



APCASE'17

4th Asia-Pacific Conference on Computer Aided System Engineering – APCASE 2017

Conference Program

10th – 13th November 2017

Guilin, Guangxi, China

**The 4th Asia-Pacific
Conference on
Computer-Aided System
Engineering**



10th – 13th November 2017
Guilin, Guangxi, China

Conference Program

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Chairperson's Welcome

We cordially welcome you to the Asia-Pacific Computer-Aided System Engineering conference, APCASE 2017 in Guilin, Guangxi, China. Hosted by Guangxi Normal University, Guilin, the beautiful tourist resort from the 10th – 13th November 2017, the conference will provide a high-level forum for scholars, researchers and engineers from all over the world to share their views, research achievements, explore the cutting-edge issues and exchange the new experiences and technologies in the fields of System and Application Engineering.

The conference runs the Springer publication stream, as the process of paper acceptance for the publication being different for each stream. Within the Springer publication stream papers are accepted for the presentation at the conference as extended abstracts.

Accepted papers will be submitted for inclusion into ISI Thomson's Scientific and Technical Proceedings, ISTP/ISI Proceedings, Ei's Engineering Information Index, SCOPUS, Compendex, DBLP and Google Scholar. Papers submitted and accepted for the Springer's publication stream will be published in Studies in Computational Intelligence series book. Additionally, extended versions of selected papers will be recommended to be published in the following SCI/EI journals:

- 1) IEEE Transactions on Mobile Computing
- 2) Archives of Control Sciences
- 3) International Journal of Electronics and Telecommunications

We would like to appreciate the reviewers for their hard work and efforts to review the submitted papers. After the review process by technically competent reviewers, the accepted papers are to be presented in the conference sessions. Besides the technical program, APCASE 2017 also presents keynote speeches by professors and experts in subjects of Computer Aided System Engineering.

We do hope all the participants will enjoy the whole program offered in APCASE 2017.

Monday, 6 November 2017

Zenon Chaczko
Franz Pichler
Frank Jiang

Conference Topics

The conference is structured as a set of parallel workshops listed below:

System Theory and Applications

- Computer-aided system optimization and design
- Cooperative System Engineering
- Heuristic computation models and systems
- Systems Biology, Bioinformatics and Biomimicry
- Model-driven system design
- Computer-based methods in medicine

Communications and Networks

- Wireless network systems & apps
- Security and safety systems
- Cognitive Radio systems
- Fog computing
- Body area & actuators networks
- Mobile computing and applications

Soft and Ubiquitous Computing

- Cloud computing systems and applications
- Web-oriented and ontological systems
- Computational Intelligence and Complexity
- Soft computing and Internet-of-Things (IoT)
- Autonomous and autonomic systems
- AI systems

Mechatronics, Electronics & Robotic Systems

- Digital Signal Processing
- Electronics circuits design
- Nano-technology, Networks-on-Chip and applications
- Machine vision and image processing
- Sensory systems and applications
- Soft robotics
- Real-time systems and applications
- Telematics and haptics
- Production engineering

Software Intensive Systems

- Virtual and Augmented Reality
- Social network systems
- User and data centric systems
- Information Systems and Applications
- Big Data, Data Science and Engineering
- Simulation systems

Engineering Smart Systems

- Engineering of smart infrastructures
- Precision and vertical agriculture systems
- Smart cities, buildings and homes
- Smart laboratory and education systems
- Smart manufacturing
- 3D Printers and scanners

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- University of Technology, Sydney, Australia
- Global Big Data Technology Centre, UTS, Australia
- University of Applied Sciences, Hagenberg, Austria
- University of Las Palmas, Spain
- Wroclaw University of Science and Technology



Conference Program

Friday, 10th November 2017

Registration 14:00 – 18:00

Venue: Room 1		
Session: Workshop Presentation		
15:00–17:00	Workshop 1	<i>Luke Brandt: Application, Design and Technology of 3D Printing</i>

Saturday, 11th November 2017

Registration 08:00 – 18:00

Venue: Room 1		
Session: Welcome and Keynote Presentation		
08:00–09:00	Welcome Speeches	
09:00–12:30	Keynote 1	<i>Prof Robin Braun: Can we use new ways of modelling complex systems to optimise student learning?</i>
	Keynote 2	<i>Prof Carmen Paz Suárez Araujo: Detection and monitoring of environmental pollutants and neurological pathologies using HUMANN-based intelligent systems</i>
	Keynote 3	<i>Prof David Goad: Security and the IoT: Why the next big IT Security Breach will likely be in IoT</i>

