PROCEEDINGS OF SPIE

# *Ninth International Symposium on Precision Engineering Measurements and Instrumentation*

**Jiubin Tan**
**Xianfang Wen**
*Editors*

**8–10 August 2014**
**Changsha, China**

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International Committee on Measurements and Instrumentation • Instrumentation Committee of CSM (China) • Harbin Institute of Technology (China) • National University of Defense Technology (China)

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SPIE • Beijing Information Science and Technology University (China) • Hefei University of Technology (China)

*Published by*
SPIE

**Volume 9446**
Part One of Two Parts

Proceedings of SPIE 0277-786X, V. 9446



Ninth International Symposium on Precision Engineering Measurement and Instrumentation
edited by Jiubin Tan, Xianfang Wen Proc. of SPIE Vol. 9446, 944601 · © 2015 SPIE
CCC code: 0277-786X/15/$18 doi: 10.1117/12.2189854

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Please use the following format to cite material from this book:
Author(s), "Title of Paper," in *Ninth International Symposium on Precision Engineering Measurement and Instrumentation*, edited by Jiubin Tan, Xianfang Wen, Proceedings of SPIE Vol. 9446 (SPIE, Bellingham, WA, 2015) Article CID Number.

ISSN: 0277-786X
ISBN: 9781628415612

Published by
**SPIE**
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org



Printed in the United States of America.

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# Symposium Welcome

Ladies and Gentleman,

Good morning everybody!

While we are all gathering here today for ISPEMI 2014, I extend on behalf of the Chinese Society for Measurement warm congratulations to the convention of ISPEMI 2014.

Since its founding, the Instrumentation Committee has been promoting the development of measurement instrumentation industry, and the exchange of measurement technologies.

Somebody likened instrumentation to the eyes of human being, but I want to say the future instrumentation is no longer eyes only. It will have the function of brain and play the role of hands, and thus becomes really a "man". This "man" is a very clever man, too. He can recognize different things with different eyes (sensors) to generate different measurements. He can do different analyses with his brain, generate new instructions, and does different operations with his hands. Intelligentization, integration, modularization and accuracy enhancement are the future development trend of measurement instrumentation.

Low carbon economy, scientific approach to development, people's happiness is the focus of world attention, and the ultimate goals for measurement services as well. Monitoring the change of the earth, the sole home of mankind, customization production at future factories, energy efficiency and diversification of energy supply, healthy citizens, life with security guaranteed are all ultimate goal for our future development. We have a lot to do in the future, and we have a wide prospect for future development.

In recent years, many countries worked out development plans for development of measurement instrumentation, and reinforced investment into its development. It can be seen from The Measurement Instrumentation Development Plan for 2013–2020 published by the State Council of the People's Republic of China in March of 2013, that innovation and breakthrough are the keys for the development of measurement technologies. So I sincerely hope we could work closely with our colleagues all over the world to achieve breakthrough and innovation in highly sophisticated techniques, development of core detail parts for instrumentation, autonomy intellectual property right and way of technical exchange, especially innovation in measurement concept. Let's provide better

measurement service for the economic development.
I wish ISPEMI 2014 a complete success!
Thanks!

**Mr. Aiwen Ma**
Secretary-general of Chinese Society for Measurements, China
9 August 2014, Changsha, China

# Introduction

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 International Symposium on the Instrumentation Science and Technology (ISIST), which has been held for a total of 5 sessions. These meetings in series have greatly promoted the academic exchange in this particular field. In 2010, ISIST was converted to ISPEMI, and the use of ISPEMI means the establishment of a more efficient platform for the academic exchange among 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 2014 is the 9th ISPEMI, and was held 8–10 August 2014, in Changsha, Hunan Province. The keywords for the present meeting are "major frontier subjects of science and technology, overlapping and fusion of subjects, innovative instrumentation an ultra-precision engineering." More than 300 delegates and guests attended the meeting. Plenary speakers from the United States, United Kingdom, Australia, Japan, Germany, Russia, and China made excellent presentations on their work. A wide range of subjects was covered during session discussions. The meeting was an international technical forum for scientists, research workers and students working in the field of precision engineering measurements and instrumentation in different countries and regions to present their work, and to develop their knowledge of recent advances on this particular aspect.

From the 387 manuscripts received, we accepted only 225 papers for oral and poster presentation at the meeting. After the meeting, we worked further together with authors to make sure all the papers included in the proceedings of ISPEMI 2014 are good in both technical quality and English.

While the proceedings of ISPEMI 2014 is now ready for distribution to the authors, we would like to thank International Committee on Measurements and Instrumentation, National Natural Science Foundation of China, Chinese Society for Measurement, China Instrument and Control Society, Harbin Institute of Technology, National University of Defense Technology, Beijing Information Science and Technology University, and Hefei University of Technology for their funds and

assistances provided. Our thanks go to the procedure and organizing committee members, especially honorary chairman, co-chairmen, and plenary speakers, Prof. Tony Wilson, Prof. Frank Härtig, Prof. Lihong V. Wang, Prof. Lars Montelius, Prof. Shuang Zhang, Prof. Saulius Juodkazis and Prof. Yiming Zhu for their efforts to make the meeting fruitful and successful. And our special thanks go to SPIE for its efforts to enable us to do all these so well.

**Prof. Jiubin Tan**
*Conference Chair of* ISPEMI 2014