the exploding, random, and diverse mobile data traffic through CR. The 5G CR network would use innovative software defined radio techniques, interference tolerant, dynamic, self-organized network for interference cancellation, spectrum sharing and the power management with ultimate gain of the spectrum utilization. Heterogeneous cell structures such as Macro and Femto in 5G networks would enable femto users for better indoor coverage in which femto cells may be CR enabled in either underlay (cooperative) or overlay (non-cooperative) modes. Further, Femto users can communicate through mm-wave communication that increases the overall data rate and the system capacity. Macro BS may communicate with the Femto BS using licensed radio resources. In a cooperative cognitive cellular network, cognitive relay may

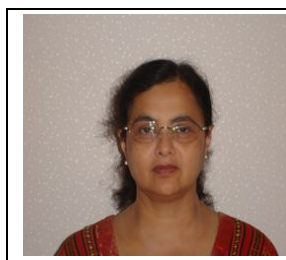
deploy for coverage and capacity enhancement in which cognitive radio may communicate with base station through licensed radio resource providing local coverage using cognitive radio.

Recent advances in the design of Internet of Things (IoT) technologies allow the Wireless Body Area Network (WBAN) to be connected over Internet for continuous ubiquitous monitoring of patients data. Remote Health monitoring has been regarded as one of the emerging applications of Machine-to-Machine (M2M) communications enabling ubiquitous and autonomous connectivity and monitoring between the sensors, Body Network Controller and the remote-end requiring minimal or no human intervention. However, conventional cellular M2M networks include spectrum scarcity or resource constraints with the huge demand of IoT connectivity. An alternative solution is the Cognitive M2M (M2M communications employing CR technology), which enhances efficiency, flexibility, and reliability of M2M communications. Cognitive M2M is expected to be indispensable in the era of IoT and needs research focus for seamless integration between WBAN and CR backhaul. This lecture will consider the possible path of using CR technology in 5G networks and IOT enabled 5G services, particularly in health care system.

Biography:

Dr. Iti Saha Misra is the immediate past Head and now a professor in the Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata. She is the Senior Member of IEEE, Present ComSoc Chair, Kolkata Chapter and the Founder Chair of Women in Engineering Affinity Group, IEEE Kolkata Section. Under her leadership, WIE AG, Kolkata Section won the first prize in 2007 and IEEE ComSoc Kolkata Chapter won the 2015 and 2017 Chapter Achievement Awards. She is the recipient of prestigious Career award for Young teachers by All India Council for Technical Education (AICTE), IETE Gowri memorial award in 2007 in the best paper category for the topic of “4G networks: Migration to the Future”, co –author of several best paper awards in the wireless communication domain. She has supervised 19 doctoral research students (in which 9 already awarded, 2 under completion) and 50 theses at master’s level in the field of Mobile Communication and Antennas. Under her supervision, two PhD students have received the Young Scientist Award from IEEE URSI International Radio Conference out of their research presentation in the year 2014 and 2015 consecutively. She has authored more than 210 research papers in refereed Journals and International Conferences and has filed several patents. She is the author of widely acclaimed textbook on “Wireless Communication and Networks: 3G and Beyond” published by McGraw Hill. She has supervised many projects from Govt. of India like, DST FIST, DST PURSE, UGC-UPE, AICTE etc. Her current research interests are in the areas of VoIP, Cognitive Radio Networks, Low Cost and Energy Efficient IoT solutions, Mobility Management, Wireless Body Area Networks, Call Admission control and Packet Scheduling, Smart Antenna System etc.

INVITED TALK - 2



Name: Dr. Basabi Chakraborty, Professor, Iwate Prefectural University, Japan

Talk Title: **Discovering Social Needs through Social Network Data Mining**

Timings: 14:30-14:45 | **Venue:** C.V. Raman College of Engineering, Auditorium 4

Abstract: With the rapid growth of Internet, Information and Communication Technologies various web based social networks are emerging at a fast pace. People interact with each other through online social networks and their decision making in every sphere of life is influenced by those interactions. The vast amount of data available in online social media provides tremendous challenges to researchers and analysts, who are trying to gain insights into human interaction and collective behavior. Efficient mining and analysis of online social data can provide assistance to people in different social needs like crisis management, reputation analysis, customer profiling and product survey, thereby leading to new applications related to economy, marketing, education, business or medical science. In this talk, I would like to present our research works on extracting important topics encompassing social needs and change of topics over time in online social media like twitter, blog and video sharing websites by using data mining techniques and how the extracted knowledge can be used for fulfillment of society's needs. Specifically I would like to present the results of our work after the Great East Japan Earthquake as a case study.

