IEEE ICCCN 2008 Tutorial Program
(*Fully Sponsored by QUALCOMM*)
Sunday August 3rd, 2008

Morning sessions:
Tutorial 1

Title: **Digital Media Distribution: Trends, Challenges and Opportunities (Part I)**

Presenters:

1) Dr. Sanjoy Paul, InfoSys Technologies Limited, USA

2) Dr. Katherine Guo, Bell Labs, Alcatel-Lucent, USA

Tutorial 2

Title: **Game Theory for Wireless Networks**

Presenter:

Prof. Mainak Chatterjee, University of Central Florida, USA

Afternoon sessions:
Tutorial 3

Title: **Digital Media Distribution: Trends, Challenges and Opportunities (Part II)**

Presenters:

1) Dr. Sanjoy Paul, InfoSys Technologies Limited, USA

2) Dr. Katherine Guo, Bell Labs, Alcatel-Lucent, USA

Tutorial 4

Title: **Distributed Source Coding and its Applications**

Presenters:

1) Dr Vladimir Stankovic, University of Strathclyde, Glasgow, UK

2) Dr. Lina Stankovic, University of Strathclyde, Glasgow, UK

3) Dr. Samuel Cheng, University of Oklahoma, USA

** The Tutorial program is open to all ICCCN 2008 attendees for FREE**

Tutorial 1 (and 3)
Title: Digital Media Distribution: Trends, Challenges and Opportunities

Abstract:

This tutorial will focus on the details of architecture, protocols, and algorithms for delivering video over a hybrid multi-technology-wireless and wired network highlighting how the various technology trends may be used in an efficient manner to enable a service provider to deliver video at a very low cost/MB without sacrificing quality of experience for consumers and in the process, generating revenue from a range of video-based services. This tutorial will also provide in-depth knowledge of how Telecom service providers would deliver high quality video over IP networks in a cost-effective manner to compete with cable and satellite service providers. Moreover, the challenges for a mobile

wireless service provider to deliver high quality video in a secure manner to customers anytime anywhere will be discussed together with potential solutions. In addition, topics, such as, scalable video on demand using a combination of smart scheduling technology, IP multicasting, and XML-based semantic routing will also be covered. Advances in video codecs will be briefly touched as well together with security issues and Digital Rights Management (DRM). Finally, the tutorial will cover a variety of research topics in the area of digital video distribution and also profile a number of prominent start-up companies in the space.

Dr. Sanjoy Paul
InfoSys Technologies Limited, USA

Bio:
Dr. Sanjoy Paul (sanjoy_paul@infosys.com) is currently Associate Vice President, General Manager-Research and Head of Convergence Technology Lab at Infosys Technologies Limited where he heads research and innovation in the field of Communications, Media and Entertainment. Prior to that, he was a Research Professor at WINLAB, Rutgers University, and Founder & CEO of RelevantAd Technologies Inc. Before that Sanjoy spent five years as the Director of Wireless Networking Research at Bell Labs, Lucent Technologies, and as the CTO of WhenU, a privately-held online Advertising company. In a previous tenure at Bell Labs as a Distinguished Member of Technical Staff, Sanjoy was the chief architect of Lucent's IPWorX Caching and Content Distribution product line. He has also been the CTO of Edgix, a startup focusing on Media Streaming and Caching. Sanjoy has over fifteen years of technology expertise, specifically in the areas of End-to-End Protocol Design and Analysis, Mobile Wireless Networking, Quality of Service, Multicasting, Content Distribution, Media Streaming, Intelligent Caching, and Secure Commerce. He served as an editor of IEEE/ACM Transactions on Networking, General Chair of IEEE/ICST COMSWARE 2007, Technical Program Chair of IEEE/ICST COMSWARE 2006, Guest Editor of IEEE Network Special Issue on Multicasting, and as a Technical Program Committee Member of several IEEE and ACM International conferences. Sanjoy has authored a book on Multicasting, published over 60 papers in International Journals and refereed Conference

Proceedings, authored over 70 US patents (20 granted, 50+ pending), and is the co-recipient of 1997 William R. Bennett award from IEEE Communications Society for the best original paper in IEEE/ACM Transactions on Networking. He holds a Bachelor of Technology degree from IIT Kharagpur, India, an M.S and a Ph.D. degree from the University of Maryland, College Park, and an MBA from the Wharton Business School, University of Pennsylvania. Sanjoy is a Fellow of IEEE and a Member of the ACM.

