WTS 2005

Wireless Telecommunications Symposium 2005

Next Generation Wireless Communications

April 28 - 30, 2005

California State Polytechnic University, Pomona

Kellogg West Conference Center

WELCOME TO WTS 2005

Welcome to the fourth annual Wireless Telecommunications Symposium. We hope that WTS 2005: Next Generation Wireless Communications will be an informative and enjoyable experience for you.

The Wireless Telecommunications Symposium recognizes the multi-disciplinary, multi-faceted nature of mobile communications and wireless networking. WTS 2005 participants represent more than twenty nations and are affiliated with a diverse group of companies, governmental agencies, and universities. Participants serve in a variety of capacities, ranging from key executives and researchers to first-year university students. The wide variety of topics in the WTS 2005 program reflects the Wireless Telecommunications Symposium's broad scope, emphasizing the interplay of technology, management, security, and applications. The symposium's technical co-sponsors, the IEEE Communications Society, INFORMS Telecommunications Section, and ACM SIGMOBILE, view wireless telecommunications from different perspectives.

WTS has grown. The WTS 2005 Program Committee received 114 paper submissions, more than double the number of paper submissions received by the Program Committee last year. We thank all the authors who submitted papers to WTS 2005 and the many reviewers for their excellent reviews. Converting from a two-day to a three-day format enabled the Committee to schedule some outstanding panel discussions and tutorials, and we thank all the individuals who submitted tutorial and workshop proposals to WTS 2005 for making this possible. We also thank the participants in the interactive video trial of this year's Executive Session, and Cal Poly Pomona's Instructional and Information Technology Department for supporting the trial. We hope that interactive video will permit greater numbers of individuals and organizations to participate in WTS in the future.

Special thanks go to the distinguished invited speakers participating in WTS 2005 and to the organizations that have contributed to the symposium or lent it financial support. Notable among the contributors and donors are Cal Poly Pomona's Computer Information Systems Department, Engineering Technology Department, Electrical and Computer Engineering Department, and Computer Science Department; SWIFT - Cal Poly Pomona's IEEE Communications Society student chapter; QUALCOMM; Microsoft; the IEEE Foothill Section; MESAQIN; Cingular Wireless; the IEEE Communications Society's Foothill, Los Angeles, and Orange County chapters; the IEEE Foothill AP/MTT Chapter; MAITT; NCTT; Innovation Village Research Park; and IEE - Inspec.

On behalf of the WTS 2005 Committee -- Welcome to WTS 2005!

Dr. Steven Powell and Dr. Massoud Moussavi
Co-Chairs, WTS Committee

Thursday, April 28		
7:00 am – 8:00 am	Registration and Continental Breakfast	
	Business	Technology
8:00 am - 10:00 am	T2: Mobile Commerce Tutorial (I)	T1: Next Generation Network Design Optimization Tutorial
10:00 am – 10:15 am	Networking Break	
10:15 am - 12:15 pm	T2:Mobile Commerce Tutorial (II)	"Future Directions In Wireless Communications Research" Panel Discussion
12:15 pm – 1:15 pm	Buffet Lunch at Kellogg West	
1:15 pm – 3:15 pm	"Wireless Security: Best Practices and Lessons Learned" Panel Discussion	T3: UWB and Impulse Radio Tutorial (I)
3:15 pm – 3:30 pm	Networking Break	
3:30 pm – 5:30 pm	"Mobile Wireless Services and Business: Current Issues" Panel Discussion	T3: UWB and Impulse Radio Tutorial (II)
5:30 pm – 7:00 pm	Free Time WTS Organizers' Meeting	
7:00 pm – 9:30 pm	Welcoming Reception at Kellogg West IEEE Communications Society Recognition **IEEE Communications Society Lecturer**: Dr. Stephen B. Weinstein **"Communications Diversity and Convergence"**	

Friday, April 29	
8:00 am – 9:00 am	Registration and Breakfast
9:00 am – 9:15 am	Opening Remarks
9:15 am – 10:15 am	Dr. Paul Mankiewich, Chief Technical Officer, Mobility Solutions, Lucent Technologies and Senior Vice President, Networking Research, Lucent Technologies – Bell Laboratories **"Beyond 3G Communications"**
10:15 am – 10:30 am	Networking Break
10:30 am – 11:30 am	Dr. Al Javed, Vice-President, Wireless Networks Technology Nortel Networks **"This Is The Way: Next Generation Wireless Systems"**
11:30 am – 12:15 pm	Egil Gronstad, Vice-President, Product Line Management Ericsson Mobile Systems CDMA
12:15 pm – 1:45 pm	Buffet Lunch at Kellogg West WTS 2005 Co-Sponsor Recognition **Speaker**: Andrew Seybold, Consultant and Author, Outlook 4Mobility **"The Vision is Clear BUT the road is long!"**
1:45 pm – 2:45 pm	Dr. Preston Marshall, Program Manager, Next Generation Communications and Connectionless Networking Advanced Technology Office, Defense Advanced Research Projects Agency (DARPA), U.S. Department of Defense **"Wireless Networking Technology Needs: Radios, TCP/IP and Some Heresy"**
2:45 pm – 3:00 pm	Networking Break
3:00 pm – 4:00 pm	Dr. Stephen Huffman, Vice President, The MITRE Corporation Networking Break **"Cognitive Spectrum Access: The Future of Spectrum Management"**

4:00 pm – 4:45 pm	Masaaki Maeda, Senior Vice President, Service and Technology Division, NTT DoCoMo USA
4:45 pm – 5:00 pm	Free Time
5:00 pm – 5:45 pm	Bus Travel to Disney's Grand California Hotel at Disneyland
5:45 pm – 6:30 pm	Networking Session
6:30 pm – 7:45 pm	Dinner
7:45 pm – 10:45 pm	Disneyland Park
10:45 pm – 11:30 pm	Bus Travel to Kellogg West
Saturday, April 30	
8:00 am – 9:00 am	Registration and Breakfast
9:00 am – 10:30 am	Accepted Paper Sessions Doctoral Students Session
10:30 am – 10:45 am	Networking Break
10:45 am – 12:15 pm	Accepted Paper Sessions
12:15 pm – 1:15 pm	Buffet Lunch at Kellogg West Student Paper Award Ceremony
1:15 pm – 1:45 pm	Poster Paper Session
1:45 pm – 3:15 pm	Accepted Paper Sessions
3:15 pm – 3:30 pm	Networking Break
3:30 pm – 5:00 pm	Accepted Paper Sessions

