5 Days Webinar
on
EMERGING WIRELESS TECHNOLOGIES : CONNECTING THE FUTURE

Supported by DST-GATI, (WISE-KIRAN Division) &
Technically Co-Sponsored by IEEE Kolkata Section

19th – 23rd *March 2022*

National Institute of Technology Rourkela

Odisha, India
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Course Overview

5G networks and devices are now a reality with wide deployment and spread among the population, but the demand for more data rates is still booming. It will soon need a newer generation for wireless/cellular communication, the 6G. It will be a new standard that not only provides a huge data rate (+1Tbps) and extremely low delay (0.1ms), but also massive IoT will enable the "hyper-connected" paradigm that will connect users and things. Artificial Intelligence (AI) will play a significant role within 6G, and thus more computation and communication resources will be consumed, where their optimization is a must. 6G communications will bring new challenges due to their sensitivity to scenario conditions, thereby requiring highly adaptive techniques that will adapt extremely fast in order to guarantee a delay of less than 100 microseconds. Spectrum and resources management will be crucial within 6G in order to account for the extremely heterogeneous scenario. The network's complexity will also be unprecedented due to the very diverse applications such as ultra-low latency requirements for critical vehicle communication, the growing demand for high positioning accuracy for location-based services, and dense heterogeneous architectures. Several emerging topics are encountered within 6G, and this Short term course will focus on such emerging topics and potential solutions. Researchers and engineers from academia and industry (especially women) will be invited to highlight their recent results and innovations.

Topics to be Covered

- 5G New Radio concepts
- 5G Challenges and Enabling Technologies
- Opportunities & Challenges IoT applications of WSN on 5G infrastructure
- Machine learning for 5G and beyond
- Cognitive Radio applications in 5G
- THz Communication Technologies
- Future 6G Wireless technologies

Distinguished Speakers from Academia & Industries

- ☺ **Prof. Upena Dalal**, Professor, S. V. National Institute of Technology Surat.
- ☺ **Prof. Iti Saha Misra**, Professor, Jadavpur University.
- ☺ **Prof. Debjani Mitra**, Professor, Indian Institute of Technology (ISM) Dhanbad.
- ☺ **Dr. Jyotsna Bapat**, Professor, International Institute of Information Technology Bangalore.
- ☺ **Prof. Kalpana Dhaka**, Associate Professor, Indian Institute of Technology Guwahati.
- ☺ **Prof. Sharayu Moharir**, Assistant Professor, Indian Institute of Technology Bombay.
- ☺ **Dr. Parul Patel**, Sci./Eng. 'G', Space Applications Centre (ISRO).
- ☺ **Ms. Rashmi Varma**, President & CTO, Innovate5G Inc.
- ☺ **Prof. Poonam Singh**, Professor, National Institute of Technology Rourkela.
- ☺ **Prof. Susmita Das**, Professor, National Institute of Technology Rourkela.
- ☺ **Ms. Devarpita Sinha**, Engineer, Education Team, MathWorks.

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Emerging Wireless Technologies : Connecting the Future

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Department of Electrical Engineering

National Institute of Technology Rourkela, Odisha-769008, India

About the Institute

National Institute of Technology (NIT), Rourkela was founded as Regional Engineering College, Rourkela in 1961. It is a prestigious Institute with a reputation for excellence at both undergraduate and postgraduate levels, fostering the spirit of national integration among the students, a close interaction with industry and a strong emphasis on teaching and research in both basic and applied fields. Being an Institute of National Importance it has been consistently ranked within TOP 20 engineering institutes for last five consecutive years as per NIRF ranking of Ministry of Education, Government of India. The Institute houses twenty versatile departments across different fields of engineering, science, management, and humanities. The Institute facilitates an active incubation center for encouraging budding innovators and hosts 27 Start-ups till date.

Who Should Attend

A team of distinguished experts from academia and industries will share their expertise on topics related to the near future of wireless communication and networks. Thus, the course is suitable for engineers, faculties and research scholars pursuing Ph.D. This course will open up many potential research directions, opportunities and challenges ahead. Interested undergraduate and post graduate students, who would like to further explore the cutting-edge research in future wireless technologies, will be accommodated in this course.

