

WTS 2015

Wireless Telecommunications Symposium 2015

*Wireless Communications: A
Multidisciplinary Perspective*

April 15 - 17, 2015



California State Polytechnic University, Pomona

**Holiday Inn Midtown 57th Street
New York City, New York USA**

WELCOME TO WTS 2015

Welcome to the fourteenth annual Wireless Telecommunications Symposium, WTS 2015, “Wireless Communications: A Multidisciplinary Perspective.” 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 a panel discussion, WTS 2015 will explore a wide range of multidisciplinary wireless communications, mobile computing, e-health and telecommunications in healthcare, big data, and emerging media topics in depth.

The WTS 2015 Program Committee received paper submissions from authors around the world, covering a wide area of topics. We thank all the authors who submitted papers and proposals to WTS 2015, 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 and contributions behind the scene. Producing an event like WTS 2015 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 2015, 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; MESAQIN, and Springer.

On behalf of the WTS 2015 Committee -- Welcome to WTS 2015!

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

**WTS 2015 Program April 15-17, 2015
Holiday Inn Midtown 57th Street
New York City, New York, USA**

Tuesday, April 14
Holiday Inn Midtown 57th Street

2:00
pm –
6:00
pm

Sight-Seeing in New York City: Visit to the United Nations
*Note: The Size of the Tour Group for this Tour will be
Restricted. A Small Fee will be Charged for the UN Tour Tickets
and Bus Transportation.

6:00
pm –
9:00
pm

WTS Organizers' Meeting

Wednesday, April 15
Holiday Inn Midtown 57th Street

8:00
am -
9:00
am

Registration

9:00
am –
9:15
am

Welcoming Remarks

9:15
am –
10:00
am

“A New Frontier for Wireless — In Vivo Wireless
Communications and Networking”
Dr. Richard Gitlin
Agere Systems Chair of Electrical Engineering
University of South Florida

10:00
am –
10:30
am

Break

10:30
am –
11:15
am

“Internet in the Small & Large: The Internet of Things and the
Open Internet”
Dr. Henning Schulzrinne
Julian Clarence Levi Professor of Computer Science
Columbia University

11:15
am –
12:00
pm

“Where is the Internet of Things heading to?”
Dr. Rob van den Dam
Global Telecommunications Leader
IBM Institute for Business Value

<p>12:00 pm – 2:00 pm</p>	<p>Lunch Guest Speaker: "Musings on missed mobile opportunities. The most interesting emerging ones." Harry Newton Writer, Consultant, Investor and Public Speaker</p>
<p>2:00 pm – 2:45 pm</p>	<p>Tutorial: "Wireless Technologies & Healthcare: Applications, Requirements, and Emerging Research" Presenter: Professor Upkar Varshney Computer Information Systems, Georgia State University</p>
<p>2:45 pm – 3:15 pm</p>	<p>Break</p>
<p>3:15 pm – 4:45 pm</p>	<p>Panel Discussion: "Leverage Big Data for Telecom" Organizer and Moderator: Dr. Ye Ouyang, DMTS, Verizon Wireless Dr. Jin Yang, Director of Wireless Data Analytics Research, Huawei Technologies USA; Dr. Mahmoud Daneshmand, Distinguished Member of the Technical Staff, AT&T Labs Research; Dr. Rong Duan, Principle Member of Technical Staff at AT&T Labs, New Jersey, USA</p>
<p>4:45 pm – 5:30 pm</p>	<p>Doctoral Students Session <i>MobileCoach: A Novel Open Source Platform for the Design of Evidence-based, Scalable and Low-Cost Behavioral Health Interventions - Overview and Preliminary Evaluation in the Public Health Context</i> Andreas Filler (ETH Zurich & University of St. Gallen & University of Bamberg, Switzerland); Tobias Kowatsch (University of St. Gallen, Switzerland); Severin Haug (Swiss Research Institute for Public Health and Addiction, University of Zurich, Switzerland); Fabian Wahle (ETH Zurich, Switzerland); Thorsten Staake (University of Bamberg, Germany); Elgar Fleisch (ETH Zurich & University St. Gallen, Switzerland)</p>
<p>5:30 pm – 9:00 pm</p>	<p>Welcoming Reception & Dinner WTS Organizer Recognition Ceremony Guest Speaker: Dr. William F. Baker Director of the Bernard L. Schwartz Center for Media, Education, and Public Policy Fordham University</p>

Thursday, April 16
Holiday Inn Midtown 57th Street

9:00
am –
10:00
am

Mobile Computing Workshop
Dr. Drew Hwang, Professor, CIS Department, Cal Poly Pomona

10:00
am –
10:30
am

Break

10:30
am –
11:15
am

"Inventing the Future of Communications"
Dr. Markus Hofmann
Vice President of IP Platforms Research
Bell Labs Research/Alcatel-Lucent

11:15
am –
12:00
pm

Dr. David Belanger
Senior Research Fellow
Stevens Institute of Technology

12:00
pm -
2:00
pm

Lunch
Guest Speaker:
"2015 Telecom Regulatory Overview"
Andrew Lipman
Partner, Morgan, Lewis & Bockius LLP

2:00
pm –
3:45
pm

Tutorial: Cloud Computing & Wireless Networks
Michael Dover
Senior Associate, Kelley Drye & Warren LLP

3:45
pm –
5:15
pm

Reception & Dinner

5:15
pm –
9:15pm

Bus and Boat Tour of New York City at Night

Friday, April 17
Holiday Inn Midtown 57th Street

8:30
am –
10:10
am

Paper Presentation Session (I)

10:10 am – 10:20 am	Break
10:20 am – 12:00 noon	Paper Presentation Session (II)
12:00 noon – 1:40 pm	Lunch Best Paper Awards Ceremony Poster Paper Session
1:40 pm – 3:20 pm	Paper Presentation Session (III)
3:20 pm – 3:30 pm	Break
3:30 pm – 5:30 pm	Paper Presentation Session (IV)

Panel Discussions & Tutorials

WTS 2015 Panel Discussion: "Leverage Big Data for Telecom"



Abstract:

Smartphones penetrate into people's life at a gallop providing subscribers with better connectivity, services, and applications. On the other hand, the appearance of smartphones brings numerous and unpredictable changes to 4G LTE wireless networks, such as much heavier signaling traffic, concurrent connections of new applications, and changes in the data traffic consumed by every data application connection. With a smartphone in almost every person's pocket, it is no surprise that mobile operators have access to huge amounts of subscriber and network data from which, thanks to the power of big data analytics, mobile operators can uncover important insights into network patterns and consumer behavior.

