

# WTS 2014

## Wireless Telecommunications Symposium 2014

*Wireless Communications in a Connected  
World*

**April 9 - 11, 2014**



**California State Polytechnic University, Pomona**

**Waterview Conference Center &  
Holiday Inn Rosslyn at Key Bridge  
Arlington, Virginia USA**

## **WELCOME TO WTS 2014**

Welcome to the thirteenth annual Wireless Telecommunications Symposium, WTS 2014: Wireless Communications in a Connected World. We hope that it will be a stimulating and rewarding experience for you. During the next three days of invited speakers' presentations, accepted paper sessions, tutorials and panel discussions, WTS 2014 will explore a wide range of global wireless communications and mobile computing, e-health and telecommunications in healthcare, and emerging media topics in depth.

The WTS 2014 Program Committee received paper submissions from authors around the world. We thank all the authors who submitted papers and proposals to WTS 2014, the many reviewers who reviewed them, and the co-chairs, mini-symposia chairs, track chairs, and session chairs for coordinating the paper and proposal evaluation and selection process. We also thank the WTS support personnel for their tireless efforts behind the scene. Producing an event like WTS 2014 is not an easy task, and they did a masterful job. In addition, the WTS Committee is grateful to the IEEE Communications Society and its Communications & Information Security Technical Committee for their technical support for WTS 2014, and to the distinguished invited speakers representing the telecommunications, healthcare, and media industries for having taken time to participate in the conference and help us organize the program.

Finally, special thanks go to many organizations that have contributed to the conference or lent it financial support. Notable among the contributors and donors are Cal Poly Pomona's College of Business Administration and College of Engineering; Cal Poly Pomona's Computer Information Systems and Electrical & Computer Engineering Departments; and MESAQIN.

On behalf of the WTS 2014 Committee -- Welcome to WTS 2014!

Dr. Steven Powell, WTS General Chair  
Dr. Thomas Ketseoglou, WTS Assistant Chair

**WTS 2014 Program April 8-11, 2014**  
**Waterview Conference Center, Holiday Inn Rosslyn at Key Bridge,**  
**and Le Meridien Arlington**  
**Arlington, Virginia, USA**

**Tuesday, April 8**  
**Holiday Inn Rosslyn at Key Bridge**

Morning & Afternoon	Sight-Seeing in Washington, DC Tour Includes the U.S. Capitol, Library of Congress, and Supreme Court Meeting with Congressman Matt Salmon, 5 <sup>th</sup> District of Arizona  *Note: The Size of the Tour Group for this Free Tour will be Restricted. Early Conference Registration and Tour Sign-up are Recommended.
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7:00 pm - 9:00 pm	WTS Organizers' Meeting
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**Wednesday, April 9**  
**Waterview Conference Center**

8:00 am - 9:00 am	Registration
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9:00 am - 9:15 am	Welcoming Remarks
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9:15 am - 10:00 am	<b>Peter Hadinger</b> , President, Inmarsat, Inc.
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10:00 am - 10:30 am	Break
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10:30 am - 11:15 am	<b>Patricia Cooper</b> President, Satellite Industry Association
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11:15 am - 12:00 pm	<b>Peter A. Tenhula</b> , Senior Advisor U.S. Department of Commerce, National Telecommunications and Information Administration
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12:00 pm – 2:00 pm	Lunch "2014 Telecom and Media Regulatory Overview" Guest Speaker: <b>Andrew D. Lipman</b> , Partner, Bingham McCutchen LLP
2:00 pm – 2:45 pm	"What being global really means" <b>Dr. Rob van den Dam</b> , Global Telecommunications Industry Leader IBM Institute for Business Value
2:45 pm – 3:15 pm	Break
3:15 pm – 4:45 pm	Panel Discussion: "Toward Gigabit Wireless Networks: Technology, Regulatory, and Business Opportunities" Organizer and Moderator: <b>Dr. Ehsan Sheybani</b> , Professor, VSU Panelists: <b>Dr. Habib Riazi</b> , Director of RF and Systems Engineering, Mobile Access Division, Corning Telecom <b>Dr. Saied Kazeminejad</b> , Engineer IV, 4G Network Development- LTE Advanced, Sprint <b>Dr. Masoud Olfat</b> , Director of RAN Technology & Standards, LightSquared
4:45 pm – 9:00 pm	Welcoming Reception & Dinner Waterview Conference Center & Hotel Le Meridien Arlington Guest Speaker: <b>Julius Knapp</b> , Chief of the Office of Engineering and Technology (OET) U.S. Federal Communications Commission
<b>Thursday, April 10</b> <b>Waterview Conference Center</b>	
8:00 am – 10:00 am	Mobile Computing Workshop: Part I "Responsive Web Design": Presenter: <b>Dr. Drew Hwang</b> "Mobile Forensics & Security": Presenter: <b>Dr. Gregory Carlton</b> "Mobile Application Development": Presenter: <b>Dr. Zhongming Ma</b> Computer Information Systems Department California State Polytechnic University, Pomona
10:00 am – 10:15 am	Break

<p>10:15 am – 11:15 am</p>	<p>Mobile Computing Workshop: Part II  "Responsive Web Design": Presenter: <b>Dr. Drew Hwang</b>  "Mobile Forensics &amp; Security": Presenter: <b>Dr. Gregory Carlton</b>  "Mobile Application Development": Presenter: <b>Dr. Zhongming Ma</b>  Computer Information Systems Department  California State Polytechnic University, Pomona</p>
<p>11:15 am – 12:00 pm</p>	<p><b>Dr. Eduardo Esteves</b>  VP, Product Management  Qualcomm Research</p>
<p>12:00 pm - 2:00 pm</p>	<p>Lunch  Guest Speaker: <b>Dr. Martin S. Kohn</b>, Chief Medical Scientist,  Jointly Health</p>
<p>2:00 pm – 2:45 pm</p>	<p><b>Michael D. Gallagher</b>  President and CEO  Entertainment Software Association</p>
<p>2:45 pm – 3:00 pm</p>	<p>Break</p>
<p>3:00 pm – 3:45 pm</p>	<p><b>Dr. Francois Cosquer</b>  CTO Security IP Platforms  Alcatel-Lucent</p>
<p>3:45 pm – 4:45 pm</p>	<p>Tutorial: "Wireless Technologies &amp; Healthcare: Applications, Requirements, and Emerging Research"  Presenter: <b>Professor Upkar Varshney</b>  Computer Information Systems, Georgia State University</p>
<p>4:45 pm – 6:45 pm</p>	<p>Reception &amp; Dinner  Waterview Conference Center &amp; Hotel Le Meridien Arlington  "Media Going Mobile: The Multi-Screen Revolution and the American Media Landscape?"  Guest Speaker: <b>Dr. William F. Baker</b>, Director, the Bernard L. Schwartz Center for Media, Education, and Public Policy at Fordham University</p>
<p>7:00 pm – 10:30 pm</p>	<p>Twilight Tour of Washington, DC</p>

**Friday, April 11**

<b>Waterview Conference Center</b>	
8:30 am – 10:00 am	Paper Presentation Session (I)
10:00 am – 10:15 am	Break
10:15 am – 11:45 am	Paper Presentation Session (II)
11:45 am – 1:45 pm	Lunch Awards Ceremony "Spectrum - from mining to recycling" Guest Speaker: <b>Dr. Henning Schulzrinne</b> , Chief Technology Officer, U. S. Federal Communications Commission Julian Clarence Levi Professor of Computer Science, Columbia University
1:45 pm – 3:15 pm	Paper Presentation Session (III)
3:15 pm – 3:30 pm	Break
3:30 pm – 5:00 pm	Paper Presentation Session (IV)

