ISMTII 2017
Xi'an·China

The 13th International Symposium on Measurement Technology and Intelligent Instruments

September 22-25, 2017

Xi'an，China

Organized by

Xi'an Jiaotong University

Co-organized by

Hefei University of Technology

Harbin Institute of Technology

Sponsored by

National Natural Science Foundation of China

Shaanxi Provincial Institute of Mechanical Engineering

State Key Laboratory for Manufacturing Systems Engineering

Collaborative Innovation Center of High-End Manufacturing Equipment

Shaanxi Association for Science and Technology

ISMTII 2017 Timetable

Friday, September 22		
14:00-20:00	Registration	Empark Grand Hotel
Saturday, September 23		
7:30-8:00	Registration	Empark Grand Hotel
8:00-8:30	Opening Ceremony	Banquet Hall
8:30-12:00	Plenary Keynote Session 1-Session 4	Banquet Hall
12:00-13:30	Lunch	Coffee House
14:00-17:30	Invited Talk 1-3 & Oral Presentation Session 1-Session 6	International Hall & Conference Room No.7 & Conference RoomNo.10
17:30-18:30	Poster Session 1	Jindian Hall
19:00-21:00	Welcome Reception	Coffee House
Sunday, September 24		
8:00-10:35	Plenary Keynote Session 5-Session 7	Banquet hall
10:35-11:50	Oral Presentation Session 7-Session 9	International Hall & Conference Room No.7 & Conference Room No.10
12:00-13:30	Lunch	Coffee house

Sunday, September 24		
14:00-17:30	Invited Talk 4-6 & Oral Presentation Session 10 - Session 15	International Hall & Conference Room No.7& Conference Room No.10
17:30-18:30	Poster Session 2	Jindian Hall
19:00-21:00	Conference Banquet & Award Ceremony	Banquet Hall
Monday, September 25		
8:30-10:00	Plenary Keynote Session 8-Session 9	Banquet Hall
10:20-11:50	Oral Presentation Session 16-Session 18	International Hall &Conference Room No.7 & Conference Room No.10
12:00-13:20	Lunch	Coffee house
13:20-14:30	Laboratory visit	
14:30-18:00	Invited Talk 7-9 & Oral Presentation 19-24	International Hall & Conference Room No.7 & Conference Room No.10
18:00-19:00	Poster Session 3	Jindian Hall
19:00-21:00	Close remark	Coffee House
Tuesday-Wednesday, 26-27 September		
Technical Tours		

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	Prof. Jian Liu (Harbin Institute of Technology, China)

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M.r. Kun Yao (Xi'an Jiaotong University, China)

Plenary Keynote Session 1, Day 2, Sep.23, 8:30-9:15 am (Banquet hall)

Prof. Dame Jane Jiang, University of Huddersfield

Title: Manufacturing Infratechnology

Abstract:
This talk is will discuss the essential scientific foundations for the future manufacturing of high valued products. Manufacturing is going through a 'disruptive revolution', from traditional, through innovation to future breakthrough factories that are fully intelligent and digitalized, allowing autonomous, cloud and distributed manufacturing during 2025-2050. This demands the creation of completely new technologies and methodologies to make design, production and quality control of complex products intelligently and automatically and thereby suitable for future production. However, current scientific understanding of high value manufacturing is far behind the autonomous target; it is much slower than the development of scientific computing technology which can be ready to support the 'Internet of Things' in time. This is a consequence of the lack of science fundaments, knowledge and enabling technologies. The talk will concentrate on how to create infratechnology for future manufacturing of high valued products and establish scientific fundamentals and revolutionary technology to accelerate a transformation in high value manufacturing. These include fundamentals for imaginative product design and metrology, embedded sensors/instrumentation and breakthroughs in-process quality control.

Biography:

Professor Dame Jane Jiang holds a UK Royal Academy of Engineering/Renishaw Chair in Precision Metrology and is the Director of the EPSRC National Centre for Innovative Manufacturing in Advanced Metrology. She obtained her PhD in measurement science in 1995, a Professorial Chair in 2003, a DSc for precision engineering in 2007. More recently, she received Damehood in the 2017 Queen's Birthday Honours for services to manufacturing and engineering. Jane is leading the creation of the concept of the 'Factory on the Machine' and 'Manufacturing Infra-technology' for future Manufacturing. Jane is an internationally respected research leader in advanced metrology, involves two major aspects: mathematical models and algorithms for geometrical products specification and metrology, including geometric shape and surface texture analysis, filtration and parametric characterization; and optical interferometry technology for embedded measurement, including wavelength/frequency scanning interferometry and optical chip interferometry. Jane is a Fellow of the Royal Academy of Engineering (FREng), a Fellow of the International Academy of Production Research / College International pour la Rechercheen Productique (FCIRP) and the Institute of Engineering Technology (FIET). Jane is an editor for Natural Group Journal: Light Science and Applications and a principle member of ISO TC/213 GPS committee. She has published more than 400 papers; was awarded a Royal Society Wolfson Research Merit Award in 2006 and the Sir Harold Hartley Medal in 2014.

Plenary Keynote Session 2, Day 2, Sep.23, 9:15-10:00 am (Banquet hall)

Prof. Hans Nørgaard Hansen, Technical University of Denmark

Title: Quality Assurance in Micro Manufacturing

Abstract:
The talk will address the topic of metrology and quality assurance in manufacturing of components and products with characteristic length scales in the sub-mm area. In this dimensional area metrology plays a major role both in terms of component validation and as a major tool in understanding and optimizing processes and process chains. The combination of both a product and process perspective is essential in finding viable solutions. When dimensions are scaled down, tolerances are typically not scaled down at the same rate, and this result in increased demands to metrology in terms of traceability and measurement uncertainty. The talk will present examples of these challenges and possible solutions.

Biography:

Professor Hans Nørgaard Hansen is professor of Micro Manufacturing at the Department of Mechanical Engineering of which he is also the head. He obtained his PhD in geometrical metrology in 1997 and became professor in 2002.Hans's main research area is micro manufacturing. This includes the entire value chain from design of micro mechanical systems over manufacturing process chains to quality assurance and metrology. Processes included are for example tooling technologies for micro injection moulding and micro metal forming, mass production methods (micro injection moulding and micro metal forming) and material removal processes (micro machining, micro EDM, micro laser machining). The integration of single processes into coherent process chains and production systems including the necessary quality assurance activities is the ultimate goal of the research. Hans is a Fellow of the International Academy of Production Research (CIRP) the International Society for Nanomanufacturing and the Danish Academy of Technical Sciences. He is member of the European Society for Precision Engineering and nanotechnology (euspen) and he acted as president for euspen 2015-2017.

Plenary Keynote Session 3, Day 2, Sep.23, 10:20-11:05 am (Banquet hall)

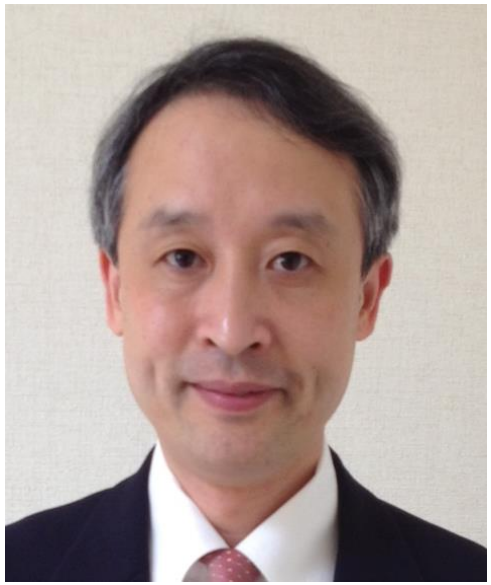
Prof. Wei Gao, Tohoku University

Title: Precision Manufacturing Metrology Based on Scanning Probe Systems

Abstract:

When manufacturing a precision workpiece, it is a common operation to measure the manufactured workpiece for quality control and feedback manufacturing. It is effective to make the precision manufacturing metrology in a place and at a time as close as possible to the manufacturing process for assurance of accuracy and efficiency of the measurement operation as well as the manufacturing process. Precision manufacturing metrology technologies can be classified into in-situ, in-line, on-machine or in-process metrology, based on the where and how the metrology is carried out. In many cases, precision manufacturing cannot be accomplished without a proper precision manufacturing metrology technology. Very large surface fabrication, ultra-precision surface machining, complicated freeform surface fabrication, ultra-fast laser processing, 3D Additive manufacturing, micro-structured surface stitching, extremely high reliability part manufacturing are some of the examples. In this keynote, the definitions of precision manufacturing metrology technologies will first be made clearly. Then the needs, benefits and limitations, as well as the specifications required for the related technologies will be specified, together with an overview of the state-of-the-art scanning probe systems that have been developed in the past decade.

Biography:



Wei Gao received his Bachelor of Precision Instrumentation from Shanghai Jiao Tong University, China, in 1986, followed by MSc and Ph. D 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 Finemechanics of Tohoku University. He research interests lie primarily in the field of precision engineering, specialized in precision metrology and micro/nano-metrology. He and his group have developed a number of surface form measurement systems as well as a couple of optical sensor technologies for precision measurement and nanometrology. He is a fellow of the International Academy for Production Engineering (CIRP), the International Society for Nanomanufacturing (ISNM), and the Japan Society for Precision Engineering (JSPE). He serves as the Chairman of The Scientific Technical Committee Precision Engineering and Metrology of CIRP and also served as a Vice President of JSPE in 2015. He is working as editorial board member for several major international journals in the field of precision engineering and metrology such as Precision Engineering and IEEE Transactions on Instrumentation and Measurement. He is the author of the book “Precision Nanometrology” (Springer). He and his group have won five Paper Awards from JSPE.

