



Online One Week
Short Term CEP Course on

Futuristic Wireless Communication and IoT – 5G and Beyond

(07 – 11 Nov 2020)

National Institute of Technology Rourkela
Odisha, India

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Course Overview

5G is the next generation wireless communication and network that enables innovation and supports progressive change across all verticals of industries and society at large. The forecast for future 10 years' traffic demand illustrates an increase in 1000 scales and more than 100 billion connections of Internet of Things. This foists a big challenge for future mobile communication technology beyond year 2020. 5G & beyond have the potential to enable fundamentally new applications, industries, and business models and dramatically improve quality of life around the world via unprecedented use of high data-rate instantaneous communications, low latency, and massive connectivity for new applications such as eHealth, intelligent transportation, autonomous vehicles, smart cities, smart homes, Industrial IoT, smart grid, terahertz communication etc. With growing IoT needs, networking should be ubiquitous, energy and spectrum efficient, ensure quality of service (QoS) and adequately secured. Further, the congregation of 5G and artificial intelligence (AI) is expected to accelerate the adoption of Industry 4.0.

Topics to be covered

- 5G New Radio concepts & standardization
- Radio access technologies for 5G
- Network layer Architecture for 5G/IoT connectivity
- Network Slicing for 5G and Beyond MAC Layer
- 5G Challenges and Enabling Technologies
- 5G Security – 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
- 5G system simulation using SystemView and prototyping with SDR platform

Distinguished Speakers from Academia

Prof. Ramjee Prasad, Fellow IEEE, IET, IETE, and WWRF; Professor of Future Technologies for Business Ecosystem Innovation (FT4BI) in the Department of Business Development and Technology, Aarhus University, Herning, Denmark, Founder President of the CTIF Global Capsule (CGC)

Prof. Ashutosh Dutta, Fellow IEEE, *IEEE Communications Society Distinguished Lecturer, Founding Co-Chair for IEEE 5G Initiative, USA, Johns Hopkins University, USA*

Prof. Prasant Mohapatra, Fellow IEEE, *Vice Chancellor for Research, Distinguished Professor of Computer Science, University of California Davis USA*

Prof. Mohamed-Slim Alouini, Fellow IEEE, *IEEE Communications Society Distinguished Lecturer, KAUST, Kingdom of Saudi Arabia*

Prof. Sudip Misra, Humboldt Fellow (Germany), INAE Fellow (India), NASI Fellow (India), *Indian Institute of Technology Kharagpur*

Prof. Iti Saha Misra, *Vice-Chairman, IEEE Kolkata Section, Comsoc Chapter Chair 2013-2018, Jadavpur University*

Prof. Chandra Murthy, *Past Chair of the IEEE Signal Processing Society, Bangalore Chapter, Indian Institute of Science Bangalore*

Prof. Suvra Sekhar Das, *Indian Institute of Technology Kharagpur*

Prof. Preetam Kumar, *General Co-Chair IEEE 5G Summit 2016, Indian Institute of Technology Patna*

Prof. Debarati Sen, *Chair, IEEE Kharagpur Section, Indian Institute of Technology Kharagpur*

Prof. Debabrata Das, *Chairman of IEEE Bangalore Section 2017, International Institute of Information Technology (IIIT) Bangalore*

Speakers from Industry

Dr. Kapil Bhattad, *Principal Engineer at Qualcomm, Bengaluru, Karnataka, India*

Dr. David Soldani, *CTO, Huawei (Australia), Adjunct Professor at New South Wales*

Mr. Srinivasan Selvaganapathy, *Sr Specialist – Radio Standards, Bell Labs And CTO, Nokia Solutions And Networks India Pvt Ltd, Bangalore, India*

Mr. Tushar Vrind, *Director, Samsung Semiconductor India Research (SSIR)*

Dr. Pallab Maji, *Sr. Solution Architect – Deep Learning, NVIDIA Graphics Pvt. Ltd., India*

Mr. Nilutpal Choudhury, *Technical Consultant, Embesys Technologies, India*

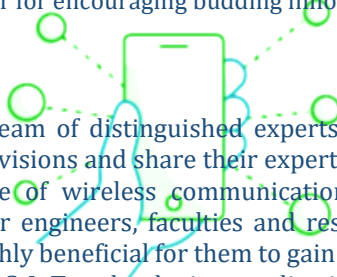
About the Institute

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. It is ranked 16 in the NIRF Rankings 2020 of Indian Engineering Universities. 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

In these five days duration of course, a team of distinguished experts from academia and industries will present their visions and share their expertise on various 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. and also will be highly beneficial for them to gain an in-depth technical knowledge in emerging 5G-IoT technologies, applications & services. This course will open up many potential research directions, opportunities and challenges ahead. We also plan to accommodate a few interested undergraduate and post graduate students with good academic record, who would like to further explore the cutting-edge research in future wireless technologies. The participants will also get an exposure to practical implementation 5G technologies through demonstrative lectures by invited industry experts.