Tutorials and Panel Discussions

T1: Next Generation Network Design Tutorial

Instructors:

Dr. Georg Hampel, Wireless Research Laboratory, Lucent – Bell Laboratories

Dr. Eli Olinick, Department of Engineering Management, Information, and Systems, Southern Methodist University

T2: Mobile Commerce: Applications, Technologies, Research Problems Tutorial

Instructor: Dr. Upkar Varshney, Department of CIS, Georgia State University

T3: Ultra-Wideband and Impulse Radio for Wireless Communications Tutorial

Instructor: Dr. Huseyin Arslan, Department of Electrical Engineering, University of South Florida

Panel Discussion: Future Directions in Wireless Communications Research

Moderator: Dr. George Rittenhouse
Vice President - Wireless Research
Lucent Technologies - Bell Laboratories
"Immersive Communications"

David Wolter
Executive Director – Wireless Networks
SBC Communications Laboratories Inc.
"Enabling Communications Convergence"

Ilkka Niva
Director, Standards and Industry Relations
Nokia
"Mobile Wireless Trends and Vision"

Dr. Jeyhan Karaoguz
Technical Director, Office of the CTO
Broadcom Corporation

Vera Kripilani
Senior Director, Global Technology Marketing
QUALCOMM

Lalit Kotecha
Advanced Technology Strategy
Verizon Wireless
"802.16e - Mobile Broadband Benefits and Challenges"

Panel Discussion: Wireless Security – Best Practices and Lessons Learned

Moderator: Frederick Gallegos, Cal Poly Pomona

Robert J. Brown, CISA, CISSP
Senior Consultant
PricewaterhouseCoopers

Mullaguru Naidu
Senior Manager, Global Technology Marketing
QUALCOMM Inc.
"Mobile Wireless Security: Best Practices and Lessons Learned"

Wayne Beckham
Security Systems Administrator, Information Security Office
Riverside County, California
"Wireless Security in the Real World"

Panel Discussion: Mobile Wireless Services and Business: Current Issues

Moderator: Dr. J.P. Shim
Professor of MIS and Director of the International Business Strategy Program
Mississippi State University
"Current Status of Cellular and DMB Services in Korea and Japan"

Michael J. Finley
Area Vice President, Southern California
Nextel Communications
"Focus 2005 - Nextel Executive and Technology Update"

Anna Maria Hall
Director of Sales, Corporate Markets Group
Cingular Wireless
"Cingular Wireless – Helping Business Run Better"

John Campbell
Regional Director - Southern California / Nevada
Major General Business Channel
T-Mobile USA

Dr. Sasha Dekleva
Associate Professor, College of Commerce
DePaul University
"Mobile Wireless Industry Consolidation"

Accepted Paper Sessions

Saturday, April 30, 2005

	Doctoral Students Session
9:00 AM – 10:30 AM	Chair: Dr. Xian Liu, University of Arkansas Panel Members: Dr. Ehsan Sheybani, Virginia State University Dr. Eli Olinick**,** Southern Methodist University **Economic model for 2-hop relaying cellular networks** Ansuya Negi, Suresh Singh **A New Service Discovery Architecture for Sensor Networks** Kaouthar Sethom, Hossam Afifi **Energy-Delay Analysis of Wireless Networks over Rayleigh Fading Channel** Shihyu Chang

	Track 1 - Wireless Networks and Systems

	Chair**:** Dr. Michael Bartolacci, Penn State University
9:00 AM – 10:30 AM	**Session A1 – Wireless Internet & WML** Chair: Dr. Qing-An Zeng, University of Cincinnati **A New Adaptive Multi-hop Access Approach in NGN Heterogeneous Networks** Xin He, ChengLin Zhao, Zheng Zho, Feng Lu **Speech-Enabled Mobile Learning Application Architecture** Luvai Motiwalla **Locating Mobile-Hosts in Multiple-Gateway IP Networks** P. C. Upadhyay, S. Tiwari
10:30 AM – 10:45 AM	Networking Break
10:45 AM - 12:15 PM	**Session B1 – 3G/4G Wireless Networks & Systems** Chair: Dr. Hong Zhou, University of Queensland **Project WISQY: A Measurement-based End-to-End Application-Level Performance Comparison of 2.5G and 3G Networks** Peter Reichl, Martina Umlauft, Joachim Fabini, Reinhard Lauster, Günther Pospischil **Transient MAC Address Scheme for Untraceability and DoS Attack Resiliency on Wireless Network** Daisuke Inoue, Ritsu Nomura, Masahiro

	Kuroda **ReWINS: A Distributed Multi-RF Sensor Control Network for Industrial Automation** Harish Ramamurthy, Dhananjay Lal, B.S. Prabhu, Rajit Gadh
12:15 PM – 1:15 PM	Lunch – Kellogg West Dining Room Student Paper Award Ceremony
1:15 PM – 1:45 PM	Poster Paper Session
1:45 PM – 3:15 PM	**Session C1 – Wireless IP, Home Networks, and Ad Hoc Networks** Chair: Dr. George Rittenhouse, Lucent - Bell Laboratories **An Adaptive Fuzzy Logic Based Secure Routing Protocol in IPv6 Ad Hoc Networks** Jing Nie, Xin He, Zheng Zhou, Chenglin Zhao. Feng Lu, DanJing Xie **Framework Architecture for Internet Content Adaptation System and Vertical Handover Management on 4G Networks** Samir Chebbine, Abdel Obaid, Robert Johnston **Instant Messaging Usage Policies Enable Ubiquitous Communication** B Bhagyavati
3:15PM – 3:30 PM	Networking Break
3:30 PM – 5:00 PM	**Session D1 – Wireless Network Methods & Techniques** Chair: Dr. James Kang, Cal Poly Pomona