Plenary Keynote Session 4, Day 2, Sep.23, 11:05-11:50 am (Banquet hall)

Prof. Shulian Zhang, Tsinghua University

Talk Title: Recent Development for Precision Measurement Based on Laser Oscillating Technology

Abstract:

The presentation introduces the progress of precision measurement technology based on Laser oscillating technology, which measure target displacement and optical birefringent through optical oscillating in laser inside. The technology was of high precision and great progress and has great development potential. And it should be known and utilized widely. The presentation includes duel frequency lasers with high precision, high power, and high/stable frequency difference and little non-linearity; measurement instruments of birefringence and wave plates as the standard and in-site; the self-mixing solid laser feedback interferometers with Nanometer resolution and small drift; and other instruments with new principle. These instruments have been opening new ways for precision measurement.

Biography:

Professor Shulian Zhang received his bachelor degree and master degree of Tsinghua University. The former director of The Key Lab of Precision Measurement Technology and Instruments at Tsinghua University from Feb.1997 to Apr. 2008 and the director of Optic-Electrical Engineering Institute of Tsinghua University from Aug. 1993 to Apr. 2004. Member of OSA, OSC, SPIE, Vice director of the Optic-electrical Technology Society. Former or present visiting Professor of several universities: Kassel University, Engineering School ENSEEIHT of Toulouse, Beijing Jiaotong University, Huanan Normal University, Zhejiang Science and Tech. University. So far, he has taught more than 60 PhD and master students. More than 300 papers, more than 60 Patents, Book: Monograph: "Fundamental of Orthogonally Polarized Lasers", Tsinghua University Press, 2005. The monograph "Orthogonal Polarization in Lasers: physical phenomena and Applications", Wiley and Tsinghua University Press, 2013. Two Second-Class National awards for technological invention, 2007 and 2010, two First-Class Science and Technology Awards of National Education Ministry, 1994 and 2006, one First-Class Science and Technology Award of Electrical Society of China, three Second-class Science and Technology Award by Beijing and Electrical Society of China.

Plenary Keynote Session 5, Day 3, Sep.24, 8:00-8:45 am (Banquet hall)

Prof. Harald Bosse, Physical Technical Federal Institute

Talk Title: Metrology and Precision Engineering: Yesterday-Today-Tomorrow

Abstract:

The development of the system of units has always been linked to the increasing requirements from science, society and industry on the one hand and the opportunities offered by new technological developments on the other hand. In this contribution, this interdependence will be discussed with a focus on the redefinition of the International System of Units, the SI, which is foreseen to be accepted in 2018 and to be put into force on the World Metrology Day on the 20th of May, 2019. Examples of the contributions from Precision Engineering to the revised SI will be discussed: precision manufacturing and dimensional metrology enabled high accuracy determinations of a set of natural constants, whose numerical values will be fixed in the revised SI system namely, h, k, e and NA. This approach follows the route which was taken in 1983 when the unit of length, the metre, was defined by fixing the numerical value of the speed of light in vacuum. In addition to the progress related to the redefined SI, the contribution will also discuss results from recently finished projects in dimensional metrology, which were coordinated within the European Metrology Research Programme of EURAMET. These projects addressed several open issues in different technical fields ranging from nanometrology over microsystems metrology and metrology for advanced manufacturing to long distance metrology. These projects will not be explained in detail however, their major research results will be identified along with their impact on the further development of dimensional metrology and precision engineering. The analysis of the project results will also be taken into account for a discussion of the future requirements on dimensional metrology to be applied in a distributed manufacturing infrastructure discussed in concepts such as industry 4.0.

Biography:

Professor Harald Bosse, head of physical technical federal institute(PTB) Division 5 “Precision Engineering” and consulting professor in Harbin Institute of Technology, works on Surface Metrology, Dimensional Nanometrology, Coordinate Metrology, Interferometry on Material Measures and Scientific Instrumentation since 2009. Bosse is author or co-author of more than 150 peer-reviewed papers. His research interests are in the area of Precision Engineering, Dimensional Metrology and Nanometrology.

Plenary Keynote Session 6, Day 3, Sep.24, 8:45-9:30 am (Banquet hall)

Prof. Martin Booth, University of Oxford

Talk Title: Dynamic Optics for Microscopy and Photonic Engineering

Abstract:
The capabilities of high-resolution optical systems are considerably enhanced through the use of dynamic optical elements, such as deformable mirrors or liquid crystal spatial light modulators. These elements can be used to perform adaptive optical correction of aberrations or dynamic beam shaping. I explain how these methods are being used in microscopy to overcome the problems of specimen-induced aberrations, extending the effective imaging depth of a range of microscopes. Further developments are extending this approach into super-resolution microscopies, such as stimulated emission depletion (STED), single molecule localization and structured illumination microscopes. Another area of application of dynamic optics is in laser micro and nano-fabrication. I will show a number of methods through which such methods are improved by dynamic optics, including aberration correction and parallelization for three-dimensional structuring of materials. These methods are being developed for the manufacture of photonic devices, such as waveguides, and the precision machining of various materials. Particular applications include waveguide circuits for quantum optics, laser writing of colour centres in diamond, novel polymer/liquid crystal structures and diamond-based radiation detectors.

Biography:

Prof Booth is Professor of Engineering Science at the University of Oxford. His research group is based jointly in the Department of Engineering Science and the Centre for Neural Circuits and Behaviour. His research involves the development and application of adaptive optical methods in microscopy, laser-based materials processing and neuroscience. He was appointed Professor of Engineering Science in 2014. In 2012, Prof. Booth was awarded the "Young Researcher Award in Optical Technologies" from the Erlangen School of Advanced Optical Technologies at the University of Erlangen-Nürnberg, Germany, and a visiting professorship at the university. In 2014, he was awarded the International Commission for Optics Prize. He has over ninety publications in peer-reviewed journals. He is Editor-in-Chief of the journal of Optics Communications and Chair of the Institute of Physics Photon conference.

Plenary Keynote Session 7, Day 3, Sep.24, 9:50-10:35 am (Banquet hall)

Prof. Richard Leach, University of Nottingham

Talk Title: Information Rich Metrology: Changing the Game

Abstract:
Often when we manufacture something, and especially when we use precision or additive manufacturing, we have a large amount of information about the object being manufactured, for example, the CAD data gives us the nominal form, and we have usually characterized the surface texture to a high degree of confidence. Information-rich metrology (IRM) is the combination of accurate modeling of the interaction of the measurement system with the object being measured with the a priori information that is available in manufacturing. In many cases, the a priori information allows us to solve the complex mathematical problems we encounter when trying to model he interaction with the object being measured (inverse problems), in many case employing tools from computer science. IRM can allow us to minimise the measurement time and increase the spatial bandwidth in which we measure (for example, by allowing us to measure high slope angles using multiple reflections). Specific examples discussed are an all-optical CMM for precision components and, form, texture, internal geometry and in-process measurements for additive components.

Biography:

Professor Richard Leach, Chair in Metrology at The University of Nottingham, is an internationally recognised expert in engineering nanometrology, surface topography measurement, traceability and optical instrument design. Formerly a principal research scientist at the UK National Physical Laboratory, Richard has made extensive contributions to the theoretical advancement and practical use of dimensional metrology systems, including Fizeau, Michelson, Twyman-Green, homodyne and low coherence interferometers, scatterometers, fringe projection, photogrammetry, and contact stylus systems and probes. He is a leader in several professional societies, a prolific author of technical papers, books and book chapters, and a visiting professor at Loughborough University and the Harbin Institute of Technology.

Plenary Keynote Session 8, Day 4, Sep.25, 8:30-9:15 am (Banquet hall)

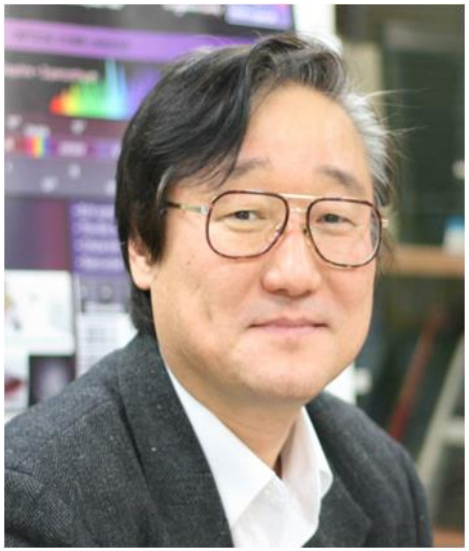
Prof. Seung-Woo Kim, Korea Advanced Institute of Science &Technology

Talk Title: Ultrafast Photonics for Precision Measurement and Instrumentation

Abstract:

Precision measurement and instrumentation is essential for most of strategically important technologies including IT, BT, NT and aerospace engineering. With ever-increasing demands on precision, various laser sources have been used to attain sub-wavelength precision in many fields of measurements and instrumentation. The precision-directed laser photonics will continue to advance to the direction of ultra-precision to achieve better resolutions, larger functional ranges, higher throughputs, and more improved stability. Particularly, the light sources available today are limited in the wavelength bandwidth, photon energy, spatial and temporal coherence, and peak power, which consequently hinders breakthroughs toward the realm of ultra-precision. Ultrafast photonics is to investigate the technological possibilities of femtosecond lasers with the aim of establishing the new foundation for ultra-precision that will cover the fundamental physical quantities of time, frequency, length and distance over extensive ranges as demanded in the next generation of precision engineering. To the end, a systematic approach will be pursued to generate noble coherent light sources covering the broad optical spectrum spanning from THz waves, infrared, visible to extreme violet light radiation by making the most of ultrafast femtosecond laser pulses.

