



5th International Conference on Computer and Communication Engineering (ICCCE 2014)

Emerging Technologies via Comp-unication Convergence

Sunway Putra Hotel, Kuala Lumpur, Malaysia
23rd – 25th September 2014

Organized by



International Islamic University
Malaysia



Kulliyah of Engineering



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OPENING CEREMONY



Opening Ceremony

Date: 24 September 2014/ Wednesday
Venue : Sunway Putra Hotel, Kuala Lumpur

9:30 am	:	Arrival of Guests
9:45 am	:	Arrival of Guest of Honour, YBhg. Prof. Dato' Sri Dr. Zaleha Kamaruddin, Rector of IIUM
10:00 am	:	Arrival of YBhg. Tan Sri Dato' Seri Utama Dr. Rais Yatim, President of IIUM
10:10 am	:	Al-Quran Recitation
10:15 am	:	Welcoming Speech by Emeritus Prof. Dato' Wira Ir. Dr. Md. Noor Salleh Chairman of IIUM Engineering Congress 2014
10:25 am	:	Welcoming Address by YBhg. Prof. Dato' Seri Dr. Zaleha Kamaruddin Honourable Rector of IIUM
10:35 am	:	Speech & Opening Address by YBhg. Tan Sri Dato' Seri Utama Dr. Rais Yatim President of IIUM Official Launching of IEC' 14 and Celebration of 20th Anniversary of Kulliyah of Engineering
10:50 am	:	Presentation of Certificates to Sponsors
11:00 am	:	Refreshments



BANQUET DINNER



Banquet Dinner

Date: 23 September 2014/Tuesday
Venue : Sunway Putra Hotel, Kuala Lumpur

- 8:00 pm. : Arrival of Guests
- 8:15 pm. : Welcoming Remarks by Master of Ceremony
- 8:20 pm : Speech by the Chairman of the IIUM Engineering Congress (IEC' 14)
- 8:30 pm : Recitation of Du'a
- 8:35 pm : Dinner
- : Presentation by CiTRA Musical Group, IIUM
- 10:00 pm : End of Programme

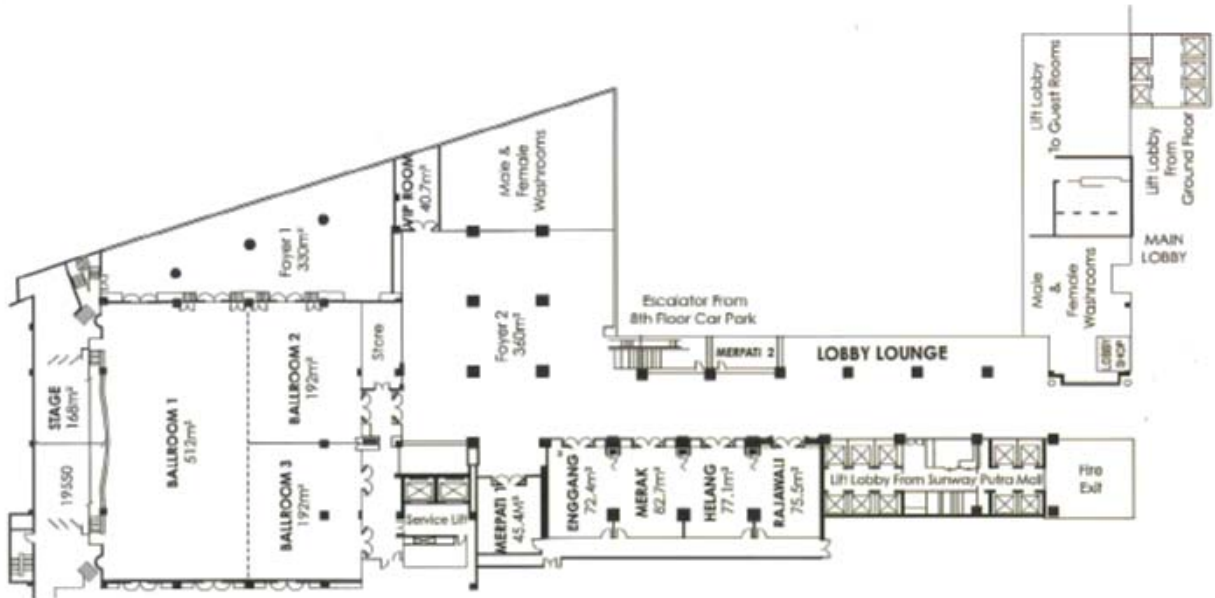


ICCCE'14 VENUE

SUNWAY PUTRA HOTEL - KUALA LUMPUR (LAYOUT PLAN MEETING AND EVENTS)