Venue: Room 1		
Session: Soft and Ubiquitous Computing Software Intensive Systems		
14:00–14:20	Paper 31	GmeiCoding: Cloud Infrastructure for Programming
14:20–14:40	Paper 22	A Computer-Aided Modelling and Verification Approach for Problem-oriented Software Development
14:40–15:00	Paper 7	Policy-Based Data Aggregation for IoT
15:00–15:20	Paper 9	Deep Learning and Learning Classifiers for Multimodal Image Processing
15:20–15:40	Paper 10	IoT Methodology for Multimodal Networks using Evolutionary Algorithms in Healthcare Context
15:40–16:00	Paper 23	Multimodal Access Control: Review of Mechanisms
16:00–16:20	<i>Afternoon Tea Break</i>	
16:20–16:40	Paper 13	Tensor Decomposition in Multimodal Big Data: Studying Multiway Behavioural Patterns
16:40–17:00	Paper 24	Overview of Multi-Layer Security Using Biometrics
17:00–17:20	Paper 33	How IoT is Changing Teaching of Technical Subjects
17:20–17:40	Paper 32	Assessment of a Multi-Agent RFID Platform for Industrial Logistic Operations
17:40–18:00	Paper 17	Virtual Shooting Range as a Tool Supporting the Process of Professional Training of Police Officers

Venue: Room 2		
Session: Communications and Networks		
14:00–14:20	Paper 5	Modified Synchronous Square Prime Code for SAC-OCDMA Systems Using New Partial Balanced Detection Technique
14:20–14:40	Paper 18	A New Novel Improved Technique for PAPR Reduction in OFDM system
14:40–15:00	Paper 21	An Energy-Aware Routing for Optimizing Control and Data Traffic in SDN
15:00–15:20	Paper 6	A Markovian Approach to the Mobility Management for the D2D Communication in 5G Network
15:20–15:40	Paper 4	A Study on the Detection of River Speed Based on UHF Radar Data
15:40–16:00	Paper 12	Hybrid Inhibition Algorithm for Ionospheric Clutter Mitigation in High Frequency Surface Wave Radar
16:00–16:20	<i>Afternoon Tea Break</i>	
16:20–16:40	Paper 3	State-of-Charge (SOC) Estimation Using T-S Fuzzy Neural Network for Lithium Iron Phosphate Battery
16:40–17:00	Paper 30	Tracking of Multiple Moving Objects Using 2D Beamforming Based on Crossed Array
17:00–17:20	Paper 19	Studies on Image Stitching Algorithms in Machine Vision Inspection of Solar Panel
17:20–17:40	Paper 20	Period Analysis of Chaotic Systems under Finite Precisions
17:40–18:00	Paper 8	Negative Refraction and Imaging Characteristics of 2D Hexagonal Air Annular Photonic Crystal

Saturday, 11th November 2017

Dong-Jiang Golf Resort Hotel	
Conference Banquet	
19:00–22:00	Official Conference Banquet

Sunday, 12th November 2017

08:00 – 16:00 Registration

Venue: Room 1		
Session: Keynote and Workshop Presentation		
09:00–12:30	Keynote 4	<i>Prof Xiangjian He</i> : Robust Surgical Endoscope Tracking and Navigation
	Keynote 5	<i>Dr Shui Yu</i> : Networking for Big Data: Challenges and Opportunities
	Keynote 6	<i>Assoc Prof Haiying Xia</i> : Robust Vessel Segmentation of Fundus Images
	Workshop 2	<i>Prof Robin Braun</i> : Modern Telemetry, Data Engineering and Future of Software Defined Networking

