

Emerging Technologies in Communications

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This JSAC special issue is covering four emerging areas in communications: Area 1 – e-Health; Area 2 – Peer-to-Peer Networking; Area 3 – Vehicular Networks and Telematics Applications; and Area 4 – Social Networks. This is the first issue of a brand new series in JSAC focusing on “Emerging Technologies in Communications.” These emerging technical areas were selected from ComSoc’s Technical Committees and Technical Sub-Committees. (The second issue will be published later in 2013 on the following areas: Area 5 – Applications of Nanotechnologies in Communications; Area 6 – Autonomic Communications; Area 7 – Fiber Wireless Integration; and Area 8 – Nanoscale and Molecular Networking.)

For this issue, 55 regular papers were selected for publication out of 197 open-call submissions. Also included are three overview (invited) papers. It is devoted to reporting on cutting-edge research achievements covering the following four emerging technical areas in communications.

AREA 1: E-HEALTH

Five papers were accepted for publications in the area of eHealth, which is concerned with the application of Information and Communication Technologies (ICT) for the delivery, management, training, research, education, and any other aspects of healthcare.

The ageing population in the developed world presents some major challenges to healthcare today. In the paper “mHealth Technologies for Chronic Diseases and Elders: A Systematic Review” Chiarini, Akter, Ray, Masella, and Ganz present a systematic overview of mHealth (care using mobile wireless devices) in the context of healthcare for the elderly as reported in major journals and conferences all over the world, as part of the WHO/ITU/IEEE initiative on the assessment of mHealth involving researchers in four continents (Australia, Europe, Asia and America).

Mental illnesses are now emerging as the biggest menace to healthcare in the world. The paper “m-Carer: Privacy-aware Monitoring for People with Mild Cognitive Impairment and Dementia” by Agusti Solanas *et al.*, presents the concept of m-Carer as a smart mobile device able to privately monitor the movements of patients having diverse degrees of mobility and autonomy.

The world is now moving toward the paradigm of “healthy life” as opposed to the “disease treatment” paradigm of healthcare. Hence, eHealth can play a major role in the management of wellness. The paper “A Novel Cooperation Strategy for Mobile Health Applications” by Bruno Silva *et al.* presents a framework for cooperative management of consumer health applications (e.g., wellness monitoring). A performance evaluation study in a real scenario is presented, using an available m-Health application, called SapoFit.

Body Area Networks (BANs) are expected to play a major role in the field of patient-health monitoring in the near future as part of mHealth solutions. While it is vital to support secure BAN access to address the obvious safety and privacy concerns, it is equally important to maintain the elasticity of such security measures. In the paper “Body Area Network Security: A Fuzzy Attribute-based Signcryption Scheme” Chunqiang Hu *et al.* present a Fuzzy Attribute-Based Signcryption (FABSC), a novel security mechanism that leverages fuzzy Attribute-based encryption to enable data encryption, access control, and digital signature for a patient’s medical information in a BAN.

Some healthcare scenarios, such as geographic disease surveillance, involve machine-to-machine (M2M) communication over the Internet — also known as the Internet of Things (IoT). The last paper in this area, “Communication Architecture for mHealth and Remote Monitoring Based on the Internet of Things,” by Antonio Jara, presents the architecture, and evaluates its capabilities to provide continuous monitoring, ubiquitous connectivity, extended device integration, reliability, and support for security and privacy.