- 9th Floor -

BALLROOM 1, 2, 3
TOTAL AREA - 896 sq. meter
FOYER TOTAL AREA - 690 sq. meter



1st and 2nd day:

Ballroom 1 Level 9 – ECE

Merak Level 9 - ECE

Meeting room 2 - ECE

FOREWORD FROM THE ICCCE'14 CHAIRMAN



Prof. Dr Othman Omran Khalifa

Chairman

International Conference on Computer and Communication Engineering (ICCCE'14)

Faculty of Engineering

International Islamic University Malaysia

Assalaamu'alaikum Warahmatullaahi Wabarakaatuh

The Department of Electrical and Computer Engineering (ECE), Faculty of Engineering at the International Islamic University Malaysia (IIUM) is pleased to organize the 5th International Conference on Computer and Communication Engineering 2014 (ICCCE'14). The theme of this conference is "***Emerging Technologies via Comp-unication Convergence***". The main objective of this conference is to provide an international technical forum for engineers, academicians, scientists and researchers to present results of their ongoing research in the field of Computer and Communications Engineering. The series of conferences has proven to be an effective medium where institutions of research, learning and industries meet to share ideas, innovations and problem solving techniques.

On behalf of the ICCCE'14 organizing committee, we are very pleased with the responses that we received from participants worldwide. With the participation of such large number of international scholars in the field of Computer and Communication Engineering, it is hoped that participants will find this conference to be an effective medium for sharing ideas and exchanging views on research activities for sustainable development to serve mankind.

I would like to take this opportunity to express my deepest gratitude to distinguish key note speakers, International Advisory Board members, sponsors and organizing committee. I am also grateful to all the reviewers, without their efforts the high standard for the conference could not have been attained.

Wassalam

ORGANIZING COMMITTEE

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Co-Chairman

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Rosminazuin Ab. Rahim

Wajdi Al-Khateeb

CONFERENCE TOPICS

Satellite, Space and Wireless Communications
Antennas and Propagation
3G, 4G Mobile Communications
RF and Microwave Devices
Information Theory and Coding
Computer Networks and Security
Network Reliability and QoS
Software Engineering and Agile Development
Neural Networks and Intelligent Systems
Bioinformatics Engineering
Ethics in Informatics and Engineering
Instrumentation and Control
Optical Communications and Photonics
Signal and Image Processing
Multiple Access Techniques
High Performance Networks and Protocols
Computer Architecture and Desing
Data Mining and Database Applications
Multimedia and Web Services
Agents, Knowledge-Based Technologies
Communications IC Design
VLSI Design
Green ICT

REVIEWERS

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Norasmahan Muridan
Norun Fariyah Abdul Malek
Nurul Fadzlin Hasbullah
Nurul Fariza Zulkurnain
Nuurul Huda Mohd Sobli
Rashidah Funke Olanrewaju
Rashid A. Saeed
Rosminazuin Ab. Rahim
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S.M.A. Abdul Motakabber
Saad Osman Bashir
Sameh Gobran
Shamsollah Ghanbari
Shihab Ahmed Hameed
Sheroz Khan
Shukor Sanim Mohd Fauzi
Siti Norjannah Ibrahim
Suriza Ahmad Zabidi
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Teddy Surya Gunawan

Wajdi Al-Khateeb
Waleed Faris
Wellington Maycon S. Bernardes
Zahirul Alam
Zuhairiah Zainal Abidin

KEYNOTE SPEAKER 1

**ASSOCIATE PROFESSOR DR. ISMAIL MUSIRIN**

Director, Community of Research (CoRe),
Advanced Computing and Communication (ACC),
Universiti Teknologi Mara (UiTM) Shah Alam, Malaysia

