Technical Program at a Glance

Wednesday, Oct 21, 2015		
14:30-18:00	Registration	Xidian Hotel
Thursday, Oct 22, 2015		
08:30-09:00	Opening Ceremony	
09:00-10:00	Keynote Speech 1	Feedback in Wireless Networks: Recent Results & Discoveries (by Prof. H. Vincent Poor, Princeton University, USA)
10:00-10:20	Tea Break	
10:20-11:10	Keynote Speech 2	Advanced Spatial Modulation Techniques for MIMO Systems (by Prof. Erdal Panayirci, Kadir Has University, Istanbul, Turkey)
11:10-12:00	Keynote Speech 3	Design and Analysis of Coded Slotted Aloha (CSA) Scheme for Erasure Channels (by Prof. Jinhong Yuan, University of New South Wales, Australia)
12:30-14:00	Lunch	Xidian Canteen
14:00-15:30	Session 1	Chair: Xuming Fang
15:30-16:00	Tea Break	
16:00-17:30	Session 2	Chair: Feifei Gao
18:30-20:00	Banquet	Ziction Liberal Hotel
Friday, Oct 23, 2015		
08:30-09:20	Keynote Speech 4	A Non-Stationary IMT-A MIMO Channel Model for High Mobility Systems (Prof. Chengxiang Wang, Heriot-Watt University, UK)
09:20-10:10	Keynote Speech 5	Future Railway Mobile Communications (by Prof. Bo Ai, Beijing Jiaotong University)
10:10-10:30	Tea Break	
10:30-12:00	Session 3	Chair: Caijun Zhong
12:00-14:00	Lunch	Xidian Canteen
14:00-15:30	Session 4	Chair: Yuan Luo
18:30-20:00	Dinner	Xidian Hotel

Conference Venue: Third floor, West Annex Building, Xidian Library (西电图书馆西裙楼三楼会议厅).

Registration Desk Hours

Wednesday October 21, 2015: 14:30-18:00, Xidian Hotel

Thursday October 22, 2015: 08:00-11:00, Conference Venue

Keynote Speaker 1

Thursday, Oct 22, 2015, 09:00-10:00

H. Vincent Poor

Professor, IEEE Fellow, Princeton University, USA

Title: **Feedback in Wireless Networks: Recent Results & Discoveries**

Abstract: Although Shannon's work showed that feedback does not increase capacity in point-to-point communications, it is known to be quite useful in multi-terminal systems. Notably, feedback has long played a major role in the development of wireless networks, from its earliest and simplest uses in protocols such as Aloha, to its more sophisticated uses in advanced multiple-antenna systems. Recent years have seen a considerable research effort in this area, both on the practical uses of feedback and on the fundamental, and sometimes surprising, properties that it can impart to networks. This talk will review some of the latter developments, notably as they relate to the capacities of interference, broadcast and time-varying channels.

Bio: H. Vincent Poor is the Michael Henry Strater University Professor at Princeton University, where is also Dean of the School of Engineering and Applied Science. He has held visiting appointments at a number of other universities, including most recently at Stanford and Imperial College. His research interests are in the areas of information theory, statistical signal processing and stochastic analysis, and their applications in wireless networks, smart grid and related fields. An IEEE Fellow, Dr. Poor is a Member of the U. S. National Academy of Engineering and the U. S. National Academy of Sciences, and is a Foreign Member of the Royal Society. He received a Guggenheim Fellowship in 2002, and the IEEE Education Medal in 2005. Recent recognition of his work includes the 2014 URSI Booker Gold Medal, the 2015 EURASIP Athanasios Papoulis Award, and honorary doctorates from several universities in Asia and Europe.

Keynote Speaker 2

Thursday, Oct 22, 2015, 10:20-11:10

Erdal Panayirci

Professor, IEEE fellow, Kadir Has University, Istanbul, Turkey

Title: **Advanced Spatial Modulation Techniques for MIMO Systems**

Abstract: The use of multiple antennas at both transmitter and receiver sides has been shown to be an effective way to improve the capacity and reliability of single antenna wireless systems. A novel concept known as spatial modulation (SM) has been introduced recently as an alternative to these two MIMO transmission techniques. In this presentation, after a brief introduction of SM, first the performance of SM is presented. Then, a new MIMO transmission scheme, called space-time-block coded spatial modulation (STBC-SM) is introduced and its design and performance issues are discussed.

