ISWCS'09

2009 6th International Symposium on Wireless Communication Systems

September 7-10, 2009

Siena, Italy

ISWCS'09

CONFERENCE JOINT PROGRAM

ISWCS'09 and IWSSC'09

IWSSC'09

2009 International Workshop on Satellite and Space Communications

September 9-11, 2009

Siena, Italy
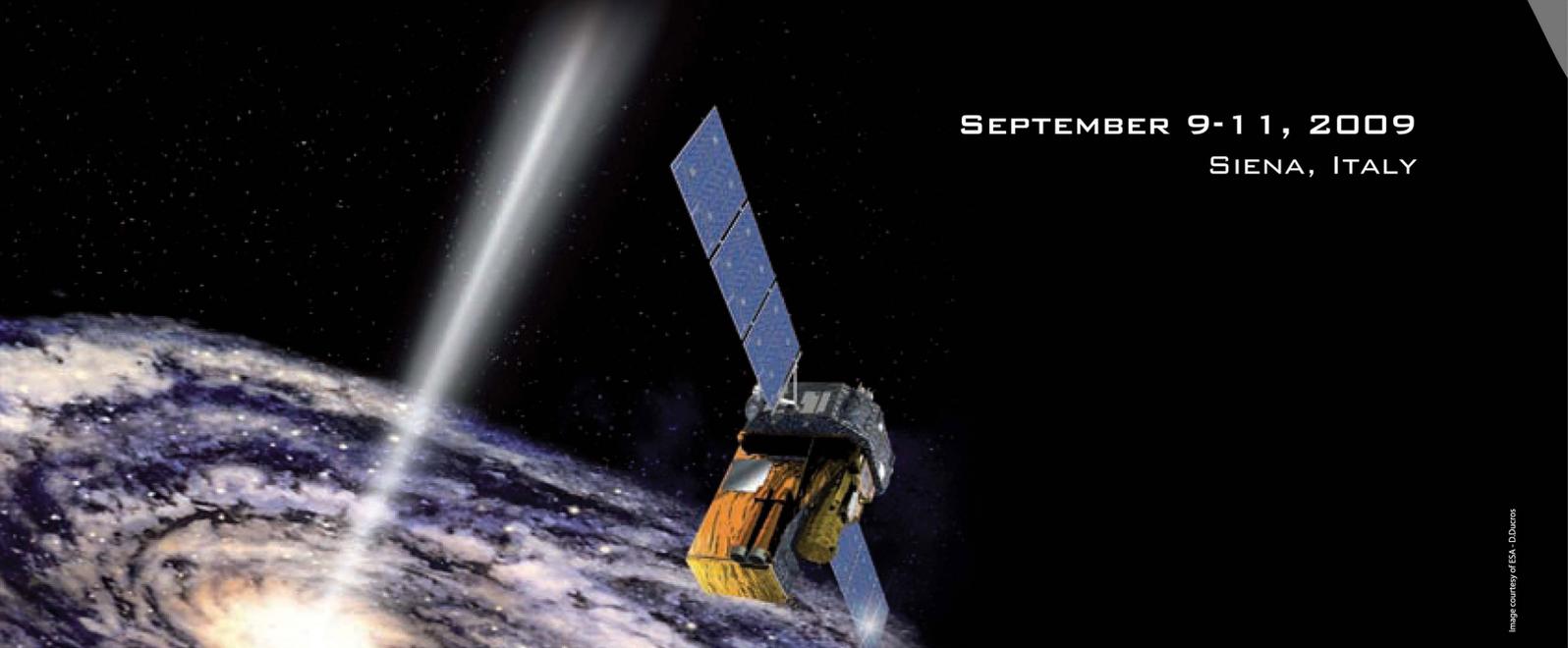
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ISWCS'09&IWSSC'09 Program Index

ISWCS'09

2009 6th International Symposium on Wireless Communication Systems

September 07-10, 2009

Conference Joint Program

Siena- Tuscany, University of Siena

Financial Co- Sponsorship by IEEE Vehicular Technology Society
**Technical Co- Sponsorship by IEEE Communications Society**

ISWCS'09 Welcome Message from the General Chairs

Giovanni Giambene

Yuming Jiang

On behalf of the ISWCS'09 Organizing Committee, it is our great pleasure to welcome you to Siena, Italy and to the International Symposium on Wireless Communication Systems 2009 (September 7-10, 2009) that this year includes also the International Workshop on Satellite and Space Communications (IWSSC'09, September 9-11, 2009). These two events are co-located, but have separate registrations.

ISWCS'09 is the 6th event in the series, following the success of ISWCS'04 in Mauritius, ISWCS'05 in Siena, ISWCS'06 in Valencia, ISWCS'07 in Trondheim and ISWCS'08 in Reykjavik. This year, we are happy to host the conference again in Siena.

The scope of ISWCS includes a wide range of technical challenges in view of the growing interest for wireless access to Internet, the evolution of future wireless communications with access across hybrid platforms, the implementation of cross-layer design for improving the efficiency and performance of the air interface.

ISWCS'09 is a platform for leading wireless communication researchers and technologists to present new ideas and contributions in the form of technical papers, panel discussions as well as test-bed implementations and real-world evaluation of ideas in wireless communications. As a part of the main ISWCS'09 event, the workshop on satellite communications (IWSSC'09) will be an important opportunity to focus on state-of-the-art research on this field. A joint exhibition area has been also organized with the support of sponsors on wireless and satellite communications.

The total number of submissions for the joint event (ISWCS and IWSSC 2009) is more than 365, based on which a high quality technical program has been produced. The submitted papers are from different regions around the world as follows: 79% from Europe, Mid-East and Africa, 16% from Asia, 3% from Latin America, and 2% from North America. These numbers indicate that ISWCS is on the right path to greater success in the future. Another such indication is that a special issue on ISWCS'09 will be published by Springer Mobile Networks and Applications (MONET) journal. Moreover, ISWCS'09 has obtained the IEEE Vehicular Technology Society sponsorship and the technical co-sponsorship of the IEEE Communication Society.

Siena is a medieval city, rich of history and beautiful landscapes, and world-renown for its wines and its Palio horse race held every year on July 2 and August 16. We hope you take advantage of the local hospitality, meet and learn from your colleagues, enjoy the conference, and visit such a beautiful city that attracts visitors and tourists from everywhere.

The organizers would like to thank Ing. Paolo Chini, Publication Chair, Ing. Ciro Guariglia, Web Chair, and CNIT for their valuable work.

Finally, a special thank to all the sponsors for their support and to the Provincia di Siena and the Regione Toscana for their involvement.

We are very pleased to invite you to attend ISWCS'09, and looking forward to meeting you in Siena.

Giovanni Giambene
General Chair
Dipartimento di Ingegneria
dell'Informazione
University of Siena, Italy

Yuming Jiang
General Co-Chair
Norwegian University
of Science and Technology
(NTNU), Norway

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ISWCS'09 Welcome Message from the Technical Program Chairs

Rajeev Shorey

Falko Dressler

Archan Misra

Welcome to the 6th IEEE International Symposium on Wireless Communication Systems 2009 (ISWCS'09) being held in Siena-Tuscany, University of Siena, Italy.

The objective of this symposium is to provide a forum for researchers and technologists to present new ideas and contributions in the form of technical papers, panel discussions as well as real-world evaluation of ideas in wireless communications and networking employed to support the needs of the Information Society. This sixth symposium, intends to bring together various wireless communication systems developers to discuss the current status, technical challenges, standards, fundamental issues, and future services and applications. ISWCS'09 seeks to address and capture highly-innovative and state-of-the-art research from the wireless industry as well as standardization advances. The scope of the conference includes a wide range of technical challenges encompassing wireless communications, quality of service support, wireless networking, cross-layer air interface design for improved performance, wireless broadband access, and cooperative networking.

ISWCS'09 has been organized to provide a high-quality program composed of a highly competitive selection of contributed papers, a very limited set of invited papers on important and timely topics from well-known leaders in the field, and a poster session that is both informative and interesting for the participants. The program also contains a set of plenary talks, addressing various facets of next-generation networking and communications, by a set of globally renowned technical experts.

We would like to acknowledge and thank our TPC members for their hard work and their extraordinary dedication in providing detailed reviews and informative discussions within a very tight timeline. Thanks also to the organizing committee and the authors who submitted a large number of high-quality and thought-provoking papers, which has resulted in an impressive technical program that we believe will spark interesting discussions and promote new areas of research. Our special thanks go to Dr. Giovanni Giambene, the General Chair of the conference. His dedication to the conference set an example for us to follow and made it a pleasure to work with him on such a considerable project.

The response to the call for papers was very positive, thanks to a highly successful publicity phase. We received a total of 233 submissions, in line with the submission rates of past years for ISWCS. These papers covered diverse topics, including, as illustrative examples aspects of wireless sensor networks, high-bandwidth coding and modulation schemes for wireless networks, multimedia communication architectures and cellular and ad hoc network protocols.

The selection of papers for this year's program was carried out by a technical program committee of 67 members. After an early reject phase by the TPC Co-chairs, which quickly rejected approximately 10 papers for being out of scope or inadequate quality, the Technical Program Committee reviewed the papers over a one-month period. Each paper was reviewed by at least three experts who provided independent reviews; in some cases we solicited an additional review to address some discrepancies or obtain feedback on specific issues.

As a result of the review process, 100 regular papers were accepted for presentation at the conference, which corresponds to an acceptance rate of 43 % (typical of high-quality networking conferences). Several high quality papers were recommended for the poster session. We accepted 39 papers as poster papers in ISWCS'09. The papers have been organized into 28 technical sessions across four tracks and additional two poster sessions spanning the three days of the conference.

It is our pleasure to welcome you to ISWCS'09 in Siena. We hope you enjoy the technical program that we have put together for you and that you take advantage of the excellent group of people that have come together for the conference. Some of the best opportunities come from the technical discussions and the chance to exchange ideas with other researchers and practitioners. We look forward to your continued participation in future ISWCS conferences as authors, attendees, sponsors, or members of the Organizing or Program committees.

Rajeev Shorey	Falko Dressler	Archan Misra
Technical Program Chair	*Technical Program co-Chair*	*Technical Program co-Chair*
GM Research	University of Erlangen	Telcordia Research
Bangalore, India	Germany	USA

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Programme- at- a- glance Scheme for ISWCS'09 & IWSSC 2009 – Faculty of Engineering, ground level and first floor

September 7, 2009

9:00-9:45	**ISWCS'09 Registration (ground level)**	
9:45-10:00	ISWCS'09 Tutorial Chair Introduction (Room A+B)	
10:00-10:30	ISWCS'09 T1 tutorial (Room A+B)	ISWCS'09 T2 tutorial (Room E)
10:30-11:00		
11:00-11:30		
11:30-12:00	**Break**	
12:00-12:30	ISWCS'09 T1 tutorial (Room A+B)	ISWCS'09 T2 tutorial (Room E)
12:30-13:00		
13:00-13:30	**Light lunch and Coffee Break (ground level)**	
13:30-14:00		
14:00-14:30		
14:30-15:00	ISWCS'09 T3 tutorial (Room A+B)	ISWCS'09 T4 tutorial (Room E)
15:00-15:30		
15:30-16:00		
16:00-16:30	**Break**	
16:30-17:00	ISWCS'09 T3 tutorial (Room A+B)	ISWCS'09 T4 tutorial (Room E)
17:00-17:30		
19:00-	**WELCOME party with wine tasting "Enoteca" in Siena city centre**	

Room 15 available for Internet access with fixed PCs and rehearsal room

September 8, 2009

Time				
8:30-9:00	ISWCS'09 Registration (ground level)			
9:00-9:30	Opening ceremony (Room A+B)			
9:30-10:00	Plenary talk by Giridhar D. Mandyam (Qualcomm, USA) (Room A+B)			
10:00-10:30				
10:30-11:00	Coffee break (ground level & EXPO area)			
11:00-11:30	WSN1 (Room A+B)	MIMO1 (Room E)	RES1 (Room 4)	RFID (Room 18)
11:30-12:00				
12:00-12:30				
12:30-13:00	Lunch (1st floor, in the court)			
13:00-13:30				
13:30-14:00				
14:00-14:30	WMN (Room A+B)	MIMO2 (Room E)	RES2 (Room 4)	COG (Room 18)
14:30-15:00				
15:00-15:30				
15:30-16:00	Coffee break			
16:00-16:30	WSN2 (Room A+B)	MIMO-QoS (Room E)	RES3 (Room 4)	QoS (Room 18)
16:30-17:00				
17:00-17:30				

Room 15 available for Internet access with fixed PCs and rehearsal room

September 9, 2009

Time	ISWCS'09 Program					IWSSC'09 Program
8:30-9:00	**ISWCS'09 Registration (ground level)**					
9:00-9:30	Plenary talks by Krishan Sabnani (Bell Labs, USA) and Henry Tirri (Nokia Research Center, USA) (Room A+B)					
9:30-10:00						
10:00-10:30						
10:30-11:00	**Coffee break (ground level & EXPO area)**					
11:00-11:30	COD1 (Room A+B)	MANET1 (Room E)	WiMAX (Room 4)	HYBRID (Room 18)		**IWSSC'09 Registration (ground level)**
11:30-12:00						IWSSC Tutorial Chair Introduction (Room 13)
12:00-12:30						
12:30-13:00	**Lunch (1st floor, in the court)**					IWSSC'09 T1 tutorial (Room 13) / IWSSC'09 T2 tutorial (Room 14)
13:00-13:45						
13:45-14:00						
14:00-14:30	Transmission of correlated sources in distributed radio systems (Room A+B)	MANET2 (Room E)	ARCH1 (Room 4)	COD2 (Room 18)		
14:30-15:00						
15:00-15:30						
15:30-16:00	**1st ISWCS'09 Poster Session & Coffee break (ground level & EXPO area)**					**Coffee break (ground level & EXPO area)**
16:00-16:30						IWSSC'09 T3 tutorial (Room 13) / IWSSC'09 T4 tutorial (Room 14)
16:30-17:00	Panel Session "Wireless Future: Green and Cooperative Networking?" (Room A+B)					
17:00-17:30						
17:30-18:00						
18:00-18:30						**IWSSC'09 WELCOME in the Faculty rear panoramic patio (1st floor)**
18:30-19:00						
19:30-	**Transfer by bus and ISWCS'09 Banquet in "Certosa di Pontignano"**					

Room 15 available for Internet access with fixed PCs and rehearsal room

September 10, 2009

Time	Left Program			Right Program			
8:30-9:00	**IWSSC 2009 Registration (ground level)**			**ISWCS'09 Registration (ground level)**			
9:00-9:30	**Opening ceremony (Room A+B)**			WSN3 (Room 4)	MIMO-APP (Room 13)	ACC1 (Room 14)	COD3 (Room 20)
9:30-10:00	Keynote talk by Sastri Kota (Harris Corp., USA) (Room A+B)						
10:00-10:30							
10:30-11:00	Plenary talk by Fabio Valle (Eutelsat, France) (Room A+B)			Plenary talk by Roberto Borri (CSP-Innovazione nelle ICT, Italy) (Room 4)			
11:00-11:30	**Coffee break (ground level & EXPO area)**			**2nd ISWCS'09 Poster Session & Coffee break (ground level & EXPO area)**			
11:30-12:00	S-COD1 (*PhD Session*) (Room A+B)	S-NET1 (*Regular Session*) (Room E)	S-BSM (*Special Session*) (Room 18)	ARCH2 (Room 4)	MIMO3 (Room 13)	ACC2 (Room 14)	COD4 (Room 20)
12:00-12:30							
12:30-13:00							
13:00-13:30	**Lunch (1st floor, in the court)**			**ISWCS'09 Best Paper Award and Closing Ceremony (Room 4)**			
13:30-14:00							
14:00-14:30							
14:30-15:00	S-COD2 (*Regular Session*) (Room A+B)	S-ISICOM (*Special Session*) (Room E)	S-SEC (*Special Session*) (Room 18)				
15:00-15:30							
15:30-16:00							
16:00-16:30	**Coffee break (ground level & EXPO area)**						
16:30-17:00	Panel Session "Key R&D Directions for Satellite Communications & Networking 2020" (Room A+B)						
17:00-17:30							
17:30-18:00							
18:00-18:30							
19:30 -	**Transfer by bus and IWSSC 2009 Banquet in Monteriggioni Castle, "Piccolo Castello" restaurant**						

Room 15 available for Internet access with fixed PCs and rehearsal room

September 11, 2009

Time			
8:30-9:00	**IWSSC'09 Registration (ground level)**		
9:00-9:30	Plenary talk by Nicolas Chuberre (Thales Alenia Space, France) (Room A+B)		
9:30-10:00			
10:00-10:30	**A3: IWSSC'09 Poster Session & Coffee break** **(ground level & EXPO area)**		
10:30-11:00			
11:00-11:30	S-RRM1 (*PhD Session*) (Room A+B)	S-NET2 (*PhD Session*) (Room E)	S-PLA (*Special Session*) (Room 4)
11:30-12:00			
12:00-12:30			
12:30-13:00	**Lunch (1st floor, in the court)**		
13:00-13:30			
13:30-14:00	S-RRM2 (*Regular Session*) (Room A+B)	S-TRA1 (*Regular Session*) (Room E)	S-DTN (*Regular Session*) (Room 4)
14:00-14:30			
14:30-15:00			
15:00-15:30	**Coffee break (ground level & EXPO area)**		
15:30-16:00	S-HYBR (*Special Session*) (Room A+B)	S-TRA2 (*PhD Session*) (Room E)	S-APP (*Regular Session*) (Room 4)
16:00-16:30			
16:30-17:00			
17:00-17:30	**IWSSC 2009 Best Paper Award and Closing Ceremony (Room A+B)**		

Room 15 available for Internet access with fixed PCs and rehearsal room

ISWCS'09 Plenary Talk

September 8, 2009, 9:30 – 10:30, Room A+B

Dr. Giridhar D. Mandyam, Vice President of Technology, Qualcomm Internet Services

Enhancing Mobile Web Service Delivery over Wide Area Networks

Abstract: Innovations in access technologies for cellular systems have now resulted in sufficient data capacity for generic mobile web services. However, increasing uptake of smart phones has lead to greater usage of the mobile browser to retrieve and render content that was previously accessed in a desktop environment. As a result, problems that plagued mobile web service delivery at the beginning of the decade are still resulting in an unsatisfactory user experience today. In this talk, two of these problems are considered – latency, and power consumption. The use of a handset-based web proxy as the primary technology enabler for addressing these two issues is examined as well.

Biography: Dr. Giridhar D. Mandyam is Vice President of Technology, Qualcomm Internet Services, San Diego, California. Born in Dallas, Texas, Dr. Mandyam received the BSEE degree (Magna Cum Laude) from Southern Methodist University in 1989, the MSEE degree from the University of Southern California in 1993, and the PhD EE degree from the University of New Mexico in 1996. At SMU he was a University Scholar and Hyer Society Scholar. While at USC he was a Teaching Assistant in the Signal and Image Processing Institute, and at UNM he studied under a NASA Fellowship. From 1989 to 1994, Dr. Mandyam held positions with Rockwell International and Qualcomm Inc. He worked at Texas Instruments from 1996 – 1998, and at Nokia from 1998 – 2006. While at Nokia, he held a number of research and management positions, including Head of the Nokia Research Center cite in San Diego, and Chief Technologist for North America. Dr. Mandyam is inventor or co-inventor of sixteen issued patents. He has also published over 70 conference and journal papers, and 4 book chapters. He is a co-author of the text Third-Generation CDMA Systems for Enhanced Data Services (Academic Press, 2002). He is presently a member of the editorial board of the IEEE Transactions on Wireless Communications. Dr. Mandyam is a Senior Member of the IEEE.