## **Panel Discussions & Tutorials**

Panel Discussion: "Toward Gigabit Wireless Networks: Technology, Regulatory, and Business Opportunities"

Abstract: This panel explores different facets of the growing demand for development of 4G wireless networks, such as LTE. The issues may include regulatory policies, spectrum requirement and placement, technical innovations, obstacles and solutions; cost effective network architecture

and operational aspects; venture capital and business development opportunities’

Organizer and moderator: **Dr. Ehsan Sheybani**, Professor, Virginia State University

Panelists:

**Dr. Habib Riazi**, Director of RF and Systems Engineering, Mobile Access Division, Corning Telecom

**Dr. Saied Kazeminejad**, Engineer IV, 4G Network Development- LTE Advanced, Sprint

**Dr. Masoud Olfat**, Director of RAN Technology & Standards, LightSquared

Speaker Bios:

**Dr. Ehsan O. Sheybani (Panel Organizer & Moderator)**

Ehsan Sheybani has earned a BSEE, MSEE, and Ph. D EE from University of Florida, Florida State University, and University of South Florida, respectively. He is currently a Professor of Computer Engineering at Virginia State University, with a research interest in Communications and Signal Processing. He is a senior member of IEEE and its professional societies. He has numerous federal grants from NASA and NSF and has a long list of publications in peer reviewed journals and conference proceedings.

**Dr. Habib Riazi**

Dr. Riazi has more than 30 years of professional contributions to the telecommunications industry with major telecom companies. He was the radio manager for the initial deployment of Verizon PCS network in Richmond, VA major trading market, chief architect for digital satellite radio receiver at Bell Laboratories, for now commercially available Sirius satellite radio service, was leading the lab for 4G technology development initiative at Nextel, Sprint and Wimax at Clearwire. Habib is currently Director of RF and Systems Engineering at MobileAccess division of Corning Telecom in Herndon, VA where he is responsible for insuring his employers product conformance to wireless service providers’ requirement for distributed antenna system (DAS) infrastructure for extending network coverage and capacity in large buildings and concentrated venues. Habib did his PhD work at George Washington University, in Washington DC, is a life senior member of IEEE ComSoc, is a registered professional engineer in the state of VA, has served on Virginia State University Industrial Advisory Board, and holds numerous US and EU patents.

### **Dr. Saied Kazeminejad**

Dr. Kazeminejad has more than 30 years of experience in wireless telecommunication industry with major companies around the world. He completed his Ph.D in Electrical Engineering, Bradford University, UK. He was director of Radio Transmission group in Iran Telecommunication Research Center, working on development of fixed microwave of radio and satellite communication. After completing a post doctoral research fellowship program in University of Bradford working, he took a manager position for development of second generation cordless product with Novatel, Canada. He was a principle member of Technical Staff for SBC Research lab (now AT&T) working on standardization of second and third generation wireless networks (EDGE, and UMTS). Since 2007 he has been a senior engineer with Sprint and Clearwire working on development of WiMAX and LTE networks. Currently he is working on LTE advanced feature development. Saied is a senior member of IEEE and holds a number of US patents.

### **Dr. Masoud Olfat**

Dr. Masoud Olfat received his PhD degrees and completed post-doctoral studies in wireless communications from University of Maryland, College Park. He has more than 18 years of experience in managing multi-task teams in developing multimedia communication systems, signal processing, and mobile broadband wireless systems such as WiMAX and 3G LTE. He has been actively participating in the development of IEEE802.16 standard and mobile WiMAX from their infancy, and 3GPP LTE.

As a manager of 4G Access in Sprint Nextel (XOHM), and Clearwire, he managed numerous key projects essential for the deployment of WiMAX network, such as WiMAX RFP, development of WiMAX RAN requirement and specifications, XOHM WiMAX IOT (RAN-Core-Device IOT), technical development of WiMAX certification, etc. In addition he was responsible for company's standard activities such as WiMAX, 3GPP, ITU, etc. Currently, as a director of RAN technology & standard in LightSquared, he is in charge of 3GPP LTE RAN development, eNB development and implementation, and company's standard activities, including standardization of company's spectrum in 3GPP, and Spectrum Management. Moreover, he is involved in projects like coexistence of LightSquared technology with GPS, RAN development, RAN sharing structure, VoIP over LTE, and IMS architecture. He is also a senior technical advisor to WiMAX Forum board of directors, and a senior advisor for Global Technology Associates (GTA). He has published numerous papers, written book chapters, and has 19 granted patents along

with 25 more filed patents in United States and internationally, all in the field of wireless communications. He has also been an adjunct professor at the University of Maryland at College Park, where he has developed and taught several wireless courses. Moreover, has been running several training and short course sessions. He is a member of Sharif University of Technology Association (SUTA) board of directors, and the president of SUTA chapter in Washington DC Metropolitan Area.

## **Workshop: “Mobile Computing”**

### **Responsive Web Design**

Dr. Drew Hwang, Computer Information Systems, Cal Poly Pomona

#### Description:

Every business today must have a presence on the web. The majority of today's business processes and operations are also turning into web-based. Amid the advance in mobile computing, Responsive Web Design (RWD) is the new design paradigm for modern websites. Developing a web design that can precisely display a webpage across a large array of user agents in terms of desktops, mobile phones, and tablets, is becoming one of the most crucial part of web development. This workshop provides you with a hands-on demo on how a website can be efficiently developed by using RWD frameworks, templates and tools.

#### List of Topics:

- RWD applications and strategies
- User agent detection and feature detection
- Fluid layout and media queries
- Responsive images and content
- RWD frameworks
- RWD templates
- RWD tools

#### Speaker's Biography

Dr. Drew Hwang is a Professor of Computer Information Systems at California State Polytechnic University, Pomona. He holds a B.S. in Business Administration, a M.S. in Information Systems, and a Ph.D. in Management Information Systems. He is also a visiting Professor of the

graduate Global Business Program of Soochow University, Taipei, Taiwan.

Dr. Hwang has had abundant industry experiences as a system analyst, project manager, IT consultant, and chief technology officer in the area of business computer information systems. He was a co-founder, a member of the board of directors, and the chief developer of eHongKong.com, an e-commerce portal site that successfully secured a venture funding of \$36 millions from New World Development Ltd., one of the top five enterprises in Hong Kong, in 2000. In the last decade, he has delivered keynote speeches and training workshops to a number of local and multi-national enterprises in the area of information technology. He has also created several professional certificates in web design, development, and security.

Dr. Hwang's research interests include electronic commerce, multichannel e-marketing, design and development of Internet-based information systems, secure web development, decision support systems, expert systems, web services, Information System education, and others. He has published many research papers in refereed journals such as Decision Support Systems, Omega, Information and Management, Journal of Information Science, Journal of the American Society for Information Science and Technology, and so on.

## **Mobile Application Development**

Dr. Zhongming Ma, Computer Information Systems, Cal Poly Pomona

### Description

More than 133 million people in the U.S. currently own a smartphone and people more and more depend on mobile devices for their information demand and social needs. For example, 43 percent of email is opened on a mobile device. Thus, besides having traditional websites, businesses and organizations have started to provide mobile applications. Android, a mobile operation system, is based on Java which is powerful, free, and open source. This workshop provides demonstrations to illustrate Android mobile application development.

