

Final Program of ISMTII 2015

September 22nd ~25th, 2015

GIS NTU International Center, Taipei, Taiwan

Organized by:



Agenda of ISMTII 2015

Time	Day 1 Sep. 22
15:00	Registration (Conference Building: GIS NTU Convention Center, until 18:00)
16:00-17:00	Life Speech: Prof. Kuang-Chao Fan Chair: Prof. Kiyoshi Takamasu (B1 Conference Hall at GIS)
18:00-20:00	Welcome Reception (Restaurant La Marée) Address: 2F., No. 16, Siyuan St., Zhongzheng Dist., Taipei City 100

Time	Day 2 Sep. 23													
8:00	Registration (GIS, until 17:50)													
8:30-8:50	Opening Ceremony (B1 Convention Hall) Opening Speech: Conference Chair, Prof. Liang-Chia Chen Welcome Speech: President of National Taiwan University, Prof. Pan-Chyr Yang													
8:50-9:30	Plenary Keynote Session 1 (Convention Hall) Dr. Wolfgang Knapp, Engineering Office, Swiss Federal Institute of Technology (ETH), Switzerland Topic: Measurement Uncertainty and Machine Tool Testing Chair: Prof. Wei Gao													
9:30-10:10	Plenary Keynote Session 2 (Convention Hall) Prof. Jiubin Tan (Prof. Jian Liu), Harbin Institute of Technology, China Topic: Advances on Superresolution Imaging in Field of Confocal Microscopy Chair: Prof. Han-Pang Huang													
10:10-10:35	Symposium Photography Tea Break													
10:35-11:15	Plenary Keynote Session 3 (Convention Hall) Dr. Ishih Tseng, Chroma ATE Inc., Taiwan Topic: Challenge of Migrating Precision Measurement into Integrated Precision Process Measurement Chair: Prof. Yuri Chugui	Exhibition (Lobby & Exhibition Hall)												
11:20-12:00	Industry Technical Session (Special Topics from Industrial Companies) Chair: Prof. Ming Chang													
12:00-13:00	Lunch (Convention Hall) / ICMI Board Meeting (Room F, 12:00-14:00)													
13:00-14:00	Poster Session I (Poster Hall)													
14:00-15:45	Oral Sessions													
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 12.5%;">Room A</th> <th style="width: 12.5%;">Room B</th> <th style="width: 12.5%;">Room C</th> <th style="width: 12.5%;">Room D</th> <th style="width: 12.5%;">Room E</th> <th style="width: 12.5%;">Room F</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Session 1 Optical Metrology (I)</td> <td style="text-align: center;">Session 2 Sensors and Actuators (I)</td> <td style="text-align: center;">Session 3 Nano-scale Measurement</td> <td style="text-align: center;">Session 4 Multi-DOF Measurement and Machine Tool Performance (I)</td> <td style="text-align: center;">Session 5 Characterization of Semiconductor Materials and Components</td> <td style="text-align: center;">Session 6 Advanced Measurement Technology</td> </tr> </tbody> </table>	Room A	Room B	Room C	Room D	Room E	Room F	Session 1 Optical Metrology (I)	Session 2 Sensors and Actuators (I)	Session 3 Nano-scale Measurement	Session 4 Multi-DOF Measurement and Machine Tool Performance (I)	Session 5 Characterization of Semiconductor Materials and Components	Session 6 Advanced Measurement Technology	
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15:45-16:05	Tea Break													
	Oral Sessions													
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18:20-20:20	Conference Dinner Howard Civil Service International House (within walking distance from GIS to HCSI House)													

Time	Day 3 Sep. 24					
8:00	Registration (GIS, until 16:50)					
8:30-9:10	Plenary Keynote Session 4 (Convention Hall) Prof. Richard Leach, University of Nottingham, UK Topic: Fundamental Limits of 3D Optical Metrology Chair: Prof. Yasuhiro Takaya					Exhibition (Lobby & Exhibition Hall)
9:10-9:50	Plenary Keynote Session 5 (Convention Hall) Prof. Satoru Takahashi, The University of Tokyo, Japan Topic: Challenge of Spatial Resolution Improvement of Optical Measurement Method Based on Localized Light Energy Chair: Prof. Seung-Woo Kim					
9:50-10:10	Tea Break					
10:10-10:50	Plenary Keynote Session 6 (Convention Hall) Dr. Wei-En Fu, Industrial Technology Research Institute, Taiwan Topic: Transmission Small Angle X-ray Scattering (TSAXS) Intensity Enhancement for Critical Dimension (CD) Measurements Chair: Prof. Robert Schmitt					
10:50-11:50	Poster Session II (Poster Hall)					
11:50-12:50	Lunch (Convention Hall)					
12:50-14:35	Oral Sessions					
	Room A	Room B	Room C	Room D	Room E	
	Session 13 Optical Metrology (III)	Session 14 Automated Optical Inspection (I)	Session 15 Micro and Nano Metrology (I)	Session 16 Machine Vision and Image Processing (I)	Session 17 Robot Vision and Automation	
14:35-14:55	Tea Break					
14:55-16:40	Oral Sessions					
	Room A	Room B	Room C	Room D	Room E	
	Session 18 Optical Metrology (IV)	Session 19 Automated Optical Inspection (II)	Session 20 Micro and Nano Metrology (II)	Session 21 Machine Vision and Image Processing (II)	Session 22 Material Characterization	
17:00-20:00	Shuttle bus leaves at 17:00 from GIS Conference Banquet begins at 18:00 (Silks Palace at the National Palace Museum) Address: 221 Chishan Road, Section 2, Shilin, Taipei City					

