PREFACE

This volume contains the papers accepted to the International Conference on Global Sustainability and Chemical Engineering (ICGSCE), 2014. ICGSCE is a three day International Conference organized by Faculty of Chemical Engineering, University Technology MARA, Malaysia during 20th-22nd August 2014 at Mid Valley City Kuala Lumpur. It provides a platform for scientists and academicians from University and Industry all over the world to promote, share and discuss various new issues and developments in different areas of Chemical Engineering aspects in terms of global sustainability. The goal of this conference is to explore the diversity of researches ranging from fundamental to applied researches being undertaken in the identified fields which have the potential to impact on global sustainability. New ideas can be developed as a key outcome of the conference for meeting the challenges encountered in the individual process for meeting the global sustainability.

We received 300 manuscripts to be presented during the conference and of those submissions, eventually 138 papers were selected and accepted to be published under Trans Tech Publications after a thorough two-phase reviewing process with External Reviewers and Editorial Board depending on the subject matter of the paper. After the peer-review process, the submitted papers were selected on the basis of originality, significance, and clarity for the purpose of the conference. The main conference themes and tracks were: (1) Advanced Materials Research; (2) Bio and Chemical Materials, Technologies and Applications; (3) Oil and Gas Research; (4) Modelling, Simulation and Control; (5) Environmental and Green Technologies. All accepted papers received either an oral or a poster presentation at the conference. For this conference, about 250 papers were selected to be presented during parallel session. While as, 50 papers were presented in the form of a poster. These proceedings are evidence of the resulting high-quality and exciting program.

Many people worked together in organizing ICGSCE 2014 and ensuring its success. ICGSCE 20154 would not have been possible without the strong support from numerous organizations and individuals. The efforts and support provided by all the authors, reviewers, sponsors, invited speakers, members of the advisory board and organizing team comprising students and faculty volunteers and all others who have contributed to the successful organization of this conference, are gratefully acknowledged. Many more people spent many hours on ICGSCE 2014 – many more than we could possibly acknowledge in this short preface. But we hope that they found their involvement just as interesting and fun as we did.

With our warmest regards

Dr Abdul Hadi Miradatul Najwa Mohd Rodhi Dr Fazlena Hamzah

Editors Faculty of Chemical Engineering Universiti Teknologi MARA Shah Alam Malaysia

Conference Committee

| Advisor: | Prof. Madya Dr Ayub Md Som | | | |
|--------------------------|---|--|--|--|
| Conference Chair: | Prof. Dr Ku Halim Ku Hamid | | | |
| Deputy Chairperson: | Prof. Madya Zulkafli Hassan | | | |
| Secretary: | Dr. Hazlina Husin | | | |
| Treasurer: | Amizon Azizan Suhaila Mohd Sauid Norasmah Mohammed Manshor | | | |
| General Protocol: | Tengku Amran Tengku Mohd Munawar Zaman Shahrudin Nor Faeqah Idrus Mohd Faizul Hassan Asdarina Dr Atikah Kadri | | | |
| Logistic: | Suffiyana Akhbar(Head) Rabiatul Adawiyah Abdol Aziz Zalizawati Abdullah Habsah Alwi Nadia Kamarrudin Sakinah Mohd Alauddin | | | |
| Head of Editorila Board: | Prof. Madya Dr Md Amin Hashim | | | |
| Publication: | Miradatul Najwa Mohd Rodhi(Head) Dr Fazlena Hamzah Dr Abdul Hadi Mohibbah Musa | | | |
| Sponsorship: | Azlinda Azizi(Head) Nur Hashimah Alias Nurul Aimi Ghazali Arina Sauki Effah Yahya Norrulhuda Mohd Taib | | | |
| Publicity & Press: | Nurul Asyikin Md Zaki(Head) Nurhaslina Che Radzi Noorsuhana Mohd Yusof | | | |
| IT & Technical: | Dr. Sherif Abdulbari Ali (Head) Hanafiah Zainal Abidin Noor Azizah Harun Ayu Dalina Rahim Mohd Nazmi Mukhelas Azril Mohamed Sharudin Ariff Azizan Nur Ermy Nadia Mohd Hussain Irwan Zainuddin Mohd Faeez Sarulan Zairul Hisham Zullkifli Mohd Idris Md Desah Mustaffa Mokhtar | | | |

International Committee

| Prof. Dr. Yoshihito Shirai | • • | Kyushu Institute of Technology, Japan |
|-----------------------------------|-----|---|
| Prof. Dr. Kevin J. Roberts | • • | University of Leeds, UK |
| Prof. Dr. Yee-Kwong Leong | • • | The University of Western Australia, Australia |
| Prof. Dr. Jo Voola | • • | The University of Western Australia, Australia |
| Dr. Joanne Edmondston | • • | The University of Western Australia, Australia |
| Prof. Emeritus K.B. Ramachandaran | • • | Indian Institute of Technology, India |
| Prof. Dr. Nosang Vicent Myung | • • | University of California, USA |
| Prof. Dr. Jae Ho Kim | | Ajou University, Korea |
| Dr. Farid Mulana | : | Universitas Syiah Kuala, Banda Acheh, Indonesia |

National Committee

| Prof. Ir. Dr. Mohd Jailani Mohd Nor | | Universiti Teknikal Malaysia Melaka |
|-------------------------------------|-----|-------------------------------------|
| Prof. Dato' Dr. Musa Ahmad | ٠. | Universiti Sains Islam Malaysia |
| Prof Ir. Dr. Mohd Omar Ab. Kadir | • • | Universiti Sains Malaysia |
| Prof. Dr. Darah Ibrahim | • • | Universiti Sains Malaysia |
| Prof. Dr. Wan Mohd Ashri Wan Daud | • • | Universiti Malaya |

Sponsors