### List of Topics

- Android development environment
- Fundamental concepts in Android development
- Creating a User Interface with Views
- Displaying Images
- Messaging

- Location-based Services

#### Speaker's Biography

Dr. Zhongming Ma is an Associate Professor of Computer Information Systems at California State Polytechnic University, Pomona. He received his Ph.D. (concentration on Information Systems) from University of Utah, M.S. in Management Information Systems from University of Arizona, and B.S. in Mechanic Engineering from Tsinghua University.

### **Mobile Forensics & Security**

Dr. Gregory Carlton, Computer Information Systems, Cal Poly Pomona

#### Description

As mobile digital devices, including smart phones, tables, and laptop computers, become more ubiquitous, more capable, and more interconnected, we experience increasing levels of security threats and increasing usage of legal matters that depend upon evidence recovered from these digital devices.

This workshop will provide attendees with an overview of the digital forensic process and specific information regarding the recovery of evidence from contemporary mobile devices.

#### List of Topics

- Overview of digital forensics
- Data acquisition of mobile devices
- Data analysis of mobile devices
- Data in the cloud
- Recovering evidence from auxiliary storage devices

#### Speaker's Biography

Dr. Gregory Carlton is an Associate Professor of Computer Information Systems and Director of Computer Forensics Programs at California State Polytechnic University, Pomona. He holds a B.S. in Business Administration from Western Carolina University, a MBA, and a Ph.D. in Communication and Information Sciences from the University of Hawaii. Dr. Carlton teaches undergraduate and graduate courses in computer forensics, database management, and the legal environment of information systems, he conducts research in the field of computer forensics and publishes his research findings in peer-reviewed journals, he developed and manages a professional certification program in digital forensics, he serves as the faculty advisor for the MSBA program, and he serves on numerous boards and committees.

Dr. Carlton provides advisement services for international government organizations pertaining to cyber security and digital forensics. He also maintains an active practice as a computer forensics examiner, and he

provides expert testimony in matters pertaining to computer technology. As a member of the High Technology Crime Investigation Association, these services are available to criminal prosecutors.

### **Tutorial: Wireless Technologies and Healthcare: Applications, Requirements, and Emerging Research**

Professor Upkar Varshney, Computer Information Systems, Georgia State University

#### Description

The introduction of telecommunications in healthcare has led to an increased accessibility to healthcare providers, more efficient tasks and processes, and a higher quality of healthcare services. However, many challenges, including a significant number of medical errors, considerable stress on healthcare providers, and a partial coverage of healthcare services in rural and underserved areas worldwide, still exist. These combined with an increasing cost of healthcare services, such as the cost of healthcare services reaching to 19% of Gross National Product for U.S., and an exponential increase in the number of seniors and retirees in developed countries have created several major challenges for policy makers, healthcare providers, hospitals, insurance companies and patients. Wireless healthcare, or pervasive healthcare, is considered a solution to many of these problems as well as a possible future of healthcare services. In simple terms, wireless healthcare can be defined as healthcare to anyone, anytime, and anywhere by removing locational, time and other restraints while increasing both the coverage and quality of healthcare. The broad definition includes prevention, healthcare maintenance and checkups, short-term monitoring (or home healthcare monitoring), long-term monitoring (nursing home), personalized healthcare monitoring, incidence detection and management, and, emergency intervention, transportation and treatment. In this tutorial, we present an introduction of wireless and mobile technologies, present wireless healthcare applications, derive requirements and wireless solutions, and discuss the future and open issues. More specifically, we discuss how wireless technologies can be applied to achieve wide-scale patient monitoring in and out of hospitals and nursing homes, location management, intelligent emergency system, and mobile telemedicine applications. Additionally, some open issues and research challenges in pervasive healthcare are also discussed.

#### List of Topics

- Current wireless technologies: Architecture, Protocols and Usage Models
  - Sensors and RFID
  - Wireless LANs
  - Ad hoc wireless networks

- 3G/4G Cellular Networks
- Satellites
- Fixed wireless
- Bluetooth and PANs
- Smart and wearable computing
- Various Healthcare Challenges and Current Technologies
  - Access
  - Quality
  - Limited resources
  - Medical errors
- Applications, Requirements and Wireless Solutions
  - Pervasive healthcare
  - Mobile Telemedicine
  - Wireless Health Monitoring
  - Wireless Emergency Management Systems
  - Health-aware Mobile Devices
  - Smart Medication Management
  - Smart Homes
  - Context-awareness in healthcare
  - Wireless decision making & cognitive load
- Future/Open issues of Wireless in Healthcare
  - Personalization of Healthcare
  - Wireless in emergencies
  - Wireless in mental health, addiction and overdose management
  - Training of healthcare professionals for wireless technologies
  - Reducing the cost of delivering healthcare services by wireless infrastructure
  - Legal and regulatory issues including liability and law-suits

#### Speaker's Biography

Prof. Upkar Varshney is on the faculty of Computer Information Systems (Associate Professor) at Georgia State University, Atlanta (<http://www.cis.gsu.edu/~uvarshne>). He received a Bachelor of Engineering in Electrical Engineering with Honors from University of Roorkee (now Indian Institute of Technology, IIT-Roorkee), and, MS in Computer Science and a Ph.D. in Telecommunications & Networking, from the University of Missouri-Kansas City. His research and teaching interests include wireless networks, pervasive healthcare, and mobile commerce.. He has written over 130 papers in these topics in major journals and international conferences. Several of his papers are among the most cited references in wireless and healthcare. He is the founding chair of International Pervasive Health Conference (since 2006) and is the author of Pervasive Healthcare Computing book (2009).

Prof. Varshney has delivered several keynote speeches and has presented more than 30 extremely well received tutorials and workshops at major international conferences. Upkar has received several teaching awards, including Myrone T. Greene Outstanding Teaching Award (2000 and 2004), and RCB College Distinguished Teaching Award (2002). He is an associate editor/member of editorial board for IEEE Access, IEEE Computer, IEEE Transactions on IT in BioMedicine, and International Journal Interdisciplinary Telecommunications & Networking (IJITN).