Time	Day 4 Sep. 25				
8:30	Pickup Point: Front Entrance of GIS Bus Departure Time: 8:30 am (Maximum number of participants is 25 for each tour group.)				
8:30-17:30	Tour A: A visit to Instrument Technology Research Center (https://www.itrc.narl.org.tw/index-e.php) and Beipu old town . Tour B: A visit to the Center for Measurement Standards of Industrial Technology Research Institute (ITRI) and Beipu old town . Tour C: A visit to Test Research Inc. (http://www.tri.com.tw/en/index.html) and National Palace Museum . Tour D: A Visit to NTU, Department of Mechanical Engineering (http://140.112.16.109/main.php?site_id=1) and Building 101 . Tour E: A Visit to Chroma Technology Group (https://www.chroma.com) and Building 101 .				

Life Speech

Location: Convention Hall

Day 1, Sep. 22, 04:00-05:00pm

Chair: Prof. Kiyoshi Takamasu



Dr. Kuang-Chao Fan

Emeritus Professor, National Taiwan University, Taiwan

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Title of speech:

“From Precision Measurements to Precision Machines”

Kuang-Chao Fan received his B.Sc. degree from National Taiwan University in 1972, M.Sc. degree from the State University of New York at Buffalo in USA in 1976, and Ph.D. degree from University of Manchester Institute of Science and Technology in UK in 1984, all in mechanical engineering. He used to be lifetime distinguished professor and Zhong-Juo Zhang Chair in the Department of Mechanical Engineering of National Taiwan University (NTU). He is Cheung Kong Scholar of Hefei University of Technology. His research interests include manufacturing metrology, optical measurements, micro/nano-measurements, and machine tool metrology. He has published more than 150 journal papers and 250 conference papers. He is the Fellow of SME, ISNM, CSME and CIAT. He was the President of SME Taiwan Chapter, Chinese Institute of Automation Technology, and Asian Society for Precision Engineering and Nanotechnology. He has received many academic and industrial-cooperative awards worldwide. In 2014, The University of Manchester awarded him the Higher Doctorate of Engineering in recognition of his lifetime contribution. He has retired from National Taiwan University since February 1st, 2015.

Abstract:

Precision measurement technology plays the role of dimensional quality control to all products. Different geometrical products require different measurement technologies with science-based methodologies. Developing new measuring instruments for difficult-to-measure parts is always my primary interest and motivation during my lifetime of 37 years at National Taiwan University. The mission of measurement is not limited to quality control only, more importantly, it should improve the quality by compensating for machining errors. My secondly interest is focused on applying the sensor technology to error compensation of machine tools and precision machine design. In this life speech, I will address my experience of working with students to cope with difficult problems from precision measurements to precision machines.

Plenary Keynote Sessions

Plenary Keynote Session 1 (Convention Hall)

Day 2, Sep. 23, 08:50-09:30am

Chair: Prof. Wei Gao



Dr. Wolfgang Knapp

Engineering Office, Swiss Federal Institute of Technology (ETH),
Switzerland

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Title of speech:

“Measurement Uncertainty and Machine Tool Testing”

Dr. Wolfgang Knapp received his PhD degree in Mechanical Engineering from the Swiss Federal Institute of Technology Zurich (ETH Zurich), Switzerland in 1984 with specialization on machine tool design and manufacturing majoring on dimensional metrology. Aside from his 80+ publications and serving as a reviewer for high impact journals, he still serves his alma mater as a lecturer on topics related to machine tools, workpiece metrology and CMM performance evaluation. Dr. Knapp has served as chair as well as an important contributor on several standards committee for machine tool safety and metrology such as swissmem/NK 9, CEN/TC 143 and ISO/TC 39 to name a few. He currently owns and manages his own consultancy firm which he had established back in 1987, specializing in machine tool metrology, workpiece metrology, three coordinate metrology and error-budgeting. His firm is an active participant for machine tools and metrology related Swiss and European research projects.

Abstract:

Smaller tolerances and smaller threshold values increased the importance of measurement uncertainties. Moreover, more complex measurement equipment caused that measurement uncertainty is no longer defined by measuring instrument uncertainty alone. Consideration of measurement uncertainty is also reflected in ISO standards for machine tools, which will be presented. Up to now machine tool manufacturers do not pay much attention to measurement uncertainty, even not when checking machine tool performance. As machine tool users are beginning to ask for uncertainty statements, machine tool manufacturers should be prepared to deal with this issue correctly and be aware of significant contributors to measurement uncertainty. The presentation will include measurement examples and procedures to reduce measurement uncertainty.

