Joint Academic & Industry and Radio Technology SIG
'Radio Technology: Realising the future'
4th July 2017
Hosted by Queen Mary University of London, sponsored by Rohde & Schwarz

The **Academic & Industry SIG** is championed by John Haine of **Bristol University**, Claudio Marinelli of **Eight19**, Joachim Wabnig of **Nokia** and Ian Wassell of **University of Cambridge**

The **Radio Technology SIG** is championed by Mark Beach of **Bristol University**, Brian Collins of **BSC Associates**, Diego Giancola of **PA Consulting Group**, and Peter Topham of **Qualcomm Technologies International**

Venue: Peston Lecture Theatre, The Graduate Centre, Queen Mary University of London, 327 Mile End Road, London, E1 4NS

AGENDA	
10:00	Registration and networking with refreshments
10:30	Introduction to Academic & Industry and Radio Technology SIGs
10:50	Welcome from event host, **Clive Parini, Queen Mary University of London**
11:00	Welcome from event sponsor, **Rohde & Schwarz**
11:10	**Dr Sajad Haq, QinetiQ**
11:20	**Directional Antennas in MANET Radio Networks** **Steve Fitz, Director of Technology, Plextek** This short talk will outline the ACTI collaborative research programme which explores the implications of using directional antennas in MANET radio networks. This topic is of current interest partly because of the growing use of mmWave bands where directional antennas are both essential for link budget and of reasonable size. Adapting beam directions in a mobile topology has far-reaching implications for the MANET stack including radio resource management and routing.
11:30	**Huawei Research University partnerships** **Michael Hill-King, Collaboration Director, Huawei** There are many challenges facing the ICT industry over the next decade arising at the device level, network connectivity, and in intelligent operation. Many of these challenges can be addressed collaboratively. The talk will introduce the foci for Huawei R&D and how Huawei works with universities to address these challenges that face us all.
11:40	**Leonardo in the UK – technology challenges give research opportunities** **John Griffin, Innovation & Technology Director, Electronic & Defence Systems Sector, Leonardo** This short talk will provide an overview of the activities in Leonardo in the UK illustrating the importance of RF technology, some of the key performance drivers and current challenges. This will link to the identification of some research areas of interest to Leonardo in the future.
11:50	Panel session - the industry perspective
12:20	**Lunch and networking**
13:30	**Antenna Innovation Driven by Advanced Materials** **Yang Hao, Professor of Antennas & Electromagnetics, Queen Mary University of London** Over recent years, Queen Mary University of London has developed several innovative antenna solutions based on the novel materials ranging from metamaterials to graphene. In this talk, I will discuss some antenna solutions pushing the conceptual boundaries whilst at the same time exploring the practical problems of design and manufacturability.

13:40	**Joint Academic and Industry Research on Indoor Wireless Coverage**
	Dr. Tongyun Li, Research Associate, Engineering Department, University of Cambridge
	This talk will present a collaborative work between Cambridge University and China Aerospace for development of a novel cloud based in-building wireless (IBW) solution which addresses the issues of high cabling and installation costs as well as difficulty in service convergence onto single network infrastructure in traditional systems. Industrial applications include mobile and IoT service coverage within stadiums, shopping malls, large building blocks and high-speed trains. A lab prototype has already been built and passed industrial-level tests. The first-generation product is expected to be launched in China later this year.
13:50	**Fronthauling for Cloud-RAN and distributed antenna systems**
	Alister Burr, Professor of Communications, Dept of Electronics, University of York
	Next generation wireless access networks are expected to make much wider use of distributed antenna systems, in which the antennas are physically separated from the baseband and higher layer processing: the "Cloud-RAN" concept is perhaps the ultimate example of this. This can reduce complexity of the access point and can also significantly improve network performance, but requires signals to be relayed across what is then known as the "front-haul" network, which can require these networks to provide very high capacity, typically several times the total user throughput. The talk will review the issues, and some potential solutions, some involving the applications of pure number theory.
14:00	**Balanced wave-impedance substrates for antenna miniaturisation: efficient or not?**
	Oliver James, Centre for Doctoral Training in Communications, University of Bristol
	In this talk, Oliver James introduces balanced wave-impedance materials for use in antennas. Certain hexagonal ferrites fall into this class of materials, exhibiting the property of equal electric permittivity and magnetic permeability, giving the material the same wave impedance as free space. Such materials are claimed to give efficient impedance matching between the antenna substrate and the transmission medium, but is this effect more important than conventional antenna substrate performance characteristics such as material loss tangent? Oliver discusses a radiatively characterised antenna built on such a substrate and considers the impact of the choice of material on antenna miniaturisation as well as the potential for frequency tuning.
14:30	Panel session - the academic perspective
15:00	Panel session with all speakers
15:30	**Tours of QMUL Laboratories**
16:30	**Event closes**

