Wireless sensor networks demystified

The technological advances in micro-electro-mechanical systems (MEMS) and wireless communications have enabled the deployment of the small intelligent sensor nodes at homes, in workplaces, supermarkets, plantations, oceans, streets, and highways to monitor the environment. The realisation of smart environments to improve the efficiency of nearly every aspect of our daily lives by enhancing the human-to-physical world interaction is one of the most exciting potential sensor network applications utilising these intelligent sensor nodes.

Professor Ian Akyildiz of the Georgia Institute of Technology (USA) recently presented a day-long tutorial on wireless sensor networks at the University of Pretoria. He explained that the above objective necessitates the efficient and application-specific communication protocols to assure the reliable communication of the sensed event features and hence enable the required actions to be taken by the actors in the smart environment.

In his tutorial, Prof Akyildiz presented the challenges and the existing solutions for the design and development of sensor/actor network communication protocols. More specifically, application layer, transport layer, network layer, data link layer, in particular, error control and MAC protocols, and physical layer issues as well as the localisation protocols and the time synchronisation algorithms were explained in detail. Open research issues for the realisation of sensor and actor networks were also discussed. The overall objective of the tutorial was to provide a global and detailed view at the current state-of-the-art in WSNs/WSANs and present the still-open research issues in this field.

The topics covered included Wireless Sensor Network (WSN), Architecture and Protocol Stack, Factors Influencing WSN Applications, Application Layer, Transport Layer, Routing Algorithms, Medium Access Control, Error Control, Physical Layer, Wireless Sensor and Actor Networks (WSANs), Coordination and Communication Problems in WASNs, Underwater Sensor Networks: Challenges, Routing and MAC Solutions, Underground Sensor Networks: Research Challenges, and Grand Challenges for Wireless Sensor Networks. Prof Akyildiz is the Ken Byers Distinguished Chair Professor in Telecommunications at Georgia Institute of Technology. ☻

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→ **Professor Ian Akyildiz** of the Georgia Institute of Technology (2nd from right) presented a day-long tutorial on wireless sensor networks at the University of Pretoria. In attendance at the tutorial were, from left: Prof Wilhelm Leuschner (Head of the Department of Electrical, Electronic and Computer Engineering), Prof Robin Crewe (Vice-Principal), Prof Gerhard Hancke (Department of Electrical, Electronic and Computer Engineering), and right, Prof Calie Pistorius (Vice-Chancellor and Principal of the University of Pretoria).