Biography: **Basabi Chakraborty** received B.Tech, M.Tech and Ph. D degrees in RadioPhysics and Electronics from Calcutta University, India and worked in Indian Statistical Institute, Calcutta, India until 1990. From 1991 to 1993 she worked as a part time researcher in Advanced Intelligent Communication Systems Laboratory in Sendai, Japan. She received another Ph.D in Information Science from Tohoku University, Sendai in 1996. From 1996 to 1998, she worked as a postdoctoral research fellow in Research Institute of Electrical Communication, Tohoku University, Japan. In 1998 she joined as a faculty in Software and Information Science department of Iwate Prefectural University, Iwate, Japan. Currently she is serving as Professor and head of Pattern Recognition and Machine Learning laboratory. Her main research interests are in the area of Pattern Recognition, Machine Learning, Soft Computing Techniques, Biometrics, Data Mining and Online Social Media Mining. She has authored more than 180 research papers in International Journals and Conferences. She is a senior member of IEEE, member of ACM, Japanese Neural Network Society (JNNS), Japanese Society of Artificial Intelligence (JSAI), and Executive committee member of ISAJ (Indian Scientists Association in Japan). She served as the chair of IEEE JC WIE (Women in Engineering) during 2010-2011. Currently she is founding chair of IEEE WIE Sendai section.

INVITED TALK - 3



Name: Dr.Arpita Thakre, Assistant Professor, Amrita School of Engineering, Amrita Vishwa Vidyapeetham (University), Bangalore

Talk Title: Spatial Modulation, an Overview

Timings: 14:45-15:00 | **Venue:** C.V. Raman College of Engineering, Auditorium 4

Abstract:

Multiple Input Multiple Output (MIMO) techniques have been used in various wireless communication standards as it provides increased data transmission rate and better reliability. MIMO system in fact increases the number of radio frequency (RF) chains, thereby increasing the cost and overall power consumption. Mesleh et. al. proposed the concept of spatial modulation for the first time where the number of RF chains will be only one irrespective of the number of transmit antenna elements. In other words, symbols will be transmitted from only one antenna at a given time. The user is free to connect the single RF chain to any one of the transmit antenna elements.

Researchers have further extended the above described idea of spatial modulation from one antenna to multiple active antennas by employing more than one RF chains at the transmitter. The above technique also known as generalized spatial modulation gives rise to higher transmit data rate provided different symbols are transmitted from the active antennas at a given time and calls for reduced switching speed of the switches connected between the RF chains and the antenna elements, although at a cost of increased power consumption, and higher detection complexity at the receiver. The idea of spatial modulation was next extended to multicarrier communication system. Over the last couple of years investigation into performance of spatial modulation in mmwave frequency bands is going on. This very short presentation will touch upon the research work done in this area till date and the reasons why this modulation technique will be incorporated into 5th Generation wireless standards.

Biography:

Arpita Thakre did her PhD from Indian Institute of Technology, Madras. She had completed the Bachelor of Technology and Master of Technology degrees from the Institute of Radiophysics and Electronics, Kolkata, India, both with a major in communications engineering. Since January 2016, she has been working as Assistant Professor at Amrita Vishwa Vidyapeetham (University), Bangalore, where she leads a team of engineers who are working on transceiver design for next generation wireless systems. She has worked for Ikanos Communications (now Qualcomm), Hellosoft (now Imagination Technologies), and Orca Radio Systems (now Imagination Technologies), developing firmware for VDSL chipset, WLAN chipset, and RF front end chipset. She has research contribution to IEEE 802.16 TGm. She was a visiting researcher with the Ilmenau University of Technology, Germany, during 2008–2009. She has more than 5 years of teaching experience at postgraduate and undergraduate engineering level.

