

# China-Japan Object Social Modeling Seminar

China-Japan Object Social Modeling Seminar will be held in 10, Aug. 2015. There will be 15 speakers to make a speech. You can get the speaker, title, abstract and speaker's biography of each report below.

Speaker	Institution	Report Title
Tadashi Dohi	Hiroshima University	<a href="#">Optimal Power-Aware Design in a Cluster System:Markov Decision Process Approach</a>
Sozo Inoue	Kyushu Institute of Technology	<a href="#">Smart Sensing for Understanding Nursing Activities and Smart Energy Applications</a>
Yukikazu Nakamoto	University of Hyogo	<a href="#">Exploring a Uniform Framework for Mobile Collaborative Work Support Platform</a>
Yoshiaki Kakuda	Hiroshima City University	<a href="#">Integrated Real-Time Self-Organized Control for Transmission Interval and Power in Autonomous Clustering of Mobile Ad Hoc Networks</a>
QunJin	Waseda University	<a href="#">Personal Analytics and Unified Individual Modeling</a>
Jianhua Ma	Hosei University	<a href="#">Digital Explosions and Digital Clones</a>
Masayuki Arai	Nihon University	<a href="#">Reliability Improvement of Multi-Path Routing for Wireless Sensor Networks and Its Application to Wormhole Attack Avoidance</a>
Mamoru Ohara	Tokyo Metropolitan Industrial Technology Research Institute	<a href="#">Optimal Allocation of Storage Resources in Multi-Version Cloud Storage Services</a>
Weishan Zhang	China University of Petroleum (East China)	<a href="#">An in-Depth Context-Awareness Framework for Pervasive Video Cloud</a>
Qinghua Lu	China University of Petroleum (East China)	<a href="#">A Performance Prediction Model for Deployment of Cross Data Center Big Data Analytics</a>
Zhangbing Zhou	China University of Geosciences (Beijing)	<a href="#">An Energy Efficient Routing Protocol for Underwater WSNs</a>
Xiong Luo	University of Science and Technology Beijing	<a href="#">Web Service QoS Prediction Based on Adaptive Dynamic Programming Using Fuzzy Neural Networks for Cloud Services</a>
Xuanxia Yao	University of Science and Technology Beijing	<a href="#">A Dynamic Trust Model Based on the Weight for VANET</a>
Yunchuan Sun	Beijing Normal University	<a href="#">Internet of Things for Smart Towns</a>
Jianwen Xiang	Wuhan University of Technology	<a href="#">Analysis of dynamic relevancy and its impact in coverage models</a>

**Report one****Speaker:** Professor Tadashi Dohi, Hiroshima University, Japan**Title:**

Optimal Power-Aware Design in a Cluster System: Markov Decision Process Approach

**Abstract:**

Dynamic power management (DPM) plays a significant role to save the power consumption effectively in both design and operational phases of computer-based systems. Especially, it is well known that the state-dependent control policy by monitoring the energy state in each component or the whole system is efficient for power saving in server systems whose system state such as transaction request can be completely observed. In this paper we consider an optimal power-aware design in a cluster system and formulate the DPM problem by means of the Markov decision process. We derive the dynamic programming equation for the optimal control policy which maximizes the expected number of requests processed per unit electrical power, and give the policy iteration algorithm to determine the optimal control policy sequentially. In a numerical

example, we consider a cluster system with two service nodes and describe the arrival stream of the transaction request process by a Markov modulated Poisson process. It is shown that the optimal control policy maximizing the expected number of requests processed per unit electrical power is given in the form of decision table.