Biography:



Professor Seung-Woo Kim's professional interests are precision optical technology with specialty on optical-mechanics system synthesis for precision machines design, optical interferometry for 3-D surface and thin-film metrology, and ultrafast photonics for nano-scale fabrication and ultra-precision measurements. During last three decades he has published ~150 technical papers in peer-reviewed journals, ~240 presentations in conferences, and ~50 patents. He has been working as principal investigator for numerous national and industrial research projects and currently involved in an important national creative research initiative project for the development of next generation precision engineering key technologies using femtosecond pulse lasers. He has also actively been involved in international academic societies for organizing on-time conferences for leading-edge precision engineering optical technologies. He was president of the Korea Society of Precision Engineering (KSPE) during the term of 2011 and is currently a member of OSA (Optical Society of America), SPIE (International Society of Optical Engineering), CIRP (International Academy for Production Engineering), and euspen (European Society Precision Engineering).

Plenary Keynote Session 9, Day 4, Sep.25, 9:15-10:00 am (Banquet hall)

Prof. Liang-Chia Chen, National Taiwan University

Talk Title: Evolution and Advance of Microscopic Confocal Profilometry for In-situ Automated Optical Inspection

Abstract:

The application of automated optical inspection (AOI) to advanced manufacturing processes with tight tact time and specifications is critical in winning today's global competition. In the past decades, great effort had been devoted to developing novel solutions for in-line optical inspection of surfaces and the dynamic characteristics of tested components or devices. Conventional approaches to micro-scale 3D profilometry have adopted novel optics or concepts in confocal microscopy for measuring 3D surface characteristics with high speed and precision. One-shot measurement capability is demanded to minimize measured uncertainty from environmental vibration or system instability. Nevertheless, extremely high-speed microscopic 3D profilometric methodologies for 100 % full-field inspection are yet to be developed. This talk intends to review the technical evolution and development trend of confocal surface profilometry in overcoming bottlenecks and developing feasible solutions. For the next significant move in 3D profilometry, obviously, the lateral resolution of the measurement currently impeded by the diffraction limit should be enhanced. Novel manufacturing technologies, such as roll-to-roll nano-imprinting or nano-scale semiconductor lithography processes require accurate reconstruction of surfaces with a lateral resolution of less than 100 nm, which is ten times better than what can be achieved by current microscopic technologies. Therefore, innovative far-field optical measurement methods for solving the detection limit are not only of academic interest, but of great significance to industrial innovation.

Biography:

Prof. Liang-Chia Chen is currently working as a distinguished professor in the Department of Mechanical Engineering of National Taiwan University (NTU) in Taiwan. Prior to embarking on his teaching career in Taiwan, he worked as a full time research engineer in Gerard Industries in Australia from 1997-2001 and Institute of nuclear energy research (INER) in Taiwan from 1991-1994. Before joining NTU, he worked as a distinguished professor in National Taipei University of Technology. He was the winner of the outstanding research award from the Ministry of Science and Technology (MOST) of Taiwan in 2016, Taiwanese national year-invention gold awards consecutively in 2013 & 2014 and the 2014 outstanding award on technology transfer from MOST of Taiwan. His major research fields are in precision metrology and manufacturing, automated optical inspection (AOI), opto-mechatronics instrumentation, and 3-D machine vision and algorithms for automation. To date, he has published one textbook, two book chapters, more than 100 referred journal papers and more than 60 invention patents internationally. He is currently served as the president of the international committee of measurement and instrumentation (ICMI). He is a member of SPIE, the society of Taiwan precision engineering, the Institution of Engineers of Australia (IEA), SME and Chinese Institute of Engineers.

Guidelines

1. Conference Venue

Empark Grand Hotel (Jiangong Road No.19, Xi'an, Shaanxi, 710043, China. Telephone: +86-029-68608888.)

2. Registration

September 22, 2017	(14:00-20:00)	Empark Grand Hotel
September 23, 2017	(07:30-8:00)	Empark Grand Hotel

Contact during Symposium

Shuming Yang Telephone: +86-13991374172
Ping Yang Telephone: +86-13402968928

3. Guidelines for presenters

Guidelines for oral speakers

1) Three sessions will take place simultaneously.
2) Please check the session rooms and presentation time in the Final Program of the Symposium.
3) Time allocated for each paper is as follows:
   Keynote presentation 45 min (including discussion)
   Invited Session presentation 30 min (including discussion)
   Oral presentation 18 min (including 3 min Q&A)
4) The presenters and session chairs are asked to keep to the paper sequence as shown in the final program as well as to adhere to the time restrictions.
5) Symposium rooms will be equipped by computer projection and light pointers.
6) Presenters are urged to prepare their files in MS PowerPoint format on a USB device and copy into the PC at session room before the session begins. Our session aids will assist the presenters to copy the file. If you wish to use your own notebook PC, please open the file before your presentation time.
7) Presenters are kindly asked to be at the session room at least 20 minutes before the start of the session. A few seats in the front will be reserved for

speakers.

8) For unexpected events that cannot be handled on the spot, you may request through session chairs and session aids.

Guidelines for poster presentations

1) Poster presentations are expected to adhere to the same high standards as oral presentations. That is, they should contain significant technical results and data together with their interpretation without commercialism. Each poster presentation must include the following:
   - A title, including author's names and affiliations
   - Abstract
   - Experimental details
   - Results
   - Discussion/Conclusions
   - References
2) Poster sessions will be held on September 23 (17:30 – 18:30), September 24 (17:30 – 18:30) and September 25 (18:00 – 19:00) in the Jindian Hall of the Symposium venue.
   Authors are kindly asked to be at their posters for the duration of the allocated discussion time (refer to the Final Program of ISMTII-2017).
3) Authors will be provided with a poster boards and support for mounting posters.
4) The presentation board will be available for you to organize your poster on September 23, September 24 and September 25 between 16:00 and 17:30. Please attach your poster 10 minutes before the poster session starts.
5) The size of the poster board for each poster presentation is 900mm (W) ×1200mm (H). Please make your poster smaller than the size of the poster board.

ISMTII 2017 Final Program

22 September	
14:00-20:00	Registration (Empark Grand Hotel)
19:00-21:00	ICMI Meeting (Empark Grand Hotel)

23 September			
7:30-8:00	Registration (Empark Grand Hotel)		
8:00-8:30	Opening Ceremony (Banquet Hall) / Group photo		
8:30-9:15	**Plenary Keynote Session 1** (Banquet Hall) Prof. Dame Jane Jiang, University of Huddersfield **Topic: Manufacturing infratechnology** Chair: Prof. Kuang-Chao Fan		
9:15-10:00	**Plenary Keynote Session 2** (Banquet Hall) Prof. Hans Nørgaard Hansen, Technical University of Denmark **Topic: Quality assurance in micro manufacturing** Chair: Prof. Wei Gao		
10:00-10:20	Coffee Break		
10:20-11:05	**Plenary Keynote Session 3** (Banquet Hall) Prof. Wei Gao, Tohoku University **Topic: Precision manufacturing metrology based on scanning probe systems** Chair: Prof. Hans Nørgaard Hansen		
11:05-11:50	**Plenary Keynote Session 4** (Banquet Hall) Prof. Shulian Zhang, Tsinghua University **Topic: Recent development for precision measurement based on laser oscillating technology** Chair: Prof. Dame Jane Jiang		
12:00-13:30	Lunch (Coffee House)		
	International Hall	Conference Room No.7	Conference Room No.10
14:00-14:30	**Invited Talk 1** Prof. Benny Chi-Fai Cheung, Hong Kong Polytechnic University	**Invited Talk 2** Prof. Satoru Takahashi, University of Tokyo	**Invited Talk 3** Prof. Ahmed Abou-Zeid, Physical technical federal institute

	Topic: Auto stereoscopic metrology for precision measurement of 3D microstructured surfaces Chair: Prof. Haihua Cui, Prof. Liandong Yu	**Topic:** High sensitive and super resolution optical inspection of nanodefects on Si wafer surface using infrared standing evanescent wave Chair: Prof. Lingbao Kong, Dr. Mingjun Ren	**Topic:** Laser interferometric length measurements Chair: Prof. Xiangchao Zhang, Dr. Jiarui Lin
14:30-15:50	**Session 1** Optical Metrology (I) (Paper ID: 44, 46, 48, 53) Chairs: Prof. Haihua Cui, Prof. Liandong Yu	**Session 2** Sensors and Actuators (I) (Paper ID: 18,76, 87, 114) Chairs: Prof. Lingbao Kong, Dr. Mingjun Ren	**Session 3** Machine Vision and Image Processing (I) (Paper ID:16, 33, 61, 66) Chairs: Prof. Xiangchao Zhang, Dr. Jiarui Lin
15:50-16:10	Coffee Break		
16:10-17:30	**Session 4** Optical Metrology (II) (Paper ID: 65, 70, 72, 80) Chairs: Prof. Haihua Cui, Prof. Liandong Yu	**Session 5** Sensors and Actuators (II) (Paper ID: 140, 172, 185, 224) Chairs: Prof. Lingbao Kong, Dr. Mingjun Ren	**Session 6** Machine Vision and Image Processing (II) (Paper ID: 88, 118, 138, 201) Chairs: Prof. Xiangchao Zhang, Dr. Jiarui Lin
17:30-18:30	**Poster Session 1** (Jindian Hall) Paper ID: 79, 237, 238, 183, 197, 209, 217, 229, 20, 34, 54, 60, 129, 21, 81, 99, 141, 40, 51, 97, 115, 116, 130, 135, 226, 236, 239,122, 306		
19:00-21:00	Welcome Reception (Coffee House)		

24 September	
8:00-8:45	**Plenary Keynote Session 5** (Banquet Hall) Professor Harald_Bosse, Physical technical federal institute **Topic: Metrology and precision engineering: yesterday-today-tomorrow** Chair: Prof. Shulian Zhang
8:45-9:30	**Plenary Keynote Session 6** (Banquet Hall) Prof. Martin Booth, University of Oxford **Topic: Dynamic optics for microscopy and photonic engineering** Chair: Prof. Harald Bosse

