Center for Wireless Technology Eindhoven (CWTe)

CWTe 6G Vision Workshop

March 31, 2021

Abstracts of the talks and the speaker's bios.

Why 6G?
- Marja Matinmikko-Blue (Research coordinator 6G Flagship, University of Oulu, Finland)

Abstract:

As 5G is being commercialized, the research community must focus on solutions for 2030 era. To start with, we need to define new KPI drivers towards 6G besides the current 5G technical superiority KPIs: global megatrends, UN sustainability goals besides new promising technical enablers are emerging critical drivers towards 2030 solutions. Global coverage with services scaling, super-efficient short range connectivity and accurate localization are missing features within current mobile systems and deserve special attention. Value chains are likely to be revolutionized via emergence of different verticals needs as well as local spectrum licensing. Ownership of spectrum, network infrastructure as well as customers will need to be rethought for different use scenarios and future needs. Customized private/local networks is an emerging trend which needs to be supported in future regulation decisions.

Speaker's bio:

Dr. Marja Matinmikko-Blue is 6G Flagship Research Coordinator at Centre for Wireless Communications (CWC), University of Oulu, where she holds an Adjunct Professor position on spectrum management. She conducts multi-disciplinary research on technical, business and regulatory aspects of mobile communication systems in close collaboration with industry, academia and regulators. She holds a Dr.Sc. degree in telecommunications engineering and a Ph.D. degree in management sciences from University of Oulu from 2012 and 2018. She has coordinated several national research project consortia that have successfully demonstrated the world's first licensed shared access spectrum sharing trials and introduced a new local 5G operator concept that has become a reality. She has published 150+ scientific publications and prepared 150+ contributions to regulatory bodies in national, European and international levels. She coordinated the preparation of twelve 6G White Papers in 6G Flagship and led the development of the White Paper on 6G Drivers and the UN SDGs.

Smart antenna systems for future 6G wireless communications - Bart Smolders (TU/e)

Abstract:

Our society is moving into a new age with concepts such as internet of things, smart cities, autonomous driving and smart industries. This requires a continuously growing need for more capacity and higher data-rates and, therefore, more signal bandwidth in wireless communications. This stimulates the use of millimeter-wave frequencies, moving up to 140 GHz. To realize this we need to explore new system concepts such as Distributed Massive Multiple-Input-Multiple-Output (DM-MIMO) in which instead of a single base-station, the cell is covered by multiple remote antenna stations, all connected to a central unit.

In this talk we will discuss how DM-MIMO based concepts can play a role in future 6G wireless systems. Several results from on-going national and European research projects will be presented.
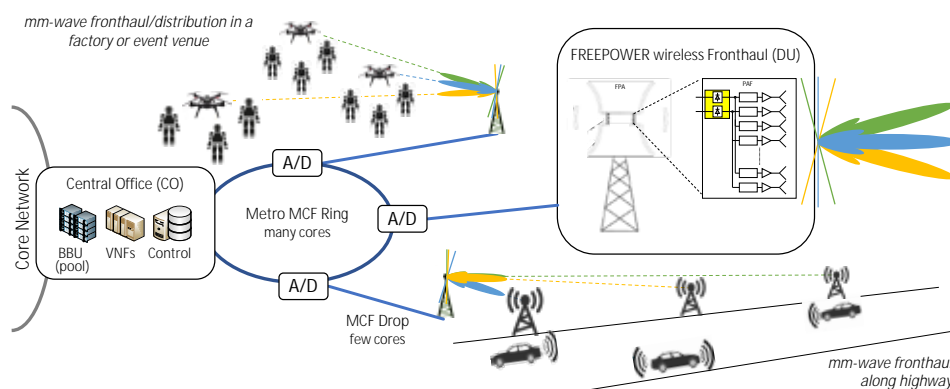
Speaker's bio:

Bart Smolders received his M.Sc. and Ph.D. degree in Electrical Engineering from the Eindhoven University of Technology (TU/e) in 1989 and 1994, respectively. From 1989 to 1991, he worked as an IC Designer at FEL-TNO, The Hague. From 1994 to 1997, he was a Radar System Designer with Thales, Hengelo. From 1997 to 2000, he was project leader of the Square Kilometer Array (SKA) with ASTRON. From 2000 to 2010, he has been with NXP Semiconductors, responsible for the innovation in the RF business line. Since 2010, he is a full-time professor at the TU/e in the Electromagnetics Group with special interest in antenna systems and applications. He currently leads several European and national projects on mm-wave 5G/6G wireless communications (www.mywave-project.eu, www.silika-project.eu). Next to his research activities, he is the dean of the department of Electrical Engineering, member of the advisory board of ASTRON and member of the supervisory board of Photondelta. He is also responsible lecturer of a MOOC on Microwave Engineering and Antennas (https://www.coursera.org/learn/microwave-antenna).

State of 5G and Considerations for 6G
- Bilel Jamoussi (ITU)

Abstract:

The presentation covers the state of 5G standards and initial deployments and considerations for 6G.

Speaker's bio:

Dr. Bilel Jamoussi has been Chief of the Study Groups Department of ITU Standardization Bureau (TSB) in Geneva Switzerland since 2010. His innovative approach has served as a catalyst to launch new standards initiatives related to emerging technologies such as IoT, Blockchain, AI and Quantum, attracting a new wave of memberships from non-traditional players.

