Compact Antennas for IoT

By Asst. Prof. Dr. Adam Narbudowicz

Wroclaw University of Science and Technology in Wroclaw, Poland

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Abstract:

Forthcoming Internet of Things (IoT), 5G and implantable devices will see a multitude of daily-use devices wirelessly connected to the Internet. Such connections require energy efficient antenna structures that are fully integrated into a device and provide bandwidth sufficient to satisfy the communication need. This pushed further the ever-growing demand for antenna miniaturization. However due to the fundamental dependency between size, bandwidth, and efficiency (so called *Chu-Harrington limit*) the design of small antennas for IoT has proven challenging. A potential solution might be reconfigurable antennas, however – as will be discussed during the talk – they also come with certain drawbacks. The talk will discuss reconfigurable antenna designs, that allow reconfiguration in frequency and/or radiation pattern. It will briefly discuss the theory and application of electrically small antennas in the context of Internet of Things, issues related to antenna operation in proximity of human body and design issues related the forthcoming mm-Wave communication in 5G.

Bio:

Adam Narbudowicz is currently an Assistant Professor at Wroclaw University of Science and Technology in Wroclaw, Poland. He received his Ph.D. in 2013 in antenna and microwave engineering from the Dublin Institute of Technology (currently TU Dublin), Ireland. Up to 2019 he was an EDGE Postdoctoral Research Fellow at CONNECT Research Centre, working jointly at Trinity College Dublin and TU Dublin. His project "Wireless-SPIne: Wireless Security and Privacy for INternEt of things" aimed to develop techniques for secure wireless communication with low computational complexity, that use propagation mechanisms and operate in the physical layer. His work on antennas for passive self-interference suppression for full-duplex radio was published in prestigious IEEE Wireless Communications journal and contributed to awarding Dr. Narbudowicz the inaugural 2018 Prof Tom Brazil CONNECT Excellence in Research Award. In 2014–2017 he was funded by Irish Research Council ELEVATE postdoctoral fellowship (co-funded by Marie Curie Actions) to work at RWTH Aachen University in Germany. He also received 3rd Best Paper Award during ISAP 2017: International Symposium on Antennas and Propagation in 2017; Best poster by popular vote during 2018 IEEE-EURASIP Summer School on Signal Processing; and DIT Inventor Competition Award for Best Postgraduate/Staff Invention in 2012.

His research interests include wireless physical-layer security, remote sensing, reconfigurable electrically small antennas, antennas for CubeSats and antennas for full-duplex radios.