AREA 2: PEER-TO-PEER NETWORKING

Peer-to-Peer (P2P) computing, a form of collaborative computing, is showing promising potential to resolve critical issues such as scalability, fault-tolerance, and heavy dependence on infrastructures of the centralized client-server based network computing model. The rapid growth in the use of mobile computing devices, including smart phones, personal digital assistants, and sensors with increasing functionalities, and the advances in wireless technologies, have fueled the utilization of mobile collaborative computing, known as mobile P2P (MP2P) in our daily life (exchanging traffic condition on a busy highway, sharing price-sensitive financial information, getting the most recent news), in national security (exchanging information and collaborating to uproot a terror network, communicating in a hostile battle field), and in a natural catastrophe (seamless rescue operation in a collapsed and disaster torn area). Due to the widespread applications of P2P as well as MP2P, this radical computing approach has gained astounding attention from industry, government, and academic research communities. Nevertheless, the dynamic, varying conditions of P2P networking has longstanding challenges in providing scalable and robust quality-of-service. In addition, MP2P faces technical challenges, including resource constraints such as processing power, storage and small power supply on mobile devices, security and privacy threats, disrupted and disconnected network topology and heterogeneity of devices.

Area 2, focusing on Peer-to-Peer Networking, brings together the state-of-the-art research and development toward making P2P and MP2P networking a better infrastructure service for both wired and wireless systems. We have received a very large number of submissions. Thirty papers were accepted for publication and they can be categorized into four topics.

The first topic focuses on content distribution in P2P networks, covered by seven papers. The paper “Accelerating Peer-to-Peer File Sharing with Social Relations” by Haiyang Wang *et al.* examines the challenges and potential of accelerating P2P file sharing with Twitter social networks. The paper “EMD: Energy-Efficient Delay-Tolerant P2P Message Dissemination in Wireless Sensor and Actor Networks” by Shibo He *et al.* addresses the problem of P2P networking for data dissemination among actors in wireless sensor and actor networks. The paper “A Scalable Vehicular Network Architecture for Traffic Information Sharing” by Jiazhen Zhou *et al.* investigates the scalability of communication architectures to provide traffic information services in a vehicular network based on the P2P network technology. The paper “On the Impact of Incentives in eMule Analysis and Measurements of a Popular File-Sharing Application” by Damiano Carra *et al.* focuses on the incentive mechanism of a very popular, yet not very well studied, P2P application, eMule. The paper “Preventing Piracy Content Propagation in Peer-to-Peer Net-

works” by Hongli Zhang *et al.* studies several important issues on how to prevent pirated content propagation in P2P networks. The paper “Self-Adaptive Context Data Distribution with Quality Guarantees in Mobile P2P Networks” by Mario Fanelli *et al.* proposes a novel P2P model and distributed architecture for context distribution in densely populated mobile systems. The paper “Inter-Swarm Content Distribution Among Private BitTorrent Networks” by Chengchen Hu *et al.* proposes a content sharing/distribution framework among Private BitTorrent (PT) sites to improve the content diversity.

The second topic focuses on multimedia P2P applications and services, covered by eight papers. The paper “Packet Loss Recovery Scheme with Uniquely-decodable Codes for Streaming Multimedia over P2P Networks” by Qiyue Yu *et al.* presents an effective packet loss recovery scheme for Internet Protocol based P2P networks that deliver multimedia streaming contents. The paper “Celerity: A Low-Delay Multi-Party Conferencing Solution” by Xiangwen Chen *et al.* presents a multi-party conferencing solution specifically designed to deliver video with low end-to-end delays. The paper “Waterfall: Video Distribution by Cascading Multiple Swarms” by Kunwoo Park *et al.* proposes a video streaming solution that splits the whole swarm into multiple swarms which are then cascaded by the scene sequence. The paper “On Characterizing Peer-to-Peer Streaming Traffic” by Yang Jie *et al.* provides an in-depth view of the current P2P streaming traffic in the current Internet of China based on the massive data collected with passive network monitoring equipment placed in the Internet backbone. The paper “Performance Investigation on Request Collisions in Peer-to-Peer Live Streaming Systems” by Yishuai Chen *et al.* introduces a novel neighbor peer selection algorithm for piece downloading in P2P live streaming systems. The paper “Optimal Rate Allocation for P2P Video Streaming” by Livio Lima *et al.* proposes a two-stage procedure of rate control for P2P video streaming. The paper “Cinematic-Quality VoD in a P2P Storage Cloud: Design, Implementation and Measurements” by Fangming Liu *et al.* explores the design space and practice of a new P2P storage cloud, which is capable of replicating, refreshing and on-demand streaming of cinematic-quality video streams, in a decentralized fashion using local storage spaces of end users. The paper “Effective Utilization of User Resources in PA-VoD Systems with Channel Heterogeneity” by Le Chang *et al.* focuses on peer cache and upload bandwidth management at the same time for multi-channel peer-assisted video on-demand (PA-VoD) systems with heterogeneous video playback rates.