ISWCS'09 Plenary Talk

September 9, 2009, 9:00–10:30, Room A+B

Dr. Krishan Sabnani, Vice President of Networking Research, Bell Labs

Next-generation Networking Technologies from Bell Labs

Abstract: *The telecom industry has an aspiration of moving to an Internet core for all of its services. Even cellular networks, with billions of end points, are moving to an Internet core. This poses a number of challenges, especially with ever-increasing content traffic. This talk will present these challenges and some efforts at Bell Labs to deal with them. Some of these challenges are issues with Mobile IP, increased complexity of routers, and the need to deal with increasing opex expenses. Here are some solutions Bell labs is working on to enable migration of telecom networks to an Internet core.*

- *Making Mobility a core part of the Internet: Mobile IP is a patch on the original IP design. Traffic sent to a mobile client is first sent to a home agent, which in turn tunnels it to the client in its current location. This design should be fixed to avoid triangulation. Bell Labs has designed a new protocol to deal with this issue. In our new approach, a mobile host gets an address locally (using a lightweight DHCP). Then this address, along with the host's unique ID, gets advertised on the network.*
- *Router designs: The networking community is looking at approaches to open up routers so that third parties can add new features. Bell Labs has developed an approach called softrouter in which routers are disaggregated into simple forwarding elements and shared control elements. This approach enables the easy addition of new functions to the IP networks.*
- *Self-management: Opex is beginning to dominate the total cost of ownership of networks, resulting in a high cost of service to the end-user. This is getting worse with the deployment of femto cells in homes and increasingly complex services. To change this trend, we need extensive automation of the deployment, configuration and optimization of networks. Scalability requires decentralized solutions where discovery and network integration tasks are performed with locally available information under local control. This is in contrast to the mostly centralized network management systems used today. Bell Labs has an extensive program in this area. This research uses various mathematical approaches such as linear programming and genetic programming.*

Biography: Krishan Sabnani is Vice President of Networking Research at Bell Labs. He manages all networking research at Bell Labs, comprising nine departments in six countries: USA, France, Germany, UK, India, and Belgium. Krishan has conceived and launched numerous systems projects in the areas of internetworking and wireless networking.

Krishan received the 2005 IEEE Eric E. Sumner Award and the 2005 IEEE W. Wallace McDowell Award. He is a Bell Labs Fellow and a Fellow of the Institute of Electrical and Electronic Engineers (IEEE) and the Association of Computing Machinery (ACM). He received the Leonard G. Abraham Prize Paper Award from the IEEE Communications Society in 1991. Krishan received the 2005 Distinguished Alumni Award from Indian Institute of Technology (IIT), New Delhi, India. He also won the 2005 Thomas Alva Patent Award from the R&D Council of New Jersey. He holds 37 patents and has published more than 70 papers.

Krishan received his B. Tech. in electrical engineering from IIT Delhi in 1975, and a Ph.D. in electrical engineering from Columbia University, New York, in 1981. He joined Bell Labs in 1981.

September 9, 2009, 9:00–10:30, Room A+B

Dr. Henry Tirri, SVP, Head of Nokia Research Center, Nokia

Mobile Sensing for the Society - the Future of Context based services

Abstract: *With a myriad of ways to connect to other devices and networks, and an ever-growing number of built-in sensors, modern mobile phones are incredibly capable radio devices with a growing ability to detect their surroundings and full-blown computers at their core. A contemporary version of a watch, these devices are always with us, but unlike a passive watch, we frequently "activate" them to help us absorb and broadcast information. In addition, because of their incredible value these devices are in the hands of billions of people, not millions, and as a result almost half of humanity is connected in a pervasive way as never before in history. As a result of this connectivity and location-awareness, combined with your mobile device's ability to know you (who you are, where you've been, where you plan to go, who you know, your patterns of behavior, etc.), it can measure context information in ways that has not been possible ever before; not just any context but context of the life we live.*

Due to the pervasiveness of these mobile sensing computers, and the law of large numbers, we can collect context data on the macrotrends of society and build services that help us to tap into the pulse of the activities surrounding us (such as traffic, weather, shopping, diseases, environmental changes). The ability to do this will not only enrich our understanding of ourselves and the cultures we dwell in, but will also allow our mobile devices to move beyond mere "objects" and morph into deeply personal assistants that cease to be something we activate. They will transform into purveyors of incredibly valuable information and insights that blend seamlessly with our lives. In this talk we will discuss the technology development for mobile sensing, the emerging future services that will benefit from (and be built upon) these technologies, and the challenges and opportunities they present for us all.

Biography: Dr. Henry Tirri is SVP and Head of Nokia Research Center (NRC). Nokia Research Center drives breakthroughs that reach far into the future, enabling new business opportunities for Nokia. As Head of Nokia Research Center, Henry is responsible for labs worldwide that pursue disruptive innovation. NRC works closely with all Nokia operating units and promotes open innovation, working on research projects in collaboration with leading universities and research institutes around the world. Henry joined Nokia in 2004 as a Research Fellow in the Software and Applications Laboratory.

Henry holds a Ph.D. in Computer Science from the University of Helsinki, Finland. In addition to his Nokia role, he is also an Adjunct Professor of Computer Science at the University of Helsinki and an Adjunct Professor of Computational Engineering at the Helsinki University of Technology. He has extensive experience in running research activities in the fields of intelligent systems and networking and his personal research interests span artificial intelligence, information theory, search technologies and wireless sensor networks.

Before joining Nokia, Henry was a Professor of Computer Science and Head of the Graduate School and the Intelligent Systems Laboratory at the University of Helsinki, leading a large, world-class research group in probabilistic modeling. Previous positions include working as a Research Scientist at Microelectronics and Computer Technology Corporation (MCC), MTS at AT&T Bell Laboratories, Visiting Scientist at NASA AMES where he contributed to the Mars Rover technology for the 2003 mission.

In the academic world, Henry has been a Visiting Professor at Stanford University and the University of California at Berkeley. He was also Vice President of Scientific Operations and Co-Founder of Ekahau. He is the author and co-author of more than 175 academic papers in various fields of computer science, social sciences and statistics and holds five patents.

ISWCS'09 Plenary Talk

September 10, 2009, 10:30–11:00, Room 4

Dr. Roberto Borri, Vice Director and Director of Research and Development at CSP-Innovazione nelle ICT

CSP's Profile and its Research Activities in Wireless Technologies

Abstract: *CSP - Innovazione nelle ICT is a research body focused on experimental development and industrial research according to European R&D legislation. Its mission consists in applying scientific and technological research in order to develop the innovation potential locally as well as for business and Public Administrations. Focusing moreover on innovation and technology transfer working closely with local universities, CSP's mission is applied to different and original environments.*

- *Development of innovative programs and projects where Information and Communication Technologies are "applied" to practical use in Living Labs: real local users in real life environments together with researchers, firms and public institutions look together for new solutions, new products, new services or new business.*
- *Technology transfer for Public Administrations concerning emerging technologies and more recently digital convergence.*
- *Creating new stable relationships and synergy with the academic world for exchanging knowledge and mutual experience through setting up permanent, technological and application labs.*

CSP's R&D area investigates and studies basic, infrastructure and application technologies as well as the new processes made practicable by their use. It also acts as an incubator for "applying research" in the strict sense as, thanks to thematic labs, the scientific and technical bases of emerging technologies can be understood and practical activities can take place that are adapted to real scenarios based on current "case studies" and near future predictions. Management oversees the following three R&D areas.

- *Communication Networks area: it deals with the convergence of the next generation networks. Main topics are Ad-Hoc Networking, C2C/C2I Communication, Cognitive and Software Defined Radio, Broadband Wireless Access.*
- *User and Embedded Systems area: it deals with networks, architectures and applications for Digital Terrestrial Television (keyword are MHP/STB, DVB-T/H, HDTV, IPTV, P2P Broadcasting, Digital Radio Mondiale), and with "embedded systems", micro systems and user equipment belonging to the "consumer electronics" family (topics are Media Systems/Domo, Embedded and Micro Electro Mechanical System, PIC Systems, Digital Radio).*
- *Application-oriented Architectures and SW Platforms area: it deals with web technologies and IT security. Main topics are Human Computer Interface (i.e. Multi-touch and surface computing systems), Digital libraries, GRID, Application architectures and Watermarking techniques, Digital Identity, Digital Right Management systems.*

In particular, this talk will present an overview on main wireless technologies CSP in working on: Mesh networking, C2C/C2I, Cognitive Radio and SDR.

Biography: Roberto Borri is Vice Director and Director of Research and Development at CSP-Innovazione nelle ICT in Turin, Italy. He is designated representative of the Piedmont Regional Council on the CNID (Digital Italy National Committee), in the Workgroup for the Technical Area and Network Development. Roberto is also member of the Regional Workgroup for the Transition to Digital Terrestrial Television in Piedmont in the context of the 2007 Framework Agreement between the Piedmont Regional Council, the Ministry for Communications and the DTTV Association. Roberto received the Diploma in Information Science in 1977. Before joining CSP in 1999, he was technical manager for network operations for CSI-Piemonte and site manager of Cray system for Centro di Supercalcolo Piemonte in Turin. Previous positions include working as manager of LAN services and WAN connectivity IP/DECnet for CSI-Piemonte, and systems analyst and manager of the CAD/CAM laboratory at the Politecnico di Torino.

ISWCS'09 Tutorials

Tutorials organized by Andreas Kassler, Karlstad University, Sweden

September 7, 2009, 10:00 – 13:00, Room A+B

T1: "Mobility and Multiaccess in Emerging Internet Architectures"
by Kostas Pentikousis

Abstract: *This tutorial thoroughly reviews recent developments in mobility and multiaccess technologies. After motivating the need for novel mechanisms to meet the challenges from the emerging network environment, we introduce the long-awaited Media Independent Handover Services standard (IEEE 802.21) and present a blueprint for its implementa- tion in GNU/Linux. Finally, we introduce recent developments in the so-called clean-slate Internet architecture design space, presenting the new paradigms, and elaborating on their impact on mobility and multiaccess.*

Biography: Kostas Pentikousis is a Senior Research Scientist at VTT Technical Research Centre of Finland, the foremost multidisciplinary applied research organization in Northern Europe. He studied computer science at Aristotle University of Thessaloniki, Greece (BS 1996; summa cum laude) and the State University of New York at Stony Brook, USA (MS 2000, PhD 2004) and was an ERCIM Fellow in 2005. Kostas has been working in R&D positions since 1996 in both industry and academia, and has been involved in several contract and joint research projects, including Ambient Networks, WEIRD, 4WARD, and the Future Internet program of the Finnish Strategic Centre for Science, Technology and Innovation in the field of ICT (TIVIT). He serves as the General Chair of MONAMI 2009 and MediaWiN 2009 and as a member of the Technical Program Committees of various conferences. He reviews papers for journals and conferences on a regular basis, and is a member of IEEE, ACM, and TEK, the Finnish Association of Graduate Engineers. Dr. Pentikousis has published more than 70 peer-reviewed papers in several areas, including mobile computing, transport protocols, web and mobile applications, network traffic measurements and analysis, and simulation and modeling (see http://ipv6.willab.fi/kostas/). He recently presented tutorials at APNOMS 2005, ISCC 2006, MUM 2008, and ICN 2009. He is currently working on information-centric networking concepts and systems and is particularly interested in energy-efficient future Internet architectures designed for mobility and multiaccess.

September 7, 2009, 10:00 – 13:00, Room E

T2: "Robust Multiuser MIMO Transceiver Design Under Channel Uncertainty"
by Michael Botros Shenouda, Timothy N. Davidson, Lutz Lampe

Abstract: *Employing multiple antennas in multiuser communication systems has the potential to increasing the achieved data rates and improving the overall system performance. However, many of these potential gains depend on the amount of channel state information available (CSI) at both the transmitter and the receiver. In many systems, the CSI that is available at the transmitter suffers from inaccuracies that are caused by errors in channel estimation and/or limited, delayed or erroneous feedback, and the performance of many multiuser systems are particularly sensitive to uncertainties in the CSI. These uncertainties can result in multiuser systems that are dominated by interference, and hence in a significant degradation of the quality of service (QoS) offered to the users and their data rates. Due to the inevitability of imperfect CSI, robust communication schemes that take into account the channel uncertainty are of interest in practice. The goal of the tutorial is to provide a unified exposition of the theoretical results regarding efficient design of multiuser systems that explicitly take into account these uncertainties. This unification is provided through the theories of robust and convex optimization. It will be demonstrated that by incorporating robustness in the design one can significantly reduce the sensitivity of multiuser systems to channel uncertainties and mitigate their deleterious effects.*

Biographies: Michael Botros Shenouda received the B.Sc. (Hons. 1) degree and the M.Sc. degree in Electrical Engineering from Cairo University in 2001 and 2003, respectively. He received the Ph.D. degree from McMaster University, Canada in 2008. His main areas of interest include wireless and MIMO communication, robust and convex

optimization, and signal processing algorithms. He is also interested in majorization theory and its application in the unification of designs for non-linear MIMO transceivers. Mr. Botros Shenouda was awarded an IEEE Best Student Paper Award at ICASSP 2006, and was also a finalist in the IEEE Best Student Paper competition at ICASSP 2007. He was the recipient of two provincial scholarships during his PhD degree. Dr. Botros Shenouda has also received the National Science and Engineering Council of Canada (NSERC) Postdoctoral Fellowship, and he holds Killam Postdoctoral Fellowship at the University of British Columbia.

Tim Davidson received the B.Eng. (Hons. I) degree in Electronic Engineering from the University of Western Australia (UWA), Perth, in 1991 and the D.Phil. degree in Engineering Science from the University of Oxford, U.K., in 1995. He is currently an Associate Professor in the Department of Electrical and Computer Engineering at McMaster University, Hamilton, Ontario, Canada, where he holds the (Tier II) Canada Research Chair in Communication Systems, and is currently serving as Acting Director of the School of Computational Engineering and Science. He is also a Registered Professional Engineer in the Province of Ontario. Dr. Davidson's research interests lie in the general areas of communications, signal processing and control. He has held research positions at the Communications Research Laboratory at McMaster University, the Adaptive Signal Processing Laboratory at UWA, and the Australian Telecommunications Research Institute at Curtin University of Technology, Perth, Western Australia. Dr. Davidson was awarded the 1991 J. A. Wood Memorial Prize (for "the most outstanding [UWA] graduand" in the pure and applied sciences) and the 1991 Rhodes scholarship for Western Australia. He is currently serving as an Associate Editor of the IEEE Transactions on Signal Processing and as an Editor of the IEEE Transactions on Wireless Communications. He has also served as an Associate Editor of the IEEE Transactions on Circuits and Systems II, and as a Guest Co-editor of issues of the IEEE Journal on Selected Areas in Communications and the IEEE Journal on Selected Topics in Signal Processing.

Lutz Lampe (S'98, M'02, SM' 08) received the Diplom (Univ.) and the Ph.D. degrees in electrical engineering from the University of Erlangen, Germany, in 1998 and 2002, respectively. Since 2003 he has been with the Department of Electrical and Computer Engineering at the University of British Columbia, where he is currently an Associate Professor. His main research interests lie in the areas of communications and information theory applied to wireless and power-line transmission. Dr. Lampe has been awarded a UBC Killam Research Prize in 2008. He is co-recipient of the Eurasip Signal Processing Journal Best Paper Award 2005, the Best Paper Award at the IEEE International Conference on Ultra-Wideband (ICUWB) 2006, and the Best Student Paper Awards at the European Wireless Conference 2000 and at the International Zurich Seminar 2002. In 2003, he received the Dissertation Award of the German Society of Information Techniques (ITG). Dr. Lampe is an Editor for the IEEE Transactions on Wireless Communications and the International Journal on Electronics and Communications (AEUE). He has served as an Associate Editor for the IEEE Transactions on Vehicular Technology from April 2004 to June 2008. He was Guest-Editor for the EURASIP Journal on Advances in Signal Processing Special Issue on Power Line Communications (vol. 2007) and ELSEVIER Physical Communication Journal Special Issue on Advances in Ultra-Wideband Wireless Communications (publication in September 2009). He serves as Vice-Chair of the IEEE Communications Society Technical Committee on Power Line Communications and as Sectetary of the IEEE Communications Society Communication Theory Technical Committee. He was General Chair of the 2005 International Symposium on Power Line Communications and Its Applications (ISPLC 2005), TPC Co-Chair of the Communication Theory Symposium of the 2009 IEEE International Conference on Communications (ICC 2009) , the General Symposium of the 2006 IEEE Global Telecommunications Conference (Globecom 2006) , the MIMO Symposium of the 2006 International Wireless Communications and Mobile Computing Conference (IWCMC 2006), and the 2007 IEEE International Symposium on Power Line Communications and Its Applications (ISPLC 2007). He has been a TPC member for numerous international conferences. He currently is the General Chair of the 2009 IEEE International Conference on Ultra-Wideband (ICUWB 2009) in Vancouver, Canada. Dr. Lampe is a Senior Member of the IEEE, a member of the German Association of Electrical Engineers (VDE) and of the Association of Professional Engineers and Geoscientists of BC (APEGBC).

September 7, 2009, 14:30 – 17:30, Room A+B

T3: "Cognitive Radios and Wireless Networks"
by Petri Mähönen, Marina Petrova

Abstract: *This tutorial starts by giving a brief historical background on the cognitive radios. We describe what is meant by spectrum agile radios and by full cognitive radios ("Mitola Radios"). We explain the difference between spectrum agile (DSA) and full context - sensitive cognitive radios. The tutorial also explains some of the recent results that have been derived from recent measurement campaigns by the tutorial speakers and others.*
From cognitive radios we then move on to basic concepts of cognitive wireless networks. The emphasis will

be on covering recent research results and remaining key research challenges towards creation of such networks. We cover briefly game theory and other classical approaches, but our focus here will be on the use of metaheuristics and machine learning algorithms for full cross - layer and network wide optimization. We shall also discuss in some detail applications of topology and geometry information in the optimization process. As a part of the discussion, a brief introduction to modern spatial statistics techniques will be provided.

The tutorial is emphasizing architectural concepts and emerging new methodologies. The tutorial also provides attendees with knowledge of the most important concepts and open research questions in this emerging field. As such it is also suited for beginning graduate students.

Biographies: Petri Mähönen is currently a full professor and holds Ericsson Chair of Wireless Networks at the RWTH Aachen University in Germany. He has studied and worked in the United States, United Kingdom and Scandinavia. Before joining to RWTH Aachen in 2002, he was a research director and professor at the Centre for Wireless Communications and the University of Oulu, Finland. He has been a principal investigator in several international research projects, including initiating and leading several large European Union research projects. Dr. Mähönen has published ca. 200 papers in international journals and conferences and has been invited to deliver research talks at many universities, companies and conferences. He is a senior member of IEEE and ACM, and fellow of RAS. He is inventor or co‐inventor for over 20 patents or patent applications. He has been particularly active in cognitive wireless network research and has been serving in different roles in relevant cognitive communications domain conferences, such as DySPAN, CogNet and CrownCom. He is serving as co‐chair for DySPAN 2010 TPC. He has been also guest‐editor for several special issues in the field. He is currently also a research area coordinator and one of the principal investigators for a newly formed Ultra High Speed Mobile Information and Communication (UMIC) research cluster at RWTH, which is one of the German national excellence clusters supported by the Federal Government of Germany. One of the key‐research domains in UMIC cluster is also cognitive radio network technologies.

Marina Petrova works as a chief research scientist at the Department of Wireless Networks at the RWTH Aachen University. She graduated in Electronics and Telecommunications engineering from the University of St. Cyril and Methodius, Skopje, Macedonia. Her research interests are focused on cognitive wireless networks, cognitive radios and adaptive wireless systems technologies. The topic of her Ph.D. thesis work at the RWTH Aachen has been also the multi‐parameter optimization methods for cognitive radio networks. As part of her research work she has participated in the several international cooperative projects and industry projects in the field of wireless communications and cognitive radios. In Aachen she has also lead the research work that has been done towards the prototype implementation of gnu Radio based cognitive resource manager for cognitive radios. She has also served in technical program and organizing committees of conferences, among those IEEE DySPAN, IEEE Crowncom, the leading conferences in the field of cognitive radios and networks.

