

CWTe 6G Vision Workshop

Opening and Introduction

Sonia Heemstra de Groot
20210331

Welcome

to CWTe 6G Vision Workshop

On-line

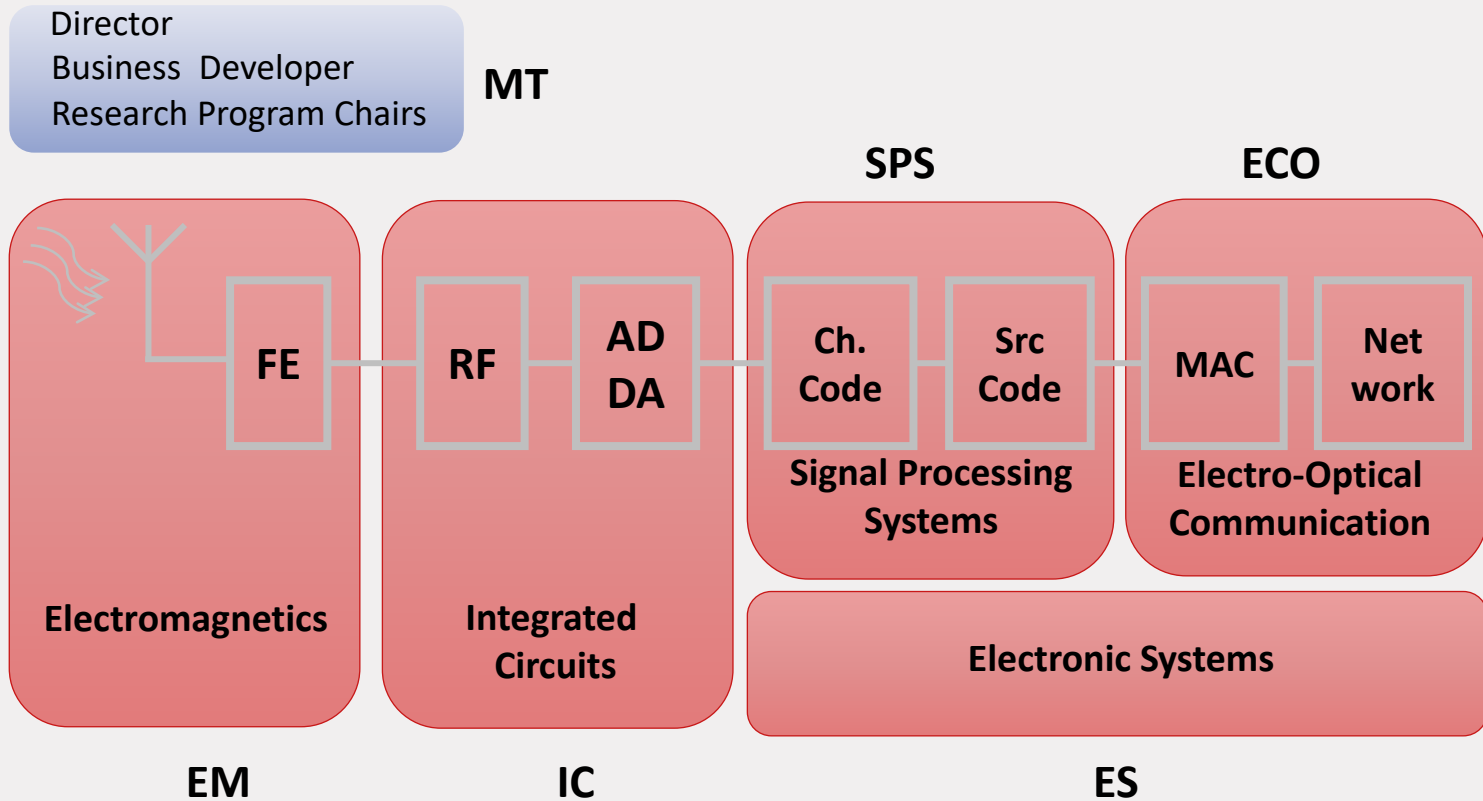
The image shows the interior of an anechoic chamber. The walls, floor, and ceiling are covered with numerous pyramidal-shaped electromagnetic absorbers. The absorbers are primarily green, but there are sections of blue and black ones. In the center, there is a piece of technical equipment, possibly a probe or antenna, mounted on a stand. The lighting is dramatic, with strong highlights and deep shadows, creating a futuristic and technical atmosphere.

Center for Wireless Technology Eindhoven

Background CWTe

- Founded in 2007
- Stimulate cooperation across group boundaries
- Multidisciplinary applied research questions
- 30 Staff members and 50 PhDs and Postdocs
- 3 M€ per year on research funding
- Several spin-offs

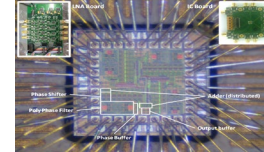
CWTe Structure



CWTe Research Programs

Ultra-high data rates (Chair: Dr. Sander Bronckers)

- High Frequencies ($\geq 30\text{GHz}$) and very high data rates (1Tbps)
- Beamforming with many elements @ low cost
- Next generation RAN (RoF, (cell-free) M-MIMO, Dyn. Reconf.)