The third topic includes six papers investigating the security and privacy issues of P2P networking. The paper “LSR: Mitigating Zero-day Sybil Vulnerability in Privacy-preserving Vehicular Peer-to-Peer Networks” by Xiaodong Lin proposes an efficient Local Sybil Resistance (LSR) scheme to mitigate zero-day sybil vulnerability in privacy-preserving vehicular P2P networks. The paper “THUP: A P2P Network Robust to Churn and DoS Attack based on Bimodal Degree Distribution” by Katsuya Suto *et al.* introduces a bimodal network based on bimodal degree distribution which is tolerant to both churn and Denial of Service (DoS) attacks. The paper “Privacy-Preserving Energy Theft Detection in Smart Grids: A P2P Computing Approach” by Sergio Salinas *et al.* investigates the energy theft detection problem considering users’ privacy issues and proposes three distributed algorithms utilizing P2P computing. The paper “Verifiable Privacy-Preserving Aggregation in People-Centric Urban Sensing Systems” by Rui Zhang *et al.* presents the design and evaluation of a novel P2P based solution to verifiable privacy-preserving data aggregation in people-centric urban sensing

systems (PC-USSs). The paper “Efficient Trust Based Information Sharing over Distributed Collaborative Network” by Huang Lin *et al.* proposes two trust based encryption schemes that can significantly improve the efficiency of information sharing and dissemination in P2P systems. The paper “TESLA-based Homomorphic MAC for Authentication in P2P System for Live Streaming with Network Coding” by Chi Cheng presents an efficient symmetric-key based authentication scheme for a P2P live streaming system with network coding to provide in-network detection against pollution attacks and entropy attacks simultaneously.

The fourth topic focuses on other aspects of P2P networking. The paper “A Naming Scheme for P2P Web Hosting” by Md. Faizul Bari *et al.* identifies the practical requirements for devising a secure, persistent, and human friendly naming scheme for P2P web hosting and proposes a novel naming scheme that satisfies all these requirements. The paper “Automatic and Autonomous Load Management in Peer-to-peer Virtual Environments” by Mahathir Almashor *et al.* exploits 3D Voronoi Diagrams (3D-VD) as a scalable, flexible, and fault-tolerant P2P overlay that is able to automatically balance arbitration loads among peers. The paper “Providing Fast Channel Switching in P2P IPTV Systems” by Daniel A. G. Manzato and Nelson L. S. da Fonseca presents and compares four novel schemes for providing fast channel switching that reduce the occurrence of latency. The paper “A Measurement Study on the Topologies of BitTorrent Networks” by Majing Su *et al.* deploys a measurement system to examine some performance-related topology properties of BitTorrent networks. The paper “Resource Allocation for D2D Underlay Systems: A Combinatorial Auction Based Approach” by Chen Xu *et al.* proposes an innovative resource allocation scheme to improve the performance of mobile P2P, i.e. device-to-device (D2D) communications as an underlay in the downlink cellular networks. The paper “Estimating the Cardinality of a Mobile Peer-to-Peer Network” by Shiping Chen *et al.* presents two novel statistical methods, called the circled random walk and the tokened random walk, to determine the cardinality, i.e. the number of nodes, in mobile P2P networks. The paper “Opportunistic Routing in Intermittently Connected Mobile P2P Networks” by Shengling Wang *et al.* proposes two opportunistic routing algorithms, which exploit the spatial locality, spatial regularity, and activity heterogeneity of human mobility to select relays. The paper “THash: A Practical Network Optimization Scheme for DHT-based P2P Applications” by Yi Sun *et al.* presents THash, a simple scheme that implements a distributed and effective network optimization for DHT systems by using standard DHT put/get semantics and a triple hash method to guide the DHT clients to choose their sharing peers in proper domains. The paper “Coding-Aware Peer-to-Peer Data Repair in Multi-Rate Wireless Networks — A Game Theoretic Analysis” by Hsiao-Chen Lu *et al.* models the users as selfish players in the network-coding based P2P packet repairing game and introduces a payment-based incentive mechanism in the packet repairing game.