September 7, 2009, 14:30 – 17:30, Room E

T4: "Biologically-Inspired and Nano-scale Communication and Networking"
by Ozgur B. Akan, Falko Dressler

Abstract: *The developments in communication technologies have yielded many existing and envisioned information network architectures such as cognitive radio networks, sensor and actor networks, quantum communication networks, terrestrial next generation Internet, and InterPlaNetary Internet. However, there exist many common significant challenges to be addressed for the practical realization of these current and envisioned networking paradigms such as the increased complexity with large scale networks, their dynamic nature, resource constraints, heterogeneous architectures, absence or impracticality of centralized control and infrastructure, need for survivability, and unattended resolution of potential failures. These challenges have been successfully dealt with by Nature, which, as a result of millions of years of evolution, have yielded many biological systems and processes with intrinsic appealing characteristics such as adaptivity to varying environmental conditions, inherent resiliency to failures and damages, successful and collaborative operation on the basis of a limited set of rules and with global intelligence which is larger than superposition of individuals, self-organization, survivability, and evolvability. Inspired by these characteristics, many researchers are currently engaged in developing innovative design paradigms to address the networking challenges of existing and envisioned information systems. In this paper, the current state-of-the-art in bio-inspired networking is captured. The existing bio-inspired networking and*

communication protocols and algorithms devised by looking at biology as a source of inspiration, and by mimicking the laws and dynamics governing these systems is presented along with open research issues for the bio-inspired networking. Furthermore, the domain of bio-inspired networking is linked to the forthcoming research domain of nanonetworks, which bring a set of unique challenges. The objective of this tutorial is to provide better understanding of the potentials for bio-inspired and nano-scale networking, and to motivate research community to further explore this timely and exciting field.

Biographies: Ozgur B. Akan received the BS and MS degrees in electrical and electronics engineering from Bilkent University and Middle East Technical University, Ankara, Turkey, in June 1999 and January 2002, respectively. He received the PhD degree in electrical and computer engineering from the Broadband and Wireless Networking Laboratory, School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, in May 2004. He is currently Associate Professor with the Department of Electrical and Electronics Engineering, Middle East Technical University and the Director of Next generation Wireless Communications Laboratory (NWCL). His current research interests are in next-generation wireless networks, biologically-inspired communications, nano-scale and molecular communications, network information theory. Dr. Akan is an Associate Editor for IEEE Transactions on Vehicular Technology and Editor for ACM/Springer Wireless Networks (WINET) Journal. He served as an Area Editor for AD HOC Networks Journal (Elsevier) (between 2004-2008), as a Guest Editor for several special issues. He has served as the General Co-Chair for The Third International Conference on Bio- Inspired Models of Network, Information, and Computing Systems (ICST/IEEE BIONETICS 2008), the European Vice Chair for The Second International Conference on Nano-Networks (ICST/ACM Nano-Net 2007), an International Vice Chair for IEEE INFOCOM 2006, and in organizing committees and technical program committees of many other international conferences on communications and networking. He is the Publications Committee Vice Chair for ICST an IEEE Senior Member (Communications Society). Dr. Akan received the IBM Faculty Award 2008, Turkish Academy of Sciences Distinguished Young Scientist Award 2008 (TUBA-GEBIP), the 2006 Parlar Foundation Research Encouragement Award for his research in bio-inspired communication techniques for wireless communication networks, the 2006 Editor of the Year Award from AD HOC Networks (Elsevier) Journal, the Best Paper Award in IEEE ISCN 2006, the TUBITAK-Career Award in 2005, and the 2003 Researcher of the Year Award in Broadband and Wireless Networking Laboratory, School of Electrical and Computer Engineering, Georgia Institute of Technology.

Falko Dressler is an assistant professor leading the Autonomic Networking Group at the Department of Computer Sciences, University of Erlangen. He teaches on self-organizing sensor and actor networks, network security, and communication systems. Dr. Dressler received his M.Sc. and Ph.D. degree from the Dept. of Computer Sciences, University of Erlangen in 1998 and 2003, respectively. In 2003, he joined the Computer Networks and Internet group at the Wilhelm-Schickard-Institute for Computer Science, University of Tuebingen. Since 2004, he is with the Computer Networks and Communication Systems group at the Department of Computer Sciences, University of Erlangen. Dr. Dressler is an Editor for the Elsevier Ad Hoc Networks journal, the ACM/Springer Wireless Networks (WINET) journal, and the Journal of Autonomic and Trusted Computing (JoATC). He was guest editor of special issues on self-organization, autonomic networking, and bio-inspired computing and communication for IEEE Journal on Selected Areas in Communications (JSAC), Elsevier Ad Hoc Networks, and Springer Transactions on Computational Systems Biology (TCSB). Dr. Dressler was general chair of the 2nd IEEE/ACM International Conference on Bio-Inspired Models of Network, Information, and Computing Systems (BIONETICS 2007). Besides chairing a number of workshops associated to high-level conferences, he regularly acts in the TPC of conferences such as IEEE INFOCOM, IEEE ICC, IEEE Globecom, IEEE MASS, IFIP Networking and others. Dr. Dressler published two books including Self-Organization in Sensor and Actor Networks, published by Wiley in 2007. Dr. Dressler is Senior Member of the IEEE (Communications Society, Computer Society, Vehicular Technology Society), member of ACM (SIGMOBILE) and GI (KuVS, Real-time). He is actively participating in several working groups of the IETF. His research activities are focused on (but not limited to) Autonomic Networking addressing issues in Wireless Ad Hoc and Sensor Networks, Vehicular Communication, Self-Organization, Bio-inspired Mechanisms, and Adaptive Network Monitoring and Security Techniques.

ISWCS'09 Panel Session

September 9, 2009, 16:30 – 18:30, Room A+B

Title: "Wireless Future: Green and Cooperative Networking?"

Abstract: The cooperative principle is expected to be effective in having wireless users more satisfyingly achieve their communication goals. Different layers are anticipated to benefit from its strength, from the low physical and network levels, up to the service level, where novel, exciting applications such as IP-TV are rousing. This trend is paralleled by an increased consciousness that wireless devices (from end-user handsets to wireless routers) have to be designed paying a specific attention to environmental efficiency: again, this translates into smart power management solutions at RF level, but also in skillful algorithm design, carefully tailored communication protocols, lightweight and distributed databases. The invited experts will provide the audience with sharp, brief presentations reflecting their ideas on such topics, and will interact answering the questions raised by the floor. A specific attention will be devoted to the industry and European Commission viewpoints on the subjects the panel is centered upon.

Panel Participants:

- Prof. Maria Luisa Merani – *Panel Chair and organizer*
  University of Modena and Reggio Emilia, Italy
- Prof. Vijay Bhargava – *Professor at the University of British Columbia, Canada*
  IEEE Fellow, Editor in Chief, IEEE Trans. On Wireless Communications
- Ing. Flavio Boano – *Head of Technical Innovation Solution & Marketing*
  Alcatel-Lucent Italia, Italy
  Dr. Giridhar Mandyam – *Vice President of Technology*
  Qualcomm Internet Services, USA
- Dr. Roberto Saracco – *Director of the Future Centre of Telecom Italia, Director of the Sister and Related Societies of ComSoc, Italy*
- Dr. Peter Stuckmann - *Project Officer with the European Commission, Directorate-General Information Society and Media, Belgium*
- Dr. Reinaldo Valenzuela – *Director of the Wireless Communications Research Dept.*
  Bell Labs, Lucent Technologies, USA

Panelists Biographies:

Maria Luisa Merani received her Ph.D. degree in electrical engineering from the University of Bologna, Italy, in 1992. In 1991 she spent one year at the Computer Science Department of the University of California in Los Angeles, CA, USA. She is currently an associate professor of Telecommunication Networks at the University of Modena and Reggio Emilia, Department of Information Engineering. She is an IEEE Senior member and has served as TPC and technical chair of several major communication conferences (IEEE ICC, IEEE Globecom, IEEE WCNC). At present she is involved in research on multicast video streaming over the wireless and wired Internet. She is currently an editor of the IEEE Transactions on Wireless Communications. In the 2009 fall, Cambridge University Press will publish her book: *"Hands on Networking: from theory to practice"*.

Vijay K. Bhargava received his Ph.D. degree from Queen's University, Kingston, Ontario in 1974. Vijay has held regular/visiting appointments at different universities worldwide and currently is a Professor in the Department of Electrical and Computer Engineering at the University of British Columbia. He was the Founder and President of *Binary Communications Inc.* (1983-2000). He is a co-author of *Digital Communications by Satellite* (Wiley 1981), a co-editor of *Reed Solomon Codes and their Applications* (IEEE Press 1994), a co-editor of *Communications, Information and Network Security* (Kluwer 2003) and a co-editor of *Cognitive Wireless Communications Networks* (Springer: 2007). Since January 2007, he is the Editor-in-Chief of the *IEEE Transactions on Wireless Communications*. A Fellow of the IEEE, the Engineering Institute of Canada (EIC), the Royal Society of Canada, and the Canadian Academy of Engineering, he has served as the President of the Information Theory Society. He is a past member of the Board of Governors of the IEEE Communications Society and the IEEE Information Theory Society.

Flavio Boano got his master degree in electrical engineering with TLC specialization on 1985 at Politecnico di Milano. In the same year he started his career at Telettra. In 1987 he joined the R&D labs of AT&T & Philips Telecommunications, where he lead a specific technology transfer project from the Corporate in the Nederlands (Hilversum) to the Italian subsidiary. In 1995, he joined Italtel as Commercial Bid Manager within the Mobile Radio System Division. In 1999 he took the role of Technical Sales Manager GSM/UMTS in the Mobile Networks Division of Siemens Informations & Communication Systems. Flavio Boano joined Alcatel Italia in 2001 with the role of UMTS Marketing & Sales Manager, having responsibilities to lead opportunities in the mobile markets both for GSM/EDGE/UMTS infrastructure and for applications.

Giridhar D. Mandyam is the Director of the Radio Systems Group in the Radio Communications Laboratory of Nokia Research Center (NRC), and also the head of NRC's San Diego, California division. He received the PhD EE degree from the University of New Mexico in 1996. From 1989 to 1994 Dr. Mandyam held positions with Rockwell International and Qualcomm Inc. In April 1996, he joined the Wireless Business Unit at Texas Instruments, Dallas, TX, to work primarily on CDMA chipsets. In September 1998, he joined Nokia Research Center (NRC) in Dallas as a Senior Research Engineer. He became Director of the Radio Systems group in NRC in July 2002, and then went on to become the first head of NRC's division in San Diego when it opened in August 2004. He has conducted research into standardization and implementation of 3G technologies such as cdma2000, WCDMA and Wi-MAX. He is the inventor or co-inventor of twelve issued US patents. He has also published over 50 conference and journal papers, and 4 book chapters. He is a co-author of the text *Third-Generation CDMA Systems for Enhanced Data Services* (Academic Press, 2002). He is a Senior Member of the IEEE.

Roberto Saracco is Director of the Future Centre in Venice and responsible for long-term research and scientific communications reporting directly to the Chief Technology Officer of Telecom Italia. In 2001 he became director of the Future Centre, a research centre focusing on the economic impact of innovations in the telecommunications area. During 1999 and 2000, Roberto proposed and delivered a World Bank project in the InfoDev framework to speed entrepreneurship in Latin American countries, and prior, 1999 and 2000, he proposed and carried out a World Bank project in the InfoDev framework to foster entrepreneurship in Latin America countries. He is a senior member of IEEE where he has held several leading roles. Currently he is the Director of the Sister and Related Societies of COMSOC, a member of the Strategic Board of IEEE, and VP of the Italian Telecommunication Association (AICT).

Peter Stuckmann is Project Officer with the European Commission, Directorate-General Information Society and Media, where he is managing the research cluster on Mobile and Wireless Communications as part of the European Research Programme FP7. Before his appointment at the European Commission in 2004 he has occupied several engineering and managerial positions both in industry and academia in the area of radio interface engineering. Dr Stuckmann is the author of the text book "The GSM Evolution", Wiley & Sons, 2002, 2 book contributions, more than 20 journal and conference publications and one patent. He is member of the IEEE and the German VDE/ITG. Dr Stuckmann holds engineering and doctoral degrees from RWTH Aachen University, Germany.

Reinaldo A. Valenzuela obtained his Bachelor of Science from University of Chile and his Ph.D. from the Imperial College of Science and Technology of the University of London, England. At Bell Laboratories, he carried out indoor microwave propagation measurements and developed statistical models. He also worked on packet reservation multiple access for wireless systems and optical WDM networks. He became Manager, Voice Research Dept., at Motorola Codex, involved in the implementation of integrated voice and data packet systems. On returning to Bell Laboratories he was involved in propagation measurements and ray tracing propagation prediction. He received the Distinguished Member of Technical Staff award and is Director of the Wireless Communications Research Department. He is currently engaged in MIMO/space time systems. He has published over one hundred papers and has twelve patents. He is a Fellow of the IEEE. He is an editor for the IEEE Transactions on Communications and the IEEE Transactions on Wireless Communications.

ISWCS'09 Detailed Technical Program

Tuesday, Sep 8

11:00 AM - 12:30 PM

WSN1: Wireless Sensor Networks 1

Room A+B, Chair: Falko Dressler (University of Erlangen, Germany)

Ultra-wide band sensor networks for tracking point scatterers or relays
Luca Reggiani (Politecnico di Milano, Italy); Mats Rydström (Chalmers University of Technology, Sweden); Gianluigi Tiberi (University of Pisa, Italy); Erik Ström (Chalmers University of Technology, Sweden); Agostino Monorchio (University of Pisa, Italy)

On Connectivity Analysis of Smart Antenna Capable Wireless Sensor Networks
Adnan Kavak (Kocaeli University, Turkey); Kerem Kucuk (Kocaeli University, Electronics-Computer Ed. Dept., Turkey)

Solar Powered Sensor Network Design and Experimentation
Daniela Krüger (University of Lübeck, Germany); Carsten Buschmann (University of Luebeck, Germany); Stefan Fischer (University of Luebeck, Germany)

MIMO1: MIMO 1

Room E, Chair: Archan Misra (Telcordia Technologies, USA)

Joint training interval length and power allocation optimization for MIMO flat fading channels
Imed Hadj-Kacem (ENIS, Tunisia); Noura Sellami (Institut Supérieur de l'Electronique et des Communications de Sfax, Tunisia); Inbar Fijalkow (ETIS, CNRS, ENSEA, Univ Cergy-Pontoise, France); Aline Roumy (INRIA Rennes, France)

Polarization Rotation Evaluation for Macrocell MIMO Channel
Lei Jiang (Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut, Germany); Lars Thiele (Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut, Germany); Volker Jungnickel (Fraunhofer Institut für Nachrichtentechnik (Heinrich-Hertz-Institut) Berlin, Germany)

Linear Precoding for Mutual Information Maximization in MIMO Systems
Meritxell Lamarca (Technical University of Catalonia, Spain)

An Error Propagation Prevention Method for MIMO-OFDM RLS-DDCE-Algorithms
Patric Beinschob (Helmut-Schmidt-Universität, Germany); Matthias Lieberei (Helmut-Schmidt-Universität, Germany); Udo Zölzer (Helmut-Schmidt-University / University of the Federal Armed Forces, Germany)

RFID: RFID Networks

Room 18, Chair: Constantinos Kolias (University of the Aegean, Greece)

A Secure and Efficient Authentication Protocol for Passive RFID Tags
Constantinos Kolias (University of the Aegean, Greece); Vasilis Kolias (National Technical University of Athens, Greece); Georgios Kambourakis (University of the Aegean, Greece)

Tag Movement Direction Estimation Methods in an RFID Gate System
Yoshinori Oikawa (NEC TOKIN Corporation, Japan)

Possible configurations and geometries of long range HF RFID antenna gates

Giuliano Benelli (Dipartimento di Ingegneria dell'Informazione, University of Siena, Italy); Stefano Parrino (University of Siena, Italy); Alessandro Pozzebon (University of Siena, Italy)

RES1: Radio Resource Management 1

Room 4, Chair: Rajeev Shorey (General Motors Research, India)

Error rate of low duty DS-IR over Selective Channels

Lorenzo Piazzo (Universita' di Roma "La Sapienza", Italy)

Power allocation for social benefit through price-taking behaviour on a CDMA reverse link shared by energy-constrained and energy-sufficient data terminals

Virgilio Rodriguez (RWTH Aachen, Germany); Friedrich Jondral (Communications Engineering Lab, University of Karlsruhe, Germany); Rudolf Mathar (RWTH Aachen University, Germany)

A Frame-Level Timing Acquisition Scheme of Ultra-wideband Signals Using Multi-templates

Wei Xu (Nankai University, P.R. China); Jiaxiang Zhao (Nankai University, P.R. China); Dong Wang (Nankai University, P.R. China)

Channel Partitioning and Relay Placement in Multi-hop Cellular Networks

Sultan Meko (Indian Institute of Technology - Bombay, India); Prasanna Chaporkar (IIT Bombay, India)

2:00 PM - 3:30 PM

WMN: Wireless Mesh Networks

Room A+B, Chair: Javier Gozalvez (Universidad Miguel Hernandez, Spain)

Routing Protocols for Mesh Networks with Mobility Support

Massimo Reineri (Politecnico di Torino, Italy); Claudio Casetti (Politecnico di Torino, Italy); Carla-Fabiana Chiasserini (Politecnico di Torino, Italy)

Wireless Sensor Network Wormhole Avoidance Using Disturbance-Based Routing Schemes

James Harbin (University of York, United Kingdom); Paul Mitchell (University of York, United Kingdom); David Pearce (University of York, United Kingdom)

Dynamic Association in IEEE 802.11 Based Wireless Mesh Networks

Hui Wang (National University of Singapore, Singapore); Lawrence Wai-Choong Wong (National University of Singapore, Singapore); Wee-Seng Soh (National University of Singapore, Singapore); Mehul Motani (National University of Singapore, Singapore)

MIMO2: MIMO 2

Room E, Chair: Rodrigo de Lamare (University of York, United Kingdom)

On the decoding of single delay STTC using filter bank based multicarrier modulation

Chrislin Lele (France Telecom R&D division, France); Le Ruyet Didier (Electronics and Communication Laboratory, France); Didier Le Ruyet (CNAM, France)

Codebook Design for Communication in Spread and Nonspread Space-Time Block Codes-based systems

Marko Beko (ISR-IST, Portugal, Portugal); João Xavier (I.S.T. - Technical U. Lisbon / I.S.R. Lisbon, Portugal); Victor Barroso (Instituto Superior Técnico, Portugal)

Preamble-based SNR Estimation Algorithm for Wireless MIMO OFDM Systems

>Milan Zivkovic (RWTH Aachen, Germany); Rudolf Mathar (RWTH Aachen University, Germany)

COG: Cognitive Radio

Room 18, Chair: Ozgur Akan (Middle East Technical University, Turkey)

Resource Allocation of Noncooperative Multi-cell for Cognitive Radio Networks

>Haijian ZHANG (CNAM, France); Didier Le Ruyet (CNAM, France); Daniel Roviras (Cnam, France); Hong Sun (Wuhan University, P.R. China)

Resource Planning in Cognitive Radio Networks

>Derya Cavdar (Boğaziçi University, Turkey); Huseyin Birkan Yilmaz (Bogazici University, Turkey); Tuna Tugcu (Bogazici University, Turkey); Fatih Alagoz (Bogazici University, Turkey)

Preliminary Experimental Results on the Spectrum Sensing Performances for UWB-Cognitive Radios for Detecting IEEE 802.11n Systems

>Sithamparanathan Kandeepan (Create-Net International Research Centre, Italy); Gianmarco Baldini (Joint Research Centre - European Commission, Italy); Radoslaw Piesiewicz (Create-Net, Italy)

RES2: Radio Resource Management 2

Room 4, Chair: Virgilio Rodriguez (RWTH Aachen, Germany)

On the Effective Adaptive Modulation Polices for Non-orthogonal Multicarrier Systems

>Adrian Kliks (Poznan University of Technology, Poland); Hanna Bogucka (Poznan University of Technology, Poland); Ivan Stupia (University of Pisa, Italy)

Achievable Rates in the SIMO-Uplink/MISO-Downlink of an FDD System with Imperfect CSI

>Mario Castaneda (Munich University of Technology, Germany); Anup Chathoth (Technische Universitaet Muenchen, Germany); Josef A. Nossek (Munich University of Technology, Germany)

Effective Spectral Efficiency for Adaptive QAM with Diversity and Pilot Assisted Channel Estimation

>Laura Toni (Italian Institute of Technology (IIT), Italy); Andrea Conti (ENDIF Univ. of Ferrara, WiLAB Univ. of Bologna, Italy); Flavio Zabini (University of Bologna, Italy); Oreste Andrisano (University of Bologna, Italy)

Optimization of link adaptation and HARQ schemes for multicast in high speed cellular networks

>Neila El Héni (Telecom Bretagne, France); Xavier Lagrange (TELECOM Bretagne, France); Patrick Maillé (Telecom Bretagne, France)

4:00 PM - 5:30 PM

WSN2: Wireless Sensor Networks 2

Room A+B, Chair: Rajeev Shorey (General Motors Research, India)

An Energy Efficient Target Tracking Scheme for Distributed Wireless Sensor Networks

>Hadi Jamali Rad (Iran University of Science and Technology, Iran); Bahman Abolhassani (Iran University of Science and Technology, Iran); Mohammad Abdizadeh (Sharif University of Technology, Iran)

Performance Evaluation of Intermittent Receiver-driven Data Transmission on Wireless Sensor Networks

Daichi Kominami (Osaka University, Japan); Masashi Sugano (Osaka Prefecture University, Japan); Murata Masayuki (Osaka University, Japan, Japan); Takaaki Hatauchi (Fuji Electric Advanced Technology, Japan); Yoshikazu Fukuyama (Fuji Electric Systems Co., Ltd., Japan)

Analytical Model of the LPL with Wake up after Transmissions MAC protocol for WSNs

Cristina Cano (Universitat Pompeu Fabra, Spain); Boris Bellalta (Universitat Pompeu Fabra, Spain); Jaume Barcelo (Universitat Pompeu Fabra, Spain); Miquel Oliver (Pompeu Fabra University, Spain); Anna Sfairopoulou (Universitat Pompeu Fabra, Spain)

MIMO-QoS: MIMO - Quality of Service

Room E, Chair: Giridhar Mandyam (Qualcomm, USA)

Look-ahead Sphere Decoding: Algorithm and Performance Evaluation

Micaela Troglia Gamba (Politecnico di Torino, Italy); Guido Masera (Politecnico di Torino, Italy)

Quasi-convex Designs of Max-min Linear BC Precoding with Outage QoS Constraints

Michael Shenouda (McMaster University, Canada); Lutz Lampe (University of British Columbia, Canada)

How many Users should inform the BS about their Channel Information?

