

Centre for Wireless Technology Eindhoven (CWTe)



CWTe 2017 Research Retreat

October 25, 2017

Cees Links on IoT wireless technologies

Speaker: Cees Links, Qorvo/GreenPeak

Abstract:

What do customers really care about, when talking about WiFi, or more in general when they are using their smart phone/laptop and/or laptop/computer? Good, high speed, seamless coverage for multiple users in the home or in the office, but for instance also on the road, or in the train/airplane. Customers do not care about technologies, whether this is WiFi or 4G/5G, will be irrelevant – reliable connection is what counts: uninterrupted video, clicking on a website and getting a response.

Infra-structure will be key, and this infrastructure will become distributed (mesh). This infra-structure will naturally pave the way for .11ax, .11ad and .11ay (one pod-per-room access). It will also support IoT: low-power WiFi (Halo), ZigBee, Thread and other technologies will be pulled into the same infra-structure.

Cees will discuss what the future architecture for wireless indoor will be, which communication technologies will prevail and how the IoT will impact our lives.

Speaker's bio:



Cees Links is a pioneer of the wireless data industry. He is the founder and CEO of GreenPeak Technologies, a Smart Home and IoT radio communications semi-conductor company, now part of Qorvo.

Earlier in his career Cees worked for NCR, AT&T and Lucent Technologies. Under his responsibility, the first wireless LANs were developed for PCs and notebooks, that ultimately became household WiFi technology integrated into computers, smart phones and connected smart devices. He also pioneered the development of access points, home networking routers, and hotspot base-stations. He was involved in the establishment of the IEEE 802.11 standardization committee and the Wi-Fi Alliance. He was also instrumental in establishing the IEEE 802.15 standardization committee that became the basis for ZigBee sense and control networking.

After Qorvo's acquisition of GreenPeak in May 2016, Cees has become the General Manager of the Wireless Connectivity business unit in Qorvo.

He was recently recognized as Wi-Fi pioneer with the Golden Mousetrap Lifetime Achievement award.

THz Technology and it's applications

Speaker: Marion Matters, TU/e

Abstract:

In this talk Professor Marion Matters will give an overview of the THz technology and give examples of its applications. Furthermore she will report on the TU/e research activities in this area.

Speaker's bio:



Marion K. Matters-Kammerer received the Bachelor (1997) and Master (1998) of physics and the Physikdiplom (1999) from Ecole Normale Superieure (Paris, France) and from TU Berlin (Germany). In 2006 she obtained the PhD degree in Physics from RWTH Aachen (Germany). In 1999 she joined Philips Research Aachen (Germany) and in 2004 Philips Research Eindhoven. In 2009 she became a lecturer and guest researcher at the faculty of electrical engineering at the RWTH Aachen (Germany). Since 2011 she joined the department of Electrical Engineer of the Technical University Eindhoven, where she now is Professor in the area of THz and mm-wave technology.

Elevating IoT sensor data towards a Digital Twin

Speaker: Peter Huisman, KLM

Abstract:

Internet of Things is currently hot within the different industries, but many fail to move to the more advanced stages of using Internet of Things.

Within KLM we are experimenting with visualization of Internet of Things data.

Speaker's bio:



Peter Huisman is working at Air France KLM, as an innovation manager, playing with new technologies and concepts to see what can be of added value for the airline industry. Air France KLM is continuously looking for new ways to engage their customers and optimize the way they operate their business including, but not limited to, how the Internet of Things will help more efficient utilization of ground assets, the way augmented reality and machine learning can help maintenance and using bot-technologies to support customers and staff in providing the right information at the right time

Advances in Radio Astronomy

Speaker: Mark Bentum, TU/e

Abstract:

The field of radio astronomy continues to provide fundamental contributions to the understanding of the evolution of our universe. Parabolic dishes dominated the field up until the end of the 20th century. Technological advances in areas such as signal processing, digital electronics, low- power/high performance super-computing and large capacity data storage systems have recently led to a revival in the field. New telescopes are developed using aperture arrays – especially at frequencies below 300 MHz. Composed of thousands of simple antennas with low-noise room-temperature amplifiers, aperture arrays with huge collecting areas can be synthesized at relatively low cost. Such instruments will enable researchers to peer deeper into the fabric of our universe and do so at faster survey speeds. They will provide enormous capability, both for unravelling today's mysteries as well as for the discovery of new phenomena.