AREA 3: VEHICULAR NETWORKS AND TELEMATICS APPLICATIONS

The benefits and enjoyment of personal and commercial mobility powered by continuously improving vehicular technology have enabled a successful automobile industry for more than one hundred years. Today, there are more than one billion vehicles on roads around the world, which create inevitable and complex impacts on human society, our daily lives, and the natural environment. In the past decade, it has been an increasing challenge to improve traffic safety, reduce roadway congestion, and enhance transportation sustainabili-

ty by reducing fossil-fuel depletion and carbon dioxide emissions by vehicles. Vehicular networks and telematics applications, enabled by advanced information and communication technologies, have been demonstrated to be a promising solution to meet this challenge.

Researchers, industries, and governments around the world have been devoting significant efforts and resources to developing vehicular networking technologies. Significant progress has enabled a growing range of vehicle safety and mobility applications such as automatic crash warning, intersection collision avoidance, hazard warning, road-side assistance, concierge assistance, and vehicle condition reports. However, many challenges remain to be addressed. This Special Issue on Vehicular Networks and Telematics Applications focuses on the current pressing technical challenges. The importance and timeliness of the topics covered in this Special Issue have attracted extensive interest. Fifty seven manuscripts were submitted for possible publication, and 13 papers have been accepted.

The papers in this special issue cover a broad range of topics in vehicular communications and telematics applications. The paper “Vehicular Communications Using DSRC: Challenges, Enhancements, and Evolution” X. Wu *et al.* provides an introduction and survey on the Dedicated Short Range Radio (DSRC) — a primary communication technology designed for vehicles.

The remaining 12 papers can be categorized into three topic areas. The first topic area focuses on field trials and radio channel modeling and it consists of four papers. The paper “IEEE 802.11p-based Vehicular Networking Operational Pilot Field Measurement” T. Sukuvaara *et al.* presents results of a vehicle communication field trial using IEEE 802.11p conducted in Northern Finland. The paper “Intervehicle Communication: Cox-Fox Modeling” by Y. Jeong *et al.* describes an analytical model to characterize vehicle-to-vehicle (V2V) communications in a doubly stochastic vehicular network. The paper “Wideband Channel Modeling and Intercarrier Interference Cancellation for Vehicle-to-Vehicle Communication Systems” by X. Cheng *et al.* proposes a regular-shaped geometry-based stochastic model for non-isotropic scattering wideband multiple-input multiple-output vehicle-to-vehicle Ricean fading channels. The paper “A Roadside Scattering Model for the Vehicle-to-Vehicle Communication Channel” by L. Cheng *et al.* proposes a geometrical model for the diffuse component based on scattering objects distributed along the roadside, which can predict the Doppler spectrum and angle-of-arrival distribution for various vehicle-to-vehicle communication scenarios.

The second topic area focuses on how to improve vehicular communication performance and it consists of three papers. The paper “Compressive Sensing Based Time Domain Synchronous OFDM Transmission for Vehicular Communications” by L. Dai *et al.* applies the compressive sensing theory to solve performance degradation problems caused by long delay spreads and fast time-varying vehicular channels. The paper “CAH-MAC: Cooperative Ad-hoc MAC for Vehicular Networks” by S. Bharati and W. Zhuang presents a cooperative medium access control scheme for vehicular networks to increase successful packet transmissions and network throughput. The paper “Persistent Localized Broadcasting in VANETs” by M. Fiore *et al.* presents a communication protocol for persistent dissemination of delay-tolerant information to vehicular users.