Umer Salim (Eurecom, France); Dirk Slock (Eurecom, France)

QoS: Quality of Service

Room 18, Chair: Hans-Juergen Zepernick (Blekinge Institute of Technology, Sweden)

Autocorrelation Analysis for Reduced-Reference Mobile Video Quality Assessment

Feng Wang (Blekinge Institute of Technology, Sweden); Hans-Juergen Zepernick (Blekinge Institute of Technology, Sweden)

A Cross-Layer Architecture for Service Differentiation in Multi-Channel Multi-Radio Wireless Mesh Networks

Luciano Bononi (University of Bologna, Italy); Marco Di Felice (University of Bologna, Italy); Antonella Molinaro (University "Mediterranea" of Reggio Calabria, Italy); Sara Pizzi (University "Mediterranea" of Reggio Calabria, Italy)

User Satisfaction Based CRRM Policy for Heterogeneous Wireless Networks

Juan Jesús González-Delicado (University Miguel Hernandez, Spain); Javier Gozalvez (Universidad Miguel Hernandez, Spain)

RES3: Radio Resource Management 3

Room 4, Chair: Laura Toni (Italian Institute of Technology (IIT), Italy)

A Probability based Vertical Handover Approach to Prevent Ping-Pong Effect

Gabriele Tamea (Università di Roma "La Sapienza", Italy); Anna Maria Vegni (University of ROMA TRE, Italy); Tiziano Inzerilli (University of Rome Sapienza, Italy); Roberto Cusani (University of Rome "Sapienza", Italy)

On Two Cross-layer Assisted Resource Allocation Schemes in Multiuser Multicarrier Systems

Qing Bai (Technische Universität München, Germany); Josef Nossek (TU Munich, Germany)

Multipolling and OFDMA reservation protocol for IEEE 802.11 networks

David Perez Diaz de Cerio (Universitat Politecnica de Catalunya, Spain); Jose Valenzuela (Universitat Politecnica de Catalunya, Spain); Javier Villares (Technical University of Catalunya, Spain)

Linear Modeling and Performance Evaluation of Resource Allocation and User Scheduling for LTE-like OFDMA networks

Antonis Gotsis (National Technical University of Athens, Greece); Dimitris Komnakos (National Technical University of Athens, Greece); Philip Constantinou (National Technical University of Athens, Greece)

A Study on the Statistical Properties of Double Hoyt Fading Channels

Nazih Hajri (Ecole Supérieure de Communications de Tunis, Sup'Com, Tunisia); Neji Youssef (Ecole superieure des communications de Tunis, Tunisia); Matthias Pätzold (University of Agder, Norway)

Wednesday, Sep 9

11:00 AM - 12:30 PM

COD1: Coding, Modulation & Equalization 1

Room A+B, Chair: Athanasios Gkelias (Imperial College London, United Kingdom)

Ov-OFDM: A Reduced PAPR and Cyclic Prefix Free Multicarrier Transmission System

Klaus Hueske (TU Dortmund University, Germany); Juergen Goetze (TU Dortmund University, Germany)

Synchronization in OFDM systems based on a multi-periodic preamble

Malte Schellmann (Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut, Germany)

Seed Graph Expansion for Construction of Structured LDPC Codes

Wojciech Sulek (Silesian University of Technology, Poland)

Bounds on Network Coding and Multi-Rate Diversity Gain in Multicast Wireless Applications

Luiz Vieira (UCLA, USA); Mario Gerla (University of California at Los Angeles, USA); Archan Misra (Telcordia Technologies, USA)

MANET1: Mobile Ad Hoc Networks 1

Room E, Chair: Martin Hynes (National University of Ireland, Galway, Ireland)

Cross-layer architecture for TCP splitting in the return channel over satellite networks

Elizabeth Rendon-Morales (Universidad Politecnica de Cataluña, Spain); Jorge Mata (Universitat Politécnica de Catalunya, Spain); Juanjo Alins (Universitat Politècnica de Catalunya, Spain); Jose L. Muñoz (Technical University of Catalonia, Spain); Oscar Esparza (Technical University of Catalonia, Spain)

Coarse time- and frequency synchronization applied in a mobile WiMAX system

Tero Hurnanen (University of Turku, Finland); Jussi Poikonen (University of Turku, Finland); Jarkko Paavola (University of Turku, Finland)

A Testbed for Emulation of MANETs in Hostile Scenarios

Marco Pratesi (University of L'Aquila, Italy); Andrea Colarieti (Center of Excellence DEWS, L'Aquila, Italy); Fortunato Santucci (University of l'Aquila, Italy); Andrea Di Cola (University of L'Aquila, Italy); Sebastiano Schillaci (University of L'Aquila, Italy)

HYBRID: Hybrid Wireless Communication

Room 18, Chair: Falko Dressler (University of Erlangen, Germany)

Cross-Ambiguity Function of Weighted Pulse Trains with Oppermann Sequences

Momin Jamil (Harman/Becker Automotive Systems GmbH, Germany); Hans-Juergen Zepernick (Blekinge Institute of Technology, Sweden); Mats Pettersson (Blekinge Institute of Technology, Sweden)

Some Corrections and new Results from a Scheme to Improve TCP Over Wireless Networks

Lucas Mendes (National Institute of Telecommunications - Inatel, Brazil); José Marcos Brito (Inatel, Brazil)

Hybrid, Optical and Wireless Near-Gigabit Communications System

Lahatra Rakotondrainibe (IETR-INSA Rennes, France); Yvan Kokar (IETR-INSA Rennes, France); Gheorghe Zaharia (IETR-INSA de Rennes, France); Ghais El Zein (IETR-INSA Rennes, France); Eric Tanguy (IREENA, France); Hongwu Li (IREENA, France); Benoit Charbonnier (Orange Labs, France)

WIMAX: WiMAX

Room 4, Chair: Giovanni Giambene (University of Siena, Italy)

Fair Traffic Scheduling for WiMAX Systems

Alberto Bestetti (Alcatel-Lucent, Italy); Giovanni Giambene (University of Siena, Italy); Snezana Hadzic (University of Siena, Italy)

A Joint Utilility-Token Bucket Packet Scheduling Algorithm for IEEE 802.16e WiMAX Networks

Alberto Nascimento (Univ. Madeira, Portugal); Atilio Gameiro (Telecommunications Institute/Aveiro University, Portugal); Jonathan Rodriguez (Instituto de Telecomunicações, Portugal)

Performance Analysis of WiMax Systems in the Presence of MB-OFDM UWB Interference

Eduardo Cano (European Commission, Joint Research Centre, Italy); Alberto Rabbachin (Joint Research Centre, European Commission, Italy); Joaquim Fortuny-Guasch (Joint Research Center, Italy)

On the WiMAX Robustness against Interfering Signals in Emergency Marine Scenario

Rosario Garroppo (University of Pisa, Italy); Stefano Giordano (University of Pisa, Italy); Davide Iacono (University of Pisa, Italy); Alessandro Cignoni (Italian Navy, Italy); Matteo Falzarano (Italian Navy, Italy)

2:00 PM - 3:30 PM

Special Session: Transmission of correlated sources in distributed radio systems: theory and applications

Room A+B, Chair: Andrea Abrardo (University of Siena, Italy)

Joint Channel Decoding with Feedback Power Control in Sensor Networks with Correlated Sources

Andrea Abrardo (University of Siena, Italy); Gianluigi Ferrari (University of Parma, Italy); Marco Martalò (University of Parma, Italy); Fabio Perna (University of Siena, Italy)

Analog Distributed Source-Channel Coding Using Sinusoids

Johannes Karlsson (Royal Institute of Technology, Sweden); Mikael Skoglund (Royal Institute of Technology, Sweden)

Practical Source-Network Decoding

Gerhard Maierbacher (University of Porto, Portugal); Joao Barros (University of Porto, Portugal); Muriel Medard (MIT, USA)

Distributed Analog Linear Coding of Correlated Gaussian Sources over Multiple Access Channels

Inaki Esnaola (University of Delaware, USA); Javier Garcia-Frias (University of Delaware, USA)

MANET2: Mobile Ad Hoc Networks 2

Room E, Chair: Archan Misra (Telcordia Technologies, USA)

A User-Centric Mobility Framework for Multimedia Interactive Applications

Raffaele Bolla (University of Genoa, Italy); Riccardo Rapuzzi (University of Genoa, Italy); Matteo Repetto (University of Genoa, Italy)

Optimising Transmission Path Selection in SCTP based Wireless Networking

Martin Hynes (National University of Ireland, Galway, Ireland); Liam Kilmartin (National University of Ireland, Galway, Ireland)

On the Effectiveness of IEEE 802.11e Implementations in Real Hardware

Raffaele Bolla (University of Genoa, Italy); Riccardo Rapuzzi (University of Genoa, Italy); Matteo Repetto (University of Genoa, Italy)

COD2: Coding, Modulation & Equalization 2

Room 18, Chair: Giridhar Mandyam (Qualcomm, USA)

Joint Power Allocation and Interference Mitigation Techniques for Cooperative Spread Spectrum Systems with Multiple Relays

Rodrigo de Lamare (University of York, United Kingdom)

A Distributed Opportunistic Scheduling Scheme for Wireless Network Coding

Athanasios Gkelias (Imperial College London, United Kingdom); Kin Leung (Imperial College, United Kingdom)

Multilayer Space-Time Error Correcting Codes

Mohamad Sayed Hassan (Institut TELECOM; TELECOM Bretagne, France); Karine Amis (Institut TELECOM; TELECOM Bretagne, France)

Sampling Jitter Estimation and Mitigation in Direct RF Sub-Sampling Receiver Architecture

Ville Syrjälä (Tampere University of Technology, Finland); Mikko Valkama (Tampere University of Technology, Finland)

ARCH1: Network Architecture and Services 1

Room 4, Chair: Rajeev Shorey (General Motors Research, India)

Meteorology Using Microwaves Links: a Comparative Study

Ramona Ruiz Blázquez (Institut Supérieur d'Electronique de Paris, France); Emmanuelle Vivier (Institut Supérieur d'Electronique de Paris, France); Balwant Godara (Institut Supérieur d'Electronique de Paris, France)

An Adaptive Location Management Scheme for Mobile Broadband Cellular Systems

Maria Canales (University of Zaragoza, Spain); Jose Ramon Gallego (University of Zaragoza, Spain); Angela Hernandez-Solana (University of Zaragoza, Spain); Antonio Valdovinos (University of Zaragoza, Spain)

Multi-Criteria Dynamic Access Selection in Heterogeneous Wireless Networks

Ikram Smaoui (University of Sfax, Tunisia); Faouzi Zarai (University of Sfax, Tunisia); Ridha Bouallegue (National Engineering School of Sousse SUP'COM, 6'Tel Laboratory, Tunisia); Lotfi Kamoun (LETI Laboratory University of Sfax Tunisia, Tunisia)

3:30 PM - 4:30 PM

Poster 1: Poster 1

Chair: Rajeev Shorey (General Motors Research, India)

Adaptive Linear Interference Suppression Based on Block Conjugate Gradient Method in Frequency Domain for DS-UWB Systems

Sheng Li (University of York, United Kingdom); Rodrigo de Lamare (University of York, United Kingdom)

Perceptual-based Quality Assessment of Error Protection Schemes for Wireless JPEG2000

Muhammad Imran Iqbal (Blekinge Institute of Technology, Sweden); Hans-Juergen Zepernick (Blekinge Institute of Technology, Sweden); Ulrich Engelke (Blekinge Institute of Technology, Sweden)

Multi-Level Threshold Opportunistic Transmission in MU-MIMO Downlink with Reduced Feedback

Zhao Li (Xidian University, P.R. China); Jiawei Yang (Xidian University, P.R. China); Junliang Yao (Xidian University, P.R. China)

A Resource Management Strategy for Interconnected WLAN and UMTS Networks based on User Mobility, Call Renegotiation, and Call Reallocation

Hermes Del Monego (FEUP- Faculdade de Engenharia da Universidade do Porto, Portugal); Jose Oliveira (INESC Porto, Portugal); Manuel Ricardo (INESC Porto, Portugal)

Novel Results on Adaptive UMTS Outer Block Interleaving Using SOVA Turbo Decoder

Costas Chaikalis (TEI of Larissa, Greece); Nicholas Samaras (TEI Larissa, Greece)

Pitfalls in Energy Consumption Evaluation Studies

Kostas Pentikousis (VTT Technical Research Centre of Finland, Finland)

A Novel Spectrum Sensing Method using Multi-Antennas without Channel State Information

Abdulrahman Al-Abbasi (University of Electro-Communication, Japan); Takeo Fujii (The University of Electro-Communications, Japan)

Performance Analysis of Outdoor Localization Systems based on RSS Fingerprinting

Azin Arya (Ecole Télécom Paris-Tech, France); Philippe Godlewski (ENST-Telecom Paris, France); Philippe Mellé (SFR, France)

Multimedia Session Continuity with Context-Aware Capability in IMS-based Networks

Huu Thanh Nguyen (Hanoi University of Technology, Vietnam); Hang Le Thi (Viettel Technologies, Vietnam); Quynh Thu Ngo (Hanoi University of Technology, Vietnam); Van Yem Vu (Hanoi University Of Technology, Vietnam); Dung Nguyen (Hanoi University of Technology, Vietnam)

MOGAMESH: A Multi-Objective Algorithm for Node Placement in Wireless Mesh Networks based on Genetic Algorithms

Giuseppe De Marco (Toyota Institute of Technology, Japan)

Achievable Rate of Dual-Hop OFDM Relay System with Non-regenerative Relay without FFT Process

Shuhei Haraguchi (Nara Institute of Science and Technology, Japan); Masato Saito (Nara Institute of Science and Technology, Japan); Chandra Athaudage (University of Melbourne, Australia); Minoru Okada (Nara Institute of Science and Technology, Japan)

Low Power Medium Access Control for Body-Coupled Communication Networks

Steven Corroy (RWTH University of Aachen, Germany); Heribert Baldus (Philips Research Europe, Germany)

Joint Power Management and Beamforming for Base Stations in Cognitive Radio Systems

Xiao Fu (University of Electronic Science and technology of China, P.R. China); Jun Wang (University of Electronic Science and Technology of China, P.R. China); Shaoqian Li (University of Electronic Science and Technology of China, Taiwan)

A Continuous-Space Analytical Approach for Relay Node Placement in Hybrid Cellular and Ad Hoc Networks

Ziaul Haq Abbas (University of Agder (UiA), Norway, Norway); Frank Li (University of Agder, Norway)

Vehicle-Roadside-Vehicle Relay Communication Network employing Multiple Frequencies and Routing Function

Yasushi Yamao (The University of Electro-Communications, Japan); Kazuya Minato (University of Electro-Communications, Japan)

Vertical handover among broadcast networks

Gabriele Tamea (Università di Roma "La Sapienza", Italy); Tiziano Inzerilli (University of Rome Sapienza, Italy); Paolo Rea (University of Rome "Sapienza", Italy); Roberto Cusani (University of Rome "Sapienza", Italy)

Sigma-Point Kalman Filters for Multipath Channel Estimation in CDMA Networks

Zahid Ali (KFUPM, Saudi Arabia); Mohamed Deriche (King Fahd University of Petroleum & Minerals, Saudi Arabia); Adnan Al-Andalousi (KFUPM, Saudi Arabia)

Optimized Orphan Algorithm for IEEE 802.15.4 Networks

Antonio-Javier Garcia-Sanchez (Technical University of Cartagena, Spain); Felipe Fgarcia-Sanchez (Technical University of Cartagena, Spain); Joan Garcia-Haro (Polytechnic University of Cartagena, Spain)

A Robust And Redundant Key Management For Mobile Ad Hoc Networks

Hisham Dahshan (University of Strathclyde, Egypt); James Irvine (University of Strathclyde, United Kingdom)

Adaptive resource allocation for SDMA-OFDMA systems with genetic algorithm

Berna Ozbek (Izmir Institute of Technology, Turkey); Didier Le Ruyet (CNAM, France)

Out-of-Band Distortion Analysis of Envelope Tracking Technique for Power Amplifiers

Yasunori Suzuki (NTT Docomo, Japan); Shoichi Narahashi (NTT Docomo, Japan); Toshio Nojima (Hokkaido University, Japan)

Thursday, Sep 10

8:30 AM - 10:00 AM

MIMO-APP: MIMO - Applications
Room 13, Chair: Micaela Troglia Gamba (Politecnico di Torino, Italy)

Energy Efficient Cooperative MIMO with Idle Nodes in Cluster Based Wireless Sensor Networks
Li Fei (Beihang University, P.R. China); Qiang Gao (Beihang University, P.R. China); Xu Zhang (Beihang University, P.R. China)

System Level Analysis of Vertical Sectorization for 3GPP LTE
Osman N. C. Yilmaz (Nokia Siemens Networks, Finland); Seppo Hamalainen (Nokia Siemens Networks, Finland); Jyri Hämäläinen (Helsinki University of Technology, Finland)

On Multiuser MIMO Capacity Benefits in Air-to-Ground Communication for Air Traffic Management
Jawad Rasool (Norwegian University of Science and Technology (NTNU), Norway); Geir Oien (NTNU, Norway); Jan Erik Hakegard (SINTEF, Norway); Tor Myrvoll (SINTEF, Norway)

ACC1: Wireless Access Techniques 1
Room 14, Chair: Yuming Jiang (Norwegian University of Science and Technology (NTNU), Norway)

Omni-directional Characteristics over Frequency Range for UWB of Modified Planar Antenna with an Elliptical Element on the Dielectric Substrate
Toshio Wakabayashi (Tokai University, Japan); Hiroyasu Matsui (Researcher, Japan)