## **WTS 2014 Paper Presentation Sessions Friday, April 11, 2014**

**8:30 am – 10:00 am**

**Session 1-A**

### **Wireless Telecommunications Systems I**

*Minimizing Energy Consumption for Cooperative Network and Diversity Coded Sensor Networks*, Gabriel Arrobo (University of South Florida, USA), Richard D. Gitlin (University of South Florida, USA)

*UE Power Saving with RRC Semi-Connected State in LTE*, Jianke Fan (Broadcom Communication Finland, Finland), Seppo Alanara (Broadcom, Finland)

*Covert Channels in 802.11e Wireless Networks*, Hong (Hannah) Zhao (Fairleigh Dickinson University, USA)

*A Low Power Receiver Architecture for Near Field Communication Readers*, Nurcan Keskin (Oregon State University, USA); Huaping Liu (Oregon State University, USA)

*An Efficient Multi-Parent Hierarchical Routing Protocol for WSNs*, Carolina Del Valle (Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico); Carlos Mex (ITESM, Mexico); Aldo Orozco (CINVESTAV, Mexico); Giselle Galvan-Tejada (Cinvestav, Mexico); Mauricio Lara (Centro de Investigación y de Estudios Avanzados del IPN, Mexico); Oscar Olmedo (Centro de Investigación y de Estudios Avanzados del IPN, Mexico)

**8:30 am – 10:00 am**

**Session 1-B**

**E-health & Telecommunications in Healthcare**

*Multimedia Content Delivery for Remote Patient Monitoring using Cognitive Radio Networks*, Dramane Ouattara (University of Bordeaux, France); Mohamed Aymen Chalouf (IRISA Lab - University of Rennes 1, France); Omessaad Hamdi (LaBRI, France); Francine Krief (University of Bordeaux, France)

*CrowdHelp: m-Health Application for Emergency Response Improvement through Crowdsourced and Sensor-Detected Information*, Liliya Besaleva (University of Virginia, USA)

*Patterns of Effective Medication Adherence: The Role of Wireless Interventions*, Neetu Singh (Georgia State University, USA); Upkar Varshney (Georgia State University, USA)

*Wireless Monitoring of Misuse of Prescription Medications*, Upkar Varshney (Georgia State University, USA)

*An Innovative Wireless Cardiac Rhythm Management (iCRM) System*, Gabriel Arrobo (University of South Florida, USA); Calvin Perumalla (University of South Florida, USA); Stanley Hanke (University of South Florida, USA); Thomas Ketterl (University of South Florida, USA); Peter Fabri (University of South Florida, USA); Richard D. Gitlin (University of South Florida, USA)

**8:30 am – 10:00 am**

**Session 1-C**

**Physical Layer I**

*Cognitive Radio Sensing Based on Joint Distribution of Pseudo Wishart Matrix Eigenvalues*, Usama Y. Mohamad (University of Kassel, Germany); Dirk Dahlhaus (University of Kassel, Germany)

*Non-Coherent detection of GFSK Using Extended Kalman Filtering for Non-Gaussian Noise*, Ahmad Nsour (Oakland University, USA); Alhaj-Saleh Abdallah (Oakland University, USA); Mohamed Zohdy (Oakland University, USA)

*Performance Analysis of AF Cooperative Networks with Time-Varying Links: Error Rate and Capacity*, Yazid Khattabi (University of

Mississippi, USA); Mustafa Muhammad Matalgah (University of Mississippi, USA)

*Performance Improvement of Decode-and-Forward Relay Systems Using Dual Polarized Antenna*, Maja Ilic-Delibasic (University of Montenegro, Montenegro); Milica Pejanovic-Djurisic (University of Montenegro, Montenegro)

*Performance Analysis of AF Cooperative Networks with Time-Varying Links: Outage Probability*, Yazid Khattabi (University of Mississippi, USA); Mustafa Muhammad Matalgah (University of Mississippi, USA)

**10:00 am – 10:15 am**

**Break**

**10:15 am – 11:45 pm**

**Session 2-A**

**Wireless Telecommunications Systems II**

*On Optimizing the Performance of Interference-Limited Cellular Systems*, Rana A. Abdelaal (University of California, Irvine, USA); Alireza S. Behbahani (University of California, Irvine, USA); Ahmed M. Eltawil (University of California, Irvine, USA)

*On the Performance of Massive MIMO Cellular Systems With Power Amplifiers*, Rana A. Abdelaal (University of California, Irvine, USA); Alireza S. Behbahani (University of California, Irvine, USA); Ahmed M. Eltawil (University of California, Irvine, USA)

*Energy Efficiency Metrics for Heterogenous Wireless Cellular Networks*, Milica Pejanovic-Djurisic (University of Montenegro, Montenegro); Ana Aligrudic (University of Montenegro, Montenegro)

*WiFi iLocate: WiFi based Indoor Localization for Smartphone*, Xiang He (Oakland University, USA); Shirin Badieli (Oakland University, USA); Daniel Aloia (Oakland University, USA); Jia Li (Oakland University, USA)

*Applying Spatial Diversity to Mitigate Partial Band Interference in Undersea Networks*, James McGee (University of Rhode Island, USA); Josko Catipovic (NUWC, RI, USA); Peter Swaszek (University of Rhode Island, USA)

**10:15 am – 11:45 pm**

**Session 2-B Wireless**

**Business, Investments, and Applications**

*Telecommunications Service Providers in Transition: A Strategic Retrospective*, Steven Powell (Cal Poly Pomona, USA)

*Bring Your Own Device (BYOD): Benefits, Concerns, and Security Issues*, J. P. Shim (Georgia State University, USA)

*A Novel Methodology of Data Analytics and Modeling to Evaluate LTE Network Performance*, Ye Ouyang (Stevens Institute of Technology, USA); M. Hosein Fallah (Stevens Institute of Technology, USA); Sanqing Hu (Stevens Institute of Technology, USA); Yong Ren (Stevens Institute of Technology, USA); Yirui Hu (Rutgers University, USA); Zhichang Lai (Harbin Engineering University, USA); Mingxin Guan (Stevens Institute of Technology, USA); Wenyuan Lu (VPIsystems, USA)

*Logistic Statistics for Optimal Resource Allocation*, Zory Marantz (NY City College of Technology, USA)

*Emerging Mobile Technologies/Tools for E-learning*, Benjamin Khoo (New York Institute of Technology, USA)

**10:15 am – 11:45 pm**  
**Physical Layer II**

**Session 2-C**

*Opportunistic Access in Frequency Hopping Cognitive Radio Networks*, Ethan Hennessey (Air Force Institute of Technology, USA); Kenneth Mark Hopkinson (Air Force Institute of Technology, USA); Mark D. Silvius (Air Force Institute of Technology, USA)

*Spectral Re-harvesting for 4G networks: Through low-complexity VAMOS receiver design*, Muyeen Nawaz (Samsung Research India Bangalore, India); Arvind Chakrapani (Samsung R&D, India)

*Analysis and Comparison of Fractional Frequency Reuse Schemes Based on Worst Case Signal to Interference Power Ratio in OFDMA Uplink*, Sherief Hashima (Engineering Dept, EAEA, Cairo, Egypt); Osamu Muta (Kyushu University, Japan); Said M. Elnoubi (Alexandria University, Egypt); Masoud Alghoniemy (University of Alexandria, Egypt); Hossam Shalaby (Alexandria University, Egypt); Hiroshi Furukawa (Kyushu University, Japan); Imbaby Mahmoud (Egyptian Atomic Energy Authority, Egypt)



Stephan (Bradley University, USA); Jacob Siegers (Bradley University, USA)

*Source-Observation Weighted Fingerprinting for Machine Learning Based Localization*, Thomas Ketseoglou (California State Polytechnic University, USA); Brian Mohtashemi (California State Polytechnic University, Pomona, USA)

**1:45 pm – 3:15 pm** **Session 3-B**  
**Network Layer and Medium Access Control (MAC) Layer I**

*Mitigating Black Hole Attacks in Wireless Sensor Networks Using Node-Resident Expert Systems*, Vincent F Taylor (University of Oxford, United Kingdom); Daniel T Fokum (University of the West Indies, Jamaica)

*K-Centers Mean-shift Reverse Mean-shift Clustering Algorithm over Heterogeneous Wireless Sensor Networks*, Qingyan Xie (University of Cincinnati, USA); Yizong Cheng (University of Cincinnati, USA)