With the permission of the speakers, presentations will be loaded to the CW website on the day following the event

Profile of organisers

Cambridge Wireless (CW)

CW is the leading international community for companies involved in the research, development and application of wireless and mobile, internet, semiconductor and software technologies. With over 400 members from major network operators and device manufacturers to innovative start-ups and universities, CW stimulates debate and collaboration, harnesses and shares knowledge, and helps to build connections between academia and industry. CW's 19 Special Interest Groups (SIGs) provide its members with a dynamic forum where they can network with their peers, track the latest technology trends and business developments and position their organisations in key market sectors. CW also organises major conferences and start-up competitions along with other high-quality industry networking events and dinners. With headquarters at the heart of Cambridge, UK, CW partners with other international industry clusters and organisations to extend its reach and remain at the forefront of global developments and business opportunities. **www.cambridgewireless.co.uk**

Profile of sponsor

Rohde & Schwarz

Rohde & Schwarz UK Ltd has been the UK subsidiary of Rohde & Schwarz GmBH for 40 years. Based in Fleet, RSUK employs 105 people to provide dedicated sales, services and support to customers across the UK and Ireland. Rohde & Schwarz has designed and manufactured the highest-quality specialist products in Germany for 77 years across a wide range of technologies and industries, including wireless, broadcast, aerospace, defence and security markets. **www.rohde-schwarz.com**

Profile of host

Queen Mary University of London

Queen Mary University of London is one of the UK's leading research-focused higher education institutions. With 21,187 students, 4,000 staff and an annual turnover of £400m, we are one of the biggest University of London colleges. We teach and research across a wide range of subjects in the humanities, social sciences, law, medicine and dentistry, and science and engineering. We have been based in a creative and culturally diverse area of east London for over 130 years – our main site in Mile End is one of the largest self-contained residential campuses in the capital. **www.qmul.ac.uk**

Profile of Academic & Industry SIG Champions

John Haine, Bristol University

Professor John Haine is Royal Academy of Engineering Visiting Professor at Bristol University, and also the Chairman of the IoT Security Foundation, whose mission is to promote best practice in appropriate security to those who specify, make and use IoT products and systems. John is a member of the IET and IEEE and serves on the CW Board. John has spent his career in the electronics and communications industry, working for BT, Marconi, PA Consulting, and with start-ups including Cognito and Ionica. In 1999, he joined TTP Communications working on research, technology strategy and M&A activities; and then became Director of Technology Strategy in Motorola Mobile Devices. He was CTO Enterprise Systems with ip.access Limited, the leading manufacturer of GSM picocells and 3G femtocells. In 2010, he joined Cognovo Ltd, which was acquired by u-blox AG, where he worked on RF platform strategy for future wireless modules. John retired from u-blox in 2015. **www.bristol.ac.uk**

Claudio Marinelli, Eight19

Claudio Marinelli is VP Business Development at Eight 19, a start-up manufacturing plastic solar modules for indoor and outdoor applications. Prior to this, Claudio was Business Development Director at Applied Graphene Materials, a publicly listed UK start-up company in the field of advanced materials. In Nokia, as a Business Management Director and Open Innovation Director, he was responsible for technology commercialisation and for the strategic and operational oversight of R&D collaborations across the globe. Before joining Nokia, Claudio was Entrepreneur-in- Residence with Advance Nanotech, a US-based, seed investment fund specialised in academic spin-offs. In the past, he was also a Senior Device Engineer with Luxnet Corp., a Fremont, Ca, start-up specialised in fibre optics components. Claudio holds a first degree in Physics (University of Trieste, Italy), a PhD in Electronic Engineering (University of Bristol, UK) and an MBA from the Judge Business School (Cambridge, UK). Claudio is a co-founder of Scannerfutures, which focuses on medical imaging and diagnostics. **www.eight19.com**

