Keynote&Plenary Speakers

Prof. Li, Han Xiong, PhD-EE(Auckland), ME-EE(TUDelft), BE-Aerospace(NUDT), IEEE Fellow,
City University of Hong Kong, Hong Kong

Biography: Han-Xiong LI (李涵雄) received his B.E. degree in aerospace engineering from the National University of Defence Technology, China, M.E. degree in electrical engineering from Delft University of Technology, Delft, The Netherlands, and Ph.D. degree in electrical engineering from the University of Auckland, Auckland, New Zealand.

Currently, he is a full professor in the Department of Systems Engineering and Engineering Management, the City University of Hong Kong. Over the last thirty years, he has had opportunities to work in different fields, including military service, investment, industry, and academia. He published over 190 SCI journal papers with h-index 36 (ISI web of science). He has been rated as highly cited Chinese scholar by Elsevier since 2014. His current research interests are in system intelligence and control, integrated process design and control, distributed parameter systems, intelligent learning and decision informatics.

Dr. Li serves as Associate Editor of IEEE Transactions on Systems, Man & Cybernetics: system (2016-), IEEE Transactions on Cybernetics (2002-2016), and IEEE Transactions on Industrial Electronics (2009-2015). He was awarded the Distinguished Young Scholar (overseas) by the China National Science Foundation in 2004, a Chang Jiang professor by the Ministry of Education, China in 2006, and a national professorship in China Thousand Talents Program in 2010. He serves as the distinguished expert for Hunan Government and China Federation of Returned Overseas. He is a fellow of the IEEE.

Prof. Chun-Yi Su, Concordia University, Canada

Biography: Dr. Chun–Yi Su received his Ph.D. degrees in control engineering from South China University of Technology in 1990. After a seven–year stint at the University of Victoria, he joined the Concordia University in 1998, where he is currently a Professor of Mechanical and Industrial Engineering and holds the Concordia Research Chair in Control. His research covers control theory and its applications to various mechanical systems, with a focus on control of systems involving hysteresis nonlinearities. He is the author or co–author of over 400 publications, which have appeared in journals, as book chapters and in conference proceedings. In addition to his academic activities, he has worked extensively with industrial organizations on various projects. Dr. Su has been an Associate Editor of IEEE Transactions on Automatic Control, IEEE Transactions on Control Systems Technology, Mechatronics, Control Engineering Practice, and several other journals. He has served as Chair/Co–Chair for numerous international conferences.

Speech Title: Modeling and Control of Hysteresis Nonlinearities in Smart Actuators: Magnetostrictive Actuator Case

Abstract: Magnetostrictive actuators featuring high energy densities, large strokes and fast responses are playing an increasingly important role in micro/nano-positioning applications. However, such actuators with different input frequencies and mechanical loads exhibit complex dynamics and hysteretic behaviors, posing a great challenge on applications of the actuators. To this end, a comprehensive model is developed. According to the proposed hysteresis model, an inverse Asymmetric Shifted Prandtl-Ishlinskii (ASPI) Model is proposed for the purpose of compensating the hysteresis effect. However, in real systems, there always exists a modeling error between the hysteresis model and the true hysteresis. The use of an estimated hysteresis model in deriving the inverse compensator would yield some degree of hysteresis compensation error. To accommodate such a compensation error, an analytical expression of the inverse compensation error is derived first. Then, a prescribed adaptive control method is developed to suppress the compensation error and simultaneously guaranteeing global stability of the closed loop system with a prescribed transient and steady-state performance of the tracking error. The effectiveness of the proposed control scheme is validated on the magnetostrictive- actuated experimental platform.

Prof. Everett X. Wang, Guangdong University of Technology, China

Everett X. Wang received the BS from Peking University in 1982. In 1986 he received the MS from Institute of Theoretical Physics, Academy of Sciences of China and Ph.D. from University of Texas at Austin in microelectronics in 1993. He then joined Intel Corporation as Sr. Engineer, Staff Engineer and Sr. Staff Engineer, working on stress modeling, quantum tunneling, quantum size effect, 3D mesh generation, hydrodynamic and Monte Carlo models. In 2000 he transferred to Photonic Technology Operation in Intel as a program manager for thermal optical switch products. In 2003 he joined Design Technology Service of Intel as team leader working on hole mobility under arbitrary stress using 2D quantum transport and Monte Carlo method. In 2006, he founded a high-tech startup for developing energy efficient transportation systems. Since 2011, he has been with Guangdong University of Technology as 100-talent-plan distinguished professor. Dr. Wang authored and co-authored 54 journal and conference papers. He also holds 34 approved and pending patents. Dr. Wang's interests include receiver and system design for global navigation satellite systems, transport models for advanced electron devices, modeling and control of robotic systems as well as deep learning in medical applications.

