DSA 2017 Session Schedule

Monday, October 30, 2017		
13:00-22:00	Registration	Foyer
17:00-18:30	Dinner	Dining Room

Tuesday, October 31, 2017		
7:30-8:30	Registration	Foyer
8:30-12:00	● Tutorial *Reliability Evaluation for Complex Software System: Methodology and Practice – Part I* Russell W. Morris Morris Consulting, USA	He Hall
10:00-10:20	Coffee Break	Foyer
12:00-13:00	Buffet Lunch	Dining Room
13:30-17:30	● Tutorial *Reliability Evaluation for Complex Software System: Methodology and Practice – Part II* Russell W. Morris Morris Consulting, USA	He Hall
15:00-15:20	Coffee Break	Foyer
18:00-19:30	Buffet Dinner	Dining Room

Wednesday, November 1, 2017		
7:30-9:00	Registration	Foyer
9:00-9:30	Opening Ceremony ● General Chair: Ming Gao (Technology & Engineering Center for Space Utilization, CAS) ● President of IEEE RS : Jeff Voas (IEEE Reliability Society, USA) ● Program Committee Chairs: Guangheng Zhao (Technology & Engineering Center for Space Utilization, CAS) Sudipto Ghosh (Colorado State University, USA) Zhenyu Chen (Nanjing University, China)	International Ballroom
9:30-9:50	● Opening Speech Huimin Lin (Institute of Software Chinese Academy of Sciences, China)	International Ballroom
9:50-10:40	● Keynote Speech I *Networks of 'Things'* Jeff Voas IEEE Reliability Society, USA	International Ballroom

10:40-10:50	● Announcement by Local Chair Jinbo Wang (Technology & Engineering Center for Space Utilization, CAS)	International Ballroom
10:50-11:10	Coffee Break Collective photo	Foyer Hotel entrance
11:10-12:00	● Keynote Speech II *Unmanned Aircraft System Reliability* Russell W. Morris Morris Consulting, USA	International Ballroom
12:00-13:00	Buffet Lunch Poster Session I	Dining Room
13:30-15:30	● Session I: Formal Methods and Testing	International Ballroom-A
13:30-15:30	● Session II: Security and Dependable System	International Ballroom-B
13:30-15:30	● Session III: Data processing and Applications	Juhe Hall
13:30-15:30	● Software Reliability Technology Summit ● Moderator : W. Eric Wong ● Subject I: Automated Software Testing 　　　Software Quality Evaluation Expert: Jeff Voas, Russ Morris, Sudipto Ghosh, Xiaoying Bai , Zhenyu Chen	He Hall
15:30-15:40	Coffee Break	Foyer
15:40-17:00	Session IV: Fault diagnosis	International Ballroom-A
15:40-17:00	Session V: Software design and testing	International Ballroom-B
15:40-17:30	● Software Reliability Technology Summit ● Moderator: W. Eric Wong ● Subject II: Embedded Software Testing 　　　New Technique Application Expert: Jeff Voas, Russ Morris, Sudipto Ghosh, Xiaoying Bai , Zhenyu Chen	He Hall
18:00-20:00	Buffet Dinner	Dining Room

Thursday, November 2, 2017		
8:00-9:00	Registration	Foyer
9:00-10:00	● Keynote Speech III *Formalized Engineering Mathematics and Next Generation AI* Gang Chen Beijing Jinghang Research Institute of Computing and	International Ballroom

	Communication	
10:00-10:20	Coffee Break	Foyer
10:20-11:20	● Keynote Speech IV *Condition Design for Software Testing* Ke Han Institute of Information Technology, HGS, China	International Ballroom
11:30-12:30	Buffet Lunch Poster Session II	Dining Room
13:00-15:00	Discussion: FPGA testing application Chair: Gang Chen	International Ballroom-A
13:00-15:00	Discussion: Software testing application Chair: Qingmin Yue	International Ballroom-B
15:00-15:10	Coffee Break	Foyer
15:30-16:30	Closing Ceremony	International Ballroom
17:30-20:00	Buffet Dinner	Dining Room