Assoc. Prof. Dr. Ismail Bin Musirin obtained Bachelor of Electrical Engineering (Hons) in 1990 from Universiti Teknologi Malaysia, MSc Pulsed Power Technology in 1992 from University of Strathclyde, United Kingdom and PhD in Electrical Engineering from Universiti Teknologi MARA (UiTM), Malaysia in 2005. He is currently an Associate Professor at the Faculty of Electrical Engineering, UiTM and the Director, Community of Research (CoRe), Advanced Computing and Communication (ACC) at UiTM. He has authored and co-authored 2 books, over 65 international journal papers and 200 international indexed conference papers. He is also an international journal reviewer for IEEE Transactions, Elsevier Science, WSEAS, Energy Policy, International Journal of Physical Science and many others. He has been the organizing chair for International Power Engineering and Optimization Conference (PEOCO) for the past eight years since 2007. He has delivered a keynote speech at 2009 WSEAS international Conference on Knowledge and Data Bases (AIKED2009) at Cambridge University, United Kingdom and International Conference on Computing, Mathematics and Statistics (iCMS2013), Malaysia. He has examined numerous PhD and MSc theses from local and foreign universities. His research interest includes artificial intelligence, optimization techniques, power system analysis, renewable energy, distributed generation and power system stability. He is a senior member of Institute Electrical and Electronics Engineers (IEEE), Senior Member of International Association of Computer Science and Information Technology (IACSIT), and a member of Artificial Immune System Society (ARTIST).

AI APPLICATIONS TECHNIQUES FOR SOLVING ENGINEERING PROBLEMS

Artificial Intelligence (AI) has been known as the promising technique in solving multi-mode problems such as Engineering, Mathematics, Sciences and even Social Sciences. AI can be subdivided into three categories namely Artificial Neural Network (ANN), Evolutionary Computation (EC) and Fuzzy Logic (FL). ANN was originally meant for prediction process; while EC and FL are meant for optimization and decision making processes. This talk presents computational intelligence: black-box prediction and optimization. The talk aims to expose the participants on basic black-box modelling using ANN and its applications in science and engineering. On the other hand, several optimization techniques will be presented to solve several optimization problems related to engineering. Amongst the popular computational intelligence optimization techniques are Genetic Algorithm (GA), Evolutionary Programming (EP), Artificial Immune System (AIS), Particle Swarm Optimization (PSO) and Ant Colony Optimization Technique (ACO). The process flow of these techniques will be highlighted so as to make decision on the suitable techniques for solving optimization problems.

KEYNOTE SPEAKER 2

**PROFESSOR A.R. AL-ALI**

Computer Science and Engineering Department
American University of Sharjah, UAE

Professor A. R. Al-Ali (SM IEEE) received his Ph.D. in electrical engineering and a minor in computer science from Vanderbilt University, Nashville, TN, USA, 1990; Master degree from Polytechnic Institute of New York, USA, 1986 and B.Sc.EE from Aleppo University, Syria, 1979. From 1991-2000, he worked as an associate /assistant professor in KFUPM, Saudi Arabia. Since 2000 and till now, he has been a professor of computer engineering at the American University of Sharjah, UAE. His research and teaching interests include: embedded systems hardware and software architectures, smart homes automations, smart grid evolutions and development, remote monitoring and controlling industrial plants utilizing Internet, GSM, and GPRS networks.

Dr. Al-Ali has more than 100 conference and journal publications including two USA and European Patents. Professor Al-Ali has been invited to deliver keynote speeches on the recent evolution and development in the smart grid in several international conferences.

CLOUD COMPUTING PARADIGM AS SMART GRID ENABLING TECHNOLOGY

As the smart grid is rolling out from its' conceptual model into the implementation phase, scalability, security and huge data are becoming issues that may slowdown the performance and efficiency of such large scale smart grid.

Within the smart grid context, utilities should have data center that are equipped with large high speed computing infrastructure, huge data storage capacities and wide spread telecommunication networks as well as software platforms to maintaining and operating the grid efficiently.

Building large data center infrastructure takes long time, requires wide spread communication networks and huge capital cost. In addition, the center must have trailed operation and maintenance software package such as distribution management system (DMS), geographic information systems (GIS), outage management systems (OMS), customer information systems (CIS) and supervisory control and data acquisition system (SCADA). Maintaining and upgrading the data center infrastructure and communication networks as well as renewing the software package licenses cost adds to additional capital running cost.