The participants will be provided with online certificates upon completion of the short term CEP course.



Registration details

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

Category	Registration Fee (INR)
UG/PG Students	500.00
Doctoral Scholars	600.00
Faculties from Academia	800.00
Industry persons	1000.00

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

Account Name: DIRECTOR NIT ROURKELA

Account Number: 37537622247

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://docs.google.com/forms/d/e/1FAIpQLSf3zF2rhtc_gFvkG8RJBf14QvhBE7Jvj7wLw4VA5SmnAz64_7w/viewform

Registration deadline: 04 Nov 2020

Confirmation to participants: 04 Nov 2020

Online platform details and detail program schedule will be intimated by: 04 Nov 2020

*** Registration fees is not required for current students and faculties of NIT Rourkela and GEC Bilaspur (TEQIP-twinning institute). Those who are interested may upload their ID card in the google form for registration.**

Any one interested after these deadlines can register by filling up the google form and putting a request in the contact emails only.

Coordinator

Prof. Susmita Das

Department of Electrical Engineering
Rourkela, Odisha-769008, India

Co-coordinators

Prof. Suman Kr. Dey

Department of Electrical Engineering
Prof. Sambit Bakshi

Department of Computer Science & Engineering
National Institute of Technology (NIT) Rourkela,
Rourkela, Odisha-769008, India

Contact and Queries

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&

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Course schedule

Day #0 (06 Nov 2020 Friday) INAGURAL SESSION				
18.30 HRS-19.10 HRS IST Chief Patron: Prof.Animesh Biswas(Director, NIT Rourkela), Chief Guest: Prof. Ramjee Prasad, Patron: Prof. C.R Patra (Coordinator , TEQIP-III), Chairperson: Prof. Dipti Patra (HOD,EE), Guests: Prof. Ashutosh Dutta, Prof. Iti saha Mishra (IEEE Technical Co-Sponsor), Course Coordinators: Prof. Susmita Das, Prof. Suman Kr. Dey, Prof. Sambit Bakshi Keynote Lecture on “5G and the Modernization of Industry: FROM INDUSTRY 4.0 TO SMART CITIES” by Prof. Ramjee Prasad				
Day #1 (07 Nov 2020 Saturday)				
09:00 HRS IST – 10:00 HRS IST Mr. Srinivasan Selvaganapathy Title: Radio Technologies for Cellular IoT	10:30 HRS IST – 11:30 HRS IST Dr. Kapil Bhattad Title: Making 5G NR a commercial reality	17:00 HRS IST – 18:00 HRS IST Prof. Chandra Murthy Title: Design and Analysis of Massive MIMO Systems under Non-idealities	18:30 HRS IST – 19:30 HRS IST Prof. Ashutosh Dutta IEEE ComSoc Distinguished Lecture Title: Security in SDN/NFV and 5G Networks-Opportunities and Challenges [Youtube link]	19:30 HRS IST – 19:45 HRS IST Interaction with participants Course Coordinators
Day #2 (08 Nov 2020 Sunday)				
09:00 HRS IST – 10:00 HRS IST Prof. Prasant Mohapatra Title: Millimeter-wave for smart sensing	10:30 HRS IST – 11:30 HRS IST Prof. Sudip Misra IEEE ComSoc Distinguished Lecture Title: UAV Networks: Architectures, Opportunities, Challenges, and Future [Youtube link]	17:00 HRS IST – 18:00 HRS IST Dr. Pallab Maji Title: Developer’s approach to Multi-camera large-scale intelligent video analytics	18:30 HRS IST – 19:30 HRS IST Prof. Mohamed-Slim Alouini Title: What should 6G be?	19:30 HRS IST – 19:45 HRS IST Interaction with participants Course Coordinators
Day #3 (09 Nov 2020 Monday)				
	14:30 HRS IST – 16:00 HRS IST Mr. Pratik Khurana, Keysight Technologies Title: 5G System Simulation using SystemView’s 5G Library	16:30 HRS IST – 17:30 HRS IST Prof. Suvra Sekhar Das Title: OTFS: A potential waveform for 6G	18:00 HRS IST – 19:00 HRS IST Prof. Debabrata Das Title: Network Slicing for 5G and Beyond MAC Layer	19:00 HRS IST – 19:15 HRS IST Interaction with participants Course Coordinators
Day #4 (10 Nov 2020 Tuesday)				
11:00 HRS IST – 12:00 HRS IST Prof. Preetam Kumar Title: 5G challenges and Enabling Technologies	15:00 HRS IST – 16:00 HRS IST Dr. David Soldani Title: Introduction to AI for 5G Systems	16:30 HRS IST – 17:30 HRS IST Prof. Iti Saha Misra Title: Cognitive Radio and 5G communication	18:00 HRS IST – 19:00 HRS IST Mr. Tushar Vrind Title: Connecting dots from current state of 5G to B5G and 6G	19:00 HRS IST – 19:15 HRS IST Interaction with participants Course Coordinators
Day #5 (11 Nov 2020 Wednesday)				
11:00 HRS IST – 12:00 HRS IST Mr. Nitesh Pradhan Title: 5G system prototyping using LabVIEW and USRP	15:00 HRS IST – 16:30 HRS Mr. Nilutpal Choudhury Title: 5G Prototyping Massive MIMO and mmWave Systems	16:45 HRS IST – 17:45 HRS IST Prof. Debarati Sen Title: Terra Hertz Communication in 6G	18:00 HRS IST – 19:00 HRS IST Prof. Susmita Das Title: Reliable Communication in Ultra Wide Band Body Area Network	19:00 HRS IST – 19:30 HRS IST Course review, Feedback, Valedictory Session, and Vote of thanks by Course Coordinators