	Cooperative MIMO Gateways: A Promising Technique for Fast Handoff D. J. Shyy, James Dunyak **Novel Pilot-free Adaptive Modulation for Wireless OFDM Systems** Hsiao-Chun Wu, Xiaozhou Huang, Yiyan Wu **A Lifetime Based Hybrid Gateway Discovery in IPv6 Ad Hoc Networks** Jing Nie, Danjing Xie, Zheng Zhou, Xin He, Chenling Zhao, Feng Lu **Accusing Tree Based Intrusion Detection in Mobile Ad Hoc Networks** Xiao-ning Zhang, Deng-guo Feng
	Track 2 – Algorithms, Methods, Simulation, and Software Chair: Dr. Salam Salloum, Cal Poly Pomona
9:00 AM – 10:30 AM	**Session A2 – Wireless Multimedia & Mobile Platform Operating Systems and Architectures** Chair: Dr. Antonio Pescape, Dipartimento di Informatica e Sistemistica, Italy **Dynamic Admission Control and QoS for 802.16 Wireless MAN** Dharma Agrawal, Haitang Wang, Li Wei **Asymptotic Eigenvalue Moments in Large Chip-Synchronous CDMA** Chien-Hwa Hwang **On the Reliability-Aware Geographic Routing** Zafar Taha, Xian Liu
10:30 AM – 10:45 AM	Networking Break

10:45 AM - 12:15 PM	**Session B2 – Wireless Network Modeling, Algorithms, and Simulation** Chair: Dr. Hong-Chuan (Tim) Lin, Cal Poly Pomona **Wireless Load Sharing with Heterogeneous Services and Adaptive Placement** Susan Lincke **Throughput Analysis of a Novel Backoff Algorithm for IEEE 802.11 WLANs** I-Hung Lin, Jen-Yi Pan **Simulations of Site Diversity Based Outage Improvements for Point-to-Multipoint Systems in Millimeter-Wave Band** Pavel Pechac, Stanislav Zvanovec
12:15 PM – 1:15 PM	Lunch – Kellogg West Dining Room Student Paper Award Ceremony
1:15 PM – 1:45 PM	Poster Paper Session
1:45 PM – 3:15 PM	**Session C2 - QoS and Wireless Network Reliability** Chair: Dr. Jan Holub Czech Technical University, Czech Republic **How Mobility Impacts the QoS Capabilities of Wireless Cellular Networks** Yide Zhang, Lemin Li, Bo Li **Mobile Network Voice Transmission Quality Estimation based on Radio Path Parameters** Jan Holub, Barobra Dolezalova, Michael Street

	A Sensitivity Analysis Approach to the Optimal Policy Range of the Resource Access Control in Wireless Systems Huan Chen, Chih-Chuan Cheng, Mei-Hsiu Chi, Hsi-Hsun Yeh
3:15PM – 3:30 PM	Networking Break
3:30 PM – 5:00 PM	**Session D2 – Broadband Wireless Access & Mobile and WLAN Interoperability** Chair: Dr. Jeyhan Karaoguz, Broadcom Corporation **Improving the Radio Link Layer QoS Performance for Bluetooth Real-time Video Communications** Zhikui Chen, Paul Christ **Data Link Control for Multiple Input Multiple Output Wireless Systems** Wessam Ajib, David Haccoun **Taxonomy of Faults in Wireless Networks** B Bhagyavati
	Track 3 – Wireless Network Technologies and Standards Co-Chairs: Dr. Richard Cockrum, Cal Poly Pomona Dr. William Michalson, Worcester Polytechnic Institute
9:00 AM – 10:30 AM	**Session A3 – Spread-Spectrum/CDMA/OFDM Technologies** Chair: Dr. Thomas Ketseoglou, Cal Poly Pomona **Bayesian Parameter Estimation for Time and Frequency Synchronization** Matthew Bromberg, Ilir F. Progri

	Performance Analysis of Asynchronous Carrier Interferometry/MC-CDMA Uplink with Interference Cancellation Techniques Vijaya Thippavajjula, Balasubramaniam Natarajan **Peak-to-Average Power Ratio Analysis of Multi-Carrier Pulse Shape Synthesis** Jason Kipp, Balasubramaniam Natarajan
10:30 AM – 10:45 AM	Networking Break
10:45 AM - 12:15 PM	**Session B3 – Power Control and Signal Processing in Wireless Systems** Chair: Mr. Lionel Garin, SIRF Technology **Evaluation of the Interference Rejection Capability of a Uniform Circular Array in CDMA Systems** Marco Panduro, Angel Andrade, Juan García **Robust Frequency Offset Estimation with a Single Symbol for FH-OFDMA** Dong Seog Han, Daejung Yoon **A Novel Statistical approach to ISI Mitigation** Peng Wang, Wee Ser
12:15 PM – 1:15 PM	Lunch – Kellogg West Dining Room Student Paper Award Ceremony
1:15 PM – 1:45 PM	Poster Paper Session
1:45 PM – 3:15 PM	**Session C3 - Ultra Wide-Band (UWB) and OFDM Technology** Chair: Dr. Dan J. Kim, Michigan State University