9:30-9:50	Coffee Break		
9:50-10:35	**Plenary Keynote Session 7** (Banquet Hall) Prof. Richard Leach, University of Nottingham **Topic: Information-rich metrology: changing the game** Chair: Prof. Seung-Woo Kim		
10:35-11:50	**Session 7** Optical Metrology (III) (Paper ID:82, 83, 101, 102) Chair: Dr. Fang Cheng,	**Session 8** Sensors and Actuators (III) (Paper ID: 225, 251, 252, 253) Chair: Prof. Satoru Takahashi,	**Session 9** Machine Vision and Image Processing (III) (Paper ID:255, 307, 316, 339) Chair: Dr. Lina Fei,
12:00-13:30	Lunch (Coffee House)		
	International Hall	Conference Room No.7	Conference Room No.10
14:00-14:30	**Invited Talk 4** Prof. Liandong Yu, Hefei University of Technology **Topic:** Techniques of fringe projection profilometry for complicated surface measurement Chairs: Prof. Benny Chi-Fai Cheung, Prof. Yongmeng Liu	**Invited Talk 5** Dr. J.R. Lin , Tianjin University **Topic:** Coordinate measurement accuracy analysis of large-sc aleheterogeneous network Chairs: Prof. Ping Cai, Dr. Ian Forbes	**Invited Talk 6** Dr. Lina Fei, Zeiss Industrial Metrology **Topic:** Future of manufacturing metrology in industry 4.0 Chairs: Prof. Ahmed Abou-Zeid, Prof. Jian Liu
14:30-15:50	**Session 10** Optical Metrology (IV) (Paper ID: 107, 110, 128, 137) Chairs: Prof. Benny Chi-Fai Cheung, Prof. Yongmeng Liu	**Session 11** Sensors and Actuators (IV) (Paper ID: 260, 250, 263, 265) Chairs: Prof. Ping Cai, Dr. Ian Forbes	**Session 12** Micro and Nano Metrology (I) (Paper ID: 23, 84, 91, 94) Chairs: Prof. Ahmed Abou-Zeid, Prof. Jian Liu,
15:50-16:10	Coffee Break		
16:10-17:30	**Session 13** Optical Metrology (V) (Paper ID: 175, 194, 198, 207) Chairs: Prof. Benny Chi-Fai Cheung, Prof. Yongmeng Liu,	**Session 14** Sensors and Actuators (V) & Calibration and Machine Tool Performance (I) (Paper ID: 268, 328, 50, 149)	**Session 15** Micro and Nano Metrology (II) (Paper ID: 155, 159, 165, 196) Chairs: Prof. Ahmed Abou-Zeid, Prof. Jian Liu,

		Chairs: Prof. Ping Cai, Dr. Ian Forbes	
17:30-18:30	**Poster Session 2** (Jindian Hall) Paper ID: 279, 289, 308, 205,295, 241, 266, 273, 67, 154, 164, 89,52, 142, 171,232, 247, 151,158, 166, 177, 186,203,261, 262, 264, 271, 315, 333, 353		
19:00-21:00	Conference Banquet/ Award ceremony (Banquet Hall)		

25 September			
8:30-9:15	**Plenary Keynote Session 8** (Banquet Hall) Prof. Seung-Woo Kim, Korea Advanced Institute of Science &Technology **Topic: Ultrafast photonics for precision measurement and instrumentation** Chair: Prof. Liang-Chia Chen		
9:15-10:00	**Plenary Keynote Session 9** (Banquet Hall) Prof. Liang-Chia Chen, National Taiwan University **Topic: Evolution and advance of microscopic confocal profilometry for in-situ automated optical inspection** Chair: Prof. Martin Booth		
10:00-10:20	Coffee Break		
	International Hall	Conference Room No.7	Conference Room No.10
10:20-11:50	**Session 16** Optical Metrology (VI) (Paper ID:216, 233, 243, 282) Chair: Dr. Fang Cheng,	**Session 17** Calibration and Machine Tool Performance (II) (Paper ID: 150, 377,199, 240) Chair: Prof. Ping Cai,	**Session 18** Micro and Nano Metrology (III) & Surface Metrology(I) (Paper ID: 200, 259, 63, 113) Chair: Prof. Satoru Takahashi,
11:50-13:00	Lunch (Coffee House)		
13:00-14:30	Laboratory visit		
14:30-15:00	**Invited Talk 7** Dr. Fang Cheng, Advanced Remanufacturing and Technology Centre **Topic:** Enhanced industrial measurement assisted by augmented reality	**Invited Talk 8** Dr. Hao. Jiang, Huazhong University of Science and Technology **Topic:** Latest research progress on Mueller matrix ellipsometry for anometrology Chairs: Prof. Zonghua Zhang,	**Invited Talk 9** Dr. Ian Forbes， Institute of Physics Publishing **Topic:** How to get published Chairs: Prof. Jie Lin, Dr. Feng Gao

	Chairs: Prof. Yongsheng Gao, Dr. Lina Fei	Prof. Haihua Cui	
15:00-16:20	**Session 19** Optical Metrology (VII) & In-Process and Online Metrology (I) (Paper ID: 288, 340, 17, 181) Chairs: Prof. Yongsheng Gao, Dr. Lina Fei	**Session 20** Intelligent Instruments for Automation (I) (Paper ID: 85, 86, 109, 152) Chairs: Prof. Zonghua Zhang, Prof. Haihua Cui	**Session 21** Surface Metrology (II) (Paper ID: 133, 285, 297, 338) Chairs: Prof. Jie Lin, Dr. Feng Gao
16:20-16:40	Coffee Break		
16:40-18:00	**Session 22** In-Process and Online Metrology (II) (Paper ID: 206,222,231,300) Chairs: Prof. Yongsheng Gao, Dr. Lina Fei	**Session 23** Intelligent Instruments for Automation (II) & Management of Measurement Processes (Paper ID: 168, 213, 275, 210) Chairs: Prof. Zonghua Zhang, Prof. Haihua Cui	**Session 24** Surface Metrology (III) & Material Characterization (Paper ID: 345, 31, 281, 283) Chairs: Prof. Jie Lin, Dr. Feng Gao
18:00-19:00	Poster Session 3 (Jindian Hall) Paper ID: 326, 358, 337, 280, 376, 364, 375, 96, 117, 119, 256, 335, 351,356, 234, 248, 272, 284, 322, 277, 299, 352, 355, 363, 367, 368, 370, 189, 93		
19:00-21:00	Close Remark (Coffee House)		

26-27 September
Technical Tours

Oral Presentations

***Day 2*- 23th September, 2017 (Saturday), 14:30-15:50**

Session 1 (International Hall)
Optical Metrology (I)
Chairs: Prof. Haihua Cui, Prof. Liandong Yu

44 Single-spot two-dimensional displacement measurement with non-destruction, non-contact and highsensitivity
Yidong Tan, Kaiyi Zhu, Yueyue Lu, Bo Guo and Shulian Zhang

46 Experimental verification of a novel in-process depth measurements of sub-diffraction limited micro-groove based on near-field optical response
Shiwei Ye, Chengshuo Jin, Masaki Michihata, Kiyoshi Takamasu and Satoru Takahashi

48 The new NIM angular comparator
Zi Xue, Yao Huang, and Dan Qiao

53 Light field measurement based on the single-lens coherent diffraction imaging
Cheng Shen, Jiubin Tan and Zhengjun Liu

Session 2 (Conference room No.7)
Sensors and Actuators (I)
Chairs: Prof. Lingbao Kong, Dr. Mingjun Ren

18 A new capacitive long-range displacement nanometer sensor with differential sensing structure based on time-grating
Zhicheng Yu, Kai Peng, Xiaokang Liu, Hongji Pu and Ziran Chen

76 Rectangular closed double magnetic circuit for ultra-low-frequency vibration calibration
Zhangqiang He, Junning Cui and Jiubin Tan

87 Bias electric field distribution analysis for a non-contact nano-probe based on tunneling effect
Xingyuan Bian, Junning Cui and Jiubin Tan

114 Research on measuring method of rotation angle and clearance in intelligent spherical hin
Yichang Lu, Penghao Hu, Shiyi Chen,Xueming Dang and Lianqin Zhu

Session 3 (Conference room No.10)
Machine Vision and Image Processing (I)
Chairs: Prof. Xiangchao Zhang, Dr. Jiarur Lin

16 Calibration of a vision-based location system with hybrid Genetic- Newton method
Wensong Jiang, Zhongyu Wang, Jing Lv and Li Zhang

33 An image processing system for extension measurement

	Terry Yuan-Fang Chen and Yi-ru Liu
61	**Simple method to achieve metric reconstruction using a movable stereo rig** Feifei Gu, Hong Zhao, Zhan Song, Yueyang Ma and Penghui Bu
66	**An algorithm based on regional separation for extracting grain boundaries automatically by improved mean shift method** Zhenying Xu, Jiandong Zhu, Qi Zhang and Philip Yamba