About the speakers



Prof. Ramjee Prasad, Fellow IEEE, IET, IETE, and WWRF; Professor of Future Technologies for Business Ecosystem Innovation (FT4BI) in the Department of Business Development and Technology, Aarhus University, Herning, Denmark, Founder President of the CTIF Global Capsule (CGC)

Ramjee Prasad, Fellow IEEE, IET, IETE, and WWRF, is a Professor of Future Technologies for Business Ecosystem Innovation (FT4BI) in the Department of Business Development and Technology, Aarhus University, Herning, Denmark. He is the Founder President of the CTIF Global Capsule (CGC). He is also the Founder Chairman of the Global ICT Standardization Forum for India, established in 2009. He has been honored by the University of Rome “Tor Vergata”, Italy as a Distinguished Professor of the Department of Clinical Sciences and Translational Medicine on March 15, 2016. He is an Honorary Professor of the University of Cape Town, South Africa, and the University of KwaZulu-Natal, South Africa. He has received Ridderkorset of Dannebrogordenen (Knight of the Dannebrog) in 2010 from the Danish Queen for the internationalization of top-class telecommunication research and education. He has received several international awards such as IEEE Communications Society Wireless Communications Technical Committee Recognition Award in 2003 for making contribution in the field of “Personal, Wireless and Mobile Systems and Networks”, Telenor's Research Award in 2005 for impressive merits, both academic and organizational within the field of wireless and personal communication, 2014 IEEE AESS Outstanding Organizational Leadership Award for: “Organizational Leadership in developing and globalizing the CTIF (Center for TeleInfrastruktur) Research Network”, and so on. He has been the Project Coordinator of several EC projects namely, MAGNET, MAGNET Beyond, eWALL. He has published more than 50 books, 1000 plus journal and conference publications, more than 15 patents, over 140 Ph.D. Graduates and a larger number of Masters (over 250). Several of his students are today worldwide telecommunication leaders themselves.