Prior to 2010, he worked in the private sector for 15 years and held senior executive positions such as Director of Standards for Nortel. In this role he participated in over 90 standards making bodies worldwide. In the Internet Engineering Task Force (IETF), he authored a number of Internet standards.

As an IEEE Senior Member, he was elected to the IEEE Standards Association (IEEE-SA) Board of Governors and the IEEE-SA Corporate Advisory Group.

He holds a BSc, MSc and PhD degrees in Computer Engineering from the Pennsylvania State University, USA.

6G is about 4S: Spectrum, Speed, Safety and Security
- René Vroom (Agentschap Telecom)

Abstract:

6G, just around the corner or appearing on the horizon? International standards and protocols for 6G are not yet set and policies on new frequencies and spectrum are under development. Internationally, the WRC-2023 conference is expected to set further guidelines for future IMT bands globally, and Europe will define how to issue higher bands and larger bandwidths.

In addition to spectrum issues, 6G faces many technological challenges. For example in achieving greater speeds, lower latency, and better antennas and network layouts. And all this needs to be achieved in a computing landscape that moves towards cloud services and large-scale deployment of IOT devices. 6G, -perhaps even more than 5G- touches on business interests and on important public values. Digital connectivity is already a part of our daily life. In every step in the evolution of the mobile generations all relevant topics need to be treated with the utmost care. Some topics are relevant in every step of the way, such as safety and the possible impact on health, others might change over time. How can we manage the interdependencies between society, industry and operators' networks? How can we stop the spread of false information or terrorist content? Sustainability and low energy consumption will also be important design goals.

Last but not least, there is need for security with 6G. How can we ensure that networks are being operated at the right level of continuity and cyber security? The benefits of artificial intelligence in these areas are promising, but as of yet unfulfilled. Generally speaking, how do we secure a trustworthy use of algorithms?

All in all: people drive technology and technology drives societal development, and it should go hand in hand with other relevant factors to allow a responsible societal change.

Speaker's bio:

René Vroom has a degree in business administration and management. In 2009, after a career of 15 years in international industry, René started as Head of Innovation at Agentschap Telecom. Focus areas of his team include 5G, cybersecurity and artificial intelligence. The Agentschap Telecom Research Agenda explores new fields of interest: dynamic spectrum management & sharing, energy transition, and future internet infrastructures. Since 2012 René is also Head of Antennebureau, the government's public information office on antennas.

Agentschap Telecom is the Dutch Radio Communications Agency, part of the Ministry of Economic Affairs and Climate Policy.

Implementation challenges in beyond-5G communication systems - Ulf Gustavsson (Ericsson)

Abstract:

As 5G NR is being rolled out, research effort is being focused on the evolution of what is to come in the post-5G era. In order to meet the diverse requirements of future wireless communication in terms of increased capacity and reduced latency, technologies such as distributed massive MIMO, sub-mm-wave and the use of terahertz spectrum become technology components of interest. In this talk, we will discuss a few important challenges we face when approaching the limitations dictated by physics in the pursuit of more bandwidth and higher frequencies.

Speaker's bio:

Ulf Gustavsson received the MSc degree in electrical engineering from Örebro University, Örebro, Sweden, in 2006, and the PhD degree from Chalmers University of Technology, Gothenburg, Sweden, in 2011. His background ranges from power amplifier design to radio signal processing. He's currently a senior specialist with Ericsson Research, where his research interests include novel radio signal processing techniques for hardware impairment mitigation and behavioral modeling of radio hardware for future advanced antenna systems and communication engineering. Link to scholar-profile: https://scholar.google.com/citations?user=4TMeS-AAAAAJ&hl=en

AI role in the future networks
- Mostafa Essa (Vodafone)

Abstract:

Artificial Intelligence (AI) and mobile communication racing for the future, most of the studies were discussing how much the mobile communication capability to handle the massive increase of intelligent connected devices, how much the data rate and latency should be, however it was essential to have a opposite study and project to check the investment we should pay for emerging the Artificial Intelligence into mobile communication networks, I explore the successful project of the first generation of the Intelligent mobile communication network via Vodafone combined AI solutions serving mobile communication network entirely.

Speaker's bio:

Mostafa, RAN AI and Data Analytics Vodafone Distinguished Engineer, is a globally recognized authority in Digital Transformation and RAN strategy, design and optimization, applying AI/ML to new tools via using new innovative AI concept. He is also Chairman for ITU Network 2030, co-chairman in ITU FGML5G WG1, ETSI POC rapporteur leader and International Academia Board Member advisor.

Distinguished Engineers community consists of 15 world class members (Professors and Highest standard Engineering experts worldwide), shaping the future of the technology worldwide by researches and technical consultancies.

Mostafa holds a BSc in Electronics & Telecommunication and is undertaking MSc in Nano-technologies & Artificial Intelligence. He holds 3 patents, the 4th in progress and has authored/contributed to numerous publications and participation regarding AI, Cognitive Networks in ITU-ETSI-GSMA beside his Psychology self-study.