The third topic area focuses on services and applications and it consists of five papers. The paper “Analytic Design of Active Safety Systems for Vehicular Ad hoc Networks” by M. Nekoui and H. Pishro-Nik is an analytical study of parameter designs for vehicle safety applications. The paper

“Dynamic Traffic Control with Fairness and Throughput Optimization Using Vehicular Communications” by L.-W. Chen *et al.* presents a dynamic traffic control framework using vehicular communications and fine-grained information, such as vehicles’ turning intentions and lane positions, to maximize traffic flows and provide fairness among traffic flows. The paper “A Holistic Approach to Service Delivery in Driver-in-the-Loop Vehicular CPS” by X. Li *et al.* addresses a Driver-centric Service Delivery Problem (DSDP) from a cross-disciplinary resource allocation standpoint. The paper “Secure Cooperative Data Downloading in Vehicular Ad hoc Networks” by Y. Hao *et al.* presents a secure cooperative data downloading framework for vehicles. The paper “Dynamic Popular Content Distribution in Vehicular Networks using Coalition Formation Games” by T. Wang *et al.* proposes a cooperative approach based on coalition formation games to allow pieces of a message to be relayed by different vehicles to a destination vehicle.

AREA 4: SOCIAL NETWORKS

Following the rapid growth of the Internet into our daily life, social networks have emerged as a key information communication technology, to potentially influence e-commerce and human society. Among many technological aspects to look into social networks, this section pays special attention to technological development based on communication and networking knowledge, and impacts on the design of communication systems and networks. In the paper “From Technological Networks to Social Networks” Chen *et al.* overview the ways that communication and networking technologies are useful for algorithms in social networks, and that social networks can influence technological networks.

Random graphical analysis plays a key role in understanding social networks. Makowski and Yagan explore the scaling laws for random connectivity in random threshold graphs in the paper “Scaling Laws for Connectivity in Random Threshold Graph Models with Non-Negative Fitness Variables.” As time evolution plays a critical role to characterize social networks, Ghosh *et al.* use bipartite networks to specify inter-group relationship in the paper “Understanding Evolution of Inter-Group Relationships Using Bipartite Networks.” In the paper “The Role of Persistent Graphs in the Agreement Seeking of Social networks” by Shi and Johansson, persistent graphs have been introduced to fully interpret the process of agreement reaching. In the paper “Incentive Provision and Job Allocation in Social Cloud Systems” Zhang and van der Schaar propose an incentive mechanism to invoke cooperation to achieve effective computation in the cloud-based social systems.

In addition to fundamental explorations, we can enjoy more important investigations on useful techniques in social network applications. It is critical to identify leaders and followers in e-commerce or social science, Shafiq *et al.* study in the paper “Identifying Leaders and followers in Online Social Networks,” and similarly to identify information hubs in the paper “A Distributed Algorithm for Identifying Information Hubs in Social Networks.” Privacy preserving techniques are of practical interests in social networks. Liang *et al.* design privacy preserving profile matching for mobile applications in the paper “Fully Anonymous Profile Matching in Mobile Social Networks,” and Zhang *et al.* adopt a proximity based approach in mobile social networks in the paper “Privacy-Preserving Profile Matching for Proximity-based Mobile Social Networking.” Finally, an incentive-based content exchange protocol is proposed for selfish opportunistic mobile networks in the paper “ConSub: Incentive-Based Content Subscribing in Selfish Opportunistic Mobile Networks” by Zhou *et al.*

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BIOGRAPHIES



NAOHISA OHTA has been engaged in research and development of high-quality digital media systems and new applications associated with networked digital media. After he received PhD from Tohoku University in Japan, he joined NTT Laboratories where he researched and developed algorithms for high-quality audio-video communications and highly parallel processing systems. He joined Sony and directed R&D on high-quality AV transmission for real-time networked applications. He worked at Research Institute for Digital Media and Content as a professor and directed projects on networked multimedia such as the world-first trans-pacific 4k motion picture transmission between Tokyo and San Diego. Currently, as a Professor of Graduate School for Media Design, he is leading projects for creating new experience and business using high-quality image media and networks. He is also active outside University as a member of professional societies such as IEEE, IEICE Japan, and so on. He is an IEEE Fellow.