The participants will be provided with online certificates upon successful completion of the course.

Registration Details

Interested candidates should pay the registration fee as per category to the following account.

Category	Registration Fee (INR)
UG/PG Students	Rs. 300/-
Doctoral Scholars	Rs. 500/-
Faculties from Academia	Rs. 800/-
Industry persons	Rs. 1,000/-

Registration Fee*: To be deposited in the following account.

Account Name: CONFERENCE, NIT ROURKELA

Account Number: 36734418111

IFSC Code: SBIN0002109

Swift Code: SBINBB137

Bank: STATE BANK OF INDIA

Branch: NIT CAMPUS ROURKELA

To complete online registration, fill the Google Form after paying the registration fee at:
`https://forms.gle/92eash2dBgDcV2gL8`

Registration deadline: 16th March, 2022
Confirmation to participants: 18th March, 2022
Online platform details and detail program schedule will be intimated by: 18th March, 2022

*Registration fees is not required for current students and faculties of NIT Rourkela. Those who are interested should upload their ID card in the google form for registration.

Coordinators

Prof. Susmita Das
&
Prof. Suman Kr. Dey
Department of Electrical Engineering
National Institute of Technology Rourkela,
Rourkela, Odisha-769008, India

Contact and Queries

You may write to us for any queries to the following Email.

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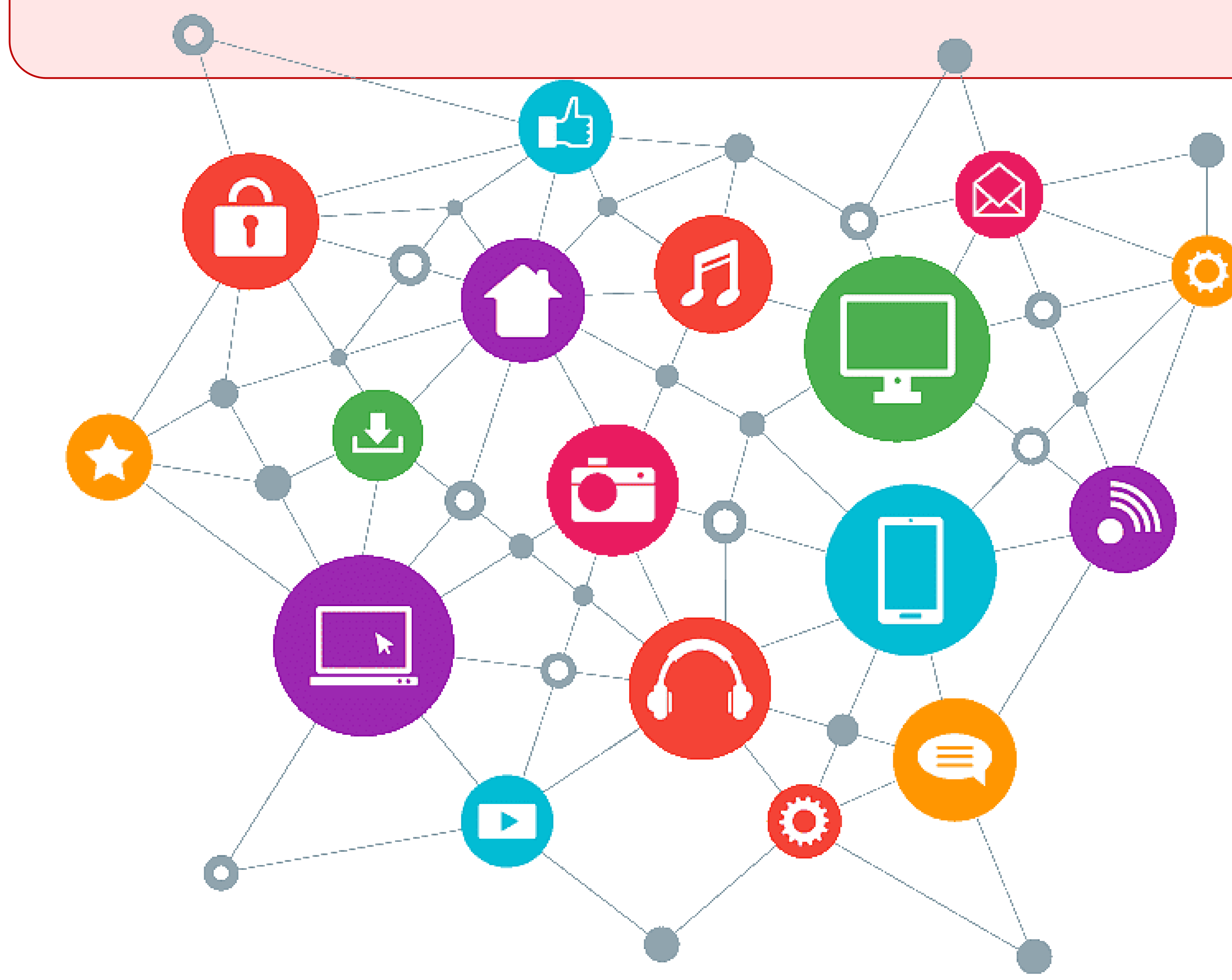
☎ (+91) 661-246-2402