Bio: Erdal Panayirci (M'80–SM'91–F'2003–LF'2006) received the Diploma Engineering degree in Electrical Engineering from Istanbul Technical University, Istanbul, Turkey and the Ph.D. degree in Electrical Engineering and System Science from Michigan State University, USA. Currently, he is Professor of Electrical Engineering and Head of the Electronics Engineering Department at Kadir Has University, Istanbul, Turkey. Prof. Panayirci's recent research interests include communication theory, synchronization, advanced signal processing techniques and their applications to wireless electrical, underwater and optical communications. He has published extensively in leading scientific journals and international conference and co-authored the book Principles of Integrated Maritime

Surveillance Systems (Boston, Kluwer Academic Publishers, 2000). He spent the academic year 2008-2009 at the Department of Electrical Engineering, Princeton University, New Jersey, USA, working on new channel estimation and equalization algorithms for high mobility WIMAX and LTE systems. He has been the principal coordinator of a 6th and 7th Frame European project called NEWCOM (Network of Excellent on Wireless Communications) and WIMAGIC Strep project for two years, representing Kadir Has University. Prof. Panayirci was an Editor for IEEE Transactions on Communications in the areas of Synchronizations and Equalizations in 1995-2000. He served as a Member of IEEE Fellow Committee in 2005-2008. Presently he is Head of the Turkish Scientific Commission on Signals and Systems of URSI (International Union of Radio Science).

Keynote Spezker 3

Thursday, Oct 22, 2015, 11:10-12:00

Friday, Oct 23, 2015, 8:30-9:20

Jinhong Yuan

Professor, University of New South Wales, Sydney, Australia

Title: **Design and Analysis of Coded Slotted Aloha (CSA) Scheme for Erasure Channels**

Abstract: For the future machine-to-machine communications (M2M), efficient random multiple access protocols are required to accommodate a massive number of uncoordinated transmissions. It is known that packet contention is a critical issue for increasing the throughput in the uncoordinated transmissions. Thus, how to deal with packet contentions is the key for novel efficient multiple access schemes of future wireless communication networks. In this talk, we investigate the design and analysis of random multiple access schemes and coding techniques for the future machine to machine. We design the optimal coded slotted Aloha (CSA) scheme with repetition codes and maximum distance separable (MDS) codes under both packet erasure channels and slot erasure channels. We derive an upper bound on the throughput of CSA scheme. We show that our optimal distributions improve the maximum traffic load and enhance the throughput of the CSA scheme significantly. Moreover, we propose a Gaussian elimination (GE) aided successive interference cancellation (SIC) decoding (GE-SIC) method to further improve the throughput of the CSA scheme. We demonstrate that by introducing the GE decoding to recover packets that cannot be decoded by the SIC decoding, the peak throughput of CSA scheme can reach as high as 90%.

Bio: Jinhong Yuan (M'02--SM'11) received the B.E. and Ph.D. degrees in electronics engineering from the Beijing Institute of Technology, Beijing, China, in 1991 and 1997, respectively. From 1997 to 1999, he was a Research Fellow with the School of Electrical Engineering, University of Sydney, Sydney, Australia. In 2000, he joined the School of Electrical Engineering and Telecommunications, University of New South Wales, Sydney, Australia, where he is currently a Telecommunications Professor with the School. He has published two books, three book chapters, over 200 papers in telecommunications journals and conference proceedings, and 40 industrial reports. He is a co-inventor of one patent on MIMO systems and two patents on low-density-parity-check codes. He has co-authored three Best Paper Awards and one Best Poster Award, including the Best Paper Award from the IEEE Wireless Communications and Networking Conference, Cancun, Mexico, in 2011, and the Best Paper Award from the IEEE International Symposium on Wireless Communications Systems, Trondheim, Norway, in 2007. He is currently serving as an Associate Editor for the IEEE Transactions on Communications. He served as the IEEE NSW Chair of Joint Communications/Signal Processions/Ocean Engineering Chapter during 2011-2014. His current research interests include error control coding and information theory, communication theory, and wireless communications.

Keynote Speaker 4
Friday, Oct 23, 2015, 8:30-9:20

Chengxiang Wang

Professor, IET Fellow, SMIEEE, Advanced Wireless Technologies Lab, Heriot-Watt University, Edinburgh, UK

Title: A Non-Stationary IMT-A MIMO Channel Model for High Mobility Systems

Abstract: With the recent developments of high-mobility wireless communication systems, e.g., high-speed train (HST) and vehicle-to-vehicle (V2V) communication systems, the ability of conventional stationary channel models to mimic the underlying channel characteristics has widely been challenged. Measurements have demonstrated that the current standardized channel models, like IMT-Advanced (IMT-A) and WINNER II multiple-input multiple-output (MIMO) channel models, offer stationary intervals that are noticeably longer than those in measured HST channels. In this talk, we propose a non-stationary IMT-A channel model with time-varying parameters including the number of clusters, powers and delays of clusters, angles of departure (AoDs), and angles of arrival (AoAs). Based on the proposed non-stationary IMT-A channel model, important statistical properties such as the local spatial cross-correlation function (CCF) and local temporal autocorrelation function (ACF) are derived and analyzed. Simulation results demonstrate that the statistical properties vary with time due to the non-stationarity of the proposed channel model. An excellent agreement is achieved between the stationary interval of the developed non-stationary IMT-A channel model and that of relevant HST measurement data, demonstrating the utility of the proposed channel model.

