IEEE GLOBECOM 2007
GLOBAL COMMUNICATIONS CONFERENCE.
EXHIBITION & INDUSTRY FORUM

50th Anniversary

THE PREMIER TELECOMMUNICATIONS EVENT

26 - 30 November 2007
Hilton Washington Hotel, Washington, DC

PROGRAM INCLUDES:

9 TECHNICAL SYMPOSIA
(164 Sessions & 900+ Technical Presentations)

GENERAL SYMPOSIUM
(17 Sessions & 100+ Technical Presentations)

ACCESS '07 EXECUTIVE BUSINESS FORUM
(12 Sessions & 1 Luncheon Executive Panel)

DESIGN AND DEVELOPERS FORUM
(9 Sessions)

20 TUTORIALS & 9 WORKSHOPS

50th ANNIVERSARY CELEBRATION
Hosted by DR. IRWIN JACOBS,
Co-Founder & Chairman, QUALCOMM, INC.
Featuring Keynote Speaker DR. JEONG KIM,
President, Bell Labs at Alcatel-Lucent

50th ANNIVERSARY COMMEMORATIVE LECTURE
by DR. LEONARD KLEINROCK, UCLA

CO-LOCATED EVENTS

EntNet
GOLD Program
MANIAC Challenge

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CO N T E N T S

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HIGHLIGHTS

IEEE GLOBECOM 2007 offers attendees multiple opportunities to meet and interact with their peers in a stimulating and thriving environment.

Gain Industry Insight from Experienced Leaders

> Scott McGregor, CEO, Broadcom
  Tuesday, 27 November 2007 • 8:00 am - 9:30 am

> Mark A. Wegleitner, Senior Vice President, Technology & CTO, Verizon Communications
  Tuesday, 27 November 2007 • 8:00 am - 9:30 am

> Dr. Jeong Kim, President, Bell Labs at Alcatel-Lucent
  Tuesday, 27 November 2007 • 6:15 pm – 7:15 pm

> Matt Bross, CTO, BT Group
  Wednesday, 28 November 2007 • 8:00 am – 9:30 am

> Representative Cliff Stearns, Florida’s Sixth District
  Wednesday, 28 November 2007 • 2:00 pm – 3:45 pm

> Prof. Wu Hequan, Vice President, Chinese Academy of Engineering
  Thursday, 29 November 2007 • 8:00 am – 9:30 am

Network with Industry Experts

Awards Luncheon
Tuesday, 27 November 2007 • 12:15 pm – 1:45 pm

50th Anniversary Celebration
Hosted by Dr. Irwin Jacobs, Co-Founder & Chairman QUALCOMM, Inc; featuring Dr. Jeong Kim, President, Bell Labs at Alcatel-Lucent
Tuesday, 27 November 2007 • 6:15 pm – 7:15 pm

Welcome Reception
Tuesday, 27 November 2007 • 7:30 pm – 10:00 pm

Conference Banquet
Wednesday, 28 November 2007 • 7:00 pm – 10:00 pm

50th Anniversary Commemorative Lecture
by Dr. Leonard Kleinrock, UCLA
Thursday, 29 November 2007 • 12:00 pm – 1:45 pm

Register by 31 October and Save!
On behalf of the IEEE Communications Society and the IEEE GLOBECOM 2007 Executive Committee, we are pleased to invite you to the 50th Anniversary of the IEEE Global Communications Conference (IEEE GLOBECOM) to be held 26 – 30 November 2007 in Washington, DC, the nation’s capital. The theme for this year’s conference is “Innovate, Educate, Accelerate.”

IEEE GLOBECOM 2007 is a special celebration of the first 50 years of IEEE GLOBECOM and will be an event to remember, culminating in historical recollections of past successes of our conference, as well as holding to our traditional coverage of the latest in technological trends and future advances in the field of communications.

At IEEE GLOBECOM 2007, the 2nd Annual IEEE Communications Industry Forum and EXPO will focus on components and equipment used in communications systems, as well as extensive EXPO technical programs geared to industrial designers and developers. The EXPO program includes the ACCESS ’07 Executive Business Forum and Design and Developers Forum, tailored to executives and experts representing industry and government.

At the heart of IEEE GLOBECOM is the technical presentations, which will be given in 9 Symposia that focus on technological trends in recent communication research and development from academia to the industrial laboratories throughout the world. Attendees will be able to further explore fields of interest and select specialty areas presented by the leading scientists, professors, and engineers from around the world.

IEEE GLOBECOM 2007 will be held in the Hilton Washington Hotel with some meetings at the nearby Marriott Courtyard. Conveniently located near the Washington Area Metropolitan Subway System, the hotels are just minutes from the beautiful Rock Creek Park Preserve, the Washington National Zoo, and the Washington museums and monuments.

Without a doubt, IEEE GLOBECOM 2007 is the one conference you want to attend. The 50th anniversary celebration and events will be something to remember for years to come. Make a commitment to join us in Washington, DC this November and enjoy the beautiful surrounding areas of Virginia and Maryland.

Jorome (Jerry) Gibbon
J & BG Consultants, LLP
General Chairman
IEEE GLOBECOM 2007

Karl Rauscher
Bell Labs, Alcatel-Lucent
General Vice Chair
IEEE GLOBECOM 2007

On behalf of the Technical Program Committee, I would like to welcome you to the 50th Annual IEEE Global Telecommunications Conference, themed “Innovate, Educate, Accelerate”, to be held in Washington, DC – the capital city of the United States.

IEEE GLOBECOM 2007 will showcase a technical program consisting of one General Symposium, 9 Symposia on special topics, tutorials and workshops, covering many exciting aspects of telecommunications and new emerging technologies. This year we received a record number of 2,576 paper submissions, 48 tutorial and 13 workshop proposals, out of which 1,018 papers, 20 tutorial and 9 workshop proposals have been accepted. The papers for the technical symposia are divided into 153 oral presentations and 11 poster presentations. All accepted papers for oral and poster presentations will be published in the conference proceedings.

I would like to express my sincere appreciation and thanks to all the symposia, tutorial and workshop co-chairs, the technical program committee members, and the external reviewers for their great efforts in the paper review process. I would like to thank all the authors who submitted their papers to IEEE GLOBECOM 2007. I would also like to thank the IEEE GLOBECOM 2007 Executive Committee for its full support. I hope to see you in Washington, DC this November!

Xuemin (Sherman) Shen
University of Waterloo
Technical Program Chair
IEEE GLOBECOM 2007

EXECUTIVE COMMITTEE

GENERAL CHAIR:
Jorome (Jerry) T Gibbon, J&BG Consultants

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Karl Rauscher, Bell Labs, Alcatel-Lucent

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Dilip Krishnaswamy, QUALCOMM, Inc.

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Xiaojun Lin, Purdue University

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Heather Ann Sweeney, Associate Marketing Manager
Kerrianne Sullivan, Desktop Production Specialist
David Alvarez, Information Systems & Networking Manager
IEEE GLOBECOM 2007 PATRONS AS OF AUGUST 2007

On behalf of IEEE Communications Society and the IEEE GLOBECOM 2007 Planning Committee, I would like to take this opportunity to invite your company’s support of IEEE GLOBECOM 2007. From the generosity of companies like yours, the IEEE GLOBECOM 2007 Planning Committee will reach the impressive milestone for celebrating its 50th Anniversary. This year’s conference celebration will be an exciting event, one sure to draw engineers, scientists, and leaders from across the globe.

Tim Weil
Booz Allen Hamilton
Patronage Chair, IEEE GLOBECOM 2007

For further details on how to Exhibit at the IEEE Communications Expo, please contact Connie Shaw at J. Spargo and Associates at 703-631-6200 ext. 3905.
SCOTT MCGREGOR
CEO
Broadcom

Scott McGregor is the President and Chief Executive Officer of Broadcom. In this role, he is responsible for guiding the strategic direction of the company, business development, and day-to-day operations.

Mr. McGregor, who is also a member of the Board of Directors, joined Broadcom in January 2005 after serving since September 2001 as President and CEO of the Philips Semiconductors division of the Netherlands-based Royal Philips Electronics. At Philips, Mr. McGregor oversaw one of the world’s largest semiconductor suppliers, with 34,000 employees in over 50 countries and nearly US$6 billion in sales in 2004. In addition to his CEO role, he was also a member of the Group Management Committee of Royal Philips Electronics. He joined Philips Semiconductors in February 1998 as head of its Emerging Business unit, focusing on fast growing markets for smart cards, RFID, networking, digital media processing and computing, and leading the group to profitability and nearly US$1 billion in sales.

Before joining Philips, from 1990 to 1998 Mr. McGregor served in various senior management positions, most recently as Senior Vice President and General Manager at Santa Cruz Operation Inc. (SCO), a provider of network computing solutions. From 1985 to 1990, he served in senior positions at Digital Equipment Corporation (now part of HP) where he led the UNIX workstation software group and was one of the architects of the X Window System. Prior to joining Digital Equipment Corporation, he worked at Microsoft, where he was Director of the Interactive Systems Group and the architect and development team leader of the original version of Microsoft(r) Windows(r). Prior to Microsoft, Mr. McGregor spent over six years in various positions at the Xerox Corporation’s Palo Alto Research Center (PARC), where he was involved in designing software for the first personal computers employing graphical user interfaces. Mr. McGregor received a B.A. in Psychology and a M.S. in computer science and computer engineering from Stanford University.