Prof. Ashutosh Dutta, Fellow IEEE, *IEEE Communications Society Distinguished Lecturer, Founding Co-Chair for IEEE 5G Initiative, USA, Johns Hopkins University, USA*

Ashutosh Dutta is currently senior scientist and 5G Chief Strategist at the Johns Hopkins University Applied Physics Laboratory (JHU/APL). He is also a JHU/APL Sabbatical Fellow and adjunct faculty at The Johns Hopkins University. Ashutosh also serves as the chair for Electrical and Computer Engineering Department of Engineering for Professional Program at Johns Hopkins University. His career, spanning more than 30 years, includes Director of Technology Security and Lead Member of Technical Staff at AT&T, CTO of Wireless for NIKSUN, Inc., Senior Scientist and Project Manager in Telcordia Research, Director of the Central Research Facility at Columbia University, adjunct faculty at NJIT, and Computer Engineer with TATA Motors. He has more than 100 conference, journal publications, and standards specifications, three book chapters, and 31 issued patents. Ashutosh is co-author of the book, titled, “Mobility Protocols and Handover Optimization: Design, Evaluation and Application” published by IEEE and John & Wiley. Ashutosh obtained his BS in Electrical Engineering from NIT Rourkela, India; MS in Computer Science from NJIT; and Ph.D. in Electrical Engineering from Columbia University, New York under the supervision of Prof. Henning Schulzrinne. Ashutosh is a Fellow of IEEE and senior member of ACM.

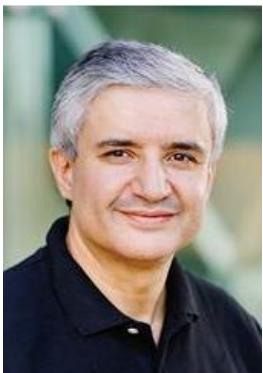
As a Technical Leader in 5G and security, Ashutosh has been serving as the founding Co-Chair for the IEEE Future Networks Initiative that focuses on 5G standardization, education, publications, testbed, and roadmap activities. Ashutosh serves as IEEE Communications Society's Distinguished Lecturer for 2017-2020 and as an ACM Distinguished Speaker (2020-2022). Ashutosh has served as the general Co-Chair for the premier IEEE 5G World Forums and has organized 65 5G World Summits around the world.

Ashutosh served as the chair for IEEE Princeton / Central Jersey Section, Industry Relation Chair for Region 1 and MGA, Pre-University Coordinator for IEEE MGA and vice chair of Education Society Chapter of PCJS. He co-founded the IEEE STEM conference (ISEC) and helped to implement EPICS (Engineering Projects in Community Service) projects in several high schools. Ashutosh has served as the general Co-Chair for the IEEE STEM conference for the last 10 years. Ashutosh served as the Director of Industry Outreach for IEEE Communications Society from 2014-2019. He was recipient of the prestigious 2009 IEEE MGA Leadership award and 2010 IEEE-USA professional leadership award. Ashutosh currently serves as Member-At-Large for IEEE Communications Society for 2020-2022.



Prof. Prasant Mohapatra, Fellow IEEE, *Vice Chancellor for Research, Distinguished Professor of Computer Science, University of California Davis USA*

Prasant Mohapatra is serving as the Vice Chancellor for Research at University of California, Davis. He is also a Distinguished Professor in the Department of Computer Science and served as the Dean and Vice-Provost of Graduate Studies at University of California, Davis during 2016-18. He served as an Associate Chancellor during 2014-16, and the Interim Vice-Provost and CIO of UC Davis during 2013-14. He was the Department Chair of Computer Science during 2007-13, and held the Tim Bucher Family Endowed Chair Professorship during that period. In the past, Dr. Mohapatra has been on the faculty at Iowa State University and Michigan State University. He has also held Visiting Scientist positions at Intel Corporation, Panasonic Technologies, Institute of Infocomm Research (I2R), Singapore, and National ICT Australia (NICTA). He has been a Visiting Professor at the University of Padova, Italy and Yonsei University, and KAIST, South Korea. D. Mohapatra was the Editor-in-Chief of the IEEE Transactions on Mobile Computing. He has served on the editorial board of the IEEE Transactions on Computers, IEEE Transactions on Mobile Computing, IEEE Transaction on Parallel and Distributed Systems, ACM WINET, and Ad Hoc Networks. He has served as the Program Chair and the General Chair and has been on the program/organizational committees of several international conferences. He has been a Guest Editor for IEEE Network, IEEE Transactions on Mobile Computing, IEEE Communications, IEEE Wireless Communications, and the IEEE Computer. Dr. Mohapatra received his doctoral degree from Penn State University in 1993, and received an Outstanding Engineering Alumni Award in 2008. He is also the recipient of Distinguished Alumnus Award from the National Institute of Technology, Rourkela, India. Dr. Mohapatra's research interests are in the areas of wireless networks, mobile communications, cybersecurity, and Internet protocols.