*Achieving Guaranteed Connected Coverage by Using Virtual Hexagonal Partition in Wireless Sensor Networks*, Attapol Adulyasas (University of Surrey, United Kingdom); Zhili Sun (University of Surrey, United Kingdom); Ning Wang (University of Surrey, United Kingdom)

*K-Centers Clustering Protocol for Heterogeneous Wireless Sensor Networks*, Qingyan Xie (University of Cincinnati, USA); Yizong Cheng (University of Cincinnati, USA); Qing-An Zeng (North Carolina A&T State University, USA)

*Many-to-All Priority-Based Network-Coding Broadcast in Wireless Multihop Networks*, Jung-Chun Kao (National Tsing Hua University, Taiwan)

**1:45 pm – 3:15 pm** **Session 3-C**  
**Physical Layer III**

*HPA Nonlinearities Mitigation by Joint Predistorter and Constellation Rotation Using MIMO Communication Systems*, Latif Jan (University of Engineering & Technology Peshawar, Pakistan); Mohammad Haseeb Zafar (University of Engineering and Technology, Peshawar, Pakistan); Ishtiaq Ahmed (Salman bin AbdulAziz University, Saudi Arabia); Mohammad Babar (, Pakistan); Sahibzada Ali Mahmud (University of Engineering and Technology, Peshawar, Pakistan); Gul Muhammad Khan (University of Engineering and Technology Peshawar,

Pakistan); Syed Gilani(University of Engineering and Technology, Peshawar, Pakistan)

*Effect of Discrete Constellations on Duality between the Gaussian Multiple Access and the Gaussian Broadcast Channel*, Iram Abdur Rehman (National University of Sciences and Technology, Pakistan); Rizwan Ghaffar (Samsung US R&D Center, Canada); Saad B. Qaisar (School of Electrical Engineering and Computer Science (SEECs), NUST, Pakistan); Imran Rashid (National University of Sciences and Technology, Pakistan)

*On the Feasibility of Generalized Interference Alignment with Partial Interference Cancellation*, Xinya Tu (University of Electronic Science and Technology of China, P.R. China); Zhi Chen (University of Electronic Science and Technology of China, P.R. China); Jun Fang (University of Electronic Science and Technology of China, P.R. China); Lingxiang Li (University of Electronic Science and Technology of China, P.R. China); Bo Qu (University of Electronic Science and Technology of China, P.R. China); Bin Fu (University of Electronic Science and Technology of China, P.R. China)

*Blind Multiuser Detection Based on the Fast Relative Newton Algorithm*, Zaid Albataineh (Michigan State University, USA); Fathi Salem (Michigan State University, USA)

**3:00 pm – 3:15 pm**

**Break**

**3:15 pm – 5:00 pm**

**Session 4-A**

**Wireless Telecommunications Systems IV**

*Solving Binary and Continuous Knapsack Problems for Radio Resource Allocation over High Altitude Platforms*, Ahmed Ibrahim (University of Manitoba, Canada); Attahiru Alfa (University of Manitoba, Canada)

*The Design of Indoor Positioning System for Emergency Evacuations*, Liren Zhang (United Arab Emirates University, UAE)

*Bayesian Quantized Network Coding via Generalized Approximate Message Passing*, Mahdy Nabaee (McGill University, Canada); Fabrice Labeau (McGill University, Canada)

*A MCS Adaptive Scheduling Algorithm for IEEE802.11ad Wireless Communications*, Weijie Liu (Panasonic Corporation, Japan)

*Towards Layer Adaptation for Audio Transmission*, Jan Holub (FEE CTU Prague, Czech Republic); Oldrich Slavata (Faculty of Electrical Engineering, Czech Technical University, Czech Republic); Pavel Souček (FEE CTU, Czech Republic); Odysseas Zisimopoulos (University of Patras, Greece); Dimitris Toumpakaris (University of Patras, Greece); Stavros Kotsopoulos (Wireless Telecommunications Laboratory, Greece)

**3:15 pm – 5:00 pm**

**Session 4-B**

**Medium Access Control Layer II**

*A New Anti-Collision Protocol for RFID Networks*, Fariha Baloch (Wichita State University, USA); Ravi Pendse (Wichita State University, USA)

*Throughput Analysis of Channel Surfing in Jammed Single-Hop Wireless Networks*, Peng Wang (NRC PostDoc, USA); Brian Henz (US Army Research Laboratory, USA)

*A Multi-channel Cooperative Clustering-Based MAC protocol for VANETs*, Fan Yang (Xiamen University, P.R. China)

*CBA-EVT: A Traffic-Adaptive Energy-Efficient MAC Protocol for Wireless Sensor Networks*, Jung-Chun Kao (National Tsing Hua University, Taiwan)

*Modeling and Simulation of Energy Efficient Enhancements for IEEE 802.15.4e DSME*, Silvia Capone (CMC Labs, Italy); Riccardo Brama (CMC Labs, Italy); Fabio Ricciato (Austrian Institute of Technology (AIT), Italy); Gennaro Boggia (Politecnico di Bari, Italy); Angelo Malvasi (CMC Labs, Italy)

**3:15 pm – 5:00 pm**

**Session 4-C**

**Wireless Telecommunications Systems V**

*Development of a Satellite Communication Emulator for the Hyperspectral Microwave Atmospheric Sounder (HyMAS)*, Giti Javidi (Virginia State University, USA); Ehsan Sheybani (Virginia State University, USA); Janelle Williams (Virginia State University, USA)

*Visualization of Real-time Radar Data by Integration of X-Band Software*, Giti Javidi (Virginia State University, USA); Ehsan Sheybani (Virginia State University, USA); Danielle Mason (Virginia State University, USA)

*Design Considerations for Radio Protocol Improvement Beyond LTE-Advanced: Service Access Integration and Optimization*, Ki-Dong Lee (LG Electronics Mobile Research, USA)

*An Optimized SIMD Implementation of the HEVC/H.265 Video Decoder*  
Paolo Lambruschini (University of Genoa, Italy); Massimo Bariani (University of Genoa, Italy); Marco Raggio (University of Genoa, Italy); Luca Pezzoni (Advanced System Technology, Italy)

*Signaling Cost Analysis for NEMO Extended Support Protocol using Correspondent Router*, Samer Sami Hasan (University Kebangsaan Malaysia, Malaysia); Rosilah Hassan (Universiti Kebangsaan Malaysia, Malaysia)

## **WTS 2014 Poster Papers Friday, April 11, 2014**

**Poster papers will be posted all day. Authors will be available to answer questions during the morning and afternoon breaks and after lunch.**

*Dyadic Green's functions for Wireless System to Electric Field Prediction: A Study Case for Digital TV Systems in Amazon Region*, Silva, D. K. N.; Oliveira, A. W.; Barros, W. J. da S. Faculty of Electrical Engineering and Computer Federal University of Pará – UFPA, Belém – Pará – Brazil

*Practical Considerations for Electromagnetic Interference Suppression Rate in Wireless System Applications*, Nurcan Keskin and Huaping Liu, School of Electrical Engineering and Computer Science, Oregon State University, Corvallis, OR 97331-5501, USA

*Integrating WSN with the Internet: QoS Analysis and Modeling for Heterogeneous Data Traffic*, Syarifah Ezdiani Syed Nor Azlan and Adnan Al-Anbuky, Sensor Network and Smart Environment Research Centre Auckland University of Technology, Auckland, New Zealand

*Environment Monitoring And Control In Aquaculture Based On Wireless Sensor Networks*, Shi-feng Yang, Long Xue, College of Electronic Information and Automation, Tianjin University of Science and Technology, P. R. China

*Packet Collision Avoidance Scheme for CRMBR*, Dan Liu, Roujia Sun, Pei Xue, Yan Sun, School of Electronic Engineering and Computer Science, Queen Mary University of London, London, UK

## **Speaker Biographies**

**Dr. William F. Baker** directs the Bernard L. Schwartz Center for Media, Education, and Public Policy at Fordham University, where he is also Journalist-in-Residence and a professor in the Graduate School of Education. He is a professor at IESE Business School, ranked #1 globally by The Economist. Baker is a Senior Research Fellow at Harvard's Hauser Center for Nonprofit Organizations, Executive-in-Residence at the Columbia University Business School, teaches at the Juilliard School, and is President Emeritus of Educational Broadcasting Corporation (EBC), licensee of America's flagship PBS station Thirteen/WNET, and WLIW21, New Jersey's PBS affiliate.