Plenary Keynote Session 2 (Convention Hall)

Day 2, Sep. 23, 09:30-10:10am

Chair: Prof. Han-Pang Huang



Prof. Jiubin Tan

Harbin Institute of Technology, China

jbtan@hit.edu.cn

Title of speech:

“Advances on Superresolution Imaging in Field of Confocal Microscopy”

Prof. Jiubin Tan is an outstanding professor affiliated with Harbin Institute of Technology (HIT), China. After completing his PhD in the same university specializing in the field of ultra-precision instrumentation, he served as a visiting professor in University of Oxford before founding and heading the center for ultra-precision optoelectronic instrument engineering of HIT. He has authored a number of papers which advanced the field of precision instrument & machinery and holds several patents which led him to get the 2013 National Award for Technological Invention in China. He serves as the Vice President of the Chinese Society for Measurement (CSM), as well as the Chairman of the Instrumentation Committee of CSM.

Abstract:

Optical microscopy is specimen dependent and the holly grail is to pursuing for high resolutions. Confocal microscopy is indeed one of the societies. A clear trend of microscopes is to satisfy the rising high-value manufactured parts whatever with areal nano structures or large scale profiles but nano precision. Manufacturing puts demands on the metrology to assure product quality and inspire innovations. In terms of modern optical metrology, part of the challenges due to limited size of tight focusing optical probes and beam reflections on highly curved smooth surfaces. This paper will show the recent advances, optical theories and interdisciplinary interests, on superresolution imaging in field of confocal microscopy, which may benefit the fields of microelectronics, structured surfaces, crystal sphere or particle growth, roll -to-roll manufacturing and lens fabrications.

Plenary Keynote Session 3 (Convention Hall)

Day 2, Sep. 23, 10:35-11:15am

Chair: Prof. Yuri Chugui



Dr. Ishih Tseng

Chroma ATE Inc., Taiwan
ist@chroma.com.tw

Title of speech:

“Challenge of Migrating Precision Measurement into Integrated Precision Process Measurement”

Dr. I-Shih Tseng obtained his PhD in Mechanical Engineering in The Pennsylvania State University. He had held some patents when he worked for the Institute of Information Industry before becoming a key person in the growth and success of Chroma Ate Inc. His contributions on testing and measurement technologies for electronics, LEDs and solar panels to name a few, had contributed greatly to where Chroma stands today. He served as R&D Vice President, then as Chief Technology Officer of Semiconductor Test Equipment BU and he is currently the President of Integrated System Solutions BU at Chroma ATE Inc.

Abstract:

Global vendors of electronic devices are no longer competing in signals and functions. The forever growing volumes and continuing deterioration of pricing have demanded highly efficient, and yet even better and more reliable manufacturing processes. Test and measurement technology, adopted to such industrial trend, can no longer be simply signal accuracy or measurement throughput. Integrated technology which comprises both high speed device processing, delicate process control and monitoring, and more repeatable and reliable measurement, is needed in almost every new device development plan. Chroma's effort into a highly integrated automation measurement technology, which is called turn-key solution, is introduced and elaborated with several examples.

Plenary Keynote Session 4 (Convention Hall)

Day 3, Sep. 24, 08:30-09:10am

Chair: Prof. Yasuhiro Takaya



Prof. Richard Leach

University of Nottingham, UK

richard.leach@nottingham.ac.uk

Title of speech:

“Fundamental Limits of 3D Optical Metrology”

Prof. Richard Leach finished his PhD in Surface Metrology from University of Warwick. He has current research interests in surface topography measurement, micro-coordinate metrology, high dynamic range sensing and computed tomography. He is part of the Council of the European Society of Precision Engineering and Nanotechnology, one of the Board of Directors of the American Society of Precision Engineering, the EPSRC Peer Review College, the International Committee on Measurements and Instrumentation. He is also the European Editor-in-Chief for Precision Engineering and the founder of the new Institute of Physics journal: Surface Topography: Metrology & Properties. Aside from the above mentioned, he is also a Fellow of the Institute of Physics, the Institution of Engineering & Technology, the International Society of Nanomanufacturing, a Sustained Member of the American Society of Precision Engineering, a Chartered Engineer and a Chartered Physicist. He served as Principal Research Scientist at the National Physical Laboratory in the United Kingdom till last year and currently serves the University of Nottingham as a Professor of Metrology, leading the Manufacturing Metrology research. He is also a visiting professor at Loughborough University and the Harbin Institute of Technology.

Abstract:

Optical instruments are now used extensively in manufacturing industry to determine the 3D geometry of objects. Optical instruments offer a range of benefits over mechanical contacting techniques; not least, much higher measurement speeds. However, despite their benefits, optical instruments have a number of fundamental limitations when being used for 3D measurement, many of which cannot be overcome by improvements in engineering and technology. These limitations will be discussed in this paper along with limitations in current technology. Approaches will be presented that can partially overcome some of the limitations by making use of advances in mathematics, physics and engineering.