Joachim Wabnig, Nokia

Joachim Wabnig has been educated as a theoretical physicist (PhD from Umeå University, Sweden). After postdoc placements in Oxford and Cambridge working on quantum technologies he joined the Nokia Cambridge Lab in 2011. Since then he has been working on a wide range of topics including quantum computing, quantum key distribution, compressed sensing and machine learning. He is now leading the machine learning and analytics team in Cambridge and is looking at applications in digital media and digital health. **www.nokia.com**

Ian Wassell, University of Cambridge

Dr Ian Wassell joined the University of Cambridge Computer Laboratory as a Senior Lecturer in January 2006. Prior to this, he was with the Department of Engineering for six years. He received the PhD degree from the University of Southampton in 1990 and the BSc., BEng. (Honours) Degrees (First Class) from the University of Loughborough in 1983. He has in excess of 20 years' experience in radio communication systems gained via positions in industry and

academia and has published more than 180 papers. His research interests include broadband wireless networks, wireless sensor networks, radio propagation, coding, communication signal processing and compressive sensing. **www.cl.cam.ac.uk**

Profile of Radio Technology SIG Champions

Mark Beach, Bristol University

Mark Beach received his PhD for research addressing the application of Smart Antenna techniques to GPS from the University of Bristol in 1989, where he subsequently joined as a member of academic staff. He was promoted to Senior Lecturer in 1996, Reader in 1998 and Professor in 2003. He was Head of the Department of Electrical & Electronic Engineering from 2006 to 2010, and then spearheaded Bristol's hosting of the EPSRC Centre for Doctoral Training (CDT) in Communications. He currently manages the delivery of the CDT in Communications, leads research in the field of enabling technologies for the delivery of 5G and beyond wireless connectivity, as well as his role as the School Research Impact Director. Mark's current research activities are delivered through the Communication Systems and Networks Group, forming a key component within Bristol's Smart Internet Lab. He has over 25 years of physical layer wireless research embracing the application of Spread Spectrum technology for cellular systems, adaptive or smart antenna for capacity and range extension in wireless networks, MIMO aided connectivity for through-put enhancement, Millimetre Wave technologies as well as flexible RF technologies for SDR modems underpins his current research portfolio. **www.bristol.ac.uk**

Brian Collins, BSC Associates

Brian has designed antennas for applications including radio and TV broadcasting, base stations, handsets and consumer products, and has operated his own consultancy firm for the last 15 years. He has published more than 70 papers on antenna topics and contributed chapters to several recent textbooks. He operates a small consultancy company, chairs the Antenna Interface Standards Group and is an Honorary Visiting Professor in the School of Electronic Engineering and Computer Science at Queen Mary, University of London. **www.bscassociates.co.uk**

Diego Giancola, PA Consulting Group

Diego has spent his career in radio systems R&D and modem design in the wireless communication sector, from 2G to the latest 4G evolutions. His research interests lie in multi-antenna systems and novel signal processing and architectures for radio signals. He currently co-runs PA's signal processing team and leads the research activities in LTE evolution and 5G landscaping. Diego has a first degree in telecommunication engineering and a doctorate in electronics and communication engineering from Politecnico di Milano. **www.paconsulting.com**

Peter Topham, Qualcomm Technologies International

Peter has more than 30 years' experience of RF and high-speed circuit design, taking chips into production ranging from FM Band II through cellular, Bluetooth and on to UWB at 10GHz. He has been with Qualcomm for 7 years, specialising in low-power RF design for portable and wearable products. **www.qualcomm.com**

Profile of speakers

Alister Burr, University of York

Alister Burr is Professor of Communications in the Dept of Electronic Engineering at the University of York. His research interests are in the physical layer of wireless communications, especially as it is implemented in large scale radio access networks. He has published more than 230 papers on these topics in international journals and conferences, and has received more than £3 million in funding for his research: the bulk of the projects funded involved industrial partners or industrial support. He has given more than 15 invited or keynote presentations, and has been UK representative and working group chair for the series of European COST Actions on radio communications. **www.york.ac.uk/electronic-engineering**