Baker is co-author of the book *Leading with Kindness: How Good People Consistently Get Superior Results* (American Management Association, 2008), and hosts the documentary of the same name which premiered on public television in 2008.

Baker's career spans four decades. During his twenty years as chief executive officer of EBC, he distinguished himself as one of America's most prolific fundraisers, raising over \$1 billion for the station, and establishing the largest endowment in the history of public television. Among many other accomplishments at EBC, Baker introduced the landmark program *Charlie Rose*, oversaw the station's transition to digital broadcasting, and launched WNET's first cable channel, *MetroArts/Thirteen*.

Prior to joining EBC, he was president of Westinghouse Television and chairman of their cable and programming companies. At Westinghouse, Baker introduced Oprah Winfrey as a talk show host and established *PM Magazine* as the #1 syndicated program in America in the 1980s. During Baker's tenure, Westinghouse also launched five cable networks, including the *Discovery Channel* and the *Disney Channel*.

Baker is the executive producer of the *The Face: Jesus in Art*, a landmark Emmy-winning documentary film that traces the image of Jesus Christ in art around the world and across two millennia. *The Face* premiered nationwide on public television in 2001 and also enjoyed a limited

theatrical

release.

Baker is the recipient of seven Emmy Awards and is a fellow of the American Academy of Arts and Sciences. In 2007, he was inducted into the National Academy of Television Arts & Sciences (NATAS) Management Hall of Fame and received the Mark Schubart Award from the Lincoln Center Institute, given to individuals who most exemplify the Institute's ideal of integrating the arts with education. He has been inducted into Broadcasting & Cable's Hall of Fame and the New York State Broadcasters Association Hall of Fame. In addition to numerous other awards, Baker has received the Gabriel Personal Achievement Award, two Alfred I. duPont-Columbia University Journalism Awards and the 1987 Trustees Emmy Award, given in recognition of outstanding contribution to the advancement of television.

Baker is also the co-author of *Down the Tube: An Insider's Account of the Failure of American Television* (Basic Books, 1998) and the author of *Lighthouse Island: Our Family Escape* (Ruder Finn Press, 2004).

In addition to being Chairman of the National Parks System Advisory Board, Baker serves on the boards of Rodale Press and the Intrepid Sea, Air & Space Museum in New York City. He holds B.A., M.A. and Ph.D. degrees from Case Western Reserve University, and seven honorary doctorates.

Dr. Baker's long standing commitment to promoting education led him to establish WNET's Educational Resources Center, America's most prolific trainer in multimedia teaching techniques. He also established the Bernard L. Schwartz Center for Media, Education, & Public Policy at Fordham University, and he is an annual speaker at WNET's Celebration of Teaching and Learning.

His interests include astronomy, horology, and polar science, and he is believed to be one of only a few people who have stood on both the North and South Poles.

**Patricia Cooper** has led the Satellite Industry Association since November 2007. As President, Ms. Cooper acts as SIA's lead advocate for regulatory and policy issues of critical importance to the Association's membership, including spectrum and licensing issues, defense and public safety matters, and export control and international trade issues.

SIA is a U.S.-based trade association providing worldwide representation of the leading satellite manufacturers, operators, service providers, launch

services providers, and ground equipment suppliers. The Association is the unified voice of the U.S. satellite industry on policy, regulatory, and legislative issues affecting the satellite community.

For more information: [www.sia.org](http://www.sia.org)

Ms. Cooper has more than 20 years of experience, both in the communications and satellite sector and in the U.S. government. She joined SIA following a five year tenure in the Federal Communications Commission's International Bureau, where she served as Senior Satellite Competition Advisor and Branch Chief for Regional & Bilateral Affairs. Before joining the FCC, Patricia directed the international market access at PanAmSat Corporation during its transformation from a start-up single-satellite communications company to a global satellite system. She also worked with CoreExpress, a start-up intelligent data delivery company, and was the satellite analyst for the U.S. Commerce Department's International Trade Administration.

Patricia is a member of the Federal Advisory Committee for the Federal Communications Commission 2015 World Radiocommunication Conference (FCC WAC), the Federal Aviation Administration's Commercial Space Transportation Advisory Committee (COMSTAC) and the U.S. State Department's Advisory Committee on International Communications and Information Policy (ACICIP).

Patricia holds a Master's Degree in International Economics from the School of Advanced International Studies at Johns Hopkins University (SAIS) and graduated summa cum laude from Kansas State University with a Bachelor's Degree in Political Science and German.

**Dr. François Cosquer** is CTO Security IP Platforms for Alcatel-Lucent. He has also served as Head of Solutions Security for the Alcatel-Lucent Corporate Solutions organization and as CTO Security and Technology Strategist for the Alcatel-Lucent Enterprise Business Group. Over the past 20 years, he has held senior positions with research institutions, equipment vendors and telecommunications operators. He draws on extensive experience in security architecture, networking, operating systems, middleware, and multimedia applications. He has been speaker, panellist, and chair at key industry events and conferences. François graduated in Electronics and Computing and holds an MSc in Computer Science and a Ph.D. in Computer Engineering. He currently serves as Adjunct Professor at the Faculty of Engineering and Computer Science, University of Concordia, Montreal.

**Eduardo Esteves** is a vice president of product management in Qualcomm's Research group. He currently leads the team responsible for market strategy, technology adoption and industry collaboration.

Dr. Esteves has contributed to the evolution of satellite and wireless communications for more than 20 years. His areas of expertise include 4G, 3G, Wi-Fi, Bluetooth, and wireless modem design.

Dr. Esteves received his PhD in electrical engineering from the University of Southern California. He also obtained an executive management certificate from the Anderson School of Management at UCLA, an MS from Pontificia Universidade Católica do Rio de Janeiro (Brasil) and BS from Instituto Militar de Engenharia (Brasil). Dr. Esteves holds more than 30 patents related to wireless communications.

**Michael (Mike) D. Gallagher** is president and CEO of the Entertainment Software Association (ESA), the trade association representing U.S. computer and video game publishers.

Mr. Gallagher joined ESA in 2007. Under his leadership, ESA engages in activities that demonstrate the influence of entertainment software on areas of daily life such as education, health and the workplace. He frequently appears as the public face of the industry and regularly serves as an expert resource for major media outlets, including CNN, Associated Press, The New York Times, The Washington Post, NBC News and CBS News.