This panel explores different opportunities that big data brings to wireless ecosystems. The issues may include big data analytics in 4G wireless network performance, network mining, network security, traffic management, network security, monetization, and business development opportunities. In particular, the panel focuses on five questions for mobile operators, vendors, and OTTs:

- How does big data help them make 4G networks more reliable and more profitable?
- How does big data help them better understand networks, subscribers, devices, and apps subscribers' use?
- How does big data help them discover opportunities for launching services that meet unaddressed subscriber needs?
- How does big data help them learn how customers want to be engaged and find out which areas could be most profitable for new offerings?

- How does big data help them gain insights from the network increasing the ability to innovate and capitalize on innovations sooner?

Organizer and moderator:

Dr. Ye Ouyang, DMTS, Verizon Wireless

Panelists:

1. Dr. Jin Yang, Director of Wireless Data Analytics Research, Huawei Technologies USA
2. Dr. Mahmoud Daneshmand, Assistant Chief Scientist & DMTS, AT&T Labs; Industry Professor, Stevens Institute of Technology
3. Dr. Rong Duan, Principle Member of Technical Staff at AT&T Labs, New Jersey, USA

Panelists' Bios:

Dr. Jin Yang is now the Director of Wireless Data Analytics Research team, aiming to combine the strength of machine learning algorithms and years of experience and insight of wireless communication system. He joined Huawei USA in 2011. Prior to that, he worked for Motorola (UK and China) as the Director of Communication Lab in Beijing, and Lucent (UK). His expertise includes wireless systems (RAN and CN), Data Analytics, IP based communication and multimedia applications. He holds 10+ patents. Jin obtained his BSc and MSc degrees from Tsinghua University (Beijing) and PhD from Imperial College (London).

Dr. Mahmoud Daneshmand is a Distinguished Member of Technical Staff, AT&T Labs Research; Executive Director of University Collaborations Program and Assistant Chief Scientist of the AT&T Labs; Professor of CS Department as well as Howe School of Technology Management at the Stevens Institute of Technology. With more than 35 years of research & publications, teaching, consultation, and management experience, Dr. Daneshmand is well recognized as an expert in Probability & Stochastic Processes, Statistics, Big Data Analytics, Data Mining, and Machine Learning.

His experience spans teaching, research & publications, and management experience in academia and industry including Bell Laboratories, AT&T Labs, and University of California at Berkeley, University of Texas at Austin, Tehran University, Sharif University of Technology, National University of Iran, New York University, and Stevens Institute of Technology. He has published more than 70 journal/conference papers and

book chapters. Co-authored two books, and has given several keynote talks, and served as general chair and TPC chair of many IEEE conferences. His current areas of teaching and research include Artificial Intelligence; Knowledge Discovery and Data Mining; Complex Networks Analysis, Sensor Networks and RFID Systems reliability & performance and data mining of sensor and RFID data. He has a PhD and MA in Statistics from the University of California, Berkeley, and MS and BS in Mathematics from the University of Tehran.

Dr. Rong Duan, Principle Member of Technical Staff at AT&T Labs, New Jersey, USA. She received her Ph.D. in Computer Engineering from Stevens Institute of Technology. Rong has extensive experience in data mining, statistical learning and business intelligence for various business applications. Her main research areas include statistical learning theory and methods, Spatial-Temporal data modelling, Cause-effect modelling, data integration and quality assessment on big data.

Rong served as Secretary/Treasurer, Vice Chair and Chair for the Data Mining Section of INFORMS (Institute of Operations Research and Management Sciences) in 2006-2008, 2008-2009, 2009-2010 respectively. She was the Data Mining cluster co-chair for INFORMS Annual Conference in 2008 and INFORMS International Beijing in 2012. Rong also served as a program co-chair for the First and Second International Symposium on System Informatics and Engineering in 2011 and 2013.

Organizer and Moderator Bio:

Dr. Ye Ouyang is a Distinguished Staff Scientist-Mobile Network & Device Analytics at Verizon Wireless USA Headquarters. He has over 12 years' experience in the telecommunications industry, working on the forefront of the cutting edge wireless and big data analytics field.

Dr. Ouyang's research lies in big data analytics and quantitative modeling for wireless networks, with a focus on 2G/3G/4G LTE network performance, network capacity, traffic patterns, user behaviors, and network and device service quality etc. by leveraging data analytics, network simulation, statistical modeling, machine learning, and data mining techniques.

He holds a Bachelor of Engineering from Southeast University in Nanjing, China, a Master of Science from Tufts University in Massachusetts, USA, and a Doctor of Philosophy from Stevens Institute of Technology in New Jersey, USA. In 2012-2013, Dr. Ouyang as Co-Principal was awarded telecom research funding by White House, the office of Science and

Technology and National Science Foundation (NSF). He authored 20+ academic papers, 3 book chapters, and 8 US Patents. Dr. Ouyang is also a columnist of SINA Technology (新浪科技), which is the largest online media portal in China. He serves as Chair for Big Data Analytics Session in IEEE WOCC and WTS Conference, and TPC and reviewer for many leading academic journals and transactions.

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.