About The Speakers

Prof. Upena Dalal, Professor, S. V. National Institute of Technology Surat **Title:** Beyond 5G Communications Enabling Intelligent Mobility

Upena Dalal is currently Professor at Electronics and Communication Engineering department, at the Sardar Vallabhbhai Patel National Institute of Technology (SVNIT), Surat. She received her doctoral degree in era of wireless communication and post graduation in Electronics and Communication Systems in which she was gold medalist. She has vast teaching experience of 24 years and her major subjects are Cellular Technology, Wireless Communication and Fiber optic networks. She is author of well-known book on ”Wireless Communication" by Oxford University press (2009) and ”Selectively Imposed Pilot based Channel Estimation" by VDM publications, Germany (2010). She is also co-author of book on ”WiMAX Developments" from Intechweb, Viena, Austria (2010). She has guided several PhD and MTech students and coordinated conference, STTPs, workshops and numerous technical programs for betterment of students, faculty and research fraternity.

Prof. Iti Saha Misra, Professor, Jadavpur University **Title:** Cognitive Radio & Application in IoT

Iti Saha Misra is the former Head of the Department and now a professor in the Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata. She is the recipient of prestigious Career award for Young teachers by All India Council for Technical Education (AICTE) in 2004, obtained IETE Gowri memorial award in 2007 in the best paper category, co-author of several best paper awards in the wireless communication domain. She has authored more than 240 research papers in refereed journals (IEEE, Elsevier, Springer, Wiley) and International Conferences and has filed several (5) patents in Cognitive Radio Networks for VoIP communication and Wireless Body Area Networks. She is the author of a widely acclaimed textbook on ”Wireless Communication and Networks: 3G and Beyond" published by McGraw Hill. She is the co-author of another book ”VoIP communication Challenges and Applications" published by Springer International. Her current research interests are in the areas of VoIP over Cognitive Radio Networks, Low Cost and Energy Efficient IoT solutions, Wireless Body Area Networks, Radio Resource Management, 5G Networks, and Intelligent Transport System, etc. She has developed the Broadband Wireless Communication Laboratory to carry out advanced research under wireless communication in the ETCE Department of Jadavpur University, Kolkata. She is the Senior Member of IEEE, Past ComSoc Chairperson, Kolkata Chapter, the founder Chair of Women in Engineering Affinity Group, IEEE Kolkata Section. Under her leadership ComSoc Kolkata Chapter won Chapter Achievement Awards in 2015 and 2017 and WIE Year of the Award in 2007. She was the organizing Chair for IEEE 5G Summit in 2017 and IEEE Conference CALCON -2020.

