6G and Wireless Communication Technologies

Under the SPARC-UKIERI Scheme, IIT (BHU) Varanasi, India and University of Edinburgh, UK.

SPARC
Scheme for Promotion of Academic and Research Collaboration

About SPARC-UKIERI

The UK-India Education and Research Initiative (UKIERI) is the flagship bilateral collaboration program between the UK and India, focused on education and research. By strengthening educational and research partnerships, UKIERI helps both countries achieve their knowledge ambitions. It provides funding to support joint research projects between Indian researchers and their international counterparts.

Course: 6G and Wireless Communication Technologies

The course on 6G and Wireless Communication Technology provides a comprehensive exploration of the next generation of wireless communication systems, highlighting the revolutionary capabilities and advancements anticipated with 6G technology. The course is driven by the growing demand for faster, more reliable, and more efficient communication networks. It focuses on cutting-edge technologies, including millimeter-wave communication, massive MIMO, full-duplex radio, AI/ML-based wireless networks, distributed/federated learning, wireless caching, and Internet of Things (IoT) integration, aiming to equip participants with a deep understanding of the evolving landscape. By addressing key concepts, challenges, and potential applications of 6G, this course prepares professionals and researchers to be at the forefront of wireless communication technology, fostering innovation and expertise in this rapidly advancing field.

The primary objectives of the course are as follows. Exposing participants to the fundamentals of wireless communication techniques. Providing a deep understanding of wireless communication techniques associated with MIMO communications systems, space-time coding, BLAST architectures, massive MIMO, precoding technique, and related information-theoretic capacity limits. Providing the students with a clear idea of singleuser, multi-user, and multicarrier communications, single and multi-cell (including the emerging small cell architectures), and ad-hoc networks. Exposing the students to advance mobile communication techniques such as massive MIMO, non-orthogonal multiple access (NOMA) communications, AI/ML, full-duplex radio, and the Internet of Things (IoT), orthogonal time frequency space (OTFS) modulation. Providing hands-on experience on the latest communication (LTE, massive MIMO) and signal processing techniques through labs and tutorials.

Who can attend

BE/B.Tech./M.Sc./ME/M/Tech./PhD Students and Early Researchers studying/working in the area of Wireless Communication/ Signal Processing/ Cyber Physical Systems/ IoT/ Data Science/ Machine Learning/ Artificial Intelligence/ and other relevant areas of wireless communication and signal processing.

Certification

Attendees will be given E-certificate.

Registration Details

There is no registration fee. Deadline of registration is November 20, 2024.

For registration visit:

`https://forms.gle/uBuUkhz6T35Nju6A9`

Location

Committee Room, Department of Electronics Engineering, IIT (BHU) Varanasi

Course Organizers:

Prof. Tharmalingam Ratnarajah, University of Edinburgh, UK, T.Ratnarajah@ieee.org
Prof. Mathini Sellathurai, Heriot-Watt University, UK M.Sellathurai@hw.ac.uk
Prof. Amritanshu Pandey,IIT (BHU) Varanasi, India, amrit.ece@iitbhu.ac.in
Prof. Sanjeev Sharma, IIT (BHU) Varanasi, India, sanjeev.ece@iitbhu.ac.in

The course will provide an opportunity to understand and learn about 5G and 6G communication technologies, as well as the challenges for next-generation wireless networks.