Tutorial: Cloud Computing and Wireless Networks

Michael Dover, Senior Associate, Kelley Drye & Warren LLP

Description

The tutorial will address 21st century concerns with cloud computing and its specific application to wireless networks. While cloud computing allows computer technology to be easily accessible as a service over the Internet or via a private network from any location, it also raises data privacy, security, and intellectual property concerns.

This session will cover the most popular cloud computing service models and their application to wireless networks. It will also explain the technology and infrastructure underlying cloud computing networks and how cloud computing can improve business and efficiency. During the session, we will also highlight several best practices and regulatory responsibilities that companies should consider.

List of Topics

Introduction – Overview of cloud computing

Cloud Computing Services and Technical Models:

Cloud Infrastructure as a Service (IaaS)

Cloud Software as a Service (SaaS)

Cloud Platform as a Service (PaaS)

Key Cloud Computing Concerns

Contracting Process and Issues

Intellectual Property Rights

Disaster Recovery / Business Continuity

Compliance

Regulatory Considerations

Privacy and Information Security

Contractual Obligations

Regulatory Requirements

E-Discovery

Copyright and New Media Intellectual Property Concerns

Speaker's Biography

Michael Dover is a senior associate in Kelley Drye & Warren LLP's Chicago office. His practice focuses on communications litigation and regulatory proceedings. Mr. Dover has represented clients in a variety of matters, from significant intellectual property disputes in federal court, to state public service commission proceedings. His broad experience allows him to provide strategic counsel on issues ranging from telecommunications infrastructure regulation and Lifeline to commercial business litigation.

Mr. Dover also has extensive experience in communications and technology litigation. His experience includes participating in federal litigation concerning the preemption of state telecom regulations by Section 251 and 271 of the Telecommunications Act, and by the FCC's Triennial Review Order and the Triennial Review Remand Order. Mr. Dover was also a member of the litigation team in a \$950 million trade secret lawsuit concerning misappropriation of confidential software information.

Prior to joining Kelley Drye, Mr. Dover worked as a regional network engineer, network planner and build-out project manager for T-Mobile USA (and predecessor entities VoiceStream and Omnipoint) in Illinois and Michigan.

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 2015 Paper Presentation Sessions Friday, April 17, 2015

Friday, April 17
Holiday Inn Midtown 57th Street

Paper Presentation Session (I - A)

Wireless Modeling, Algorithms and Simulations I

Chair: Jan Holub, Czech Technical University

Symbol Request Sharing Scheme for Mobile Cooperative Receivers in OFDM Systems

Yasser Samayoa (Gottfried Wilhelm Leibniz Universität Hannover, Germany);
Joern Ostermann (Leibniz Universität Hannover, Germany)

8:30
am –

A High Payload Video Steganography Algorithm in DWT Domain Based on BCH Codes (15, 11)

Ramadhan J. Mstafa and Khaled M. Elleithy (University of Bridgeport, USA)

10:10
am

IEEE 802.11ac: Performance of MIMO Detectors Based on List Detection and/or Lattice Reduction Techniques with Hard-Decision Viterbi Decoding

Roger Pierre Fabris Hoefel (Federal University of Rio Grande do Sul, Brazil)

Analysis of Routing and QoS Issues for Traffic Types in WMANs Based on IEEE802.11S

Adeel Hassan (COMSATS Institute of IT, Pakistan)

Using Long Samples in Subjective Testing of Voice Transmission Quality in IP Network

Jan Holub (Czech Technical University in Prague & Faculty of Electrical Engineering, Czech Republic); Oldrich Slavata (Faculty of Electrical Engineering, Czech Technical University, Czech Republic); Pavel Souček (FEE CTU, Czech

Republic)

Paper Presentation Session (I - B)

Physical Layer I

Chair: Thomas Ketsseoglou, Cal Poly Pomona

Improved Reliability Information for OFDM Systems On Time-Varying Frequency-Selective Fading Channels

Olayinka Ogundile (University of the Witwatersrand & Tai Solarin University of Education, South Africa); Jaco Versfeld (University of the Witwatersrand & Centre for Telecommunications Access and Services, South Africa)

Energy-Detection Based Spectrum-Sensing in Cognitive Radio Networks over Multipath/Shadowed Fading Channels

Ibrahim Atawi and Osamah S. Badarneh (University of Tabuk, Saudi Arabia); Mohammed Aloqlah (Yarmouk University, Jordan); Raed Mesleh (University of Tabuk, Saudi Arabia)

Accurate Performance Evaluation of Semi-Blind Dual-Hop Wireless Relay Systems Under Generalized Fading

Mohammed Aloqlah (Yarmouk University, Jordan); Ibrahim Atawi (University of Tabuk, Saudi Arabia)

Channel Quantization in Order to Realize Interference Alignment Onto a Lattice
Cibele Cristina Trinca (State University of Campinas (UNICAMP), Brazil); Jean-Claude Belfiore (Ecole Nationale Supérieure des Télécommunications, France); Edson Donizete de Carvalho (UNESP-Ilha Solteira, Brazil); Jozué Vieira Filho (UNESP-São João da Boa Vista, Brazil)

MIMO Linear Precoders with Reduced Complexity

Thomas Ketsseoglou (California State Polytechnic University, USA); Ender Ayanoglu (University of California, Irvine, USA)

8:30
am –
10:10
am

Paper Presentation Session (I - C)

MAC Layer

Chair: Zhiyu Zhang, Nanyang Technological University

A Highly Efficient and Secure Shared Key for Direct Communications Based on Quantum Channel

Remah A Alshinina, Khaled M. Elleithy and Fatima Aljanobi (University of Bridgeport, USA)

Link Adaptive Relaying with Noncoherent BFSK and DPSK Modulations in Multiple Access Relay Channels

Muhammet Ali Karabulut and Hacı İlhan (Yildiz Technical University, Turkey); Özgür Özdemir (Selcuk University, Turkey)

