Editorial

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Biographical notes: Wei Gao received his Bachelor of Precision Engineering from Shanghai Jiaotong University, China, in 1986, followed by MS and PhD in Precision Engineering from Tohoku University, Japan, in 1991 and 1994, respectively. He is currently a Professor and the Director of Research Center for Precision Nanosystems, Department of Nanomechanics of Tohoku University. His research interests include optical sensors, precision nanometrology and precision nanosystems. He acted as a Visiting Professor at the Center for Precision Metrology, University of North Carolina, Charlotte, in 1998. He is a member of the SPIE, ASPE, JSPE, JSME and CIRP.

Kiyoshi Takamasu is a Professor of the Department of Precision Engineering in the University of Tokyo, Japan since 2001. He received his Bachelor's, Master's and Doctor Degree in Precision Engineering from the University of Tokyo, in 1977, 1979 and 1982, respectively. His research interests include

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precision measurement, coordinate measurement, nanometre measurement and calibration of precision instrument. He acted as a Visiting Researcher at department of engineering, University of Warwick, UK in 1990. He is a member of the euspen, JSPE, RSJ, IEEJ and SICE. He is the chairman of the technical committee of intelligent measurement with nanoscale in JSPE.

Yasuhiro Takaya received a PhD Degree in Precision Engineering from Hokkaido University in 1992. Since 2006, he is working as a Professor at Osaka University. His research interests include laser-applied nano-in-process measurement of surface textures and profiles, laser-applied measurement and machining in micromachine production engineering, nano-CMM, and fundamental measurements in nanotechnology. He is a member of JSPE, JSME, JSAT, ASPE and CIRP.

Satoru Takahashi received his Bachelor's and Master's Degrees in the Mechanical Engineering for Industrial Machinery and Systems from Osaka University, Japan in 1993 and 1995, respectively. He received his Doctor Degree in Mechanical Engineering and Systems from Osaka University, Japan in 2002. He is currently an Associate Professor of the Department of Precision Engineering at the University of Tokyo, Japan. His research interests include the nano-in-process measurement and nano-scale-metrology based on the advanced optics using localised photon energy such as evanescent light, near-field light, and so on. He is a member of the ASPE, euspen, JSPE and JSME.

Assuring the accuracy of surface profile measurement and dimensional measurement to nanometer level is still underdevelopment while the influence of information generated by measurement is becoming increasingly important and extensive in nanoscale manufacturing industries such as semiconductor industry and precision machining industry. The required measurement accuracy has come to such a high level that it is difficult to achieve by only improving the measuring instrument/system from the hardware approach. Big breakthroughs are required and expected in both intensive fundamental researches and extensive applications of intelligent nano-measurement technology through the innovation of measuring methods and systems from the software approach. In the intelligent nano-measurement technology, extensions of measurement targets and measurement ranges as well as improvement of measurement accuracy are made possible by combination of optical measurement technologies and mechanical measurement methods, and/or by error compensation with software datum techniques. The systematisation and utilisation of the intelligent nano-measurement technology are expected to make significant contributions to the next-generation nanoscale manufacturing industries.

Based on the worldwide leadership taken by the Japan Society for Precision Engineering (JSPE) in the field of precision engineering, a JSPE technical committee named as "New Technology for Intelligent Measurement with Nanoscale" has been launched since March, 2004. The aim of the committee is to systematise the intelligent nano-measurement technology through cooperation between universities and industries so that this new technology can play a more important role in manufacturing industries. There are 30 active researchers and 15 leading companies involved in the committee. This special issue includes some of the recent achievements made by the members

of the committee. All the papers published in this special issue are original work and strictly peer reviewed by multiple reviewers. The papers cover a wide range of topics in surface profile measurement and dimensional measurement, including gear transmission error measurement, optical measurement of residual resist layer thickness, self-calibration of sensors, position measurement and control, cutting force measurement, etc.

As guest editors, we believe this special issue represents the newest information on advances in the intelligent nano-measurement technology from basic research to applied systems. We wish this special issue could be a good window for showing the related research trend in Japan. We would like to thank all the authors for their great contributions to this special issue and the referees for their careful review of the papers. We would also like to thank Professor Liangchi Zhang and Professor J. Paulo Davim, editors of *Int. J. Surface Science and Engineering* for their kind offer to publish this special issue. The dedicated efforts by the publishing staff of IJSurfSE to make this special issue possible are also appreciated.