MARK A. WEGLEITNER
Senior Vice President, Technology & Chief Technology Officer
Verizon Communications

Mark Wegleitner is Senior Vice President – Technology and Network Planning, and Chief Technology Officer (CTO) for Verizon Communications. His responsibilities include technology assessment, network architecture, platform development and laboratory testing for the local and long distance wireline communications businesses, as well as network planning for local wireline communications. In his current role, he and his organization support all wireline business units in the management of technology and network matters.

Prior to his current assignment, Mr. Wegleitner served as Vice President, Technology and Engineering at Bell Atlantic Network Services, where he was responsible for all technology and engineering functions. Before that, he was CTO at Bell Atlantic Network Services. Since joining Bell Atlantic, he has also held a variety of other management positions in strategic planning, network architecture, technology development, information systems, research and development, broadband implementation, and new services technology.

Mr. Wegleitner began his career with Bell Telephone Laboratories in local switching systems development. He later joined the exchange switching systems design organization at AT&T General Departments, where he had responsibility for the introduction of new features and services on local switching systems. He held another brief assignment with Bell Laboratories in local switching systems engineering before transferring to Bell Atlantic. Mr. Wegleitner received a B.A. in mathematics from St. John’s University, and a M.S. in electrical engineering and computer science from the University of California at Berkeley.
Dr. Jeong H. Kim’s career is a unique synthesis of academic distinction and technical, entrepreneurial, and organizational leadership. Businessman and teacher, philanthropist and former nuclear submarine officer, Dr. Kim is currently President of Bell Labs, the communication industry’s most heralded research organization. Dr. Kim’s executive mission is to infuse Bell Labs’ research and development with an entrepreneurial spirit that generates revolutionary technologies and dramatic impact in the marketplace.

Jeong Kim was born in Seoul, South Korea. He immigrated to the United States with his family at 14 and entered public school in Maryland speaking no English. At 16 he left home, worked odd jobs to support himself through high school, and won a place at Johns Hopkins University, where in three years he completed degrees in electrical engineering and computer science while working for Digitus, a technology start-up in which he became a partner.

After a seven-year stint in the U.S. Navy — a period in which he earned a master’s degree in technical management from Hopkins — Dr. Kim joined AlliedSignal to work at the Naval Research Laboratory, simultaneously earning a PhD in reliability engineering from the University of Maryland.

In 1992, Dr. Kim launched Yurie Systems, the enterprise that would define him as one of the nation’s most successful high-tech entrepreneurs. Yurie was built around an enormously flexible and robust asynchronous transfer mode technology that streamlined data communications between different systems. So successful was Yurie’s switch that, in February 1997, Dr. Kim took the firm public; in May, Business Week ranked Yurie the #1 Hot Growth Company among all public companies in the United States. In 1998, Lucent Technologies acquired Yurie for $1.1 billion in cash. Dr. Kim was named Ernst & Young’s National Emerging Entrepreneur of the Year.

Until 2001, Dr. Kim stayed on with Lucent and successfully led a major turnaround effort of its multi-billion dollar Optical Networking Group’s business as the Group President. Then, he returned to the University of Maryland to teach engineering. He rejoined Lucent (now Alcatel-Lucent) in 2005 as the 11th President of Bell Labs. He has been widely recognized for his diverse accomplishments. A member of the prestigious National Academy of Engineering and of the Washington Business Hall of Fame, he was inducted into the University of Maryland’s Innovation Hall of Fame in 2004. The university also named its new Jeong H. Kim Engineering Building in his honor.
Wednesday, 28 November 2007 • 8:00 am - 9:30 am

MATT BROSS
Chief Technology Officer
BT Group

Matt Bross, BT Group CTO, is responsible for setting the BT Group technology strategy and the vision and direction of innovation across BT. In his role at BT, Matt is responsible for BT’s Research and Venturing efforts globally. Matt is the leading force behind BT’s multi-billion pound, 21st Century Network transformation, and is leading innovation for BT. He has served on the boards of many companies providing strategic technology and business leadership. He is a commissioner of the Global Information Infrastructure Commission (GIIC) since December 2005, as Regional Director for Europe. GIIC is a confederation of CxO level executives engaged in the development, deployment, operation, financing, and use of ICT services and products.

Matt is also a board member of the Alliance for Telecommunications Industry Solutions (ATIS), a United States based body focusing on the development and promotion of technical and operations standards for the communications and related information technology industry globally. ATIS is accredited by the American National Standards Institute (ANSI). Matt is the Chairman on the Board of Advisors for the Global Innovation Research Centre (GIIC), the organization that works to foster innovation in Malaysian Government, industry and education sectors. Matt is widely regarded as a visionary speaker on media and telecommunications issues globally. He is married with 5 children and proud to have one of the coolest jobs on the planet.

Thursday, 29 November 2007 • 8:00 am - 9:30 am

PROF. WU HEQUAN
Vice President
Chinese Academy of Engineering

Wu Hequan graduated from Wuhan Post and Telecommunications Institute in 1964. He has worked for the China Academy of Post and Telecommunications (CAPT) of MPT since 1964. He was Vice President and Chief Engineer of the China Academy of Telecommunications Technology (CATT) from 1997 to 2003. He has studied optical fiber transmission system and broadband network and managed R&D projects. In recent years, he has focused on the development strategy of NGN and NGI as well as 3G. He was elected Academician of the Chinese Academy of Engineering (CAE) in 1999 and Vice President of CAE since June 2002. He is currently serving as Vice Director of the Advisory Committee for the State Informatization of China as well as Vice Director of the Executive Council of the China Institute of Communications (CIC) and the Chinese Institute of Electronics (CIE), respectively. He is an advisor to the Communication S&T Committee of MII and a member of the Advisory Committee of the National Basic Research Program of China (973 Plan). He serves as Director of the Experts Committee of China’s Next Generation Internet (CNGI) project. He is a senior member of IEEE.

Thursday, 29 November 2007 • 12:00 noon - 1:45 pm

Dr. LEONARD KLEINROCK
UCLA

Dr. Leonard Kleinrock created the basic principles of packet switching, the technology underpinning the Internet, while a graduate student at MIT. In this effort, he developed the mathematical theory of data networks. This was a decade before the birth of the Internet which occurred when his host computer at UCLA became the first node of the Internet in September 1969. He wrote the first paper and published the first book on the subject; he also directed the transmission of the first message to pass over the Internet. He was also responsible for setting up and running the Internet measurement facility that stressed the early Internet to establish its performance limits and to evaluate its performance and behavior. In these efforts, he laid the groundwork and established the discipline by which future generations of engineers would seek to model, measure and evaluate the computer and communication systems they were building. He was listed by the Los Angeles Times in 1999 as among the “50 People Who Most Influenced Business This Century”.

Dr. Kleinrock received his Ph.D. from MIT in 1963 and has served as a professor of computer science at the University of California, Los Angeles since then, serving as chairman of the department from 1991-1995. He received his BEE degree from CCNY in 1957. He has also received honorary degrees from CCNY (1997), the University of Massachusetts, Amherst (2000), the University of Bologna (2005), and Politecnico di Torino (2005). He has published more than 240 papers and authored six books on a wide array of subjects including queueing theory, packet switching networks, packet radio networks, local area networks, broadband networks, gigabit networks and nomadic computing.

Dr. Kleinrock is a member of the American Academy of Arts and Sciences, a member of the National Academy of Engineering; an IEEE fellow, an ACM fellow and a founding member of the Computer Science and Telecommunications Board of the National Research Council. Among his many honors, he is the recipient of the CCNY Townsend Harris Medal, the CCNY Electrical Engineering Award, the Marconi Award, the L.M. Ericsson Prize, the NAE Charles Stark Draper Prize, the Okawa Prize, the IEEE Internet Millennium Award, the UCLA Outstanding Teacher Award, the Lanchester Prize, the ACM SIGCOMM Award, the Sigma Xi Morrie First Award, the INFORMS Presidents Award, and the IEEE Harry Goode Award.
IEEE GLOBECOM 2007 will feature 9 Technical Symposia and the General Conference, featuring 153 oral presentation sessions (918 papers) and 11 post sessions (100 papers). (P) designates the poster session.

General Conference:
16 oral sessions, 1 poster session
Co-Chairs:
Wenjing Lou, Worcester Polytechnic Institute
Alek Kawcic, University of Hawaii
John Buford, Panasonic
Stefano Bregni, Polytechnic of Milan
Wanjiun Liao, National Taiwan University

Security
• IP Networks Security
• Cryptography and Key Management
• Intrusion Detection and Reputation Based Systems
• Security Protocols
• Wireless Security - PHY and MAC
• Wireless Channel and Coding Techniques

P2P
• Overlay Routing and Topology
• P2P Streaming and Measurement
• P2P Traffic and Performance

Data Storage
• Data Storage

Power Lines Communications and Other Topics
• Power Line Communications and Intelligent Transportation Systems (ITS)
• Wireless Communications and Networking
• Routing, Addressing, and Multicasting
• Resource Management
• Switch and Router Designs
• Service and Applications

Ad Hoc and Sensor Networking Symposium:
22 oral sessions, 2 poster sessions
Co-Chairs:
Azzedine Boukerche, University of Ottawa
Hsiao-Hwa Chen, National Sun Yat-Sen University
Hussein Moutah, University of Ottawa

• MAC Protocols and Performance Evaluation
• Power Control and Collision Avoidance
• Resource Allocation and QoS Provisioning
• Coding, Modulation, and Synchronization
• Modeling of Ad Hoc Networks
• Ad Hoc Network Security: Misbehavior, Fault Detection and Secure Algorithms

Communication Theory Symposium:
12 oral sessions, 1 poster session
Co-Chairs:
Amir H. Banihashemi, Carleton University
Sennur Ulukus, University of Maryland

• Cooperative Communications-I
• Cooperative Communications-II
• Coded Modulation
• Detection, Channel Estimation and Equalization
• Error Control Coding
• Fading Channels
• Iterative Coding Schemes
• MIMO Systems I
• MIMO Systems II
• Multiple-Access Schemes
• OFDM and Multicarrier Systems
• Space-Time Coding
• Topics in Communication Theory (P)

Internet Protocol Symposium:
8 oral sessions
Co-Chairs:
Nirwan Ansari, New Jersey Institute of Technology
Mohammed Atiquzzaman, University of Oklahoma
Nei Kato, Tohoku University

• Mobility Management
• Quality of Service
• Routing Protocols
• Network Security and Privacy
• Multicast, Anycast and Wireless
• Transport Protocol and Application Services
• Advanced Architectures and Protocols I
• Advanced Architectures and Protocols II

Multimedia Communications, Software, and Services Symposium:
4 oral sessions
Co-Chairs:
Gary Chan, Hong Kong University of Science and Technology
Pascal Frossard, EPFL
Algirdas Pakstas, London Metropolitan University

• Multimedia Coding and Control
• Multimedia Content Distribution
• Wireless Multimedia
• Multimedia Systems and Applications
IEEE GLOBECOM 2007 will feature 9 Technical Symposia and the General Conference, featuring 153 oral presentation sessions (918 papers) and 11 post sessions (100 papers). (P) designates the poster session.

