

CWTe Research Retreat 2020

Opening and Introduction

Sonia Heemstra de Groot
20201014

Welcome

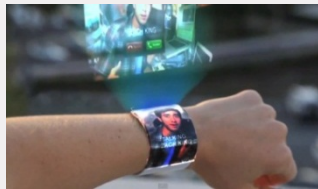
to the 11th CWTe

Research Retreat

On-line

Wireless Research: Looking Beyond 5G

- 5G being rolled out, but ...
- New use cases and new applications are on the horizon



Holographic watch



Fully autonomous vehicles



Internet of everything



Tele-presence



Extended reality



Haptic holography



Pervasive connectivity



In-body networks



Smart factories



eHealth

Many of these services require performance figures not supported by 5G

New generation wireless networks (6G)

- Disruptive communication technologies
 - Higher spectrum technologies e.g. THz and optical wireless
- Innovative network architectures
 - 3D coverage, cell-free architectures, tight integration of different communication technologies
- Embedded network intelligence
 - Distributed intelligence, unsupervised learning and knowledge sharing

**Many challenges and new opportunities:
Focus of CWTe**

The image shows the interior of an anechoic chamber, characterized by thousands of green and blue pyramidal-shaped electromagnetic absorbers designed to eliminate reflections. A red semi-transparent banner is overlaid horizontally across the middle of the image. On the left, a blue horn antenna is mounted on a stand. On the right, a small electronic device with a probe is visible. The text 'Center for Wireless Technology Eindhoven' is written in white on the red banner.

Center for Wireless Technology Eindhoven

CWTe Structure



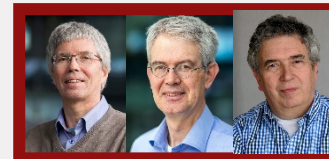
Research Program Chairs



Bus. Dev.



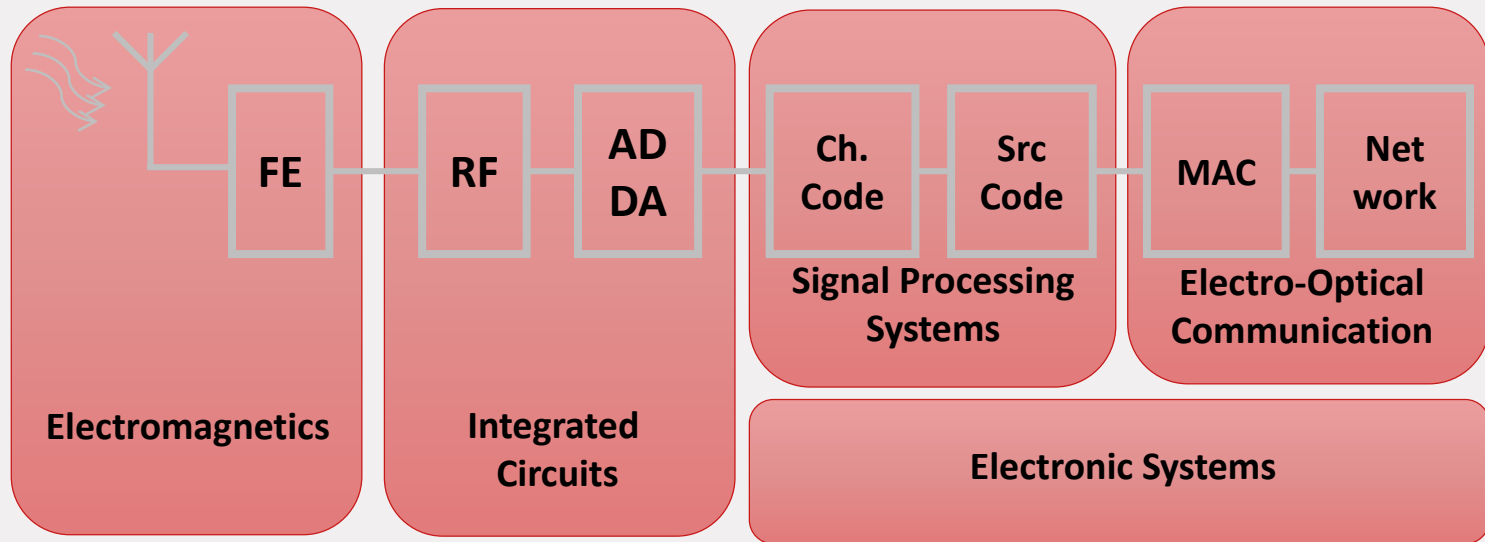
Director



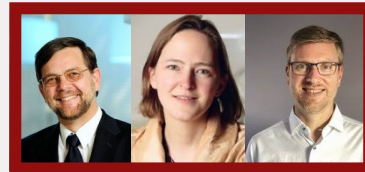
SPS



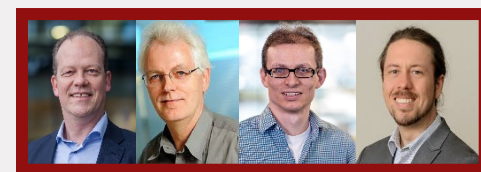
ECO



EM



IC

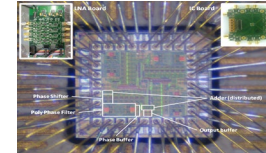


ES

CWTe Research Programs

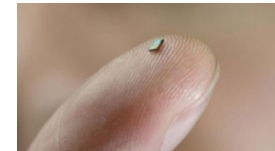
Ultra-high data rates (Chair: Dr. Ulf Johannsen)

