

Joint ICT KTN and Radio Technology SIG Event “New Materials, Devices and Circuit Techniques for RF”

10th October 2013

Supported and Hosted by  **SiliconSouthWest**
Promoting the UK's South West electronics sector

Joint Lunch Sponsor  **ROHDE & SCHWARZ**

This SIG is championed by John Haine of **u-blox UK**, Brian Collins of **BSC Associates**, Gerald Mialle of **CSR** and Diego Giancola of **PA Consulting**

Venue – University of Bath Innovation Centre, Carpenter House, Broad Quay, Bath, BA1 1UD

AGENDA

12:30 Registration & Networking over lunch

13:30 Introduction to the Cambridge Wireless Radio Technology SIG from **John Haine** of **u-Blox**

13:40 Welcome from our host **Simon Bond** of **Silicon South West**

13:45 Welcome from our joint lunch sponsor, **Rohde & Schwarz**

13:50 Welcome from our partner, **Stuart Revell** of **ICT KTN**

Speaker Session chaired by SIG Champion **Brian Collins**, **BSC Associates**

14:00 **‘Handset Antenna Design’**

Dr Sampson Hu, CTO of Smart Antenna Technologies

Smart Antenna Technologies uses software re-configurable hardware to enable manufacturers to cover all functions and bands (2G, 3G, 4G LTE, WiFi, Bluetooth, GPS and etc.) and produce one device for all territories, reducing costs, streamlining manufacturing and logistics. This talk will review the handset antenna history, including different type of handset antennas, and their limitation and then introduce SAT innovated antenna technology and how it will be deployed in current and future wireless systems.

14:20 Q&A

14:25 **‘Plasma Silicon Devices (PSiDs) in Wireless Networks’**

Dr David Hayes, Founder and CEO of Plasma Antennas Ltd

A plasma silicon device (PsiD) can perform beam-forming and beam-selection operations in a single monolithic microwave integrated circuit (MMIC). The MMIC works by reflecting an RF signal off electronically controllable solid state plasma, trapped within a parallel plate waveguide. This RF technology has applications from 1GHz to 100GHz. Targeted uses for the PSiDs include small cell backhaul and extended range (>10m) WLAN, operating at the higher microwave and millimetre wave frequencies, (e.g. 60GHz). The talk will review the latest advancements in the technology, its functionality within various antenna configurations and how it will to be used in future wireless systems.

14:45 Q&A

14:50 **‘Circuit and Technology Solutions to Address the Multi-Mode Mobile Terminal Front-End Challenge’**

Chris Clifton, CTO and Divisional Director, Sony EU

This talk will focus on a number of radical but practical technology and circuit solutions for addressing the size, performance and cost challenges associated with multi-mode, wideband mobile terminals.

15:10 Q&A

15:15 Refreshment break over networking

Speaker Session chaired by SIG Champion **Diego Giancola**, **PA Consulting**

15:45 Graphene for RF and Microwave Applications: Potential and Challenges
'Is graphene really the wonder material for high frequency applications?'

Dr Hatice Tuncer, Research Associate, Cambridge Graphene Centre and the Engineering Department of Cambridge University

Graphene transistors with projected ft at 1.4 THz may be promising to fulfil the ITRS 2015 requirements; however issues such as the lack of current saturation remain unresolved. Out-of-the-box thinking could lead to novel applications of this unique 2D material rather than compete with current technology. The Cambridge Graphene Centre, established in February 2013, is running collaborative research between the University of Cambridge and Queen Mary College – University of London assessing the suitability of graphene for the microwave and THz regimes. The talk will cover issues with CVD graphene from synthesis to device construction while relating physical properties to high frequency design metrics using simulation tools and measurements.