A Channel Allocation Algorithm for OSA-Enabled IEEE 802.11 WLANs
Francisco Novillo (Universitat Politècnica de Catalunya, Spain); Mathew Churchman (Universitat Politècnica de Catalunya, Spain); Ramon Ferrús (Universitat Politècnica de Catalunya, Spain); Ramon Agusti (Universitat Politècnica de Catalunya, Spain)

Adaptive Set-Membership Reduced-Rank Interference Suppression for DS-UWB Systems
Patrick Clarke (The University of York, United Kingdom); Rodrigo de Lamare (University of York, United Kingdom)

On IEEE EDCA 802.11n
Roger Hoefel (Federal University of Rio Grande do Sul - UFRGS, Brazil)

COD3: Coding, Modulation & Equalization 3
Room 20, Chair: Ville Syrjälä (Tampere University of Technology, Finland)

Loading Techniques for OFDM Systems with Nonlinear Distortion Effects
Teresa Araújo (Instituto de Telecomunicações/ISEP, Portugal); Rui Dinis (Instituto de Telecomunicações/UNINOVA/FCT-UNL, Portugal)

Distributed Interleave-Division Multiplexing Space-Time Codes for Coded Relay Networks
Petra Weitkemper (University of Bremen, Germany); Dirk Wübben (University of Bremen, Germany); Karl-Dirk Kammeyer (University of Bremen, Germany)

Non-binary Split LDPC Codes defined over Finite Groups
Bilal Shams (University of Cergy-Pontoise, France); David Declercq (ETIS lab. ENSEA/UCP/CNRS UMR-8051, France); Vincent Heinrich (STMicroelectronics, France)

Filter Bank Transmission Systems: Analysis with Phase Noise
>Nicola Moret (Università di Udine, Italy); Andrea Tonello (University of Udine, Italy)

Optimized Signal Mappings for BICM-ID Systems over Fast Fading MIMO Channels
>Muammar Alfasi (Concordia University, Canada); Yousef Shayan (Concordia University, Canada)

WSN3: Wireless Sensor Networks 3

Room 4, Chair: Marco Di Felice (University of Bologna, Italy)

Performance Monitoring and Control in Contention-Based Wireless Sensor Networks
>Thomas Lindh (Royal Institute of Technology, Sweden); Ibrahim Orhan (KTH, Sweden)

Application-Specific Node Clustering of IR-UWB Sensor Networks with Two Classes of Nodes
>Daniel Bielefeld (RWTH Aachen University, Germany); Gernot Fabeck (RWTH Aachen University, Germany); Rudolf Mathar (RWTH Aachen University, Germany)

An optimal network dimensioning and initial energy assignment minimizing the monetary cost of a heterogeneous WSN
>Cüneyt Sevgi (Bilkent University, Turkey); Altan Koçyiğit (Middle East Technical University, Turkey)

On the Steady State in Multiuser Multiband IR-UWB without NBI Detection
>Hessam Moussavinik (Norwegian University of Science and Technology, Norway); Sang-Seon Byun (Norwegian University of Science and Technology, Norway); Ilangko Balasingham (Oslo University Hospital & NTNU, Norway)

10:30 AM - 11:30 AM

Poster 2: Poster 2

Chair: Rajeev Shorey (General Motors Research, India)

Channel Equalization in Narrowband Mobile Peer-to-Peer Networks using Superimposed Pilots
>Jukka Talvitie (Tampere University of Technology, Finland); Toni Levanen (Tampere University of Technology, Finland); Markku Renfors (Tampere University of Technology, Finland)

A Study of Cooperative Communication with Consideration of Power Loss Caused by Relay Abortion
>Mayumi Suzuki (Tokyo University of Science, Japan); Osamu Takyu (Tokyo University of Science, Japan); Yohtaro Umeda (Tokyo University of Science, Japan)

Cooperative Space-Time Codes with Opportunistic Network Coding with Increasing Numbers of Nodes
>Gordhan Das Menghwar (Vienna University of Technology, Austria); Syed Asif Ali Shah (Vienna University of Technology-Austria, Austria); Christoph Mecklenbräuker (Vienna University of Technology, Austria)

Optimizing System Capacity and Application Delays in WiMAX Networks
>Iwan Adhicandra (University of Pisa, Italy); Rosario Garroppo (University of Pisa, Italy); Stefano Giordano (University of Pisa, Italy)

Empirical Analysis of UMTS Propagation Channel (2127.6 MHz) for case of Stationary Receiver
>Irena Jankovic (University of Belgrade, School of Electrical Engineering, Serbia); Aleksandar Neskovic (University of Belgrade, School of Electrical Engineering, Serbia); Natasa Neskovic (School of Electrical Engineering, University of Belgrade, Serbia); Djordje Paunovic (University of Belgrade, Yugoslavia (defunct))

Fully Software OFDM modulation in vehicular, highly time-variant channels - An implemented technology and its results
Vincenzo Pellegrini (Università di Pisa, Italy); Marco Luise (University of Pisa, Italy)

Comparative Study of Fade Margins with Hard and Soft Handoff in CDMA based Microcellular Systems
Jose Ernesto Rojas-Lima (ESIME Zacatenco-IPN, Mexico)

Dynamic on-body channel and its ARQ error control
Bin Zhen (National Institute of Information and Communications Technology, Japan); Takahiro Aoyagi (Tokyo Institute of Technology, Japan); Ryuji Kohno (Yokohama National University, Japan)

Adaptive Location Division Multiple Access for Reliable Safety Message Dissemination in VANETs
Yong Hoon Choi (Carnegie Mellon University, USA); Ragunathan Rajkumar (Carnegie Mellon University, USA); Priyantha Mudalige (General Motors, USA); Fan Bai (General Motors, USA)

Long Life Monitoring of Historical Monuments via Wireless Sensors Network
Donato Abruzzese (University of Rome "Tor Vergata", Italy); Michele Michele Angelaccio (University of Rome "Tor Vergata", Italy); Berta Buttarazzi (University of Rome "Tor Vergata", Italy); Romeo Giuliano (Università di Roma Tor Vergata, RadioLabs, Italy); Lorenzo Miccoli (University of Rome "Tor Vergata", Italy); Alessandro Vari (University of Rome "Tor Vergata", Italy)

Design of Adaptive Multi-Branch SIC Receivers for MIMO Spatial Multiplexing Systems
Rui Fa (University of York, United Kingdom); Rodrigo de Lamare (University of York, United Kingdom)

Reducing the signalling overhead for wireless VoIP transmission using weighted prioritisation
Milos Tesanovic (Philips Research Laboratories, United Kingdom); Tim Moulsley (Philips, United Kingdom); Matthew Baker (Philips, United Kingdom)

Evaluation of Wireless Channel Quality for an Ad Hoc Network in the Sky, SKYMESH
Tomoaki Umeki (Niigata University, Japan); Hiraku Okada (Saitama University, Japan); Kenichi Mase (Niigata University, Japan)

UMTS900 Deployment with Different Call Handling Strategies
Muhammad Sheikh (Tampere University of Technology, FINLAND, Finland); Jukka Lempiäinen (Tampere University of Technology, Finland)

Digital Cinema Delivery using Frequency Multiplexed DVB-T Signals
Giuseppe Baruffa (University of Perugia, Italy); Paolo Micanti (University of Perugia, Italy); Fabrizio Frescura (University of Perugia, Italy); Saverio Cacopardi (University of Perugia, Italy)

Cell Outage Management in LTE Networks
Mehdi Amirijoo (Ericsson Research, Sweden); Ljupco Jorguseski (TNO Information and Communication Technology, The Netherlands); Thomas Kürner (Technische Universität Braunschweig, Germany); Remco Litjens (TNO Information and Communication Technology, The Netherlands); Michaela Neuland (Technische Universität Braunschweig, Germany); Lars-Christoph Schmelz (Nokia Siemens Networks, Germany); Ulrich Tuerke (atesio GmbH, Germany)

Precoded Multiuser Distributed MIMO OFDM Systems
Reza Holakouei (Instituto de Telecomunicações - Universidade de Aveiro, Portugal); Adão Silva (Instituto de Telecomunicações, University of Aveiro, Portugal); Atilio Gameiro (Telecommunications Institute/Aveiro University, Portugal)

Performance Analysis of Binary DPSK Modulation Schemes over Hoyt Fading Channels

Nazih Hajri (Ecole Supérieure de Communications de Tunis, Sup'Com, Tunisia); Neji Youssef (Ecole superieure des communications de Tunis, Tunisia); Matthias Pätzold (University of Agder, Norway)

11:30 AM - 1:00 PM

MIMO3: MIMO 3

Room 13, Chair: Michael Shenouda (McMaster University, Canada)

Multistage MIMO Receivers Based on Multi-Branch Interference Cancellation for MIMO-CDMA Systems

Yunlong Cai (University of York, United Kingdom); Rodrigo de Lamare (University of York, United Kingdom)

Schnorr-Euchner Sphere Decoder with Statistical Pruning for MIMO Systems

Junil Ahn (GIST, Korea); Heung-No Lee (University of Pittsburgh, USA); Kiseon Kim (GIST - Gwangju, Republic of Korea, Korea)

High-Rate Full-Diversity Space-Time Block Codes with Linear Receivers

Ertugrul Basar (Istanbul Technical University, Turkey); Umit Aygolu (Istanbul Technical University, Turkey)

A novel algorithm to improve the blind receiver for convolutive MIMO systems

Iman Habibi (Shiraz University, Iran); Mohammad Ali Masnadi-Shirazi (Shiraz University, Iran); Pegah Habibi-Ardekani (Sepahan University, Iran)

Multiple Antenna Relay-Assisted Schemes for the Uplink OFDM Based Systems

Andreia Moço (Instituto de Telecomunicacoes(IT)/University of Aveiro, Portugal); Hugo Lima (Instituto de Telecomunicacoes(IT)/University of Aveiro, Portugal); Adão Silva (Instituto de Telecomunicações (IT)/University of Aveiro, Portugal); Atilio Gameiro (Telecommunications Institute/Aveiro University, Portugal)

ACC2: Wireless Access Techniques 2

Room 14, Chair: Rajeev Shorey (General Motors Research, India)

Optimum Joint Detection Using Soft Decision Combined with Maximum Gradient Search

Khalid Al Murrani (University of Nottingham, Malaysia Camous, Malaysia)

A Load Adaptive Subcarrier and Bit Allocation Algorithm for Non-real Time Services in an OFDMA System

Hossam Fattah (Texas A&M University at Qatar, Qatar); Hussein Alnuweiri (Texas A&M University, Qatar, Qatar)

Full Interference Model in Wireless Sensor Network Simulation

Hengguang Li (University of York, United Kingdom); Paul Mitchell (University of York, United Kingdom)

Multi-Code SS-CSMA/CA for Cluster-Tree Wireless Ad Hoc Networks

Naoto Kobatake (The University of Electro-Communications, Japan); Satoru Takagishi (The University of Electro-Communications, Japan); Yasushi Yamao (The University of Electro-Communications, Japan)

Simple, Zero-Feedback, Collaborative Beamforming for Emergency Radio

Aggelos Bletsas (Technical University of Crete, Greece); Andrew Lippman (MIT Media Laboratory, USA); John Sahalos (Aristotle University of Thessaloniki, GR-54124, Thessaloniki, Greece, Greece)

COD4: Coding, Modulation & Equalization 4

Room 20, Chair: Petra Weitkemper (University of Bremen, Germany)

A tree-search algorithm for ML decoding in underdetermined MIMO systems

Gianmarco Romano (Second University of Naples, Italy); Francesco Palmieri (Seconda Università di Napoli, Italy); Pierluigi Salvo Rossi (Second University of Naples, Italy); Davide Mattera (Università degli Studi di Napoli Federico II, Italy)

Performance Analysis of Rotated PSK over Nakagami-m Fading Channels

Ahmet Yilmaz (Gebze Institute of Technology, Turkey); Oguz Kucur (Gebze Institute of Technology, Turkey)

An Efficient Decoding Algorithm for Tailbiting Codes on Wireless Channels

Jorge Ortín (University of Zaragoza, Spain); Paloma Garcia (University of Zaragoza, Spain); Fernando Ferguso (University of Zaragosa, Spain); Antonio Valdovinos (University of Zaragoza, Spain)

Efficient SER measurement method for OFDM receivers with nonlinear distortion

Lilia Smaoui (Technische Universität München, Germany); Amine Mezghani (TU Munich, Germany); Leonardo Baltar (Technische Universität München, Germany); Heinz Mellein (Rhode & Schwarz GmbH & Co. KG, Germany); Josef Nossek (TU Munich, Germany)

Symbol MAP detection aided with first channel estimate for TDMA systems over a frequency selective channel

Inès Kammoun (Ecole Nationale d'Ingénieurs de Sfax, BPW 3038 Sfax - Tunisia, Tunisia); Mohamed Siala (Sup'Com, Tunisia); Noura Sellami (Institut Supérieur de l'Electronique et des Communications de Sfax, Tunisia); Aline Roumy (INRIA Rennes, France)

ARCH2: Network Architecture and Services 2

Room 4, Chair: Yuming Jiang (Norwegian University of Science and Technology (NTNU), Norway)

Novel Cross-layer Decoding Design for 'WBC over DVB-H' Link Layer

Zhanlin Ji (University of Limerick, Ireland); Ivan Ganchev (University of Limerick, Ireland); Mairtin O'Droma (University of Limerick, Ireland)

Attractive pricing mechanism for connection sharing and coverage extension of wireless networks

Pasquale Pace (University of Calabria, Italy); Mariangela Mole' (University of Calabria, Italy); Gianluca Aloi (University of Calabria, Italy)

Single Channel All Digital Direction Finding System

Van Yem Vu (Hanoi University Of Technology, Vietnam); Nguyen Huu Thanh (Hanoi Univ. of Tech., Vietnam)

Effects of relay position and power allocation in space-time coded cooperative wireless systems

Luca Zuari (University of Ferrara, Italy); Andrea Conti (ENDIF Univ. of Ferrara, WiLAB Univ. of Bologna, Italy); Velio Tralli (University of Ferrara - Italy, Italy)

ISWCS'09 Welcome Party

Monday, September 7, 19.00 - WELCOME party with wine tasting

Enoteca Italiana's Millevini restaurant, Fortezza Medicea, Bastione San Francesco - Siena

ISWCS'09 Banquet

Wednesday, September 9, 19.30 - Banquet

Certosa di Pontignano, Loc. Pontignano, 5 - Vagliagli, Siena

IWSSC 2009

2009 International Workshop on Satellite and Space Communications

September 09-11, 2009

Conference Program

Siena- Tuscany, University of Siena

Technically supported by IEEE Communications Society

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IWSSC 2009 Welcome Message from the General Chairs

Giovanni Giambene

Boon Sain Yeo

Satellite communications have renewed interest for their special potentialities in providing communications where terrestrial infrastructures are not present. Important questions to address concern the research areas for future satellite networks, support of mobility, new air interfaces, optimization of the design. Some answers to these important questions will be provided at the 2009 International Workshop on Satellite and Space Communications (IWSSC'09). This is the fifth year we are organizing this event and we are proud that its size increased over the years.

After the success of IWSSC'05 in Siena, Italy, IWSSC'06 in Léganes, Spain, IWSSC'07 in Salzburg, Austria, and IWSSC'08 in Toulouse, France, we have received a very good number of submissions, with authors from different regions: 89% from Europe (including Middle East and Africa), 15% from Latin America, 12% from North America, and 8% from Asia. This workshop has also obtained the technical co-sponsorship of the IEEE Communication Society, the European Space Agency (ESA), and the Integral Satcom Initiative (ISI).

IWSSC'09 seeks to address and capture highly innovative and state-of-the-art research from the satellite communications industry, focusing on the following main areas: multimedia services via satellite, integration of terrestrial and satellite components in hybrid networks, network management issues, secure communications via satellite, new mobile satellite systems and services, cross-layer air interface design, and standardization.

The IWSSC'09 programme is very rich in technical contents, including 4 tutorials, a panel session with the participation of international high-profile experts and 15 technical sessions. Due to the high number of received papers, this year, for the first time, we have also organized a poster sessions that we hope could contribute to present innovative ideas in the field of satellite and space communications. Thanks to the participation of ESA, ISI, industries (e.g., Astrium GmbH, Harris Corp., Hughes, Telespazio, Thales Alenia Space) as well as operators (e.g., Hispasat, Inmarsat, TerreStar), we think that IWSSC'09 may represent an important opportunity where industry and academia meet and discuss about future trends and research directions.

This year we have also an exhibition area with the participation of our sponsors that are contributing to the success of this event. In particular, we would like to thank TEMIX, National Instruments, and SatEXPO for their support. A special thank is for the FP6 SatNEx II Network of Excellence that has made possible that this workshop could continue and increase in participation during these years.

Siena is a particularly enchanting city bounding with Gothic architecture and Tuscan cuisine. The atmosphere in this city is special and makes very comfortable the stay of tourists and visitors. We hope that you can exploit these very special conditions for a nice participation to the IWSSC'09 workshop and its social event in the Monteriggioni Castle.

Finally, the organizers would like to thank Ing. Paolo Chini, Publication Chair and Ing. Ciro Guariglia, Web Master for their valuable work.

Looking forward to meeting you in Siena,

Giovanni Giambene
General Chair
Dipartimento di Ingegneria dell'Informazione
University of Siena, Italy

Boon Sain Yeo
General Co-Chair and Finance Chair
Helius Engineering,
Singapore

IWSSC 2009 Welcome Message from the Technical Program Chairs

Haitham Cruickshank

Zhili Sun

After the successful previous workshops held in 2005 in Siena, in 2006 in Madrid, in 2007 in Salzburg, in 2008 in Toulouse, the fifth International Workshop on Satellite and Space Communications in 2009 (IWSSC'09) is organised again in the beautiful city of Siena at the heart of Tuscany, Italy. The IWSSC'09 is co-located with the Sixth International Symposium on Wireless Communication Systems 2009 (ISWCS'09).

The IWSSC09 confirms the tendency observed in the last years of an increasing interest in the topics of space communications and the participation to this workshop is increasing from year to year. More precisely, 95 papers were submitted to this workshop. The reviewing process was carried out by at least 3 reviewers per paper, the top 66 papers were accepted for the workshop and 21 papers were accepted for the poster sessions.

The program of the workshop has been defined as follows. First of all, four tutorials by researchers working in the framework of the European Network of Excellence 'SatNEx' are given September 9, 2009. A keynote deals with: "Next Generation Network Technologies for Emerging Services and Applications" and a plenary talk deals with "Trends in Mobile Satellite Systems". A Panel session is organised on September 10, 2009 on "Key R&D Directions for Satellite Communications & Networking 2020".

The 66 papers have been distributed into Regular sessions (26 papers), PhD sessions (16 papers) and Special sessions (24 papers). The Regular and PhD sessions are organised in the following topics: Modulation and coding, Satellite networking, Radio resource management and Transport protocols&QoS. There are addition Regular sessions in Delay/Disruption Tolerant Networking and Satellite applications/Services. Also there are five special sessions dealing with ETSI broadband satellite multimedia (BSM) activities, Network security, Interplanetary communications, Hybrid networks for rural and Tropics, and the Integral Satcom Initiative (ISI) research challenges.

All the activities to build this technical programme have been carried out in close collaboration between chair and co-chair and we would like to thank Giovanni Giambene for his active support during the preparation of the conference. Also we would like to thank all TPC members who have participated to the review process and therefore have actively contributed to the success of this workshop. Finally many thanks to the special session organisers for their efforts as well.

Eventually, we hope that the audience will benefit from all this technical material to improve research in this highly dynamic area.