	High Performance Transmission Using a Combined Pulse Position and Differential Multi-Pulse Modulation in Transmit-Reference Ultra-Wideband (TR-UWB) Communications Jakkrapong Sumethnapis, Kiyomichi Araki **The Study of Algorithm to Design UWB Pulse Based on the Peak Frequency** Weixia Zou, Zheng Zhou **Efficient Adaptive Modulation and Power Allocation Algorithm for OFDMA Cellular Systems** Kwang Soon Kim **Computation of Weighting Phase Factors and Embedding Side Information for PAR Reduction of OFDM Symbols Using Partial Transmit Sequence** EunJung Chang, HoYeol Kwon, John Cioffi
3:15PM – 3:30 PM	Networking Break
3:30 PM – 5:00 PM	**Session D3 – IEEE 802.11 and Bluetooth** Chair: Dr. Tareef Al-Mahdawi, Intelleflex Corporation, San Jose, California **A Study of Frequency Interference and Indoor Location Sensing with 802.11b and Bluetooth Technologies** Abhishek Patil, Dan Kim, Lionel Ni **Implicit MAC Acknowledgment: An Optimization to 802.11** Romit Roy Choudhury, Abrita Chakravarty, Tetsuro Ueda

	Decision Directed Determinate State Multiuser Detector for Asynchronous DS-CDMA System Virat Deepak, David Matolak
	Track 4 - Business, Management, Security, Policy, and Applications Chair: Dr. Eli Olinick, Southern Methodist University
9:00 AM – 10:30 AM	**Session A4 – Doctoral Students Session** Chair: Dr. Xian Liu, University of Arkansas Panel Members: Dr. Ehsan Sheybani, Virginia State University Dr. Eli Olinick, Southern Methodist University **Accusing Tree Based Intrusion Detection in Mobile Ad Hoc Networks** Xiao-ning Zhang, Deng-guo Feng **A New Service Discovery Architecture for Sensor Networks** Kaouthar Sethom, Hossam Afifi **Energy-Delay Analysis of Wireless Networks over Rayleigh Fading Channel** Shihyu Chang
10:30 AM – 10:45 AM	Networking Break
10:45 AM - 12:15 PM	**Session B4 - Global Wireless Services, Business, and Applications** Chair: Dr. Upkar Varshney, Georgia State University **All-IP Convergent Communications**

	over Open Service Architecture Jiann-Liang Chen, Yao-Chung Chang, Sy-Yen Kuo **A Novel Telemammography Scheme across Ad Hoc Networks** Ehsan Sheybani **Towards Music Download and Radio Broadcast Convergence in Mobile Communications Networks** Sandro Grech, Sakari Luukkainen **From Personal Area Networks to Ubiquitous Computing: Preparing for a Paradigm Shift in the Workplace** Karen Patten, Katia Passerini
12:15 PM – 1:15 PM	Lunch – Kellogg West Dining Room Student Paper Award Ceremony
1:15 PM – 1:45 PM	Poster Paper Session
1:45 PM – 3:15 PM	**Session C4 – Wireless Telecommunications Management** Chair: Dr. Katia Passerini, New Jersey Institute of Technology **Monitoring and Management Solutions For 3G/4G Wireless Mobile Networks** Eero Wallenius, Timo Hämäläinen, Olli Alanen, Henri Helanterä **Optimal Pricing For Broadband Wireless Internet Access Service** Seungjae Shin, Martin Weiss **Cellular Survivability: Mobile PCS Systems as Scale Free Networks** Jack Freund

	A Key Pre-distribution Scheme for Wireless Sensor Networks Alan Price, Kristie Kosaka, Samir Chatterjee
3:15PM – 3:30 PM	Networking Break
3:30 PM – 5:00 PM	**Session D4 - Mobile and Wireless Network Security and Privacy** Co-Chair: Mr. Chris Wullems, QASCOM, Italy Co-Chair: Mr. Fred Gallegos, Cal Poly Pomona **Wireless Network Security – A Discussion From a Business Perspective** Ankush Karnik, Katia Passerini **Lightweight Packet Authentication in IEEE 802.11** KeunSoon Lee, HyoJin Kim, JooSeok Song **An Architecture of Security Control in Sensor Networks** Xian Liu

Speaker Biographies

Mr. Andrew Seybold is one of the pioneers of mobile computing and wireless data. He was wireless when most people were still dreaming about it. His vision and keen sense has made him one of the most sought after consultants in the industry. When you ask people in wireless, you will get a variety of responses: He's a wireless Guru; he's a visionary; he's an opinionated pain the neck; he's a troublemaker. whatever the response, he will always tell it like it is, and that has made him a respected "presence" in the industry.

Mr. Seybold currently heads the Andrew Seybold Group, LLC, a highly regarded consulting firm specializing in the connected mobility space where mobile computing and advanced communications technology meet. Mr. Seybold's clients are all among the top leading--edge companies in wireless. He is also president of Andrew Seybold's Outlook 4Mobility, a parent company that produces an electronic weekly commentary , as well as a tutorial called the Wireless Data University, which is held in conjunction with the Cellular Telecommunications & Internet Association (CTIA Show). He is also a partner in a newly formed company called "The Wireless Experience" - the first source dedicated exclusively to Total Sales Training for leading companies in the industry.

Prior to August 2003, Mr. Seybold published an investors newsletter in conjunction with Forbes. In the eight years prior to the launch of this newsletter, he published Andrew Seybold's Outlook, a monthly publication covering mobile computing and communications from an end-users perspective. He has written several books, and currently contributes monthly columns to a variety of trade magazines. As a result, Mr. Seybold is highly sought after as a speaker and panelist.

Dr. Stephen B. Weinstein is currently a consultant and Adjunct Professor in the Department of Electrical Engineering at Columbia University. Dr. Weinstein has a forty-year career in telecommunications including employment at Philips Research Labs, Bell Labs, American Express, Bellcore (Telcordia), and NEC USA. He has made basic contributions to OFDM, modem technologies, and broadband communication. Dr. Weinstein is an IEEE Fellow, a past President of the IEEE Communications Society (1996-97) and past Member of the IEEE Board of Directors (2002-2003).

Dr. Weinstein is coauthor of the textbook Data Communication Principles (Plenum1992), author of the light technical Getting the Picture: A Guide to CATV and the New Electronic Media (IEEE Press, 1984) and author of the recently published The Multimedia Internet (Springer, 2005), a survey of communications, media compression, and Internet media protocols and technologies.