### Optical Networking Symposium:
8 oral sessions, 1 poster session

Co-Chairs:
- **Admela Jukan**, Technical University Carolo-Wilhelmina of Braunschweig
- **Ahmed Kamal**, Iowa State University
- **Achille Pattavina**, Politecnico Milano
- **George Ellinas**, University of Cyprus

- Optical Access Networks
- Free Space Optical Networks and Optical Burst Switching
- Multipoint Optical Communication
- Optical Network Control
- Optical Switching
- Optical Communications
- Optical Network Survivability
- Optical Network Dimensioning and Provisioning
- Topics in Optical Networks and Systems (P)

### Performance Modeling, QoS, and Reliability Symposium:
9 oral sessions, 1 poster session

Co-Chairs:
- **Pascal Lorenz**, University of Haute Alsace
- **Fabrizio Granelli**, University of Trento

- Bandwidth Management
- Cellular Networks and WMMAX
- Modeling and Performance Evaluation of IEEE 802.11
- Network Measurement and Design
- Network Simulation
- Performance Modeling
- Quality of Service
- Routing, Load Balancing and Scheduling
- Traffic and Workload Control
- Topics in Performance Modeling, QoS, and Reliability (P)

### Signal Processing Symposium:
11 oral sessions

Co-Chairs:
- **Xiang-Gen Xia**, University of Delaware
- **Ye (Geoffrey) Li**, Georgia Institute of Technology
- **Tomohiko Taniguchi**, Fujitsu Laboratories Limited

- MIMO-I
- MIMO-II
- MIMO-III
- OFDM-I
- OFDM-II
- Channel Estimation
- Channel Estimation and Signal Processing
- Equalization and Coding
- Cooperative Networks-I
- Cooperative Networks-II
- Signal Processing Algorithms

### Wireless Communications Symposium:
43 oral sessions, 3 poster sessions

Co-Chairs:
- **Andreas F. Molisch**, Mitsubishi Electric Research Laboratories
- **Maria Luisa Merani**, University of Modena e Reggio Emilia
- **Yao Ma**, Iowa State University
- **Rajarathnam Chandramouli**, Stevens Institute of Technology

- Propagation Channels-I
- Propagation Channels-II
- Wireless Channel Capacity
- Channel Estimation and Synchronization-I
- Channel Estimation and Synchronization-II
- MIMO Capacity-I
- MIMO Capacity-II
- MIMO-Algorithms-I
- MIMO-Algorithms-II
- MIMO-Algorithms-III
- MIMO-Algorithms-IV
- MIMO-Algorithms-V
- Diversity-I
- Diversity-II
- Diversity-III
- Space-Time Coding I
- Space-Time Coding II
- Space-Time Coding III
- LDPC Codes
- Equalization
- UWB-I
- UWB-II
- Cognitive Radio-I
- Cognitive Radio-II
- Cognitive Radio-III
- Cognitive Radio-IV
- Cooperative Communications and Coding-I
- Cooperative Communications and Coding-II
- OFDM-Based Wireless Networks
- CoS and Resource Management in Wireless Networks
- Resource Allocation in Wireless Networks
- Resource Management in WLANs
- Routing in Wireless Networks
- Satellite Networks
- Scheduling and Admission Control in Wireless Networks
- Security Issues in Wireless Networks
- WiMAX
- CDMA
- OFDM-I
- OFDM-II
- OFDM-III
- OFDMA
- Wireless MAC
- Crosslayer-I
- Crosslayer-II
- Crosslayer-III
- Topics in Wireless Communications
- Wireless Networks (P)
- Topics in MIMO, MIMO, and RF Systems (P)
- RFID, Cellular and Satellite Communications (P)

### Wireless Networking Symposium:
20 oral sessions, 2 poster sessions

Co-Chairs:
- **Abbas Jamalipour**, University of Sydney
- **Dongmei Zhao**, McMaster University
- **Mario Marchese**, University of Genoa
- **Ebram Hossain**, University of Manitoba

- Cognitive Radio Networks-I
- Cognitive Radio Networks-II
- IEEE 802.16 Networks
- Mobility and Handoff
- Modeling and Analysis of IEEE 802.11-Based WLANs
- Modeling and Optimization of Wireless Networks
- Modeling and Performance Analysis
- Network Designs and protocols
- OFDM-Based Wireless Networks
- QoS and Resource Management in Wireless Networks
- Resource Allocation in Wireless Networks
- Resource Management in WLANs
- Routing in Wireless Networks
- Cooperative Communications and Coding-I
- Cooperative Communications and Coding-II
- Cooperative Communications and Coding-III
- Relaying-I
- Relaying-II
- Ad Hoc Networks
- WiMAX
- CDMA
- OFDM-I
- OFDM-II
- OFDM-III
- OFDMA
- Cooperative Communications and Coding-I
- Coexistence Models
- Handoff and Mobility Management
- Multiuser Detection
- Physical Layer Security
- Topics in Wireless Communications
- Wireless Networks (P)
- Topics in MIMO, MIMO, and RF Systems (P)
- RFID, Cellular and Satellite Communications (P)
Tuesday, 27 November 2007 • 10:00 am - 11:45 am

**Regulatory Policies Driving Fiber Access**
Chair: Dr. Niel Ransom, Board of Directors of AMCC, EQ, Telecom, Ellacoya Networks, Overture Networks and TEKNOVUS

Invited Speakers:
- David Young, Verizon Communications
- Marcus Weinkopf, Deutsche Telekom
- Dorothy Atwood, AT&T
- TBD, NTT

Tuesday, 27 November 2007 • 10:00 am - 11:45 am

**Operator Perspectives on Next Generation Mobile Networks**
Session Chair: Dr. Mallik Tatipamula, Juniper Networks

Invited Speakers:
- Dr. Kazuo Imai-san, NTT DoCoMo
- Dr. Kalyani Bogineni, Verizon Wireless
- Dr. Klaus-Juergen Krath, T-Mobile International
- Remi Thomas, Orange/France Telecom
- Bob Pippert, Sprint-Nextel

Tuesday, 27 November 2007 • 2:00 pm - 3:45 pm

**IPTV Network Requirements and Interoperability**
Session Chair: Dan O’Callaghan, Verizon Communications

Invited Speakers:
- Randy Sharpe, Alcatel-Lucent
- Kimney Bacon, Scientific Atlanta
- Jeff Carr, Sony Electronics
- Kenneth Toney, Tektronix

Tuesday, 27 November 2007 • 2:00 pm - 3:45 pm

**Moving Spectrum Management Forward: Technical and Regulatory Challenges**
Session Chair: Fred Matos, National Telecommunications and Information Administration (NTIA)

Invited Speakers:
- Mark Gannon, Motorola Labs
- Alan Crouch, Communications Technology Labs, Intel Corp.
- Dr. Phillip Alveda, MobiTV, Inc.
- Shaker Viswanathan, QUALCOMM MediaFLO Technologies
- Regis Paquette, Alcatel-Lucent
- Scott Poretsky, Reef Point Systems

Tuesday, 27 November 2007 • 4:15 pm - 6:00 pm

**Next Generation Home Network and Home Gateway**
Session Chair: Dr. Tetsuya Yokotani, Mitsubishi Electric Corp.

Invited Speakers:
- Ryutaro Kawamura, NTT Cyber Solution Laboratory
- Tetsuya Yokotani, Mitsubishi Electric
- Lawrence Chee, PMC-Sierra
- Nikolay Guenov, Fraescale Semiconductor
- Stanley Moyer, CSG
- Paulo Pastorino, HOL

Tuesday, 27 November 2007 • 4:15 pm - 6:00 pm

**The Road to 4G: Obstacles and Challenges**
Session Chair: Angeliki Alexiou, Alcatel-Lucent

Invited Speakers:
- Dr. Shigeyuki Akiba, KDDI R&D Labs Inc.
- Brian Whitten, Verizon Communications
- Dan Parsons, BroadLight Inc.
- Bruno Orth, Deutsche Telekom

Wednesday, 28 November 2007 • 10:00 am - 11:45 am

**Community / Municipal / Regional Networks**
Session Chair: Dr. Richard Wolff, Montana State University

Invited Speakers:
- Representative Cliff Stearns, Florida’s Sixth District
- Dr. Prathima Agrawal, Wireless Engineering Research and Education Center
- Dr. John Waclawsky, Motorola
- Dr. Jon Peha, Center for Wireless & Broadband Networking & Carnegie Mellon University

Wednesday, 28 November 2007 • 12:00 pm - 1:45 pm

**Lunchtime Executive Panel**
Chair and Panelists: TBD

Wednesday, 28 November 2007 • 2:00 pm - 3:45 pm

**Operational Aspects of Fiber Access Systems**
Session Chair: Dr. Thomas Pfeiffer, Alcatel-Lucent Germany

Invited Speakers:
- David Meis, Corning
- Malcolm Campbell, British Telecom
- Yves T’Joens, Alcatel-Lucent

For complete session descriptions, visit http://www.ieee-globecom.org/2007/access.html
Tuesday, 27 November 2007 • 10:00 am – 11:45 am
**High Reliability/Availability in Telecommunication Systems**
Session Co-Chairs: Xin Meng, Motorola
Yan Liu, Motorola

Reliability studies include the design disciplines by contributing to the selection of the system architecture, materials, processes, and components; followed by verifying the selections made by thorough analysis and test. The major aim of this forum is to stimulate interactions between participants by exchanging new ideas and practical experience to address these challenges.

