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IEEE COMMUNICATIONS SOCIETY North Jersey Chapter

ENABLING COMMUNICATION IN WIRELESS NANOSENSOR NETWORKS (WNSNs)

Josep Miquel Jornet, Georgia Institute of Technology

Date: September 1, 2011 (Thursday)
Time: 11:30 am (refreshment starts at 11:15 am)
Place: 202 ECEC, NJIT

About the Speaker

Josep Miquel Jornet received the Engineering Degree in Telecommunication Engineering and the Master of Science in Information and Communication Technologies from the School of Electrical Engineering, Universitat Politècnica de Catalunya (UPC), Barcelona, Spain, in 2008. From September 2007 to December 2008, he was a visiting researcher at the MIT Sea Grant, Massachusetts Institute of Technology, Cambridge. Currently, he is pursuing his Ph.D. degree in the Broadband Wireless Networking Lab, School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, under the supervision of Dr. Ian F. Akyildiz. He is a student member of the IEEE and the ACM. His current research interests are in nanonetworks, nanosensor networks and graphene-enabled wireless communication.

About the Talk

Nanotechnology is enabling the development of miniaturized sensors which are able to detect nanoscale events with unprecedented accuracy, such as the presence of chemical compounds in concentrations as low as one part per billion, or the existence of different biological agents such as virus, bacteria or cancerous cells. Wireless NanoSensor Networks (WNSNs) will expand the capabilities of single nanosensors by allowing them to cooperate and share information. Classical communication paradigms need to undergo a profound revision before being used in the nanoscale. In this talk, first, the state of the art in nanosensor technology is surveyed from the device perspective, giving details on the internal architecture and components of an individual nanosensor device as well as the main challenges in their integration in a single unit. After reviewing the different options for communication among nanosensors, the use of electromagnetic waves in the Terahertz frequency range is justified from the device perspective and in light of the quantum properties affecting nano-antennas. Then, the characteristics of the Terahertz channel in the nanoscale are reviewed, emphasizing the need of new solutions for communication in WNSNs. Finally, the open research challenges in terms of network architectures, algorithms and protocols for nanosensor networks are highlighted, defining a roadmap for the development of this new networking paradigm.

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