Center for Wireless Technology Eindhoven (CWTe)

2025 Research Retreat

October 8, 2025

Abstracts of the talks and speakers' bios:

Radiofrequency electromagnetic fields – exposure assessment or the art of (not) running behind (too much)
- Anke Huss (Utrecht University)

Abstract:

Environmental epidemiology tries to understand and quantify the impact of environmental exposures on human health. Accurate exposure assessment of large groups of persons is essential for epidemiological research, which is getting very complex with the introduction of new technologies and changes in use of existing technologies. In this presentation I will outline how we did exposure assessment to RF-EMF in the past, what has changed, and what the approaches mean in the context of environmental epidemiology.

Speaker's bio:

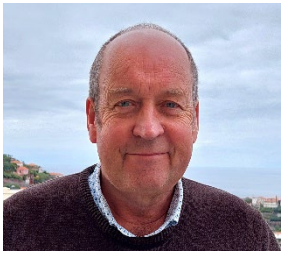
Dr Anke Huss is an associate professor in environmental epidemiology at the Institute for Risk Assessment Sciences from Utrecht University. She is involved in advanced methods of exposure assessment including modelling of diverse exposures (electromagnetic fields, pesticides, perceived exposures, noise and others) and has evaluated effects of these exposures regarding a wide range of health outcomes including sleep, symptoms, neurodegenerative and neurodevelopmental effects and others. She is co-PI of the Dutch AMIGO cohort and serves as a member of ICNIRP, the Swedish expert group on electromagnetic fields and health SSM, and the Dutch Health Council.

Ensuring 6G stays connected: Multi-domain 6G resilience for critical infrastructure
- Simon Pryor (Acceleran)

Abstract:

Private 5G started the journey of moving beyond purely providing (B2C) consumer smartphone connectivity, to address (B2B) industrial and critical infrastructure verticals. In the current geo-political climate of GPS jamming, hackers and malicious state actors, the increased needs of all aspects of security, robustness and resilience have become paramount drivers towards 6G. There is no single 'silver bullet' solution; a multi-domain diversity approach to enhancing network resilience is currently a hot 6G research topic & will be discussed, together with the practical commercial constraints, allowing these capabilities to be affordably introduced into intelligent Open RAN based B5G/6G networks.

Speaker's bio:



Simon is R&I Director @ Accelleran, an Antwerp based SME researching and developing advanced Open RAN based networks for Private 5G solutions. After a broad engineering ICT background, Simon coordinates and helps to write and lead strategic 6G research projects, within the European research programs such as SNS.

Advances in drone technology: An EW perspective - Netherlands Aerospace Center

Abstract:

Recent developments show an increased interest in drones and related research towards their operations. The flexibility and low-cost provides operations with a versatile platform. These drones, often equipped with a plethora of sensors and/or effectors can be deployed easily and are difficult to detect due to their size. Within the Royal NLR we perform research towards the usage of drones and applications with the safety and security domain. Furthermore, we develop solutions to minimize disruption to civilian platforms. One of the most recent examples being the GPS disruptions. This presentation provides an overview of the evolving domain from both Radio Frequency (RF) and Electro-Optical (EO) perspectives, including a use case for each. Moreover, it aims to inform about how the domain is evolving in relation to wireless technologies and address the challenges posed by drones, and to contribute to the developments of effective countermeasures. Decisively, by informing and presenting the knowledge and abilities of the Royal NLR the goal is to generate some fruitful discussions and possible follow-up research collaborations.

Speaker's bio:

NLR EW RF & EO Engineer.

Biomedical Electromagnetics – from killing to exciting
- Maarten Paulides (Eindhoven University of Technology)

Abstract:

Electromagnetic (EM) waves, spanning from extremely low frequencies (ELF) to radiofrequency (RF) or microwaves (MW), are increasingly applied in medical technologies that range from RF / MW for therapeutic heating to ELF for neural excitation. Their frequency-selective and non-invasive nature enables diverse applications such as MRI, hyperthermia cancer therapy, neurostimulation, and wireless communication with implants. Ensuring safety and efficacy under stringent regulatory constraints drives the development of advanced EM simulation and validation methods, which support model-based control and optimization of devices—particularly in temperature-critical treatments like hyperthermia. Innovations from the EM4Care+Cure lab, developed within the “Golden MedTech Triangle” of academia, clinics, and industry, include MR-integrated antenna arrays, the Hypercollar3D for head-and-neck therapy, and simulation-driven neurostimulation for epilepsy. These advances illustrate how EM technologies can transition from a destructive to a stimulative role, pushing the boundaries of biomedical electromagnetics toward smarter, safer, and more personalized healthcare.