Tuesday, 27 November 2007 • 10:00 am – 11:45 am, 2:00 pm – 3:45 pm & 4:15 pm – 6:00 pm
**Modeling and Simulation Tools for Network Designers and Developers**
Session Co-Chairs: Jack L. Burbank, (JHU/APL)
William T. Kasch, (JHU/APL)
Jon R. Ward, (JHU/APL)

M&S is a critical element in the design, development, and test and evaluation (T&E) of any network product or solution. The goal of this technical session is to provide attendees an overview of many of the M&S tools and techniques that are available to assist them in their projects.

Tuesday, 27 November 2007 • 2:00 pm – 3:45 pm & 4:15 pm – 6:00 pm
**Next Generation Mobile Wireless Broadband Technologies**
Session Co-Chairs: Tom Tofigh, AT&T
Andres Kwasinski, Texas Instruments

This session will focus on the technology and deployment issues associated with the WiMAX IEEE 802.16 and Long Term Evolution (LTE) standards as the mobile wireless broadband radio technologies for fourth generation (4G) networks.

Wednesday, 28 November 2007 • 10:00 am – 11:45 am
Session Co-Chairs: Mark Buckner, Oak Ridge National Laboratory
Paul Ewing, Oak Ridge National Laboratory

This session will focus on the latest approaches related to the design and development of SDRs/CRs and in particular, the tools, design philosophies, problems/challenges, and potential technology gaps. Presentations by some of the leading SDR/CR designers and developers, along with a lengthy panel discussion, are planned.

Wednesday, 28 November 2007 • 2:00 pm – 3:45 pm & 4:15 pm – 6:00 pm
**IMS (IP Multimedia Subsystem)**
Session Co-Chairs: Mike Loushine, Telcordia Technologies
Vijay Varma, Telcordia Technologies
Melbourne Barton, Telcordia Technologies

This session will address the state of the art in IMS including IMS core network issues, IMS applications, role of IMS in network convergence, IMS standardization, migration strategies, interoperability and interworking issues, and IMS market and deployment status.

Thursday, 29 November 2007 • 2:00 pm – 3:45 pm & 4:15 pm – 6:00 pm
**Wireless Access for Vehicular Environments**
Session Co-Chairs: Tim Weil, Booz Allen Hamilton
Jim Marousek, Booz Allen Hamilton
Dr. Tao Zhang, Applied Research of Telcordia Technologies

This session will focus on the VII Identity and Access Management challenges and opportunities provided by the IEEE 1609.2, WAVE Security Services for Applications and Management Messages. An examination of the working model will demonstrate the use of 1609.2 PKI to manage secure message and applications using DSRC/WAVE communication services.

Thursday, 29 November 2007 • 2:00 pm – 3:45 pm & 4:15 pm – 6:00 pm
**Quantum Key Distribution Systems, Networks, and Applications**
Session Chair: Robert J. Runser, Laboratory for Telecommunications Sciences

This session will feature advances in experimental optical fiber and free-space QKD, approaches to the Integrated EC-project SECCOC to QKD, networking considerations for entanglement-based QKD, the latest developments in MagiQs QPN Technology, and Integrated Devices for Practical Fiber QKD Systems and their applications.
Wireless technology is subject to significant government regulation all over the world. This tutorial is an overview for wireless engineers of the regulatory issues you may encounter in moving a new technology from the lab to the marketplace and how to plan for them. These issues deal with frequency allocation, experimental licensing, licensing, unlicensed systems, and equipment authorization. Knowing what the issues are enables the developer to make realistic plans in parallel to R&D efforts.

Monday, 26 November 2007 • 9:00 am – 12:00 pm
**T1: Spectrum Policy and the Wireless Engineer: Navigating the Regulatory Maze to Get New Technology to Market**
Instructors: Michael J. Marcus, Marcus Spectrum Solutions
Anne Linton, Washington Federal Strategies, LLC

This tutorial intends to provide the audience with an in-depth introduction to the fundamental concepts, essential principles, and advanced algorithms for CR systems with a broad coverage spanning from theoretical analysis to experimental testbed results. The main contents of this tutorial include: principles of CR, key physical layer technologies for CR, dynamic spectrum management/sharing models, and results from a CR testbed. At first, the tutorial will give an overview of CR systems including the basics of CR systems and the different spectrum sharing models. Next, a spectrum estimate and prediction model, a flexible spectrum allocation scheme, and system capacity analysis under a given interference temperature will be discussed in detail. After that, with a friendly introduction to the basic game theory concepts, several game theoretic dynamic spectrum management/sharing models for cognitive radio will be introduced. Applications of these models for spectrum sharing and pricing in WiFI and WiMAX-based cognitive radio networks will be also discussed. Finally, results from a CR testbed, which integrates a fast two-stage spectrum sensing algorithm, an efficient channel allocation scheme, and a Markov channel prediction model, will be presented. In this way, an exciting multidisciplinary area of “wireless” research will be exposed to the attendees.

Monday, 26 November 2007 • 9:00 am – 12:00 pm
**T2: Code Designs for Multi-Terminal Communication Networks**
Instructor: Dr. Zixiang Xiong, Texas A&M University

Recent works on limit-approaching practical designs for distributed source coding and dirty-paper coding have set the stage for applications of network information theory to multi-terminal communication networks (e.g., distributed sensor networks and wireless cooperative networks). This tutorial will provide a comprehensive coverage of the theory, practical designs and applications of distributed source coding, dirty-paper coding, and cooperative diversity.

Monday, 26 November 2007 • 9:00 am – 12:00 pm
**T3: A Crash Course in Wireless Meshes**
Instructor: Dr. Victor Bahl, Networking Research Group

This is a fast paced tutorial on the development of practical, deployable, and low-cost wireless mesh networks. The tutorial is designed to lay down the technological challenges for mesh networking and describe how the research community is addressing them. Issues associated with each layer of the protocol stack will be explored as well as various cross-layer approaches. There will be an emphasis on discussing the experiences and lessons learned from various experimental testbeds. This tutorial is ideal for engineers, graduate students, executives and practitioners in the field of wide-area wireless (3G) and 802.11 LAN technologies.

Monday, 26 November 2007 • 9:00 am – 12:00 pm
**T4: Fundamentals of UWB Systems**
Instructor: Prof. Win Moe, Massachusetts Institute of Technology (MIT)

This tutorial provides a basic understanding and a technical overview that encompass the fundamentals of UWB system design and analysis. It will cover relevant topics including Transmitted-Reference Systems, Reke Reception, Effect of Narrowband Interference, Distribution-Invariant Monotonicity Theorems, Fundamental Limits on Wide Bandwidth Signal Acquisition, and Ranging and Localization.

Monday, 26 November 2007 • 9:00 am – 12:00 pm
**T5: Adaptive Processing and Cross-Layer Design in Wireless Communications**
Instructor: Prof. Mohamed Ibnkahla, Queen’s University

This tutorial covers adaptive techniques as well as cross-layer approaches and their impact on current and future wireless communications. The tutorial will be supported, in particular, with illustrations and demonstrations of adaptation in MIMO and OFDM systems, sensor and ad hoc networks, as well as heterogeneous networks.

Monday, 26 November 2007 • 2:00 pm – 5:00 pm
**T6: Key Topics in Cognitive Radio Networks: Challenges, Tasks, Algorithms, and Testbed**
Instructors: Prof. Ekram Hossain, University of Manitoba
Prof. Weidong Xiang, University of Michigan-Dearborn

This tutorial will be supported, in particular, with illustrations and demonstrations of adaptation in MIMO and OFDM systems, sensor and ad hoc networks, as well as heterogeneous networks.

Monday, 26 November 2007 • 9:00 am – 12:00 pm
**T7: The Next Generation CDMA Technologies**
Instructor: Prof. Hsiao-Hwa Chen, National Sun Yat-Sen University

This tutorial covers various important issues about the next generation CDMA technologies as a major air-link technology for beyond 3G wireless applications. It includes the topics from next generation CDMA system modeling to analytical methodology, starting with the basics and progressing to advanced subjects. Innovative CDMA technologies will be introduced in a step-by-step approach, such as DS/CC-CDMA, GS/CC-CDMA, space-time complementary coding CDMA, M-ary CDMA, etc. As an all-in-one tutorial on next generation CDMA technologies, it is a must for telecommunications engineers, advanced R&D personnel, undergraduate and postgraduate students.

