

Preface



IE'14 is the 10th anniversary of the Intelligent Environment series of conferences and, consequently, it is somewhat of a special event. Since the first edition of Intelligent Environments at the University of Essex in 2005, it has visited Athens in Greece (2006), Ulm in Germany (2007), Seattle in the USA (2008), Barcelona in Spain (2009), Kuala-Lumpur in Malaysia (2010), Nottingham in the UK (20011), Guanajuato in México (2012) then back to Athens in Greece (2013) before heading to Shanghai in China for the current, 2014, edition.

Intelligent Environments is a continuously evolving field, changing in response to both advances in technology and research. For example, the early conferences had a heavy focus on smart home applications but more recent conferences have seen a shift towards smart cities. Being our 10th anniversary, we have managed to engage, Dr Gordon Hunter, the only person that has submitted a paper to every edition of IE, to provide what promises to be a fascinating keynote talk describing some of these changes. One of those changes to this year's edition is the addition of an Education Forum, which reflects the increased interest in applying this technology to teaching and learning. In support of this, Professor Yuanchun Shi from Tsinghua University who has extensive experience of pervasive computing and smart classroom will be giving a keynote talk. 'Big Data' is another current hot-topic and Dr Yu Zheng, from Microsoft Research, will use his keynote talk to describe how urban computing can generate and use big-data to tackle some major issues that cities face such as air pollution, energy management and traffic congestion. This talk links well to another recent feature of the conference, an Industrial Forum that adopts the theme "*Smart City: Innovation-driven Industry Upgrading*". IE'14 prides itself as being a multidisciplinary forward-looking conference where participants get a chance to rub shoulders with researchers from other areas. This year that tradition is continued with papers from architecture, social science and businesses featuring amongst the presentation and a keynote talk from Doug Wolens the director of the widely acclaimed documentary about the technological singularity, a hypothetical moment in the future when (and if) machine intelligence surpasses human intelligence. The importance of this topic to researchers in Intelligent Environments eloquently conveyed by an article by the Physics Prize laureate from Cambridge University, Stephen Hawkins, who's article in the Huffington post on the 19th April 2014 stated "*...it's tempting to dismiss the notion of highly intelligent machines as mere science fiction. But this would be a mistake, and potentially our worst mistake in history*". This session surely will motivate much discussion at the conference. Another, innovation for this edition of Intelligent Environments is the inclusion of a set of '*Challenges*' which are competitions to promote innovative thinking and collaboration within the Intelligent Environment community. For

example the '*Intelligent Environments Challenge*' invites contestants to use an Intelligent Environment to perform specific tasks in a either a smart-home or smart-classroom whereas the '*Micro SciFi-Prototype Challenge*', from the Creative Science Foundation, invites IE'14 attendees to write a short description (about 28 words) to describe how intelligent environments research might contribute to product or business innovation.

In addition to these activities there are a number of supporting workshops which include the 9th Workshop on *Artificial Intelligence Techniques for Ambient Intelligence* (AITAmI'14), the 4th Workshop on *Creative Science 2014* (CS'14), the 3rd edition of our Workshop on *Future Intelligent Educational Environments* (WOFIEE'14), the 3rd International Workshop on the Reliability of Intelligent Environments (WoRIE 2014), the 2nd Workshop on the *Cloud-of-Things 2014* (CoT'14), the 2nd International Workshop on *Applications of Affective Computing in Intelligent Environments* (ACIE'14) and the 1st Workshop on *Hyper Realistic Intelligent Environments 2014* (HyperRealitIE'14) with papers being published as a volume of the IOS Press Ambient Intelligence and Smart Environments book series (ISI indexed and electronically available through the ACM Digital Library). In addition, this year, we have introduced another new type of event, '*The Sandpits*' which function like publicationless workshops, providing an opportunity for attendees to get some valuable hands-on experience developing practical skills. This year we have started with *Imagine'14* that introduces workshop and conference attendees to the use of Science-Fiction Prototyping as a means of innovating new products or areas of research. We are also marking the tenth anniversary of the series of IE conferences, by launching a supporting organisation (the *Association for the Advancement of Intelligent Environments*) that will provide a means for everyone with an interest this research area to be involved in proposing, organizing and participating in events to further work in this area. Initially, the association will have three journals associated with its work; the Journal of Ambient Intelligence and Smart Environments (JAISE), the Journal of Reliability in Intelligent Environments and the Transactions of Future Educational Environments (TOFIEE). We will be contacting you about this later in the year.

Beyond the technical focus there are numerous social activities associated with the conference such as the gala dinner in the Xiao Nan Guo (Shanghai Min) restaurant which includes a performance from the Shanghai Jiaotong Student Chinese Orchestra, and a Spanish dance from the multi-talented Intelligent Environments regular, Minjuan Wang, a Professor of Learning Design and Technology at San Diego State University and the Oriental Scholar of Shanghai International Studies University. To mark the tenth Anniversary of the conference we commissioned Juan Carlos Zamudio, to compose a special '*International Environments Overture*' based on inspirations from aspects of the differing cultures the conference has visited which we will be playing at the conference, something we are all looking forward to.