Plenary Keynote Session 5 (Convention Hall)

Day 3, Sep. 24, 09:10-09:50am

Chair: Prof. Seung-Woo Kim

Prof. Satoru Takahashi

The University of Tokyo, Japan

takahashi@nanolab.t.u-tokyo.ac.jp



Title of speech:

“Challenge of Spatial Resolution Improvement of Optical Measurement Method Based on Localized Light Energy”

Prof. Satoru Takahashi received his doctor degree in Mechanical Engineering and Systems from Osaka University in 2002. His research interests include the nano-in-process measurement, nano-scale-metrology, and nano/micro microfabrication using the advanced optics based on not only far-field optics but also localized photon energy such as evanescent light, near-field light, and so on. He has been awarded various prizes from national academic communities, including three JSPE Best Awards, two JSPE Numata Memorial Prize, and has also received various international awards of Outstanding paper award of ISMQC (2010), and Certificate of Merit for Outstanding Presentation of LEM (2013). He is currently working as a full professor of the University of Tokyo (UTokyo), Japan, and leads the Photon based Advanced Manufacturing Science Division of the Research Center for Advanced Science and Technology (RCAST) of UTokyo.

Abstract:

In the micro manufacturing field, in-process optical inspection plays one of the most important roles for manufacturing the advanced products with high reliability, because it has several practical advantages typified by nondestructiveness, high-throughput characteristics, and so on. Optical measurement method, however, essentially restrict its spatial resolution due to the diffraction limit, which means that finer structures less than half of the wavelength of optical wave from the objects to be inspected, cannot be observed. This resolution limit of the optical measurement method is a big problem especially for the next-generation manufacturing process, where the functions of submicrometer fine structures should be more important. This critical limit about spatial resolution can be physically explained by focusing on light energy localization property. Light energy can be mainly classified in the following three types of localizations: (1) Evanescent light generated under the total internal reflection. (2) Near-field light existing in the vicinity of the bulk materials. (3) Interference intensity distribution of freely propagating light such as standing wave, focusing beam (generated with multiple beam interference), and so on. Physical principles for spatial resolution improvement are different based on types of light energy localization. In order to develop the effective optical inspection beyond the diffraction limit, it is important to recognize their super resolution property of depending on their light energy localization. In this talk, I would like to present the challenge of the spatial resolution improvement of optical measurement using various types of localized light energy, which can be applied to the micro manufacturing process inspection, and discuss their possibility for the next-generation microstructure manufacturing.

Plenary Keynote Session 6 (Convention Hall)

Day 3, Sep. 24, 10:10-10:50am

Chair: Prof. Robert Schmitt

Dr. Wei-En Fu

Industrial Technology Research Institute, Taiwan

weienfu@itri.org.tw



Title of speech:

“Transmission Small Angle X-ray Scattering (TSAXS) Intensity Enhancement for Critical Dimension (CD) Measurements”

Dr. Wei-En Fu finished his Master’s degree in Mechanical Engineering at University of Connecticut and his PhD in Industrial and Manufacturing Engineering at Pennsylvania State University. His expertise is in the fields of nanoscale metrology, thin film stress characterization, X-ray technology and micro/nano-machining for advanced materials. He had served as a Production Specialist at Ford Motors in Taiwan and as a guest researcher for the Material Science Laboratory of the National Institute of Standards and Technology in the U.S. He then continued his career in both the National Measurement Laboratory of R.O.C and Center for Measurement Standards, Industrial Technology Research Institute in Hsinchu, Taiwan. He is currently the manager of the Center for Measurement Standards at the same time a senior researcher for the National Measurement Laboratory

Abstract:

The semiconductor industry is moving into 22 nm technology node and beyond, concurrently, it is also moving away from 2D planar features and heading to 3D ones, for example, FinFET structures. The ever decreasing feature size and more complex structures redefine the needs for metrology solutions. Transmission small angle X-ray scattering (tSAXS) has been identified as a possible metrology solution to address these challenges. However, the major hurdle is its measurement speed; it is simply too slow for the high volume manufacturing process due to a lack of high brilliance X-ray sources other than synchrotrons. Here, we describe a novel ideal and the related measurements which are expected to amplify the X-ray scattering intensity from a target object under a fixed incident X-ray flux, hence, to increase the measurement speed. When properly implemented this technique is expected to enhance the tSAXS intensity of target objects regardless of the type of X-ray source.

