

CWTe Research Retreat 2019

Opening and Introduction

Sonia Heemstra de Groot
20191009

Welcome

to the 10th CWTe
Research Retreat

Some highlights wireless technology now

- 5G is being rolled out - most countries will have access to 5G in 2020
- 6G initiatives have started
- WiFi
 - IEEE802.11ax
 - IEEE802.11ay
- Optical wireless communication
 - VLC: Li-Fi/802.11bb
 - Beam steered IR
- Large IoT networks
- Artificial Intelligence

**Many challenges and new opportunities
New interdisciplinary research topics**

The image shows the interior of an anechoic chamber, characterized by a dense array of green, pyramidal-shaped electromagnetic absorbers designed to eliminate reflections. A red horizontal band is superimposed across the middle of the image, containing the text 'Centre for Wireless Technology Eindhoven'.

Centre for Wireless Technology Eindhoven

CWTe Structure



Program Board Chairs



Bus. Dev.



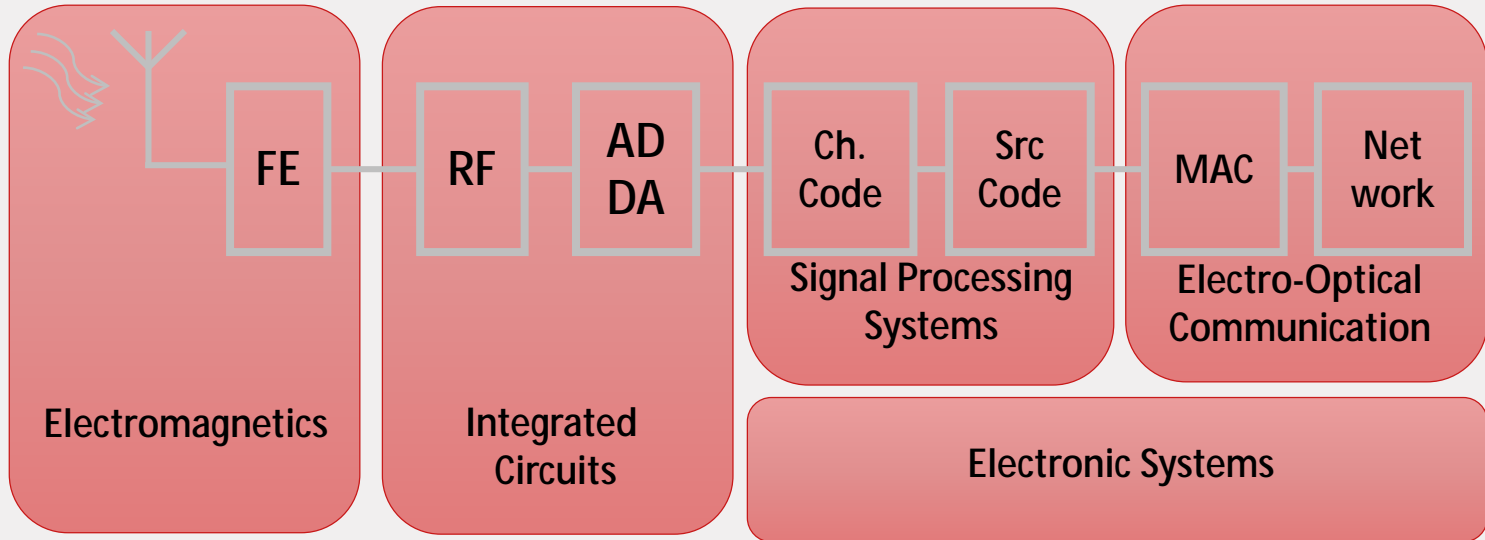
Director



SPS



ECO



EM



IC



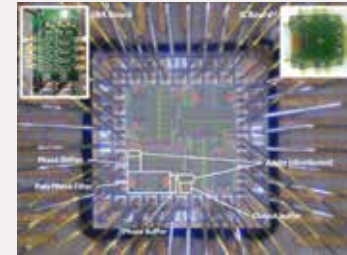
ES

CWTe Research Programs

- Ultra-high data rates

Coordinator: Dr. Ulf Johannsen

- High Frequencies ($\geq 30\text{GHz}$) and very high data rates ($>\text{Tbps}$)
- Beamforming with many elements @ low cost
- Next generation RAN (RoF, M-MIMO, Dyn. Reconf.)



- Ultra-low power and IoT

Coordinator: Dr. George Exarchakos

- Small ($\ll 1\text{mm}^3$), low-cost
- Battery-less sensors/controls
- Self-configuring networks, autonomous devices and AI



- THz Systems

Coordinator: Prof. Marion Matters

- 3D spectroscopic imaging
- Small, low-cost short range
- Radar



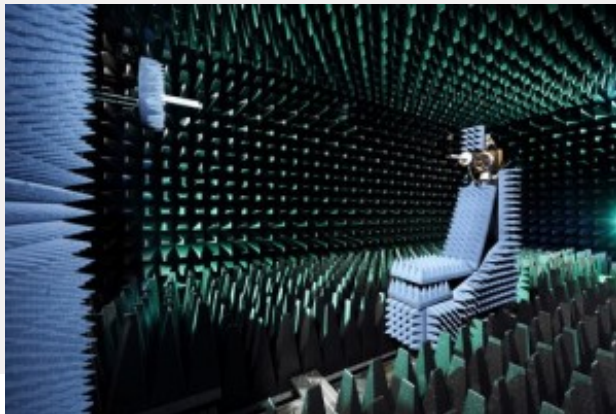
- Radio Astronomy

Coordinator: Prof. Mark Bentum

- Next generation radio telescopes
- Large antenna arrays
- Low frequency ($<30\text{MHz}$)