**Speaker's Biography:**

Tadashi Dohi received the B.E., M.S. and Dr. of Engineering degrees from Hiroshima University, Japan, in 1989, 1991 and 1995, respectively. In 1992 and 2000, he was a Visiting Researcher in the Faculty of Commerce and Business Administration, University of British Columbia, Canada, and Hudson School of Engineering, Duke University, USA, respectively, on the leave absent from Hiroshima University. Since 2002, he has been working as a Full Professor in the Department of Information Engineering, Graduate School of Engineering, Hiroshima University, Japan. His research areas include Reliability Engineering, Software Reliability, Dependable Computing, Performance Evaluation, Computer Security and Operations Research. He is a Regular Member of ORSJ, IEICE, IPSJ, REAJ, IEEE Computer Society, and IEEE Reliability Society. He published over 210 journal papers, 270 peer-reviewed conference papers, 28 book chapters, and edited 20 books/proceedings in the above research area. Dr. Dohi served as the General Chair of several international conferences; AIWARM 2004, AIWARM 2006, AIWARM 2008, APARM 2010, APARM 2012, IEEE MENS 2010, IEEE ISSRE 2011, IEEE ATC 2012, QR2MSE 2014, and as the Program Committee Chair of RASOR 2005, RASOR 2007, PRDC 2013. He has worked as a Program Committee Member in some international premier conferences such as IFIP/IEEE DSN, IEEE ISSRE, IEEE COMPSAC, IEEE SERE,

IEEE PRDC, IEEE HASE, ACM SAC, ACM RACS, ICSEA, MMR, MIMAR, ICORES, among so many others. He is an Associate Editor/Editorial Board Member of Asia-Pacific Journal of Operational Research, International Journal of Industrial Engineering, Journal of Risk and Reliability, International Journal of Reliability and Quality Performance, International Journal of Quality, Statistics, and Reliability, International Journal on Computer Science and Technology, Advanced Science and Technology Letters.

## **Report Two**

**Speaker:** Professor Sozo Inoue , Kyushu Institute of Technology, Japan

### **Title:**

Smart Sensing for Understanding Nursing Activities and Smart Energy Applications

### **Abstract:**

In this talk, we talk the state of the art of pervasive sensing technology and its applications, including understanding nursing processes in hospitals, and helping households to recognize daily

activities related to energy consumption. Recent deployment of light-weight sensors equipped with wireless networking or embedded in smart phones made it possible to recognize and understand the activities and contexts of the users. If we can compile them in an understandable manner to the users, we can expect various applications such as in healthcare and energy management domains. In this new horizon of technology, we introduce the state of the art of the research, including utilization and improvement of machine learning methods, such as being robust for labels with uncertain segments, or utilizing periodical information for daily activities. Moreover, we also introduce the activity of collecting and providing a large-scale dataset for activity recognition, such as a mobile accelerator open dataset with about 35,000 activity data from more than 200 subjects, nurses' sensor data combined with 100 patients' sensor data and medical records, and 34 households' light sensor data set for 4 months combined with smart meter data.

### **Speaker's Biography:**

Sozo Inoue is an associate professor in Kyushu Institute of Technology, Japan. His research interests include human activity recognition with smart phones, and healthcare application of web/pervasive/ubiquitous systems. Currently he is working on verification studies in real field applications, and collecting and providing a large-scale open dataset for activity recognition, such as a mobile accelerator dataset with about 35,000 activity data from more than 200 subjects, nurses' sensor data combined with 100 patients' sensor data and medical records, and 34 households' light sensor data set for 4 months combined with smart meter data. Inoue has a Ph.D of Engineering from Kyushu University in 2003. After completion of his degree, he was appointed as an assistant professor in the Faculty of Information Science and Electrical Engineering at the Kyushu University, Japan. He then moved to the Research Department at the Kyushu University Library in 2006. Since 2009, he is appointed as an associate professor in the Faculty of Engineering at Kyushu Institute of Technology, Japan. Meanwhile, he was a guest professor in Kyushu University, and a visiting professor at Karlsruhe Institute of Technology, Germany, in 2014. He is a member of the IEEE Computer Society, the ACM, the Information Processing Society of Japan (IPSJ), the Institute of Electronics, Information and Communication Engineers (IEICE), the Japan Society for Fuzzy Theory and Intelligent Informatics, the Japan Association for Medical Informatics (JAMI), and the Database Society of Japan (DBSJ). Contact him at sozo@acm.org; 1-1 Sensui-cho, Tobata-ku, Kitakyushu, 804-8550, Japan.