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12:00-13:00		Buffet Lunch Poster Session I	Dining Room
13:30-15:30	●	Session I: Formal Methods and Testing Chair: Jianwen Xiang ➢ Mutation Testing based Evaluation of Formal Verification Tools, Arun Chakrapani Rao, Abdul Raouf, Gunwant Dhadyalla and Vijay Pasupuleti. ➢ A method of false alarm recognition based on k-nearest neightbor. Fei Guan, Junyou Shi, Xiaodong Ma, Weiwei Cui and Jie Wu. ➢ Formalization of Laplace Transform in Coq, Yifei Wang and Gang Chen. ➢ Logical Combination Index Table Based Model and Heuristics for Combinatorial Testing. Peng Lin, Xiaojuan Wang and Xiang Chen. ➢ A New Attribute Selection Method Based on Maximal Information Coefficient and Automatic Clustering. Haijin Ji, Song Huang, Yaning Wu, Zhanwei Hui and Xuewei Lv.	International Ballroom-A
13:30-15:30	●	Session II: Security and Dependable System Chair: Guigang Zhang ➢ A System Safety Analysis Method Based on Multiple Category Hazard Factors. Hao Wang, Deming Zhong, Yukun Zhao and Rui Sun. ➢ CVSSA: Cross-Architecture Vulnerability Search in Firmware Based on Support Vector Machine and Attributed Control Flow Graph. Hong Lin, Dondong Zhao, Linjun Ran, Mushuai Han, Jing Tian, Jianwen Xiang, Xian Ma and Yingshou Zhong. ➢ An Experimental Study of Four Methods for Homology Analysis of Firmware Vulnerability. Linjun Ran, Liping Lu, Hong Lin, Mushuai Han, Dongdong Zhao, Jianwen Xiang, Haiguo Yu and Xian Ma. ➢ Software Architecture Modeling and Reliability Evaluation Based on Petri Net. Chi Zhang, Yunyun Ma, Xiaohua Wang and Ruixue	International Ballroom-B

	Wang.	
13:30-15:30	● Session III: Data Processing and Applications 　Chair: Yihao Li 　➢ Plaintext-dependent selective image encryption scheme based on chaotic maps and DNA coding. 　　Lin Li and Ying Ying Yao. 　➢ A Novel Testing Method for Narrowband Synthetic Aperture Radar (SAR) Imaging Algorithm. 　　Letian Zeng, Chunhui Yang, Yuelong Zhao, Ping Chen and Qiang Wang. 　➢ Prediction of Cancer Based on Mobile Cloud Computing and SVM. 　　Liang Kou, Ye Yuan, Jianguo Sun and Yun Lin. 　➢ A Software Defined Work Based Approach to Dependable Scenic Region Management. 　　Hongming Che, Lin Zou, Qinyun Liu, Hongji Yang, Chi Zhang, Chengchung Chu and Haiying Qi.	Juhe Hall
13:30-15:30	● Software Reliability Technology Summit ● Moderator: W. Eric Wong ● Subject I: Automated Software Testing 　　　　Software Quality Evaluation 　Expert: Jeff Voas, Russ Morris, Sudipto Ghosh, Xiaoying Bai , Zhenyu Chen	He Hall
15:30-15:40	Coffee Break	Foyer
15:40-17:00	● Session IV: Fault diagnosis 　Chair: Jianwen Xiang 　➢ High-Reliable Testing for FPGA Software in Space Utilization Engineering. 　　Tao Zhang, Xiaodan Wang and Jinbo Wang. 　➢ System Analysis and PHM Methods for Power Devices Based on Physics-of-Failure. Yulong Zhang, Lulu Wang, Bo Gao, Lixin Wang, Jiajun Luo and Zhengsheng Han. 　➢ A fault diagnosis method based on Bispectrum-LPP and PNN. Jinlong Zhao, Pinwang Zhao, Shulin Liu, Qiufang Wang and Na Jiao.	International Ballroom-A
15:40-17:00	● Session V: Software design and testing 　Chair: Guigang Zhang 　➢ Anomaly Detection of Space Payload Using Multivariate State Estimation Technique and Self-Organizing Feature Map. Lei Song, Lili Guo, Huiping Wang, Shilong Yang, Jun Rao, Zhen Yan, Jiangyong Duan and Lele Xu.	International Ballroom-B