Venue: Room 1		
Session: Engineering Smart Systems Mechatronics, Electronics and Robotic Systems		
14:00–14:20	Paper 36	Synchronization of Chaotic Permanent Magnet Synchronous Motor System via Sliding Mode Control
14:20–14:40	Paper 37	Adaptive Synchronization of Chaotic Brushless DC Motors Based on Lyapunov Stability Theory
14:40–15:00	Paper 29	Low Cost Wireless Micro-Electro-Mechanical-Systems (MEMS) Accelerometers Linear Sensor Model
15:00–15:20	Paper 40	Optimal Design of Degree Distribution in LT Codes Based on Evolution Strategy
15:20–15:40	Paper 2	A Review of 5D Printing
15:40–16:00	Paper 16	Design and Implementation of CoreXY Writing Robot
16:00–16:20	<i>Afternoon Tea Break</i>	
16:20–16:40	Paper 14	Path Optimization Model of Sugarcane Transportation
16:40–17:00	Paper 15	Site Selection Model of Sugarcane Transportation
17:00–17:30	Closing Speeches	

Venue: Room 2		
Session: System Theory and Applications		
14:00–14:20	Paper 25	Cell Deformation on Microscopic Image Sequence
14:20–14:40	Paper 27	An Improved Supervised Descent Method based Face Alignment Algorithm
14:40–15:00	Paper 35	A Relay Routing Algorithm for Remote Concentrated Ammeter Reading based on Ant Colony Optimization
15:00–15:20	Paper 42	An Improved Fringe-Reflection Measurement Method for Rotational Symmetric Surface
15:20–15:40	Paper 43	Numerical Approach for Solving Aerial Inspection
15:40–16:00	Paper 38	A New Softmax Regression Mode for Classification of Cardiovascular Disease
16:00–16:20	<i>Afternoon Tea Break</i>	

Monday, 13th November 2017

Conference Closure and One Day Tour	
Conference Closure	
08:00–12:30	One Day Li River Day Tour Li River originates in the Mao'er Mountains in Xing'an County and flows southerly through Guilin, Yangshuo and Pingle.
20:00–21:10	Opera Night Show of “Impression: Liu San Jie” Night show directed by Mr Yi Mo Zhang, the World-Famous Movie Director.

Conference Session Chairs

Keynote Speakers

Keynote 1: Prof Robin Braun

Affiliation: *University of Technology, Sydney, Australia*

Robin Braun received the B.Sc.(Hons) from Brighton University in the UK, and the M.Sc.(Eng) and PhD from the University of Cape Town, South Africa in 1980, 1982 and 1986 respectively. Professor Braun started his academic career in 1986 at the University of Cape Town, where he was director of the Digital Communications Research Group. He moved to the University of Technology, Sydney, Australia, in 1998, where he occupies the Chair of Telecommunications Engineering. Prior to moving to academia, he spent 10 years in industry, mostly with Philips and Plessey, where he worked on the design of precision electronic distance measuring equipment.



His recent work has been in network protocols and Software Defined Networks. He has a strong interest in radar and remote sensing. Dr Braun has been active in the IEEE and URSI for many years, serving as URSI Commission C representative, as well as chairing and being on the technical committees of many international Conferences or as TPC chair, including ITHET since 2006. Professor Braun's primary interests are in communications networks and sensor networks. He is interested in their theoretical constructs, middleware for their resources, routing algorithms and embedding such networks in feedback control systems. He has a deep interest in Complex Systems and their modelling. Professor Braun is a committed academic with a deep interest in new teaching paradigms and his current major work at UTS is the introduction of an engineering degree majoring in Data Engineering.

Keynote Address: *Can we use new ways of modelling complex systems to optimise student learning?*

Students and the way they learn, combined with the learning programs and environments we provide for them are complex and intractable systems. They create the wonderful emergent properties of learning, capability and creativity. The fundamental question is this. Can we model the process using new agent based modelling paradigms to both predict and optimise these emergent properties? This talk will explore both the learning system, and the modelling paradigm, using NetLogo to see if the two can ever meet, and if this may be useful to us.

Keynote 2: Prof Carmen Paz Suárez Araujo

Affiliation: *University of Las Palmas of Grand Canaria, Spain*

Carmen Paz Suárez Araujo is Professor of Computer Sciences and Artificial Intelligence at the Universidad de las Palmas de Gran Canaria (ULPGC). She is BS and MS in Physics and PhD. in Computer Sciences. She currently is Director of Intelligent Computing, Perception and Big Data Research Group of ULPGC and Head of Computational Neuroscience Research Division at the Institute of Cybernetics Science and Technology of the ULPGC. The research group of Adaptive Neural Computing and Computational Neuroscience of the ULPGC was also headed for her since 2002 until 2015. She has been Director of Doctorate Programs of Neural Computing in Natural and Artificial Systems of the same University. She has also been Vice-Rector of the University of Las Palmas de Gran Canaria, Vice-Dean and Erasmus Departmental Coordinator of the Faculty of Computer Sciences of this University for many years. Her teaching activity has been essentially developed at the ULPGC, in Computer Sciences Engineering Degree and in PhD. Programs, principally devoted to Cybernetics, Neural Computing, Artificial Perception and Intelligent Computing & ITs in Social and Business fields. She has also been teaching in some Masters concerning with Computer Sciences and Biomedical Computing at the University Pontifical of Madrid and at several other European Universities.