Speaker's bio:



Mark Bentum received his PhD degree in Electrical Engineering from the University of Twente in 1995. Since 1996 he worked at the Netherlands Foundation for Research in Radio Astronomy (ASTRON). In 2008 he became also an Associate Professor in the Telecommunication Engineering Group at the University of Twente. In 2017 he became a Full Professor in Radio Science at Eindhoven University of Technology. He is now involved with research and education in radio science. His current research interests are radio astronomy, short-range radio communications, novel receiver technologies (for instance in the field of radio astronomy), channel modelling, interference mitigation, sensor networks and aerospace. Mark Bentum is a senior member of the IEEE, chairman of the Dutch URSI committee, vice chair of the IEEE Benelux section, initiator and chair of the IEEE Benelux AES/GRSS chapter, and has acted as a reviewer for various conferences and journals.

5G NR – Radio Access for the Future

Speaker: Stefan Parkvall, Ericsson

Abstract:

The cellular industry is currently working on 5G, enabling even higher data rates and even higher efficiency for mobile broadband. However, the scope of 5G is much wider than just further enhanced mobile broadband. Mobile broadband is, and will continue to be, an important part of future cellular communication, but future wireless networks are to a large extent also about a significantly wider range of use cases. In this talk, an overview of the technology components and capabilities of the New Radio (NR) radio-interface standard for 5G, currently under development by 3GPP, will be provided. NR will enable new use cases, requiring further enhanced data rates, latency, coverage, capacity, and reliability. This needs to be accomplished with improved network energy performance, and the capability to exploit spectrum in very high frequency bands. Key technology components to reach these targets include flexible numerology, latency-optimized frame structure, massive MIMO, interworking between high and low frequency bands, and ultra-lean transmissions.

Speaker's bio:



Stefan Parkvall (senior member, IEEE) is currently a principal researcher at Ericsson Research working with research on 5G and future radio access. He is one of the key persons in the development of HSPA, LTE and LTE-Advanced radio access and has been deeply involved in 3GPP standardization for many years. Dr Parkvall is a senior member of the IEEE, served as an IEEE Distinguished lecturer 2011-2012, and is co-author of the popular books “3G Evolution – HSPA and LTE for Mobile Broadband”, “HSPA evolution – the Fundamentals for Mobile Broadband”, “4G – LTE/LTE-Advanced for Mobile Broadband”, and “4G, LTE Evolution and the Road to 5G”. He has more than 1000 patents in the area of mobile communication. In 2005, he received the Ericsson "Inventor of the Year" award, in 2009 the Swedish government's Major Technical Award for his contributions to the success of HSPA, and in 2014 he and colleagues at Ericsson was one of three finalists for the European Inventor Award, the most prestigious inventor award in Europe, for their contributions to LTE. Dr Parkvall received the Ph.D. degree in electrical engineering from the Royal Institute of Technology in 1996. His previous positions include assistant professor in communication theory at the Royal Institute of Technology, Stockholm, Sweden, and a visiting researcher at University of California, San Diego, USA.

5G New Radio System Research at the TU/e

Speaker: Ulf Johannsen, TU/e

Abstract:

The development of the next generation telecommunication system (5G) is in full swing. In general, the use cases for 5G can be clustered into three main classes

- 1) Enhanced/Extreme Mobile Broadband (eMBB)
- 2) Ultra-Reliable and Low Latency Communications (URLLC) and
- 3) Massive Machine Type Communications (mMTC).

Many projects are currently underway to develop the associated technologies. Also the Centre for Wireless Technology Eindhoven (CWTe) is hosting several projects in this area and is leading a large multidisciplinary European project, called SILIKA. The goal within SILIKA is the design, analysis and prototyping of 5G mm-wave base-station concepts that allow the use of massive MIMO signal processing algorithms. Such base-stations will ultimately serve all three use cases by increasing the data-rate per user as well as the capacity of the overall communications system. In this presentation we will give an overview of CWTe projects in the area of 5G with a special focus on SILIKA as it combines several research topics from different disciplines in a common system approach.

