

Short Biography of Dr. Jun Liu

Dr. Jun Liu is currently a Senior Lecturer in Computer Science at School of Computing and Mathematics, a key research member of Artificial Intelligence and Applications Research Group¹ (AIARG) at Computer Science Research Centre² (CSRI), University of Ulster (Ulster) at Jordanstown Campus, Northern Ireland, UK. Prior to his current appointment, he was a Postdoctoral Research Fellow (Feb. 2002 - Dec. 2004) at School of Management at UMIST (current Manchester Business School, The University of Manchester), UK. From Mar. 2000 to Feb. 2002, he was a Postdoctoral Research Fellow staff member at Belgian Nuclear Research Center (SCK•CEN). He received the BSc. and MSc. degrees in Applied Mathematics, and PhD. degree in Information Engineering from Southwest Jiaotong University, Chengdu, Sichuan, China, in 1993, 1996, and 1999, respectively.

He has been working in the field of Artificial Intelligence for many years. His current research is focused on two themes: 1) Intelligent decision methodologies (IDM) using techniques from systems theory, operational research and artificial intelligence, with applications in management, engineering, and industry field etc. (e.g., safety and risk analysis; policy decision making; security/disaster management; situation awareness and emergency systems, and scenario/activity recognition). In particular he is actively involved in the following areas aiming at IDM: information fusion and data combinations; data mining and knowledge-based systems; and applied computational intelligence for uncertainty analysis and optimization; 2) non-classical logic and automated reasoning methods for intelligent systems. In particular he is actively involved in the following logic related areas: resolution-based automated reasoning methods, algorithm and tools with applications (including software verification and automated theorem proving); lattice-valued logics with focus on handling incomparability, inconsistency and imprecision; lattice-valued temporal logic and reasoning system for decision making under dynamic and uncertain environment; logic based decision support system. Approximately 50% of his research output since 1993 can be directly linked to the area (2) and the other 50% is focused on the area (1) through publications, the organization of events, Research Council, EU projects and International Collaborative Projects in different applications, supervising PhD/MSc students and examining PhD thesis and projects at national and international level and delivering invited keynotes and lectures related internationally. He is currently leading the key research area on Knowledge Representation, Reasoning & Decision Making in the AIARG. His research on intelligent decision support technologies with applications in risk/safety/security analysis has been identified as one of the core research themes within the AIARG. He collaborates closely with colleagues within the AIARG and CSRI, and the School in general, either as a leading researcher or as a member of a team.

He has authored or co-authored over 140 publications (with 4 papers included in UK REF2014 submission and 4 papers in UK REA2008 submission), involving the best publishers in the area and including over 60 SCI-index journal papers with 2061 citation, the H-index 20 (ISI Web of Science); the H-index (Google Scholar) as 26 for all publications and 23 for publications since 2010; and the i10-index (Google Scholar) as 41 for all publications and 38 for publications since 2010. This includes (since 2000): 81 Journal papers; 3 books (research oriented taken as text book for postgraduate and researchers); 13 book chapters; over 70 research papers in conferences and workshop papers; 4 technical reports and project reports.

He served as Editor of Journal of The Franklin Institute (SCI-Indexed). He is also in the editor board of Information Fusion Journal (SCI-Indexed), International Journal of Computational Intelligence Systems (SCI-Indexed), Journal of Universal Computer Science (SCI-Indexed), International Journal of Nuclear Governance Economy and Ecology – (IJNG2E), The Journal of Fuzzy Mathematics, and International Journal of Knowledge and Systems Science (IJKSS). He has also been a Guest Editor of Information Fusion Journal and Journal of Universal Computer Science. He has been the registered reviewer for over dozen SCI-Indexed international journals.

He has participated as a main investigator in over 10 research projects in China, Belgium, Spain and UK in last 10 years on intelligent control, logic based intelligent systems, decision support system for nuclear safeguards and industry, safety and risk analysis in engineering, modeling and techniques for sensory evaluation and online recommendation, health care and smart home, software defect detection, policy decision making, video surveillance system for security etc. have been awarded a substantial amount of research funding as grant holder and principle co-investigator, totally approx. £1.5 Million from various funding bodies, including 3 EU FP7 Security projects, 1 EU lifelong Learning Programme project, 2 research council international project, 4 international collaborative funding project (4 with Spain), 2 Sponsorship (funding support) from EPSRC or IEEESMC for the organization of academic and technical events, 4 invited research visit grant awarded, as well as attracted 7 research visitors supported from external funding (from short stay for a few day or one month to 6 month or one year).

He has established his credibility and reputation in related research communities including computational intelligence, non-classical logic and automated reasoning, and intelligent decision support. He is the local organization chair of the first UK-Ireland IEEE SMC Celebration Lecture Series 2013 and Strategic Workshop 2013, which was held on 25-26th of March, 2013, University of Ulster, UK. IEEE Outstanding SMCS Chapter Award was given to the Belfast Northern Ireland UK Chapter for successfully hosting the Northern Ireland SMC Celebration Lecture Series October 2013. He is also the Executive Steering Committee Member of International FLINS Conference since 2012 and the Executive Steering Committee Member of International ISKE Conference since 2012. He has also co-organized the ECAI Summer School for Advanced Course in Artificial Intelligence '09: Intelligent Decision Support Systems [theory, algorithms, and applications] in 2009. He has been invited to give several talks at universities in different countries and international conferences, and being chair or co-chair for a number of conferences and has served as a member of technical committees of more than 20 scientific conferences. He has been invited to give a keynote or guest talks in some international conferences or invited by some universities in Europe or Asia. He is a member of the IEEE and IEEESMC, member of EUCog (European Network for the Advancement of Artificial Cognitive Systems, Interaction and Robotics), member of International Institute of Forecasting (IIF), member of Association for Automated Reasoning (AAR), member of Chinese Automation and Computing Society in the UK (CACSUk), member of the UK Safety and Reliability Society (SaRS), and member of EUSFLAT (European Society for Fuzzy Logic and Technology).