Haitham Cruickshank
Technical Program Chair
University of Surrey,
United Kingdom

Zhili Sun
Technical Program Co-Chair
University of Surrey,
United Kingdom

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Chunming Zhao, Freescale Semiconductor (Motorola), USA

IWSSC 2009 Keynote Speech

September 10, 2009, 9:30 – 10:30, Room A+B

Dr. Sastri Kota, Senior Scientist, Harris Corporation (USA) and Adjunct Professor, University of Oulu (Finland)

Next Generation Network Technologies for Emerging Services and Applications

Abstract: *Next Generation Networking provides ubiquitous global communication infrastructure in which information can be accessed* **anywhere***,* **anytime***, by* **anyone** *using* **anything***. As the demand for converged services, multimedia applications and mobility, increases new IP-based net-centric hybrid and integrated network architectures must be developed. Satellite communications have evolved over the years establishing its significant role in achieving global communications. The recent DVB-S/S2 and DVB-RCS technologies have successfully demonstrated the support for multimedia and interactive services including mobile applications. Terrestrial wireless has a unique position in personal and mobile networks supporting triple play services through existing cellular, WLAN, MAN (WiMAX) and evolving long term evolution (LTE) and femto cell technologies. However, the current telecommunications and networking infrastructure is not adequate enough to meet the needs of emerging services such as health, e-learning, e-governance, mobile services in rural and thinly populated urban areas. This keynote will address the complementary role of satellites in supporting the next generation hybrid /integrated satellite-terrestrial architectures meeting the future service requirements. It will also provide an insight into the growing market potential, technical challenges, regulatory and standards development, and research needs for deployment of next generation networks. The presentation concludes with a few thoughts on social implications of pervasive communications on a fast growing "*****personalized creative society***".**

Biography: Dr. Kota is a Senior Scientist in Harris Corporation and Adjunct Professor in University of Oulu, Finland He has held technical and management positions at Loral, Lockheed Martin, SRI International, the MITRE Corp, and Xerox Corporation, and contributed to both military and commercial satellite communication systems and broadband (IP, ATM) network design and analysis. He made significant contributions to various programs e.g. MILSTAR, AEHF, AFSATCOM, DSCS, GBS and MSE-programs and early phase of TSAT and WIN-T programs. He was the chief network architect of broadband multimedia services (BMS), a two way IP satellite network and he developed the first phase of Astrolink - ka-band satellite network architecture. Currently he is head of the U.S. delegation and the U.S. chair of the ITU-R Working Party 4B involved with Fixed and Mobile satellite system performance. He led the efforts of development of Recommendations of TCP over Satellite Networks and Satellite ATM performance. He is the principal author of a book Broadband Satellite Communications for Internet Access, and co-edited a book Emerging Location Aware Broadband Wireless Ad Hoc Networks, and wrote book chapters on Satellite TCP/IP in High Performance Networking, Trends in Broadband Networking in Wiley Encyclopedia of Telecommunications. He has published more than 130 papers in conference proceedings, and journals. He served as a guest editor of special issues for IEEE Communications Magazine, International Journal of Satellite Communications and Networking, Space Communications- an International Journal and Int'l Journal of Wireless Information Networks. He is member of the editorial boards on the International Journal of Satellite Communications and Networking, and the Space Communications Journal. Dr. Kota received his Ph.D. from the University of Oulu, Finland; Electrical Engineer's Degree from Northeastern University, Boston, USA; MSEE from IIT; BSEE from BITS, India. Dr. kota has been a keynote speaker, invited speaker and panelist at various international conferences. He served as the Unclassified Technical Program Chair of MILCOM 2007, Technical Committee member of MILCOM2004, 1997, and Asst Technical Chair of MILCOM 1990; Satellite Communications symposium chair of IEEE GLOBECOM 2002, 2000, co-chair of Wireless Communications and networking symposium of GLOBECOM2006, and Technical chair of ISWPC2007, WCNC 2008 panel chair, and invited session chair for PIMRC 2006,2005, 2004. He is the co-chair of Wireless Networking Symposium for GLOBECOM 2009. He is the recipient of Golden Quill awards from Harris Corporation, publication awards from Lockheed Martin and ATM Forum Spotlight Award. In addition, he is a Senior Member of IEEE, Associate Fellow of AIAA, and Member of ACM.

IWSSC 2009 Plenary Talk

September 10, 2009, 10:30 – 11:00, Room A+B

Fabio Valle, Eutelsat, France

Satellite Broadband Revolution: How Latest Ka-band Systems Will Change the Rules of the Industry

Abstract: *The talk analyzes the satellite broadband systems for consumer from the perspective of technological innovation. The suggested interpretation relies upon such concepts as technological paradigm, technological trajectory and salient points. Satellite technology for broadband is a complex system on which each component (i.e. the satellite, the end-user equipment, the on-ground systems and related infrastructure) develops at different speed. Innovation in this industry concentrates recently on satellite space aircraft that seemed to be the component with the highest perceived opportunity for improvement. The industry has designed recently satellite systems with continuous dimensional increase of capacity available, suggesting that there is a technological trajectory in this area, similar to Moore's law in the computer industry. The implications for industry players, Ka-band systems, and growth of future applications that could be beneficial to reduce the Digital Divide will be also examined.*

Biography: Fabio Valle is responsible for the strategic development of the Value Added Services in Paris for Eutelsat that is the 3rd larger satellite operator. He is also Executive Director in one of the affiliates of the group. His previous experiences include management consulting with Mckinsey and Co in Milan and other international consulting projects in the IT and marketing sector. He holds a degree with honours in Engineering from Padua University and an MBA at INSEAD.

IWSSC 2009 Plenary Talk

September 11, 2009, 9:00 – 10:00, Room A+B

Dr. Nicolas Chuberre, Thales Alenia Space and Chair of the Mobile Satellite System working group at ETSI

Trends in Mobile Satellite Systems

Abstract: *Mobile Satellite Systems encompass various systems operating in different spectra. Each offers a wide range of services and applications. While the MSS market is globally limited in size when compared to the terrestrial mobile market, MSS still offers interesting business perspectives provided adequate positioning. The presentation aims at identifying the main business opportunities as well as the related technical and regulatory enablers which will set the trends for MSS.*

Biography: Nicolas Chuberre graduated from "Ecole Supérieure d'Ingénieur en Electronique et Electrotechnique" in Paris in 1988. During his studies he attended the course of M.Sc. in Telecommunications at University of Essex/UK and wrote a Diplomarbeit on Remote sensing at the Henrich Hertz Institute in the Karlsruhe Universität/Germany. He has 20 years experience in digital radio communications. Previously with Nokia & Alcatel Mobile phones to design several cellular handsets/systems, he joined Thales Alenia Space to manage the development of payload equipment and design satellite communication solutions. Since 2001, Nicolas has managed several R&D projects in the area of Mobile Satellite Systems among which the IST FP6 MAESTRO integrated project addressing hybrid satellite/terrestrial mobile broadcast system also known as Unlimited Mobile TV. Nicolas holds more than 10 patents and has published several papers on innovative Mobile Satellite System concepts. He is currently working on mobile broadband satellite systems and chairs the Mobile Satellite System working group at ETSI (TC SES).

IWSSC 2009 Tutorials

Tutorials organized by Anton Donner, DLR, Germany

September 9, 2009, 14:00 – 15:30, Room 13

T1: "A Suitable Protocol Stack for Space Communications: the CCSDS Suite"
presented by Tomaso de Cola, DLR, Germany

Abstract: *The Consultative Committee for Space Data Systems (CCSDS) is a standardisation body composed of worldwide space agencies, involved in the definition of protocols for effective data communications over space networks. A full protocol stack including specifications from the physical up to the application layers has been defined and continuously refined and re-elaborated over the years according to the requirements of various space missions. Being space exploration a key-topic in current satellite community, this tutorial is intended to give an overview of the main protocols currently available from CCSDS and their interoperability with legacy suites such as TCP-IP.*

September 9, 2009, 14:00 – 15:30, Room 14

T2: "DVB-S2/RCS Enhanced for Mobile Applications"
presented by Stefano Cioni (Authors: S. Cioni, G. E. Corazza, A. Vanelli-Coralli), University of Bologna, Italy

Abstract: *The DVB-RCS standard has been recently extended to cover mobile scenarios for airplane, maritime, railways, and vehicular applications. These challenging mobile propagation environments along with the regulatory constraints called for the introduction of new transmission modes both at physical and upper layers. Moreover, the target scenarios required also the introduction of a forward link able to deal with mobility issues. To this aim, an augmented version of the DVB-S2 standard has been designed and included thus providing an efficient DVB-RCS/S2 bundle now known and standardized as DVB-RCS+M. This tutorial will dwell on this standard providing a deep understanding of the rationale behind the standard design and its performance. Starting from the characterization of the mobile environment targeted by the DVB-RCS+M standard, the Course will cover both physical layer techniques able to cope with the challenging mobile propagation channel and upper-layer solutions introduced to improve the service continuity and robustness to long fading events. Finally, the tutorial will also take the chance to discover the preliminary advanced solutions for the second generation of the DVB-RCS standard, which is currently under specification.*

September 9, 2009, 16:00 – 17:30, Room 13

T3: "Managing Aeronautical Telecommunication: a Role for Satellite?"
presented by Christian Kissling, DLR, Germany

Abstract: *The continuous and significant growth in aircraft passenger demand, especially in Europe and the U.S., is expected to exceed the capacity limitations of current Air Traffic Management (ATM) communication systems around 2020 and possibly even earlier. A new Air Traffic Management communications infrastructure is thus required for the future. Satellite communication links can be a central component of this infrastructure and can complement terrestrial communication links to provide in sum the needed capacity and service levels. The design of a seamless network architecture which integrates these different and heterogeneous links*

into a seamless network is thus of high importance and has to deal with many different aspects, especially with respect to provision of mobility, security and the provision of Quality of Service. In contrast to regular, terrestrial Internet applications, the operational ATM data traffic has strict requirements, e.g. regarding maximum latencies, availability and integrity which have to be fulfilled. This tutorial aims to provide an introduction of the aeronautical communication scenario, its particularities and to show possibilities how satellite communication links can be integrated in the overall network architecture. Moreover, approaches with respect to the technical issues to manage mobility, safety and security and QoS in this particular environment are presented.

September 9, 2009, 16:00 – 17:30, Room 14

T4: "Satellite Network Security and Related Research Issues"
presented by Haitham Cruickshank, UNiversity of Surrey, UK

Abstract: *Satellite network security has become a hot research topic in recent years due to the closer integration of satellite and IP networks and due to the wider choice of applications and services that run over satellite networks. This tutorial will give an overview of the security threats and requirements in satellite networks. Also it gives some specific security systems such as DVB-S, DVB-RCS, ULE and IPsec over satellites. The tutorial will also focus on the open research issue in satellite networks such key management, secure multicasting, identity hiding and DTN related key management.*

IWSSC 2009 Panel Session

IWSSC 2009 Panel Session organized by Dr. Yi Qian, NIST, USA

September 10, 2009, 16:30 – 18:30, Room A+B

Title: "Key R&D Directions for Satellite Communications & Networking 2020"

Scope: In this panel we will depict possible application scenarios for future SATCOM networks, together with the associated key challenges as well as critical techniques and technologies which in the panelists' opinion show enough potential to justify the development in the coming 10 to 20 years' time.

Despite the pessimistic view about the commercial SATCOM perspective already emerging in the '80s and the bankruptcies of several big SATCOM systems at the end of the '90s, telecom satellites do still represent the most important commercial application of satellites. But the past success should not relax the need for a continuous yet reinforced innovation effort to guarantee a comparable role in the medium long term. This is particularly true when we look at the fast pace at which terrestrial wire line and wireless technologies are developing and the extreme competition existing in this field that makes service quality constantly growing with reduced provisioning cost.

In the panel we will identify key challenges for the satellite broadband interactive and broadcasting services, backbone services provision, satellite components of mobile terrestrial networks. We will also discuss directions and strategic development initiatives in European and US satellite communications and networking field.

Panelists:

- Sastri Kota, Harris Corporations, USA (*also Panel Moderator*)
- Riccardo de Gaudenzi, European Space Research and Technology Centre (ESA/ESTEC) in the Netherlands
- Aradhana Narula-Tam, MIT Lincoln Labs, USA
- Julián Seseña, ROSE Vision, S.L, Spain
- Vincenzo Fogliati, Telespazio, Italy

Panelists participants biographies:

Sastri Kota received his B.S Physics from Andhra University, B.S.E.E. from BITS, Pilani, M.S.E.E. from Indian Institute of Technology (IIT), India. He received the Electrical Engineer's Degree from Northeastern University, Boston, U.S.A and Ph.D. in Electrical and Information Engineering from University of Oulu, Finland. Since 2003 he has been a Senior Scientist in Harris Corporation involved with Corporate Technologies and Standards with special emphasis on Wireless and Mobile Ad Hoc Networks, satellite communication networks and Standardization. He is an Adjunct Professor in the Telecommunications Laboratory of University of Oulu. His research interests include wireless and mobile Information networks, satellite IP networks, QoS and traffic management, broadband satellite access, and ATM networks. Over the years, he held technical and management positions and contributed to military and commercial communication systems at Loral Skynet, Lockheed Martin, SRI International, The MITRE Corp and Xerox Corp. He has been very active in telecommunications and networking standards development. Currently he is the US chair for ITU-R, Working Party 4B and International Rapporteur for Ka-Band Fixed Satellite Systems. He was the chair for Wireless ATM Working Group and has been an ATM Forum Ambassador. He was the recipient of the ATM Forum Spotlight award and Golden Quill award from Harris Corporation for his contributions to Broadband Satellite Communications and Assured Communications. Dr. Kota has been a keynote speaker, invited speaker and panelist at various International Conferences. He also served as Tutorial chair and Asst. Technical chair of MILCOM2004, 1997, 1990; symposium chair, co-chair of satellite Communications symposium of GLOBECOM 2000, 2002 and invited session chair of PIMRC 2004, 2005 and 2006. He is the co-chair of Wireless Communications and networking symposium of GLOBECOM2006 and Technical chair of ISWPC2007. He has been a member of technical program committees of several IEEE, AIAA, SPIE and ACM conferences and workshops. He is a senior member of IEEE, Associate Fellow of AIAA, and member of ACM.

Riccardo De Gaudenzi was born in Italy in 1960. He received his Doctor Engineer degree (cum Laude) in electronic engineering from the University of Pisa, Italy in 1985 and the PhD from the Technical University of Delft, The Netherlands in 1999. From 1986 to 1988 he was with the European Space Agency (ESA), Stations and Communications Engineering Department, Darmstadt (Germany) where he was involved in satellite telecommunication ground systems design and testing. In particular, he followed the development of two new ESA's satellite tracking systems. In 1988, he joined ESA's Research and Technology Centre (ESTEC), Noordwijk, The Netherlands where in 2000 he has been appointed head of the Communication Systems Section and since 2005 he is Head of the RF Payload and Systems Division. The division is responsible for the definition and development of advanced satellite system, subsystems and technologies for telecommunications, navigation and earth observation applications. In 1996 he spent one year with Qualcomm Inc., San Diego USA, in the Globalstar LEO project system group under an ESA fellowship. His current interest is mainly related with efficient digital modulation and multiple access techniques for fixed and mobile satellite services, synchronization topics, adaptive interference mitigation techniques and communication systems simulation techniques. From 2001 to 2005 he has been serving as Associate Editor for CDMA and Synchronization for IEEE Transactions on Communications. He is co-recipient of the VTS Jack Neubauer Best System Paper Award from the IEEE Vehicular Technology Society.

Aradhana Narula-Tam received the B.S.E. degree in electrical engineering from the University of Pennsylvania, Philadelphia, in 1990and the S.M. and Ph.D. degrees also in electrical engineering from the Massachusetts Institute of Technology (MIT), Cambridge, in 1992 and 1997, respectively. At MIT she developed and analyzed antenna diversity methods for mobile communication systems. From 1997-1998 she was in the Research and Advanced Development Group at Motorola Information Systems Group, Mansfield, MA where she developed methods for improving ADSL modems. Since 1998, she has been a member of the technical staff in the Advanced Networks and Applications Group at MIT Lincoln Laboratory where she has worked in a variety of areas including optical networking, dynamic resource allocation for future satellite communication systems, and Quality of Service for IP satellite networks. She is currently working with the Air Force on the Family of Advanced Beyond Line-of-Sight Terminal (FAB-T) acquisition program. She has co-authored over 30 papers.

Julian Seseña has a Ph. degree on Radiocommunications. He has the Master in Communications Systems and Networks and he has diplomas on European Communities, Advanced Telecommunications Services, Marketing Management, Business Development, Strategic Management, Negotiation, etc. He has served as Executive Director of Teledesic Communications Spain, Director of Telecommunications in Hispasat, Head of Research and Development in the Spanish General Direction of Telecommunications (Ministry of Science and Technology). Currently, he is Executive VP at ROSE Vision, a Spanish firm specialized on, with expertise on ICT technology and regulation. Areas of activity include: mobile communications, digital television, satellite communications, telecom regulation, research and innovation. He has wide experience working at many international groups as ITU, CEPT, ETSI, DVB, GVF, TF-ASMS, etc. He has managed several European R+D projects: Digismatv, Digisat, S3M, Avista and participated in many others: NEMi, 4NEM, MOSSA, BROADWAN, SFERA, MOVISAT, etc. Dr. Seseña is Chairman of CENELEC TC 206 and the Working Group Regulatory as well as ViceChair of the Integral SatCom Initiative (ISI). He is elected member of the Steering Committee of European Technology Platform NEM and European Technology Platform ISI. He is coordinator of the Spanish Aprotech Office of AETIC and project manager of the European project SALA+, dealing with cooperation in the international domain on audiovisual and mobile audiovisual technologies with Latin America. He has lectured more than 70 conferences and he has published more than 50 papers. He has also served as Chairman of the specialized European Group DVB-RC mandated to produce specifications for the Interactive Digital Television, and was Special Rapporteur of the ITU for converging to a world-wide standard for the digital multiprogramme television by satellite.

Vincenzo Fogliati was born in Turin (Italy). He received the degree in Electronic and Telecommunication Engineering (graduated with full marks) at the University of Rome "La Sapienza". He attended advanced post-graduate courses on Business Management at the Business School of the LUISS University of Rome. He has around 20 year experience in the Satellite Communications and Navigation domains. During the last five years he has been Head of Security Initiatives and Responsible of R&D Financing Institutions Relations within Telespazio S.p.A. (a Finmeccanica/Thales space company). At international level, he is the Chairman of the ISI European Technology Platform on Satellite Communications. His areas of competence and experience include both Satellite Communications and Satellite Navigation Programmes (Galileo). Previously, he was Head of the Business Development and Regulatory department within MCS Europe (a European mobile communications company set up by some major industrial and financial entities), his areas of responsibilities including the management of European innovative projects and initiatives in the field of integrated Satellite/Terrestrial Mobile Communications and Satellite Navigation (Galileo/GPS).