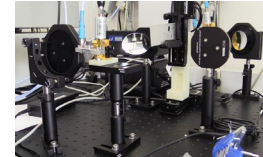
Ultra-dense ultra-scale AI-driven networks (Chair: Dr. George Exarchakos)

- Ultra small, ultra-low power and battery-less wireless systems
- Self-configuring networks, autonomous devices and AI
- High-reliability and low latency



THz Systems and sensing (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

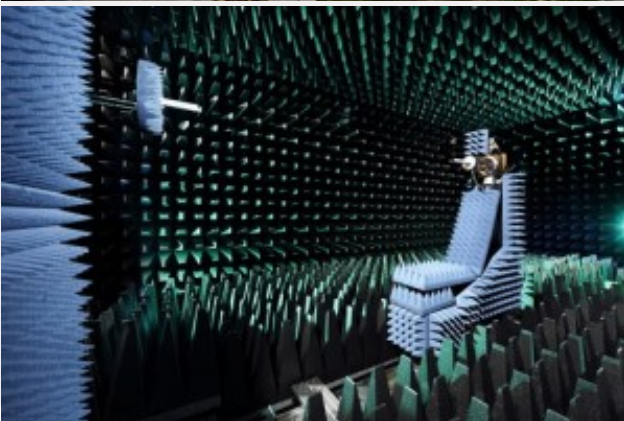
IC

ES

SPS

ECO

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

European and national projects

- 5G evolution /6G Antenna systems, propagation, transceivers, mm and submm Wave, (15 projects)
- Optical wireless communications, hybrid optical/RF-based ultra-high data

Starting a large 6G-oriented program including THz communication, optical-wireless and in-network intelligence

- In-network intelligence
- Next generation radio telescopes, antenna research, satellite systems
- ...

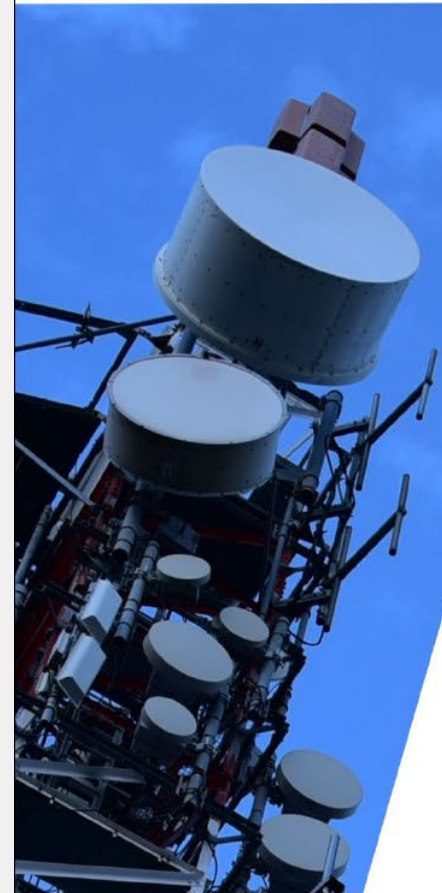
CWTe 6G Vision Workshop

Looking Beyond 5G

5G being rolled out, but ...

- New use cases and new applications are on the horizon
- Every 10 years there is a new generation of mobile networks
- We can expect a new generation around 2030: 6G

- **What can we expect from 6G?**
- **What are the challenges?**
- **What are the opportunities**



Agenda

CWTe 6G Vision Workshop

CWTe
CENTER
FOR WIRELESS
TECHNOLOGY
EINDHOVEN

TU/e

Wednesday, 31st of March 2021
Online event

Hosted by: Center for Wireless Technology Eindhoven

10.30 - Getting connected with home made coffee

Morning program

10.35 Opening and introduction

10.45 Why 6G?

11.10 Smart antenna systems for future 6G wireless communications

Sonia Heemstra de Groot (TU/e)
Marja Matinmikko-Blue (Univ Oulu)
Bart Smolders (TU/e)

11.35 **Lunch break**

Afternoon program

13.00 State of 5G and Considerations for 6G

13.25 6G is about 4S: Spectrum, Speed, Safety and Security

13.50 **Break**

14.05 Implementation challenges in beyond-5G communication systems

14.30 AI role in the future networks

14.55 **Closing**

Bilel Jamoussi (ITU)
René Vroom (Agentschap Telecom)

Ulf Gustavsson (Ericsson)
Mostafa Essa (Vodafone)
Sonia Heemstra de Groot (TU/e)

www.tue.nl/cwte

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 'Center for Wireless Technology Eindhoven'. In the background, a white horn antenna is mounted on a stand, and to the right, a piece of electronic equipment is visible on a raised platform.

Center for Wireless Technology Eindhoven