***Day 2*- 23th September, 2017 (Saturday), 16:10-17:30**

Session 4 (International Hall) **Optical Metrology (II)** **Chairs: Prof. Haihua Cui, Prof. Liandong Yu**	
65	**A high resolution and response speed interrogation method for FBGs-based sensors** Hong Dang, Kunpeng Feng, Haoran Zhang, Dong Jiang, Xun Sun, Weidong Wu, Yuanhang Zhang, Jiwen Cui and Jiubin Tan
70	**Iodine frequency stabilizing laser diode and displacement measuring Mach-Zehnder interferometer based on sinusoidal phase modulation** Duong Quang Anh, Shinohara Jun, Dong Wei and Aketagawa Masato
72	**A calibration method for non-overlapping cameras based on mirrored phase target** Yongjia Xu, Feng Gao, Zonghua Zhang and Xiangqian Jiang
80	**Two dimensional ellipsometer by ghost imaging technique** Yasuhiro Mizutani, Yasuhiro Takaya and Tetsuo Iwata
Session 5 (Conference room No.7) **Sensors and Actuators (II)** **Chairs: Prof. Lingbao Kong, Dr. Mingjun Ren**	
140	**Iterative learning identification of linear motor cogging force in the presence of measurement noise** Yang Liu, Fazhi Song, Yue Dong and Jiubin Tan
172	**Design, simulation and fabrication of micro gas chromatography column for breath analysis** Hairong Wang, Guishan Wu, Baoqing Han, Hao Huang and Jiuhong Wang
185	**Wireless and passive temperature sensor based on microwave slot radiation patch** Fei Lu, Haixing Wang, Xiaowei Guo, Yanjie Guo,Lei Zhang and Qiulin Tan
224	**Design of optical fiber Fabry-Perot micropressure sensor based on beam-membrane structure** Bian Tian, Feng Zhan, Na Zhao, Ning Yang and Zhuangde Jiang
Session 6 (Conference room No.10) **Machine Vision and Image Processing (II)** **Chairs: Prof. Xiangchao Zhang, Dr. Jiarur Lin**	
88	**Abnormal detection of two-dimensional attitude for small-sized objects in complex scene**

	Shengya Liu, Zhenying Xu, Philip Yamba, Rong Zou and Shilin Cui
118	**A multi-scale seed point selection algorithm for registration**
	Chen-Song Yao, Li-Kun Zhang, Bao-Quan Shi and Shu-Xing Du
138	**Improvement of high temperature deformation measurement accuracy based on image restoration method**
	Yue Hu, Xizuo Dan, Anqi Huang, Siyuan Bao and Yonghong Wang
201	**Design of surface defect detection system for reversing radar probe**
	Qiang Gao, Wei Tao, Wanggu He and Hui Zhao

***Day 3*- 24th September, 2017 (Sunday), 10:30-12:00**

Session 7 (International Hall)	
Optical Metrology (III)	
Chair: Dr. Fang Cheng	
82	**Super-resolution scanning microscopy with virtually structured illumination**
	Limin Zou, Qing Yan, Su Zhang, and Xuemei Ding
83	**A new method for measuring the glass thickness and refractive index using optical frequency comb**
	Fumin Zhang, Xianyu Zhao, HanzhongWu and Xinghua Qu
101	**Error analysis of spectral phase shifting digital holographic microscopy**
	Jie Wang and Xiangchao Zhang
102	**High-precision lateral distortion correction in 2D and 3D optical imaging system**
	Rong Su, Peter Ekberg and Richard Leach
Session 8 (Conference room No.7)	
Sensors and Actuators (III)	
Chair: Prof. Satoru Takahashi	
225	**A differential accelerometer composed of quartz resonator and silicon substrate with digital output signal**
	Bo Li, Yulong Zhao and You Zhao
251	**Multi-finger metal-graphene-metal photodetector based on CVD monolayer graphene**
	YimingWang, Qiang Liu, Xiaokai Yang, Pengfei Tian, Biyao Cheng, Dasaradha Rao Lambada and Shuming Yang
252	**Voice coil based actuator with scanning range of 25 mm using built-in interferometric sub-nanometre position feedback**
	Gabor Molnar, Sebastian Bütefisch, Christian Werner, Rudolf Meeß, Hans-Ulrich Danzebrink and Jens Flügge
253	**Multichannel sub-millikelvin temperature logger for thermocouple and resistive temperature sensors**
	Christian Werner, LiangYu, Henrike Heuer, Gabor Molna and Jens Flügge
Session 9 (Conference room No.10)	
Machine Vision and Image Processing (III)	

Chair: Dr. Lina Fei	
255	**An innovative error compensation method of circular grating based on the visual** Yuan Wang
307	**Designing index to recognize roughness based on color distribution statistical matrix** Enhui Lu, Jian Liu, Hang Zhang, Shengfeng Chen and Weifang Wang
316	**Bayesian inference based multi-scale optimization of stereo matching** Cancan Zeng,Mingjun Ren and Yuehong Yin
339	**Deep learning based fast object detection in light field imaging** Runxing Liu, MingjunRen, Da Li and Jieji Ren

***Day 3*- 24th September, 2017 (Sunday), 14:30-15:50**

Session 10 (International Hall) **Optical Metrology (IV)** **Chairs: Prof. Benny Chi-Fai Cheung, Prof. Yongmeng Liu**	
107	**Light filed-based 3D reconstruction technique for micro-structure measurement** Zhuo Chen, Yao Hu, Xiaoli Jiang and Yinyin Chao
110	**Resolution analyzing method of cell imaging based on transmittance digital holographic microscopy** Junsheng Lu, Yanan Zeng, Xinyu Chang and Xiaodong Hu and Xiaotang Hu
128	**Intracavity laser spectroscopy of waveguide structures** Aleksandr Shulga and Irina Shilova
137	**Study on adaptive Kalman filtering for laser Doppler velocimetry** Fan Zhe, Sun Qiao, Du Lei and Bai Jie
Session 11 (Conference room No.7) **Sensors and Actuators (IV)** **Chairs: Prof. Ping Cai, Dr. Ian Forbes**	
260	**Novel annular-circular coupled piezoelectric micromachined ultrasonic transducers** Tingzhong Xu, Zhixia Qiao,Libo Zhao, Zhiming Zhao, Jiuhong Wang, Jie Li, Zhikang Li, Yihe Zhao and Zhuangde Jiang
250	**Fabrication of a ZnO nanowire CO sensor by a simple combing process and Its property measurement** Biyao Cheng, Shuming Yang and Tao Liu
263	**A new functionalization method for CMUTs-Based resonant biochemical sensors** Yihe Zhao, Libo Zhao, Hongyan Wang, Yong Xia, Zhikang Li, Jie Li, Jiawang Zhang, Mimi Huang, Jiuhong Wang and Zhuangde Jiang
265	**A temperature compensation method in fluid density measurement using MEMS resonant sensor** Linya Huang, Libo Zhao, Hongyan Wang, Yingjie Hu, Zhikang Li, Mingzhi Yu, Mimi Huang， Zhiming Zhao, Jiuhong Wang and Zhuangde Jiang

Session 12 (Conference room No.10)
Micro and Nano Metrology (I)
Chairs: Prof. Ahmed Abou-Zeid, Prof. Jian Liu

23 Displacement measurement with high/low resolutions based on multiple gratings
Jie Lin, Hang Chen, Peng Jin, and Jiubin Tan

84 Non-contact detection of surface defects by using a micro thermal sensor
Yuki Shimizu, Yuki Matsuno, Yuan-Liu Chen and Wei Gao

91 Ultra-precision temperature control of circulating cooling water based on fuzzy-PID algorithm
Yesheng Lu, Junning Cui, Yue Zhao and Jiubin Tan

94 Uncertainty analysis in the evaluation of pitch deviation and out-of-flatness of a planar scale grating by Fizeauinterferometry
Xiuguo Chen, Yuki Shimizu,Yuan-Liu Chen and Wei Gao

***Day 3*- 24th September, 2017 (Sunday), 16:10-17:30**

Session 13 (International Hall)
Optical Metrology (V)
Chairs: Prof. Benny Chi-Fai Cheung, Prof. Yongmeng Liu

175 Low-coherence Interference Wide-field Optical Microscopy with Improved Axial Measurement Range
Shin Usuki, Katsuaki Tamaki and Kenjiro T. Miura

194 Innovative full-field chromatic confocal microscopy using multispectral sensors
Liang-Chia Chen, Pei-Ju Tan, Chih-Jer Lin, Duc Trung Nguyen, Yu-Shuan Chou, Nguyen Dinh Nguyen and Nguyen Thanh Trung

198 Three-dimensional deformation measurement technique combining DSPI and DIC
Tingting Wang, Hao Yan, Pengfei Li and Ping Cai

207 Recent development of next generation of laser interferometer at Harbin Institute of Technology
Ke Wang, Pengcheng Hu, Hongxing Yang, Haijin Fu, Ruitao Yang and Jiubin Tan

Session 14 (Conference room No.7)
Sensors and Actuators (V) & Calibration and Machine Tool Performance (I)
Chairs: Prof. Ping Cai, Dr. Ian Forbes

268 Annealing-pressure-influenced ultraviolet photodetecting performance of ZnO film fabricated by electrospinning
Yong Xia, Rahman•hebibul, Libo Zhao, Lei Li, Zhikang Li, Wendi Gao, Guoxi Luo, Xudong Fang, Jiuhong Wang and Zhuangde Jiang

328 Study on novel temperature sensor based on amorphous carbon film
Qi Zhang, Xin Ma, Meiling Guo, Lei Yang and Yulong Zhao

50 Evaluation of self-calibratable rotary encoder (Self A) to detect shaft run out
Yuri Ueyama, Ryoshu Furutani and Tsukasa Watanabe

149 Two dimensional abbe error analysis and modeling of CNC machine tool XY worktable
Hongtao Yang, Li Li, Bangsheng Chen, Yongjun Pang and Xiaona Zha

Session 15 (Conference room No.10)
Micro and Nano Metrology (II)
Chairs: Prof. Ahmed Abou-Zeid, Prof. Jian Liu

155 Development of multi-spectral tomographic Mueller matrix microscopy for the characterization of two-dimensional materials
Chao Chen, Xiuguo Chen, Cai Wang and Shiyuan Liu

159 Precision measurement of microoptics with double steep sidewalls by an atomic force microscopy with a linear-rotary scanning strategy
Yuan-Liu Chen, Bo Wen, Minglei Li, Yuki Shimizu and Wei Gao

165 Study on the arc discharging parameters for fabricating the micro ball tips
Rui-Jun Li, Chen Chen, Qi Li and Kuang-chao Fan