Monday, 26 November 2007 • 9:00 am – 12:00 pm
**T8: Standardization of MIMO-OFDM Technology**
Instructors: Dr. Syed Aon Mujtaba, LSI Corporation
Dr. Jack Winters, AT&T Labs-Research

This tutorial will identify the various flavors of MIMO-OFDM that are being standardized in 802.11n, 802.16e, and LTE, and describe in detail the similarities and differences of these systems. The topics covered in this tutorial include spatial multiplexing, transmit diversity, and transmit beamforming techniques.

For complete tutorial descriptions, visit http://www.ieee-globecom.org/2007/tuts.html
field trials and early deployments of IMS networks. Migration scenarios, interworking with existing networks, and a survey of Session Continuity. The tutorial will also cover fixed-mobile convergence, Service Level Interworking of Messaging Services, and Multimedia centralized services (ICS), Combined Circuit-Switched and IMS (CSI), addressing this challenge with its on-going and emerging work on IMS circuit-switched networks. The tutorial will discuss how the 3GPP is control, consistent provision of services from different access networks networks are evolving towards packet-based infrastructures with IMS. This tutorial will start with a brief introduction to IMS vision and its evolution from GSM/UMTS. It will then discuss IMS concepts, architectures, procedures, protocols and services. As communications networks are evolving towards packet-based infrastructures with IMS, consistent provision of services from different access networks becomes a major challenge, particularly during the transition period from circuit-switched networks. The tutorial will discuss how the 3GPP is addressing this challenge with its on-going and emerging work on IMS centralized services (ICS), Combined Circuit-Switched and IMS (CSI), Service Level Interworking of Messaging Services, and Multimedia Session Continuity. The tutorial will also cover fixed-mobile convergence, migration scenarios, interworking with existing networks, and a survey of field trials and early deployments of IMS networks.

This tutorial will provide an overview of the security issues and solutions of sensor networks including attacks, encryption, authentication, key managements, secure routing, secure aggregation, secure location, intrusion detection, privacy issues, security services, RFID security, Zigbee Security, lightweight ciphers, security in sensor and actuator networks, security in underwater sensor networks, etc.

The aim of this tutorial is to bring together, and put in context, all the recent progress in addressing the various aspects of cognitive radio networks for license-exempt use of TV bands. This tutorial will cover recent relevant FCC regulation, technical challenges pertaining to communications, networking protocols and implementation, and summarize the emerging standard(s) for Cognitive Radios in TV bands.

This tutorial will present the theoretical capacity-achieving techniques in MU MIMO networks for the multiple access (uplink) and broadcast (downlink) channels. Because of the complexity of these capacity-achieving techniques, we describe suboptimum downlink techniques including sectorization and recent beamforming techniques using limited feedback. On the uplink, we make similar comparisons considering suboptimum resource allocation and multiuser detection techniques. In the context of cellular networks, the MU MIMO performance is limited by interference from adjacent cells. We describe a class of techniques known as network MIMO for mitigating the effects of intercell interference in which spatially distributed base stations transmit and receive signals in a coordinated manner. Finally, we propose a series of guidelines for applying MIMO techniques in practical wireless systems. Given the large number of multiuser MIMO techniques, these insights in performance and complexity tradeoffs can be used by system engineers to choose the right MIMO technology for next-generation wireless systems operating in various environments.

The aim of this tutorial is to bring together, and put in context, all the recent progress in addressing the various aspects of cognitive radio networks for license-exempt use of TV bands. This tutorial will cover recent relevant FCC regulation, technical challenges pertaining to communications, networking protocols and implementation, and summarize the emerging standard(s) for Cognitive Radios in TV bands.

This tutorial will provide an overview of the security issues and solutions of sensor networks including attacks, encryption, authentication, key managements, secure routing, secure aggregation, secure location, intrusion detection, privacy issues, security services, RFID security, Zigbee Security, lightweight ciphers, security in sensor and actuator networks, security in underwater sensor networks, etc.

This tutorial on the latest advances in wireless data networking is designed to address important research challenges undertaken for automotive networking and telematics applications. The focus is on network protocols, emerging communications standards, performance modeling for active safety, telematics, and infotainment applications enabled by a vehicular-to-infrastructure and vehicle-to-vehicle wireless communications technology.

This tutorial aims to raise awareness of the many security risks related to the Web. The first part gives an overview of Web protocols and technologies, including DNS, HTTP, SHTTP, SSL, Java, Javascript, ActiveX, and AJAX. The second part of the tutorial focuses on the security of Web servers. We give an overview of possible attacks on Web servers and current practices to strengthen servers against attacks. The third part of the tutorial addresses attacks on the Web client (browser). Many attacks on the user attempt social engineering, malicious downloads, data theft, or exploits of software vulnerabilities. For social engineering, we describe defenses against phishing attacks. For malicious software, we describe the limitations deliberately placed on Java, Javascript, and ActiveX for security. Additional defenses include antivirus, firewalls, and intrusion detection systems. The last part of the tutorial describes current trends and open issues in Web security that merit attention from researchers and system administrators.

For complete tutorial descriptions, visit http://www.ieee-globecom.org/2007/tuts.html
This tutorial will present the basic principles of MIMO detection. We describe the fundamental problem, and present an overview of MIMO techniques that are used in practice. Our coverage ranges from simple linear detectors based on the zero-forcing and minimum-MSE criteria to the optimal maximum-likelihood tree-based sphere detector. In between, we will describe successive-cancellation or decision-feedback detectors, multi-stage detectors, and suboptimal tree-based detectors like the MMSE sphere detector, the Fano algorithm, the M-algorithm, and the K-best algorithm. The impact of both lattice-based preprocessing and ordering on performance and complexity will be described. This tutorial will benefit practicing engineers and researchers who are interested in understanding and doing research in MIMO and related topics, particularly those who are engaged in the design of high-speed wireless data systems.

The tutorial is primarily addressing the emerging broadband wireless solutions as specified by the IEEE 802.16 standards, often referred to as WiMAX (Worldwide Interoperability for Microwave Access) technology. WiMAX is an Orthogonal Frequency Division Multiplexing (OFDM) based system which offers promising high spectral efficiency, scalable carrier bandwidth options (e.g. from 1.25MHz to 20MHz), flexible spectrum options (e.g. 2-6 GHz), multiple duplexing options (Time Division Duplexing & Frequency Division Duplexing), various subchannelization options and users mobility thanks to its 802.16e variant, and more recently 802.16m. Technologies such as Hybrid Automatic Repeat Request (H-ARQ), Space Time Coding (STC), Advanced Antenna Systems (AAS), Multiple Input Multiple Output (MIMO) and Space Division Multiple Access (SDMA) have been enhanced to support mobile environments and to improve the broadband access speed. WiMAX supports a rich set of applications via a connection oriented service flow mechanism in both uplink and downlink directions, where service flow parameters can be dynamically managed through Medium Access Control (MAC) messages in order to meet the Quality of Service (QoS) requirements of various service classes. Examples of supported services are Unsolicited Grant Service (UGS), Real-Time Polling Service (rtPS), and Extended Real Time Polling Service (ErtPS) – particularly suitable for real time applications like speech with activity detection (VoIP). While the 802.16 standards provide a rich set of design options and a great deal of flexibility in defining the WiMAX related products, a significant challenge is often encountered in the selection of the most appropriate set of features and parameters and in finding the desirable deployment scenarios.

This tutorial introduces concepts of network virtualization and its interaction with computer, storage virtualization within the Data Center as well as in the context of Grid Computing within the logical boundaries of an Enterprise. The participants will learn how these virtualization techniques can be applied cost-effectively to maintain service continuity in the era of Globalization.

Friday, 30 November 2007 • 2:00 pm – 5:00 pm
T16: MIMO Detection: Theory and Practice
Instructor: Prof. John R. Barry, Georgia Tech

This tutorial will present the basic principles of MIMO detection. We describe the fundamental problem, and present an overview of MIMO techniques that are used in practice. Our coverage ranges from simple linear detectors based on the zero-forcing and minimum-MSE criteria to the optimal maximum-likelihood tree-based sphere detector. In between, we will describe successive-cancellation or decision-feedback detectors, multi-stage detectors, and suboptimal tree-based detectors like the MMSE sphere detector, the Fano algorithm, the M-algorithm, and the K-best algorithm. The impact of both lattice-based preprocessing and ordering on performance and complexity will be described. This tutorial will benefit practicing engineers and researchers who are interested in understanding and doing research in MIMO and related topics, particularly those who are engaged in the design of high-speed wireless data systems.

Friday, 30 November 2007 • 2:00 pm – 5:00 pm
T17: WiMAX: An Advanced Broadband Wireless System
Instructor: Dr. Doru Calin, Bell Labs at Alcatel-Lucent

The tutorial is primarily addressing the emerging broadband wireless solutions as specified by the IEEE 802.16 standards, often referred to as WiMAX (Worldwide Interoperability for Microwave Access) technology. WiMAX is an Orthogonal Frequency Division Multiplexing (OFDM) based system which offers promising high spectral efficiency, scalable carrier bandwidth options (e.g. from 1.25MHz to 20MHz), flexible spectrum options (e.g. 2-6 GHz), multiple duplexing options (Time Division Duplexing & Frequency Division Duplexing), various subchannelization options and users mobility thanks to its 802.16e variant, and more recently 802.16m. Technologies such as Hybrid Automatic Repeat Request (H-ARQ), Space Time Coding (STC), Advanced Antenna Systems (AAS), Multiple Input Multiple Output (MIMO) and Space Division Multiple Access (SDMA) have been enhanced to support mobile environments and to improve the broadband access speed. WiMAX supports a rich set of applications via a connection oriented service flow mechanism in both uplink and downlink directions, where service flow parameters can be dynamically managed through Medium Access Control (MAC) messages in order to meet the Quality of Service (QoS) requirements of various service classes. Examples of supported services are Unsolicited Grant Service (UGS), Real-Time Polling Service (rtPS), and Extended Real Time Polling Service (ErtPS) – particularly suitable for real time applications like speech with activity detection (VoIP). While the 802.16 standards provide a rich set of design options and a great deal of flexibility in defining the WiMAX related products, a significant challenge is often encountered in the selection of the most appropriate set of features and parameters and in finding the desirable deployment scenarios.