### **Report Three**

**Speaker:** Professor Yukikazu Nakamoto, University of Hyogo, Japan

**Title:**

Exploring a Uniform Framework for Mobile Collaborative Work Support Platform

**Abstract:**

We present a framework for a mobile collaborative work support platform.

Those collaboration works that we focus on include activities that people do for some purposes not only in an organization, but in not an organization such as relief centers in a disaster.

We described the specification, the implementation overview, and the lesson learned of a collaborative work support system platform for Android devices using a data stream management system.

From learned lesson to the development, we considered that the graph database model was suitable for the collaborative work group support and presented the initial design issues of collaborative work group support using the graph database.

We believe that those frameworks are effective not only in the mobile environments but in the cloud.

**Speaker's Biography:**

Yukikazu Nakamoto received M.E. and Ph.D. degrees from Osaka University in 1982 and 2000, respectively. From 1982 to 2004, he worked for NEC Corporation.

He led research and development of embedded software, including Java and Linux for mobile phone, OS for the International Space Station and IC Card. In 2004, he joined the University of Hyogo and is currently a Professor of Graduate School of Applied Informatics. From 1990 to 1991, he was a Visiting Researcher at Cornell University. Since 2006, he has been a Designated Professor of the Center for Embedded Computing Systems, in the Graduate School of Information Science, Nagoya University. His research interests include real-time systems, distributed systems, mobile systems, and software development environments.

## **Report Four**

**Speaker:** Professor Yoshiaki Kakuda, Hiroshima City University, Japan

**Title:**

Integrated Real-Time Self-Organized Control for Transmission Interval and Power in Autonomous Clustering of Mobile Ad Hoc Networks

**Abstract:**

As the IoT and M2M technologies grow, the volume of traffic among communication devices for computing, sensing and so on tremendously increases and its variation becomes big and unpredictable. To cope with such recent network environments, we have proposed a novel concept of assurance networks. We have also presented the unified design methodology for assurance networks. The methodology consists of autonomous network structure hierarchization and real-time self-organized control. It can be applied to dynamic networks in which network size is huge and network environments frequently change. A mobile ad hoc network (MANET) is a typical one of such dynamic networks. Autonomous clustering is an example of autonomous network structure hierarchization applied for MANET and real-time self-organized transmission interval control and real-time self-organized transmission power control for autonomous clustering are examples of real-time self-organized control applied for MANET. In my talk, we introduce autonomous clustering and its individual real-time self-organized control for transmission interval and power and propose integrated real-time self-organized control for transmission interval and power in MANET autonomous clustering. In the proposed integrated real-time self-organized control, both the interval and the power for transmission of control packets are simultaneously adjusted for adapting them to variation of node mobility and node density in MANET.

**Speaker's Biography:**

Yoshiaki Kakuda received the B.E., M.Sc., and Ph.D. degrees from Hiroshima University, Japan, in 1978, 1980 and 1983, respectively. From 1983 to 1991, he was with Research and Development Laboratories, Kokusai Denshin Denwa Co., Ltd. (KDD). He joined Osaka University from 1991 to 1998 as an Associate Professor. He is currently a Professor in the Graduate School of Information Sciences, Hiroshima City University, since 1998. His current research interests include network software engineering, assurance networks and mobile ad hoc networks. He is a member of IEEE (U.S.A), IEICE (Japan) and IPSJ (Japan). He has published over 200 journal and international conference papers. He has served as program chairs of several international conferences and program committee members of many international conferences. He has organized International Workshop on Assurance in Distributed Systems and Networks (ADSN) for fourteen years as a Vice Chair. He has served as a General Chair for ATC-2014. He has presented keynote speeches on assurance networks at MENS2010 and ICNC2010 and introduced technologies for assurance networks as a panelist at ADSN 2013 and ATC-2014.