¹ <http://scm.ulster.ac.uk/~scmresearch/AIARG/>

² <http://www.compeng.ulster.ac.uk/csri.php>

He is the Ulster coordinator of the EU ERASMUS programme (since 2007) between University of Jaen in Spain and University of Ulster, UK, which supports each year 2 students exchange visit (PhD, MSc or Undergraduate), and also 2 academic staffs visit. He has been invited to serve as international external member in several research institutes/centres in Europe and other countries.

He also worked as the Ulster coordinator on Action 2 of the EU Erasmus Mundus Partnership Programme Eureka SD (<http://www.eureka-sd-project.eu/>, July 15, 2013 – July14, 2017): Enhancement of University Research and Education in Areas Useful for Sustainable Development, which is for partnerships between European (EU) and Latin American (LA) countries for mobility. Erasmus Mundus is a co-operation and mobility Programme in the field of higher education, awarded by the EU over €4.2 million EURO for the whole consortium to support networking and mobility in different level including undergraduate students, MSc, PhD, Post-doc and academic staff.

He is the Ulster coordinator and played the leading role in establishing the MoU and collaborative agreement between Ulster and Southwest Jiaotong University (SWJTU) in China as well as establishing the International Joint Research Centre called “Advanced Machine Intelligence (AMI)” between two universities officially in September 2013. As one of three partners (SWJTU, Xihua University in China, Ulster), he is also the Ulster coordinator and played the leading role for establishing “Sichuan System Automated Credibility Verification Engineering Lab”, which has recently been approved and will be financially supported by the central and local government of China. He also coordinated and organized as co-chair the first SWJTU-Ulster Collaborative AMI Research Centre Strategic Workshop 2014 on “Towards Advanced Machine Intelligence for the Cyber World”, held on 6 July, 2014 at Southwest Jiaotong University at Jiuli Campus, Chengdu, China.

He has been the external reviewer for European PhD Scholarship Application in 2007. He has been invited as external examiner for 4 PhD viva from UK, EU universities and Australia, has taken the role of internal examiner of 6 PhD viva. He is currently mentoring 3 Post-doc research associates (under EUIP7-SAVASA project: <http://www.savasa.eu/>). He has so far supervised 5 PhD to completions, and currently supervising 3 PhD students, as well as supervised 3 MSc projects.

He is coordinating the Research Seminar Series within the School of Computing and Mathematics which is an important formative resource and forum for postgraduate students, research staff and academic staff via the internal or external speakers in different research topics.

He and some of his colleagues have cross-faculty close collaboration with Built Environment Research Institute especially in urban planning research theme including one strategic funding on Policy Decision Making, joint PhD research project on GIS-Based Intelligent Decision Support System, and one EU funded project INTACT - On the Impact of Extreme Weather on Critical Infrastructures (CEC - EU FP7-SEC-2013-1.6-3).

The following two parts of work have formed a good shape and placed a good basis to contribute to Research Impact of his work:

1) Intelligent decision support system

As one of his main research contributions in last few years, he has developed a Belief Rule Based Inference Methodology (called RIMER) which is a data-driven and domain knowledge based intelligent decision methodology, the related work have been published in IEEE Transactions on Systems, Man and Cybernetics, Knowledge-Based Systems, and others. Along with PhD student, the modelling and investigation work has been implemented into an Intelligent Decision Support System (also called RIMER). RIMER is an extension of traditional rule based systems and provided unique and innovate ways of handling uncertain and incomplete information while incorporating domain knowledge. The methods have been cited and appreciated by many researchers. It has been applied in different areas, such as risk and safety analysis in general, more specific, including: oil pipe leak detection; software fault detection; monitoring, diagnosis, activity recognition in Smart Homes; urban planning and policy decision making; security/disaster management (nuclear safeguards evaluation; video based surveillance); and multiple attribute group decision making. In addition, a GIS-Based RIMER version has been completed, which is an integrated software package of RIMER into GIS, with application into urban planning and policy decision making. In addition, RIMER has also been used in the current EU-FP7 Security Project –SAVASA as the key technical solution in the Work Package – Scenario Recognition led by Ulster. Research in such areas in the UK is significant. This research outcome is cross-disciplinary in nature with different potential application areas, providing an opportunity to collaborate with private or public sector via an intelligent decision support system or identify further possible research projects to bring significant impact in areas of quality evaluation, prediction, policy decision making and risk/safety assessment under high uncertainties.

(2) Logic-based intelligent system: a novel automated reasoning theory, algorithm and tool

His collaborative works with Prof Yang Xu from SWJTU in China in the area of lattice-valued logic and automated reasoning starts since 1996, where state of art formal logic system being established in handling imprecision and incomparability. The works have been published in IEEE Transactions on Fuzzy Systems, Information Sciences, and International Journal of Intelligent Systems, among others. Especially an original and novel automated reasoning theory, algorithm and tool has been developed and tested, so far the testing results have shown the new automated reasoning tool beyond the State of Art in many aspects. This work has been a significant breakthrough of our previous joint research work. A joint System Automated Credibility Verification Engineering Lab has recently been approved and will be financially supported by the central and local government of China. The investigation along the software tools developed provided a platform and create a new technology for different potential applications including automated software and hardware verification, aiming at the improvement of software/hardware productivity and quality in the UK, China, or international industry, especially in the critical system verification, e.g., high-speed train control system verification.