Friday, 30 November 2007 • 2:00 pm – 5:00 pm
T18: Next Generation Cellular Networks: Features and Algorithms
Instructor: Dr. Harish Viswanathan, Bell Labs at Alcatel-Lucent

This tutorial will present the basic principles of MIMO detection. We describe the fundamental problem, and present an overview of MIMO techniques that are used in practice. Our coverage ranges from simple linear detectors based on the zero-forcing and minimum-MSE criteria to the optimal maximum-likelihood tree-based sphere detector. In between, we will describe successive-cancellation or decision-feedback detectors, multi-stage detectors, and suboptimal tree-based detectors like the MMSE sphere detector, the Fano algorithm, the M-algorithm, and the K-best algorithm. The impact of both lattice-based preprocessing and ordering on performance and complexity will be described. This tutorial will benefit practicing engineers and researchers who are interested in understanding and doing research in MIMO and related topics, particularly those who are engaged in the design of high-speed wireless data systems.

WORKSHOPS

Monday, 26 November 2007 • 9:00 am – 12:00 pm
W1: 8th International Workshop on Optical Networking Technologies
Chair: Tarek S. El-Bawab, Jackson State University

Strengthening fiber towards the last mile has always been an interesting option for the industry. However, this option was not cost effective until recently. Today, progress in optical technologies brought down the cost of many optical components, devices, and systems, which are instrumental for optical access. Meanwhile, bandwidth-hungry services and demand for triple-play delivery are changing the economics of optical access solutions, which is making a new case for FTTH. This acronym embraces a number of optical access technologies, such as Fiber To The Curb (FTTC), Fiber To The Node (FTTN), Fiber To The Building (FTTB), Fiber To The Home (FTTH), and Fiber To The Premises (FTTP). Today, FTTH relies on Passive Optical Network (PON) and active Optical Ethernet (OE) architectures. In this workshop, we will discuss FTTH and examine the penetration of optical technologies into the access segment of service providers’ networks. We will examine several technical, economic, business and market aspects of this topic.

Monday, 26 November 2007 • 9:00 am – 5:00 pm
W3: Workshop on Security and Privacy in 4G Networks
Co-Chairs: Prof. Seung-Woo Seo, Seoul National University
Dr. Anand R. Prasad, DoCoMo Eurolabs

Workshop on Security and Privacy in 4G Networks will bring together security and privacy experts, practitioners, standards developers and others in academia, industry and government. The objective of this workshop is to identify the key issues to be addressed by future research in the areas of security and privacy in 4G networks that will constitute of a new air interface providing higher capacity and increased coverage in the form of multi-hop communication and interworking with existing radio access networks. We believe that having security from the beginning will lead the researchers to develop a realistic 4G solution.

Monday, 26 November 2007 • 9:00 am – 5:00 pm
W4: 1st IEEE Workshop on Enabling the Future Service-Oriented Internet
Co-Chairs: Michael Devetsikiotis, North Carolina State University
George Michailidis, University of Michigan

The objective of this workshop is to address network-level as well as application and service-layer topics of analysis, design, monitoring and experimentation. The top-down interplay between services and networking creates unique modeling, design and implementation challenges. The goal of this workshop is to focus the community’s efforts in building up this important area by discussing perspective issues and required breakthroughs in research and development. The workshop format will be a combination of original papers, review/white papers, quick ‘hot topic’ presentations, and a panel discussion with participants from industry, the NSF, and academia. This will allow workshop participants to obtain a global perspective of the scope of this area and of the technical challenges associated with it, in a participative and interactive manner.

For complete workshop descriptions, visit http://www.ieee-globecom.org/2007/tuts.html

Monday, 26 November 2007 • 2:00 pm – 5:00 pm
W2: Multi-Sensor Data Fusion
Co-Chairs: Dr. Syed Aon Mujtaba, LSI Corporation
Dr. Jack H. Winters, JVC

Multi-sensor data fusion is a concept whereby data collected from multiple sensors is processed and combined in a manner that improves the accuracy of the decision making process compared to that in a single sensor system. While the underlying principle of multi-sensor data fusion is simple (i.e., multiple information sources providing redundancy and diversity), there are several challenges associated with realizing a cost-effective and robust system, which requires a cross-disciplinary approach with joint multi-disciplinary optimization. A system leveraging multi-sensor data fusion techniques will typically consist of an array of sensors, feeding data into a central node that processes and fuses the data to make a decision or an inference. Application of the multi-sensor data fusion concept can be found in both the commercial and military sectors. The first challenge is associated with the design of sensors, which can be either homogeneous or heterogeneous. In complex systems, information may have to be gathered in a variety of forms, such as radio, optical, thermal, and acoustic. The second challenge is the reliable transfer of the data from the sensor nodes to the central node. The sensors may be mobile (and perhaps power constrained) and/or not co-located. The third challenge is the fusion of data from multiple sensors, particularly when they are heterogeneous. Different sensors may experience different noise levels and different operating conditions. Hence, multi-sensor data fusion systems have three main areas of focus for cross-disciplinary research - sensors, networking, and data fusion. Joint optimization of these areas can use signal processing techniques that are well established in communication systems, such as estimation theory, error control coding, and sigma-delta processing. This workshop will explore this theme by inviting subject matter experts in sensor design, network protocol design, and data fusion algorithms.

Monday, 26 November 2007 • 9:00 am – 5:00 pm
W5: 2nd International Workshop on Distributed Autonomous Network Management Systems (DANMS)
Co-Chairs: Nazim Agoulmine, University of Evry Val d’Essonne
Anne-Marie Bosneag, Ericsson Ireland Research Centre
Farnam Jahanian, University of Michigan Ann Arbor
Francoise Sailhan, Ericsson Ireland Research Centre

The IEEE DANMS 2007 workshop will provide an opportunity to bring together a broad range of researchers from network management, distributed systems, dependable systems, and autonomic computing, to exchange ideas and promote discussion on research topics in these areas. The workshop will be comprised of technical presentations, a panel session with representatives from industry and academia, and will provide ample opportunities for free discussions on the ideas presented.

THE PREMIER TELECOMMUNICATIONS EVENT!
This workshop is intended to serve as a forum and bring together researchers and engineers in both academia and industry to exchange ideas, share experiences, and report original works about all aspects of service discovery and composition in ubiquitous and pervasive environments. The main purpose is to promote discussions of research and relevant activities in the design of architectures, algorithms, and applications for UPC environments.

Friday, 30 November 2007 • 9:00 am – 5:00 pm
W8: 2nd IEEE Automotive Networking and Applications (AutoNet) Workshop
Co-Chairs: Wai Chen, Telcordia Technologies
Onur Altintas, Toyota InfoTechnology Center

Following the success of the 1st IEEE AutoNet, this one-day workshop seeks to present the latest research results and challenges in vehicle-to-vehicle and vehicle-with-infrastructure communications technologies, and their applications including improved safety, reduced traffic congestion and pollution, smoother driving experience, among others.

Friday, 30 November 2007 • 9:00 am – 5:00 pm
W9: Wireless Mesh and Sensor Networks: Paving the Way to the Future or Yet Another
Co-Chairs: Neeli R. Prasad, Center for TeleInFrastruktur (CTIF), Aalborg University
Dr. Paolo T. De Sousa, Head of Sector, Internet of the Future, in the Directorate-General Information Society, European Commission
Dr. C. Skianis, University of Aegean

Wireless systems for industry have mostly used cellular-style radio links, using point-to-point or point-to-multipoint transmission. Traditional wireless formats have liabilities in industrial applications. These include rigid structure, meticulous planning requirements, and dropped signals. In contrast, wireless mesh networks are multihop systems in which devices assist each other in transmitting packets through the network, especially in adverse conditions. You can drop these ad hoc networks into place with minimal preparation, and they provide a reliable, flexible system that can be extended to thousands of devices. Similarly, the self-configuring and self-healing capability, redundancy and scalability, diagnostic monitoring and distributed nature of wireless sensor networks place them among the most important technologies in the 21st century. This workshop will examine the technical and economic challenges for deploying wireless municipal mesh networks and wireless sensor networks.

For complete workshop descriptions, visit http://www.ieee-globecom.org/2007/tuts.html
The 7th IEEE International Conference on Enterprise Networking & Services (EntNet) is co-located with IEEE GLOBECOM 2007. EntNet's popularity continues to grow as the premier forum for a rich diversity of leading telecom experts from industry, universities, and government to consider where the industry is going and discuss hot topics in enterprise networking and services, technology solutions, and best practices.