She has been Invited Professor in a broad range of European Universities, among others Fachhochschule Brandenburg (Germany), Institute of Chemical Technology of Praga (Czech Republic), University of Birmingham, Johannes Kepler Universität Linz (Austria), Università degli Studi di Bologna (Italy), Wrocław University of Technology (Poland), Comenius University (Slovakia), Centro da Complexidade Universidade Clásica de Lisboa, Universidad de Coimbra, Pomeranian University (Poland), etc. She has also done research stays in several universities: The University of Florida, Universidade de Lisboa, Comenius University and currently is visiting professor at the University of Technology Sydney (UTS). She has an extensive research experience with more than 135 scientific articles and book chapters, 3 edited research books and more than 140 contributions to international and national congresses. Her research work has been award winning for several Spanish and international institutions, like the ULPGC, the Royal Spanish Academy of Doctors and some international conferences. She has also been Project Leader and Investigator of 19 Research projects in the international, national and regional ambits, Supervisor of Doctoral Thesis and more than 304 Dissertations. She is referee of a wide range of international scientific journals, international congresses and several international and national Evaluation Agencies. She has been general chairperson of several international congresses and she has participated as a member of Program Committee of a high number of national and international con-

gresses as well. She has also been invited speaker in more than 40 seminars and conferences. Her research fields are focused in: Natural and Artificial Neural Networks. Design of New Neural Architectures, Application of Neural Computation in Clinical and Environmental Domains, Biomedicine, Neuroinformatics and Bioinformatics. Intelligent Systems for Decision Making, Computational Neuroscience and Cognitive Computation: Neural communication models and learning.

Keynote Address: *Detection and monitoring of environmental pollutants and neurological pathologies using HUMANN-based intelligent systems*

This presentation discusses detection of environmental pollutants and the non-communicable diseases associated with ageing, as diagnosis of dementia, are, at present, two different but significant issues in our society. The intelligent computing techniques can be a very good candidate that effectively manage these concerns. HUMANN-based intelligent systems deal with both challenges well. The building block of these systems is the HUMANN and its supervised version, HUMANN-S, for the detection of environmental pollutants and neurological disorders respectively. HUMANN is a biologically plausible feedforward hierarchical unsupervised modular adaptive neural network, which can work in domains with noise and overlapping classes. It works with no priori information of the number of different classes in the data. It deals with non-linear boundary class and with high dimensionality data vectors. It consists of an input layer and three modules hierarchically organised in the neural processing with different neurodynamics, connection topologies and learning laws. These modules are, Kohonen, Tolerance and Labelling layers. HUMANN implements the two last stages of the general approach of the classification process, template generation and discrimination (labelling), in a transparent and efficient way. In HUMANN-S, a Perceptron type layer replaces the Labelling one. HUMANN is appropriate for classification processes, performing blind clustering and the author(s) propose it for providing an intelligent computing solution for detection and monitoring of environmental pollutants including Polychlorinated Biphenyls (PCBs), Polychlorinated dibenzofurans (PCDFs) and Benzimidazole Fungicides (BFs) families of organochlorine compounds usually utilised in agriculture and industry. Use of these pollutants in large quantities may have adverse effects which have been detected after decades of their application. Hence, the detection of these pollutants and their mixtures in in the environment is crucial.

Keynote 3: Prof David Goad

Affiliation: *University of Sydney & University of New South Wales, Sydney, Australia*

David Goad has over 30 years of industry experience having held senior leaderships roles with recognized IT brands such as KPMG Consulting, Microsoft and Hitachi Solutions. Being a consummate entrepreneur David has created his own successful IT start-up, built it up to being a global award-winning business and then sold it off. Currently as a Post-Graduate Fellow at Sydney University, David teaches at both Sydney University and the University of New South Wales in the areas of Innovation, Business Applications, Digital Business Management and Accounting Information Systems. David's research areas are the Internet of Things, Business Models and Innovation. A published author he has presented his work on IoT Architecture at the American Conference on Information Systems (<https://goo.gl/M5nake>) and has recently published a book on IoT Strategy for Business Directors (<https://goo.gl/R9XTnv>). David is a member of the IoT Association of Australia and provides consulting advice to entrepreneurs starting new businesses and to enterprises developing their IoT strategy.