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



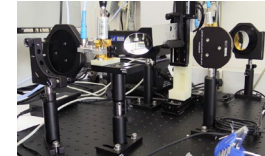
Ultra-low power and IoT (Chair: Dr. George Exarchakos)

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



THz Systems (Chair: Dr. Dook van Mechelen)

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



Radio Astronomy (Chair: Prof. Mark Bentum)

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



EM

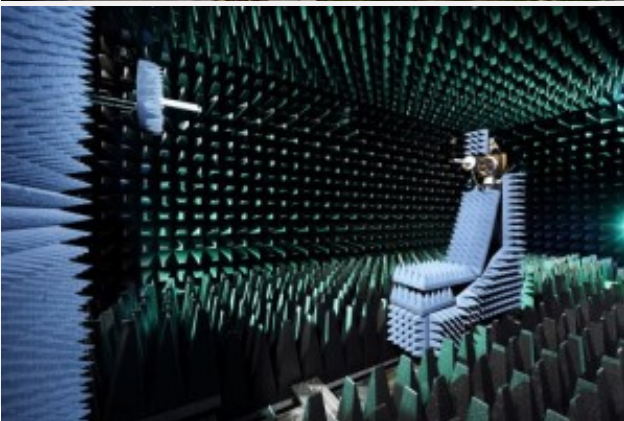
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CWTe Labs in Flux



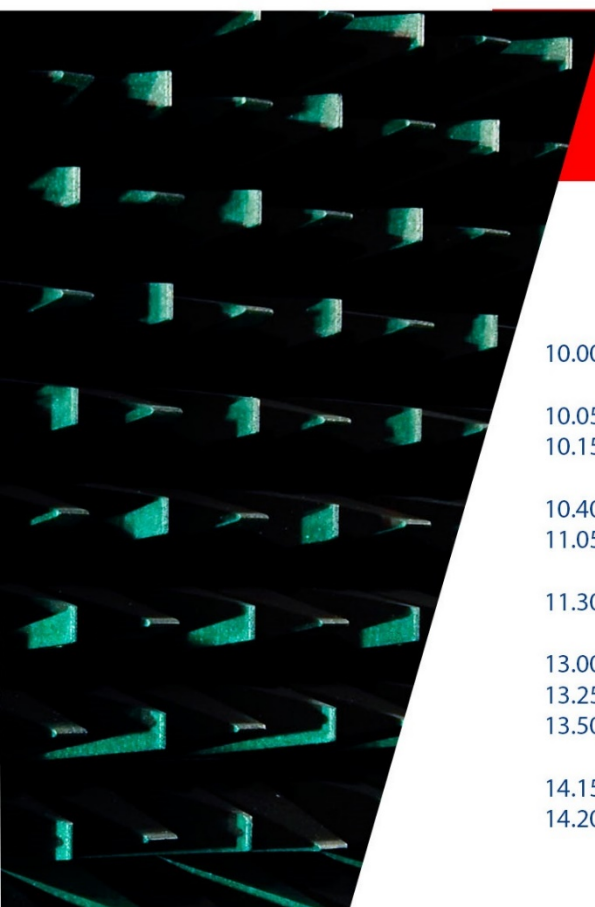
- Co-located and integrated laboratories, occupying about 700m², for all different disciplines of wireless systems
- Fully shielded
- Anechoic chambers
- On-wafer and PCB-level characterization

CWTe Highlights 2020

- 30 Staff members and 50 PhDs and Postdocs
- Starting and recently granted projects
 - EU European Innovative Training Network 'MyWave'
 - EU H2020 ADENEAS
 - EU ECSEL Next Perception
 - EU Penta HEFPA
 - TU/e-KPN Flagship: SmartTWO
 - NWO Cross-over projects
- Spin-offs: TeraNova, MaxWaves, AntenneX
- In the news, including many radio/ TV appearances
- Article: <https://www.tue.nl/en/news/news-overview/14-07-2020-the-waves-of-our-wireless-future/>

CWTe Research Retreat 2020

Program



Invitation

CWTe 2020 Research Retreat

CWTe
CENTER
FOR WIRELESS
TECHNOLOGY
EINDHOVEN

TU/e

Wednesday, 14th of October 2020
Online event

Hosted by: Center for Wireless Technology Eindhoven

- 10.00 - Getting connected with home made coffee
- Morning program**
- 10.05 Opening and introduction Sonia Heemstra de Groot (TU/e)
- 10.15 Automated material handling systems:
How wireless technology affects product structure and organization Evert van de Plassche (VanderLande)
- 10.40 Collaborative autonomous agents: state-of-the-art and research challenges Bayu Jayawardhana (RUG)
- 11.05 Plantenna: Creating an Internet of plants for a sustainable future Sander Bronckers (TU/e)
- Lunch break**
- 11.30 - Home made lunch
- Afternoon program**
- 13.00 Poster pitches various speakers
- 13.25 Empathic homes that can 'care' for you Masi Mohammadi (HAN, TU/e)
- 13.50 5G/Satcom-on-the-move agile antenna frontends: RF design challenges Rens Baggen (IMST)
- Closing**
- 14.15 Closing words Sonia Heemstra de Groot (TU/e)
- 14.20 - End

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