## **Report Five**

**Speaker:** Professor Qun Jin, Waseda University, Japan

**Title:**

Personal Analytics and Unified Individual Modeling

**Abstract:**

Living in a highly developed information society, which features a kind of seamless integration of cyber, physical and social spaces, our daily life can be easily captured and recorded in digital form, which is called life log. Life log is a kind of personal data, and long-term accumulating of life log for an individual becomes big data. Personal data is created by and about an individual person directly or indirectly. By applying analytics to personal data, we can understand what the data says about the operation of a person and build an individual model for the person. In this talk, a unified approach to personal analytics and individual modeling based on personal data will be described and discussed. And our vision on individualized sustainable use of personal data in pursuit of timeless value will be introduced.

**Speaker's Biography:**

Qun Jin is currently a tenured full professor of the Department of Human Informatics and Cognitive Sciences, Faculty of Human Sciences, Waseda University, Japan. He has been engaged extensively in research works in the fields of computer science, information systems, and social and human informatics. He seeks to exploit the rich interdependence between theory and practice in his work with interdisciplinary and integrated approaches. His recent research interests cover human-centric ubiquitous computing, human-computer interaction, behavior and cognitive informatics, big data, personal analytics and individual modeling, MOOCs and learning analytics, and computing for well-being. He is a member of the IEEE, IEEE CS, ACM, IEICE, IPSJ, JSAI, and CCF.

## **Report Six**

**Speaker:** Professor Jianhua Ma, Hosei University

**Title:**

Digital Explosions and Digital Clones

**Abstract:**

Advances in information and communication technology (ICT) not only offer us novel digital services, but also transport us to new worlds, the digital cyber world and the cyber-physical-social integrated hyper world. These new worlds possess new fundamental characteristics including digital explosions of data, connectivity, service and intelligence, providing new ways to study humanity, even digitally clone humans. This talk sets out to explain these digital explosions by examining the history of information revolutions, and also to discuss digital clones based on our preliminary study on the cyber-individual (Cyber-I).

**Speaker's Biography:**

Jianhua Ma is a professor of the Department of Digital Media in Faculty of Computer and Information Sciences at Hosei University, Japan. Previously, he had 15 years' working experience at NUDT, Xidian University and University of Aizu (Japan). His research interests include multimedia, networks, ubiquitous computing, social computing, and cyber intelligence. He has published over 200 papers, and edited over 20 books/proceedings and over 20 journal special issues. He is a co-founder of IEEE Int'l Conf. on Ubiquitous Intelligence and Computing (UIC), IEEE Conf. on Cyber, Physical and Social Computing (CPSCom), and IEEE Conf. on Internet of Things (iThings).

**Report Seven****Speaker:** Professor Masayuki Arai, Nihon University, Japan**Title:**

Reliability Improvement of Multi-Path Routing for Wireless Sensor Networks and Its Application to Wormhole Attack Avoidance

**Abstract:**

Wireless sensor networks have recently been widely studied and applied in long-term mission-critical environments, where reliable delivery of sensing information under multiple node failure is required. In this study we discuss tabu-list-based multi-path routing which guarantees that multiple copies of events are delivered through completely different paths, without requiring additional communications to exchange path information. Toward development of attack-tolerant multi-path routing, we also investigate the effects of wormhole attacks and location-aware wormhole detection scheme.

**Speaker's Biography:**

Masayuki Arai received his B.E., M. E., and Ph. D. degrees in 1999, 2001, and 2005, respectively, all from Tokyo Metropolitan University, Japan. After working at the same university as research associate and assistant professor; currently he is an assistant professor at College of Industrial Technology, Nihon University, Japan. His research interest includes dependable networking and VLSI testing.