CWTe Labs



Highlights 2019

- Opening of the Advanced Photonics Lab for Ultrafast Spectroscopy, Nano-photonics and THz imaging
- Opening Center for Astronomical Instrumentation (CAI)

Opening Center for Astronomical Instrumentation

- Collaboration Radboud University and TU/e
 - Dr. Marc Klein Wolt, Director Radboud Radio Lab, Radboud University
 - Prof. Mark Bentum, Professor in Radio Science, TU/e
- Agreement signed on 20 September

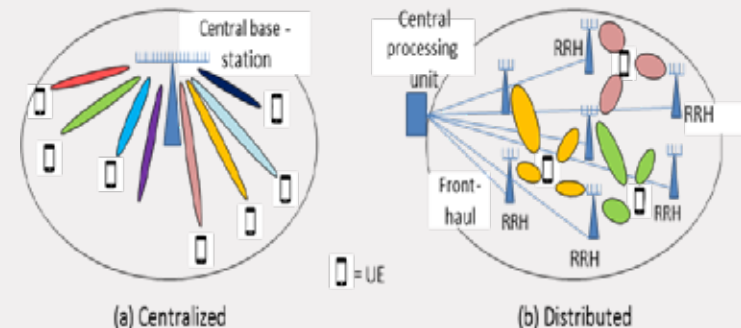


Highlights 2019

- Opening of the Advanced Photonics Lab for Ultrafast Spectroscopy, Nano-photonics and THz imaging
- Opening Center for Astronomical Instrumentation (CAI)
- European Innovative Training Network 'MyWave' on Millimetre-Wave Communications for beyond-5G wireless communications

EU ITN MyWave

- 15 Ph.D. students; 3 countries
- Partners: TU/e (coordinator), Chalmers, KIT, Fraunhofer, Ericsson, NXP, Keysight, UMS, Gapwaves, TAC
- Millimetre-wave communications for beyond-5G mobile users
 - Reduce power consumption of mm-wave antenna front-ends
 - Real-time system adaptability for robust mm-wave communication with mobile users
 - Reliable connections of mobile users by Distributed Massive-MIMO with synchronous cooperation of several base-stations



Distributed Massive MIMO

Highlights 2019

- Opening of the Advanced Photonics Lab for Ultrafast Spectroscopy, Nano-photonics and THz imaging
- Opening Center for Astronomical Instrumentation (CAI)
- European Innovative Training Network 'MyWave' on Millimetre-Wave Communications for beyond-5G wireless communications
- TU/e-KPN Flagship: SmartTWO
- Mini-master and MOOC Wireless Communication starting September 2020
- Spin-offs:
 - TeraNova
 - MaxWaves
 - AntenneX

CWTe Research Retreat 2019

Program



Invitation

CWTe 2019 Research Retreat

CWTe
CENTER
FOR WIRELESS
TECHNOLOGY
EINDHOVEN

TU/e

Wednesday, 9th of October 2019
De Zwarte Doos, 1st floor, TU Eindhoven

Hosted by: Center for Wireless Technology Eindhoven

- 9.00 - Welcome with coffee
 - Morning program**
 - 9.30 Opening and introduction
 - 9.40 Nature-Inspired Biomimetic MEMS/NEMS Sensors for Wireless Sensing
 - 10.15 THz Resonances with Infinity Lifetime
 - 10.50 - Break (incl. posters)
 - 11.20 5G developments & outlook
 - 11.55 Exploring the Unknown
 - Lunch**
 - 12.30 - Lunch (incl. posters)
 - Afternoon program**
 - 13.30 Start-up pitches
 - 14.05 Connectivity needs in Ports 2030
 - 14.40 - Break (incl. posters)
 - 15.10 Integrated Microwave Photonics chip platform by hybrid integration
 - 15.45 Towards cooperative driving - Vehicular networking for ITS
 - Closing**
 - 16.20 Closing session
 - 16.30 - Drinks and networking
- Sonia Heemstra de Groot (TU/e)
Ajay Kottapalli (RUG)
Jaime Gómez Rivas (TU/e)
- Adrian Pais (TNO)
Peter Baltus (TU/e)
- various speakers
Henk Zwetsloot (Groningen Seaports)
- Robert Grootjans (LioniX)
Geert Heijenk (UTwente)
- Sonia Heemstra de Groot (TU/e)

The image shows the interior of an anechoic chamber, characterized by a dense array of green, pyramidal-shaped electromagnetic absorbers designed to eliminate reflections. A prominent horizontal red band is superimposed across the middle of the image, containing the text 'Centre for Wireless Technology Eindhoven'. In the background, a white antenna is mounted on a stand, and a piece of equipment with a small antenna is visible on the right. The lighting is dramatic, with strong highlights and deep shadows.

Centre for Wireless Technology Eindhoven