Steve Fitz, Plextek

Steve Fitz has over 30 years' experience in developing innovative engineering solutions. Having worked as a senior technologist for SME's, large defence companies and in academia, he has a broad view across the industry and is an unashamed technology enthusiast and thought leader. He is currently Technology Director at Plextek. **www.plextek.com**

John Griffin, Leonardo

John Griffin is the Innovation and Technology Director for Leonardo's Electronic and Defence Systems Sector leading a team with transnational responsibility for initiating company-wide Innovation programmes and technology scouting for innovative and disruptive technologies. With approaching 40 years industrial experience, he has a background in antennas and electromagnetics research, R&D management and senior CTO level appointments. **www.uk.leonardocompany.com**

Oliver James, University of Bristol @oliverjnorman

Oliver graduated from the University of Birmingham in 2011, with a master's degree in physics. He subsequently spent two years working as a graduate physicist on various RF technologies. During this time, Oliver also undertook a secondment as a research officer with the Department of Informatics and Systems Engineering of Cranfield University. Today, Oliver is studying for a PhD at the University of Bristol Centre for Doctoral Training in Communications. His research examines compact antennas and tuneable antennas for wireless communications in the frequency range 300 MHz – 3 GHz (UHF band). **www.bristol.ac.uk**

Dr Sajad Haq, QinetiQ

Profile to follow. **www.qinetiq.com**

Michael Hill-King, Collaboration Director, Huawei

Michael Hill-King joined Huawei Technologies in June 2015 as Collaboration Director, UK R&D Centre. His role is to drive and support all research projects between Huawei and UK universities and to support interactions with the UK based technology suppliers. Important aspects of this role are building and maintaining strong relationships with UK partners and communicating the strengths of the UK research base to Huawei's R&D team.

Prior to joining Huawei, Michael served as Director of Partnerships at King's College London. There, he led a portfolio of functions for the university including major commercial partnerships, and knowledge transfer and entrepreneurial schemes. Michael joined King's in September 2009 from Imperial College London where he led the College's business development activities in Engineering and Technology, having joined the College in 2003 to manage major research bids and projects.

His areas of expertise are in business growth and technology development, knowledge transfer, collaborative research, intellectual property and industry-academic relations. Previously, Michael spent over fifteen years in business, primarily in sales and marketing roles with industrial and scientific equipment companies. Michael read Physics at the University of Sheffield and holds an MBA with distinction. **www.huawei.com**

Professor Yang Hao, Queen Mary University of London

Yang Hao is a Professor of Antennas and Electromagnetics at Queen Mary University of London. He also serves in the management team of Cambridge Graphene Centre. Prof. Hao was an Editor-in-Chief for the IEEE ANTENNAS AND WIRELESS PROPAGATION LETTERS between 2014-2017. He won the IET AF Harvey Research Prize in 2015 and was a co-recipient of BAE Chairman's Silver Award in 2014. He currently holds the Royal Society Wolfson Research Merit Award. Prof. Hao is an elected Fellow of the ERA Foundation, IET and IEEE. **www.qmul.ac.uk**

Dr. Tongyun Li, University of Cambridge @Tongyun_Li

Dr. Tongyun Li is currently a research associate at the Engineering Department, University of Cambridge. He obtained his first degree from the University of Aberdeen in 2007 and a PhD degree from Cambridge in 2011. His research has been focusing on radio over fibre based indoor wireless communication system. Since 2012, he has been a technical leader for EPSRC Digital Distributed Antenna System (DDAS) and the smart in-building wireless system using flexible transmission technology (SWIFT) project which is an academic-industrial collaborative project aiming to build commercially available in-building wireless system. He is also actively involved in business development and commercialisation of innovative ideas. He was a scholar of the Cambridge Overseas Trust (COT) and won a Cambridge University Entrepreneurs (CUE) 'Vision to Succeed' award in 2010-2011. Tongyun is a co-founder of eComm and ZiFiSense. **www.eng.cam.ac.uk**