ATSUSHI TAKAHARA received the B.S., M.S., and Dr. of Engineering degrees from Tokyo Institute of Technology in 1983, 1985, and 1988, respectively. He joined NTT LSI Laboratories in 1988 and has been researching formal methods of VLSI design, reconfigurable architectures, and IP processing. From 2003 to 2008, he was the director of Service Development & Operations Department, Visual Communications Division, NTT Bizlink Inc to develop and operate an IP-based visual communication service. From 2008 to 2011, he was the Executive Manager of Media Innovation Laboratory in NTT Network Innovation Laboratories. Since 2011, he has been the Director of NTT Network Innovation Laboratories. His current research interests are in IP networking for real time communication applications and IP infrastructure technologies. He is a member of IEEE, ACM, IEICE, and IPSJ.



ANDRZEJ JAJSZCZYK is a professor at AGH University of Science and Technology in Krakow, Poland. He received M.S., and Ph.D. degrees from Poznan University of Technology in 1974 and 1979, respectively. He spent a year at the University of Adelaide in Australia, two years at Queen's University in Kingston, Ontario, Canada, and half year at Ecole Nationale Supérieure des Télécommunications de Bretagne, France. He is the author or co-author of 10 books and 280 research papers as well as 19 patents in the areas of telecommunications switching, high-speed networking, network management, and reliability. He has been a consultant to industry, telecommunications operators, and government agencies in Australia, Canada, France, Germany, India, Poland, and the USA. He serves on editorial boards of several journals. He is a Fellow of the IEEE. Andrzej Jajszczyk is the Director of the National Science Centre, a Polish research funding agency, and Vice-President of the Kyoto-Krakow Foundation.



ROBERTO SARACCO is the President of EIT Italy and Node Director of EIT Italy based in Trento (European Institute for Innovation and Technology). Between 2001 and 2011 he was the Director of the Future Centre in Venice, responsible for innovative telecommunications architectures and scientific communications reporting directly to the Strategy Officer of Telecom Italia. During 1999 and 2000, Roberto proposed and delivered a World Bank project in the InfoDev framework to speed entrepreneurship in Latin American countries. Roberto chaired the Visionary Group (1996-1997) on Super Intelligent Networks to steer the cooperative research at the European Union (EU) level beyond the year 2000. He has recently served as member of the Internet 2020 Strategy Group and

European Research Network (GEANT) expert group. In 1994 he launched the Marketing & Communications area in CSELT, ensuring dissemination of innovation. In the eighties, Roberto led research in Telecommunications Management in CSELT, and actively participated in standardization activities at CCITT, in the area of formal description techniques. Prior this role, he was involved in software design for the first Italian SPC systems. He is a senior member of IEEE, that he joined over 20 years ago. In the last 15 years he has held several leading roles and conducted a number of DLTs and DSPs. Currently he is the Director of the Sister and Related Societies of COMSOC. He has published over 100 papers in journals and magazines, six books including *The Disappearance of Telecommunications*, which was published in the USA by IEEE press, and several articles in the scientific section of daily newspapers. He has also delivered speeches and keynotes at many international conferences. At several stages in his career, Roberto has taught at Universities in Italy and around the world on the subject of Telecommunications, and most recently, on the New Economy.