196 Study for the adhesion force of a microprobing system with the shear-mode detection
So Ito, Hirotaka Kikuchi and Wei Gao

***Day 4*- 25th September, 2017 (Monday), 10:30-12:00**

Session 16 (International Hall)
Optical Metrology(VI)
Chair: Dr. Fang Cheng

216 Dual-comb absolute distance measurement in 70 m range with micrometer precision
Haosen Shi, Youjian Song, Mingzhao He, Minglie Hu and Chingyue Wang

233 Characterizing a nonideal linear fabry-pérot cavity
Liang Yu, Christian Werner, Gabor Molnar, Ingmar Leber, Pengcheng Hu, Jiubin Tan, Andreas Dietzel and Jens Flügge

243 Development of nanoparticle detection method based on a new principle combining volatile liquid and optical observation method: Study of highly sensitive optical detection system
Kazuki Tachibana, Shohei Asai, Masaki Michihata, Kiyoshi Takamasu and Satoru Takahashi

282 Measurement configuration optimization of Stokes-vector polarimeter for dynamic
Jiamin Liu, Zhicheng Zhong, Hao Jiang and Shiyuan Liu

Session 17 (Conference room No.7)
Calibration and Machine Tool Performance (II)
Chair: Prof. Ping Cai

150 Coordinate measuring machine verification using an optical-comb probe with ball
Shohei Hara, Winarno Agustinus, Satoru Takahashi, Hirokazu Matsumoto and Kiyoshi Takamasu

377 Monte Carlo based analysis of peak extraction uncertainty in fluorescent aided confocal microcopy

	Chenguang Liu, Tingting Zheng, Jiubin Tan, Jian Liu, Yixuan Zhao
199	**Evaluation of high accuracy gear-type magnetic rotary encoder**
	Tsukasa Watanabe, Yoshinori Watanabe, Yasuharu Onuki, Takashi Fujimoto, Katsunori Shimodaira and Kenichi Tamura
240	**A novel approach to calibrate the galvanometric laser scanning system**
	Linlin Yang and Shuming Yang
Session 18 (Conference room No.10)	
Micro and Nano Metrology (III) & Surface Metrology (I)	
Chair: Prof. Satoru Takahashi	
200	**Design and construction of an ultra-precision instrument for nanoindentation of single point diamond cutting tool**
	Yindi Cai ,Malu Xu, Yuan-Liu Chen, Yuki Shimizu, So Ito, Wei Gao and Kuang-Chao Fan
259	**Development of an abbe error free 3D wafer inspection stage**
	Tien-Tung Chung, Teng-Hui Tseng, Fong-Yuan Chen and Liang-Chia Chen
63	**Development of chromatic dispersion for chromatic confocal microscope**
	Qing Yu, Ruilan Zhou, Changcai Cui and Ruifang Ye
113	**Defect classification and evaluation system**
	Ruifang Ye, Chia-Sheng Pan and Ming Chang

***Day 4*- 25th September, 2017 (Monday), 14:30-15:50**

Session 19 (International Hall)	
Optical Metrology (VI) & In-Process and Online Metrology (I)	
Chairs: Prof. Yongsheng Gao, Dr Lina Fei	
288	**A method of laser drift measurement for compensation**
	Zhenggang Guo, Ze Li, Liang Zhang and Yangyang Sun
340	**A fast three-dimensional profile recovery algorithm in white-light scanning interferometry**
	Xingchang Xue, Shuming Yang, Xinyu Yang, Linlin Yang and Guofeng Zhang
17	**In-process measurement on the thickness of photosensitive resin inevanescent wave-based nano-stereolithography**
	Deqing Kong, Masaki Michihata, Kiyoshi Takamasu and Satoru Takahashi
181	**Use of multiple air beams for In-Process form error measurement**
	Y. Gao and R. Li
Session 20 (Conference room No.7)	
Intelligent Instruments for Automation (I)	
Chairs: Prof. Zonghua Zhang, Prof .Haihua Cui	
85	**Experimental research on online dynamic balancing system of grinding machine**

Xialun Yun, Xuesong Mei, Gedong Jiang and Zhengbang Hu

86 Automatic monitoring of baby's state of health using optic and acoustic methods
Kseniia Sapozhnikova, Roald Taymanov, Iuliia Baksheeva, Anton Ionov,Liang-Chia Chen Dinh-Cuong Hoang, Duc-Hieu Duong, Chu Toan Thang, and Hsiu Wen Liu

109 Non-contact method of an absolute length measurement between two ball-lenses using a tandem low-coherence interferometer
Winarno Agustinus, Shusei Masuda, Satoru Takahashi, Hirokazu Matsumoto, and Kiyoshi Takamasu

152 Wearable plantar pressure mapping system and its application towards gait phase segmentation
Rui Ji and Ping Cai

Session 21 (Conference room No.10)
Surface Metrology (II)
Chairs: Prof.Jie Lin, Dr. Feng Gao

133 A method for inspecting double-sided high-sloped structured surfaces based on dual-probe wavelength scanning interferometer
Tao Zhang, Feng Gao and Xiangqian Jiang

285 A fast phase detection method based on multi-wavelength interferometry for point diffraction measuring system
Xiaoqing Kang, Bing Li, Zhuo Zhao, Lei Chen and Juangde Jiang

297 Method for cylindricity error evaluation using incremental algorithm
Lifei Ren, Ting Liu, Qijian Zhao, JiangxinYang, Yanlong Cao and Fei Li

338 A new method for integration of registered multi-view point clouds
Chao Zhang, Liping Zhou, Long Xu and Jian Wang

***Day 4*- 25th September, 2017 (Monday), 16:10-17:40**

Session 22 (International Hall)
In-Process and Online (II)
Chairs: Prof. Yongsheng Gao, Dr. Lina Fei

206 In-situ geometric parameters measurement for thin-wall rotary body based on double laser sensors
Wang Jun, Jiafu Li, Wenyang Tang, Xiaolin Zhang, Yuanyuan Hong and Yujun Wang

222 Four-probe error separation method for on-line measuring cylindricity
Wenwen Liu, Hao Zeng and Tingting Tao

231 Modeling for accuracy prediction of distribution automation test system by LS-SVM method
Siran Zuo, Zhongyu Wang, Wenbo Fan and Jinwei Fu

300 A new MOV online monitoring system in series compensation capacitor System
Zhan-hao Jia, Hai-bao Mu, Yuan Li, Qin-xiao Dong, Zhi-fang Liu and Guan-jun Zhang

Session 23 (Conference room No.7)

Intelligent Instruments for Automation (II)
Chairs: Prof. Zonghua Zhang, Prof. Haihua Cui

168 Calculation and simulation of negative pressure at outlet of throttle orifice
Yong Zhang, Xiaohui Wang, Bi Du, Guohui Qin

213 Coaxiality detection method with non-adjustment for installation errors
Xin Jin, Qiushuang Zhang, Ke Shang, Yimin Pu, Zhijing Zhang and Huan Guo

275 The method for laser drift restraining based on mirror control
Shujie Liu, Shixin Zhang, Yubin Huang, Yayong Wang and Kuangchao Fan

210 Whole gear outline scanning measurement of internal gear by using CNC gear measuring machine
Syuhei Kurokawa, Yuki Utsunomiya, Tetsuya Taguchi, Terutake Hayashi and Yoji Matsukawa

Session 24 (Conference room No.10)
Material Characterization & Management of Measurement Processes
Chairs: Prof. Jie Lin, Dr. Feng Gao

345 3-D surface profiling of rough surfaces by coherence scanning interferometry using femtosecond pulsed laser
Yang Lu,Jiyong Park, Liandong Yu and Seung-Woo Kim

31 Analysis of vulnerable components in automatic brake arm
Kun Tian, Zai Luo and Dong Li

281 Effect of ambient air flow on the resistivity uniformity of Ga-doped ZnO film deposited in open air
Chun-Tang Liang, Yu-Yi Chen, Hsin-Tien Lin, Kuo-Long Pan and Jia-Yang Juang

283 Three-dimensional parameter detection of defects for gas turbine blades based on digital radiography
Hao Zhou, Bing Li, Lei Chen and Zhuangde Jiang

Poster Presentations

Poster Session 1

Day2-23th September 2017 (Friday) 17:30-18:30

Topic	Poster ID	Paper ID	Paper Title
Calibration and Machine Tool Performance	**P1-01**	**79**	**A method to calibrate the effect of pressure on high-precision vibrating tube densimeter** Jingyue Zhang, Jintao Wang, Zhihao Li, Xiang Liu
	P1-02	**237**	**Ultra-precision turn-milling machine tool dynamic characteristics analysis and optimization** Qiming Li, Xin Jin, Erbo Li, Zhijing Zhang, Hongchang Sun
	P1-03	**238**	**Structural optimization design of body guide rail assembly for optical inspection instrument of large glass substrate** Chunzhu Liu and Zhou Yang
In-Process and Online Metrology	**P1-04**	**183**	**Anew in-process optical method for surface form profile measurement in precision machining** F. Xie and Y. Gao
	P1-05	**197**	**In-process metrology for powder directed energy deposition via three-dimensional reconstruction** Yingying Chen, Yihua Zhang, Haihua Cui, Jiquan Yang, Jianhua Ma
Intelligent Instruments for Automation	**P1-06**	**209**	**An temperature compensation system for quartz differential resonant accelerometer using FPGA and SOPC** Guanwu Zhou, Bo Li and Mengmeng Hao
	P1-07	**217**	**The calibration and analysis of inertia sensors for unmanned aerial vehicle** Chao Wang, Jinyong Yu and Bian Tian
	P1-08	**229**	**Design of motion controller in flat-panel detection and conveying platform based on STM32F4** Xiaojie Tao, Qun Zhang, Lan Zhang and Lu Quan
Machine Vision and Image Processing	**P1-09**	**20**	**The motion blurred image restoration based on automatic guided vehicle** Dong Li, Zai Luo, Hui Liu
	P1-10	**34**	**Global calibration method and apparatus for multi-camera measurement system** Tianlong Yang, Qianchen Zhao and Jiang Shao
	P1-11	**54**	**First exploration in micro inertial navigation typed motion capture system** Heng Shao
Management of Measurement Processes	**P1-12**	**60**	**On-line monitoring of mine tunnel deformation using laser radar** Tianbing Ma, Liubang Han, Kuosheng Jiang, Benteng Ma, Junpeng Zhou
	P1-13	**129**	**Kernel function modeling of spatial measurement error** Yuemei Zhang, Mei Zhang, Chengyuan Gao