An emerging computing paradigm such as cloud computing can be used as the smart grid enabler to replace the current data center. As best described by the NIST, "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".

The talk will highlight the cloud computing service and development models. Mapping the smart grid NIST existing seven domain conceptual models with the cloud computing NIST service models will be explored. Also, the smart grid information and telecommunications layers will be mapped with the NIST cloud computing deployment models mainly private, public, community and hybrid models.

KEYNOTE SPEAKER 3**PROFESSOR KHALID AL-KHATEEB**

Senior Professor of Electronics and Communications
 Department of Electrical and Computer Engineering
 International Islamic University, Malaysia

In 1975 Prof. Dr. Khalid Al-Khateeb got his PhD in Electronics and Optical Communications at Manchester University, MSc in Electronic Science, Salford University UK, BSc (Hon.) in Electronics, Royal College UK, and then he got Diploma in Islamic Revealed Knowledge at IIUM.

He became a member of a number of Professional Institutions including MIEE, C.Eng., M Inst P, M. Iraqi Eng. Assoc (Consultant). He started his Academic Career as a Lecturer, then Assistant Professor, Associate Professor, Professor, and now Senior Professor. He worked at Universities in many countries, including U.K., Iraq, U.S.A., Algeria, Jordan, and Malaysia

His research interests include: Electronics, Communications, and Modern Material Science. He filed a number of patents in a variety of engineering applications ranging from Tracking and Guidance, Communication Security, Wireless Personal Networks and Novel Material for Osseointegration.

While at IIUM he produced more than 100 publications as Research Papers in Journals, International Conferences, Books, and Book Chapters.

THE EVOLUTION OF TELECOMMUNICATIONS

No branch of human knowledge or science has witnessed an escalation and fast growth as Electronics and Communications. Since the turn of the last century Telecommunications has had a marked effect on the quality of human life and modes of behavior.

The need for telecommunications has been a major concern to humans since the dawn of history. Primitive peoples used smoke signals; Bedouins used hill top fires etc. More realistic telecom techniques came much later as the shutters and lantern used by ships. Ironically this primitive technology used free space optics (FSO) and digital signaling, which is considered nowadays as one of the modern sophisticated systems.

A real technological leap however came at the hands of Alexander Graham Bell in his analogue FSO system. He used sun rays as a source and a selenium cell as a detector. Another major contribution came from Marconi, in which he used radio-waves, which lead to the age of Radio Broadcasting. The development of the Radio played a vital role as new mass media source of communications for news, education, entertainment etc. Broadcast systems were improved to such levels that transmission powers reached unprecedented levels. Radio systems soon found their way to Military and Commercial applications.

Antenna designs, amplifiers and signal conditioning circuits became major University topics, where major theoretical contributions by ingenious theoretical and experimental scientists were taught and elaborated by new research efforts. The ionosphere was discovered and its reflection properties made the range of telecommunications cover the entire Globe with a variety of frequencies; MW, SW1, SW2, etc. for different times and different locations. Various phenomena were studied to improve fidelity, and reduce noise with modulation techniques as AM, FM etc.

World War II witnessed the age of mass produced electronic devices which were initially based on Thermionic Valves. The advent of the transistors however opened a new horizon and widened the scope of communication devices to be much smaller in size, use less power, and provide a much more efficient means of communications.

The combination of printed circuit boards with discrete semiconductor components has soon led to the integrated circuits, followed by digital integrated circuits. A real revolution in the world of electronics and communications has begun. Medium scale integration (msi) technology was soon followed by large scale integration (LSI) which resulted in miniature devices, which are faster and more compact. Digital integrated circuits soon followed. Digital CMOS technology further reduced the power consumption to extreme levels and improved the retention of stored information. John Moore came up with an empirical law, more like a prophecy. The Law states that the size of integrated circuits will be halved while the speed and capacity will be doubled every 18 months. True enough this law has been holding well since the nineteen sixties.