Prof. Mohamed-Slim Alouini, Fellow IEEE, *IEEE Communications Society Distinguished Lecturer, KAUST, Kingdom of Saudi Arabia*

Mohamed-Slim Alouini was born in Tunis, Tunisia. He received the Ph.D. degree in electrical engineering from the California Institute of Technology (Caltech), Pasadena, CA, USA, in 1998. He served as a Faculty Member at the University of Minnesota, Minneapolis, MN, USA, then in the Texas A&M University at Qatar, Education City, Doha, Qatar, before joining the King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia, as a Professor of electrical engineering in 2009. His current research interests include the modeling, design, and performance analysis of wireless communication systems. He has published several papers on the above subjects and he is co-author of the textbook Digital Communication over Fading Channels published by Wiley Interscience. He was honored in 2017 with the Organization of Islamic Cooperation (OIC) Science and Technology (S&T) Achievement Award in Engineering Science at the First OIC Summit on Science and Technology, Astana, Kazakhstan. Prior to this, he received the 2016 Recognition Award of the IEEE Communication Society Wireless Technical Committee and the 2016 Abdul Hameed Shoman Award for Arab Researchers in Engineering Sciences. Other recognitions include his selection as (i) Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the African Academy of Science (AAS), the European Academy of Science and Arts (EASA), and the Academia Europaea (AE), (ii) IEEE Distinguished Lecturer for the IEEE Communication Society and IEEE Vehicular Technology Society, (iii) member for several times in the annual Thomson ISI Web of Knowledge list of Highly Cited Researchers as well as the Shanghai Ranking/Elsevier list of Most Cited Researchers, and (iv) a co-recipient of best paper awards in eleven IEEE conferences (including ICC, GLOBECOM, VTC, PIMRC, ISWCS, and DySPAN).



Prof. Sudip Misra, Humboldt Fellow (Germany), INAE Fellow (India), NASI Fellow (India) , *Indian Institute of Technology Kharagpur*

Sudip Misra is a full Professor in the Department of Computer Science and Engineering at the Indian Institute of Technology Kharagpur. Prior to this he was associated with Cornell University (USA), Yale University (USA), Nortel Networks (Canada) and the Government of Ontario (Canada). He received his Ph.D. degree in Computer Science from Carleton University, in Ottawa, Canada, and the masters and bachelors degrees, respectively, from the University of New Brunswick, Fredericton, Canada, and the Indian Institute of Technology, Kharagpur, India. Prof. Misra has several years of experience working in the academia, government, and the private sectors in research, teaching, consulting, project management, software design and product engineering roles. His current research interests include mobile ad hoc and sensor networks, internet of things (IoT), computer networks, and learning systems. Prof. Misra is the author of over 300 scholarly research papers, of which over 170 of them are in distinguished journals. He has won ten research paper awards in different international conferences and journals. He was awarded the coveted Careers360 Outstanding Faculty Award in 2018 for his distinguished contributions in Computer Science. He also received the Faculty Excellence Award at IIT Kharagpur in 2017 (the only researcher to receive the award from all disciplines of electrical and computer sciences). He received the IEEE ComSoc Asia Pacific Outstanding Young Researcher Award at IEEE GLOBECOM 2012, Anaheim, California, USA. Further, his team was awarded the GYTI Award (2018) by the President of India, and the 3rd Prize in the Samsung Innovation Award (2014) at IIT Kharagpur, the IBM Innovation Award (2016) at IIT Kharagpur. He was also the recipient of several academic awards and fellowships such as the Young Scientist Award (National Academy of Sciences, India), Young Systems Scientist Award (Systems Society of India), Young Engineers Award (Institution of Engineers, India), (Canadian) Governor General's Academic Gold Medal at Carleton University, the University Outstanding Graduate Student Award in the Doctoral level at Carleton University and the National Academy of Sciences, India – Swarna Jayanti Puraskar (Golden Jubilee Award). He was also awarded the Canadian Government's prestigious NSERC Post Doctoral Fellowship and the Humboldt Research Fellowship in Germany. Prof. Misra has been serving as the Associate Editor of the IEEE Transactions on Mobile Computing, IEEE Transactions on Vehicular Technology, and IEEE Systems Journal, International Journal of Communication Systems (Wiley), and IET Communications Journal. Prof. Misra has published 10 books in the areas of opportunistic networks, wireless ad hoc networks, wireless sensor networks, wireless mesh networks, communication networks and distributed systems, network reliability and fault tolerance, and information and coding theory, published by reputed publishers such as Springer, Cambridge University Press, Wiley, and World Scientific. Prof. Misra is the Fellow of the National Academy of Sciences (NASI), India, the Institution of Engineering and Technology (IET), UK, and the Institution of Electronics and Telecommunications Engineering (IETE), India.