Dr. Katherine Guo
Bell Labs, Alcatel-Lucent, USA

Bio:
Dr. Katherine Guo (kguo@bell-labs.com) is a Member of Technical Staff in Center for Networking and Network Management at Bell Labs in New Jersey, U.S.A. She has extensive research and product experience in Multimedia Streaming, Internet Content Distribution, Multicasting, 3G Wireless Systems, IP Multimedia Subsystems (IMS), Quality of Service support for real time applications such as VoIP, Video Streaming and Distributed Gaming. Formerly, she was the architect for Lucent's IPWorX/Imminet streaming cache and video content distribution product line. She has published over 25 research papers in refereed International Journals and Conference Proceedings, has served on the Technical Program Committees of a number of IEEE and ACM International Conferences, has served as editor for Wireless Networks Journal (WINET), general chair for IEEE ICCCN'2007, program vice-chair for IEEE ICDCS'2006, program co-chair for IEEE ICCCN'2006, program co-chair for IEEE/ACM MobiArch'2006 and 2007, panel chair for IEEE ICDCS'2006. She holds three U.S. and international patents and has over 20 other patents pending. She holds a B.S. degree in computer science and a B.A. degree in mathematics from the University of Texas at Austin and both M.S and Ph.D. degrees in computer science from Cornell University in Ithaca, New York. She has received Lucent Inventor of the Month Award for July 2006, has been part of the teams that have received the Bell Labs Teamwork Award (2005), the Lucent Chairman's Award (2005) and one of the six finalists of the Bell Labs President Award (2005). She is a Senior Member of the IEEE and a Member of the ACM.

Tutorial 2
Title: Game Theory for Wireless Networks

Abstract:
Wireless networks consist of devices that try to communicate with each other in the most efficient manner. These devices make critical decisions with regard to their transmission parameters so as to comply with the quality of service (QoS) specifications and system-wide goals. Such decisions are often conflicting in nature, particularly so, when limited resources are shared. The interactions among devices (or users) sharing a common resource can be formally modeled using game theory.

Game theory is a branch of applied mathematics that describes and studies the interactive decision problems. In such problems, the decisions made by each decision maker affect the outcomes and, thus, the resulting situation of all decision makers involved. When applied to wireless networks, the outcome of these games, and consequently the overall network performance, can be predicted using game theoretic techniques.

In this tutorial, we will study the basics of game theory (which by no means is a complete exposure to game theory). We will talk about various problems in wireless networks and see how game theory can be effectively applied to solve such problems. Though we will not go into the solution techniques, we will discuss the problem statement and their game theoretic formalization. The problems will be selected from the broad domain of cellular networks and services, ad hoc networks, and sensor networks. The topics include packet forwarding, shared media access, jamming, power control, cognitive radio and dynamic spectrum access, and co-operation in ad hoc networks. An important objective of this tutorial is to give the audience the opportunity to learn and apply game theoretic design techniques for solving various resource allocation problems in wireless networks.

Prof. Mainak Chatterjee
School of Electrical Engineering and Computer Science
University of Central Florida
Orlando, Florida, USA

Bio:
Mainak Chatterjee is an Assistant Professor in the School of Electrical Engineering and Computer Science at the University of Central Florida. He received his Ph.D. from the University of Texas at Arlington and M.E. from the Indian Institute of Science. His research interests include economic issues in wireless networks, applied game theory, auction theory, resource management and quality-of-service provisioning, ad hoc and sensor networks. He serves on the executive and technical program committees of several international conferences.

He is the founding chair of the IEEE Workshop in Mobile Video Delivery (MoViD). He is currently serving as the Secretary of the IEEE sub-committee on Cognitive Networks. He has published over 80 research papers and the recipient of AFOSR sponsored Young Investigator Program(YIP) award. Website: http://www.eecs.ucf.edu/~mainak

Tutorial 4
Title: Distributed Source Coding and its Applications

Abstract:
Distributed source coding (DSC) refers to separate compression and joint decompression of mutually correlated sources, e.g., compression of multiple correlated sensor outputs that do not communicate with each other, and the sensors send their compressed outputs for a centralized joint decoding. Though theoretical foundations were set more than thirty years ago, driven by applications such as wireless sensor networks, video surveillance, and stereo video, DSC has over the past few years become a very active research area with interest from both academia and industry. DSC has strong potentials to enable efficient and low-cost signal processing in sensor networks, to improve current video communication technologies and open the door for many exciting new applications. However, the impact of DSC is expected to be much broader and cannot be overstated, since the potential of DSC is limitless.

The proposed tutorial addresses theory and application of DSC, with the following aims: 1) introduce the theory of DSC and its connections to multimedia communications, 2) survey recent advances and exciting progresses made in DSC, and 3) discuss open challenges and opportunities in both theory and practical DSC designs, 4) present current applications. We hope this tutorial will provide the impetus for more researchers to contribute to the exciting and challenging field of DSC.