The increasing demand for large bandwidths for telecom and TV, which use short range line of site microwave links, soon became inadequate, contrary to the Radio broadcasting, which utilizes ionosphere reflection for long range transmission. The charge density in the ionosphere could not support the reflection of high frequencies such as microwaves. This necessitated the use of space stations, i.e. transponders onboard geostationary satellites acting as relay stations. This opened a new era in worldwide space telecom.

Around mid seventies Citizens' Band Radio became quite popular especially among long distance truck drivers in the US and elsewhere. The 40 available channels enabled drivers to inform each other about traffic conditions, police traps, connection with home etc. The mobile phones soon followed in the early eighties. At the same time digital technology has been progressing at a very fast rate. A calculator which performs only the 4 operations cost about \$80 in 1972. In 1973 a calculator with full scientific functions and 2 memory locations and rechargeable battery costs no more than \$30. The HP produced a series of intelligent calculators.

Microprocessors became more elaborate, smaller in size with more and more facilities for programming and memory storage soon led to the Personal Computers (PCs). Digital processing techniques combined with digital communications resulted in a huge revolution with unlimited possibilities and fantastic achievements were accomplished. Recent developments could not have been imagined a decade or two ago. New devices and new wired and wireless networking techniques made it possible for a single device to access huge data bases, communicate anytime with anyone anywhere in the world at the touch of a button.

Considering a Smart Phone or an iPad; is it a telephone, a computer, a camera, a memory device, a fax, a word processor, a GPS ... or is all these combined. Therefore we have reached the age of integration by Converging Technologies. This is the theme of our present conference and we hope the effort of our colleagues, Scientists, Engineers, and Researchers will push the wheel of progress further and further.

MALAYSIA – TRULY ASIA



With the land size of 329,758 sq km the Federation of Malaysia comprises of Peninsular Malaysia and the states of Sabah and Sarawak on the island of Borneo. Located between 2° and 7° north of the Equator, Peninsular Malaysia is separated from the states of Sabah and Sarawak by the South China Sea. To the north of Peninsular Malaysia is Thailand while its southern neighbour is Singapore. Sabah and Sarawak are bounded by Indonesia while Sarawak also shares a border with Brunei.

Malays who make up about 57% of the 25 million populations are the predominant group in Malaysia, with Chinese, Indians and other ethnic groups making up the rest. Bahasa Melayu (Malay) is the national language but English is widely spoken. The ethnic groups also speak various languages and dialects. The official religion in Malaysia is Islam but all other religions are freely practiced.

Malaysia is blessed with a tropical climate with warm weather all year round. The temperatures ranged from around 21°C (70°F) to 32°C (90°F) and the annual rainfall varies from 2,000mm to 2,500mm. Manufacturing constitutes the largest single component of Malaysia's economy. Tourism and primary commodities such as petroleum, palm oil, natural rubber and timber are other major contributors to the economy.

Malaysia is divided into Peninsular Malaysia (West Malaysia) and East Malaysia. The capital, Kuala Lumpur, lies midway along the West Coast of Peninsular Malaysia. Kuala Lumpur represents the heartbeat of Malaysia, serving as its administration, cultural, commercial and transportation centre.

It all began in the Middle of the 19th century when a group of tin prospectors came to settle around the convergence of the Klang and Gombak rivers. This marked the foundation of Kuala Lumpur and it has been its share of growth and setbacks to become metropolitan centre of today.

With a population of over 1.3 million, Kuala Lumpur is by far the largest city in Malaysia. Malays, Chinese and Indians comprise the main races among others in this multicultural backdrop. This ethnic diversity has shaped the city over the years and is clearly seen in the various cultural customs and religious beliefs, as well as languages, cuisines and architecture.

Better known as KL to the locals, the city is a heady mix of history and culture intertwined with mushrooming skyscrapers and office towers. Kuala Lumpur is one of the best examples of a city that has managed to preserve the best of its cultural heritage and combine it with modern conveniences to offer a wholly unique experience to visitors.

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA (IIUM)



IIUM was established in 1983 to fulfill one of the major aspirations of the contemporary global Muslim community. This yearning of the Ummah is a key element in IIUM's vision statement: "To be an international centre of educational excellence which integrates Islamic revealed knowledge and values in all disciplines and which aspires to the restoration of the Ummah's leading role in all branches of knowledge."