## **Report Eight**

**Speaker:** Professor Mamoru Ohara, Tokyo Metropolitan Industrial Technology Research Institute, Japan

**Title:**

Optimal Allocation of Storage Resources in Multi-Version Cloud Storage Services

**Abstract:**

In recent years, data replication has received attention in terms of tolerance for large-scale disasters. Also, file versioning features, by which more than one version of a file can be maintained, have been commercially available in many cloud storage services. In this talk, we discuss a cloud storage service having both replication and file versioning features. For providing the both features with limited storage resources, it is essential to divide the resources among versions in accordance with the varied needs of numerous users, as well as to fulfill dependability requirements, e.g., the minimum redundancy of each version. We focus on applications in which newer versions of a file are more likely to be requested; this assumption may be common in many classes of applications. We propose a new distributed data replication protocol with which users can manage an explicitly defined number of versions according to the needs. We also construct an analytical model that can derive an optimal allocation of the resources.

**Speaker's Biography:**

Mamoru Ohara received his B.E., M.E., and Ph. D degrees from Tokyo Metropolitan University respectively in 2001, 2003, and 2006. He is currently employed as a senior researcher by Tokyo Metropolitan Industrial Technology Research Institute and supports product developments in small and medium businesses. He is interested in dependability of parallel and distributed systems and embedded systems. He is also a visiting researcher at Tokyo Metropolitan University. Currently he joins work for juxtaposing electrical energy systems and information communication, which will be required in smart communities.

**Report Nine**

**Speaker:** Professor Weishan Zhang, China University of Petroleum (East China), China

**Title:**

An in-Depth Context-Awareness Framework for Pervasive Video Cloud

**Abstract:**

We claim that context-awareness for big data should be more in-depth than that of classical one, due to complexities of big data. Intelligent video data processing based on video cloud plays an important role for some applications such as public security and transportation. The existing work on context-awareness can not work properly on pervasive video cloud due to the intrinsic complexities of big video data. Therefore, in this paper we propose an in-depth context-awareness framework for pervasive video cloud in order to know the underlying contexts in big video data, based on deep learning techniques. We have conducted initial evaluations to show the effectiveness of the proposed approach, including the prediction of workload for cloud nodes, and the recognition of targets in the video at real time.

**Speaker's Biography:**

Weishan Zhang is a professor, deputy head for research of Department of Software Engineering, China University of Petroleum. His main research focuses are big data processing, cloud computing, internet of things, and software engineering. He was a Research Associate Professor/Senior Researcher at Computer Science Department, University of Aarhus (til Dec. 2010). He visited Department of Systems and Computer Engineering, Carleton University, Canada (Jan. 2006 - Jan. 2007). He was an Associate Professor at School of Software Engineering, Tongji University, Shanghai, China (Aug. 2003- June 2007). He was a NSTB post-doctoral research fellow at Department of Computer Science, National University of Singapore (Sept. 2001 to Aug. 2003). His current H-index is 13, I10-index is 18, and the number of total citations is over 500 in Jan 2015.

**Report Ten**

**Speaker:** Dr. Qinghua Lu, China University of Petroleum (East China), China

**Title:**

A Performance Prediction Model for Deployment of Cross Data Center Big Data Analytics

**Abstract:**

Big data has become an IT trend which aims to improve intelligence of services provided by business and government organizations. Massive data are processed on cluster nodes in parallel. However, when the source data is widely geo-distributed in multiple data centers, the traditional approaches usually move massive data to one data center and then process the data, which is often limited by data size and network transmission capacity. We propose a performance prediction model which can analyze performance of different deployment architecture for cross data center big data analytics. We evaluate the correctness of the model by comparing the estimated results with the experiment results on Amazon EC2.

**Speaker's Biography:**

Dr. Qinghua Lu is a lecturer at Department of Software Engineering, China University of Petroleum and a visiting researcher of NICTA, Australia. She received her PhD from University of New South Wales (UNSW) in 2013. Her research interests include deployment of big data analytics, dependability of cloud computing, and service engineering.