Prof. Debjani Mitra, Professor, Indian Institute of Technology (ISM) Dhanbad **Title:** Eigen structure of massive and mmWave MIMO: 5G and beyond

Debjani Mitra is currently a Professor at IIT (ISM) Dhanbad, India. The author has done her B.Tech in Electronics and Communication Engg. from BIT Sindri and M.Tech and Ph.D. in Electronics Engineering from IIT(ISM) Dhanbad. Previously she has served in the Instrumentation Department, Rourkela steel plant (SAIL) and B.I.T. Sindri as faculty. She has been supervising students in her specialization areas of Soft Computing Applications in Complex System Modelling, Wireless Communication, Cognitive Radio and Machine Learning.

Dr. Jyotsna Bapat, Professor, International Institute of Information Technology Bangalore **Title:** 5G New Radio

Dr. Jyotsna Bapat is currently a Professor at IIIT Bangalore (IIITB). Before joining IIITB in 2006, she worked as an Assistant Professor at Fairleigh Dickinson University, Teaneck, NJ and Lucent Technologies, Holmdel, NJ. Her main areas of research interest are IoT and Physical Layer aspects of Wireless Communication. She received her Ph.D. in Electrical Engineering from Pennsylvania State University, University Park.

About The Speakers

Prof. Kalpana Dhaka, Associate Professor, Indian Institute of Technology Guwahati **Title:** The Future of Wireless Communications

Dr. Kalpana Dhaka received the B.E. degree in electronics and communication engineering from the Mody College of Engineering, Rajasthan, India, in 2005, the M.Tech. degree in information and communication technology from the Dhirubhai Ambani Institute of Information and Communication Technology, Gujarat, India, in 2008, and the Ph.D. degree in electrical engineering from the Indian Institute of Technology Delhi, New Delhi, India, in December 2012. She is currently an Associate Professor with the Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, Guwahati, India. Her research interests include channel modeling and resource allocation for wireless relay systems, cooperative communications, multi-hop relaying, multiple-input multiple-output (MIMO) wireless communication systems, non-orthogonal multiple access techniques, network coding, millimeter-wave communications, and multicasting in wireless networks.

Prof. Susmita Das, Professor, National Institute of Technology Rourkela **Title:** Ultra Reliable Low Latency Communication: Requirements and Enabling Technologies

Susmita Das is Professor in the Department of Electrical Engineering, National Institute of Technology, Rourkela. She has teaching and research experience of more than 30 years at NIT, Rourkela. She has done her B.Sc. Engineering from College of Engineering and Technology, Bhubaneswar. She got her M. Tech and Ph.D. degree in the field of Electronics Systems and Communication from National Institute of Technology, Rourkela. She has published more than 120 Journal and Conference papers in the area of Signal processing and wireless Communications. Her research interests are Advanced Wireless Communication, URLLC, adaptive Beamforming, Cognitive Radio, Cooperative communications, Soft computing and Machine learning. She has supervised 7 Ph.D. students and 7 students are continuing Ph.D. under her supervision. She has undertaken major Administrative Responsibilities at NIT, Rourkela during her tenure. She is also the Coordinator for STIC established in collaboration with ISRO. She is a Senior Member of IEEE, Fellow IETE, life member of ISTE, Fellow of Institution of Engineers (IE) and member of many Editorial Boards.

Ms. Rashmi Varma, President & CTO, Innovate5G Inc **Title:** Sustainable Power Consumption in 5G Networks

Rashmi has lead the way for Women in Telecommunications since 1997. Rashmi has experience in both Optical and Wireless Communications together with Embedded Software Design, Research & Development. She envisions bold and cutting-edge, innovative ideas and leads multi-disciplinary product teams across the globe, with an unwavering focus to exceed customer expectations. In 2016 Rashmi was amongst 25 Honorees selected as the Top Women in Technology in North Texas. Since then, Rashmi has launched several startups and is currently building innovate5G Inc. targeted at building the first Telco Application Performance Monitoring(APM) Platform that allows ground-breaking 5G applications to emerge in the market.