Bio: Prof. Chengxiang Wang received the BSc and MEng degrees in Communication and Information Systems from Shandong University, China, in 1997 and 2000, respectively, and the PhD degree in wireless communications from Aalborg University, Aalborg, Denmark, in 2004. He has been with Heriot-Watt University, Edinburgh, UK since 2005, and was promoted to a Professor in Wireless Communications in 2011. He is also an Honorary Professor of the University of Edinburgh, UK. He was a Research Fellow at the University of Agder, Grimstad, Norway, from 2001-2005, a Visiting Researcher at Siemens AG-Mobile Phones, Munich, Germany, in 2004, and a Research Assistant at Technical University of Hamburg-Harburg, Hamburg, Germany, from 2000-2001. His current research interests include wireless channel modeling and 5G wireless communication networks. He has edited 1 book and published over 220 papers in refereed journals and conference proceedings.

Prof. Wang served or is serving as an Editor for 8 international journals including IEEE Transactions on Vehicular Technology (2011-now) and IEEE Transactions on Wireless Communications (2007-2009). He was the leading Guest Editor for IEEE Journal on Selected Areas in Communications, Special Issue on Vehicular Communications and Networks. He is also a Guest Editor for IEEE Journal on Selected Areas in Communications, Special Issue on Spectrum and Energy Efficient Design of Wireless Communication Networks. He served or is serving as a TPC member, TPC Chair, and General Chair for over 80 international conferences. He received the Best Paper Awards from IEEE Globecom 2010, IEEE ICCT 2011, ITST 2012, IEEE VTC 2013-Fall, and IWCMC 2015. He is a Fellow of the IET and a Senior Member of the IEEE.

Keynote Speaker 5
Friday, Oct 23, 2015, 9:20-10:10
Bo Ai
Professor, IET fellow, Beijing Jiaotong University

Title: **Future Railway Mobile Communications**.

Abstract: High-speed railway (HSR) has brought much convenience for peoples' travelling. To ensure safe and reliable operation of HSR, the train operation control system acts as a nerve center. To make such nerve center work well with less time delay, maintaining a reliable bidirectional communication link between the train and the ground, dedicated mobile communication systems such as GSM for railway (GSM-R) and LTE for railway (LTE-R) play key roles. Moreover, rapid growth of future railway services and applications such as real-time high-definition (HD) video surveillance has aroused 1 Gbps data transmission rate with 100 MHz bandwidth at least. Thus, higher frequency band such as mm-wave technique, the fifth generation (5G) technique and corresponding mobile communication network should be designed accordingly to provide high capacity and high data transmission rate for newly developed railway services and applications. In this presentation, the key techniques and challenges for GSM-R, LTE-R and the fifth generation technique such as massive MIMO implemented in HSR will be discussed.

Bio: Prof. Bo Ai received his Master degree and Ph. D. degree from Xidian University in China. He graduated from Tsinghua University with the honor of Excellent Postdoctoral Research Fellow at Tsinghua University in 2007. He was a visiting professor with Prof Andrea Goldsmith at EE Department, Stanford University in 2015. He is now working in State Key Lab of Rail Traffic Control and Safety at Beijing Jiaotong University as a full professor and Ph. D. candidate advisor. He is the Deputy Director of State Key Lab of Rail Traffic Control and Safety, and the Deputy Director of Modern Telecommunication Institute. He is one of the main responsible people for Beijing "Urban rail operation control system" International Science and Technology Cooperation Base, and the backbone member of the Innovative Engineering Based jointly granted by Chinese Ministry of Education and the State Administration of Foreign Experts Affairs.
He has authored/co-authored 6 books and published over 230 academic research papers in his research area. He has hold 21 invention patents. He has been the research team leader for 26 national projects and has won some important scientific research prizes. He has been notified by Council of Canadian Academies (CCA) that, based on Scopus database, Prof. Bo Ai has been listed as one of the Top 1% authors in his field all over the world. Prof. Bo Ai has also been Feature Interviewed by IET Electronics Letters. His interests include the research and applications of channel measurement and channel modeling, dedicated mobile communications for rail traffic.
Prof. Bo Ai is a Fellow of The Institution of Engineering and Technology (IET Fellow). He was as a Co-chair or a Session/Track Chair for many international conferences. He is an Editor of IEEE Transactions on Consumer Electronics and an Editorial Committee Member of the Wireless Personal Communications journal. He is the Lead Guest Editor for Special Issues on IEEE Transactions on Vehicular Technology, IEEE Antennas and Propagations Letters, International Journal on Antennas and Propagations. He has received many awards such as the Qiushi Outstanding Youth Award by Hong Kong Qiushi Foundation, the New Century Talents by the Chinese Ministry of Education, the Zhan Tianyou Railway Science and Technology Award by the Chinese Ministry of Railways, and the Science and Technology New Star by the Beijing Municipal Science and Technology Commission.

