

Институтот за телекомуникации (ИТК) при ФЕИТ – Скопје,
Истражувачката група Wireless Networks Group (WiNGroup)

и

Докторската школа на УКИМ (студиска програма ЕИТ)

имаат особена чест и задоволство да Ве поканат на предавањето

NANONETWORKS: A NEW FRONTIER IN COMMUNICATIONS

Предавач: **Проф. Ian Akyildiz**

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Апстракт на предавањето:

Nanotechnology is enabling the development of devices in a scale ranging from one to a few one hundred nanometers. Nanonetworks, i.e., the interconnection of nano-scale devices, are expected to expand the capabilities of single nano-machines by allowing them to cooperate and share information. Traditional communication technologies are not directly suitable for nanonetworks mainly due to the size and power consumption of existing transmitters, receivers and additional processing components. All these define a new communication paradigm that demands novel solutions such as nano-transceivers, channel models for the nano-scale, and protocols and architectures for nanonetworks. In this talk, first the state-of-the-art in nano-machines, including architectural aspects, expected features of future nano-machines, and current developments are presented for a better understanding of the nanonetwork scenarios. Moreover, nanonetworks features and components are explained and compared with traditional communication networks. Novel nano-antennas based on nano-materials as well as the terahertz band are investigated for electromagnetic communication in nanonetworks. Furthermore, molecular communication mechanisms are presented for short-range networking based on ion signaling and molecular motors, for medium-range networking based on flagellated bacteria and nanorods, as well as for long-range networking based on pheromones and capillaries. Finally, open research challenges such as the development of network components, molecular communication theory, and new architectures and protocols, which need to be solved in order to pave the way for the development and deployment of nanonetworks within the next couple of decades are presented.

Куса биографија на предавачот:

I. F. AKYILDIZ received his BS, MS, and PhD degrees in Computer Engineering from the University of Erlangen-Nuernberg, Germany, in 1978, 1981 and 1984, respectively. Currently, he is the Ken Byers Chair Professor with the School of Electrical and Computer Engineering, Georgia Institute of Technology, Director of the Broadband Wireless Networking Laboratory and Chair of the Telecommunications Group at Georgia Tech. He is a FiDiPro (Finnish Distinguished Professor) and Founder of the Nano Communications Center (NCC) at Tampere University of Technology, Tampere, Finland since January 2013. Dr. Akyildiz is an Honorary Professor with School of Electrical Engineering at the Universitat Politecnica de Catalunya, and Founder and Director of N3Cat (NaNoNetworking Center in Catalunya) in Barcelona, Spain, since June 2008.

He is also a Consulting Chair Professor in Telecommunications at the King Abdulaziz University, Jeddah, Saudi Arabia since October 2011. He was an Extraordinary Professor with Department of Electrical, Electronic and Computer Engineering at the University of Pretoria, South Africa between 2009-2012. He is the Editor-in-Chief of Computer Networks (Elsevier) Journal since 2000, the founding Editor-in-Chief of the Ad Hoc Networks Journal (Elsevier) in 2003, the founding Editor-in-Chief of the Physical Communication (PHYCOM) Journal (Elsevier) in 2008, and the founding Editor-in-Chief of the Nano Communication Networks (NANOCOMNET) Journal (Elsevier) in 2010.

Dr. Akyildiz is an IEEE FELLOW (1996) and an ACM FELLOW (1997). Dr. Akyildiz received the 1997 IEEE Leonard G. Abraham Prize award (IEEE Communications Society) for his paper entitled "Multimedia Group Synchronization Protocols for Integrated Services Architectures" published in the IEEE Journal of Selected Areas in Communications (JSAC) in January 1996. Dr. Akyildiz received the 2003 Best Tutorial Paper Award (IEEE Communications Society) for this paper entitled "A Survey on Sensor Networks" published in the IEEE Communications Magazine, August 2002. Dr. Akyildiz received the Best Paper Award for "Interferer Classification, Channel Selection and Transmission Adaptation for Wireless Sensor Networks" in the Ad Hoc and Sensor Networks (AHSN) symposium at IEEE ICC, June 2009.

He received the "Don Federico Santa Maria Medal" for his services to the Universidad of Federico Santa Maria in Chile in 1986. He served as a National Lecturer for ACM from 1989 until 1998 and received the ACM Outstanding Distinguished Lecturer Award for 1994. Dr. Akyildiz received the 2002 IEEE Harry M. Goode Memorial award (IEEE Computer Society) with the citation "for significant and pioneering contributions to advanced architectures and protocols for wireless and satellite networking". He also received the 2003 ACM SIGMOBILE Outstanding Contribution Award for his "pioneering contributions in the area of mobility and resource management for wireless communication networks", September 2003.

Dr. Akyildiz received the 2004 Georgia Tech Faculty Research Author Award for his "outstanding record of publications of papers between 1999-2003", April 2004. He also received the 2005 Distinguished Faculty Achievement Award from School of ECE, Georgia Tech, April 2005. Dr. Akyildiz received the Georgia Tech Outstanding Doctoral Thesis Advisor Award for his 20+ years service and dedication to Georgia Tech and producing outstanding PhD students. He also received the 2009 ECE Distinguished Mentor Award by the Georgia Tech School of Electrical and Computer Engineering Faculty Honors Committee.

Dr. Akyildiz is the author of an advanced textbook on "Wireless Sensor Networks" published by John Wiley and Sons in June 2010. Dr. Akyildiz is the author of an advanced textbook on "Wireless Mesh Networks" published by John Wiley and Sons in February 2009.

Dr. Akyildiz serves on the advisory boards of several research centers, companies, journals, and publication companies. His current research interests are in Nanonetworks, Next Generation Cellular Systems, Cognitive Radio Networks and Wireless Sensor Networks.