Apart from describing the exciting events that IE'14 is offering, we would also like to thank the organizing committee and, especially the local organizing committee at the Shanghai Jiaotong University who designed and supported this event so effectively. Likewise we wish to acknowledge our program committee and the external reviewers (all listed below) who took time from their busy agendas to provide feedback on the submissions and organise IE'14 activities. In addition, we need to say a special word of thanks to our sponsors: IEEE Systems, Man & Cybernetics Society Technical Committee, Taylor & Francis Group, IOS Press, Intel, British Telecom, FortiTo and China ComService.

Finally, we want to express our deep gratitude to all the researchers attending IE14, as it is their inspired research and participation that makes the Intelligent Environments conferences the very special experience they are.

We welcome you all to IE'14 and hope you enjoy the conference and venue.

Proceedings Editors

Vic Callaghan, *University of Essex, United Kingdom*
Liping Shen, *Shanghai Jiaotong University, China*
Simon Egerton (Monash University, Malaysia)
Ruimin Shen (Shanghai Jiaotong University, China)
Jianbo Su (Shanghai Jiaotong University, China)
Juan Carlos Augusto (Middlesex University, UK)
Tongzhen Zhang (Shanghai Jiaotong University, China)

Programme Chairs

Vic Callaghan, *University of Essex, United Kingdom*
Liping Shen, *Shanghai Jiaotong University, China*

General Chairs:

Ruimin Shen (Shanghai Jiaotong University, China)
Jianbo Su (Shanghai Jiaotong University, China)

Workshop Chairs

Juan Carlos Augusto (Middlesex University, UK)
Tongzhen Zhang (Shanghai Jiaotong University, China)

Publications Chair

Simon Egerton (Monash University, Malaysia)

Publicity & Social Media Chairs

Victor Zamudio (Instituto Tecnológico De León, Mexico)
Du Jing (Tsinghua University, China)
Jeannette Chin (Anglia Ruskin University, UK)

Financial Chairs

Michael Weber (University of Ulm, Germany)
Juan Botia Blaya (Universidad de Murcia, Spain)
SU Zhihua (Shanghai Jiaotong University, China)

Professional Society Liaison

Diane Cook (Washington State University, USA)

Poster Chairs

Davy Preuveneers (KU Leuven, Belgium)
Chang-Shing Lee (National University of Tainan, Taiwan)
Shumei Zhang (Shijiazhuang University, China)

Doctoral Colloquium Chairs

Gordon Hunter (Kingston University, UK)
Nicholas Wickström (Halmstad University, Sweden)
Heng Luo (University of Montreal, Canada)

Demos & Video Chairs

Fahim Kawsar (Bell Labs, Belgium)
Aaron Crandall (Washington State University, USA)
Gang Chen (Shanghai Jiaotong University, China)

Student Chairs:

Anasol Peña-Rios (University of Essex, UK)

Hsuan-Yi Wu (National Taiwan University, Taiwan)

Bowen Xie (Shanghai Jiaotong University, China)

Shanghai Education Forum (Theme: Future Intelligent Education Environments)

Dr Minjuan Wang (San Diego State University /Shanghai Int'l Studies University)

Dr. Sabine Lawless-Reljic (Ashford University, USA)

Virtual Conference Chair:

Marc Davies (University of Essex, UK)

Strategic Programmes Chairs

Sumi Helal (University of Florida, USA)

Juan Carlos Augusto (Middlesex University, UK)

Social Activities:

Liping Shen (Shanghai Jiaotong University, China)

Tongzhen Zhang (Shanghai Jiaotong University, China)

Michael Gardner (University of Essex, UK)

Minjuan Wang (San Diego State University)

Lorah Wood Bodie (San Diego State University)

Juan Carlos Zamudio ((Indiana University)

Programme Committee (alphabetical order)

- Waleed Abdulla - University of Auckland, New Zealand
- Mohammad Akhlaghinia - Nottingham Trent University, UK
- Dilaksha Attananyake - Kingston University, UK
- Asier Aztiria - University of Mondragon, Spain
- Javier Bajo - Universidad de Salamanca, Spain
- Spyridon Bakas - Kingston University, UK
- Joerg Baus - DFKI GmbH, Germany
- Michael Beigl - TECO/KIT, Germany
- Lorah Bodie - San Diego State University, USA
- Kenneth Camilleri- University of Malta
- Marcello Cinque - University of Naples, Italy
- Graham Clarke - University of Essex, UK
- Pau Climent-Perez - Kingston University, UK
- Jennifer O'Connor - National University of Ireland, Galway, Eire
- David Corney - City University, London, UK
- Fulvio Corno - Politecnico di Torino, Italy
- James Crowley - INRIA Grenoble, France
- Jinshi Cui - Peking University, China
- Konstantinos Daflos - National Technical University of Athens, Greece
- Susi Daryanti - Universitas Gadjah Mada, Indonesia
- James Denholm-Price - Kingston University, UK
- Faiyaz Doctor - Coventry University, UK
- Hugo Estrada Esquivel - CENIDET, Mexico
- Ava Fatah, University College London, UK
- Sven Fleck - SmartSurv Vision Systems GmbH, Germany
- Kim Flintoff (Curtin University, Australia)
- Patrick Gebhard - DFKI GmbH, Germany
- Bjorn Gottfried - University of Bremen, Germany
- Mingyi GU - Shanghai International Studies University, China
- Hans Guesgen - Massey University, New Zealand
- Liying Hao - Shanghai Education Forum