Enhanced Multi-user Access in WLAN using Dynamic Frequency Band Selection and Clustering Allocation

Bhoomek Pandya (National Taiwan University, Taiwan); Tzi-Dar Chiueh

8:30
am –
10:10
am

(National Chip Implementation Center & National Taiwan University, Taiwan)

Optimal Rate Control for Energy-Efficient Packet Transmission with Individual Arrivals and Deadlines
SiPing Liu, Changming Zhang and Yuezhi Zhou (Tsinghua University, P.R. China); Yaoxue Zhang (Central South University, P.R. China)

Novel Distributed Optimization Scheme for Wireless Network Resilience
Zhiyu Zhang (Nanyang Technological University, Singapore)

Paper Presentation Session (I - D)
Wireless Applications I
Chair: Zory Marantz, New York City College of Technology

Quality Control in Wireless Networks
Albert Asmaryan (Moscow State Technical University, Russia)

A Novel Mobility Model for FANETs
Samil Temel and Numan Unaldi (Turkish Air Force Academy, Turkey)

Revisit on Maximum Ratio Combining Reception Practically Attained across Correlated Nakagami-m Branches
Jia-Chin Lin (Princeton University, Taiwan)

Decoding of Short LT Codes over BIAWGN Channels with Gauss-Jordan Elimination-Assisted Belief Propagation Method
Amrit Kharel (University of Mississippi, USA); Lei Cao (The University of Mississippi, USA)

Radios or Sensors - Which are the Best for Semi-/Non-autonomous Traffic?
Zory Marantz, New York City College of Technology

10:10
am –
10:20
am

Break

Paper Presentation Session (II - A)
Wireless Modeling, Algorithms and Simulations II
Chair: Izabella V Lokshina, SUNY Oneonta

Optimal Wake-Up Scheduling for Energy Efficient Fixed-Rate Wireless Transmissions with Real-Time Constraints
Lei Miao (Farmingdale State College, USA); Lijian Xu (SUNY Farmingdale, USA)

Impact of DSRC Information Content and Transmission Rate for Highway Vehicle Platoons

Lijian Xu (SUNY Farmingdale, USA); Lei Miao (Farmingdale State College, USA); Junhui Zhao (University of New Haven, USA)

QR Codes and Authentication Protection

Jing Tina Yang (SUNY Oneonta, USA); Yue Zhang (California State University, Northridge, USA)

The Impact of Integrated Wireless and Mobile Communication Technologies on the Corporate World

Barbara Durkin and Izabella V Lokshina (SUNY Oneonta, USA)

Buffer Overflow Simulation in Self-Similar Queuing Networks with Finite Buffer Capacity Accelerated Using RESTART/LRE

Izabella V Lokshina (SUNY Oneonta, USA); Evan Schiele (SAP America, Inc, USA)

Paper Presentation Session (II - B)

Physical Layer II

Chair: Ehsan Sheybani, Virginia State University

Enhancing Satellite System Throughput Using Adaptive HARQ for Delay Tolerant Services in Mobile Communications

Rami Ali Ahmad (ISAE, France); Jerome Lacan (University of Toulouse, France); Fabrice Arnal and Mathieu Gineste (Thales Alenia Space, France); Laurence Clarac (CNES, France)

10:20
am –
12:00
pm

A 2-Stage SI Estimation Scheme for SLM-OFDM Systems Without SI Transmission

Saheed A Adegbite, Scott McMeekin and Brian G Stewart (Glasgow Caledonian University, United Kingdom)

A Block-Level Detection Scheme in OFDM Wireless Systems

Saheed A Adegbite, Scott McMeekin and Brian G Stewart (Glasgow Caledonian University, United Kingdom)

Radio Frequency Interference (RFI) Blocker

Giti Javidi, Ehsan Sheybani, Aleeyah Hopkins (Virginia State University)

Satellite Detection through USRP

Giti Javidi, Ehsan Sheybani, Candice Brown (Virginia State University)

Paper Presentation Session (II - C)

Network Layer

Chair: Alben Mihovska, Aalborg University

10:20
am –
12:00
pm

A New Bandwidth-Efficient Multicast Routing Scheme for Mobile Ad hoc Networks

Yan Sun (Queen Mary University of London, United Kingdom); Roujia Sun (Queen University of London, P.R. China); Fenyu Jiang (Queen Mary University of London, P.R. China); Chris Phillips (Queen Mary University of London,

United Kingdom)

Optimal Sample Delay for OFDM Error Floor over Small-Delay Dispersion Channel

Adriana Lipovac and Vlatko Lipovac (University of Dubrovnik, Croatia); Borivoj Modlic (University of Zagreb, Croatia)

Statistical Functions Describing Two-Hop Amplify and Forward Relay Systems Under Ricean Fading

Maja Delibasic (University of Montenegro, Montenegro); Milica Pejanovic-Djurisic (University of Montenegro & Centre for Telecommunications, Montenegro); Neeli Rashmi Prasad (Center for TeleInFrastructure (CTIF), USA)

Integration of Wireless and Data Technologies for Personalized Smart Applications

Albena Mihovska and Sofoklis Kyriazakos (Aalborg Universitet, Denmark); Milica Pejanovic-Djurisic (University of Montenegro & Centre for Telecommunications, Montenegro); Vladimir K. Poulkov (Technical University of Sofia, Bulgaria); Ramjee Prasad (Aalborg University, Denmark)

Hybrid SDN Architecture for Resource Consolidation in MPLS Networks

Anton Katov (Aalborg University & CTIF, Denmark); Albena Mihovska (Aalborg Universitet, Denmark); Neeli Rashmi Prasad (Center for TeleInFrastructure (CTIF), USA)

Paper Presentation Session (II - D)

