

Joint conference of  
**iMEC 2015**  
 (2nd International Manufacturing Engineering Conference)

&

**APCOMS 2015**  
 (3rd Asia-Pacific Conference on Manufacturing Systems)




12th -14th November 2015  
 Swiss-Garden Hotel,  
**Kuala Lumpur, Malaysia**

### Abstract:

The iMEC 2015 is the second International Manufacturing Engineering Conference organized by the Faculty of Manufacturing, Universiti Malaysia Pahang (UMP), held from 12-14th November 2015 in Kuala Lumpur, Malaysia, with a theme *"Materials, Manufacturing and Systems for Tomorrow"*. For the first time, iMEC is organized together with 3rd Asia-Pacific Conference on Manufacturing System (APCOMS 2015) which owned by Fakulti Teknologi Industri, Institut Teknologi Bandung (ITB), Indonesia. This is an extended collaboration between UMP and ITB to intensify knowledge sharing and experiences between higher learning institutions.

This conference (iMEC & APCOMS 2015) is a platform for knowledge exchange and the growth of ideas, particularly in manufacturing engineering. The conference aims to bring researchers, academics, scientists, students, engineers and practitioners from around the world together to present their latest findings, ideas, developments and applications related to manufacturing engineering and other related research areas. With rapid advancements in manufacturing engineering, iMEC is an appropriate medium for the associated community to keep pace with the changes. In 2015, the conference theme is *"Materials, Manufacturing and Systems for Tomorrow"* which reflects the acceleration of knowledge and technology in global manufacturing.

The papers in these proceedings are examples of the work presented at the conference. They represent the tip of the iceberg, as the conference attracted over 200 abstracts from Malaysia, Indonesia, Japan, United Kingdom, Australia, India, Bangladesh, South Africa, Turkey and Morocco and 151 full papers were accepted in these proceedings. The conference was run in four parallel sessions with 160 presenters sharing their latest finding in the areas of manufacturing process, systems, advanced materials and automation. The first keynote presentation was given by Prof. B. S. Murthy (IIT, Madras) on *"Nanomaterials with Exceptional Properties Synthesized through Top Down Approach"*, which was warmly welcomed by an eager and highly motivated audience. The second keynote speaker was Prof. Ir. Dradjad Irianto (ITB, Indonesia) on *"Collaborative Manufacturing for Small-medium Enterprises"*. The organizers are very grateful to them for supporting the conference and sharing their latest research results with the conference participants.

The conference organizers would like to express our sincere gratitude and thanks to the honorary chairman Prof. Dato, Dr. Daing Nasir Ibrahim and Prof. Dr. Wan Azhar Wan Yusoff and organizing committee members of iMEC2015, Assoc. Prof. Dr. A.K. Prasada Rao (chairman), Dr. Ing. Mohd Azmir Mohd Azhari (co-chairman), and all committee members Assoc. Prof. Dr. Ahmad Razlan Yusoff, Assoc. Prof. Dr. Ismed Iskandar, Dr Noraini Mohd Razali, Dr Muhammed Nafis Osman Zahid, Dr Noor Mazni Ismail, Dr Izwan Ismail, Dr



Zamzuri Hamedon, Dr Faiz Mohd Turan, Ms Suraya Sulaiman and secretariat Miss Zuryaty, Mrs Wan Norshihah, Mr. Mohd Khairulnazri and Mr Rafilah and also a million thanks to the steering committee from APCOMS Prof. Dr. Kadarsyah Suryadi, Prof. Dr. Bermawi, P. Iskandar, Prof. Dr. Abdul Hakim Halim, Prof. Dr. Dradjad Irianto, Dr. TMA Ari Samadhi, Ir. I Made Dana Tangkas and APCOMS organizing committee Prof. Dr. Abdul Hakim Halim (chair), Dr. Rachmawati Wangsaputra (co-chair) and other committee members Dr. Iwan Inrawan Wiratmadja, Dr. Anas Ma'ruf, Dr. Sukoyo and Dr. Wisnu Aribowo.

The editorial board are indebted to all of the reviewers who were willing to spend their precious time in reviewing the papers. Thanks also to all who contributed direct or indirectly in making this conference a success, especially Mr. Mohd Khairulnazri in helping the editors complete the proceedings.

Dr. Zamzuri Hamedon

*Editor in-chief*

*iMEC & APCOMS 2015*

Associate Editors

1. Assoc. Prof. Dr. A.K. Prasada Rao
2. Assoc. Prof. Dr. Ahmad Razlan Yusoff
3. Dr. Ing. Mohd Azmir Mohd Azhari
4. Dr. Muhammed Nafis Osman Zahid
5. Dr. Faiz Mohd Turan