Center for Wireless Technology Eindhoven (CWTe)

CWTe 2020 Research Retreat

October 14, 2020

Automated material handling systems: How wireless technology affects product structure and organization
Speaker: Evert van de Plassche (Vanderlande)

Abstract:

In the world of automated material handling, wireless technologies play an increasing role. Self-driving vehicles transport bags, robots pick items and kilometers of conveyors form the arteries in modern distribution centers - all relying on communication. But why are some wireless technologies easily adopted and do others struggle? This presentation will try to answer the question by elaborating on how different wireless technologies affect product structures and the organization.

Speaker's bio:

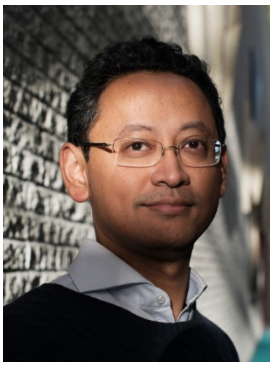
Evert van de Plassche MSc. TU Delft mechanical engineering (graduated 2001). Many years of product concepting and development experience at Vanderlande – item picking robots, case picking system, condition monitoring applications. 5 years of machine diagnostics experience at ASML. Current role is technology owner IoT (internet of things) within R&D Innovate at Vanderlande.

Collaborative autonomous agents: state-of-the-art and research challenges
Speaker: Bayu Jayawardhana (RUG)

Abstract:

The deployment of collaborative autonomous agents (such as, mobile robots, vehicles, drones, underwater vehicles), where each agent has a high-degree of autonomy and must cooperate with its neighbouring agents such that some prescribed global tasks can be achieved by the whole group, has a lot of potentials in many industrial sectors. It has found potential applications in logistics, manufacturing, environmental and creative industries. In this talk, we will present state-of-the-art distributed control systems techniques, which are enabling technologies for the autonomous collaboration where the use of centralised computing device for orchestrating the multi-agent systems is avoided at all cost. We present experimental results and challenges that include computational aspects and communication technology.

Speaker's bio:



Bayu Jayawardhana is Professor in Mechatronics and Control of Nonlinear Systems at the University of Groningen. His research expertise is on mechatronics, robotics, systems & control theory and systems biology. He is currently the program leader of TTW Perspectief programme on DIGITAL TWIN (2020-2025).

Plantenna: Creating an Internet of plants for a sustainable future
Speaker: Sander Bronckers (TU/e)

Abstract:

Food security is set to be one of the main societal challenges, with a rapidly growing population combining with urbanization and industrialization. In addition to this, sudden or erratic climate changes like floods and droughts endanger the crop yield. These factors add to the shortage of land and water resources for agriculture and human use, making it extremely challenging to provide sufficient food and nutrition to all. Thankfully, with more accurate information about localized plant health, the efficiency of resource usage can be increased dramatically by the ability to make better informed decisions. This can be addressed by using electronic systems for monitoring health status of plants which, together with wireless communication features, form an internet of plants – a set of connected 'plantennas'.

This presentation takes a look at the 4.TU Plantenna project, which researches innovative sensors for plant stress and environmental strain, in a collaboration between the four Dutch technical universities. In particular, we'll look at the role that RF technologies can play here after their widespread success in communications.

Speaker's bio:

Sander Bronckers received the M.Sc. degree (cum laude) in electrical engineering from Eindhoven University of Technology (TU/e), The Netherlands, in 2015. He obtained the Ph.D. degree (cum laude) in electrical engineering in 2019, within the electromagnetics group at TU/e, on design and measurement techniques for next-generation integrated antennas. He is currently an assistant professor on Metrology for Antennas and Wireless Systems. His research interests include reconfigurable antennas and RF metrology, in particular antenna measurements in reverberation chambers and material characterization.

Empathic homes that can 'care' for you
Speaker: Masi Mohammadi (HAN, TU/e)

Abstract:

With emerging technologies like sensor technology, AI, robotics, the next stadium of smart homes has been introduced. In this new generation, 'smart' is not just a precondition but technology is seamlessly integrated into the environment, and 'empathizes' with the condition of the user (in need of care). Empathic home is an emotionally intelligent place that can recognize and interpret inhabitant's action and is able to react upon that. Such a house makes sure you get sufficient exercise, gives you tailored care and in that way contributes to keeping you healthy. Advanced wireless technologies and large electronic areas with high density deployments of various types of sensors are expected in these spaces to enable accurate capturing of the conditions of the environment, behavioural patterns and emotional state of the inhabitant. Furthermore, this large electronic area benefits the inhabitant to be able to be 'seen' by the system.
By integration and implementation of developed principles and concepts in several Living Labs throughout the Netherlands, we aim to examine the impact of these interventions on the real-life of users.

Speaker's bio:

Masi Mohammadi is full professor of Smart Architectural Technologies at Eindhoven University of Technology, holds the KIVI-chair of Architecture in Health at HAN University of applied sciences, in the Netherlands, and visiting professor at University of Technology Sydney (2017).
She is the principal investigator and leader of the research program 'Empathic Environment', an ongoing interdisciplinary study into technological, spatial and social aspects of ageing. She currently supervises 21 (PhD and PDEng) dissertations on this subject.

5G/Satcom-on-the-move agile antenna frontends: RF design challenges
Speaker: Rens Baggen (IMST)

Abstract:

The demand for ubiquitous connectivity in data-intensive applications calls for a more efficient use of the radio spectrum, and for the extension of current systems towards additional frequency bands above 6 GHz, in the (sub-)millimetre-wave region and beyond. New strategies have to be developed and implemented for the air interface in order to meet demands like ultra-high data rates, low consumer prices, high sustainability and low power consumption. Mm-wave antennas need to feature a large degree of re-configurability and involve a significant number of radiating elements arranged in large arrays. Advanced RF-switching, beamforming and beamsteering algorithms, as well as advanced Multiple-Input Multiple-Output (MIMO) strategies will have to be developed to overcome the challenging propagation scenarios in the mmW region, increase efficiency, and allow for higher data rates, while still providing reasonable coverage. Component size, power efficiency and thermal management are some of the bottlenecks for the design of agile antenna arrays for future communications systems. This webinar gives an overview of these challenges and potential solutions.

Speaker's bio:

Rens Baggen has a long standing experience in phased arrays and related RF-topics. He is one of the leading senior antenna experts of IMST with 24 years of experience in agile antenna frontends, and has authored and co-authored over 70 papers on latter topic.