Dr. Paul Mankiewich is currently Chief Technical Officer for Lucent, Mobility Solutions and Senior Vice President of Networking Research, Lucent, Bell Labs. He is responsible for all aspects of new technology implementation for the business from radio through the network. Dr. Mankiewich was previously, Director of the Wireless Technology Research Department in Bell Labs. He was also Wireless Research Hardware and Architecture Director for Mobility Solutions.

Dr. Mankiewich received his Ph.D. from Boston University in Applied Physics. He began working in cellular wireless in 1988. Since then he has been involved in and responsible for all aspects of wireless system design for both CDMA and TDMA systems GSM, EDGE, UMTS, IS-95, IS-136, CDMA2000 (3G-1X, 1XEV-DO, 1XEV-DV) as well as numerous proprietary systems.

Dr. Al Javed is Vice-President, Wireless Networks Technology, at Nortel Networks. Dr. Javed joined Nortel in 1977 as a member of the scientific staff in the system engineering division. Before joining Nortel, he served on the faculties of the University of Alberta, and the University of Engineering and Technology in Pakistan. Since joining Nortel in 1977, Dr. Javed has held a number of management positions in the areas of system design, systems planning, technology development, and product development. Since 1988, he has been leading wireless R&D activities in Nortel Networks. From 1988-95, he was responsible for wireless access systems development. From 1995-99, he oversaw the development of wireless technologies for advanced wireless systems and product development for the wireless access business.

Dr. Javed is also the technical prime for the external research program for Wireless Networks. He has received numerous Nortel awards, including the Chairman's Award of Excellence in Innovation, and the CALA President's Award of Excellence in Innovation. In 1999, the Ottawa Centre of Research and Innovation (OCRI) recognized him for his leadership in innovation. Dr. Javed is on the board of directors for the Canadian Institute of Telecommunication Research (CITR), Advisory Committee of

Electronic and Information Engineering for Hong Kong Polytechnic and Cambridge Positioning Systems in U.K.

Dr. Javed has a Ph.D. in electrical engineering from the University of Alberta, Canada.

Egil Gronstad, Vice-President, Product Line Management, Ericsson Mobile Systems CDMA, has been with Ericsson for 11 years. He is experienced in CDMA, GSM, and TDMA, having served in key positions in product development and product management for each technology over the course of his career at Ericsson.

Gronstad came to San Diego in September 1999 to be part of the team for Ericsson CDMA Systems. He heads the product line management efforts overseeing the CMS 11 system, Ericsson's total CDMA solution based on industry standard open interfaces and leading compact technology design. Gronstad oversees the product development for cdmaOne and CDMA2000 solutions in his role.

Gronstad has a degree in electrical engineering and computer science from the University of California at Santa Barbara.

Dr. Preston F. Marshall has an almost 30 year background in communications, software and hardware development and system development. Currently he is with the Defense Advanced Research Projects Agency (DARPA) Advanced Technology Office (ATO), and serves a Program Manager for several of the DARPA Networking programs, including Connectionless Networking, investigating low energy protocols in low duty cycle ad-hoc networks; neXt Generation (XG) Communications, developing networks that provide adaptive spectrum usage; WOLFPACK, developing a distributed network of forward positioned, Coke-can sized electronic and network warfare devices; Disruption Tolerant Networking, Developing Delay Tolerant Networking and extending existing technology to address episodic connectivity, distributed name and routing spaces, and non-IP system transport; and a program to develop very small radioisotope power sources.

Dr. Stephen D. Huffman is Vice President of MITRE's Washington C3 Center. He also directs special studies for a variety of Government customers. In addition, Dr. Huffman recently served as the Acting Technical Director of MITRE's Center for Innovative Computing and Informatics where he was responsible for programs in high-performance networking, distributed information systems, modeling and simulation,

intelligent systems, human-computer interaction, and advanced command and control. Dr. Huffman joined MITRE in 1988 and was the Associate Technical Director of the Navy Systems and Technology Division and Director of the Signal Processing Technical Center. In that position, he was responsible for management and technical direction of technology programs in Mathematics, Neural Networks, Acoustics Signal Processing, Communications Technology, Speech Recognition, Advanced Computer Architectures, Very Large Scale Integrated (VLSI) circuit design, Signals Intelligence, and Electro-Optical Signal Processing.

Before joining MITRE in 1988, Dr. Huffman was Director of Research and Development at M/A-COM Linkabit, Vienna, VA where he developed anti-jam and low-probability of intercept communications systems, error-correction coders, speech store-and-forward systems, satellite communications, and signals intelligence systems.

From 1978 to 1983 Dr. Huffman was Supervisor of the Signal Processing Section of the Center for Systems Engineering at the Research Triangle Institute (RTI). At RTI, he developed and evaluated algorithms for underwater acoustic signal processing, radar signal processing, radio navigation, atmospheric monitoring, and spread spectrum communications.

Dr. Huffman has also served an Adjunct Assistant Professor of Electrical Engineering at Duke University, teaching communications theory and digital signal processing. He is an instructor for the Armed Forces Communications Engineering Association (AFCEA) course on Military Satellite Communications.

Dr. Huffman received the BSE, MS, and Ph.D. degrees, all in Electrical Engineering, from Duke University in 1974, 1976, and 1978. He is a member of the IEEE and serves as a reviewer for the IEEE Transactions on Signal Processing, the IEEE Transactions on Communications, and the IEEE Transactions on Aerospace and Electronics Systems. He has published numerous papers and has organized and chaired sessions on tactical communications at the 1989 and 1998 IEEE Military Communications Conferences. He was the Technical Program Chairman for the 2001 IEEE Military Communications Conference.

Masaaki Maeda is currently Senior Vice President of the Service and Technology Division at NTT DoCoMo USA's New York headquarters and is responsible for developing new mobile multimedia services and forming

alliances with American companies. NTT DoCoMo USA is a wholly owned subsidiary established in November 1999 of Japan's NTT DoCoMo Inc. In November 2004, Mr. Maeda launched DoCoMo USA's first service in North America, called "namikiteru," which is a Public Wireless LAN Access service for Japanese-speaking residents of the USA.