Thursday, 29 November 2007 • 10:15 am – 11:45 am • Opening Session

KEYNOTE SPEAKER
The Next Net Things: Net-centricity, Net Neutrality, NGN and IPv6 Transition to Social Networks

FRED BAKER
Former IETF Chair, Former ISOC Chair, Cisco Fellow

Thursday, 29 November 2007 • 2:00pm – 3:45pm
Panel 1: Empowering the Enterprise with State-of-the-Art Voice Communication Services
Chair: Bhumip Khasnabish, Verizon Communications
Topics: VoIP Deployments Worldwide, SIP Deployments and Technology, Contact Center Applications, IMS, Presence Services, and QoS-based Services

Thursday, 29 November 2007 • 4:15pm – 6:00pm
Panel 2: Enterprise Wireless / Mobility / Applications: Empowering Productivity
Chair: David Yates, Bentley College
Topics: IEEE 802.11/g/n, Bluetooth all over, 3g/4g, Services and Applications, WMAN, MANETs/Ad-Hoc Networking, and NEMO (Network Mobility)

Thursday, 29 November 2007 • 4:15pm – 6:00pm
Panel 3: Next Generation Carrier Ethernet Technologies and Architectures
Chair: Jim Pizzirusso, Turin Networks
Ethernet is increasingly being adopted as a strategic component of the WAN infrastructure. However, network operators have a complex choice among what are oftentimes competing Carrier Ethernet technologies and architectures – Ethernet over SONET/SDH, RPR, Ethernet over WDM, MPLS, VPLS. Key considerations to the choice include deployment cost and time, resiliency, manageability, and performance. This panel will bring together representatives from key stakeholders in a stimulating discussion of the various technological and architectural options. It will provide a critical assessment of emerging Carrier Ethernet solutions and study the issues associated with their convergence in the WAN.

Thursday, 29 November 2007 • 4:15pm – 6:00pm
Panel 4: Empowering the Enterprise with Integrated Services: Fact or Fiction?
Chair: Daniel Minoli, SES Americom

Friday, 30 November 2007 • 10:00am – 11:45am
Panel 8: Network and Technology Management in the Global Environment
Chair: TBD
Topics: Managing Voice Networks and Costs, Managing Data Networks and Costs – especially extranets, and Managing Security

Friday, 30 November 2007 • 2:00pm – 5:00pm
T21: On-Demand Enterprise: Virtualization and Grid-Based Mechanisms for Service Continuity
Instructors: Inder Monga, Nortel
Siva Subramanian, Nortel
This tutorial introduces concepts of network virtualization and its integration with computer, storage virtualization within the Data Center as well as in the context of Grid Computing within the logical boundaries of an Enterprise. The participants will learn how these virtualization techniques can be applied cost-effectively to maintain service continuity in the era of Globalization.

Friday, 30 November 2007 • 2:00pm – 5:00pm
T22: Internet Protocol Multimedia Subsystem (IMS) for New Generation Enterprise Services
Instructors: J-Ch. Grégoire, INRS-EMT
B. Khasnabish, Verizon Communications
This tutorial starts with a review of the session initiation protocol (SIP) and its evolution to support the IP multimedia subsystem (IMS) in Enterprise. Status of the Next-generation converged Enterprise networking using IMS is then presented. Service providers’ views and the lessons from Blackberry, CENTREX, and alternatives in integration are then carefully reviewed. Finally, the instructors will present the future of service migration using IMS and service oriented architecture (SOA) concept.
Maniac Challenge

Sunday, 25 – Monday, 26 November 2007

The Mobile Ad-hoc Networking Interoperability And Cooperation (MANIAC) Challenge is a multi-institution competition that explores the tension between cooperation and selfish behavior in wireless self-organizing networks. Each participating team will devise strategies to establish cooperation and avoid and punish uncooperative nodes in the network, to maximize the amount of the team’s traffic that is correctly delivered while minimizing resources spent in forwarding other teams’ traffic. An API is available to all teams to facilitate forwarding and dropping decisions, for example allowing the node to bypass the routing table. A distributed monitoring solution was developed to collect topology, traffic load, and cooperation information during the competition. For more information on the MANIAC Challenge, including software available for download, visit www.maniacchallenge.org.

GOLD

IEEE Graduates of the Last Decade

Wednesday, 28 November 2007 • 4:15 pm – 6:00 pm
Chair: Dr. Irena Alov, Telstra Corporation

The GOLD session is aimed at giving graduate students and young professionals an opportunity to mix with leaders in the telecommunications field, and peers who have been successful entrepreneurs. The GOLD session is divided into two halves. Two invited keynote talks will be followed by a special poster session. This session has been designed to be highly interactive and allow opportunities for discussion and sharing of ideas.

One of the keynote speakers will be Prof. Fred Harris (YES his name is purposely spelled lower case) San Diego State University. The keynotes will be focused on career and success factor issues facing young professionals in the telecommunications industry. For further information, e-mail GOLDConference@ieee.org.

Social Events

Tuesday, 27 November 2007 • 12:15 pm - 1:45 pm
IEEE GLOBECOM 2007 AWARDS LUNCHEON

Celebrate with your colleagues at this biannual event honoring the achievements of IEEE and IEEE Communications Society members. This event is included with the full conference registration. Additional tickets can be purchased for $60.00 per person.

Tuesday, 27 November 2007 • 6:15 pm – 7:15 pm
IEEE GLOBECOM 2007 50th ANNIVERSARY CELEBRATION

The IEEE GLOBECOM 2007 Planning Committee invites you to celebrate IEEE GLOBECOM’s 50th Anniversary, hosted by Dr. Irwin Jacobs of QUALCOMM, Inc. The celebration features Keynote Speaker Dr. Jeong Kim of Bell Labs at Alcatel-Lucent, IEEE GLOBECOM Panel Session, Trivia Contest with prizes, a Color Guard Performance, and more. This event is included with the conference registration fee. Accompany guests are welcome to attend.

Tuesday, 27 November 2007 • 7:30 pm - 10:00 pm
IEEE GLOBECOM 2007 WELCOME RECEPTION & EXPO OPENING

The IEEE GLOBECOM 2007 Executive Committee welcomes you to Washington, DC and invites you to join them for the opening of the IEEE GLOBECOM 2007 EXPO. This event is included with the conference registration fee. Accompany guests are welcome to attend.

Wednesday, 28 November 2007 • 7:00 pm – 10:00 pm
IEEE GLOBECOM 2007 CONFERENCE BANQUET

Join IEEE GLOBECOM 2007 General Chair, Jerry Gibbon for a relaxing evening of fine dining and entertainment. This event is included with the full conference registration. Additional tickets can be purchased for $115.00 per person.
The museum is the former residence of Marjorie Merriweather Post, cereal heiress, collector and philanthropist. Post was once one of the grande dames of Washington society. She collected art throughout her life, emphasizing only the finest French and Russian objects. The opulent Georgian, 40-room mansion, built in 1926, and subsequent auxiliary buildings, house her collection as well as the turn-of-the-century collection of her father, Charles W. Post, founder of the Post Cereal Company. Her collection of Russian icons, gold and silver pieces, porcelain and Fabergé eggs has been called the most representative outside of the former Soviet Union. The grounds of the estate are equally magnificent including gardens and a greenhouse. [NOTE: Children under the age of 6 are not permitted]

Mount Vernon
Wednesday, 28 November 2007 • 11:00 am — 5:00 pm • Price: $65.00

At the home of George Washington, you will see gardens and greens as well as the original furnishings placed throughout the Georgian-style manor house. After your tour of the mansion and grounds, guests will board a coach for the return trip along the George Washington Memorial Parkway to Alexandria, Virginia, referred to by many as George Washington’s home town. You will see Christ Church, ride by Gadsby’s Tavern, Market Square, and the Apothecary Shop.

The National Portrait Gallery’s and National Museum of Women in the Arts
Thursday, 29 November 2007 • 12:30 pm – 4:30 pm • Price: $60.00

The National Portrait Gallery’s mission is to collect and display images of “men and women who have made significant contributions to the history, development and culture of the people of the United States.” Additionally, the National Portrait Gallery’s collections include portraits of all U.S. presidents, more than 5,400 glass-plate negatives from the studios of Mathew Brady and original artwork from more than 1,600 TIME magazine covers.

National Museum of Women in the Arts is the first museum in the world devoted specifically to works of art produced by women throughout the centuries and from around the world. The Museum is housed in a Renaissance Revival building built in 1907. The permanent collection dates back to the Renaissance and includes not only examples of Western Art, but also Native works from America and abroad. Following your tour of the National Museum of Women in the Arts, guests will enjoy lunch in the NMWA café.
**Registrant(s) Information** *(Please print clearly)*

*ARE REQUIRED FIELDS & MUST BE COMPLETED*

<table>
<thead>
<tr>
<th>Information</th>
<th>Field(s)</th>
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</thead>
<tbody>
<tr>
<td><em>Family/Surname</em></td>
<td><em>Personal Name</em></td>
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| *Company, University or Other Affiliation* | Nickname (Badge Name) *
| *Mailing Address* | *P.O. Box / Mail Stop* |
| *City* | *State/Province*                  |
| *Postal Code* | *Country*                        |
| *Phone Number* | *Fax Number*                     |
| Emergency Contact Name | Phone Number |

*IEEE Membership Number*

Are you a member of an IEEE sister society? *(circle applicable)*: AElT CCIS CIC CIE CIEE EZS HTE IETE KICS LITKA POPOV REV SBT SEE SEEI SR VDE

Do you have any special needs? *(circle applicable)*: Wheelchair Access  Audio  Visual  Vegetarian  Other: _______________________

**Registration Category:** *(Check all that apply)*

- Technical Paper Presenter
- Workshop Paper Author/Presenter
- Technical Paper Author
- Tutorial Presenter
- Attendee
- EXPO Technical Session Chair (D&D or Access)
- EXPO Technical Session Presenter (D&D or Access)