Speaker's bio:



Ulf Johannsen obtained his Dipl.-Ing. degree from Hamburg University of Technology (TUHH), Germany, in 2009 and his Ph.D. degree from Eindhoven University of Technology (TU/e), the Netherlands, in 2013. From 2013 until 2016 he worked as Senior Systems Engineer at ATLAS ELEKTRONIK GmbH in Bremen, Germany. His duties included the roles of system designer and engineering manager for autonomous underwater vehicle (AUV) systems with sonar payloads. Since 2016 he is assistant professor with the Electromagnetics group at the TU/e. His research focus lies on (sub-)millimeter-wave antenna systems for various applications. Moreover, he leads the Ultra-High-Data-Rate Systems programme within

TU/e's Centre for Wireless Technology and he is the chair person of the IEEE Benelux AP/MTT joint chapter.

Wireless Positioning in Indoor Environments

Speaker: Stavros Stavrou, Open University of Cyprus

Abstract:

Wireless Positioning, or Wireless localization, refers to the process of locating wireless devices that are either utilized by users or are attached to assets. Research on indoor localization is attracting a lot of interest since most wireless users 'roam' in indoor environments while utilizing smartphone devices equipped with cellular, wireless broadband and other radio technologies. As a result, a number of indoor Location Based Services (LBS) have emerged. Examples of such services include: indoor navigation and tracking, healthcare related, mobile couponing, in store assistance, geo indoor advertisement, security related, social geo networking etc. It has to be noted that the market potential for indoor positioning is estimated around 10 Billion USD. This presentation discusses how cellular, WiFi, Bluetooth and other radio technologies can be used in Real Time Localization Systems (RTLS) and what are the challenges involved.

Speaker's bio:



Associate Professor **Stavros Stavrou** holds a PhD from the University of Surrey (U.K.), and he is currently the Head of School of Pure and Applied Sciences of the Open University of Cyprus. Between 2000 - 2009 he was a faculty member of the University of Surrey at the Centre for Communication Systems Research (CCSR), currently Institute for Communication Systems (ICS). In 2009 he joined the Open University of Cyprus where he established and currently leads the Telecommunication Systems Research Lab (TSRL). TSRL's purpose is to initiate and execute applied research activities in wireless communications and selected security topics. Dr. Stavrou has participated in more than 20 national and European Research projects, graduated several PhD student's, and published extensively in peer reviewed publications in areas related to wireless communications and positioning. He has up to date raised more than 4 million euros in personal research grants (PI) from research councils, government organizations and industrial collaborations. Dr. Stavrou is the patent holder of a mobile phone jammer and he is an appointed member of the executive academic board of the European Defence and Security College and a Fellow of the Higher Education Academy U.K.

High-Speed Radio Communication over a Plastic Fiber

Speaker: Joost van Beek, NXP

Abstract:

Technology scaling has enabled RF-CMOS circuits to operate in the mm-wave frequency range (30 to 300GHz) where large bandwidths are available. This enables a new kind of high-speed wireline communication for short to medium distances. At mm-Wave frequencies, the “wire” can be a low-cost and low-weight plastic fiber, made from PP, PS or Teflon, acting as a waveguide. The coupling of the mm-wave from the CMOS chip into the fiber can be simple and does not require complex heterogeneous semiconductor implementation, as is the case in optical fiber links. As such, RF communication through a plastic fiber is an interesting alternative for wireline copper or optical fibers currently used in automotive communication networks.

Speaker’s bio:



Joost van Beek (PhD), Senior Principal, has over 15 years of experience in the field of RF Microsystems. During his career, he held several scientific positions at Massachusetts Institute of Technology, University of California at Berkeley, Philips Research, and NXP Research. At NXP and Philips, he managed projects on RF-Passives, RF-MEMS, MEMS timing devices, Ultrasound Sensing, and is currently project coordinator for the ‘Wicon’ project on Polymer Microwave Fiber technology. He is co-author of over 50 scientific papers and holds 25 granted patents.