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W. Sun, R. K. Leach, National Physical Lab. (United Kingdom)

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Q. Zhu, Y. Zhang, Capital Normal Univ. (China)

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K. G. Arakantsev, D. V. Zhukov, I. A. Konyakhin, Saint-Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation)

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Congratulations on the Convocation of ISPEMI 2010

It is my honor, on behalf of the International Committee on Measurements and Instrumentation (ICMI), to warmly congratulate the successful convocation of the 6th International Symposium on Precision Engineering Measurements and Instrumentation in Hangzhou, China.

The International Committee on Measurements and Instrumentation (ICMI) was established during the Second International Symposium on Measurement Technology and Intelligent Instruments, ISMTII'93, in Wuhan, China. Since then ICMI has organized a series of ISMTII symposia around the world: Hayama, Japan (1996), Miskolc Lillafured, Hungary (1998), Giza Cairo, Egypt (2001), Hong Kong, China (2003), Huddersfeld, UK (2005), Sendai, Japan (2007), and Saint-Petersburg, Russia (2009).

While symposia of ISMTII were being held in the rest of the world, another series of symposia, ISIST (International Symposium on Instrumentation Science and Technology) were held in China. The first symposium of ISIST, organized by Prof. J. B. Tan and Prof. Y. T. Fei, was held in Luoyang, China in 1999, as many scholars expressed their wish to attend the symposium in China. The second symposium, ISIST 2002, and First International Symposium on Precision Mechanical Measurement ISPMM 2002, were held in Jinan and Hefei, respectively. Therefore, ICMI has three series of symposia: ISMTII, ISIST, and ISPMM.

In order to make the subject areas of ISIST and ISPMM more precise, specific, and interdisciplinary, the organizing committees decided to combine them into one, and under the suggestion from the General Secretary of ICMI Prof. Yongsheng Gao, refer to it as International Symposium on Precision Engineering Measurements and Instrumentation (ISPEMI) from 2010 onward.

Precision Engineering Measurements and Instrumentation are closely related multidisciplinary fields and instrumentation science could create versatile instruments for precision measurements.

Finally, I wish to express my heartfelt thanks to all contributors, the members of ICMI, the members of the Honorary Committee, the members of the Program

Committee and Organizing Committee, as well as the Secretary General of the conference, for all of their tireless work and cooperation. In particular, many thanks are due to Prof. Jiubin Tan for his contribution to the conference. Many thanks are also due to the Organizers and Cooperating Organizations, Harbin Institute of Technology, China Jiliang University, and Hefei University of Technology, for their warm reception as the hosts of the conference. Also, we appreciate very much and would like to thank the sponsors NSFC, CSM, and CIS, for their generous support of the conference.

We came to Hangzhou to promote precision engineering measurements and instrumentation as well as the friendship and cooperation between scholars and specialists in this field worldwide. I believe every participant can benefit from the conference.

It is a great pleasure for us to renew our existing friendly feelings and to make new friends during the conference. I am sure our friendship will live on and develop further as time goes by.

Prof. Li Zhu

Founding Chairman of ICMI
Huazhong University of Science and Technology, Wuhan, CHINA

Lizhu 李柱

Preface

The International Symposium on Precision Engineering Measurements and Instrumentation (ISPEMI) is an international symposium held every other year in different cities of China with English as its working language. It originated from the International Symposium on Instrumentation Science and Technology (ISIST), which has been held for a total of five sessions. ISIST 1999, the first session, was held in Luoyang, Henan Province, ISIST 2002, the second session, in Jinan, Shandong Province, ISIST 2004, the third session, in Xi'an, Shanxi Province, ISIST 2006, the fourth session, in Harbin, Heilongjiang Province, and ISIST 2008, the fifth session, in Shenyang, Liaoning Province. From the second session of ISIST onward, Hefei University of Technology organized three sub-sessions on precision mechanical measurements (ISPMM) and held them in Beijing, Urumchi, Xinjiang Province, and Hefei, Anhui Province, respectively. This series of meetings has greatly promoted the academic exchange in this particular field. However, in order to efficiently use the resources available to run one important international symposium well, these two meetings were merged in 2010 into ISPEMI as suggested by the National Natural Science Foundation of China (NSFC), Chinese Society for Measurements (CSM), and China Instrument and Control Society (CIS). The merging of ISIST and ISPMM and the use of ISPEMI means the establishment of a more efficient platform for the academic exchange amongst well-accomplished scientists and postgraduates, both inside and outside China, to facilitate the in-depth discussion and cooperation in the field of precision engineering measurements and instrumentation.

ISPEMI 2010, the 6th ISPEMI, was held 8–11August 2010, in Hangzhou, Zhejiang Province. More than 300 delegates attended the meeting. Plenary speakers from the U.S., U.K., Australia, Japan, Germany, Russian Federation, and China made excellent presentations on their work. A wide range of subjects was covered during session discussions. Two Chinese students received SPIE Best Student Paper Awards. From the 647 manuscripts received, we accepted only 257 papers for oral and poster presentation at the meeting. After the meeting, we worked together with authors to make sure all of the papers included in the proceedings of ISPEMI 2010 are good in both technical quality and English.

While these proceedings from the ISPEMI 2010 is now ready for distribution to the authors, we would like to thank the National Natural Science Foundation of China (NSFC), International Committee on Measurements and Instrumentation (ICMI), Chinese Society for Measurement (CSM), China Instrument and Control Society (CIS), Harbin Institute of Technology (HIT), China Jiliang University (CJLU), and Hefei University of Technology (HFUT) for their funds and assistances provided. Our thanks go to the procedure and organizing committee members, especially honorary chairman, cochairmen, and plenary speakers, Prof. Li Zhu, Prof. Abou-Zeid, Prof. Fei Yetai, Prof. Tony Wilison, Dr. Harald Bosse, Prof. James Burge, Prof. Gao Wei, Prof. Gu Min, Prof. Alexander Poleshchuk, Prof. Zhang Xiang, Prof. Tim Watson and Prof. Li Shengyi for their efforts to make the meeting fruitful and successful. And our special thanks go to SPIE for their efforts to enable us to do all these so well.

Prof. Jiubin Tan
Chair, ISPEMI 2010 Organizing Committee

Tanjiubin