Prof. Iti Saha Misra, *Vice-Chairman, IEEE Kolkata Section, Comsoc Chapter Chair 2013-2018, Jadavpur University Kolkata*

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. Chandra Murthy, *Past Chair of the IEEE Signal Processing Society, Bangalore Chapter, Indian Institute of Science Bangalore*

Chandra R. Murthy received the B. Tech degree in Electrical Engineering from the Indian Institute of Technology, Madras, Chennai, India in 1998 and the M.S. degree in Electrical and Computer Engineering from Purdue University, West Lafayette, IN, USA in 2000. In 2006, he obtained the Ph.D. degree in Electrical and Computer Engineering from the UC San Diego, La Jolla, CA, USA. From Aug. 2000 to Aug. 2002, he worked on WCDMA baseband transceiver design and 802.11b baseband receivers at Qualcomm, Inc, San Jose, USA; and from Aug. 2006 to Aug. 2007, he worked on advanced receiver algorithms for the 802.16e mobile WiMAX system at Beceem Communications (now Broadcom), Bangalore, India. Currently, he is working as a Professor in the department of Electrical Communication Engineering at the Indian Institute of Science, Bangalore, India. His research interests are in the areas of sparse signal recovery, energy harvesting based communications and performance analysis and optimization of wireless communication systems. He is an IEEE senior member, an associate editor for the IEEE Transactions on Signal Processing and the IEEE Transactions on Information Theory, an editor for the IEEE Transactions on communications, an elected member of the IEEE SPCOM Technical Committee for the years 2014-16, and has been re-elected for the years 2016-19. He is a past Chapter Chair of the IEEE Signal Processing Society, Bangalore Chapter. He served as an associate editor for the IEEE Signal Processing Letters during the years 2012-16.



Prof. Suvra Sekhar Das, *Indian Institute of Technology Kharagpur*

Suvra Sekhar Das (M'00) received the B.Eng. degree in electronics and communication engineering from the Birla Institute of Technology, Ranchi, India, in 2000, and the Ph.D. degree from Aalborg University, Aalborg, Denmark, in 2007. He was a Senior Scientist with the Innovation Laboratory, Tata Consultancy Services, from 2000 to 2008. His previous collaborations include research projects in cooperation with Vodafone, ISRO, Reliance Jio, and among others. He is currently an Associate Professor with the Department of Electronics and Electrical Communication Engineering and the G. S. Sanyal School of Telecommunications, IIT Kharagpur, India. He has authored over 70 refereed journals and conference papers, holds two patents, and wrote two books. He has also developed several teaching resources. His research interests include cross-layer optimization of mobile broadband cellular networks, 5G waveform design, heterogeneous networks, ultra-dense networks, millimeter-wave communications, radio access technology, and radio access network for quality of service traffic.



Prof. Preetam Kumar, *General Co-Chair IEEE 5G Summit 2016, Indian Institute of Technology Patna*

Preetam Kumar received the Ph.D. degree in the field of wireless cellular communications from the Indian Institute of Technology, Kharagpur, India. He is currently an Associate Professor in the Department of Electrical Engineering, Indian Institute of Technology Patna, Patna, India. He has around 20 years of teaching, research, and industry experience. Physical (PHY) layer issues in wireless communications, 5G network, error control coding, and digital communication systems are his areas of research interest. Dr. Kumar has authored or co-authored several research papers in various refereed IEEE journals, other peer-reviewed journals and conferences. He is a regular reviewer of premier journals and TPC member of various conferences. He was the Organizing Chair of the first IEEE Symposium on 5G in Asia at Indian Institute of Technology Patna in 2016. He has also successfully executed high-value sponsored projects as well as consultancy project from the industry. He is a senior member of IEEE. He serves as an editorial board member of Springer Wireless Personal Communication journal.



