

Massive MIMO, Harmonic Radar to Chase Insects and other Research Highlights from the Wireless Research Centre, University of Canterbury, NZ.

Dr. Graeme Woodward.

The Wireless Research Centre (WRC) at the University of Canterbury, New Zealand, is an industry facing research centre focussing on research challenges defined by the needs of industry and government. The centre has extensive knowledge and experience working with emerging wireless standards, including the 3GPP family of cellular standards (3G, 4G, 5G, and now emerging 6G concepts), local area and personal-area networks. Specific technologies of expertise include information theory, multi-antenna systems (MIMO), modulation and coding, diversity systems, relaying, scheduling, combinations of wireless and geospatial technologies, and the internet of things. Application areas include mission critical communications (civilian and strategic), intelligent transportation systems (vehicular automation), swarm intelligence (e.g. Unmanned Aerial Vehicle/drone swarming), biosecurity (e.g. trapping and tracking of invasive species), and Antarctic operations (e.g. remote sensing).

This talk will introduce the capabilities of the Centre and give some research highlights from the most recent year, including some work on mmWave Massive MIMO and the use of hybrid beamforming with non-linear precoding to reduce system complexity while also dealing more effectively with spatially correlated challenges. We will also give an update on our ambitious project to use bistatic harmonic radar operating from a swarm of unmanned aerial vehicles to track insects. The lead researcher on the project is Dr. Anastasia Lavrenko, a recent PhD graduate from Ilmenau.

Biography:

Dr Graeme Woodward received B.Sc., B.E., and Ph.D. degrees from the University of Sydney, and has enjoyed a career spanning industry and academia. His extensive industrial research experience includes pioneering VLSI designs for multi-antenna 3G Packet Access (HSDPA) with Bell Labs (Lucent Technologies), Sydney. Subsequently he worked with Agere Systems and LSI Logic with a focus on low power chip design for 3G and 4G (LTE) terminals contributing to chip designs shipped in volume to a major international handset vendor. From 2007 he worked as Research Manager of the Telecommunications Research Laboratory, Toshiba Research Europe (Bristol, UK) engaged in numerous large UK and EU projects. He is now Research Leader with the Wireless Research Centre, University of Canterbury, New Zealand. His speciality is digital baseband signal processing for wireless communications standards, with a particular interest in multi-antenna processing and interference/channel distortion mitigation. He is a Senior Member of the IEEE, has authored more than 50 papers and 12 U.S. patents and has served on numerous conference committees.