## **Report Eleven**

**Speaker:** Professor Zhangbing Zhou, China University of Geosciences (Beijing), China

**Title:**

An Energy Efficient Routing Protocol for Underwater WSNs

**Abstract:**

A routing protocol, which is not expensive in packets forwarding and energy consumption, is fundamental for sensory data gathering and transmitting in underwater wireless sensor networks (UWSNs). To address this challenge, this paper proposes E-CARP, which is an enhanced version of the Channel-Aware Routing Protocol (CARP), to achieve the location-free and greedy hop-by-hop packet forwarding strategy. Generally, CARP does not consider the reusability of previously collected sensory data to support certain domain applications in the following, which induces data packets forwarding which may not be beneficial to applications. Besides, the PING-PONG strategy in CARP could be simplified for selecting the most appropriate relay node at each time point, when the network topology is relatively steady. These two research problems have been addressed by our E-CARP. Simulation results validate that our technique can decrease the communication cost significantly and increase the network capability to a certain extent.

**Speaker's Biography:**

ZhangBing Zhou received the Ph.D. degree in Digital Enterprise Research Institute, from National University of Ireland, Galway, Ireland, in 2010. Until April 2011, he was a Post-Doctoral Researcher in the Computer Science Department, TELECOM SudParis, France. Since September 2011, he joined the China University of Geosciences (Beijing), China as an associate professor, and an adjunct associate professor at the Computer Science Department, TELECOM SudParis, France. His research interests include Service-Oriented Computing, Process-Aware Information Systems, and Wireless Sensor Networks. He had published over 80 papers in related conferences, journals, and books in these areas. He had been awarded the Outstanding Service Award of IEEE iThings 2013 as Executive Chair, and the Outstanding Service Award of ComComAP 2014 as General Co-Chair. He has been serving as Guest Editors for Journal of Network and Computer Applications, Personal and Ubiquitous Computing, The Computer Journal, International Journal of Distributed Sensor Networks, Journal of Internet Technology. He served as more than 20 various Co-Chair for international conferences/workshops, e.g. Steering and Executive Chair for IEEE iThings 2013/2014, Publicity Co-Chair for ICSOC 2014, Program Co-Chair for IEEE ATC 2015, Technical Program Co-Chairs for ISITC 2015, and TPC members of more than 50 conferences. He is a member of IEEE and ACM.

## **Report Twelve**

**Speaker:** Professor Xiong Luo and Master Yixuan Lv, University of Science and Technology Beijing, China

**Title:**

Web Service QoS Prediction Based on Adaptive Dynamic Programming Using Fuzzy Neural Networks for Cloud Services

**Abstract:** With the increasing presence of web services used in cloud computing, the Quality of Service (QoS) prediction plays an important role in the implementation of web service for intelligence support cloud applications. In this talk, motivated by the adaptive critic design and Q-learning technique, we propose an effective QoS prediction approach through the combination of fuzzy neural networks (FNNs) and adaptive dynamic programming (ADP), i.e., an online learning scheme. This approach extracts fuzzy rules from QoS data and employs ADP method to parameter tuning of the fuzzy rules. Experimental results on a large-scale web service QoS data set verify the prediction accuracy of our proposed approach.

**Speaker's Biography:**

1) Xiong Luo currently works as an Associate Professor and Acting Head of the Department of Computer Science and Technology, University of Science and Technology Beijing, China. From 2005 to 2006, he was with the Department of Computer Science and Technology, Tsinghua University, China, as a Postdoctoral Fellow. From 2012 to 2013, he was with the School of Electrical, Computer and Energy Engineering, Arizona State University, USA, as a Visiting Scholar. His research interests include computational intelligence and machine learning for big data.

2) Yixuan Lv is currently working toward his Master's degree at the University of Science and Technology Beijing, China. His research interests include adaptive dynamic programming and computational intelligence.

### **Report Thirteen**

**Speaker:** Professor Xuanxia Yao, University of Science & Technology Beijing, China

**Title:**

A Dynamic Trust Model Based on the Weight for VANET

**Abstract:**

With the rapid development of networking, communication, embed technologies and automobile industry, more and more vehicles are quipped with smart devices or modules, which make them can communicate with each other and form Vehicular Ad hoc Networks (VANET) to reduce traffic accident, improve traffic efficiency and safety. As a distributed system, VANET is with the characteristics of dynamics and ephemeral, which make the nodes in it are lack of trust for each other and facing many security threat. To deal with these problems, a dynamic trust model based on the weight is proposed according to the diversity of data and the roles of vehicles in VANET. The simulation results show that the trust model can enhance the security of the routing protocol GPSR with low delay and high success delivery rate.