Oral Presentations

Day 2- 23rd September, 2015 (Wednesday), 14:00~15:45 pm

Session 1 (Room A) Optical Metrology (I) Chairs: Prof. Yu-Lung Lo and Dr. Gabor Molnar		
14:00-14:25	(1325)	(Invited Paper) Ultra Stable Laser Interferometer for Precision Measurement in MEMS and Nano-Technology Applications <u>Charles Wang</u> , Joe Zhou, Andy Chen, Johnson Zhu
14:25-14:43	(1149)	Measurement on high-stepped structures by wide repetition rate tunable femtosecond laser with paired CFBGs <u>Jiyong Park</u> , Seungman Kim, Byung Soo Kim, Young-Jin Kim, Seung-Woo Kim
14:43-15:01	(1182)	Analyses of DNA Image Cytometry Uncertainty Caused by Diffractive Blurring <u>Irina Georgievna Palchikova</u> , Evgenii Sergeevich Smirnov, Alexander Alexanderovich Konev
15:01-15:19	(1086)	Metrology performance of laser line scanning of Additive Manufacturing fixtures on CMMs <u>Min Zhang</u> , Bart Boeckmans, Jean-Pierre Kruth, Wim Dewulf, Zhaoyao Shi
15:19-15:37	(1075)	Stereoscopic Measuring System Based on the Holographic Optical Element and Spatial Frequency Wei-Ren Chen, Shih-Yu Chan, Jun-Lin Long, Hsi-Fu Shih, Jenq-Shyong Chen, <u>Yi-Shiang Wang</u>
Session 2 (Room B) Sensors and Actuators (I) Chairs: Prof. Volker Hans and Prof. Dong-Yea Sheu		
14:00-14:25	(1007)	(Invited Paper) Problems of Signal Processing in Ultrasonic Gas Flow Measurement <u>Volker Herbert Hans</u>
14:25-14:50	(1073)	(Invited Paper) A MEMS Density and Viscosity Resonant Sensor Based on the Torsional Vibrating Mode <u>Yingjie Hu</u> , Libo Zhao, Tongdong Wang, Yulong Zhao, Guoying Yuan, Liwei Lin, Zhuangde Jiang
14:50-15:08	(1342)	Advanced optical 3D form measurement of aspheres including determination of wedge and decenter errors and lens thickness <u>Y.Yu</u> , G.Berger, J.Petter
15:08-15:26	(1062)	Novel diaphragm structure combined peninsula-island for ultra-low pressure sensor with high sensitivity Libo Zhao, <u>Tingzhong Xu</u> , Yu Xu, Xin Guo, Hongyan Wang, Yulong Zhao, Liwei Lin, Zhuangde Jiang
15:26-15:44	(1328)	Tip-tilt Tests by Using Eddy Current Measuring Sensors <u>Young-Soo Kim</u> , Jihun Kim, Je Heon Song, Chan-Hee Lee, Won Gi Lee, Ho-Sang Kim, Kyoung-Don Lee, Myung Cho, Hyo-Sung Ahn, Won Hyun Park, Ho-Soon Yang, Joohyung Lee
Session 3 (Room C) Nano-scale Measurement Chairs: Prof. Richard Leach and Prof. Shulian Zhang		
14:00-14:25	(1316)	(Invited Paper) Mueller matrix ellipsometry: A powerful tool for nanostructure metrology in nanomanufacturing <u>Shiyuan Liu</u> , Xiuguo Chen, Chuanwei Zhang, Hao Jiang

14:25-14:50	(1334)	(Invited Paper) Recent Development for Laser Feedback interferometers in TU <u>Shulian Zhang</u>
14:50-15:08	(1270)	Roundness correction processing with nanometer order accuracy <u>Yoshinori Takei</u> , Hidekazu Mimura
15:08-15:26	(1284)	Application of 3D nanorelief sharp-edge detection method in the optical interference microscope Evgeny V. Sysoev, Yuri Vasil'ievich Chugui, Rodion V. Kulikov, <u>Ignat A. Vykhristyuk</u> , Liang-Chia Chen, Hai Hong Hoang, Kuang-Chao Fan
15:26-15:44	(1285)	Lateral resolution improvement of 3D relief measurement by interferometric method Evgeny V. Sysoev, <u>Ignat A. Vykhristyuk</u> , Vasiliy V. Shirokov, Rodion V. Kulikov

Session 4 (Room D)
Multi-degree-of-freedom Measurement and Machine Tool Performance (I)
Chairs: Prof. Kuang-Chao Fan and Prof. So Ito

14:00-14:25	(1068)	(Invited Paper) Some progress in development of laser system for simultaneously measuring six-degree-of-freedom geometric motion errors of a linear guide <u>Qibo Feng</u> , Bin Zhang, Cunxing Cui, Yuqiong Zhao
14:25-14:50	(1071)	(Invited Paper) A three-axis angle sensor with a linear encoder scale reflector <u>Yuki Shimizu</u> , Taiji Maruyama, So Ito, Wei Gao
14:50-15:08	(1137)	Self-calibration of Coupling Error for 3-DOF Displacement Measurement of Planar Working Stage Based on Two Planar Gratings <u>Yongmeng Liu</u> , Maoqiang Yuan, Jiubin Tan
15:08-15:26	(1299)	Error Compensation of Precision Machines with Multi-degree-of-freedom Sensor Systems <u>Kuang-Chao Fan</u> , Hao-Wei Yang, Shih-Hsin Hsu, Ruijun Li, Qiaoyun Liu
15:26-15:44	(1311)	Concurrent measurement method of spindle radial, axial and angular motions using concentric circle grating and phase modulation interferometers <u>Tung Thanh Vu</u> , Yoshitaka Maeda, Muhummad Madden, Masato Aketagawa