Speaker’s bio:

Prof. dr. ir. Margarethus M. (Maarten) Paulides is Full Professor of Biomedical Electromagnetics (EM) at Eindhoven University of Technology (TU/e), where he chairs the Care+Cure lab of the EM group (EM4Care+Cure) and serves as Scientific Director of the Center for Care and Cure Technology Eindhoven (C3Te). He specializes in the development of electromagnetic technologies for medical applications. His work bridges simulation, device design, and clinical validation, aiming to personalize and optimize treatments. Paulides holds an MSc in Electrical Engineering from TU/e and a PhD (cum laude) in Health and Medical Physics from Erasmus University Rotterdam. He holds an honorary professor position at Erasmus MC Cancer Institute in Rotterdam and co-founded Sensius BV, a MedTech company in hyperthermia treatment. His research has contributed to novel medical devices and patient-specific modelling including clinical validation and implementation, as well as to EM exposure guidelines.

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Multi-Terabit Transmission Over a 4.6 km Free Space Optical Communications Urban link
- Chigo Okonkwo (Eindhoven University of Technology)

Abstract:

A unique testbed demonstrating transmission over of coherent signals in an urban environment is presented. We discuss approaches and techniques for mitigating impact of turbulence.

Speaker's bio:

Chigo Okonkwo is Full Professor and Chair of Secure Ultra-High-Capacity Transmission at Eindhoven University of Technology, which he joined in 2010 after a Ph.D. in Optical Signal Processing from the University of Essex, with contributions to EU ICT projects MODEGAP.
His research spans ultra-high-capacity transmission using space division multiplexing, free space optical transmission and quantum-secure communications, with emphasis on CV-QKD (coherent detection, discrete modulation, DSP and error-correction reconciliation schemes) and coexistence with DWDM networks; he is a member of Casimir Institute at TU Eindhoven and contributes to the Dutch National Growth Fund programs on Quantum Technology and Photonics.
He has served on the ECOC Technical Programme Committee (on and off since 2014), chaired the ECOC 2018 DSP Subcommittee and the OSA Advanced Photonics Congress conference on Signal Processing in Photonics, and has (co)authored more than 350 publications. He is co-founder of CUbIQ Technologies.

Holistic Tunable antenna design for flagship smartphones - Mojtaba Zamanifekri (Qorvo)

Abstract:

The rapid evolution of next-generation mobile devices presents significant engineering challenges, especially in antenna integration. One major challenge is that 5G smartphones generally require more than twice the number of RF paths compared to LTE devices, due to the addition of new frequency bands and standards including cellular, Wi-Fi, Ultra-Wideband (UWB), mmWave (mmW), and GPS.
At the same time, innovations in device form factors—such as foldable or rollable displays and the shift from physical buttons to virtual controls—impose strict limitations on antenna placement and design. With limited internal space, adding new antennas becomes difficult, and sharing antennas across multiple bands introduces complex design issues.
To ensure efficient operation across all usage scenarios, careful antenna design and strategic positioning are essential. This raises critical questions: How can battery life be maintained amid ever-increasing performance demands? What are the limits of current technologies, and how can we advance to achieve better performance?
Addressing these challenges requires the development of new technologies combined with innovative antenna tuning techniques to meet both current and future smartphone design needs.

Speaker's bio:

Mojtaba Zamanifekri received his M.Sc. degree in Electrical Engineering from Chalmers University of Technology, Sweden, in 2010, and his Ph.D. degree in Ka-band integrated focal plane arrays from Eindhoven University of Technology in 2015. From 2015 to 2019, he worked at Cavendish Kinetics, Netherlands, where he was responsible for tunable antenna design. In 2019, he joined Qorvo as a design and modeling expert specializing in antenna solutions and RF systems for mobile communication. His research interests include tunable antenna systems, RF and antenna modeling, and antenna-in-package technologies.