IWSSC 2009 Detailed Technical Program

Thursday, Sep 10

11:30 AM - 1:00 PM

S-COD1: Coding and Modulation I

PhD Session

Room A+B, Chair: Francisco Cercas (ISCTE - Instituto Superior das Ciências do Trabalho e da Empresa, Portugal)

A Delay Model for Satellite Constellation Networks with Inter-Satellite Links
> Romain Hermenier (DLR (German Aerospace Centre), Germany); Christian Kissling (German Aerospace Center (DLR), Germany); Anton Donner (German Aerospace Center (DLR), Germany)

Two Iterative Algorithms for Blind Symbol Timing Estimation of M-PSK Signals
> Markus Flohberger (Graz University of Technology, Austria); Wilfried Gappmair (Graz University of Technology, Austria); Stefano Cioni (University of Bologna, Italy)

Rate-Compatible Punctured DVB-S2 LDPC Codes for DVB-SH Applications
> Miha Smolnikar (Jozef Stefan Institute, Slovenia); Stylianos Papaharalabos (Institute for Space Applications and Remote Sensing (ISARS), Greece); Tomaz Javornik (Jozef Stefan Institute, Slovenia); Mihael Mohorcic (Jozef Stefan Institute, Slovenia); Mathiopoulos Panayiotis (Institute for Space Applications & Remote Sensing, Greece)

Quality of Experience in Satellite video streaming transmissions in urban vehicular environment
> Alberto Gotta (ISTI-CNR, Italy); Erina Ferro (Istituto di Scienze e Tecnologie dell'Informazione "Alessandro Faedo", Italy); Francesco Potortì (ISTI-CNR, Italy)

S-NET1: Networking I

Regular Session

Room E, Chair: Tomaso De Cola (German Aerospace Center (DLR), Germany)

The Satellite Communications Network of Excellence "SatNEx"
> Erich Lutz (DLR, Germany); Anton Donner (German Aerospace Center (DLR), Germany)

Laboratory Test-bed Development for IPv6 Network Mobility Demonstration in Aeronautical Communications Network
> Eriza Hafid Fazli (TriaGnoSys GmbH, Germany); Angels Via Estrem (TriaGnoSys GmbH, Germany); Markus Werner (TriaGnoSys GmbH, Germany)

MedNET: TeleMedicine over AmerHis system
> Ana Solano Ros (Thales Alenia Space, Spain); Carla Salas (Thales Alenia Space, Spain); Juan M. Rodriguez (Thales Alenia Space, Spain); Despina Rizou (Fraunhofer IGD, Germany); Cristina Arias (Hispasat SA, Spain)

Traffic Prediction Scheme for Resource Assignment of Satellite/Terrestrial Frequency Sharing Mobile Communication System
> Tomohiro Aman (Nagoya University, Japan); Takaya Yamazato (Nagoya University, Japan); Masaaki Katayama (Nagoya University, Japan)

S-BSM: Broadband Satellite Multimedia

Special Session

Organized by Robert Mort (Systek Consulting Ltd, UK) and Haitham S. Cruickshank (University of Surrey, UK)

Room 18, Chair: Robert Mort (Systek Consulting Ltd, United Kingdom) , Haitham Cruickshank (University of Surrey, United Kingdom)

DVB-RCS systems in the NGN convergence framework

Borja de la Cuesta (Thales Alenia Space, Spain); Ana Yun (Thales Alenia Space España, Spain); Ana Solano Ros (Thales Alenia Space, Spain)

BSM Integrated PEP with Cross-Layer Improvements

Haitham Cruickshank (University of Surrey, United Kingdom); Robert Mort (Systek Consulting Ltd, United Kingdom); Giovanni Giambene (University of Siena, Italy); Matteo Berioli (German Aerospace Center (DLR), Germany)

Multicast Architecture for PIM-SM in Broadband Satellite Multimedia Systems

Robert Mort (Systek Consulting Ltd, United Kingdom); Haitham Cruickshank (University of Surrey, United Kingdom)

Mobility Extension for Broadband Satellite Multimedia

Yim-Fun Hu (University of Bradford, United Kingdom); Prashant Pillai (University of Bradford, United Kingdom); Matteo Berioli (German Aerospace Center (DLR), Germany)

Performance Management in Broadband Satellite Multimedia Networks

Robert Mort (Systek Consulting Ltd, United Kingdom); Matteo Berioli (German Aerospace Center (DLR), Germany); Haitham Cruickshank (University of Surrey, United Kingdom)

2:30 PM - 4:00 PM

S-COD2: Coding and Modulation II

Regular Session

Room A+B, Chair: Mathiopoulos Panayiotis (Institute for Space Applications & Remote Sensing, Greece)

Capacity Optimized Line-of-Sight HAP-MIMO Channels for Fixed Wireless Access

Emmanouel Michailidis (University of Piraeus, Greece); Athanasios Kanatas (University of Piraeus, Greece)

The Channel Capacity of MIMO Satellite Links in a Fading Environment: A Probabilistic Analysis

Robert Schwarz (Fed. Office of the Bundeswehr for Information Technology, Germany); Andreas Knopp (Fed. Office of the Bundeswehr for Information Technology, Germany); Berthold Lankl (Munich University of the German Armed Forces (Bundeswehr), Germany)

Performance Analysis of Maximal Ratio Combining over Shadowed-Rice Fading Channels

George Ropokis (University of Patras, Greece); Athanasios Rontogiannis (National Observatory of Athens, Greece); Kostas Berberidis (University of Patras, Greece); Mathiopoulos Panayiotis (Institute for Space Applications & Remote Sensing, Greece)

Design of Binary Sequences and Matrices for Space Applications

Roberto Garello (Politecnico di Torino, Italy); Boujnah Noureddine (Politecnico di Torino, Italy); Jia Yifan (Politecnico di Torino, P.R. China)

Optimum bit-mapping of TCH codes

Francisco Cercas (ISCTE - Instituto Superior das Ciências do Trabalho e da Empresa, Portugal); Joao Silva (Lisbon Technical University (IST), Portugal); Nuno Souto (ISCTE/Instituto de Telecomunicações, Portugal); Rui Dinis (Instituto de Telecomunicações/UNINOVA/FCT-UNL, Portugal)

S-ISICOM: ISICOM: the Research Challenges for the European SatCom

Special Session
Organized by Julián Seseña (Rose Vision, ES)
Room E, Chair: Julián Seseña (ROSE VISION, Spain)

Basic pillars for the ISICOM system development

Vincenzo Fogliati (Telespazio, Italy)

The ISICOM Architecture

Alessandro Vanelli-Coralli (University of Bologna, Italy); Giovanni Emanuele Corazza (University of Bologna, Italy); Michele Luglio (Univ. of Rome Tor Vergata - Dip. Ing. Elettronica, Italy); Stefano Cioni (University of Bologna, Italy)

Regulatory environment for the successful ISICOM development

Julián Seseña (ROSE VISION, Spain); Antonio Alfaro (ROSE Vision, S.L., Spain); Sara Muñoz (ROSE Vision, S.L., Spain)

S-SEC: Security

Special Session
Organized by Prashant Pillai (University of Surrey, UK) and Haitham S. Cruickshank (University of Surrey, UK)
Room 18, Chair: Prashant Pillai (University of Bradford, United Kingdom) , Haitham Cruickshank (University of Surrey, United Kingdom)

Transmitter and Receiver Processing Specification for a Unified ULE Security Extension

Michael Noisternig (University of Salzburg, Austria); Bernhard Collini-Nocker (University of Salzburg, Austria); Prashant Pillai (University of Bradford, United Kingdom); Lei Liang (University of Surrey, United Kingdom); Haitham Cruickshank (University of Surrey, United Kingdom)

Performance impact of ECN on multimedia traffic with satellite delay

Nimbe Ewald (University of Aberdeen, United Kingdom); Chamil Kulatunga (Waterford Institute of Technology, Ireland); Gorry Fairhurst (University of Aberdeen, United Kingdom)

Real-Time Loss Tolerant Video Streaming Authentication for Satellite Links

Gabriele Oligeri (ISTI-CNR, Pisa, Italy); Stefano Chessa (University of Pisa, Italy); Paolo Barsocchi (ISTI-CNR, Italy); Gaetano Giunta (University of "Roma TRE", Italy); Prashant Pillai (University of Bradford, United Kingdom); Pauline Chan (University of Bradford, United Kingdom)

AAA Framework for Aeronautical Passenger Multicast Communications

Prashant Pillai (University of Bradford, United Kingdom); Yim-Fun Hu (University of Bradford, United Kingdom)

Integration of TESLA and FLUTE over Satellite Networks

Lei Liang (University of Surrey, United Kingdom); Muhammad Nasir Mumtaz Bhutta (University of Surrey, United Kingdom); Haitham Cruickshank (University of Surrey, United Kingdom); Zhili Sun (University of Surrey, United Kingdom); Chamil Kulatunga (Waterford Institute of Technology, Ireland); Gorry Fairhurst (University of Aberdeen, United Kingdom)

Friday, Sep 11

10:00 AM - 11:00 AM

S-Poster: Poster Session

Room Ground-level Corridors and Coffee Break Area
Chair: Giovanni Giambene (University of Siena, Italy)

Software Defined Phased Array Antenna Architecture and Design Approach

Petr Tosovsky (Brno University of Technology, Czech Republic)

Selective Encryption for Efficient and Secure Transmission of Compressed Space Images

Susanna Spinsante (Università Politecnica delle Marche, Italy); Ennio Gambi (Università Politecnica delle Marche, Italy)

A Study on Economic Evaluation of IMT-Advanced Satellite Services in Korea

Jaekyoung Ahn (Seoul National University of Technology, Korea); Nam Wook Cho (Seoul National University of Technology, Korea); Do-Seob Ahn (Electronics and Telecommunications Research Institute, Korea); Jonghwa Kim (Konkuk University, Korea)

Impact of Various Flow-Fields on Laser Beam Propagation

Fotios Stathopoulos (National Technical University of Athens, Greece); Philip Constantinou (National Technical University of Athens, Greece); Athanasios Panagopoulos (National Technical University of Athens, Greece)

A Bandwidth Limited and Error Tolerant nVoD Schema for Satellite Networks

Héctor Cerezo-Costas (Universidad de Vigo, Spain); Rafael Asorey-Cacheda (Universidad de Vigo, Spain); Francisco Castano (Universidad de Vigo, Spain)

Time and Site Diversity Gain: A Close Relationship

Carlo Capsoni (Politecnico di Milano, Italy); Michele D'Amico (Politecnico di Milano, Italy); Roberto Nebuloni (Ieiit - Cnr, Italy)

Comparing The Snow Effects on Hybrid Network Using Optical Wireless and GHz Links

Farukh Nadeem (University of Technology, Graz, Austria); Erich Leitgeb (TUG, Austria); Muhammad Saleem Awan (Graz University of Technology, Austria); Gorazd Kandus (Jozef Stefan Institute, Slovenia)

Dynamic Radio Resource Management for DVB-RCS system using FMT at Ka band

Anbazhagan Aroumont (Tesa/SUPAERO, France); Jose Radzik (ISAE - Institut Supérieur de l'Aéronautique et de l'Espace, France); Laurent Castanet (ONERA, France); Michel Bousquet (SUPAERO, France)

Navigation Techniques Enhancing Intersatellite Communication for Earth Observation Missions

Elisa Duca (Agenzia Spaziale Italiana, Italy); Claudia Facchinetti (Italian Space Agency, Italy); Mario Cosmo (ASI, Italy)

Design of a Small Satellite for Performing Measurements in a Ground Station Network

Bastian Preindl (Vienna University of Technology, Austria); Lars Mehnen (Technikum Wien, Austria); Frank Rattay (Vienna University of Technology, Austria); Jens Nielsen (Aalborg University, Denmark)

Evaluation of Dynamic DTN Routing Protocols in Space Environment

Ioannis Komnios (Democritus University of Thrace, Greece); Sotiris Diamantopoulos (Democritus University of Thrace, Greece); Vassilis Tsaoussidis (Democritus University of Thrace, Greece)

Forward Prediction of FSO received signal for FSO/RF hybrid network

Farukh Nadeem (University of Technology, Graz, Austria); Erich Leitgeb (TUG, Austria); Muhammad Saleem Awan (Graz University of Technology, Austria); Gorazd Kandus (Jozef Stefan Institute, Slovenia)

OFDM based Adaptive Beamforming for Hybrid Terrestrial-Satellite Mobile System with Pilot Reallocation

Ammar Khan (University of Surrey, United Kingdom); Muhammad Ali Imran (University of Surrey, United Kingdom); Barry Evans (University of Surrey, Italy)

Effective Method to Assess the Impact of Interference between Non-Geostationary Satellite Orbit System and Fixed Service

Hyemi Gam (Electronics and Telecommunications Research Institute, Korea); Dae-Sub Oh (Electronics and Telecommunications Research Institute, Korea); Do-Seob Ahn (Electronics and Telecommunications Research Institute, Korea)

PAPR Reduction for OFDM Transmission using a method of Convex Optimization and Amplitude Predistortion

Sara Pino Povedano (Universidad Carlos III De Madrid, Spain); Francisco Javier Gonzalez Serrano (University Carlos III of Madrid, Spain)

BoD algorithm for TCP and multimedia applications in a DVB-S2/RCS system

Armando Garcia Berumen (Instituto Tecnologico de Sonora, Mexico); Michel Marot (Institut TELECOM; Telecom SudParis, France)

Iterative Decodable Block Codes for High-Speed Free Space Optical Communication

Yongxiong Ren (Peking University, P.R. China)

Quasi-Cyclic Low-Density Parity-Check (QC-LDPC) Codes for Deep Space and High Data Rate Applications

Nikoleta Andreadou (Aristotle University of Thessaloniki, Greece); Stylianos Papaharalabos (Institute for Space Applications and Remote Sensing (ISARS), Greece); Fotini-Niovi Pavlidou (Aristotle University of Thessaloniki, Greece); Mathiopoulos Panayiotis (Institute for Space Applications & Remote Sensing, Greece)

Relative Timing Characteristics of GPS Timing Modules for Time Synchronization Application

Pavel Vyskocil (Brno University of Technology, Czech Republic); Jiri Sebesta (Brno University of Technology, Czech Republic)

Multipath Propagation Model for High Altitude Platform (HAP) based on Circular Straight Cone Geometry

José Cuevas Ruíz (Instituto Tecnológico de Estudios Superiores de Monterrey, Mexico); Alejandro Aragon-Zavala (Tecnologico de Monterrey, Campus Queretaro, Mexico); Jose Delgado-Penín (UPC-Technical University of Catalonia, Spain); Gerardo Medina-Acosta (Universidad Politecnica de Cataluña, Spain)

Class Based Scheduling for DVB-S2

Bernhard Collini-Nocker (University of Salzburg, Austria); Thomas Soboll (University of Salzburg, Austria)

11:00 AM - 12:30 PM

S-RRM1: Radio Resource Management I

PhD Session
Room A+B, Chair: Nicolas Chuberre (Thales Alenia Space, France)

Effect of SNR Margin in TCP Performance for HSDPA via GEO Satellite

Fambirai Takawira (University of KwaZulu-Natal, South Africa); Gbolahan Aiyetoro (University of KWaZulu-Natal, Durban, South Africa, South Africa)

A Spectral Efficient Decode-and-Forward Relaying Scheme for Satellite Broadcast Networks

Hui Luo (University of Surrey, United Kingdom); Yi Ma (University of Surrey, United Kingdom); Barry Evans (University of Surrey, Italy)

Cross-Layer Study for Resource Management in DVB-S2 with Mobile Users

Giovanni Giambene (University of Siena, Italy); Samuele Giannetti (University of Siena, Italy); Cristina Parraga Niebla (German Aerospace Center (DLR), Germany); Aduwati Sali (University of Surrey, United Kingdom); Gorry Fairhurst (University of Aberdeen, United Kingdom)

Diversity Investigation of Satellite Backbone Network for BFWA Systems

Péter Kántor (Budapest University of Technology and Economics, Hungary); Gábor Tóth (Budapest University of Technology and Economics, Hungary); Árpád Drozdy (Budapest University of Technology and Economics, Hungary); János Bitó (Budapest University of Technology and Economics, Hungary)

S-NET2: Networking II

PhD Session
Room E, Chair: Bernhard Collini-Nocker (University of Salzburg, Austria)

Comparison of different models for prediction of attenuation from visibility data
Farukh Nadeem (University of Technology, Graz, Austria); Erich Leitgeb (TUG, Austria); Muhammad Saleem Awan (Graz University of Technology, Austria); Gorazd Kandus (Jozef Stefan Institute, Slovenia)

Cloud Attenuations for Free-Space Optical Links
Muhammad Saleem Awan (Graz University of Technology, Austria); Marzuki Marzuki (TUG, Austria); Erich Leitgeb (TUG, Austria); Bernhard Hillbrand (TUG, Austria); Farukh Nadeem (TUG, Austria); Muhammad Saeed Khan (TUG, Austria)

Optical Wavelengths Comparison For Different Weather Conditions
Farukh Nadeem (University of Technology, Graz, Austria); Erich Leitgeb (TUG, Austria); Muhammad Saleem Awan (Graz University of Technology, Austria); Gorazd Kandus (Jozef Stefan Institute, Slovenia)

IEEE802.15.4 Wireless Sensor Network in Mars
Renato Pucci (University of Florence, Italy); Enrico Del Re (University of Florence, Italy); Luca Simone Ronga (CNIT, Italy)

S-PLA: Interplanetary Communications

Special Session
Organized by Otto Koudelka (Graz University of Technology, AT)
Room 4, Chair: Otto Koudelka (Graz University of Technology, Austria)

Interplanetary Communication: A Review of Future Missions
Christian Jentsch (Astrium GmbH - Satellites, Germany); Andreas Rathke (Astrium GmbH, Germany); Oswald Wallner (Astrium GmbH, Germany)

Generic Communication User and System Requirements for Future Space Science Missions
Michael Bergmann (Graz University of Technology, Austria); Patrick Romano (Graz University of Technology, Austria); Otto Koudelka (Graz University of Technology, Austria); Manfred Wittig (ESA, The Netherlands)

Data Relay for Earth, Moon and Mars Missions
Manfred Wittig (ESA, The Netherlands)

Optical Wireless Links in Future Space Communications with High Data Rate Demands
Paul Brandl (TU Graz, Austria); Thomas Plank (TU Graz, Austria); Erich Leitgeb (TUG, Austria)

Developments Towards an Interplanetary Internet
Patrick Romano (Graz University of Technology, Austria); Peter Schrotter (Technical University Graz, Austria); Otto Koudelka (Graz University of Technology, Austria); Manfred Wittig (ESA, The Netherlands)

The Drivers for Future Interplanetary Communication and Navigation
Andreas Rathke (Astrium GmbH, Germany); Christian Jentsch (Astrium GmbH - Satellites, Germany); Oswald Wallner (Astrium GmbH, Germany)

1:30 PM - 3:00 PM

S-RRM2: Radio Resource Management II

Regular Session
Room A+B, Chair: Giovanni Giambene (University of Siena, Italy), Paolo Chini (University of Siena, Italy)

Game-theoretic approach of fair bandwidth allocation in DVB-RCS networks

Stavroula Vassaki (National Technical University of Athens, Greece); Athanasios Panagopoulos (National Technical University of Athens, Greece); Philip Constantinou (National Technical University of Athens, Greece)

Adaptive Admission Control for MBMS satellite system

Anju Pillai (University of Bradford, United Kingdom); Yim-Fun Hu (University of Bradford, United Kingdom); Pauline Chan (University of Bradford, United Kingdom); Roz Millington (University of Bradford, United Kingdom); Paul Febvre (Inmarsat, United Kingdom); Juan Rivera Castro (ESA, The Netherlands)

Advances in Random Access Protocols for Satellite Networks

Riccardo De Gaudenzi (ESA, The Netherlands); Oscar Del Rio (ESTEC TOS-ETC, European Space Agency, The Netherlands)

Simulation of an Adaptive Strategy Designed for Low Bit Rate Emergency Satellite Communications Links in Ku/Ka/Q/V Bands

Ponia PECH (TeSA, France); Puming Huang (SUPAERO, France); Michel Bousquet (SUPAERO, France); Marie Robert (CNES, France); Alban Duverdier (Centre National D'Etudes Spatiales (CNES), France)

View Angle Statistics of Aircraft Airborne Antenna to GEO Satellites

Eriza Hafid Fazli (TriaGnoSys GmbH, Germany); Markus Werner (TriaGnoSys GmbH, Germany)

S-TRA1: Transport and Quality of Service I

Regular Session
Room E, Chair: Christian Kissling (German Aerospace Center (DLR), Germany)

IP-Level Satellite Link Emulation with KauNet

Tanguy Perennou (University of Toulouse - ISAE / LAAS-CNRS, France); Amine Bouabdallah (Tésa/ensica, France); Anna Brunstrom (Karlstad University, Sweden); Johan Garcia (Karlstad University, Sweden); Per Hurtig (Karlstad University, Sweden)

Limitation of Performance Enhancement Proxy with Specialized Oil and Gas Applications

Fawaz Farooqui (Saudi ARAMCO, Saudi Arabia)

Optimal Configuration for Satellite PEPs using a Reliable Service on Top of a Routers-Assisted Approach

Dino Martin Lopez Pacheco (University of Toulouse - ISAE / LAAS-CNRS, France); Emmanuel Lochin (University of Toulouse - ISAE / LAAS-CNRS, France)

A Dynamic Cross-Layer Architecture for QoS Provisioning of Multimedia Services on all-IP based Adaptive Satellite Networks

Jorge Diaz del Rio Garcia (European Space Agency, Spain); Oscar Del Rio (ESTEC TOS-ETC, European Space Agency, The Netherlands); Manuel Fernández Veiga (Universidade de Vigo, Spain)

S-DTN: Delay Tolerant Networking

Regular Session
Room 4, Chair: Haitham Cruickshank (University of Surrey, United Kingdom)