Session 5 (Room E)
Characterization of Semiconductor Materials and Components (Special Session)
Chairs: Prof. Ming-Han Liao and Prof. Shien-Kuei Liaw

14:00-14:25	(1172)	(Invited Paper) Fiber Optics Devices Characteristics Evaluation and Measurement <u>Shien-Kuei Liaw</u> , Yi-Lin Yu, Hsi-Hsir Chou, Le-Minh Hoa, Zabih Ghassemlooy
14:25-14:43	(1177)	Drain Side N⁺ Layout Manners ("nnpn" Arranged-type) on ESD Robustness in the 60-V pLDMOS-SCR Shen-Li Chen, Yu-Ting Huang, <u>Chih-Hung Yang</u> , Chih-Ying Yen, Kuei-Jyun Chen, Yi-Cih Wu, Jia-Ming Lin
14:43-15:01	(1183)	Investigation of macro-defects and electric properties evolution of SiC bulk single crystals grown by PVT method <u>Bang-Ying Yu</u> , Dai-Liang Ma, Jun-Bin Huang, Zhi-Wei Guo, Shiu-Ping Chang, Ta-Ching Li, Bo-Cheng Lin, Hsueh-Yi Chen, Tsao-Chum Peng, Ying-Cong Zhao
15:01-15:19	(1290)	Characteristics of Indium Incorporated Barrier Layer on GaN for HEMTs (High-Electron-Mobility Transistors) Applications P.-G. Chen, Min-Hung Lee, <u>H.H. Chen</u>
15:19-15:37	(1291)	Nano-Structure Fabrication on the Nitride Films by Automatic Scanning Probe Oxidation Bor-Jiunn Wen, Chang-Chun Lee, <u>Chia-Ping Hsieh</u>

Session 6 (Room F)		
Advanced Measurement Technology		
Chairs: Prof. Shih-Ming Wang and Prof. Po-Ting Lin		
14:00-14:25	(1191)	(Invited Paper) Specific Features of Dynamic Measurements in the Field of Psychophysics Roald Taymanov, Yulia Baksheeva, <u>Kseniia Sapozhnikova</u>
14:25-14:43	(1307)	Robot-Assisted Evaluation for Effects of Botulinum Toxin Injection on Spasticity of Upper Limb in Patients with Chronic Stroke Yu-Ching Lin, Cheng-Tao Chang, Chou-Ching K. Lin, <u>Ming Shaung Ju</u>
14:43-15:01	(1199)	A New Fiber Boisenor for Real-time Detection of PH and Oxygen during the Process of Cell Metabolism <u>Wei Tao</u> , Hui Zhao, Yanli Hu, Yubing Bi, Rong Cai
15:01-15:19	(1277)	Study of Various Numeric Treatments for Flux Limiters <u>Yu-Tso Li</u> , Tzong-Hann Shieh, Meng-Rong Li
15:19-15:37	(1281)	Study of Unsteady Aerodynamic Effects for a Vertical Axial Wind Turbine Tzong-Hann Shieh, Charng-Chin Hsiao, <u>Yung-Ting Chen</u> , Ya-Tzu Hsu, Yang-Hsu Liao

Oral Presentations

Day 2- 23rd September, 2015 (Wednesday), 16:05-17:50 pm

Session 7 (Room A)		
Optical Metrology (II)		
Chairs: Dr. Charles Wang and Dr. Irina Georgievna Palchikova		
16:05-16:30	(1211)	(Invited Paper) High Speed Scanning Ellipsometry for Glucose Sensing Quoc Hung Phan, <u>Yu-Lung Lo</u>
16:30-16:48	(1041)	Design and development of novel three-dimensional optical scanner <u>Jyun-Cheng Huang</u> , Chien-Sheng Liu, Chuan-Chen Kuo, Pei-Ju Chiang, Jian-Liang Liu
16:48-17:06	(1095)	A passive THz near-field microscope equipped with a helium-free cryostat <u>Kuan-Ting Lin</u> , Susumu Komiyama, Sunmi Kim, Ken-ichi Kawamura, Yusuke Kajihara
17:06-17:24	(1166)	Evaluation of Volumetric Data for Dimensional X-ray Computed Tomography <u>Hiroyuki Fujimoto</u> , Makoto Abe, Kazuya Matsuzaki, Osamu Sato, Toshiyuki Takatsuji
17:24-17:42	(1158)	A Gauge to Detect Geometrical Errors of dimensional X-ray Computed Tomography Toshiyuki Takatsuji, Makoto Abe, Hiroyuki Fujimoto, <u>Osamu Sato</u> , Kazuya Matsuzaki
Session 8 (Room B)		
Sensors and Actuators (II)		
Chairs: Prof. Chii-Wann Lin and Prof. Shuming Yang		
16:05-16:30	(1029)	(Invited Paper) A three-dimensional Fiber Probe based on Orthogonal Micro Focal-length Collimation and Fiber Bragg Grating <u>Jiwen Cui</u> , Junying Li, Kunpeng Feng, Jiubin Tan, Jian Zhang
16:30-16:48	(1278)	Study of Flow Control Using Plasma Actuator <u>Yung-Ting Chen</u> , Tzong-Hann Shieh, Ya-Ting Hsu
16:48-17:06	(1117)	A piezoresistive accelerometer with axially stressed self-supporting sensing beams <u>Yu Xu</u> , Libo Zhao, Zhuangde Jiang, Tingzhong Xu, Wendi Gao, Yulong Zhao
17:06-17:24	(1192)	Scanning Surface Plasmon Microscope for Sensing Lipid Array and Au Film Defect Shih-Chung Wei, Pei-Tung Yang, Frank X. Gu, Kung-Bin Sung, <u>Chii-Wann Lin</u>
17:24-17:42	(1205)	Stochastic Nano-Sensor Array for Measurement of Molecular Interactions Chu-Su Yu, Tzu-Heng Wu, Shih-Chung Wei, Chia-Chen Chang, Hui-Hsin Lu, <u>Chii-Wann Lin</u>