Keynote Address: *Security and the Internet of Things: Why the next big IT Security Breach will likely be in IoT*

This presentation introduces IoT security discussing recent events in IoT Security, common IoT security attack vectors and newly evolving environment in terms of IoT security standards and regulation in terms of governmental responses and pre-emptive actions.

Keynote 4: Prof Xiangjian He

Affiliation: *University of Technology, Sydney, Australia*

Prof Xiangjian (Sean) He as a Chief Investigator, has received various research grants including four national Research Grants awarded by Australian Research Council (ARC). He is the Director of Computer Vision and Pattern Recognition Laboratory at the Global Big Data Technologies Centre (GBDTC). He is also the Director of UTS-NPU International Joint Laboratory on Digital Media and Intelligent Networks. He is an IEEE Senior Member and has been an IEEE Signal Processing Society Student Committee member. He is a leading researcher in several research areas including big-learning based human behaviour recognition on a single image, image processing based on hexagonal structure, authorship identification of a document and a document's components (e.g., sentences, sections, etc.), network intrusion detection using computer vision techniques, car license plate recognition of high speed moving vehicles with changeable and complex background, and video tracking with motion blur. He has played various chair roles in many international conferences such as ACM MM, MMM, IEEE BigDataSE, IEEE CIT, IEEE AVSS, IEEE TrustCom, IEEE ICPR and IEEE ICARCV. In recent years, he has many quality publications in IEEE Transactions journals such as IEEE Transactions on Computers, IEEE Transactions on Parallel and Distributed Systems, and IEEE Transactions on Multimedia; and in Elsevier's journals such as Pattern Recognition, Signal Processing, and Computer Networks. He has also had papers published in premier international conferences and workshops such as ACL, IJCAI, CVPR, ECCV and ACM MM. He has recently been a guest editor for various international journals such as Journal of Computer Networks and Computer Applications (Elsevier), Future Generation Computer Systems (Elsevier) and Signal Processing (Elsevier). He is currently an Advisor of HKIE Transactions.



Keynote Address: *Robust Surgical Endoscope Tracking and Navigation*

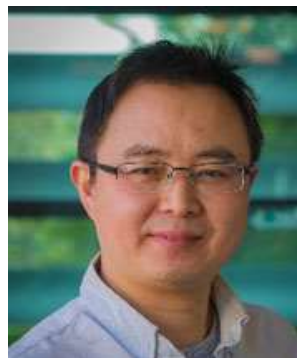
Medical endoscopic procedures with a surgical tool called endoscope are widely performed in minimally invasive surgery (MIS). The endoscopes have been integrated with cameras at their distal tip and directly inserted into the body through natural orifices (e.g., mouth and nose) to observe the interior of hollow organs, e.g. sinus inspection, colonoscopes for colon/rectum cancer detection, angioscopes for examining the lumen of blood vessels, and bronchoscopes for lung and bronchus cancer diagnosis, staging, and treatment. Nowadays, navigated endoscopy is generally agreed to be the next generation of interventional or surgical endoscopy. It usually combines pre- and intra-operative imaging information to guide physicians during endoscopic procedures. However, endoscope three-dimensional motion tracking that spatially and temporally synchronizes various sensory information remains challenging for developing different endoscopic navigation systems. In this respect, endoscope tracking and navigation aim at fusing the modality information to accurately and robustly locate or fly through the

endoscope at any interest of regions. Unfortunately, fusing the multimodal information is still an open issue due to the information incompleteness, e.g., image artefacts, tissue deformation, and sensor output inaccuracy in computer assisted endoscopic interventions. In this talk, a novel framework of multimodal information fusion is presented to use evolutionary computing for endoscopic navigation systems. As most popular evolutionary computing algorithms, adaptive particle swarm optimizer and differential evolution are modified to precisely localize the endoscope and estimate the movement.

