Massive MIMO, Beamforming and Radio Access Networks

Alister Burr

Professor, University of York,
York, UK

Abstract

While the concept of Massive MIMO has been very influential on the development of 5G wireless standards, it is arguable that the 5GNR standard itself as it is likely to be implemented bears little resemblance to the concept as originally presented. Rather it uses large antenna arrays to exploit more explicitly the spatial dimension using beamforming: in some ways this is reminiscent of the "smart antenna" concept from a decade or more ago. There is also a relationship between Massive MIMO, and in particular distributed or "cell-free" massive MIMO (CF-MaMIMO), and the "Cloud-RAN" (C-RAN: a.k.a Centralized Radio Access Network, Virtualized RAN: vRAN) concept in radio access network architecture. The presentation will explore some of these themes as they affect the development of radio access networks in 5G and beyond, including the use of millimetre-waves. It will show how the CF-MaMIMO concept in particular can cast light on issue such as fronthaul load and optimal "splits" of the physical layer within a C-RAN network.

Bio

Alister Burr is Professor of Communications at the University of York, UK. His research interests for many years have been within the physical layer of wireless networks, including modulation and coding, multiple access and MIMO techniques. More recently he has worked on aspects of the "Network Aware" physical layer, including physical-layer network coding and radio access network architectures. He is author of "Modulation and Coding for Wireless Communication", and co-author of "Wireless Physical Layer Network Coding", as well as of around 250 papers in international conferences and journals. He was Chair WG1/2 (on physical layer aspects) of several COST Actions in wireless communications, and has also served as Associate Editor for IEEE Communications Letters, Workshops Chair for IEEE ICC 2016, and TPC co-chair for PIMRC 2018 and 2020.