

# Center for Wireless Technology Eindhoven (CWTe)

## CWTe 2022 Research Retreat

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## What will 6G bring us; a TNO vision on the next generation - Toon Norp (TNO)

### Abstract:

Introduction of 6G is not expected before 2030. However, research into 6G is starting (e.g. in the EU Research program SNS) and standardization (e.g. in 3GPP) is expected to start in a few years. The presentation will present a time frame towards 6G, will address what kind of use cases can be expected for 6G, and what are the related 6G requirements. The presentation will also discuss a number of main 6G technology components.

### Speaker's bio:



Toon Norp is a Senior Business Consultant at TNO. Toon Norp joined TNO (former KPN Research) in 1991, where he has since been working on network aspects of mobile communications. He has been involved in standardisation of mobile networks for more than 25 years, and as chairman of the 3GPP SA1 service aspects working group was responsible for the requirements specification phase of 5G. In 2021, Toon was elected as governing board member of the 6G SNS Industry Association and was appointed member of the SNS Joint Undertaking Governing Board. Toon holds a Master's Degree in Electrical Engineering from the Eindhoven University of Technology.

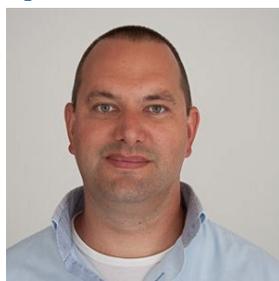
## Bluetooth chip development

- Chris Smit (Renesas)

### Abstract:

Since its inception in the mid-nineties Bluetooth has become a technology that we all use still today. Over the past decades a lot of advances have been made in this standard from simple cable replacement connections to higher data throughput applications (e.g. handsfree calls). With the launch of Bluetooth Low Energy (Bluetooth version 4.0) in 2010 a new low power standard was added that enabled a whole new range of low power devices that are battery powered. This presentation will give a quick overview of Bluetooth technology and provide insight in BLE chip development. Nowadays these chips are not merely simple radio transceivers anymore but full SoC's with all kinds features and connectivity.

### Speaker's bio:



He received his B.Sc. EE from polytechnic school 'Hogeschool Enschede' in 1996. He joined Ericsson Mobile Networks in Enschede as an RF IC designer and worked on DECT transceiver IC design, later followed by first generation Bluetooth IC designs. He joined National Semiconductor in 2000 in the same capacity again working on DECT radio IC transceivers. By 2003 a management buy-out started SiTel Semiconductor and DECT radios became fully integrated in SoC's where he specialized in top level design and Mixed-Signal verification of complex transceiver architectures. After an acquisition of Dialog

Semiconductor in 2010 he worked on the first generation of Bluetooth Low Energy radios as a lead engineer. He joined management in 2012 responsible for the radio development and MS verification of the entire System-on-Chip (SoC). Dialog Semiconductor was acquired by Renesas Electronics in 2021 and currently he is holding the position of Director Hardware Engineering at Renesas.

## B5G/6G Vision: Communications and Mobility - Marcel Geurts (NXP)

### Abstract:

In the upcoming 6G wireless systems more functionality is added. Aim is to make the networks support the global digital society challenges (e.g. safety, energy efficiency). 6G is progressing to support passive sensing on top of network localization. This presentation describes the ambition of 6G regarding automotive safety and Joint Communication and Sensing (JCAS).

### Speaker's bio:



Marcel Geurts is principal system architect at NXP Semiconductors. In this role, he focuses on NXP's Smart Antenna Solutions with responsibility on customer program management for 5G products, and business development for new markets.

Marcel has initiated and contributed to a large number of co-operation programs focusing on mmwave applications.

## 6G systems: What are you actually measuring? - Anouk Hubrechs (AntenneX)

### Abstract:

Wireless devices are becoming smaller, more integrated, and cheaper. This puts 6G applications (e.g. antenna in package) at the edge of our current manufacturing capabilities which can introduce significant tolerances and degraded performance. With all that in mind, how are we ever going to know that our integrated antenna system is according to spec? In this talk, we focus on the challenges of measuring >100 GHz wireless systems, the solutions from AntenneX, and the inevitable question of whether or not your measurement system is telling you the truth.