Session 9 (Room C)
Gears Measurement and Technology (Special Session)
Chairs: Prof. Zhaoyao Shi and Prof. Syuhei Kurokawa

16:05-16:30	(1033)	(Invited Paper) Principle and Practice of the Measurement for Hourglass Worms and Hobs Bo Yu, Zhaoyao Shi, Yong Ye, Lu Yan, Ying Fu, Lintao Zhang, <u>Tang Jie</u>
16:30-16:55	(1232)	(Invited Paper) Comprehensive Evaluation for Individual Gear Accuracy by Whole Circumference Scanning Measurement <u>Syuhei Kurokawa</u> , Kensuke Uesugi, Takashi Teraoka, Tetsuya Taguchi, Terutake Hayashi, Yoji Matsukawa
16:55-17:13	(1011)	Weight least squares association of cylinder from data points with uncertainty in Super-large gear measurement Jiachun Lin, <u>Zhaoyao Shi</u> , Hongfang Chen, Haoran Niu
17:13-17:31	(1049)	Evaluation of high precision gear measuring machine for helix measurement using helix and wedge artifacts <u>Tetsuya Taguchi</u> , Yohan Kondo
17:31-17:49	(1292)	Evaluation of Handle Rotational Feeling in Fishing Reel by Coordinate Measurement and Gear Transmission Error Measurement <u>Tetsuo Inoue</u> , Syuhei Kurokawa

Session 10 (Room D)
Multi-degree-of-freedom Measurement and Machine Tool Performance (II)
Chairs: Prof. Kuang-Chao Fan and Prof. Qibo Feng

16:05-16:30	(1145)	(Invited Paper) Design and calibration of a 3D constraint gauge for articulated coordinate measuring machine Huining Zhao, <u>Liandong Yu</u> , Ningning Liu
16:30-16:55	(1147)	(Invited Paper) Design and calibration of real-time 3D coordinate measurement system based on multi-angle intersection and cylindrical imaging <u>Haqing Liu</u> , Linghui Yang, Yongjie Ren, Jiarui Lin, Yin Guo, Jigui Zhu
16:55-17:13	(1258)	(Invited Paper) Study of On-machine Error Identification and Compensation Methods for Micro Machine Tools <u>Shih-Ming Wang</u> , Han-Jen Yu, Chun-Yi Lee, Hung-Sheng Chiu
17:13-17:31	(1276)	Simultaneous multi degree of freedom (DoF) measurement system <u>Gabor Molnar</u> , Sebastian Strube, Hans-Ulrich Danzebrink, Jens Flügge
17:31-17:49	(1248)	Analysis of CNC machining based on characteristics of thermal errors and optimal design of experimental programs during actual cutting process En-Ming Miao, Xuan-Xuan Lv, Kuang-Chao Fan, <u>Hui Liu</u> , Yi Liu

Session 11 (Room E)
Intelligent Instruments for Automation
Chairs: Prof. Ping Cai and Prof. Chao-Ching Ho

16:05-16:30	(1253)	(Invited Paper) Broadband Fourier-transform spectroscopy using femtosecond lasers Keunwoo Lee, Young-Jin Kim, <u>Seung-Woo Kim</u>
16:30-16:55	(1215)	(Invited Paper) Study on the Frequency Compensation of the Dynamic Unbalance Signal Extraction for General Hard Bearing Dynamic Balancing Machine <u>Ru Qin</u> , Ping Cai, Dingding Zhao, Yi Gao
16:55-17:13	(1132)	Development of Cloud-Dust Based Intelligent Spectrum Analysis System <u>Chung-Chi Huang</u> , Chi-Ao Hsieh, Jun-Jie Liu, Ming-Han Xie, Kai-Jie Hu, Han-Yang Zhang
17:13-17:31	(1194)	Multi-channel Measuring Systems with Metrological Self-check <u>Kseniia Sapozhnikova</u> , Roald Taymanov, Irina Danilova, Igor Druzhinin