	➢ Performance Analysis Model for Fog Services under Multiple Resource Types. Bo Liu, Xiaolin Chang, Lin Li and Zhi Chen. ➢ Deterministic Replay for Multi-core VxWork Applications. Junjie Liu, Xiaopeng Gao, Bo Jiang and Zhenyu Zhang.	
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Plenary Talk Speakers

Opening Speech

Expert: Huimin Lin

Prof. Huimin LIN received Ph.D in Computer Science from the Institute of Software, Chinese Academy of Sciences, in 1986. He is currently a research professor and the director of the Laboratory of Computer Science, Institute of Software, Chinese Academy of Sciences. He was elected a Member of Chinese Academy of Sciences in 1999. Prof. Lin's research interests include: concurrency and mobility, model checking and modal logics, formal methods, tools and algorithms for concurrent systems. He designed and implemented Process Algebra Manipulator PAM/VPAM which is the first parameterised interactive proof tool for process algebras. He is a co-originator of the "symbolic bisimulation" theory for value-passing process algebras. Prof. Lin has published papers in a number of international journals(such as Acta Informatic,ACM Transactions on Programming Languages and Systems, Information and Computation, Theoretical Computer Science, Formal Aspects of Comuting) and conferences(such as ICALP, TAPSOFT, ETAPS, PSTV, CONCUR). He has served in program committees for many international conferences.

Keynote Speech I

Networks of 'Things'

Expert: Jeffrey Voas

Jeffrey Voas is a computer scientist. His current research interests include vetting mobile app software, how apps depend on clouds, software certification ethics, and Internet of Things (IoT). Voas has worked for small private companies, defense contractors, and government agencies. Dr. Voas has served as the IEEE Reliability Society President (2003-2005, 2009-2010), Vice-President of the IEEE Technology Management Council for Operations (2013-2014), and as IEEE Director (2011-2012). He co-authored two John Wiley books, *Software Assessment: Reliability, Safety, and Testability* (1995) and *Software Fault Injection: Inoculating Software against Errors* (1998). He is currently an Associate Editor-In-Chief of IEEE's IT Professional Magazine, and is on the editorial board of IEEE Computer Magazine as well as the Editorial Advisory Board of IEEE Spectrum Magazine. Voas also serves on IEEE's Industry Advisory Board for the Future Directions Committee, and on IEEE's Fellow Committee. Dr. Voas received his undergraduate degree in Computer Engineering from Tulane University (1985), and his M.S. and Ph.D. in Computer Science from the College of William and Mary (1986 and

1990, respectively). He is a Fellow of the IEEE and Fellow of the American Association for the Advancement of Science (AAAS).

Abstract

System primitives allow formalisms, reasoning, simulations, and reliability and security risk-tradeoffs to be formulated and argued. In this work, five core primitives belonging to most distributed systems are presented. These primitives apply well to systems with large amounts of data, scalability concerns, heterogeneity concerns, temporal concerns, and elements of unknown pedigree with possible nefarious intent. These primitives are the basic building blocks for a Network of "Things" (NoT), including the Internet of Things (IoT). This talk offers an underlying and foundational science to IoT based on the realization that IoT involves sensing, computing, communication, and actuation. The material presented here is generic to all distributed systems that employ IoT technologies (i.e., "things" and networks). The expected audience is computer scientists, IT managers, networking specialists, and networking and cloud computing software engineers. To our knowledge, the ideas and the manner in which IoT is presented here is unique.