Prof. Sharayu Moharir, Assistant Professor, Indian Institute of Technology Bombay **Title**: Leveraging Edge Resources for Service Hosting

Sharayu Moharir is an Associate Professor in the Department of Electrical Engineering, Indian Institute of Technology Bombay since 2016. Prior to joining IIT Bombay, she was a visiting fellow in the School of Technology and Computer Science at the Tata Institute of Fundamental Research (TIFR), Mumbai from 2014-2015. She obtained her Ph.D. in Electrical and Computer Engineering from the University of Texas at Austin in 2014 and B.Tech. in Electrical Engineering and M.Tech. in Communications and Signal Processing from IIT Bombay in 2009. Her research interests are modeling and the design of scalable resource allocation algorithms for networks.

About The Speakers

Dr. Parul Patel, Sci./Eng. 'G', Space Applications Centre (ISRO) **Title:** Synthetic Aperture Radar (SAR) Polarimetry (PolSAR) Polarimetric Interferometry (PolInSAR) Remote Sensing

Dr Parul Patel is a senior scientist with Space Applications Centre (SAC), ISRO Ahmedabad. She did her Masters in Science from the MS University of Baroda and Ph.D. in Science on ?Target parameter retrieval using Synthetic Aperture Radar Polarimetry? from Nirma University. She joined ISRO in the year 1988. At present, she is Group Director, Research, Training and Outreach Coordination Group, SAC; Ph D Guide at Nirma University, Ahmedabad. She leads Technology development and R&D activities of SAC and sponsored research across Indian academia. She also looks after Space Technology Incubation Centre, ISRO-academia-industry triad, Outreach and extramural Training activities across the country. She has made significant contributions in the field of Microwave Remote Sensing focusing on Multi-parametric Synthetic Aperture Radar, Interferometry, Polarimetry and Polarimetric Interferometry for soil moisture, Agriculture, Wetland, Forestry, Human Settlement and Calibration/Validation. With a number of international and national research papers to her credit, she is reviewer to reputed International journals. For her outstanding contributions to Indian Space programme, she has been awarded the ISRO Merit Award-2018 and Women excellence award in Science by Utkarsh foundation. In addition to her scientific contributions, she is passionate about nurturing scientific inquisitiveness of the young minds. She is a scientific advisor to Shreyas foundation and served as the Secretary to the Indian Society of Remote Sensing, Ahmedabad Chapter that won the Best Performance Award.

Prof. Poonam Singh, Professor, National Institute of Technology Rourkela **Title:** Terahertz Communications

Poonam Singh is Professor in the Department of Electronics and Communication Engineering, National Institute of Technology, Rourkela. She has teaching and research experience of more than 30 years at NIT Rourkela. She did her B. Tech and M. Tech from Sambalpur University and Ph. D. from IIT, Kharagpur in the field of wireless communications. She has published more than 80 Journal and Conference papers in the area of Wireless Communications. Her research interests are Multicarrier communications, Spread Spectrum Modulation, 5G Communications, Millimeter Wave and Terahertz Communications, Massive MIMO, Cooperative communications etc. She has supervised 6 Ph.D. students and 9 students are continuing Ph.D. under her supervision. She is a Senior Member of IEEE, member of IEEE Communication Society, IEEE Vehicular Technology, life member of ISTE and member of many Editorial Boards.

Ms. Devarpita Sinha, Engineer, Education Team, MathWorks **Title:** A Roadmap to 5G Design Using MATLAB

Devarpita is associated with the Education Team at MathWorks India. She actively collaborates with faculties and students across the country with an aim to advocate computational thinking in modern STEM education. She is also involved in collaborating with researchers to accelerate interdisciplinary research using MATLAB and Simulink. Prior to joining MathWorks, Devarpita worked on dynamic resource scheduling for information freshness in real-time wireless networks during her PhD at Indian Institute of Technology Kharagpur. She obtained her Master?s and Bachelor?s Degree from the Department of Electronics and Communication Engineering at Birla Institute of Technology Mesra, Ranchi and West Bengal University of Technology, respectively. She was awarded Richard. E. Merwin Scholarship by the IEEE Computer Society, USA for her promising academic and leadership activities. Her research interest includes, but not limited to, advanced wireless technologies, real-time wireless networks, smart manufacturing, intelligent learning techniques for decision making, performance evaluation, resource planning and optimization.