**How did you hear about IEEE GLOBECOM?** *(Check all that apply)*

- IEEE GLOBECOM 2007 Web Site
- Other Professional/Industry Web Site
- Advance Program
- Colleague
- Email
- Advertisement, where____________________
- Other: ___________________________

**Organizational Status:** *(Check all that apply)*

- Industry
- Government
- Academia
- Other: ___________________________

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**AUTHOR REGISTRATIONS**

<table>
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<tr>
<th>Registration Code</th>
<th>Description</th>
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<td>RG-01</td>
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<td>RG-02</td>
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<td>RG-03</td>
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<td>RG-04</td>
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<td>RG-05</td>
<td>Full Non Member Presenter</td>
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<tr>
<td>RG-06</td>
<td>Limited Non Member Presenter</td>
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*PLEASE DO NOT SHARE YOUR REGISTRATION CONFIRMATION CODE WITH ANYONE ELSE. ALTHOUGH THE CODE ENABLES SUBMISSION OF UP TO THREE PAPERS, IT CAN ONLY BE USED ONCE, BY YOU, TO CREATE ONE AUTHOR ACCOUNT FOR THESE SUBMISSIONS.*

**ATTENDEE MEMBER REGISTRATIONS**

<table>
<thead>
<tr>
<th>Registration Code</th>
<th>Description</th>
<th>ON/BY 31 OCTOBER</th>
<th>AFTER 31 OCTOBER</th>
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<td>RG-11</td>
<td>EXPO Technical Program Only IEEE ComSoc Member</td>
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<td>EXPO Technical Program Only IEEE Member</td>
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<td>RG-13</td>
<td>1 Day IEEE ComSoc Member (TUES WED THURS FRI (CIRCLE DAY))</td>
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<td>RG-14</td>
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<td>IEEE Life Member</td>
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<td>RG-16</td>
<td>Student Member (FULL TIME STUDENTS ONLY)</td>
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**ATTENDEE NON-MEMBER REGISTRATIONS** *(see pg 3 for membership offer)*

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<th>Registration Code</th>
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**OTHER REGISTRATIONS**

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<td>RG-21</td>
<td>EXPO Only</td>
<td>$50</td>
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<tr>
<td>RG-22</td>
<td>Enterprise Networking (EntNet) Keynote and Panels Event Only</td>
<td>$0</td>
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</table>

*Check here if you plan to attend this event*

**Registration Total:** $__________

What’s included with registration is listed on Page 2


Accompanying Guest Includes: Welcome Reception, Plenary on Monday, and Access to EXPO.

Tutorial/Workshop Registration Includes: Tutorial/Workshop and Access to EXPO.

EntNet Keynote and Panels Registration Includes: EntNet Keynote and Panel sessions only.


TUTORIALS & WORKSHOPS
You may register for Tutorials and Workshops without registering for the conference. Tutorials and Workshops are not included in any conference registration category.

HALF DAY TUTORIALS – Include Tutorial Notes and Tea/Coffee Breaks

<table>
<thead>
<tr>
<th>Tutorials</th>
<th>ON/OCTOBER</th>
<th>AFTER 31 OCTOBER</th>
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<tbody>
<tr>
<td>T1: Spectrum Policy &amp; the Wireless Engineer: Navigating Regulatory Maze</td>
<td>$250</td>
<td>$300</td>
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<tr>
<td>T2: Code Designs for Multi-Terminal Communication Networks</td>
<td>$250</td>
<td>$300</td>
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<tr>
<td>T3: A Crash Course in Wireless Meshes</td>
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<tr>
<td>T4: Fundamentals of UWB Systems</td>
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<tr>
<td>T5: Adaptive Processing &amp; Cross-Layer Design in Wireless Communications</td>
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<tr>
<td>T6: Key Topics in Cognitive Radio Networks</td>
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<tr>
<td>T7: The Next Generation CDMA Technologies</td>
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<tr>
<td>T8: Standardization of MIMO-OFDM Technology</td>
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<tr>
<td>T9: IP Multimedia Subsystem (IMS): A Platform for Convergence and Next Generation Services</td>
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<td></td>
</tr>
<tr>
<td>T10: Security Issues in Sensor Networks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please select which Tutorials you would like to attend below. For more information about the tutorials, please visit the IEEE GLOBECOM 2007 website.

Monday, 26 November Morning Tutorials (9:00am – 12:00pm)

- T1: Spectrum Policy & the Wireless Engineer: Navigating Regulatory Maze
- T2: Code Designs for Multi-Terminal Communication Networks
- T3: A Crash Course in Wireless Meshes
- T4: Fundamentals of UWB Systems
- T5: Adaptive Processing & Cross-Layer Design in Wireless Communications

Monday, 26 November Afternoon Tutorials (2:00pm – 5:00pm)

- T6: Key Topics in Cognitive Radio Networks
- T7: The Next Generation CDMA Technologies
- T8: Standardization of MIMO-OFDM Technology
- T9: IP Multimedia Subsystem (IMS): A Platform for Convergence and Next Generation Services
- T10: Security Issues in Sensor Networks

Friday, 30 November Morning Tutorials (9:00am – 12:00pm)

- T11: Cognitive Radio Networks for license-exempt use of TV Spectrum
- T12: Next Generation Wireless Technologies: High Throughput WiFi, WiMAX & UWB
- T13: Multistat MIMO Techniques for Wireless Systems
- T14: Automotive Networking & Telematics Applications
- T15: Web Security

Friday, 30 November Afternoon Tutorials (2:00pm – 5:00pm)

- T16: MIMO Detection: Theory & Practice
- T17: WiMAX: An Advanced Broadband Wireless System
- T18: Next Generation Cellular Networks: Features & Algorithms
- T19: Generalized Multi-Protocol Label Switched (GMPLS) Networks
- T20: Routing in Delay Tolerant Mobile Ad Hoc Networks: Overview & Challenges
- T21: On-Demand Enterprise: Virtualization & Grid-Based Mechanisms for Service Continuity
- T22: IMS for New Generation Enterprise Services

WORKSHOPS - Includes Proceedings, Lunch (Only for Full Day Workshops), and Tea/Coffee Breaks

<table>
<thead>
<tr>
<th>Workshops</th>
<th>ON/OCTOBER</th>
<th>AFTER 31 OCTOBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1: 8th International Workshop on Optical Networking Technologies (9:00am – 12:00pm)</td>
<td>$250</td>
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</tr>
<tr>
<td>W2: Multi-Sensor Data Fusion (2:00pm – 5:00pm)</td>
<td>$250</td>
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Monday, 26 November Full Day

- W3: Workshop on Security & Privacy in 4G Networks
- W4: Enabling the Future Service-Oriented Internet
- W5: 2nd International Workshop on Distributed Autonomous Network Management Systems

Friday, 30 November Full Day

- W6: Service Discovery & Composition in Ubiquitous & Pervasive Environments (9:00am – 12:00pm)
- W7: Coding for Data Storage (2:00pm – 5:00pm)
- W8: 2nd IEEE Automotive Networking & Applications (AutoNet) Workshop
- W9: Wireless Mesh and Sensor Networks: Paving the way to the future of yet another

Tutorial/Workshop Total $
IEEE COMSOC AFFILIATE MEMBERSHIP OFFER**
If you are registering for IEEE GLOBECOM 2007 as a Non Member, you can take advantage of our offer to become an IEEE Communications Society Affiliate Member. The cost is $104 for a Full Year IEEE Communications Society Affiliate Membership.
☐ Check here to receive your membership code.

ADDITIONAL ITEMS
□ Qty _______ EX-01 – Awards Luncheon - $60  
□ Qty _______ EX-02 – Conference Banquet - $115  
□ Qty _______ EX-03 – Additional Conference Record (CD-ROM) $60  
□ Qty _______ EX-04 – Overlength Page Charge (over 5 pages) $100

TOURS
□ Qty _______ OT-01 – Hillwood Museum and Gardens $70  – Tuesday, 27 November, 12:00pm-4:00pm
□ Qty _______ OT-02 – Tour of Mount Vernon $65  – Wednesday, 28 November, 11:00am-5:00pm
□ Qty _______ OT-03 – Tour of the National Portrait Gallery & National Museum of Women in the Arts $60  
  Thursday, 29 November, 12:30pm-4:30pm

Optional Items Total $ ____________

Refund Policy: All refund requests must be in writing to IEEE CMS, by emailing globecom07reg@ieee.org. All cancellations will be subject to a $100 cancellation fee. No refunds will be given after Wednesday, 31 October 2007.

Registration Total $ ____________  
Tutorial/Workshop Total $ ____________  
Optional Items Total $ ____________  
Total Remittance $ ____________

METHOD OF PAYMENT:
☐ CHECK Issued in US Dollars  (Payable to: IEEE/2007 GLOBECOM)

There is a $15 service fee per transaction required for Payments by Wire Transfer and Purchase Order.

☐ WIRE TRANSFER - $15 - Please contact globecom07reg@ieee.org for Wire Transfer instructions.

☐ PURCHASE ORDER - $15 - Please attach a copy of the purchase order if possible

☐ Visa ☐ MasterCard ☐ American Express ☐ Diners Club ☐ Discover

Card Number ___________________________________________ Expiration Date _____________________
Name on Card _______________________________________Authorized Signature ________________________________________

Mail or Fax Completed Registration Form & Payment To: IEEE/CMS: Caroline Colabaugh
445 Hoes Lane, Piscataway, New Jersey 08855 USA
Tel: +1 732 981 3437  Toll Free (in US or Canada): + 1 800 810 4333
Fax: +1 732 465 6447  E-mail: globecom07reg@ieee.org