- Hakan Haberdar - University of Houston, USA
- Jim Hensman - Coventry University, UK
- Miguel J. Hornos - University of Granada, Spain
- Idham Muhammad Ananta Timur - Universitas Gadjah Mada, Indonesia
- Dino Isa - University of Nottingham Malaysia
- Pabico Jaderick - University of the Philippines
- Javier Jaen - Polytechnic University of Vale, Spain
- Angel Jimenez-Molina - Universidad de Chile, Chile
- Rui Jose University of Minho, Portugal
- Fujinami Kaori -Tokyo Univ. of Agriculture and Technology, Japan
- Fahim Kawsar - Bell Labs, Belgium
- Irene Kotsia - Middlesex University, UK
- Tobias Kowatsch - University of St.Gallen, Switzerland
- Alexander Kroner - Georg Simon Ohm University of Applied Sciences, Germany
- Caroline Langensiepen - Nottingham Trent University, UK
- Choonhwa Lee - Hanyang University, South Korea
- Giorgos Lepouras - University of Peloponnese, Greece
- Fei Li - Vienna University of Technology, Austria
- Seng Loke - La Trobe University, Australia
- Antonio Lopez - University of Oviedo, Spain
- Ahmad Lotfi - Nottingham Trent University, UK
- Jose Machado - Uiniversity of Minho, Portugal
- Goreti Marreiros - GECAD/ISEP-IPP, Portugal
- Alicia Martinez-Rebollar - CENIDET, Mexico
- Rene Meier - Trinity College Dublin, Eire
- Davide Merico - University of Milan-Bicocca, Italy
- Jim Miller - Smith College, USA
- Jose Molina - Universidad Carlos III, Spain
- Dorothy Monekosso - University of West England, UK
- Subhas Mukhopadhyay - Massey University, New Zealand"
- Andres Muñoz - Universidad Católica San Antonio Murcia, Spain
- Tatsuo Nakajima - Waseda University, Japan
- Nayyab Zia Naqvi, KU Leuven, Belgium
- Hongbo Ni - Northwestern Polytechnical University, China
- Paulo Novais - University of Minho, Portugal
- Juan Ortega - University of Seville, Spain
- Giorgos Papakonstantinou - University of Thessaly, Greece
- Susanna Pirttikangas - University of Oulu, Finland
- Davy Preuveneers - KU Leuven, Belgium
- Arun Ramakrishnan - University of Leuven, Belgium
- Carlos Ramos - Polytechnic of Porto, Portugal
- Rozeha Rashid - Universiti Teknologi Malaysia
- Andreas Riener - University of Linz, Austria
- Martin Rieser - De Montfort University, UK
- Teresa Romao - FCT/Universidade Nova de Lisboa, Portugal
- Mario Romero - KTH Royal Institute of Technology, Sweden
- Dolores Royo - Universitat Politècnica de Catalunya, Spain
- Usa Sammapun - Kasetsart University, Thailand
- Klaus Schmidt -Illinois State University,USA
- Aidan Slingsby - City University, London, UK

- Greg Snow - San Diego State University, USA
- Xiang Su - University of Oulu, Finland
- Riku Suomela - Nokia, Finland
- Vincent Tam - University of Hong Kong, Hong Kong
- Kia Hock Tan - Universiti Tunku Abdul Rahman, Malaysia
- Jilei Tian - Nokia Research Center Beijing, China
- Susan Toma-Berge (University of California, Irvine, USA)
- Sonia Tzimopoulou - NTUA, Greece
- Geert Vanderhulst - Bell Labs, Belgium
- Jatila van der Veen - University of California, Santa Barbara, USA
- Alessio Vecchio - University of Pisa, Italy
- Stavros Vergopoulos - University of Thessaloniki, Greece
- Fang Wang - Brunel University, UK
- Erik Wilde - UC Berkeley, USA
- Roman Yampolskiy - University of Louisville, USA
- Xianmin Yang - Jiangsu Normal University
- Albert (Wai) Yeap - Auckland University of Technology, New Zealand
- Takuro Yonezawa - Keio University, Japan
- Shumei Zhang - University of Shijiazhuang, China
- Ping Zheng - Canterbury Christ Church University, UK