Workshop on Health-IT and Mobile Health

Chair: Upkar Varshney, Georgia State University

Energy-Cost-Distortion Optimization for Delay-Sensitive M-Health Applications

Alaa Awad Abdelhady (Qatar University, Qatar); Amr Mohamed (Qatar University & Qatar University Wireless Innovations Center, Qatar); Tarek M. Elfouly (Qatar University, Qatar)

10:20

am –

12:00

pm

Adaptive Ubiquitous Mobile Gaming System for Youth Obesity Rehabilitation

Moutaz Saleh Saleh (Qatar University, Qatar)

Assistive Visual Aid for the Elderly Hearing Impaired

Chai Kiat Yeo (Nanyang Technological University, Singapore)

Enabling Seamless IP Applications in Delay Tolerant Networks

Chai Kiat Yeo (Nanyang Technological University, Singapore)

Mobile Interventions and Evaluation for Medication Abuse

Upkar Varshney (Georgia State University, USA)

12:00

pm –

1:40

Lunch

Best Paper Awards Ceremony

pm	Poster Paper Session
1:40 pm – 3:20 pm	<p>Paper Presentation Session (III - A) Wireless Modeling, Algorithms and Simulations III Chair: Howard Karloff, Georgia Tech</p> <p><i>An Efficient Fuzzy-based Power Control Scheme for Ad hoc Networks</i> Christopher Lowrance and Adrian Lauf (University of Louisville, USA)</p> <p><i>Analysis of Full Volterra nonlinear Equalizer For Downlink LTE System</i> Nasreddine Mallouki (ENIT, Tunisia); Nsiri Bechir (National Engineering School of Tunis, Tunisia)</p> <p><i>Simplified Simulator for Performances Evaluation of Scheduling Algorithms in LTE Cellular Network</i> Nsiri Bechir (National Engineering School of Tunis, Tunisia)</p> <p><i>LDPC-Based Code Hopping for Gaussian Wiretap Channel With Limited Feedback</i> Zhao Chen, Liuguo Yin and Jianhua Lu (Tsinghua University, P.R. China)</p> <p><i>Designing Wireless Metropolitan-Area Networks Using Mathematical Optimization</i> Howard Karloff (Georgia Tech, USA); Ramesh Subbaraman (AT&T, USA)</p>
1:40 pm – 3:20 pm	<p>Paper Presentation Session (III - B) Physical Layer III Chair: George Dimitrakopoulos, Harokopion University</p> <p><i>Multi-Hop Relay Selection Based on Fade Durations</i> Aklilu Gebremichael and Cory Beard (University of Missouri-Kansas City, USA)</p> <p><i>Relay Selection in Multiple Clustered Relay Networks</i> Woosuk Kim and Woojin Kim (SungKyunKwan University, Korea); Hae Sol Lee (SungKyungKwan University, Korea); Il-Min Kim (Queen's University, Canada); Dong In Kim (Sungkyunkwan University (SKKU), Korea); Seokki Kim and Kwangjae Lim (ETRI, Korea)</p> <p><i>Effect of Modulation Scheme on Ultra High Definition (UHD) Video Transmission</i> Urvashi Pal (Victoria University & Centre for Telecommunication Electronics, Photonics and Sensors, Australia); Horace King (Victoria University, Australia)</p> <p><i>Autonomic Decision Making for Vehicles based on Visible Light Communications</i> George Dimitrakopoulos (Harokopion University of Athens, Greece); Johnny Ghattas (Smart-Path Ltd., Israel)</p> <p><i>Evaluation of Operator-Coordinated Spectrum Pooling in Cognitive, Cellular, Beyond the 4th Generation, Infrastructures</i></p>

George Dimitrakopoulos (Harokopion University of Athens, Greece)

Paper Presentation Session (III - C)
Global Wireless Business and Investments
Chair: J. P. Shim, Georgia State University

Geographic Expansion and Integration Strategies of Telecommunications Services Providers: A Value-Based Perspective
Steven R. Powell (California State Polytechnic University, Pomona, USA)

1:40
pm –
3:20
pm

The True ROI of Mobile Big Data Project
J. P. Shim, (Georgia State University, USA)

Mobile Device Access: Effect on Online Purchases
Ruiqi Yan, Brian Cozzarin and Stanko Dimitrov (University of Waterloo, Canada)

Conceptualizing mBusiness
Irena Ivanochko (Lviv Polytechnic National University & University of Vienna, Ukraine); Viktoria Masiuk Masiuk (Lviv Polytechnic National University, Austria); Michal Gregus (Comenius University in Bratislava, Faculty of Management, Slovakia)

User-Specific QoS Aware Scheduling and Implementation in Wireless Systems
Chao He and Richard D. Gitlin (University of South Florida, USA)

Paper Presentation Session (III - D)
Wireless Applications II
Chair: Ahmed Dooguy Kora, Ecole Supérieure Multinationale de Télécommunications

System for Identifying a Biological Collection using RFID
Alfonso Osorio, Luis Soto and Maria Calle (Universidad del Norte, Colombia)

1:40
pm –
3:20
pm

A Remote Triggered Wireless Sensor Network Testbed
Preeja Pradeep, Divya Pullarkatt, Aryadevi Devidas, Rekha P, Sangeeth K and Maneesha Ramesh (Amrita Center for Wireless Networks and Applications, Amrita Vishwa Vidyapeetham, India)

A Passive Fingerprint Technique to Detect Fake Access Point
Bandar Alotaibi and Khaled M. Elleithy (University of Bridgeport, USA)

Full-Duplex Communications with the Use of Parasitic Array Radiators
Konstantinos Maliatsos (University of Piraeus & National Technical University of Athens, Greece); Panagiotis N. Vasileiou and Athanasios G. Kanatas (University of Piraeus, Greece)

Semi blind approach of voice quality of experience assessment
Ahmed Dooguy Kora, Salisson Maman M. Moutari Abdou and Adama Nantoume (Ecole Supérieure Multinationale de Télécommunications, Senegal)