The proposed tutorial will be tailored to graduate students, engineers, and researchers in academia/industry working in the fields of wireless communications, signal processing and multimedia processing. Basic knowledge of communication theory is a pre-requisite.

Dr. Vladimir Stanković

Dept. of Electronic and Electrical Engineering,
Royal College Building, University of Strathclyde
Glasgow, U.K.

Bio :
Dr Vladimir Stanković received the Dipl.-Ing. degree in electrical engineering from the University of Belgrade, Serbia, in 2000, and the Dr.-Ing. degree from the University of Leipzig, Germany, in 2003. From June 2003 to February 2006, he was with the Dept. Electrical and Computer Engineering at Texas A&M University, College Station. From March 2006 to September 2007, Dr Stanković was with the Dept. of Communication Systems, Lancaster University, UK, as a lecturer. In Oct. 2007, he joined the Dept. Electronic and Electrical Engineering, at the University of Strathclyde, Glasgow, where he is currently a lecturer.

Over the past five years Dr Stanković has published 70 papers in peer reviewed leading scientific journals and prestigious international conference proceedings. He has been awarded several patents in the area of distributed source coding and applications, and is currently the holder of a three-year research grant by Engineering and Physical Sciences

Research Council (EPSRC) to work on applications of DSC to multimedia processing and communications. He has served on the Programme and Organizing Committees of international conferences, and has given many invited talks. Dr Stanković serves as an Associate Editor of *IEEE Communication Letters*.

Dr Stanković was a presenter of a tutorial at *IEEE ICC-2007*, and has been teaching undergraduate- and graduate-level courses in the area of signal processing and communications in several institutions: Texas A&M College Station, Lancaster University, and University of Strathclyde.
His research focuses on image/video processing, network information theory, wireless communications, and wireless ad hoc/sensor networks.

Dr. Lina Stanković

Address: Dept. of Electronic and Electrical Engineering
Royal College Building, University of Strathclyde
Glasgow, UK

Bio :
Dr. Lina Stanković (Fagoonee) received her first-class BEng (Hons) degree in Electronic Communication Systems in 1999, and PhD in 2003 from Lancaster University, Lancaster, UK. From May 2002 to September 2007, Dr Stanković was with the Dept. of Communication Systems at Lancaster University, first as a Research Associate, then as a Lecturer for 3 years. Dr Stanković has significant experience with industry, having worked with BT Research Labs in Ipswich, UK, QinetiQ UK and Philips Research Eindhoven. Dr Stanković has been actively engaged in research for the past five years publishing 2 book chapters and over 40 papers in peer-reviewed international journals and conference proceedings. Dr Stanković has been involved in many EPSRC and European Union research projects in the areas of signal processing for wireless communications, multimedia and optical storage. She has served on the Programme and Organizing Committees of international conferences and has given many invited talks to industry and academia.

Dr Stanković was a presenter of a tutorial at *IEEE ICC-2007*, and has been teaching undergraduate and graduate level courses in the area of signal processing and communications for five years. Dr Stanković was nominated for a teaching prize for her innovative approach towards disseminating math-intensive material to an audience with varying mathematical backgrounds. Her research interests include channel code design, signal processing for communications including equalization and synchronization, network coding, compressive sampling, all with applications in (but not limited to) wireless communications, sensor networks and storage.

Prof. Samuel Cheng

School of Electrical and Computer Engineering
University of Oklahoma, USA

Bio:
Dr Samuel Cheng received the B.S. degree in Electrical and Electronic Engineering from the University of Hong Kong in 1995, and the M.Phil. degree in Physics and the M.S. degree in Electrical Engineering from Hong Kong University of Science and Technology and the University of Hawaii, Honolulu, in 1997 and 2000, respectively. He received the Ph.D. degree in Electrical Engineering from Texas A&M University in 2004.

Dr. Cheng worked in Microsoft Asia, China, and Panasonic Technologies Company, New Jersey, in the areas of texture compression and digital watermarking during the summers of 2000 and 2001. In 2004, he joined Advanced Digital Imaging Research, Houston, Texas. He has several patent submissions and has been awarded three US patents. Since 2006, he has been with the Department of Electrical and Computer Engineering at the University of Oklahoma, where he is an Assistant Professor. He is co-recipient of the 2006 *IEEE Signal Processing Magazine* Best Paper Award, which

reviews DSC. His research interests include information theory, image/signal processing, and pattern recognition. Dr Cheng has been teaching undergraduate- and graduate-level courses in the area of signal processing and communications.