16:05 Q&A

16:10 'Efficient Linear Power Amplifiers for use in 4G systems'

Dr Kevin Morris, Reader in Radio Frequency Engineering, Bristol University

There are a number of methods of producing linear efficient amplifiers that are currently receiving a great deal of attention within the power amplifier research community. As the bandwidths of signals has risen to up to 20MHz per channel and signals required to be amplified now have peak to average power ratios of greater than 10dB, this has led to the need for new approaches to amplifier linearisation. This talk will describe the latest research into two promising techniques used for efficient linear amplifier design, the Inverse Doherty amplifier and the Non-Linear Envelope Tracking (NET) technique. These techniques are both capable of amplifying 4th generation signals with efficiencies of greater than 50%.

16:30 Q&A

16:35 Open Forum, chaired by Stuart Revell of ICT KTN

17:20 Closing remarks by SIG champion Gerald Mialle from CSR and fill in evaluation forms

17:30 Event Closes

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

Profile of Organisers

ICT KTN

Creating a competitive advantage for the UK by facilitating knowledge exchange on Information and Communications Technologies and accelerating innovation. This new KTN has been formed from a merger by the Digital Communications and Digital Systems KTNS with the objective of bringing competitive advantage to the UK by facilitating the exchange of knowledge on ICT technologies and capabilities. We plan to do this by acting as a 'Network of Networks', organising a range of events and providing support throughout the UK in association with other communities of interest and centres of excellence. For further information please visit www.ictktn.org.uk

Cambridge Wireless

Cambridge Wireless is a leading industry forum and vibrant community with a rapidly expanding network of companies actively involved in the development and application of wireless technologies. In addition to high level networking dinners, educational events and business development activities, Cambridge Wireless runs an annual Future of Wireless International Conference along with the Discovering Start-Ups initiative to support emerging, innovative wireless companies. Over 15 Special Interest Groups focused on specific technologies and market sectors, also provide opportunities for members to meet, form partnerships to exploit new commercial opportunities, and share knowledge and information about the latest industry trends and hot topics. Cambridge Wireless has partnerships with other leading industry clusters and organisations around the world to extend its international reach and to keep members up to date with the latest global developments and business opportunities. For further information, please visit www.cambridgewireless.co.uk

Profile of Host

Silicon South West

The Silicon SouthWest network provides industry support in the form of professional networking, a regular newsletter and other resources supportive of growth and communication. The South West is home to the UK's largest concentration of silicon designers, second only to the USA. It is estimated that this cluster is 50% bigger than the next largest, which is in Cambridge. Silicon design companies located here enjoy the advantage of a supportive ecosystem and, importantly, a highly skilled and experienced workforce. This skills pool owes its origins to Inmos in Bristol and GEC-Plessey Semiconductor in Swindon. These two organisations effectively trained a generation of silicon designers and while the enterprises themselves have since changed beyond recognition, the individual designers have remained at the forefront of developments, particularly in the key areas of RF, video, multicore processor and reconfigurable components as well as wireless, telecoms and networking system design. For further information please visit: www.siliconsouthwest.co.uk

Profile of SIG Champions

Brian Collins, BSC Associates

Brian Collins has designed antennas for applications from radio and TV broadcasting to base station and handset antennas. He has published more than 60 papers on antenna topics and contributed chapters to several recent textbooks. As well as his work with Antenova, Brian operates a small consultancy company, chairs the Antenna Interface Standards Group and is a Visiting Professor in the School of Electronic Engineering and Computer Science at Queen Mary, University of London. www.bscassociates.co.uk

Dr John Haine, u-blox UK Ltd

John Haine has spent his career in the electronics and communications industry working for British Telecom, Marconi, PA Consulting, and with start-ups including Cognito Group and Ionica. His technical background includes R&D in radio circuitry and microwave circuit theory; and the design of novel radio systems for cordless telephony, mobile data, and fixed wireless access. He has led standardisation activities in both the latter areas in ETSI, and contributed to WiMax. In 1999 he joined TTP Communications working on research, technology strategy and M&A activities; and after the company's acquisition by Motorola became a Director of Technology Strategy in Motorola Mobile Devices. After leaving Motorola he was CTO Enterprise Systems with ip.access Limited, the leading manufacturer of GSM picocells and 3G femtocells. In early 2010 he joined Cognovo Limited, which was acquired by u-blox AG in 2012. In u-blox John is defining RF platform strategy for future wireless modules. John has a first degree from Birmingham and a doctorate from Leeds universities. For further information please visit: www.u-blox.com

