

SUNDAY 08:30 – 12:30

Wearable Antenna Systems for Joint Body-Centric Communication, Powering and Sensing

Chair: Hendrik Rogier¹

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Room: Juliana 3



SS02
EuMC

In this short course, the challenges will be addressed that designers face when implementing wireless nodes for joint body-centric communication, powering and sensing. Therefore, insights will be provided into design procedures that enable the development of wearable antenna systems that exhibit sufficient robustness and yield adequate operational autonomy for the targeted applications in the sixth-generation wireless communication system. For this purpose, a comprehensive holistic, stochastic design framework for wearable systems will be outlined in detail. First, an overview of all the different system-level design requirements will be presented. This is followed by a discussion on the material and manufacturing selection process, together with the range of material characterization

procedures available to designers to initiate the actual design process. A full-wave/circuit co-design and co-optimization strategy for pervasive integration of active electronics and energy harvesters will be proposed, which yields optimal wireless nodes. This procedure takes place after the preliminary design of the different building blocks, such as antenna system, transceiver and sensing electronics, energy harvesters and power managements system. Specific attention will be devoted to the extensive statistical analysis based on generalized polynomial chaos expansions, which ensures that designs are sufficiently resilient to variations due to fabrication tolerances and to uncertainty due to challenging deployment conditions. Moreover, validation procedures, in both the far and the near field, and both in

anechoic and realistic operation conditions, will be covered in full detail. The course will end with an overview of some designs for a few representative applications.

PROGRAMME

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