PRADEEP RAY is a Senior Member of the Academic staff at the University of New South Wales, Australia. He is the founder of the Asia-Pacific ubiquitous Healthcare Research Centre (APuHC) aimed at conducting research on achieving ubiquitous healthcare using emerging technologies, such as the mobile broadband communication technologies. He is currently leading the WHO Research on the Assessment of e-Health for Health Care Delivery (eHCD) involving a number of countries in the

Asia-Pacific region (India, China, Vietnam and Philippines). Pradeep is also leading a number of international initiatives, such as the ITU-D/IEEE Mobile eHealth Initiative for Developing Countries and the Global Longitudinal Study on the Assessment of mHealth. He was also involved in the Rockefeller Foundation Mekong Basin Disease Surveillance (MBDS) project involving Thailand, Laos, Vietnam, Cambodia and part of China. As an active member of the Institute of Electrical and Electronic Engineers (IEEE), he has been involved in organising a number of international conferences, such as IEEE Globecom Symposia, IFIP/IEEE DSOM, APNOMS, IEEE/IEC EntNet@SUPERCOMM. Pradeep Ray is the Vice Chair of the IEEE Technical Committee on eHealth (eHealthTC) and the founder of IEEE Healthcom that is now the forum of discussions for the IEEE/ITU-D/WHO initiatives on e-Health and m-Health. He has been leading a number of collaborative research projects with reputed International Research Organisations, such as the Christian Medical College-Vellore, Indian Institute of Management-Calcutta and IIT-Kharagpur-India, University of British Columbia and Univ of Calgary-Canada, Norwegian Centre for Integrated Care and Telemedicine-Norway, JSU & SNHU USA, LORIA and INSA-Lyon France, National Taiwan University and NCCU Taiwan, Inje University in South Korea, Politecnico de Milano-Italy, University of Geneva-Switzerland, University of Karlsruhe-Germany, Netstar Australia, CDC USA and CDC Beijing, TRCL and Dhaka University-Bangladesh, HIV-NAT-Thailand and Westmead Children's Hospital, Australia. He has a Ph.D in Computing Sciences from the University of Technology, Sydney (UTS), Australia, Masters in Electrical Engineering from the Indian Institute of Technology, Kanpur, and a Bachelor of Electronics Engineering from BHU-IT, Banaras, India. He has more than ten years' experience in technical and management positions in International Information Technology Business Organisations. Pradeep Ray, listed as Marquis Who's Who of the World since 1999, has published more than hundred and fifty articles in international refereed journals and conferences. He has more than fifteen years' experience in course development and teaching of courses in Information Systems and Technology at postgraduate and under-graduate levels in universities and industry all over the world.



XUEMIN (SHERMAN) SHEN (M'97-SM'02-F'09) received the BSc degree from Dalian Maritime University, China, in 1982 and the MSc and Ph.D. degrees from Rutgers University, New Jersey, all in electrical engineering, in 1987 and 1990, respectively. He is a professor and University Research Chair, Department of Electrical and Computer Engineering, University of Waterloo, Canada. He was the associate chair for Graduate Studies from 2004 to 2008. His research focuses on resource management in interconnected wireless/wired networks, wireless network security, wireless body area networks, vehicular ad hoc and sensor networks. He is a coauthor/editor of six books, and has published more than 600 papers and book chapters in wireless communications and networks, control and filtering. He served as the Technical Program Committee Chair for IEEE VTC'10 Fall, the Symposia Chair for IEEE ICC'10, the Tutorial Chair for IEEE VTC'11 Spring and IEEE ICC'08, the Technical Program Committee Chair for IEEE Globecom'07, the general cochair for Chinacom'07 and QShine'06, the Chair for IEEE Communications Society Technical Committee on Wireless Communications, and P2P Communications and Networking. He also serves/served as the editor-in-chief for *IEEE Network*, *Peer-to-Peer Networking and Application*, and *JET Communications*; a founding area editor for IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS;