SPARC Sponsored
Course
on
6G and Wireless Communication Technologies
Date: 2-6 December 2024

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MINISTRY OF SCIENCE AND TECHNOLOGY
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UK-India Education and Research Initiative

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Scan to register:

Speakers

Prof. Tharm. Ratnarajah, Institute for Digital Communications, University of Edinburgh, UK,

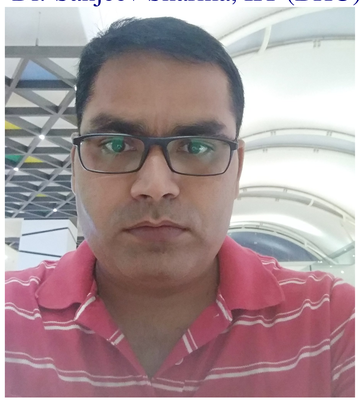
He is with the Institute for Digital Communications, University of Edinburgh, Edinburgh, UK, as a Professor in Digital Communications and Signal Processing. His research interests include signal processing and information theoretic aspects of 5G wireless networks, random matrices theory and stochastic geometry, mmWave communications, full-duplex radio, interference alignment, physical layer secrecy, cognitive radio, statistical and array signal processing, biomedical signal processing and quantum information theory. He has published over 450 publications in these areas and holds four U.S. patents. He was the coordinator of the FP7 projects ADEL (3.7 M Euros) in the area of licensed shared access for 5G wireless networks and HARP (4.6M Euros) in the area of highly distributed MIMO and FP7 Future and Emerging Technologies projects HIATUS (3.6M Euros) in the area of interference alignment and CROWN (3.4M Euros) in the area of cognitive radio networks. Dr Ratnarajah is a Fellow of Higher Education Academy (FHEA), U.K. and was an Associate Editor of the IEEE Transactions on Signal Processing (2015-2017).
More details: http://www.profratnarajah.org/

Prof. Prof. Mathini Sellathurai, Heriot-Watt University, Riccarton, Edinburgh, UK

She is currently the Dean of the University for Science and Engineering and a Full Professor in Signal Processing with the Heriot-Watt University, Edinburgh, U.K and leading research in adaptive, cognitive and statistical signal processing techniques in a range of applications including Radar, Lidar, Sonar and RF networks, Network Coding, Cognitive Radio, MIMO signal processing, satellite communications and underwater communications. She has been active in the area of signal processing research for the past 20 years and has a strong international track record in multiple-input, multiple-output (MIMO) signal processing with applications in radar and wireless communications research. Prof. Sellathurai has 5 years of industrial research experience. She held positions with Bell- Laboratories, New Jersey, USA, as a visiting researcher (2000); and with the Canadian (Government) Communications Research Centre, Ottawa Canada as a Senior Research Scientist (2001-2004). Since 2004 August, she has been with academia. She also holds an honorary Adjunct/Associate Professorship at McMaster University, Ontario, Canada, and an Associate Editorship for the IEEE Transactions on Signal Processing between 2009 -2013. Presently serving as an IEEE SPCOM Technical Committee.
More details: https://researchportal.hw.ac.uk/en/persons/mathini-sellathurai

Organizers

Dr. Sanjeev Sharma, IIT (BHU) Varanasi



Sanjeev Sharma has more than 12 years of research experience on advanced signal processing and wireless communications. He received his M. Tech. and PhD degrees from Indian Institute of Technology Guwahati, and Indian Institute of Technology Indore in 2010 and 2018, respectively, all in Electrical Engineering. He had worked in the Department of Electrical and Computer Systems Engineering at Monash University, Melbourne, Australia, as a Postdoctoral Fellow. His research interests lie in signal processing for wireless communications and networking, mathematical modeling, simulation, design, and analysis of wireless systems. In recent years, his work has centered on developing machine and deep learning algorithms for reconfigurable intelligent surface (RIS) assisted communication systems, OTFS, specifically for 5G and future wireless networks.
More details: https://www.iitbhu.ac.in/dept/ece/people/sanjeevece

Dr. Amritanshu Pandey, IIT (BHU) Varanasi

Amritanshu Pandey has around 17 years of research experience in Optical Communication Systems and components, TMD-based devices for optoelectronic applications. He has guided many PhD students and published research articles in IEEE and Elsevier journals. He is currently working on optical communication and optoelectronic devices.
More details: https://www.iitbhu.ac.in/dept/ece/people/apandeyece