Assoc. Prof. Xie Ming, Nanyang Technological University, Singapore

Biography: Xie Ming received the B.Eng degree in control and automation engineering. Subsequently, as a recipient of the overseas scholarship from Chinese government, he has completed the study for Master degree in the University of Valenciennes (France) as well as the research for PhD degree in the University of Rennes (France). He is Associate Professor of Nanyang Technological University, and was a Fellow with Singapore-MIT Alliance (SMA). He was the General Chair of 2007 International Conference on Climbing and Walking Robots (CLAWAR), the General Chair of 2009 International Conference on Intelligent Robotics and Applications (ICIRA), the Co-founder of the International Journal of Humanoid Robotics (SCI/SCIE indexed), Co-founder of Singapore-China Association for Advancement of Science and Technology, Co-founder of Robotics Society of Singapore. He has taught the courses such as Robotics, Artificial Intelligence, Applied Machine Vision, Measurement and Sensing Systems, Microprocessor Systems, and University Physics. In terms of scientific research, he has published two books, two edited books, several book chapters, over 10 patents of invention, over 30 research papers in scientific journals and over 100 research papers in international conferences. He was the recipient of one best conference paper award from World Automation Congress, the recipient of one best conference paper award from CLAWAR, the recipient of one outstanding paper award from International Journal of Industrial Robot, the recipient of one Gold Prize (S$8K) from CrayQuest, the recipient of one Grand Champion Prize (S$15K) from CrayQuest, the recipient of one A-Star's Best Research Idea Prize (S$5K), the recipient of one Silver Medal from Dragon Design Foundation.

Speech Title: Key Steps Toward Development of Humanoid Robots

Since 1996, we have embarked into the journey of developing humanoid robots at Nanyang Technological University, Singapore. We have ventured into the various technical aspects of humanoid robot development. In particular, we have placed special emphasis on mechatronics design of humanoid robots, planning and control of biped walking, hand-eye coordination for humanoid robots, cognitive vision for humanoid robots, and cognitive speech for humanoid robots. From 2006 onward, several teams in Singapore have received a substantial amount of research grants and

have developed together two full prototypes of humanoid robots, which are about 1.8 meters in height and weigh about 80 kg each. And, each humanoid robot has 42 degrees of freedom with independent actuations. In this keynote speech, I will share some findings and results related to the R&D works of humanoid robots in Singapore.

Prof. Dong Hwa Kim, Hanbat National University, South Korea

Biography: Professor Dong Hwa Kim received his two PhD degrees at the Department of Electronic Engineering, at Ajou University in Korea and at the Department of Computational Intelligence and Systems Science at the Tokyo Institute of Technology. Since 1993 he is a Professor at the Department of Instrumentation and Control Engineering, at Hanbat National University. He is currently the President of Daedeok Korea-India Forum and Vice-President of Daedeok Korea-Japan Forum. He is the author of a number of papers and articles and the co-author of two books: Hybrid Genetic Algorithm and Bacterial Foraging Approach for Global Optimization and Robust Tuning of PID Controller with Distrbance Rejection and Hybrid Genetic: Particle Swarm Optimization Algorithm. Among his many awards, he received, in 2010, the International Einstein Award for Scientific achievement; in 2008, he was included in the Top 100 Engineers of the year (UK), and received the Lifetime of Scientific Achievement Award (UK) and the Universal Award of Accomplishment (USA).

Speech Title: Research Motivation of Artificial Intelligence in Robot and Automation Engineering

Abstract: With the results of technology, social pattern goes to convergences and smart which gives an impact to works in plan for research, education. For that we need to connect research experiences and create idea. However, many experts are expecting that a big slice of the workforce is about to lose their jobs because of artificial intelligence. By Oxford's material, 47% of jobs could be automated by 2033. Even the near-term outlook has been quite negative. A 2016 report by the OECD predicts 9% of jobs in the 21 countries that make up its membership could be automated. McKinsey's report estimates AI-driven job losses at 5% in January 2017. Many researchers predict a net job loss of between 4% and 7% in key business functions by the year 2020 due to AI. Recently, more serious thing is to make platform in social network and technology. That is, global company's such as Amazon, Google, Facebook, IBM, MS and Top University such as, MIT, Harvard, McGill, Toronto University and so on is going to have an initiative about artificial intelligence because that technology has an influence on economy and social situation, and gives an impact to development of new technology. And public person just can use it easily and will crash currently job. This lecture deals with research motivation and artificial intelligence for automation and robot, others and offers currently various research topic of artificial intelligence method. In this lecture we will suggest emotional technology as artificial intelligence obtained from research experience. Conclusion suggests many possible approaches and why it is important at this point to introduce artificial intelligence, especially why we should recognize and study emotion technology earlier.