Mr. Gallagher's interest in the broader uses of games helped ESA adopt a focus on highlighting the value of video games as next-generation learning tools, and their increasing incorporation into classrooms. His accomplishments include ESA's sponsorship of the National STEM Video Game Challenge, part of the White House-led Educate to Innovate campaign. In addition, Mr. Gallagher served on the judging panel for the U.S. Department of Agriculture's "Apps for Healthy Kids" competition.

Mr. Gallagher also manages ESA's work with state officials, helping to foster a welcoming operating environment for the high-paying jobs in the video game industry. Additionally, he leads ESA's collaboration with the Congressional Caucus for Competitiveness in Entertainment Technology (E-TECH Caucus), which educates federal policymakers about the economic, educational and social benefits of interactive entertainment technology.

Mr. Gallagher has spoken at numerous venues across the country. He addressed graduating students at educational institutions such as Southern Methodist University and the DigiPen Institute of Technology.

Previously, Mr. Gallagher was the U.S. Department of Commerce's Assistant Secretary for Communications & Information, serving as chief telecommunications and Internet policy advisor. During his tenure at the Department of Commerce, he led successful efforts to pave the way for a number of ground-breaking spectrum-based technologies and services, and developed and successfully advocated the U.S. government's policies on international Internet governance. Mr. Gallagher also served as Communications Practice chair at leading international law firm Perkins Coie, during which time he co-authored, "21st Century Communications Systems for First Responders: The Right Call," which offered groundbreaking spectrum policy recommendations and championed the private sector's role in enhancing our nation's public safety communications infrastructure.

Several organizations recognized Mr. Gallagher's leadership in telecommunications and technology issues. He received the Telecommunications Industry Association's "Spirit of Innovation" award in 2005 and the Wireless Communications Association's "Leadership in Government" award in 2006. He was also recognized by former Secretary of Commerce Carlos Gutierrez in 2006 for his distinguished leadership in government service.

Mr. Gallagher holds degrees in Economics and Political Science from the University of California, Berkeley and a Juris Doctor from the University of California, Los Angeles. He serves on the Advisory Board for the Guildhall at Southern Methodist University and Spectrum Bridge, Inc. Mr. Gallagher also serves on the Boards of Directors for the Academy of Interactive Arts & Sciences and One Economy Corporation, as well as the Publishing Advisory Board of Sesame Street.

**Peter Hadinger** is President, Inmarsat, Inc., where he leads Inmarsat's business unit responsible for all U.S. Government sales and programs.

Mr. Hadinger has been most recently responsible for developing the government-focused capabilities and services of Inmarsat's new Global Xpress programme. Previously he spent 30 years as a leader in technology development, engineering and spacecraft programs at Northrop Grumman. His background includes MILSATCOM, ISR, air-space integration, cyber, and international initiatives. He holds multiple patents in advanced communications.

Mr. Hadinger has a strong regulatory and policy background, serving as

co-chair of the satellite industry delegation that helped to craft the global Telecom Services Agreement at the WTO, Vice-Chair of the FCC's WRC-07 Advisory Committee and Vice-Chair of the Satellite Task Force for the President's National Security Telecom Advisory Commission. He is past chairman of the Satellite Industry Association and served as a Brookings Congressional Fellow in the U.S. Senate.

Mr. Hadinger received his BSEEE from California State Polytechnic University, an MBA with emphasis in finance and strategic planning from George Mason University and serves on engineering advisory boards at Virginia Tech.

**Julius Knapp** is Chief of the FCC's Office of Engineering and Technology (OET). OET is the Commission's primary resource for engineering expertise and provides technical support to the Chairman, Commissioners and FCC Bureaus and Offices.

Mr. Knapp has been with the FCC for nearly 39 years. He became Chief of OET in 2006. Mr. Knapp previously served as a Deputy Chief of OET from 2002 - 2006. Prior to that he was the Chief of the Policy & Rules Division where he was responsible for FCC frequency allocation proceedings and for proceedings amending the FCC rules for radio frequency devices. Mr. Knapp was Chief of the FCC Laboratory from 1994 - 1997 where he was responsible for the FCC's equipment authorization program and technical analyses.

Mr. Knapp received a Bachelor's degree in electrical engineering from the City College of New York in 1974. He has received the FCC's Silver and Gold medal awards for distinguished service at the Commission. He was the 2001 recipient of the Eugene C. Bowler award for exceptional professionalism and dedication to public service. He was the 2010 recipient of the Federal Communications Bar Association Excellence in Government Service Award and the recipient of the WCAI 2010 government Leadership award. In 2013 he received the Presidential Distinguished Rank Award for exceptional achievement in the career Senior Executive Service of the United States of America.

**Dr. Martin S. Kohn** is Chief Medical Scientist at Jointly Health. Prior to joining Jointly Health, Dr. Kohn was the Chief Medical Scientist for Care Delivery Systems in IBM Research where he led IBM's support for the transformation of healthcare, including development of personalized care, outcomes-based models and payment reform. His research work includes healthcare population analytics and the role of expert systems in the

clinical decision process, including the use of the Watson supercomputer in healthcare. He speaks frequently on the issues on healthcare transformation, the role of information technology, the Patient Centered Medical Home and clinical decision support. Dr. Kohn is a co-author of IBM's white paper "Patient-Centered Medical Home – What, Why and How." He is on the editorial board of the Journal of Emergency Medicine. Dr. Kohn was previously in IBM Healthcare Strategy and Change, which helped healthcare systems and clinicians optimize process and make best use of health information technology. He has published multiple articles and book chapters on clinical, technical and management subjects. Dr. Kohn is an emergency physician with over 30 years of hospital-based practice and management experience. He is an alumnus of MIT, Harvard Medical School and NYU, and is a Fellow of the American College of Emergency Physicians and the American College of Physician Executives.

**Andrew Lipman**, Partner in the global law firm Bingham McCutchen LLP, has spent more than 30 years developing the firm's Telecommunications, Media and Technology Group into one of the largest practices of its kind in the nation. He practices in virtually every aspect of communications law and related fields, including regulatory, transactional, litigation, legislative and land use. The TMT Group is international in scope, representing clients in the U.S., Central and South America, Europe, Asia and other parts of the world.

Andy represents clients in both the private and public sectors, including those in the areas of local, long distance and international telephone common carriage; Internet services and technologies; conventional and emerging wireless services; satellite services; broadcasting; competitive video services; telecommunications equipment manufacturing; and other high-technology applications. In addition, Andy has managed privatizations of telecommunications carriers in Europe, Asia and Latin America.

Andy has been involved in nearly every new legal and regulatory policy at the Federal Communications Commission (FCC), at state public service commissions, in Congress and before courts to open the U.S. local telephone market to competition. He also helped shape crucial provisions of the Telecommunications Act of 1996 and has used similar approaches to promote the opening of foreign markets. He also obtained one of the first competitive local service and interconnection agreements in continental Europe and the first competitive fiber network application in Japan. Andy's expansive practice includes the strategic analysis of companies' telecom user agreements, including renegotiating existing agreements, and when necessary, negotiating new, more favorable telecom user agreements.

For nearly a decade, while maintaining his partnership at the firm, Andy also served as senior vice president, legal and regulatory affairs, for MFS Communications, the nation's largest competitive local services provider. One of the founders of MFS, Andy helped guide the company from startup to its eventual sale for \$14.4 billion to WorldCom.