Keynote Speech II

Unmanned Aircraft System Reliability

Expert: Russell W. Morris

Russell W. Morris, BSEE, MSSE, SM-IEEE, M-INCOSE, Boeing Technical Fellow (Retired) for Reliability Maintainability and Testability. Russ is currently a consultant for reliability, maintainability and systems engineering. Russ has over 35 years' experience in reliability of military and medical systems, and 13 years of design experience in Medical Diagnostic Ultrasound and Broadcast television equipment. He has worked on projects including one-shot devices, 4 MeV 1000 amp linear accelerators, magnetic plasma confinement, very low noise broadband amplifiers, video scanner servo systems, non-linear signal compression, digital subtraction angiography and digital phased array ultrasound signal processing. Russ' design and reliability work included military space systems and aircraft, commercial aircraft, Sea Launch, and unmanned aircraft. Russ' expertise covers the spectrum of avionics, hydraulics, pneumatics, flight control, guidance, and signal processing systems. He was a Boeing International trainer, mentor and coach in RAM topics and is a contributor to the Boeing Ed Wells program of technical excellence. He has written more than 40 internal white papers or other significant corporate documents for Boeing. He has three patents. He is a past co-chairman for the SAE G-11 Software Reliability Committee and past Chairman of the Reliability Committee and is a co-author and reviewer for several of the SAE-JA1000 series of Reliability, Maintainability and Testability national standards and author and editor of the Boeing Reliability, Maintainability, and Systems Health Standard.

Abstract

Development of unmanned aircraft avionic systems design generally takes two paths: fully autonomous (with update) and semi-autonomous or remotely piloted aircraft. The reliability and systems engineering elements for these aircraft take different forms specifically for the RPV versus the UAV. A generalized comparison of the attributes of these two different types of system is presented along with the major elements of their employment challenges. Both vehicle types are dependent upon significant level of fault detection and isolation, and redundancy management as well as ability to return to base or alternate field in the event of a failure. Mission duration plays a major role in the reliability demands on the system. An element that must be included is the potential for multiple failures or interrupts combined with other effects such as those associated with radiation. This presentation addresses the global system attributes and design reliability elements needed to ensure safety of flight and successful mission completion.

Keynote Speech III

Formalized Engineering Mathematics and Next Generation AI

Expert: Gang Chen

Deputy chief engineer of Beijing Jinghang Research Institute of Computing and Communication. National Thousand Talents Program Distinguished expert. Specialized in Formalized Engineering Mathematics, Higher Order Theorem Prover, Type Theory, Lambda Calculus, Formal Verification, Functional Language, Principle of Programming Language, Hardware Verification, Arithmetic Circuits, PLC Program Testing. Published more than 50 papers in POPL, PPDP, Info. & Comp., IEEE Trans. on Computers, IEEE Trans. on Computer Aided Design, IEEE Trans. on Nanotechnology, and other journals and conferences. Author of the book "Foundation of OCaml Programming" (in Chinese). Employed in Boston University, Motorola Australia Software Center, South Australia University and Shanghai Jiaotong University. Founder of the Lingcore Laboratory in which he developed world first PLC program testing software. Ph.D. In Computer Science Of University Paris 7, M.S. In Artificial Intelligence in Pekin University and B.S. In Mathematics of Zhejiang University.

Abstract

During 2016 and 2017, major industrial countries have each published their own national artificial intelligence development plan. However, in these strategic plans, the domain of theorem proving, traditionally viewed as a central element in intelligence, is nearly ignored. We analyzes the reason behind this phenomena and explains why theorem proving, and formal reasoning in general, should take an important role in the next generation of artificial intelligence. In particular, we sketch a new research direction named formalized engineering mathematics, which we believe, will be an important part of Artificial Intelligence in a future not very far away.

Keynote Speech IV

Condition Design for Software Testing

Expert: Ke Han

Ke Han is a mission critical system-software tester consultant at Institute of Information Technology. He has worked in software engineering, particularly in mission critical software testing, for more than three decades. Han holds a Ph.D. in software engineering from Nanjing Communication Engineering Institute, China. He has authorized over 30 published articles and translated more than 20 books on software engineering.

Abstract

Testing and evaluating a software depends on the context of its use. Carefully designed contextual tests can explore software defaults, especially those deeply hidden ones, more effectively and efficiently. However, because to derive suitable context of use with high quality needs a lot of domain experiences, it is not easy for testers to do it. In his speaking, Dr. Han will explain the characteristics and different abstractive levels of context for software testing.