TCP, PEP and DTN Performance on Disruptive Satellite Channels

Carlo Caini (University of Bologna, Italy); Piero Cornice (University of Bologna, Italy); Rosario Firrincieli (University of Bologna, Italy); Daniele Lacamera (University of Bologna, Italy); Marco Livini (University of Bologna, Italy)

Performance Analysis of the Delay-Tolerant Satellite Distributed MAC Reservation Protocols

Alexander Markhasin (Siberian Telecommunications University, Russia)

Evaluation of CCSDS File Delivery Protocol over Delay Tolerant Networks

Efthymios Koutsogiannis (Democritus University of Thrace, Greece); Giorgos Papastergiou (Democritus University of Thrace, Greece); Vassilis Tsaoussidis (Democritus University of Thrace, Greece)

Security analysis for Delay/Disruption Tolerant satellite and sensor Networks

Haitham Cruickshank (University of Surrey, United Kingdom); Muhammad Nasir Mumtaz Bhutta (University of Surrey, United Kingdom); Godwin Ansa (University of Surrey, United Kingdom); Henry Johnson (University of Surrey, United Kingdom); Naveed Ahmad (University of Surrey, United Kingdom); Mohammad Alsiyabi (University of Surrey, United Kingdom)

3:30 PM - 5:00 PM

S-HYBR: Robust Hybrid Networks for Rural & Tropics

Special Session
Organized by Maria-Angeles Vazquez-Castro (Universidad Autónoma de Barcelona, ES)
Room A+B, Chair: David Pradas Fernandez (Universitat Autònoma de Barcelona & CNES, ISAE, TeSA, France)

Hybrid Satellite-WiMAX architecture and access design for tropical areas

Jose Radzik (ISAE - Institut Supérieur de l'Aéronautique et de l'Espace, France); Anbazhagan Aroumont (Tesa/SUPAERO, France); Michel Bousquet (SUPAERO, France); Laurent Castanet (ONERA, France); Nicolas Jeannin (ONERA, France)

Cross-layer optimization of hybrid satellite network over the Amazonian region

Jose Radzik (ISAE - Institut Supérieur de l'Aéronautique et de l'Espace, France); Oriol Vidal (ISAE, France); David Pradas Fernandez (Universitat Autònoma de Barcelona, France); Maria-Angeles Vazquez-Castro (Universidad Autónoma de Barcelona, Spain)

Satellite and Terrestrial Diversity Reception Performance in Tropical Regions

Dimitrios Skraparlis (National Technical University of Athens, Greece); Vasileios Sakarellos (National Technical University of Athens, Greece); Athanasios Panagopoulos (National Technical University of Athens, Greece); John Kanellopoulos (National Technical University of Athens, Greece)

Satellite PHY-layer Selector Design for Video Applications in Tropical Areas

David Pradas Fernandez (Universitat Autònoma de Barcelona, France); Paolo Barsocchi (ISTI-CNR, Italy); Lei Jiang (Universidad Autónoma de Barcelona, Spain); Francesco Potortì (ISTI-CNR, Italy); Maria-Angeles Vazquez-Castro (Universidad Autónoma de Barcelona, Spain)

Latest impact of supporting DVB-RCS for Rural America

Harald Skinnemoen (AnsuR Technologies, Norway); Alexandre Tosoni (Unisat, Brazil)

S-TRA2: Transport and Quality of Service II

PhD Session
Room E, Chair: Carlo Caini (University of Bologna, Italy)

SIP Signaling and QoS for VoIP over IPv6 DVB-RCS Satellite Networks
Muhammad Ali (University of Surrey, United Kingdom); Lei Liang (University of Surrey, United Kingdom); Zhili Sun (University of Surrey, United Kingdom); Haitham Cruickshank (University of Surrey, United Kingdom)

Evaluation of TCP performance over emulated DVB-RCS scenario with multiple RCSTs
Francesco Belli (University of Rome "Tor Vergata", Italy); Michele Luglio (Univ. of Rome Tor Vergata - Dip. Ing. Elettronica, Italy); Cesare Roseti (University of Rome Tor Vergata, Italy); Francesco Zampognaro (Univeristy Tor Vergata, Italy)

A Quickly Deployable Platform for Multi-User Communications Over Satellite Links
Roksana Boreli (National ICT Australia, Australia); Thava Iyer (NICTA, Australia); Christoph Dwertmann (NICTA, Australia); Golam Sarwar (National ICT Australia Ltd (NICTA), Australia); Frits Klok (7-IP, The Netherlands)

TCP Performance on a Railway Satellite Channel
Michele Luglio (Univ. of Rome Tor Vergata - Dip. Ing. Elettronica, Italy); Cesare Roseti (University of Rome Tor Vergata, Italy); Francesco Zampognaro (University Tor Vergata, Italy); Gianluca Savone (University of Rome Tor Vergata, Italy)

S-APP: Applications and Services

Regular Session
Room 4, Chair: Haitham Cruickshank (University of Surrey, United Kingdom)

Data Collection and SCADA over GEO-MSS Satellites using Spread SCMA
Russell Fang (Hughes Network Systems, USA); Mustafa Eroz (Hughes Network Systems, USA)

Can Satellites Face Trends? The Case of Web 2.0
Luca Caviglione (National Research Council (CNR), Italy)

Network of Mobile Networks; Hybrid Terrestrial-Satellite Radio
Branimir Vojcic (George Washington University, USA); Dennis Mathesson (TerreStar Networks, USA); Henry Clark (TerreStar Networks, USA)

On DVB Satellite Network Integration in IMS
Fabrice Arnal (Thales Alenia Space, France); Julien Fasson (University of Toulouse - IRIT - INPT/ENSEEIHT, France); Cedric Baudoin (Thales Alenia Space, France); Emmanuel Chaput (IRIT-ENSEEIHT, France); Beatrice Paillassa (ENSEEIHT, France); Francois Goas (Viveris Technologies, France); Sébastien Ducloux (Viveris technologies, France); Emmanuel Dubois (CNES, France); Patrick Gelard (CNES, France)

IWSSC'09 Welcome Party

Wednesday, September 9, 19.30 – Welcome Party

Faculty of Engineering rear panoramic patio (1st floor), Via Roma, 56, Siena

IWSSC'09 Banquet

Thursday, September 10, 19.30 - Banquet

"Piccolo Castello" restaurant, Via 1° Maggio 1, Monteriggioni (Castle), Siena

ISWCS'09&IWSSC 2009 Information

Conference Location

Faculty of Engineering (ground floor and first floor), Via Roma, 56 53100 Siena – Italy

Conference Secretariat

Giuliana Pasquini, University of Siena, Italy
Tel: +39 0577 232136 – Email: pasquini@unisi.it, iswcs09@dii.unisi.it

Tours Information

Tours are available for both ISWCS'09 and IWSSC'09. If you like to make a reservation please follow the links: **http://www.iswcs.org/iswcs2009/tours.html** or **http://iwssc09.dii.unisi.it/tours.html**.

Wireless Internet Access (WiFi)

The University of Siena provides wireless access. In order to gain access to the network for the first time please follow these steps:

1. Join the network with the **SSID named "silver"**;
2. Open your web browser and you will be redirected to a welcome page;
3. Click on the button "Install GARR CA Cert" and complete the subsequent installation;
4. Enter your credential and login (provided at the registration desk);
5. Download and install the Cisco Clean Access Agent
6. Fulfil all Cisco Clean Access Agent security requirements if asked (e.g., update your antivirus)
7. Access freely the web

Note: only in Room n. 4 the SSID is "iswcs" and the access is open.

Due to the Italian legislations on security policies, in order to obtain credentials to access the wireless, a copy of your passport or ID card has to be provided at the registration desk. GARR access rules: http://www.garr.it/reteGARR/aup.php

Wired Internet Access in Room 15

Follow these steps:

1. An IP will be automatically assigned to you by a DHCP server once connected
2. Open your web browser and set automatic proxy-selection; otherwise set manually the following proxy server:

IP Address: 10.0.0.2 - PORT: 8080

Instructions for Speakers

Each oral session room will have an LCD projector, overhead projector, and screen. You need to bring your own laptop to use with the LCD projector. You can check in advance your presentation using the LCD projector in room 15.

Speakers should also prepare a short (5 to 10 lines) biography to be given to their Session Chair.

The Session Chair will be present in the room 20 minutes before the beginning of each session.

Template slides for ISWCS'09 are available at the following link: http://www.iswcs.org/iswcs2009/Presentation_style_ISWCS2009.ppt

Template slides for IWSSC 2009 are available at the following link: http://iwssc09.dii.unisi.it/Presentation_style_IWSSC2009.ppt

For papers in poster sessions, authors have poster board to showcase their works in a highly interactive format. The posters must have an A0 portrait size.

Information for Registration to IWSSC'09 (only for people already registered to ISWCS'09)

ISWCS'09 and IWSSC'09 are co-located events, but they have separate registrations.If you are registered to ISWCS'09 and you like to attend also IWSSC'09, you have to register separately for IWSSC'09 at a discounted rate of EUR 250 (for online registration: **http://iwssc09.dii.unisi.it/registration.html**).
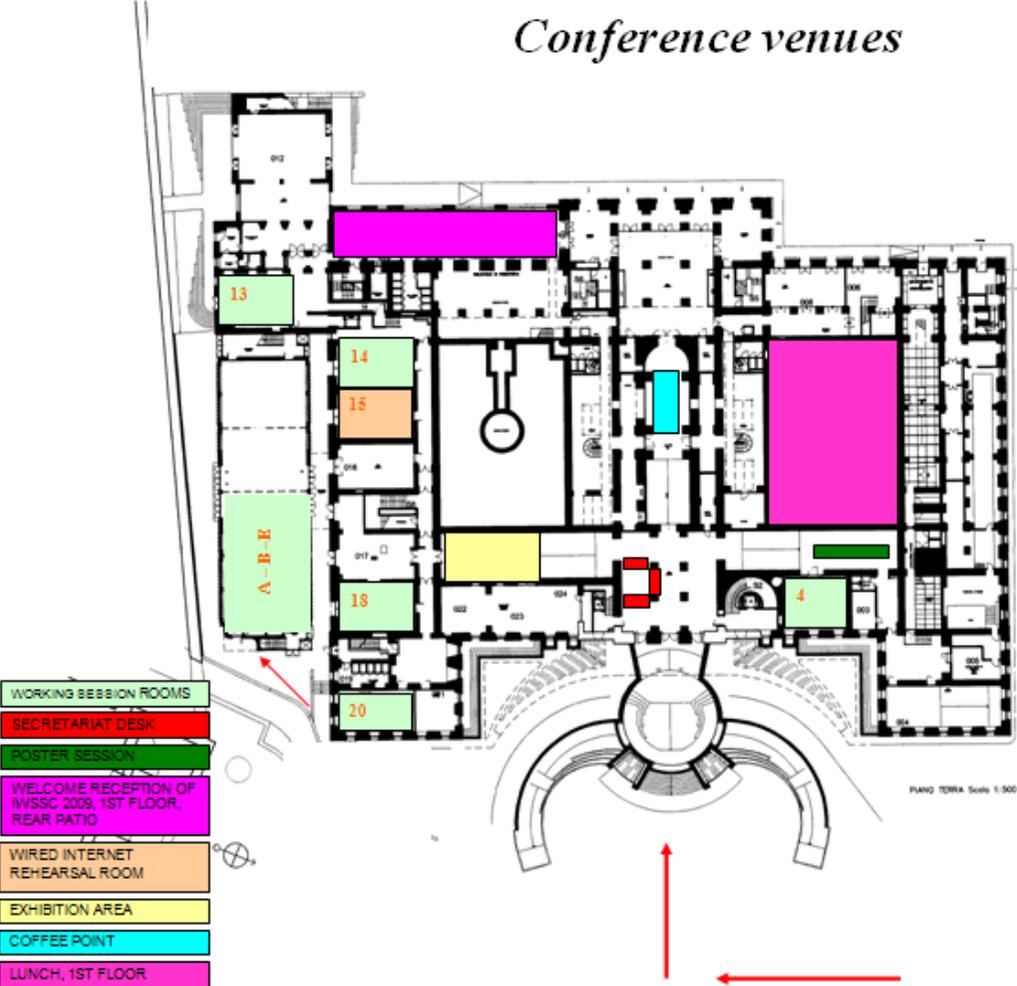
In order to enter to the Conference, please follow the green indicators and spots (Ground level)

Siena Map and Travel Directions

Siena Map and Faculty of Engineering Location

Faculty of Engineering, Via Roma 56
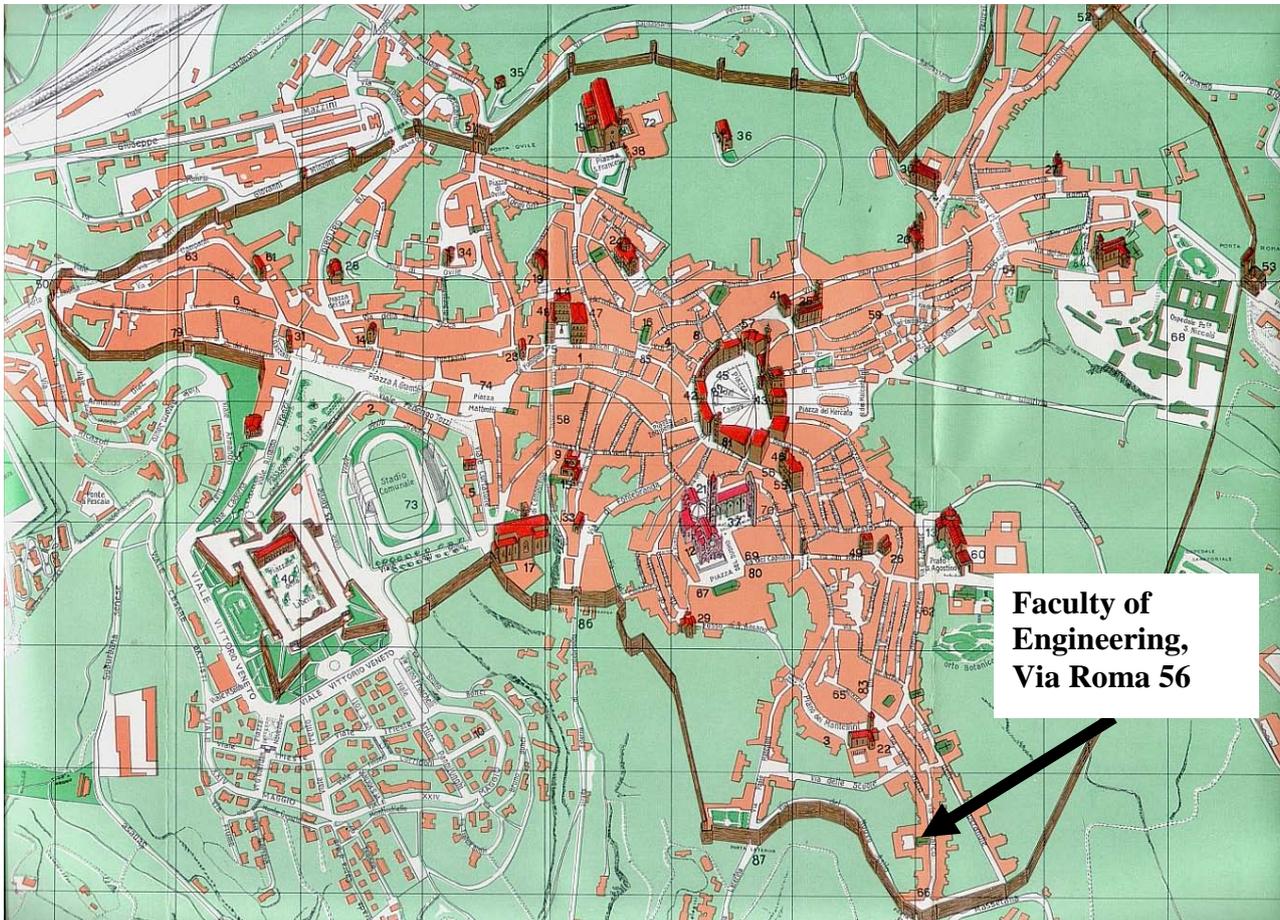
District of Siena (i.e., the "contrade")

There are 17 districts in Siena, each with its own flag:

"Aquila" (Eagle)
"Bruco" (Caterpillar)
"Chiocciola" (Snail)
"Civetta" (Owlet)
"Drago" (Dragon)
"Giraffa" (Giraffe)
"Istrice" (Porcupine)
"Lupa" (She-Wolf)
"Leocorno" (Unicorn)
"Nicchio" (Shell)
"Oca" (Goose)
"Onda" (Wave)
"Pantera" (Panther)
"Selva" (Forest)
"Tartuca" (Tortoise)
"Torre" (Tower)
"Valdimontone" (Ram)

Engineering faculty

The Faculty of engineering is located in the south of Siena in an old building known as San Niccolò, near the medieval gate of Porta Romana. The building, which formerly housed a psychiatric hospital, has recently been completely renovated by the University of Siena and currently hosts the Faculty of engineering and the Department of Communication Sciences (which belongs to the Faculty of Arts and Humanities). The Faculty of engineering covers an area of about 3.000 sqm, and has about 80 offices and 20 laboratories.

In order to enter to the Conference, please follow the green indicators and spots (Ground level).

How to reach Siena

To reach Siena you have to take the flight to Rome or (better) to Florence and Pisa.

Solutions from Florence

By bus from Florence: When you arrive at the Florence airport you have to take the shuttle "Volainbus" that leaves in the street just at the exit of the airport (in front of the arrival lounge) More details at the ATAF website. Departures are every 30 minutes (e.g., 11:00, 11:30, 12:00, 12:30....) from 6:00 to 23:30. Tickets are available on board € 4,50. With the shuttle you have to arrive to the central railway station of Florence: "Firenze S. Maria Novella". In front of this station there is the bus terminus of the "SITA" Company that links Florence and Siena. Such bus terminus is shared by two companies that jointly guarantee the service: "TRAIN" and "SITA". There are frequent buses from morning to evening (every about 40 minutes). In order to select the best buses, please consider those with the label "SIENA RAPIDA" that takes maximum 1 hour and 30 minutes to reach Siena (please avoid the buses labeled as "SIENA DIRETTA"). For more details on bus schedule, please visit the TRAIN Web site. When you arrive in Siena you have to reach the last stop, that is the bus terminus in "Piazza Gramsci" (i.e., Gramsci square). Such stop is very close to the center (5 minutes walking to "Il Campo" square). Taxi details can be found on the Web or by phone, number +39 0577 4922.

By car from Florence: Rent a car at the Florence airport. From the Florence Airport you directly take highway A11 (direction to Pisa). In a short time you find the indication for highway A1 and the Siena indication. You leave A1 almost soon at Firenze Certosa. From here you take the highway that links Florence to Siena (1 hour travel at 90 km/h). When you arrive at Siena you can exit at "Siena Nord" or "Siena Ovest". The trip totally lasts 1 hour and 30 minutes.

By train from Florence: Please note that the train is not the most efficient solution to reach Siena (even if possible from Florence). We do advice to use the bus which drives you directly to the center of the city and in less time.

Solutions from Rome

By bus from Rome: Siena is also linked with Rome through the "SENA" bus line. These buses leave from the square in front of the Roma Tiburtina railway station in Rome. To reach Tiburtina from the station there is a train every 30 minutes from the airport, the ticket costs less than 6 euros. The trip to Siena from such station lasts about 3 hours and brings you directly to Siena's center, the ticket costs 20 euros.

By train from Rome: Please note that the train is not the most efficient solution to reach Siena (even if possible from Rome). We do advice to use the bus which drives you directly to the center of the city and in less time.

Solutions from Pisa

By bus from Pisa: TRAIN S.p.a. connects Pisa Airport to Siena, daily. To/From the Airport, main bus stops on way are: Pisa Airport - Siena (P. Gramsci). You can buy tickets from the information office in the passenger terminal. Check TRAIN home page if there is a bus closed to your arrival time

By train from Pisa: Pisa Airport and Firenze SMN railway station are connected by six trains a day. The Pisa-Florence line also connects Pontedera and Empoli. You can change train in Empoli and then come to Siena.