3:20
pm –
3:30
pm

Break

3:30
pm –
5:30
pm

**Paper Presentation Session (IV - A)
Wireless Modeling, Algorithms and Simulations IV
Chair: Peter S. Lau, The University of Memphis**

Wireless Channel Measurements and Modeling for an Office Topology at 3.5 GHz
Theofilos Chrysikos and Christos Papadakos (University of Patras, Greece);
Stavros Kotsopoulos (Wireless Telecommunications Laboratory, Greece)

Low Complexity Soft-Output Detection for Massive MIMO Using Stationary Iteration and Lanczos Methods
Chiyang Xiao, Xin Su and Jie Zeng (Tsinghua University, P.R. China); Liping Rong (Tsinghua National Laboratory for Information Science and Technology (TNList), Tsinghua University, P.R. China); Xibin Xu (Tsinghua University, P.R. China)

Cell Sectorization-Based Pilot Assignment Scheme in Massive MIMO Systems
Zheng Zhao and Zhigang Chen (Xi'an Jiaotong University, P.R. China); Yitao Liu (Illinois Institute of Technology, USA)

Efficient Approaches to Resource Allocation in MIMO-based Wireless Mesh Networks
Peng Wang (Parsons Company, USA); Brian Henz (US Army Research Laboratory, USA)

Topology Refresh Data Forwarding Protocol for Opportunistic Networks
Peter S. Lau (The University of Memphis, USA)

An IP-Based Triggering Method for LTE MTC Devices
Michael Starsinic, Ahmed S. Ibrahim Mohamed, Guang Lu, Dale Seed, Behrouz Aghili, and Chonggang Wang (InterDigital Communications Inc., USA); Suresh Palanisamy and Prashanth Murthy (RadiSys Corporation, India)

3:30
pm –
5:30
pm

**Paper Presentation Session (IV - B)
Wireless Applications III
Chair: James McGee, Naval Undersea Warfare Center**

On the Protection of Fixed Service Receivers from the Interference Generated by Earth Stations On-board Vessels
Jennifer Alexandra Mendez Rangel (Pontificia Universidade Católica do Rio de Janeiro, Brazil); Fortes Jose Mauro (PUC, Brazil)

Wireless in Safety Critical Applications - benchmarking of Long Range (LoRaTM) Spread-Spectrum-Communication at 2.45 GHz
Thomas M. Wendt, Franziska Volk and Elke Mackensen (University of Applied

Sciences Offenburg, Germany)

Underwater acoustic digital voice communication using orthogonal frequency division multiplex modulation

Shengxing Liu and Qiang Fu (Xiamen University, P.R. China)

Heterogenous Collaborative Communication Mechanism with NOMA

Bing Li, Xin Su and Jie Zeng (Tsinghua University, P.R. China); Fengjie Sun (North China Electric Power University, P.R. China); Xibin Xu (Tsinghua University, P.R. China)

Applying Diversity to Mitigate Interference in Underwater Acoustic Networks

James McGee, Josko Catipovic and Steven Schoenecker (Naval Undersea Warfare Center, USA); Peter Swaszek (University of Rhode Island, USA)

Downlink Scheduling in LTE Relay Networks

Lamprini Naoumi, Angeliki Sgora, , Dimitrios D. Vergados (University of Pireaus, Greece); Angelos Michalakis (Technological Education Institute of Western Macedonia, Greece)

Paper Presentation Session (IV - C)

Workshop Big Data Analytics for Telecommunications

Chair: Ye Ouyang, Verizon Wireless

Detecting Traffic Anomaly in Wireless Networks, An Analytics Methodology

Yirui Hu (Rutgers University, USA)

Analysis of the Contradiction between Downlink and Uplink Cell Association in Two-tier Heterogeneous Networks

Fei Wang and Weidong Wang (University of Science and Technology of China, P.R. China)

3:30

pm –

5:30

pm

Analytical Modeling of Uplink Power Control in Two-tier Femtocell Networks

Fei Wang and Weidong Wang (University of Science and Technology of China, P.R. China)

A Filter Bank Multicarrier Scheme Running at Symbol Rate for Future Wireless Systems

Maurice Bellanger; Davide Mattered; Mario Tanda

Disintegrated Channel Estimation in Scalable Filter-and-Forward Relay Network with IRI Coordination

Kao-Peng Chou (National Central University, Taiwan); Jia-Chin Lin (Princeton University, Taiwan)

Predictive Broadcasting in Mobile Multimedia Communications

Zulfiquar Sayeed, Sameer Sharma and Paul Wilford (Alcatel-Lucent, USA)

3:30

Paper Presentation Session (IV - D)

Mobile Communications and Wireless Network Techniques and Methods

pm –
5:30
pm

Chair: Thomas Ketsseoglou, Cal Poly Pomona

Analysis of an Adaptive Modulation and Coding Scheme with HARQ for TCP Traffic

Onur Ozturk and Nail Akar (Bilkent University, Turkey)

Angle Modulated Particle Swarm Optimization (AMPSSO) applied on a spectrum sharing problem

Esteban Martínez (Universidad Autónoma de Baja California, Mexico); Anabel Martínez (Instituto Tecnológico de Ensenada, Mexico); Ángel G Andrade (Universidad Autónoma de Baja California & Facultad de Ingeniería, Mexico)

WLAN Covert Timing Channel Detection

Hong (Hannah) Zhao (Fairleigh Dickinson University, USA); Min-Xiou Chen (National Dong Hwa University, Taiwan)

Comparison and Performance study of different I/Q imbalance and channel compensation schemes for OFDM Receivers

Khandker Nadya Haq and Chah-Seng Chung (Cutin University of Technology, Australia)

Machine Learning Based Cooperative Relay Selection in Virtual MIMO

Kunal Sankhe (IIIT- Hyderabad, India); Chandan Pradhan (International Institute Of Information Technology, Hyderabad, India); Sumit Kumar (IIIT Hyderabad & Center for Communication Research, India); Rama Garimella (IIIT Hyderabad, India)