Mr. Maeda began his career in the Japanese telecommunications industry in May 1983 at NTT (Nippon Telegraph and Telephone Corporation) in the Technical Development Department. In March 1994, Mr. Maeda moved to NTT DoCoMo Inc., the mobile arm of NTT which was spun off from its parent company in 1992. He held a variety of managerial positions in Corporate Planning, Personnel, General Affairs, and Mobile Multimedia Planning during his career with NTT DoCoMo in Japan. Mr. Maeda joined the New York Office of NTT DoCoMo USA in July 2002.

Mr. Maeda holds both a Bachelor of Electrical Engineering and a Master of Electrical Engineering from the Tokyo Institute of Technology. In addition, he completed an MBA at MIT's Sloan School of Management in June 2002.

Dr. George Rittenhouse is Vice President of Wireless Research, Bell Laboratories. Dr. Rittenhouse heads several projects, including MIMO system development, network optimization, wireless IP networks, and fourth generation wireless. In 2001 he received the Bell Labs Fellow award. Dr. Rittenhouse is active on several national policy and standards boards, working with FCC and Homeland Security subgroups on the scientific side of wireless in the post 9/11 era. He has numerous publications and patents in the areas of wireless systems and circuits.

Ilkka Niva is a Research and Industry Relations Director at Nokia (San Diego), where he is heading CDMA Standards, 3G and beyond Research, and various programs for next generation wireless Mobility. He is responsible for university relations and is a member of the Board for the UCSD Center for Wireless Communications. In addition, he is coordinating the funding of a multi-million dollar research project. He joined Nokia Mobile Phones in 1988 (Finland) and has experience on the very first GSM, TDMA, IS-95 and WCDMA technologies and related life cycles, 3G roadmapping and strategic technology planning.

Dave Wolter is the Executive Director of the Wireless Networks group at SBC Laboratories, the applied R&D subsidiary of SBC Communications, Inc. He directs a team responsible for identification, assessment and enhancement of leading edge radio technologies. The scope of his

responsibilities includes current and future generations of cellular and PCS systems, satellite technologies, wireless LANs and fixed wireless access systems.

Prior to this position Dave lead SBC's fixed wireless access investigations for both domestic and international applications, and conducted equipment trials and deployment support. He has conducted strategic analysis and performance investigations in cellular and PCS technologies, and led SBC's analysis of wideband and software-defined radio technology.

Dave began his career with SBC in 1991. Prior to joining SBC, he was a Unit Chief in the Electronics Technology division of the McDonnell Aircraft Company where he led a team of engineers in the analysis and specification of advanced tactical aircraft communication systems.

Dave received BS and MS degrees in Electrical Engineering from Washington University in 1979 and 1981, respectively.

Dr. Jeyhan Karaoguz is Technical Director in the Office of the CTO at Broadcom Corporation, where he is leading the technology development efforts in next generation wireless personal area networks (WPAN). Over the past three years he has made key contributions to the IEEE 802.15.3 High Rate WPAN Standard and served as the assistant editor for the physical layer specification of the standard.

Vera Kripliani, Senior Director, Technology Marketing has been involved in the wireless industry for the past 18 years. Before joining QUALCOMM Incorporated, Mrs. Kripalani worked at AT&T Bell Laboratories in New Jersey on the development & testing of Lucent's AMPS, TDMA & GSM systems. As project manager at Bell Labs she was responsible for deploying the first US digital base station and testing the air interface standards for US TDMA. Mrs. Kripalani also led the application software development program for Lucent's flagship product, the Series II base station.

Mrs. Kripalani established the system test organization and test facilities for QUALCOMM's CDMA infrastructure product and later created the Technical Marketing group for the infrastructure division. She led QUALCOMM's effort to successfully establish CDMA-450 as a digital standard in the NMT band for Europe and also created the Accessibility Planning group that was responsible for ensuring QUALCOMM's compliance with Section 255 of the FCC's Telecommunications Act of 1996.

Mrs. Kripalani has represented QUALCOMM in several industry forums and was the Tutorial Chair for IEEE's International Conference on Universal Personal Communications for 4 years.

Mrs. Kripalani holds a Bachelor of Science degree in electrical engineering from the Indian Institute of Technology, Delhi and a Master of Science in computer science from Rutgers University, NJ.

Robert J. Brown is a Senior Consultant in PriceWaterhouseCooper's Security and Privacy practice. His ten years of focused security experience translate to an in-depth understanding of both the technical and business requirements of information protection. He is well versed in all aspects of information security, including high-level design of organizational information security policies, risk and vulnerability assessment, attack and penetration testing, IT auditing, network design, incident response, and forensic analysis.

Prior to his role with PwC, Mr. Brown was the co-founder and Vice President of an INC 500 security services firm. He also previously acted as a senior member of the engineering and consulting team at Trusted Information Systems, the original manufacturer of one of the first commercial network security products, the Gauntlet firewall.

Mr. Brown has been invited to speak at information security conferences and events for organizations such as SANS and ISSA as well as industry-specific groups including the Los Angeles County Bar Association, the Association of Certified Fraud Examiners, Hospitality Financial and Technology Professionals, and others. He is a member of the InfraGard group and the Usenix Association and is an active volunteer and member of the Information Systems Audit and Control Association and Information Systems Security Association in Los Angeles.

Mullaguru S. Naidu is a Senior Manager with Qualcomm Inc. San Diego, USA for their Global Technology Marketing division. His main job functionality is to promote CDMA technologies among service providers around the globe and also to provide technical support to the Business Development personnel and the Engineering Services group of Qualcomm. His current areas of focus are: Mobile wireless related Interference studies and Spectrum Management; 2G and 3G CDMA Technologies, along with current developments; IEEE 802 Standards: specifically 802.20, 802.22 activities; Voice over IP for Wireless Networks; 2G and 3G wireless network Security provisions; and Mobile wireless Market Trends and

analysis

Mr. Naidu has a Bachelor of Technology in Electronics and Telecommunications from S.V.U. College of Engineering, Tirupati, India and Master of Technology in Satellite Communications from Indian Institute of Technology, Kharagpur, India.