Gerald Mialle, CSR

Gerald Mialle has spent his entire career in the semiconductor industry, designing RF and mixed signal ICs for various wireless technologies including WLAN, BlueTooth, NFC, FM, SoftGPS as well as Cellular radios. He has developed novel ideas, which have seen patents as well as an engineering award appended to his name. Gerald currently works for Cambridge Silicon Radio (CSR plc) as a director of RF/Analog IC design. He leads two design centres which are developing state of the art wireless connectivity IC solutions for stand alone as well as Combo chips. For further information please visit: www.csr.com

Diego Giancola, PA Consulting

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. For more information please visit: www.paconsulting.com

Profile of Speakers

Dr David Hayes, Founder and CEO of Plasma Antennas Ltd

Dr. David Hayes is the founder and CEO of Plasma Antennas Limited, now based in Winchester, England, where he coordinates the company's research and development of their selectable, multi-beam antennas for both civil and defence applications. He has authored papers in the fields of telecommunications, antenna technology, electronic warfare and radar and has been the invited speaker at various international conferences. Currently, his areas of special interest include solid state plasma antennas, wide-band antennas, smart antennas for future wireless networks and the efficient electromagnetic modelling of antennas using optical ray tracing techniques. Dr. Hayes has held a variety of

research posts, including Chief Engineer, Microwave and Optics Group, Roke Manor Research Limited and Technical Director, Electronica UK Limited. For further information please visit: www.plasmaantennas.com

Chris Clifton, CTO & Divisional Director, Sony EU

Chris Clifton is CTO and Divisional Director at Semiconductor & Electronic Solutions, a division of Sony Europe Ltd. His R&D focus covers a number of technology areas including RF techniques and his team has contributed to the successful RF MMIC business within Sony. For further information please visit: www.sony-europe.com

Dr Hatice Tuncer, Research Associate, Cambridge Graphene Centre and the Engineering Department of Cambridge University

Hatice M. Tuncer is a researcher working on the high frequency and energy harvesting applications of carbon nanotechnology at the Centre for Advanced Photonics and Electronics (CAPE), University of Cambridge. She worked on navigation receivers and tactical radio, indoor and mobile telephony and low power, short range radio for sentient computing systems working as a radio frequency design engineer for Polytechnic PLC, ASELSAN Inc, Nokia Mobile Phones, Philips Paging and AT&T Laboratories-Cambridge. She holds a PhD in electronic engineering from the University of Cambridge. Her current research interests include new materials for RF circuit design, RF MEMS and NEMS, sensors, photovoltaics and infrared energy harvesting. For further information please visit: www.graphene.cam.ac.uk/

Dr Sampson Hu, CTO of Smart Antenna Technologies

Dr Sampson Hu is Co-founder and Chief Technology Officer at Smart Antenna Technologies. He is the inventor of a number of SAT patents and has been working on SAT core technology since 2009. As a SAT CTO, he is responsible for the successful execution of the company's business mission through development and the deployment of the company's technology – 'One antenna replaces all'. He is also a Honorary Research Fellow of University of Birmingham. Dr Sampson Hu has published over 30 learned papers and holds a number of patents in antenna technologies. For further information please visit www.smartantennatech.com/

Dr. Kevin Morris, Reader in Radio Frequency Engineering, Bristol University

Dr Kevin Morris specializes in radio frequency engineering and the development of highly energy efficient, high data rate hardware systems. He is currently a Reader in Radio Frequency Engineering at the University of Bristol. He leads a number of research projects funded by EPSRC and industrial sponsors. He has published over 60 papers in leading journals and conferences and holds 5 patents. For further information please visit <http://www.bristol.ac.uk/>