Full-Duplex eNodeB and UE Design for 5G Networks

Chandan Pradhan (International Institute Of Information Technology, Hyderabad, India); Kunal Sankhe (IIIT- Hyderabad, India); Sumit Kumar (IIIT Hyderabad & Center for Communication Research, India); Rama Garimella (IIIT Hyderabad, India)

WTS 2015 Poster Papers Friday, April 17, 2015

Exploration of Wireless Video Communications: A Thorough Investigation of MPEG4 H.264 Coding Dependency, Quality of Experience and Energy Efficiency Tradeoff, Navya Kumar; Wei Wang (San Diego State University, USA)

Energy Efficient Communication for LTE- Advanced Networks, Saurabh Dixit (Babu Banarsi Das University, Lucknow, India), Himanshu Katiyar (Indian Institute of Technology Guwahati, India)

An Enhanced CSMA/CA Protocol in Underwater Acoustic Sensor Networks, Junho Cho, School of Electronics Engineering, Kyungpook National University, Deagu, Korea and Ho-Shin Cho, College of IT Engineering, Kyungpook National University, Deagu, Korea “

A QoS Aware Three Level Scheduler for the LTE Downlink, Manolis Skondras (UNIPI, Greece); Angelos Michalakis (Technological Education Institute of Western Macedonia, Greece); Angeliki Sgora and Dimitrios D. Vergados (University of Piraeus, Greece)

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.

Dr. David Belanger is currently a Senior Research Fellow at Stevens Institute of Technology. In this role he continues his work in Big Data Technology, Applications, and Governance. He teaches and is a leader in the Business Intelligence & Analysis Master's Degree program. In addition, he is involved in consulting related to Big Data in areas such as Telecommunications Services, Health Care, Security, and Networking. He was recently named co-leader of IEEE Big Data Initiative (bigdata.ieee.org); and is on the steering committee of the New Jersey Big Data Alliance (njbigdata.org).

Dave joined Bell Laboratories in 1979. He has led research in software systems and engineering, information mining, information visualization, and development in very large scale data systems. He built the Software Engineering Research Department which provided software tools and techniques used across AT&T Bell Labs, and via open source, across the world.

Prior to this role, Dr. Belanger was Chief Scientist of AT&T Labs, and Vice President of Information, Software, & Systems Research at AT&T Shannon Labs in Florham Park, NJ. The Information, Software & Systems Research Lab conducted research in: large scale and real time information mining related to operations of a (communications) service business; interactive, information visualization; scalable, dependable software systems; and new, information based, communications services. It was also responsible for delivery and operations of very large scale (e.g. petabyte), near real time service management capabilities to AT&T, and its customers, as well as a wide variety of analytic and information mining services. He was the creator of the AT&T InfoLab, an organization aimed at optimizing the value gained from data for AT&T. InfoLab was a very early participant in "Big Data" research and practice. It performed data oriented projects across the spectrum of telecommunications services including: networking, mobility, operations, customer interactions, services, and fraud/security.

Accomplishments ranged from revolutionizing the corporate fraud systems and systems for measuring customer experience for each customer in the Mobility Business, to winning the Netflix Prize in 2009. They also included the development of world class tools used in Big Data. As Chief Scientist, he interacted with customers, suppliers, and government to articulate the company's technological directions.

Dave joined Bell Laboratories in 1979. He has led research in software systems and engineering, information mining, information visualization, and development in very large scale data systems. He built the Software Engineering Research Department which provided software tools and techniques used across AT&T Bell Labs, and via open source, across the world.

He has been awarded 24 patents.

Dr. Belanger received his B. S. from Union College (NY) in Mathematics, and an M. S. & Ph.D., in Mathematics, from Case Western Reserve University.

In 1998, he was awarded the AT&T Science and Technology Medal for contributions in very large scale information mining technology; in 2006 he was named an AT&T Fellow for "lifetime contributions in software, software tools, and information mining"; and in 2009 he received the IEEE Communications Society Industrial Innovator Award.

Dr. Richard D. Gitlin is a State of Florida 21st Century World Class Scholar, Distinguished University Professor and the Agere Systems Chair of Electrical Engineering at the University of South Florida. He has more than 40 years of leadership in the communications and networking industry. He was at Bell Labs/Lucent Technologies for 32-years performing and leading pioneering research and development in digital communications, broadband networking, and wireless systems. Dr. Gitlin was Senior VP for Communications and Networking Research at Bell Labs and later CTO of Lucent's Data Networking Business Unit. After retiring from Lucent, he was visiting professor of Electrical Engineering at Columbia University, where he supervised several doctoral students and research projects and Chief Technology Officer of Hammerhead Systems, a venture funded networking company in Silicon Valley.

Since joining USF in 2008, he has focused on the intersection of communications with medicine and created an interdisciplinary team that is focused on wireless networking in vivo miniature wirelessly controlled devices to advance minimally invasive surgery and other cyber-physical health care systems with colleagues in the iWINLAB and WAMI - the Center for Wireless and Microwave Information Systems.

Dr. Gitlin is a member of the National Academy of Engineering (NAE), a Fellow of the IEEE, a Bell Laboratories Fellow, and a Charter Fellow of

the National Academy of Inventors (NAI). He is also a co-recipient of the 2005 Thomas Alva Edison Patent Award and the S.O. Rice prize, has co-authored a text, published ~100 papers and holds 50 patents.

Previously he has conducted and led research and development that has resulted in many innovative products, including: the industry-leading ATLANTA ATM Chipset, the world's first 20 gigabit/sec ATM switch, wire-speed and quality of service-aware IP switches, multicode CDMA (used in 3G HSDPA wireless data), and the BLAST broadband wireless system based on advanced smart antennas (MIMO). Earlier in his career, he led the team that pioneered V.32/V.34 voice-band modems, and in 1986 he was co-inventor of DSL. He was instrumental in launching Globespan, an early DSL chip vendor.