Wayne Beckham is Security Systems Administrator, Information Security Office, County of Riverside, California. Mr. Beckham is an experienced LAN Administrator with almost 20 years experience in the industry; the last five years, he has concentrated on information security (including wireless technology applications), data recovery and computer forensics. His assignments involve the use of EnCase, Airmagnet, and other forensic tools to analyze security anomalies and events to protect the County from attack. These tasks include: Use appropriate investigative procedures to allow for the identification and prosecution of violators of County policies and/or state, local and federal statutes. Assure the integrity of all evidence. Use appropriate forensic tools to analyze security anomalies and events to protect the County from similar attacks. Coordinate the investigative/forensic effort for the Information Security Office. Coordinate all phases of the incident handling process: preparation; detection and analysis; containment, eradication and recovery; and post-incident activity. Classify the incident and take appropriate action. Investigate incident to uncover vulnerability leveraged. Provide written analysis of incident and impact on the County. Also, he works in conjunction with legal counsel and law enforcement agencies where appropriate.

Mr. Beckham received his degree in Information Systems Engineering from California Baptist University, Riverside CA. Wayne has taken additional coursework at University of California Riverside Extension and attained his MCSE Certification. He is a veteran of US Air Force.

Lalit Kotecha has an Advanced Technology Strategist role at Verizon Wireless, where he is responsible for next generation wireless and associated technologies. For the past several years he has actively participated and contributed to the IEEE 802.16 and 3GPP2 standards bodies. Previously, he worked as a Wireless Architect to design systems based on Advanced Antenna Technology and multi-hop mesh networks, both enhancing WiMax technology and proposed as part of the 802.16 standards. Mr. Kotecha was instrumental in deploying 1xRTT data networks in the South Korean market while working with Cisco Systems. He has over thirteen years of experience designing wireless systems

including, GSM, CDMA, 802.16, 802.11, UWB, digital switching systems, and satellite-based personal wireless networks for Motorola, Hughes, and Cisco Systems. Mr. Kotecha has an MS from the Indian Institute of Science.

Dr. J. P. Shim is Professor of MIS at Mississippi State University and Director of International Business Strategy Program (on business executives training). He received his Ph.D. from U of Nebraska-Lincoln and completed Harvard Business School's Executive Education program. He is the co-author of several books and has published over 50 journal articles such as Communications of the ACM, Journal of AIS, Decision Support Systems, Information & Management. He worked as an IT consultant for Booz-Allen & Hamilton-ASE, Inc. Professor Shim has received various awards, grants and distinctions, including NSF, Microsoft Corp., and John Grisham Faculty Excellence Award.

Michael J. Finley is Area Vice President for Nextel Communications and is responsible for operations, sales and engineering in the Southern California region. Prior to joining Nextel in 2002, Mr. Finley was Senior Vice President at Wingcast, a joint venture between the Ford Motor Company and QUALCOMM to develop a telematics platform for Ford vehicles.

From 1993 to 2001, Mr. Finley was President of Verizon Wireless in Southern California, Vice President and General Manager in Sacramento and Vice President of Sales in Ohio for Airtouch Cellular. Prior to joining Airtouch, Mr. Finley held positions with Cellular One and McCaw Cellular.

Mr. Finley began his career in wireless in 1985 by starting Celluland, a national franchise that created an alternative distribution approach in advance of consumer marketing of wireless products.

Mr. Finley is a graduate of Creighton University and the General Manager Program in Executive Education at Harvard Business School. He is a member of the Region 1 Homeland Security Advisory Council and is the Chairman of the HSAC Technology Committee. He is an Advisory Board Member of REZN8 and a Board Member of the Mathis Foundation For Children and The Los Angeles Sports & Entertainment Commission.

Anna Maria Hall, who has more than 8 years of experience in the wireless industry, is Director of Sales for the Corporate Markets Group at Cingular Wireless. Her region spans Greater Los Angeles, Central

California, San Diego, Las Vegas and Hawaii. Hall leads 10 teams of wireless telecommunications consultants in providing wireless business solutions (voice and data) to firms with up to $750 million in company revenues.

Hall started her wireless career with BellSouth Mobility in the 1990's working with businesses to increase productivity and efficiencies through wireless communications in Bakersfield, California. She moved to Los Angeles to work for LA Cellular where she started her wireless management career, working with Global and Middle Market accounts.

When AT&T Wireless bought LA Cellular, Hall served in management focusing on Middle Market enterprises. She served on a taskforce to develop the current Corporate Markets Group, which is designed to support the specific needs of growing Middle Market business entities.

With the merger of Cingular and AT&T Wireless, Hall was assigned to her current role for the "New" Cingular. Hall's team is bringing 2.5G and 3G wireless data services to market that are revolutionizing modern business. This group is supported by a staff of Data Solutions Consultants who focus on large, complex and custom applications.

Wireless Data Solutions available for business (some of which include wireless phone services) include tools for mobile professionals that empower individuals to better meet the needs of customers. Sales Force applications give immediate access to critical customer information, inventory, email, access to contacts and calendaring. These tools increase response times and give companies a competitive edge. Field Service Solutions include supply chain, equipment/service history, and timesheet management which lower costs. Fleet Service Solutions impact performance management, security and dispatch efficiencies.

Hall has been honored with the Circle of Excellence Award for outstanding service to her company. She was also honored with a Quality Team Award Nomination for leading various reorganization efforts leading to improved production and business customer support.

Hall received her Bachelors Degree in Business Administration from the University of Southern California and holds an MBA from Pepperdine University.