Micro and Nano Metrology	**P1-14**	**21**	**Probe error analysis of articulated arm coordinate measuring machine** Hui Liu, Zai Luo, Kun Tian
	P1-15	**81**	**Motion interactions of a 2-DOF linear piezoelectric impact drivemechanism with a single friction interface** Liling Han, Rui Zhang, Chengliang Pan, Haojie Xia, Liandong Yu
	P1-16	**99**	**Creation of a long optical needle by a planar microstructure** Qiang Liu, Tao Liu, ShumingYang, Tong Wang and Xiaokai Yang
	P1-17	**141**	**Numerical simulation of tomographic Mueller-matrix microscopy for nanoscale measurement** Yinyin Tan, Xiuguo Chen, Yating Shi, and Shiyuan Li
Optical Metrology	**P1-18**	**40**	**Design of optical detection system for centrifugal microfluidic chip** Lili Mu, Xiaojun Zhou, Jiaming Ye
	P1-19	**51**	**Numerical investigation on refractive index compensation performance of three-color method** Dong Wei, Kiyoshi Takamasu and Hirokazu Matsumoto
	P1-20	**97**	**High precision FMCW laser ranging system with an imperfect ECDL** Guang Shi
	P1-21	**115**	**Alignment error in bearing ball measurement system with laser interferometry** Weina Hao, Zhigang Liu, Bingshan Lei, Shaowei Gu, Fengchao Ling, Jun Hong
	P1-22	**116**	**A circular gird pattern detection method based on multi-exposure image fusion** Li-Kun Zhang, Chen-Song Yao, Bao-Quan Shi and Shu-Xing Du
Sensors and Actuators	**P1-23**	**130**	**Fabrication and testing of wireless passive and thin film temperature sensor** Haixing Wang, Fei Lu, Xiaowei Guo, Lei Zhang, Fei Wu, Qiulin Tan, Jijun Xiong
	P1-24	**135**	**Bio-electronicsystem for megapolis water supply monitoring** Vasiliy Lubimtsev, Sergey Kholodkevich, Roald Taymanov and Kseniia Sapozhnikova
	P1-25	**226**	**Study on novel temperature sensor based on amorphous carbon film** Qi Zhang, Xin Ma, Meiling Guo, Lei Yang, Yulong Zhao
	P1-26	**236**	**Development of a cutting force sensor based on MEMS strain gauge** You Zhao, Yulong Zhao and Xiaohui Ge
	P1-27	**239**	**Research of a novel ultra-high pressure sensor with high-temperature resistance** Guodong Zhang, Yulong Zhao, Xueyong Wei, Yun Zhao and Xinchen Wang
SurfaceMetrology	**P1-28**	**122**	**Study on the measurement and evaluation method for large-diameteraspheric surface based oncylindrical coordinate system** Jianpu Xi, Dongxu Ren, Bin Li and Zexiang Zhao
	P1-29	**306**	**Eddy current testing for blade edge micro cracks of aircraft engine**

			Weimin Zhang, Mindong Xu, Xuanyi Gao and Feng Qin

Poster Session 2
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Topic	Poster ID	Paper ID	Paper Title
Calibration and Machine Tool Performance	**P2-01**	**279**	**The design of automatic detection system of high-speed locomotive Anti-skid valve** Chuanwu Li, FujuYan, YiLu
	P2-02	**289**	**Measurement and compensation method of gantry CNC machine tool based on single laser synchronization method** MinqiangJia, Ran Gao, Lei Sun, Qianqian Guan
	P2-03	**308**	**A study of data acqusition system of FPGA-based multichannel DMA data-caching technology** Jianguang Shen, Tao Tao, Xuesong Mei and Yi Liu
In-Process and Online Metrology	**P2-04**	**205**	**Research on the practical application of the optimal measurement area of articulated arm coordinate measuring machine** Yi Hu, Chao Jiang, Wei Huang, Bing Ye and Xiaowei Gu
	P2-05	**295**	**Research on environmental test on-line detection device based on flow metrological instrument** Fanliang Meng, Senlin Gao, Quan Sun, Xiaoping Zhang, Xigang Wang
Intelligent Instruments for Automation	**P2-06**	**241**	**Design and research of transmission in automatic optical inspection of glass substrate** Xiaojie Tao, Lan Zhang, Lu Quan and Qun Zhang
	P2-07	**266**	**A method for fast alignment of the beam verticality in high precision absolute gravity measurement** Qiyu Wang, Jinyang Feng, Chunjian Li, Duowu Su and Shuqing Wu
	P2-08	**273**	**Design of pipeline leak data acquisition and processing system on LabVIEW** Zhonghu Li, Bo Ma, Jinming Wang and Junhong Yan
Machine Vision and Image Processing	**P2-09**	**67**	**A method based on transfer learning for automatic metallographic rating** Zhenying Xu, Qi Zhang, Jiandong Zhu, PhilipYamba
	P2-10	**154**	**Auniform and flexible model forthree-dimensional measurement offline-structured light senseor** Zhe Li, Jiwen Cui, Jianwei Wu, Lei Chen and Jiubin Tan
	P2-11	**164**	**Global data registration technology based on dynamic coded points** Wei Liu, Zhiguang Lan, Yang Zhang, Zhiyuan Zhang, Haiyang Zhao, Fan Ye, Zhenyuan Jia
Management of Measurement	**P2-12**	**89**	**Evaluation of uncertainty in product inspection andcalculation of misjudgment probability** Yinbao Cheng, Xiaohuai Chen, Hongli Li, Rui Jiang, Houde Liu

Processes			
Material Characterization	**P2-13**	**52**	**Optical transparent and millimeter-wave resonance mesh coating with annular aperture array** Yongmeng Liu, Cuilian Zuo, Dehao Du, Tingting Zheng, Tong Zhou, Zihan Zhou, Zelin Li and Jiubin Tan
Micro and Nano Metrology	**P2-14**	**142**	**Focus variation microscopy based on efficiency-optimized gray level variance** Xinguang Bian, Xiaosheng Cheng, Haihua Cui, Liming Yin and Huayu Jia
	P2-15	**171**	**Two-dimensional displacement measurement based on two parallel gratings** Peipei Wei, Caiyi Xiong, Decheng Qiao, Xi Lu, Limin Zou, Tong Zhou, Jiubin Tan and Zhengang Lu
	P2-16	**232**	**A novel calibration method for NIR MOEMS spectrometer with one single detector** Liang Yu, Christian Werner, Gabor Molnar, Ingmar Leber, Pengcheng Hu, Jiubin Tan, Andreas Dietzel and Jens Flügge
	P2-17	**247**	**The design of two dimensional high precision displacement stage for nanometer line-width measurement** Xu Chang, Sitian Gao, Dongsheng Li and Qi Li
Optical Metrology	**P2-18**	**151**	**Non-focused common-path laser rotary encoder** Chyan-Chyi Wu,Cheng-Chih Hsu,Ching-Liang Dai and Ju-Yi Lee
	P2-19	**158**	**Optical frequency comb distance measurement and laser tracking system** Weihu Zhou, Junkai Shi, Rongyi Ji and Ya Liu
	P2-20	**166**	**A synthetic dual-frequency self-mixing interferometer** Junbao Chen, Ming Wang and Wei Xia
	P2-21	**177**	**A stable heterodyne interferometer with tens picometers periodic error** Guolong Wu, Haijin Fu and Pengcheng Hu
	P2-22	**186**	**Dual-comb metrology with a free-running fiber laser** Ya Liu, Junkai Shi, Rongyi Ji, Weihu Zhou and Zheng Zheng
	P2-23	**203**	**Research on effect of rough surface on FMCW laser radar rang accuracy** Huirong Tao
Sensors and Actuators	**P2-24**	**261**	**Fabrication of capacitive micromachined ultrasonic transducers based on low temperature wafer-bonding technology** Jie Li, Libo Zhao, Rahman•hebibul, Zhikang Li, Jiawang Zhang, Yihe Zhao, Jiuhong Wang, Zhiming Zhao and Zhuangde Jiang
	P2-25	**262**	**A simulation analysis of a novel ultra-high g piezoresistive shock accelerometer** Chen Jia, Xixiang Liu, Yu Xu, Libo Zhao, Zhiming Zhao, Mingzhi Yu, Zhikang Li, Mimi Huang, Jiuhong Wang, Zhuangde Jiang
	P2-26	**264**	**Finite element analysis of resonant fluid density sensor based on CMUT**

			Jiawang Zhang, Libo Zhao, Hongyan Wang, Zhikang Li, Zhiming Zhao, Jie Li, Yihe Zhao, JiuhongWang and Zhuangde Jiang
	P2-27	**271**	**SU-8 MEMS force sensor usinglaterally movable gate array field effect transistor** Wendi Gao, Libo Zhao, Zhuangde Jiang, Jiuhong Wang, Yonglu Wang, Yong Xia, Mingzhi Yu, Yulong Zhao and Dong Sun
Surface Metrology	**P2-28**	**315**	**Key operations of areal surface topography measurement** Baofeng He, Cui'e Wei and Zhaoyao Shi
	P2-29	**333**	**Four-probe error separation method for on-line measuring cylindricity** Wenwen Li, Hao Zeng and Tingting Tao
	P2-30	**353**	**A generalized approach of form error evaluation for sculptured surfacewithin the framework of the new generation GPS standards system** Heping Peng and Qianpeng Han