Prof. Debarati Sen, *Chair, IEEE Kharagpur Section, Indian Institute of Technology Kharagpur*

Debarati Sen is currently an Associate Professor, G.S.S. School of Telecommunications, IIT Kharagpur, India. She received her Master in Engineering in 2004 from IEST, Howrah, as a University Gold Medallist and PhD in Telecommunication Engineering from IIT- Kharagpur in 2010 as a National Doctoral Fellow. She was a Post-Doctoral Research Fellow with the Chalmers University of Technology, Sweden, and a Senior Chief Engineer with the Samsung Research, Bangalore, India prior to join IIT Kharagpur. In 2014, Dr. Sen was a visiting faculty with the Institute for Communications Engineering, Technical University of Munich, Germany; and in 2019, she was an academic visitor with the Dept. of ECSE, Monash University, Melbourne, Australia. In her research, Debarati focuses on Wireless and Optical Communication including Interdisciplinary Computing, mostly on 5G & Beyond Communications, Millimeter Wave Communications, Large MIMO Systems, Short Range Communications, Terahertz Communications, Cloud RAN, Visible Light Communications. Her research is supported by a variety of Govt. organizations including MHRD, BEL, HAL, MeitY, DST, DRDO, Indian Railways and external collaborators like AIRBUS, Qualcomm, Samsung, Ericsson etc. Dr. Sen has 12 patent applications to her credit including a few US Granted Patents, and published more than 100 papers in Journals and Conferences of repute. She is an Editorial Board Member of two international journals; recipient of Best Paper Awards at Samsung Tech. Conference 2010 and IEEE ANTS 2016; IE(I) Young Engineers Award 2010; IETE N.V.G. Memorial Award 2013; Qualcomm Innovation Fellowship 2017, Faculty Excellence Award IIT Kharagpur 2020. Debarati is the present Chair of IEEE Kharagpur Section. She is a Senior Member of IEEE, Fellow of IE(I), and Life Member, Indian Science Congress Association.



Prof. Debabrata Das, *Chairman of IEEE Bangalore Section 2017, International Institute of Information Technology (IIIT) Bangalore*

Debabrata Das is serving as Professor at IIIT Bangalore (IIITB). Before joining IIITB, he had served at G S Sanyal School of Telecommunication at IIT Kharagpur and later at Kirana Networks in New Jersey, USA. He is CoPI of a project from Ministry of Electronics and Information Technology, Government of India and Cognizant Technologies Ltd. on Smart Home and PI of a project from Tejas Networks on network node reliability. He was PI of multiple sponsored projects from Intel, Hewlett Packard, Microsoft, Motorola Research, Nokia, Govt. of India on areas of Broadband Wireless MAC/QoS/Energy-saving, IMS. His main areas of research interest are IoT and Wireless Access Network's MAC, QoS, Power saving. Dr. Das received his Ph.D. degree from the Indian Institute of Technology Kharagpur. He has more than 160 peer reviewed papers in different Transaction/Journals and International Conferences. Dr. Das has received 4 best paper awards. He has 3 US/Indian patents and 10 more are under review. He and his wireless network team had contributed 3 ideas to IEEE Broadband Wireless Standard. He has received Prof. K. Sreenivasan Memorial Award 2017 for excellent teaching in the areas of Telecommunication from IETE. Dr. Das is recipient of IEEE Region-10 Outstanding Volunteer Award 2020, Global IEEE MGA Achievement Award 2012 and Outstanding Volunteer Award IEEE Bangalore Section 2008. He is Fellow-IETE, Fellow-IE and SM-IEEE. He was recipient of Hewlett Packard Endowment Chair Professor in IIITB from 2003-2008, 2010-2012 and 2014-2017. He was Chairman of IEEE Bangalore Section 2017. He is a Board Member of IIIT Bhubaneswar. Dr. Das is a Technical/Steering/Empower Committee member of multiple Departments of Government of India and Government of Karnataka. Dr. Das was the Dean-Academic and R&D of IIIT Bangalore (2014-17).



Dr. Kapil Bhattad, Principal Engineer at Qualcomm, Bengaluru, Karnataka, India

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