A frequent author and speaker on telecommunications related topics, Andy has published more than 170 articles and is the author of five books, including two Dow Jones books on telecommunications. He has appeared as a commentator on National Public Radio, C-SPAN, Bloomberg News Network and ABC News. In addition, he has served on the editorial advisory boards of Phillips Publishing Company, Internet Law and Regulation, Telecommunications Alert, Telecommunications Reports, Telecommunications Regulatory Monitor and The Satellite Compendium. Andy also served as general counsel to the International Teleconferencing Association and as legislative/regulatory counsel to the International Satellite Users Association. He sits on the board of directors of five public companies trading on the NYSE, NASDAQ and Toronto Stock Exchange. Andy is co-founder and the first chairman of the Association of Local Telecommunication Services (ALTS), the national trade association for competitive telecommunications carriers.

Prior to entering private practice, Andy participated in the legal honors program at the U.S. Department of Transportation and served in the Office of the Secretary of Transportation. He also served as an extern law clerk to Justice Raymond Sullivan of the California Supreme Court.

**Congressman Matt Salmon** was elected to the United States Congress on November 6, 2012 to represent the people of Arizona's 5th Congressional District. Matt was appointed by his peers to serve on the House Foreign Affairs Committee and serves as Chairman of the Subcommittee on the Western Hemisphere. He also serves on the House Committee on Education and the Workforce.

Matt attended public school in Mesa, Arizona and graduated from Arizona State University with a bachelor's degree in English literature and an MPA from Brigham Young University.

After completing his education, Matt spent thirteen years in the telecommunications industry in Arizona. In his early career, Matt learned invaluable lessons regarding the effect of government regulation on private enterprise. With the ever increasing expansion of government and burdensome tax rates on American citizens and small businesses, Matt was called to begin a life of public service.

In 1990, Matt was elected to the Arizona State Senate, where he served from 1991 until 1995. During this time, he served as Assistant Majority Leader and Chairman of the Rules Committee.

In 1994, Matt was elected to the U.S. House of Representatives, where he served three terms. As the only Member of Congress fluent in Mandarin, along with his position on the International Relations Committee, Matt led multiple U.S. delegations to China, one of which secured the release of political prisoner Song Yongyi. During his service, Matt was named a "Watchdog of the Treasury" for six consecutive years and earned the "Taxpayer Hero" award from Citizens Against Government Waste. In 2000, Matt remained faithful to a self-imposed term limit pledge and retired his seat.

After the passage of the Affordable Healthcare Act and the expansion of government regulation during an economic crisis, Matt again answered the call to serve. In 2012, Arizona reelected him to serve in the U.S. House of Representatives. Matt wants to ensure the voices of all Arizonans are heard and looks forward to advancing pro-business policies, cutting government waste and balancing the federal budget once again.

Matt has spent the last 34 years happily married to his best friend, Nancy. They are the proud parents of four children and the proud grandparents of six grandchildren.

**Dr. Henning Schulzrinne** is Chief Technology Officer for the United States Federal Communications Commission (FCC) and Julian Clarence Levi Professor of Computer Science at Columbia University. He is co-author of the Real-Time Protocol (RTP) for real-time Internet services, the signaling protocol for Internet multimedia conferences and telephony (SIP) and the stream control protocol for Internet media-on-demand (RTSP).

Dr. Schulzrinne received his undergraduate degree in economics and electrical engineering from the Darmstadt University of Technology, Germany, his MSEE degree as a Fulbright scholar from the University of Cincinnati, Ohio and his Ph.D. from the University of Massachusetts in Amherst, Massachusetts. He was a member of technical staff at AT&T Bell Laboratories, Murray Hill and an associate department head at GMD-Fokus (Berlin), before joining the Computer Science and Electrical Engineering departments at Columbia University, New York. From 2004 to 2009, he served as chair of the Department of Computer Science. From 2010 to 2011, he was an Engineering Fellow at the Federal

Communications

Commission

(FCC).

He is editor of the "Computer Communications Journal", the "ACM Transactions on Multimedia Computing", the "ComSoc Surveys & Tutorials" and a former editor of the "IEEE Transactions on Image Processing", "Journal of Communications and Networks", "IEEE/ACM Transactions on Networking" and the "IEEE Internet Computing Magazine". He has been a member of the Board of Governors of the IEEE Communications Society and is vice chair of ACM SIGCOMM, former chair of the IEEE Communications Society Technical Committees on Computer Communications and the Internet and has been technical program chair of Global Internet, IEEE Infocom 2000, ACM NOSSDAV, IEEE IM, IPTComm 2008, IFIP Networking 2009 and IPtel and general co-Chair of ACM Multimedia 2004 and ICNP 2009. He serves on the Internet2 Applications, Middleware and Services Advisory Council and has led a working in the NSF GENI project. He also has been a member of the IAB (Internet Architecture Board). He serves on a number of conference and journal steering committees, including for the IEEE/ACM Transactions on Networking.

**Peter Tenhula** is a Senior Advisor at the National Telecommunications and Information Administration (NTIA) in the Department of Commerce. Peter joined NTIA in April 2012 where he advises the Assistant Secretary of Commerce, the Office of Spectrum Management (OSM), and the Institute for Telecommunication Sciences (ITS) on spectrum policy matters. Prior to joining NTIA, Peter worked at Shared Spectrum Company in Vienna, Virginia, for six years, serving as the company's Vice President and General Counsel. Peter was also a member of the Board of Directors of the Wireless Innovation Forum (formerly the SDR Forum) and chaired the Forum's Regulatory Committee. From 1990 to 2006, Peter served at the U.S. Federal Communications Commission, where he held several positions including Acting Deputy Chief of the Wireless Telecommunications Bureau, Director of the Spectrum Policy Task Force, Senior Legal Advisor to Chairman Michael Powell, Special Counsel to General Counsel William Kennard and staff attorney in the Office of General Counsel and the Mass Media Bureau. He received his undergraduate degree in Telecommunications from Indiana University, Bloomington, and earned a law degree from Washington University in St. Louis, Missouri.

**Rob van den Dam** is the Global Telecommunications Industry Leader at the IBM Institute for Business Value. He is responsible for developing and deploying strategic thought leadership in telecommunications and as such

contributor to IBM's global telecom strategy. In this role he develops future agendas, industry outlooks and business value realization studies. He has 20 years' experience in the telecom industry and has worked in a range of advisory and implementation roles for major telecommunications, media and government organizations.

Prior to joining IBM he worked for Data Sciences where he was Senior Principal and one of the founders of Data Sciences' telecommunications practice. He started his career 30 years ago at the National Aerospace Industry where he worked in both national and international projects. Rob graduated at the Delft University in Aerospace Engineering (with honours), where he received a PhD.

Recent work includes future scenario planning, big data, Cloud, social business, and Internet of Things. Rob periodically presents or participates in panel sessions at major industry conferences, such as World Future Trends Summit, ITU World, GSMA Mobile Asia Conference, Total Telecom World, World Telecom Council, CommunicAsia, Broadband World Forum, and Asian Carriers' Conference. He has published multiple articles in, amongst others, Total Telecom Magazine, Telecom Asia magazine, European Communications, Mobile Europe, Annual Review of Communications and Journal of Telecommunications Management.

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Track-5: Wireless Telecommunications Systems Co-Chairs:

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