

# TSC DISTINGUISHED LECTURES SERIES

## Signal Theory and Communication Department - Universitat Politècnica de Catalunya (Barcelona-Spain)

The Department of Signal Theory and Communications organizes the TSC Distinguished Lectures Series as part of its Ph.D program. The Distinguished Lectures Series is organized as intensive seminars on hot topics delivered by world-class specialists. The seminars are open on a limited basis to non-enrolled Ph. D. students, and registrations are considered on first come first served basis.

For more information and registration:

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Doctorate web page: <http://www.tsc.upc.edu/doctorat/funded.php?lng=ca>

### List of courses:

WIRELESS MESH NETWORKS (WMNs)	
<b>Ian F. Akyildiz</b> Broadband Wireless Networking Lab; School of Electrical and Computer Engineering; Georgia Institute of Technology; Atlanta, GA	Dates TBD in second half of June – first half of July 2009
<b>Summary</b> Wireless Mesh Networking (WMN) is widely recognized as a promising and cost effective solution for providing broadband wireless connectivity to the users. However, the intrinsic flexibility of the WMNs poses stringent research challenges at different layers and a huge research effort is nowadays devoted to the optimization of protocols and the design of algorithms to support mesh networking. This lecture aims at providing a detailed presentation of the most recent advances in the field.	
<b>Lecture Table of Contents</b> 1. Introduction 2. WMNs architectures 3. Limiting factors for WMNs design 4. Physical layer Technology 5. MAC-Medium Access Control protocols 6. Routing protocols 7. Transport Layer issues. 8. Security 9. Network Management 10. Mobility Management 11. Network capacity analysis 12. Cross Layer Design 13. Standardization activities 14. Conclusions	
Wireless Local Area Networks (WLANs) – MODELLING, PERFORMANCE ANALYSIS AND ENHANCEMENT	
<b>Periklis Chatzimisios</b> Department of Computer and Telecommunication Engineering University of Western Macedonia, Greece	23/02/09 - 27/02/09
<b>Lecture Table of Contents</b> <b>1. Fundamentals of Wireless Networks</b> Characteristics of the wireless channel, multiple access techniques, wireless <b>2. IEEE 802.11 Wireless Local Area Networks</b> IEEE 802.11 standard family (Medium Access Control and Physical layers) Performance modelling and analysis using Markov chains Saturation and unsaturated conditions, transmission errors, packet retry limits Performance metrics (throughput, packet delay, packet drop probability, delay distribution, etc) Performance enhancements (packet bursting and concatenation, RTS/CTS optimisation, protocol parameters tuning) <b>3. QoS in WLANs</b> Voice, IPTV and Video on Demand over WLANs <b>4. Other issues in Wireless Networks (6 hours)</b> Wireless Mesh Networking Routing Energy consumption Security and encryption	
TERAHERTZ TECHNOLOGY IN OUTER AND INNER SPACE	
<b>Peter H. Siegel</b> California Institute of Technology	25/05/09 - 29/05/09
<b>Summary</b> After more than 30 years of niche applications in the space sciences area, the field of Terahertz Technology is entering a true Renaissance. While major strides continue to be made in submillimeter wave astronomy and spectroscopy, the past few years have seen an unprecedented expansion of terahertz applications, components and instruments. Broad popular interest in this unique frequency domain has emerged for the first time, spanning applications as diverse as biohazard detection and tumor recognition. Already there are groups around the world who have applied specialized Terahertz techniques to disease diagnostics, recognition of protein structural states, monitoring of receptor binding, performing label-free DNA sequencing and visualizing contrast in otherwise uniform tissue. This course will broadly survey terahertz technology from its cradle applications in space science and spectroscopy to more recent biomedical and chemical uses.	
<b>Lecture Table of Contents</b> <b>1. Terahertz Principles</b> The spectral THz gap Terahertz phenomenology Terahertz Interaction with Matter <b>2. Terahertz Components</b> Sources. Millimeter upconverters. Optical downconverters Antennas Receivers <b>3. Sensor architectures</b> Heterodyne semiconductor. Heterodyne superconductor Direct Detectors <b>4. Terahertz Applications</b> Space applications. Earth observation and monitoring Terrestrial application. Security applications Bio-applications. Biosystems monitoring	

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