John Campbell is Regional Business Sales Director, T-Mobile USA. Campbell was recruited by T-Mobile USA in January 2002 to establish the

Business and Government teams for California and Nevada. He led the Markets from 0 to 2,000,000 subscribers in less than two years. Prior to this assignment, Campbell had a fifteen-year career in senior-level sales management in telecommunications for national and international accounts. He was the Vice President of Sales for CentreCom where he had global responsibility for VoIP business - including business development, products, marketing and sales. He spent 8 years at AT&T Wireless where he was the Regional Sales Director. He is experienced in establishing divisions and integrating corporate acquisitions. Campbell graduated from Cal Poly, Pomona, with a B.S. He earned his Master of Business Administration from the University of Phoenix.

Dr. Sasha Dekleva is an Associate Professor at the College of Commerce, DePaul University in Chicago. He has over ten years of industrial experience in engineering, systems analysis and management at IBM and other companies in Slovenia. Besides being on faculty at DePaul University since 1985, he has taught at the Universities of Iowa, Maribor, and Ljubljana. Professor Dekleva's papers appeared in journals such as MIS Quarterly, Information Systems Research, Communications of the ACM, Data Base, Information & Management, Journal of Software Maintenance, Journal of Systems and Software and many others.

Dr. Georg Hampel is a Member of the Technical Staff in the Wireless Research Laboratory at Bell Labs in Murray Hill, NJ (USA) since 1996. He received an M.S. and a Ph.D. in Physics from J.W. Goethe Universität in Frankfurt am Main/Germany. At Bell Labs, he has led various research projects in the fields of telecommunications and condensed matter physics. He was instrumental in the establishment of Lucent's automated network optimization methodology for the roll out of 3G technologies. His research interests cover the wide range from rf-devices to network technologies. He has worked on network optimization, network performance modeling, network growth planning, intelligent antenna systems, superconductor filter technologies, microwave systems design, rf- and ultrasound measurement techniques as well as material properties of superconductors and magnetic compounds. Currently, he is interested in algorithm development for network control, cross-layer and cross-node optimization, mesh- and multi-hop network architectures, and network performance estimation through dynamic simulation.

Dr. Hampel has written many publications in the field of telecommunications and condensed matter physics. He holds 9 patents on rf devices, intelligent antennas, and network optimization. He has taught

various classes on automated network optimization for engineers and service providers, worldwide.

Prof. Upkar Varshney is on the faculty of Computer Information Systems 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), MS in Computer Science and a Ph.D. in Telecommunications & Networking, from the University of Missouri-Kansas City. His research and teaching interests include mobile commerce, pervasive healthcare, and mobile and wireless networking. He has written over 80 papers in these topics in major IEEE and ACM journals and international conferences. Many of his papers are among the most cited references in mobile commerce. Many consider him as the leading international authority on mobile commerce and wireless applications.

Prof. Varshney has delivered several keynote speeches and has presented more than 30 extremely well received tutorials and workshops at major international conferences including IEEE WCNC (1999, 2002, and 2003), ACM Mobicom (1999, 2001 and 2002), and HICSS (1998, 1999, and 2001). He received Myrone T. Greene Outstanding Teaching Award from Georgia State University in 2000 and 2004, and RCB College Teaching Award in 2002. He has organized and/or chaired more than 20 sessions at major international conferences. He is an editor for International Journal of Network Management, Communications of the AIS, and International Journal of Mobile Communications, and has also guest edited major journals including ACM/Kluwer Journal on Mobile Networks and Applications (MONET) on mobile commerce.

Dr. Huseyin Arslan received his PhD. degree in 1998 from Southern Methodist University (SMU), Dallas, Tx. From January 1998 to August 2002, he was with the research group of Ericsson Inc., NC, USA, where he was involved with several projects related to 2G and 3G wireless cellular communication systems. Since August 2002, he has been with the Electrical Engineering Dept. of University of South Florida. His research interests are related to advanced signal processing techniques at the physical layer, with cross-layer design for networking adaptivity and Quality of Service (QoS) control. More specifically, he is interested in signal processing techniques for wireless communication systems including modulation and coding, interference cancellation and multi-user signal detection, channel estimation and tracking, equalization, soft information generation, adaptive receiver and transmission technologies

etc. He is interested in many forms of wireless technologies including cellular, wireless PAN/LAN/MANs, fixed wireless access, and specialized wireless data networks like wireless sensors networks and wireless telemetry. He has served as technical program committee member, session and symposium organizer in several IEEE conferences. He is an editorial board member for Wireless Communication and Mobile Computing journal, and was a technical program co-chair of IEEE wireless and microwave conference 2004. Dr. Arslan is a senior member of the IEEE.

Dr. Arslan has worked in UWB significantly. He has several publications and is editing a book on UWB for Wiley publishing. He is also organizing a special issue on UWB for a wireless communications and mobile computing journal.

Dr. Eli Olinick is Assistant Professor, Department of Management, Systems and Information at SMU. He completed his B.S. in Applied Mathematics (1989) at Brown University and earned his M.S. (1994) and Ph.D. (1999) in Industrial Engineering and Operations Eli Olinick is an Assistant Professor in the Department of Engineering Research at the University of California at Berkeley where he wrote his Ph.D. thesis on "Optimization Algorithms for Survivable Network Design Problems." His research interests are in applied optimization and network design problems. As a graduate student at Berkeley, he was an active member of the Remote Interactive Optimization Testbed developing optimization applications such as the popular baseball page on the World Wide Web. He has taught courses in linear programming, operations research models, and engineering economics at SMU and Berkeley. He received the Alpha Pi Mu and Academic Senate Outstanding Graduate Student Instructor awards at Berkeley in 1998.

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SWIFT (Students With an Interest in the Future of Telecommunications) is Cal Poly Pomona's student branch chapter of the IEEE Communications Society. SWIFT is chartered by the College of Business and open to all Cal Poly Pomona students interested in telecommunications and networking. SWIFT was created in 1990 with the objective of enhancing and enriching the students' learning experience and preparing students for careers in the telecommunications and networking industry. Some of the ways in which SWIFT attempts to achieve this objective include: inviting speakers to Cal Poly to discuss the latest technologies, industry practices, and career trends; co-hosting telecommunications and networking seminars and symposia; holding "hands-on" workshops; and hosting social events.

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