Keynote 5: Dr Shui Yu

Affiliation: *Deakin University, Melbourne, Australia*

Dr Shui Yu is currently a Senior Lecturer of School of Information Technology, Deakin University. He is a member of Deakin University Academic Board (2015-2016), a Senior Member of IEEE, and a member of AAAS and ACM, the Vice Chair of Technical Subcommittee on Big Data Processing, Analytics, and Networking of IEEE Communication Society, and a member of IEEE Big Data Standardization Committee. Dr Yu's research interest includes Security and Privacy in Networking, Big Data, and Cyberspace, and mathematical modelling. He has published two monographs and edited two books, more than 150 technical papers, including top journals and top conferences, such as IEEE TPDS, IEEE TC, IEEE TIFS, IEEE TMC, IEEE TKDE, IEEE TETC, and IEEE INFOCOM. Dr Yu initiated the research field of networking for big data in 2013. His h-index is 27. Dr Yu actively serves his research communities in various roles. He is currently serving the editorial boards of IEEE Communications Surveys and Tutorials, IEEE Access, IEEE Journal of Internet of Things, IEEE Communications Magazine, and many other international journals. He has served more than 70 international conferences as a member of organizing committee, such as publication chair for IEEE Globecom 2015 and 2017, IEEE INFOCOM 2016 and 2017, TPC co-chair for IEEE BigDataService 2015, IEEE ATNAC 2014, IEEE ITNAC 2015; Executive general chair for ACSW2017. More information of Dr Yu can be found at <http://www.deakin.edu.au/~syu/>.



Keynote Address: *Networking for Big Data: Challenges and Opportunities*

Big Data is one of the hottest topics in our communities, and networking is an indispensable corner stone for the fancy big data applications. As a result, there is an emerging research branch, Networking for Big Data (NBD), in networking and communication fields. In this talk, we will firstly overview the current landscape of this energetic area, and then present the unprecedented challenges in this new domain, and finally discuss the current research directions in the main topics in networking for big data. We humbly hope this talk will shed light for forthcoming researchers to further explore the uncharted part of this promising land.

Keynote 6: Assoc Prof Haiying Xia

Affiliation: *Guangxi Normal University, Guilin, Guangxi, China*

Dr Haiying Xia received her Bachelor of Science degree in Communication Engineering on 2005 and Masters of Science degree in Information and Signal Processing on 2007 in China. She completed her PhD degree in Circuit and System at Huazhong University of Science and Technology in late 2011. Since then, Dr Xia has been working in Guangxi Normal University for nearly 4 years. She has 4 years' experience of teaching the subjects: Signal and System, Digital Signal Processing, Digital Image Processing, C++ programming and C programming. She is now an associate professor. Her current research interests include Pattern Recognition, Data Mining, Biomedical Image Processing, AI as well as Affective Computing.



Keynote Address: *Robust Vessel Segmentation of Fundus Images*

Robust vessel segmentation of fundus images is of great interest for better diagnosis of many diseases like diabetic retinopathy, retinopathy of prematurity, vein occlusions and so on. In her main address, she analyses several challenging factors existed in vessel segmentation of fundus images. Then two novel methods are explained for segmenting the retinal vessels. Finally, experimental results are conducted to verify the performance of their methods along with the research conclusion and further experimental work.

Workshop Speakers

Workshop 1: Luke Brandt

Affiliation: *Rabbit Forms (Studio), Zgierz, Łódź, Poland*

Luke (Lukasz) Brandt is passionate about modern technology and creative thinking. He studied engineering, computer science and he graduated from the Faculty of Design and Interior Architecture at the Academy of Fine Arts in Łódź, Poland. Luke is a professional industrial designer, experimenter, an educator and 3D printing evangelist. One of his goal aims is to disseminate knowledge about 3D printing in the community at large. This goal is realised through the organisation of a variety of training, community oriented events, workshops using 3D printers and rapid prototyping techniques. Luke Brandt engages in a variety of educational projects



in collaboration with various institutions, museums, cultural centres. He collaborates with various educational institutions and universities, as well as, research centres and FabLabs. He provided hundreds of sessions and workshops on 3D printing technology. He has delivered virtually thousands of hours of training related to 3D printing design methods and additive manufacturing.