Poster Session 3
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Topic	Poster ID	Paper ID	Paper Title
Calibration and Machine Tool Performance	**P3-01**	**326**	**Geometric error measurement of a 4-axis machine tool using a touch trigger probe** Ji Hun Jeong, Gyungho Khim, Chun Hong Park and Jeong Seok Oh
	P3-02	**358**	**Integrated optomechanical design and analysis of a korsch-typethree mirror anastigmat telescope** Yuchuan Lin, Shenq Tsong Chang, Roger Lien and Tingming Huang
In-Process and Online Metrology	**P3-03**	**337**	**Tolerance analysis of slider-crank mechanism for assembly functionality check** Xusong Xu, Zhiying Sun, Zhen Fan
Intelligent Instruments for Automation	**P3-04**	**280**	**The development of the relay valve comprehensive performance testing system** Xian-Yan Wang, Jie Lu , Yong-jun Zheng
	P3-05	**376**	**Filter algorithm for multi-spectrum dynamic temperature measurements on turbine blades** Xuecong Zhang, Yongjun Yang, Jing Cai, Lei Dong
Machine Vision and Image Processing	**P3-06**	**364**	**The extraction of red maple tree in complex background** Changjun Zhang, Aijun Chen, Dongsheng Li
	P3-07	**375**	**Image distortion and non-uniformity correction** Jing Cai, Xuecong Zhang, Yongjun Yang, Su Meng
Management of Measurement	**P3-08**	**96**	**Optimization design of a 12m high supporting structure for a vibration isolation platform** Junning Cui, Xingyuan Bian and Yamin Zhao

Processes	**P3-09**	**117**	**Trajectory planning strategy of 3 - PUU parallel coordinate measuring machine** Chengxiang Song, Penghao Hu, Shiyi Chen, Pu Liao, Yichang Lu
Material Characterization	**P3-10**	**119**	**Alumina and zirconia ceramics properties in high temperature** Yanjie Guo,Fei Lu and Lei Zhang, Xiaowei Guo, Qiulin Tan, Jijun Xiong
Micro and Nano Metrology	**P3-11**	**256**	**Effect of the different substrates and the film thickness on the surfaceroughness of step structure** Chenying Wang, Jiangtao Pu, Weixuan Jing, Yijun Zhang, Ming Liu, Wei Ren, Zhuangde Jiang
	P3-12	**335**	**Arc discharging parameters for fabricating the micro ball tips** Chen Chen, Rui-Jun Li, Qi Li and Kuang-Chao Fan
	P3-13	**351**	**Theoretical analysis of capacitive sensor based micro-angle measurement unit and micro-angle interferometer using spatial geometric modeling and Monte Carlo simulation for achieving nano-radian accuracy** Fan Zhu, Xinran Tan and Jiubin Tan
	P3-14	**356**	**Error analysis and correction of probe system of coordinate measuring machine** Tonglei Feng, Chi Xu, Xugang Feng and Jiayan Zhang
Optical Metrology	**P3-15**	**234**	**Research on air supply mode of flotation platformof LCD glass optical detection instrument** Chengwei Li
	P3-16	**248**	**Study on engineering module design for liquid macromolecular ingredient content detection** Xiaotong Na, Zhen Zhou, Chunyu Wang, Siqi Zhang, Xu Yang
	P3-17	**272**	**A synthetic dual-frequency self-mixing interferometer** Junbao Chen, Ming Wang and Wei Xia
	P3-18	**284**	**Analysis and research on the noise of points cloud of the 3D laser scanning measurement of rail tankers** Zhipeng Zhang, Xunjun, Shao
	P3-19	**322**	**3D feature point for point cloud registration** Haihua Cui, Xiaosheng Cheng, Jiquan Yang, Jianhua Ma
Sensors and Actuators	**P3-20**	**277**	**Design and simulation of MEMS piezoelectric vibration energy harvesters with center mass block** Lu Wang, Libo Zhao, Zhuangde Jiang, Zhikang Li, Yong Xia, Yunyun Luo
	P3-21	**299**	**Research on non-contact electromagnetic field measurement system for AC/DC transmission lines** Shuai Wang, Chao-bin Niu, Shuang Song, Yi-shu Liu, Zheng Qin and Hai-Bao Mu
	P3-22	**352**	**Submicron centroid position measurement method of screw connected structure under temperature load** Xiao Chen, Muzheng Xiao, Zifu Wang, Zhijing Zhang, Xin Jin

	P3-23	**355**	**The calibration and analysis of inertia sensors for unmanned aerial vehicle** Chao Wang, Jinyong Yu and Bian Tian
	P3-24	**363**	**Calibration device for hemodialysis instrument** Yi-gang Jiang, Shi-Tao Chen, Yong-qiang He, Ai-jun Chen, Jia-cheng Hu and Dong-sheng Li
Surface Metrology	**P3-25**	**367**	**Geometrical deviation induced measurement error of freeform surfaces for coordinate measuring machines** Mingyu Liu, Chi Fai Cheung and ShuMing Yang
	P3-26	**368**	**Correction of the optical setup error in simultaneousphase-shiftinginterferometry** Xiaoting Guo, Xiaojun Liu, Jingjing Jin
	P3-27	**370**	**An improved white-light phase-shifting interferometry** Peng Zhou, Xiaojun Liu
	P3-28	**189**	**Analysis of Angle Indexing Error Caused by Coaxial Deviation of Double Centers in Gear Measuring Machine** Zhi-Feng Lou, Peng-Fei Xue, Kuang-Chao Fan
Education and Training in Metrology	**P3-29**	**93**	**A practical method of VCMM modeling and measurement uncertainty evaluating** Hongli Li, Xiaohuai Chen, Houde Liu, Yinbao Cheng, Hanbin Wang, Zhenying Cheng and Hongtao Wang


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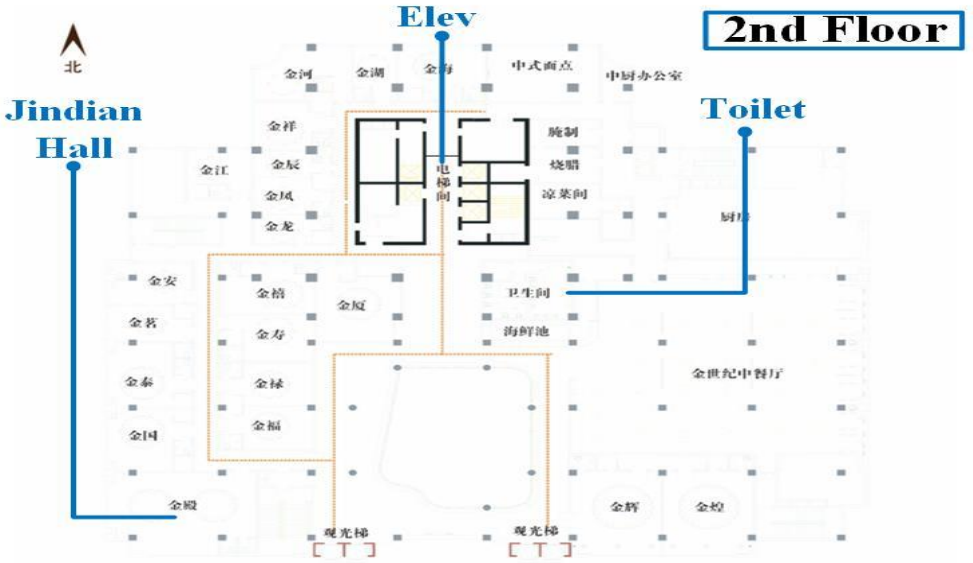

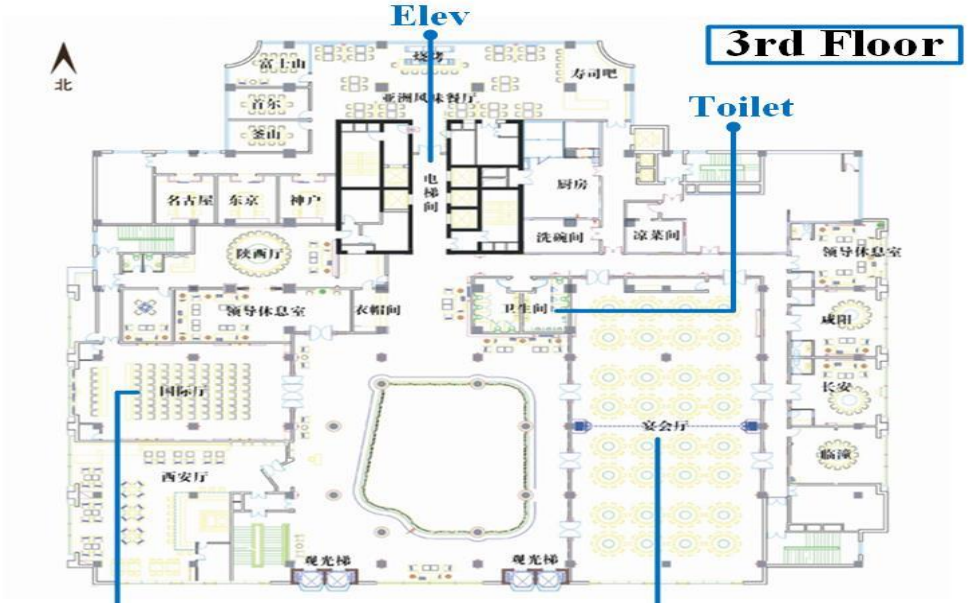

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Banquet Hall

Conference room No.7

Conference room No.10

Note: Coffee House is on the 1st floor.

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