IIUM operates under the direction of a Board of Governors with representatives from the eight sponsoring governments and the Organization of Islamic Conference (OIC). Currently, IIUM is home to over 15,000 students including students from more than 100 countries and 3,000 teaching and administrative staff members.

The university's current physical facilities are located at three sprawling campuses in Gombak, Kuala Lumpur, and Kuantan, and a Matriculation Centre in Petaling Jaya. This is a far cry from its humble beginnings in 1983 when it operated from temporary quarters with 153 students and a handful of lecturers and administrators.

IIUM offers a wide range of academic programmes through its faculties of Science, Laws, Medicine, Engineering, Islamic Revealed Knowledge and Human Sciences, Economics and Management, Nursing and Allied Health Sciences and Architecture and Environmental Design. These are geared towards both skill-building and scholastic attainments and designed in accordance with IIUM's philosophy, which is built upon the belief that knowledge must be pursued and propagated in the spirit of tawhid, as an act of worship, in full recognition that it is a trust which Allah has placed upon mankind. Malaysian graduates of IIUM have performed well in both the public and private sectors. Since 1987 IIUM has been producing about 3,000 graduates annually.



Website: <http://www.iium.edu.my>

KULLIYAH OF ENGINEERING, IIUM



The mission of the Faculty of Engineering is to provide quality engineering education, with sufficient scope to include fundamental and specialized knowledge and practice in engineering and a broad base in management, ethics, and humanities. This will enable our graduates to be ready to serve the current and emerging needs of the society.

Besides being professionally qualified and competent, the graduates will acquire spiritual, intellectual, moral and ethical characteristics towards the development of an integral and harmonious relationship with Allah (the creator), fellow human beings and with the natural environment. The interdisciplinary approach to engineering education not only allows the graduates to solve industrial and human problems; it will also enable them to bring about and manage changes in conformity with the worldview based on the principles of Islam.

Currently, there are eight programmes being offered: Aerospace Engineering, Automotive Engineering, Biotechnology Engineering, Communication Engineering, Computer and Information Engineering, Manufacturing Engineering, Materials Engineering, and Mechatronics Engineering. The faculty is also offering postgraduate engineering programmes leading to MSc. and Ph.D. degrees. At the moment the student population at the undergraduate level stands at 1981 with 200 students at the postgraduate level.

Research and development is one of the primary activities in the Faculty of Engineering and there are excellent facilities, qualified and competent academic staff, and conducive environment which enhance active participation in research activities in various fields of Engineering. To foster research collaboration amongst faculty members, research units and research groups have been established. Presently, there are three research units and fifteen research groups which span various areas of engineering, encompassing both conventional and emerging fields. There are also well equipped Advanced Laboratories to support research and development activities and postgraduate studies. The Faculty of Engineering offers PhD and Master degree programmes. The PhD programme is by research whereas the Master degree programme is conducted in three modes, namely, research only, mixed mode (equal number of credits for both courses and research), and courses only. It offers eight master programmes in the following areas: Automotive Engineering, Biotechnology Engineering, Communication Engineering, Computer and Information Engineering, Electronic Engineering, Manufacturing Engineering, Material Engineering, Mechatronics Engineering. There are also the Executive Master degree programmes by taught courses run by Advanced Engineering and Innovation Centre (AEIC).

 Kulliyah of Engineering IIUM



"World class centre of engineering education
and research with values and ethics"

Website: <http://eng.iium.edu.my>

ACKNOWLEDGEMENT

The organizing committee acknowledges the efforts of all those who have contributed their valuable time and efforts as reviewers in ensuring high quality technical papers for the IIUM Engineering Congress 2014.

Deepest appreciation to all faculty members of the Kulliyyah of Engineering, International Islamic University Malaysia (IIUM) for their sincere cooperation in making the conference successful. Appreciation also goes to all parties who have contributed to the success of the IIUM Engineering Congress 2014.

Finally, the organizing committee would like to express their thanks to the following companies for sponsoring this congress:

Malaysian Industry-Government Group for High Technology
Felda Wellness Corporation
Yayasan Kesejahteraan Bandar
Malaysia Convention and Exhibition Bureau (MyCEB)
University Putra Malaysia