

## **SHORT COURSE PROPOSAL TO EuCAP 2014, The Hague, THE NETHERLANDS**

### **Course title: Wearable antenna systems for energy-efficient body-centric communication**

Smart Fabric Interactive Fabrics systems have been widely studied in the last decade, focusing on healthcare applications, rescue worker and soldier monitoring, sports and gaming. Wearable antennas are key components in these systems, offering performances comparable to rigid antennas while being unobtrusively and comfortably integrated into the garment. Moreover, a jacket acting as antenna platform enables to deploy multi-antenna systems and exploit MIMO techniques to mitigate multipath fading and body shadowing. The short course presents a comprehensive overview on how to design, fabricate and characterize textile antennas with stable antenna characteristics in realistic operating conditions. Both conventional passive design and advanced full-wave/circuit co-design of active textile antenna modules are addressed. The latter includes the integration of active electronics and energy harvesters onto the textile antenna platform. Furthermore, in-depth insight is provided into the off-body wireless channel. A model is proposed to characterize correlated body shadowing in addition to multipath fading due to the indoor environment. Moreover, energy-efficient MIMO techniques are presented, yielding a reliable off-body wireless channel at minimal processing power by mitigating channel impairments. Receive diversity, space-time coding and beamforming schemes are discussed and their performance is critically evaluated.