Workshop Address: *Workshop on Application, Design and the Technology of 3D Printing*

If you ever wanted to get a hands-on experience with 3D Printers but never had a chance, then this is the workshop for you. The popularity and awareness of 3D Printing technology is expanding at enormous rate. Various technological barriers are breaking every day in modelling, design and manufacturing. What was impossible only just a few months ago is possible right now. Everyone involved in Computer Assisted System Engineering and ICT needs to know at least the basic understanding of 3D printers and their capability. And yes, you'll be able to gain exposure to the main facets of 3D Printing including 3D Scanning, 3D Modelling, smart materials, preparing the file for print, and finally, 3D Printing. This workshop provides a hands-on introduction and training of 3D printing technology for researchers, designers, engineers, technologists and hobbyists. This workshop is suitable for both novices and those more experienced with 3D Printing.

Workshop 2: Prof Robin Braun

Workshop Address: *Modern Telemetry, Data Engineering and the Future of Software Defined Networking (SDN)*

This workshop addresses fundamental questions regarding the future and applications of Software Defined Networking. Various concepts, elements and cases studies related to of SDN technology are discussed in context of 5G models of telecommunication.

Conference Location



Dongjiang Golf Resort Hotel

Address: No. 43, Putuo Road, Guilin 541004, China. Phone: +86 773 563 0888

Take the flight to Guilin's Liang-Jiang International Airport (International flight may transfer from Guangzhou or Shanghai), alternatively, you can fly to Guangzhou firstly, then take the high-speed train from Guangzhou to Guilin North Railway Station. The high-speed train is available from Guangzhou to Guilin (running for 2.5 hours), 40 trains every day, but due to the high demand, it is suggested that the train ticket be bought at least one day earlier via the following website: <http://english.ctrip.com/>

1. From Liang-Jiang International Airport (29 km):

Take the airport shuttle bus to the Civil Aviation Building (民航大厦), costs CNY¥20, then:

- Take a taxi to Guangxi Normal University (Yucui Campus),
- Go across the road opposite to Civil Aviation Building (民航大厦), take Bus Route No 85 or 16 to the Chaoyang intersection.
- Alternatively take taxi directly from Liang-Jiang International Airport to Guangxi Normal University (Yucui Campus), the total fare would be about CNY¥150.

2. From Guilin Railway Station:

- **By Bus:** Take bus route No. 16, air-conditioned buses, the fare is CNY¥2 which is to be dropped in the box at the bus entrance. The way to get the bus stop is to walk through the underground tunnel when stepping out of the Guilin Station, crossing the street, the station is in front of New Hyatt Kaiyue Hotel, it will arrive at the intersection of Chaoyang, that is, to the North gate of University.
- **By Taxi:** costs about CNY¥20 during the day.

3. From Guilin North Railway Station:

- **By Bus:** Take bus route no. 32, get off when approaching Chaoyang intersection
- **By Taxi:** Costs about CNY¥40 during the day

Accommodation Details

For accommodation, visit the self-booking website: <http://english.ctrip.com/>

The hotels listed below are around the campus, and we have negotiated competitive rates for the following two hotels: Dong-Jiang Golf Resort Hotel (*near Guangxi Normal University*) and the Guilin New Kwangsi Style Hotel. To book with the negotiated lower price, please send the request with your details to the conference organizer via email: 1971369972@qq.com

1. Dong-Jiang Golf Resort Hotel

- Address: No. 43, Putuo Road, Guilin 541004, China
- Phone Number: +86 773 563 0888
- Website: <https://tinyurl.com/y7wmunzb>

2. Guilin New Kwangsi Style Hotel

- Address: No. 40 Putuo Road, Qixing, 541004 Guilin, China
- Website: <https://tinyurl.com/ycoc3e95>

3. Guilin Biyu International Hotel

- Address: Qixing District, Wulidian Road on the 9th
- Telephone: +86 773 677 6666; +86 773 677 2222
- Website: <https://tinyurl.com/ya5lhbc3>

4. Vienna Hotel

- Address: Qixing District, Qixing Road, Qixing New Building, Wanda Square
- Telephone: +86 773 227 9999
- Website: <https://tinyurl.com/yathb363>

5. Jingyue Hotel

- Address: Qixing District Putuo Road on the 12th
- Telephone: +86 773 563 3333

6. 7 Days Inn: Qixing Road Area

- Address: Qixing District Tianxinli Road on the 2nd
- Telephone: +86 773 759 5197