### Speaker's bio:



Anouk Hubrechs is an antenna metrologist at the Electromagnetics group at the Eindhoven University of Technology where she develops 5G and 6G mm-wave measurement systems and methods. She is making these techniques available to industry as project leader in the spin-off company AntenneX, where she is involved in product development, marketing, and measurement services. In 2018 and 2019, she was with the National Institute of Standards and Technology in Boulder, CO, USA, to work on reverberation-chamber metrology for internet-of-things applications. Her current research interest are focused on optimizing over-the-air measurements of isotropic metrics for >100GHz applications.

# Dynamic Spectrum Sharing (DSS), the solution to the radio spectrum shortage

- Ignas Niemegeers (TU/e)

## Abstract:

Wireless communication services are growing in importance. This leads to a rapidly increasing demand for radio spectrum, which cannot be met by the present way of assigning and licensing spectrum. A large part of the assigned radio spectrum is not or hardly used, or only used locally or at particular moments, while other parts are overused or in danger of being overused. More dynamic sharing of spectrum could be a solution to ensure sufficient availability in the future, by enabling more efficient use of the radio spectrum.

In this presentation we give an overview of the state-of-the-art of dynamic spectrum management and sharing as reflected in the scientific and technical literature, ongoing and finished research projects, and experimental pilots that have been conducted. We examine concepts, methods and techniques for dynamic sharing of spectrum between two or more distinct end-user or user groups, with different spectrum use rights in the same frequency band.

## Speaker's bio:



Ignas Niemegeers obtained a Burgerlijk Ingenieur degree in Electrical Engineering from the University of Gent in 1970, an MSc degree from Purdue University, USA, in 1972 and a PhD from the same institution in 1978, both in Computer Engineering. From 1978 to 1981 he was a designer of the first generation of commercial packet switching systems at Bell Telephone Mfg. Cy, Antwerp, Belgium, used in the first Dutch data network, Datanet 1. From 1981 to 2002 he was professor and, from 1995 to 2002, scientific director of the Centre for Telematics and Information Technology of the University of Twente. From 2002 until 2012 he was chairman of the Telecommunications Department and professor in Wireless and Mobile Communications at Delft University of Technology. Since August 2012 he is emeritus professor at Delft University of Technology. From 2016 until 2018 he held a part-time chair in Future Optically-supported Wireless Networks at Eindhoven University of Technology. Presently he is guest professor at the Center for Wireless Technology (CWTe) of Eindhoven University of Technology, conducting research in 6G technologies and wireless avionics communication on-board aircraft.

## ML-Assisted Algorithms for Non-Terrestrial Networks - Symeon Chatzinotas (Univ. Luxembourg)

### Abstract:

Non-Terrestrial Networks is currently a trending research area motivated by technological advancements, private ventures and standardization activities. This talk will focus on the myths and realities about the 6G SatCom Renaissance, providing an overview of novel architectural paradigms. Subsequently, a series of concrete technical examples will be elaborated, where ML algorithms are applied in space applications. The first part will focus on “ML FOR Space”, which implies the deployment of ML algorithms on the Ground Segment, whereas the second will cover “ML IN Space”, which requires AI chipsets embedded on flying assets. The talk will conclude with a reflection on open challenges and technology roadmaps for the years to come.

### Speaker's bio:



Symeon Chatzinotas (*MEng, MSc, PhD, SMIEEE*) is currently Full Professor / Chief Scientist I and Head of the research group [SIGCOM](#) in the [Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg](#). In the past, he has lectured as Visiting Professor at the [University of Parma, Italy](#) and contributed in numerous [R&D projects](#) for the Institute of Informatics & Telecommunications, National Center for Scientific Research “Demokritos,” the Institute of Telematics and Informatics, Center of Research and Technology Hellas and Mobile Communications Research Group, Center of Communication Systems Research, University of Surrey.

He has received the M.Eng. in Telecommunications from Aristotle University of Thessaloniki, Greece and the M.Sc. and Ph.D. in Electronic Engineering from University of Surrey, UK in 2003, 2006 and 2009 respectively.

He has authored more than [600 technical papers](#) in refereed international journals, conferences and scientific books and has received numerous [awards](#). He is currently in the editorial board of the IEEE Transactions on Communications, IEEE Open Journal of Vehicular Technology and the International Journal of Satellite Communications and Networking.

## Poster pitches

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