INVITED TALK - 4



Name: Dr. Tripti Swarnkar, Associate Professor, Siksha 'O' Anusandhan University, Faculty of Engineering(ITER), Bhubaneswar, India

Talk Title: Smarter Healthcare in Smart City

Timings: 15:00-15:15 | **Venue:** C.V. Raman College of Engineering, Auditorium 4

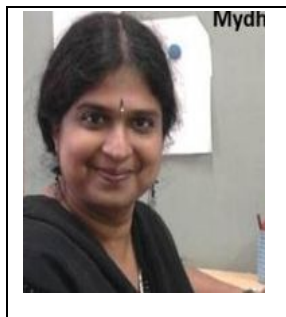
Abstract:

Smart cities hold the promise to potentially make urban areas more efficient, more secure, and even more health conscious? Of course, the ultimate goal of any smart city is to improve urban infrastructures while minimizing costs, foster innovation in different industries, and improve the quality of life for its citizens. But, can smart cities actually improve our health? To find out, we start with answer to question: how can Machine learning, and Bioinformatics enable us to address this area and what are the business implications of these technologies and advancements? The closer we get to creating smart cities, the more we discover that the possibilities are endless, and will have a direct bearing on individual health and well-being – in ways we can only imagine today. Smart healthcare uses the latest mobile and digital technologies to make advances in eHealth and mHealth systems while also driving the growth of intelligent and connected medical devices. Smart is supporting a shift from a focus on cure towards a broader view of wellness management and healthy living.

Biography:

Tripti Swarnkar did her PhD from Indian Institute of Technology, Kharagpur. She had completed the Masters in Computer Application from NIT Raipur and Master of Technology in Computer Science from the Utkal University, Bhubaneswar, India. She has an academic experience of more than 18 years. Currently she is working as Associate Professor at Siksha 'O' Anusandhan deemed to be University Bhubaneswar. Her research is focused on understanding the implicit information from various biological omic data and leveraging machine learning algorithms for gene selection. Currently, my research interest includes Machine Learning, Deep Learning, Data Mining, Computational Biology and Medical Image Analysis. Her aspiration is to work at the interface of the multidisciplinary fields of classical biology, statistics, mathematics, and computer science, or at least be able to converse effectively with others that hail from these backgrounds. She has authored many book chapters & Scopus indexed research papers in reputed publishing avenues and has been active in organizing international conferences of repute, workshops, schools, charring sessions and give invited talks.

INVITED TALK - 5



Name: Dr.Mydhili K Nair, Professor, Dept. of Information Science & Engg., M S Ramaiah Institute of Technology, Bangalore

Talk Title: Role of Interdisciplinary research in Smart Cities Initiative (covers Indian Context)

Timings: 15:15-15:30 | **Venue:** C.V. Raman College of Engineering, Auditorium 4

Abstract:

'Smart city' the buzz-word in India today, requires collaborative efforts between government, practitioners, industry researchers and most importantly, the city's residents. The Smart-City initiative aim is to create a sustainable and resilient infrastructure aiming to provide high quality services for transport, infrastructure, water, electricity, education, health-care etc for residents. The ISO 37120 working group defines a 'Smart-City' as a standard facilitating the application of Information & Communication Technology(ICT) such as the internet of things, cloud computing, big data and space/geographical information integration, to facilitate the planning, construction, management and smart services of cities. The goal of this talk is to focus on the research aspects in the ICT domains listed above, involved in providing these services. The talk focuses mainly on the research in the Data Science realm, in making "sense" out of the tsunami of data collected from disparate engineering systems deployed in the smart-city, such as civil, mechanical, electrical to name a few. Interesting case-studies in both Indian and Global contexts is presented.

Biography:

Dr.Mydhili K Nair is working as a Professor in MS Ramaiah Institute of Technology, Bangalore, since 2004. She has a mixed bag of academic as well as Industrial experience both spanning close to a decade each. In the IT Industry, she has adorned various roles ranging from Technical Lead to Project Manager in different IT companies. She has won the prestigious IBM Faculty Award in the year 2011 for her collaborative research association with IBM. She has authored many book chapters & Scopus indexed research papers in reputed publishing avenues such as Springer, CRC Press, IEEE etc. She has been active in IEEE Women in Engineering forums in organizing international conferences of repute, chairing sessions and give invited talks. She & her students have won many project competitions & best paper awards at State & National level. She is currently doing a project for developing teaching-learning Apps for differently abled school children under a funding from Corporate Social Responsibility.