**Speaker's Biography:**

Xuanxia Yao received her B.S. degree in computer application from Jiangsu University, M.S. and Ph.D. degree in computer application from University of Science and Technology Beijing (USTB), China, in 2002 and 2009. She is a member of CCF (China Computer Federation).

From 1994 to 1999, she was a research assistant with the computer center in Luoyang Mining Machinery Institute of Technology. Since 2009, she has been an associate professor with School of Computer and Communication Engineering, USTB. She is the author of one book, more than 20 articles. Her research interests include network security, trusted computing, the security issues in Internet of Things and cloud computing.

## **Report Fourteen**

**Speaker:** Professor Yunchuan Sun, Beijing Normal University, China

**Title:**

Internet of Things for Smart Towns

**Abstract:**

Different from big cities, small towns call for culture preservation in addition to revitalization. IoT technologies could potentially serve this need. This article develops an IoT architecture, and choose best IoT enabling technologies, and IoT services, applications, and standards, towards this goal. The purpose of this article is to introduce a novel concept called "smart town" whose vision is to improve livability, preservation, revitalization, and sustainability, of a small town, different from so-called smart cities. In this article, we and shed light on the opportunities and challenges of applying IoT to culture preservation and revitalization of smart towns. We expect that the intelligent use of IoT could breathe new life into traditional, close-knit culture of small towns.

**Speaker's Biography:**

Yunchuan Sun is currently *an associate professor in Beijing Normal University, Beijing, China*. He acts as *the Secretary of the IEEE Communications Society Technical Subcommittee for the Internet of Things* from Jan. 2013. He also acts as *associate editor of the Springer journal Personal and Ubiquitous Computing* since Jan. 2012. He received his PhD from the Institute of Computing Technology, Chinese Academy of Science, Beijing China in 2009. His research interests include Big Data Modeling and Analysis, Event-linked Network, Internet of Things, Semantic Technologies, Knowledge Engineering, Information Security.

## **Report Fifteen**

**Speaker:** Professor Jianwen Xiang, Wuhan University of Technology, China

**Title:**

Analysis of dynamic relevancy and its impact in coverage models

**Abstract:**

This talk addresses the issue of dynamic relevancy and its impact in systems with imperfect fault coverage (IFC). In fault-tolerant systems, a single not-covered component fault may thwart the automatic recovery mechanisms, and lead to a system or subsystem failure. The models that consider the effects of IFC are known as coverage models (CMs). In traditional CMs, the system is usually assumed to be coherent in which each component is relevant in the initial system state, and thus the coverage (including identification and isolation) is typically limited to faulty components regardless of their relevancies. However, the assumption on initial relevancy does not guarantee the dynamic relevancy because an initially relevant component could become irrelevant later due to the failures of other components. In the traditional CMs, an operational but irrelevant component will not be isolated, and may threaten the system by its future not-covered failures. We propose the irrelevancy coverage model (ICM) to cover the irrelevant components in addition to the faulty components. In the ICM, a component will be isolated from the system whenever it becomes irrelevant (even it is not failed), such that its future not-covered failures will not affect the system anymore. By incorporating the coverage of irrelevant components, the ICM opens up a new cost-effective approach to improve system reliability without additional redundancy.

**Speaker's Biography:**

Jianwen Xiang received Ph.D. degrees from Wuhan University and from Japan Advanced Institute of Science and Technology (JAIST) in 2004 and 2005, respectively. He is currently a Professor of the School of Computer Science and Technology of Wuhan University of Technology, and he was an assistant manager at NEC Corporation (2008 ~ 2014), a special researcher at National Institute of Advanced Industrial Science and Technology (AIST, 2007 ~ 2008), and a postdoc researcher at JAIST (2005 ~ 2007). His research interests include dependable computing, formal methods, and ubiquitous computing.