an Associate Editor for IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, *Computer Networks*, and *ACM/Wireless Networks*, etc.; and the guest editor for IEEE JSAC, *IEEE Wireless Communications*, *IEEE Communications Magazine*, and *ACM Mobile Networks and Applications*, etc. He received the Excellent Graduate Supervision Award in 2006, and the Outstanding Performance Award in 2004, 2007, and 2010 from the University of Waterloo, the Premier's Research Excellence Award (PREA) in 2003 from the Province of Ontario, Canada, and the Distinguished Performance Award in 2002 and 2007 from the Faculty of Engineering, University of Waterloo. He is a registered professional engineer of Ontario, Canada, an IEEE fellow, an Engineering Institute of Canada fellow, a Canadian Academy of Engineering fellow, and a distinguished lecturer of IEEE Vehicular Technology Society and Communications Society.



TAO ZHANG is the Chief Scientist for Smart Connected Vehicles at Cisco Systems and a Fellow of the IEEE. For over 25 years, he has been directing and conducting research and development in mobile Internet and vehicular networks. He holds 29 U.S. patents on wireless and vehicular networking and co-authored two books "Vehicle Safety Communications: Protocols, Security, and Privacy" and "IP-Based Next Generation Wireless Networks" published in 2012 and 2004 respectively by John Wiley & Sons. He was recently elected Chair of the IEEE Communications Society Technical Committee on Vehicular Networks and Telematics Applications, where he formerly served as Vice Chair. Dr. Zhang has served on the editorial board or as a guest editor for a number of IEEE and other journals.



JIA-CHIN LIN (S'95–M'98–SM'03) joined the Department of Electrical Engineering at National Chi Nan University (NCNU) in Taiwan as an Assistant Professor. In August 2004, he was promoted to serve as an Associate Professor. From July to August of 2004 and from August 2005 to July 2006, he held the visiting associate professorship in the Department of Electrical Engineering at Stanford University. In August 2006, he joined the faculty in the Department of Communication Engineering at National Central University (NCU) in Taiwan as an Associate Professor. In August 2008, he was promoted to serve as a Full Professor. In January 2011, he became a Distinguished Professor. Since August 2011, he has been serving as the Chairperson in the Department of Communication Engineering at NCU. Jia-Chin Lin has been serving as an Associate Editor for the IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY since 2008. He is serving as an Associate Editor for the IEEE SIGNAL PROCESSING LETTERS and as the Lead Guest Editor for the IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY (Special Issue on Telematics Advances for Vehicular Communication Networks) in 2011. He is a Fellow of the IET and a Senior Member of IEEE.



KWANG-CHENG CHEN received B.S. from the National Taiwan University in 1983, M.S. and Ph.D from the University of Maryland, College Park, United States, in 1987 and 1989, all in electrical engineering. From 1987 to 1998, Dr. Chen worked with SSE, COMSAT, IBM Thomas J. Watson Research Center, and National Tsing Hua University, in mobile communications and networks. Since 1998, Dr. Chen has been with National Taiwan University, Taipei, Taiwan, ROC, and is the Distinguished Professor and Deputy Dean in academic affairs for the College of Electrical Engineering and Computer Science, National Taiwan University. Dr. Chen actively involves organization of various IEEE conferences as General/TPC chair/co-chair. He has served editorship with a few IEEE journals and many international journals and served various positions in IEEE. Dr. Chen also actively participates and has contributed essential technology to various IEEE 802, Bluetooth, and 3GPP wireless standards. He has authored and co-authored over 250 technical papers and more than 20 granted US patents. He co-edits (with R. DeMarca) the book *Mobile WiMAX* published by Wiley 2008, and authors a book *Principles of Communications* published by River 2009, and co-author (with R.Prasad) another book *Cognitive Radio Networks* published by Wiley 2009. Dr. Chen is an IEEE Fellow and has received a number of awards including 2011 IEEE COMSOC WTC Recognition Award and co-authored a few award-winning papers published in the IEEE ComSoc journals and conferences. Dr. Chen's research interests include wireless communications and network science.