Dr. Gitlin received a Bachelor's degree with honors in Electrical Engineering from The City College of New York, and Masters and Doctor of Engineering Science degrees in Electrical Engineering from Columbia University. From 2002-2006 Dr. Gitlin served on the Board of Directors of PCTEL, Inc. (NASDAQ: PCTI), where he chaired the Intellectual Property committee.

Dr. Markus Hofmann joined Bell Labs in 1998, transitioning from researcher, to project manager, to Head of Bell Labs Research - Alcatel-Lucent's research organization that is globally recognized for inventions that shaped the world of telecommunications and technology including the transistor, the laser, DSL, UNIX, C and C++, Solar Cells and MIMO. Seven Nobel Prizes have been awarded for work completed at Bell Laboratories. Dr. Hofmann has overseen research in multimedia communications, optics, wireless, cloud, Internet, content networking and more. Not to mention he is renowned for his pioneering work on reliable multicasting over the Internet and for defining and shaping fundamental principles of content networking. In his current role, Dr. Hofmann is building up Bell Labs' new IP Platforms research program, leading a global research team in inventing and creating disruptive technologies in the software and systems space. This includes the overall research portfolio from project inception through business transfer. Dr. Hofmann has published over 60 journal and conference papers and given invited talks as well as courses all over the world. He has been granted 14 U.S. patents, with many more patent applications pending.

Dr. Hofmann has been very active in several professional organizations, and the IEEE Communications Society (ComSoc), in particular. He has served as Chair of the Internet Technical Committee (ITC), a joint

committee of the Internet Society and the IEEE Communications Society. He has also served as the Chair of the Open Pluggable Edge Services (OPES) Working Group in the Internet Engineering Task Force (IETF), on the Editorial Board of the Computer Communications Journal and on the Editorial Board of the IEEE/ACM Transactions on Networking. He has been involved in organizing a number of major international conferences and events. These include serving as the Technical Program Chair of the IEEE Globecom Symposium on Global Internet, the Network Group Communication (NGC), and the 1999 GI Multicast Workshop. He has been on the Advisory Board of the 2001 Content Distribution Networking (CDN) conference and served as guest editor of a issue of the Computer Networks Journal. Dr. Hofmann has been on the program committees of various IEEE and ACM-sponsored conferences and is an alumnus of the 2004 Frontiers of Engineering, National Academy of Engineers (NAE). Between 1998 and 2002, he was a national representative of Germany on the Cost 264 Management Committee, a project within the European research framework.

He received his Ph.D. with honors in Computer Engineering from University of Karlsruhe, Germany, in 1998 and joined Bell Labs Research the same year. For the spring 2005, spring 2006, and spring 2007 semesters, Dr. Hofmann also accepted a position as adjunct professor at Columbia University in New York, USA, teaching a graduate course on Content Networking. Before joining Bell Labs in May 1998, he worked as a Senior Researcher in the High Performance Networking Group at University of Karlsruhe, Germany, where he initiated and led several projects with industry partners in multiple European countries.

Dr. Hofmann has been awarded several prestigious awards. His Ph.D. thesis won the 1998 GI/KuVS Doctoral Dissertation Award for the best Ph.D. thesis in Germany in the area of Distributed Systems and Telecommunications, and the 1998 FZI Doctoral Dissertation Award for best Ph.D. thesis in Computer Science at University of Karlsruhe. He received the Bell Labs Teamwork Award several times and was a key leader of the team that won the 2006 Lucent Chairman award. In 2013, Dr. Hofmann and his colleagues were awarded the Thomas Edison Patent Award. For more information, see <http://www.mhof.com/>.

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.

A few years ago, **Harry Newton** was the most popular speaker in telecom. He had started six major telecom magazines (including the first networking magazine), founded several popular telecom trade shows, including Computer Telephony Expo and wrote the best-selling Newton's Telecom Dictionary, now in its 28th edition.

Then he sold the main telecom publishing business in what turned out to be the fourth largest media deal of the year. He "retired" to become a tech investor and financial blogger - he writes daily on www.InSearchOfThePerfectInvestment.com -- and to keep writing the dictionary, now an enormous 1,450 pages and covering 27,805 terms in telecommunications.

Newton has spoken before virtually every telecommunications and networking trade show and convention in the United States, Canada, England, France, Australia and New Zealand. His research findings have been quoted in the Wall Street Journal, Business Week, Fortune, Forbes, Newsweek, Inc., The New York Times, and most telecommunications trade publications. He has appeared on CNBC and various financial radio shows as an industry expert.

Newton holds a bachelor of economics degree from the University of Sydney, and an MBA from Harvard Business School.

In a 5-page cover story on Newton, Computerworld's On Communications wrote:

"With Harry, telecommunications is a metaphor for life...Every occupational group should have a Harry Newton. Harry is the patron saint of telecommunications, the exemplar of what can be. He addresses his audience members as if they were a family, chiding them and urging them to realize their potential. He really cares for them."

An issue of ACUTA News said:

"Well, I have lived through a whole day and evening with Harry Newton! I

never received a purple heart. What a happening. Never in my entire life have I witnessed more energy in one place (not even the Nebraska football team) than the energy generated by Harry."

An issue of Telephone Engineer & Management said:

"In a sense, Hurricane Harry was his usual self; captivating, impish, intuitive, profane. In a sense, he was different; more mature, less wild. Could Harry be mellowing? At any rate, his sense of timing, his boyish honesty, and his adult intuition and knowledge, made for a most enjoyable session. An entertainer he is, but also an expert in his field."

HarryNewton@TechnologyInvestor.com

Dr. Henning Schulzrinne, formerly Chief Technology Officer for the United States Federal Communications Commission (FCC), is 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.

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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