Session 1

1.1 General Hardware Framework of Nakagami m Parameter Estimator for Wireless Fading Channel
Xuhong Chen; Jiaxun Lu; Pingyi Fan

1.2 A Spatial-Temporal Correlation Model for High Mobility Wireless Channels
Liangliang Zhu; Zhaoyang Zhang; Huazi Zhang; Yu Zhang; Caijun Zhong

1.3 A 3D GBSM for High-Speed Train Communication Systems Under Deep Cutting Scenarios
Liu Feng; Pingzhi Fan; Chengxiang Wang; Ammar Ghazal

1.4 Effects of High Mobility on Resource Allocation in LTE Networks
Dadong Ni; Li Hao

1.5 Switching Rates of Selection Diversity and Switch-and-Stay Diversity on Mixed High-Speed Train Channels
Jing Zhao; Pingzhi Fan; Norman C Beaulieu; Xianfu Lei

1.6 Dynamic Channel Selections and Performance Analysis for High-Speed Train WiFi Network
Yawei Zhao; Yu Wu; Yaxiong Feng; Yuxin Zheng; Xuming Fang

Session 2

2.1 Generalized Signal Alignment for High Mobility OFDM Channels
Youlong Cao; Meixia Tao; Kangqi Liu

2.2 Structured Distributed Sparse Channel Estimation for High Mobility OFDM Systems
Qibo Qin; Bo Gong; Gui Lin; Xiang Ren; Wen Chen

2.3 Time Varying Channel Estimation for DSTC-based Relay Networks
Shun Zhang; Feifei Gao; Hongyan Li

2.4 Doppler Shift Estimation for High-Speed Railway Wireless Communication Systems with Large-Scale Linear Antennas
Dian Fan; Zhangdui Zhong; Gongpu Wang; Feifei Gao

2.5 Position-based ICI Elimination with Compressed Channel Estimation for SIMO-OFDM High Speed Train Systems
Xiang Ren; Wen Chen; Diandian Ren; Bo Gong; Qibo Qin; Gui Lin

2.6 Optimal Selection of Cooperative RAUs in HSR Based Distributed Antenna Systems and Mobile Relay with Massive Antennas
Ziyue Liu; Pingzhi Fan

Session 3

3.1 A Compensation-based User Scheduling for MU-MIMO Systems with Delayed Feedback CSI
Xiang Chen; Feng-Kui Gong; Guo Li

3.2 Outage Performance of SWPIT-enabled Two-Way Relay Networks

Ruihong Jiang; Ke Xiong; Pingyi Fan; Zhangdui Zhong

3.3 Spectrum-Efficient Index Modulation with Improved Constellation Mapping
Xiaoxiang Yang; Zhaoyang Zhang; Panyu Fu; Jing Zhang

3.4 Block Markov Superposition Transmission for High-speed Railway Wireless Communication Systems
Leijun Wang; Yunhong Zhang; Xiao Ma

3.5 Position-Based Diversity and Multiplexing Analysis for High Speed Railway Communications
Xuhong Chen; Shanyun Liu; Pingyi Fan

3.6 Obtaining Diversity Gain by Block Markov Superposition Transmission
Jinshun Zhu; Xiao Ma

Session 4

4.1 Construction of LDPC Codes Based on Resolvable Group Divisible Designs
Hengzhou Xu; Dan Feng; Cheng Sun; Baoming Bai

4.2 Gallager Mapping Based Constellation Shaping for LDPC-Coded Modulation Systems
Dan Feng; Qi Li; Baoming Bai; Xiao Ma

4.3 Spatial Coupling of RUN Codes Via Block Markov Superposition Transmission
Chulong Liang; Xiao Ma; Baoming Bai

4.4 Rateless Spinal Code for Decode-and-Forward Relay Channel
Xiaopu Yu; Ying Li; Weiqiang Yang

4.5 Design of BICM-ID for Two-Way Relay Channels
Li Chen; Yushan Yakufu; Xiaojun Yuan; Zichao Sun

4.6 Threshold Optimization for ISI-free Region Detection in High-Mobility Fading Channels
Chenchen Zhang; Xuejun Chen; Yuan Luo