17:31-17:49	(1318)	Methods of improving environmental adaptability of RFID system in oil drilling Yajun Xie, Bo Tao, Jixuan Zhu
Session 12 (Room F)		
In-process and Inline Metrology		
Chairs: Prof. Yongsheng Gao and Prof. Rainer Tutsch		
16:05-16:23	(1022)	Developing a Novel Static Tri-switches Probing Structure for Micro-CMM Kuo-Yu Tseng, Dong-Yea Sheu
16:23-16:41	(1072)	On-machine Measurement Using Capacitive LVDT-type Contact Sensor Yung-Tien Liu, Da-Wei Yan, You-Liang Kuo
16:41-16:59	(1123)	High precision in-situ shape measurements for quality control in working lathes Robert Kuschmierz, Andreas Fischer, Jürgen Czarske
16:59-17:17	(1152)	Profile measurement of neutron bent mirrors using an ultrahigh precision on-machine measurement system with an auto focus laser probe Shin-ya Morita, Jiang Guo, Norifumi L. Yamada, Naoya Torikai, Shin Takeda, Michihiro Furusaka, Yutaka Yamagata
17:17-17:35	(1174)	An Inline Surface Measurement Method for Membrane Mirror Fabrication Using Two-stage Trained Zernike Polynomials Yang Liu, Zhile Yang, Xiandong Xu, Jiubin Tan

Oral Presentations

Day 3- 24th September, 2015 (Thursday), 13:00-14:45

Session 13 (Room A)		
Optical Metrology (III)		
Chairs: Prof. Satoru Takahashi and Prof. Shyh-Tsong Lin		
13:00-13:25	(1079)	(Invited Paper) Non-contact precision profile measurement to rough surface objects with optical frequency combs Taro Onoe, Satoru Takahashi, Kiyoshi Takamasu, Hirokazu Matsumoto
13:25-13:50	(1168)	(Invited Paper) Residual Stress in Thin Films Determined by a Hybrid Interferometer with Phase Reduction Algorithms Chuen-Lin Tien, Po-Han Chen, Bo-Wei Lee, Yi-Hsuan Tseng
13:50-14:08	(1126)	In situ measurement of growth rate and surface temperature in the thin film process Ju-Yi Lee, Chun-Cheng Wang, Fu-Rong Huang, Meng-Hao Tsai
14:08-14:26	(1134)	A systemic view and strategy analysis for accurate industrial mobile robot navigation using external large-volume optical metrology network Yongjie Ren, Zhe Huang, Ling Hui Yang, Jiarui Lin, Yin Guo, Jigui Zhu
14:26-14:44	(1094)	Super-Resolution Optical Measurement Method Using Standing Wave Illumination with Three-Beam Interference Hiromasa Kume, Hiroki Yokozeki, Ryota Kudo, Satoru Takahashi, Kiyoshi Takamasu
Session 14 (Room B)		
Automated Optical Inspection (I)		
Chairs: Prof. Yuan-Fang Chen and Prof. Ryoshu Furutani		
13:00-13:25	(1262)	(Invited Paper) 3D Optical Measuring and Laser Technologies for Science and Industry Yuri Vasil'ievich Chugui
13:25-13:50	(1096)	(Invited Paper) Study on detection of 6 DOF motion of linear stage Jun Izawa, Shohei Kanno, Miyu Ozaki, Ryoshu Furutani

13:50-14:08	(1173)	A Non-Destructive and Rapid Optical-Based Method and Automation System for Measuring the Web Thickness of Microdrills Wen-Tung Chang, <u>Jian-Hong Wu</u>
14:08-14:26	(1131)	IC Test Probe Measure System Chin-Sheng Chen, <u>Hsiao-Wei Liu</u>
14:26-14:44	(1255)	Fiber-Type Multi-Excitation Photoluminescence Rapid Mapping System Sung-Yen Juang, Yi-Min Liu, Hua-Hsieh Liao, Tingting Wang, Yimin Yu, <u>Hsiang-Chen Chui</u>

Session 15 (Room C)
Micro and Nano Metrology (I)
Chairs: Prof. Sarwat Zawhi and Prof. Robert Schmitt

13:00-13:25	(1059)	(Invited Paper) Surface Metrology for Firearm Evidence Identification <u>Jun-Feng Song</u> , Theodore V Vorburger
13:25-13:50	(1125)	(Invited Paper) Development of a 3D tunneling current probing system for micro- and nano-coordinate metrology <u>Zhongyuan Sun</u> , Alexander Schuler, Tino Hausotte
13:50-14:08	(1074)	Surface Profile Measurement of Micro-optics by Using a Long Stroke AFM <u>Minglei Li</u> , So Ito, Zhigang Jia, Yuki Shimizu, Wei Gao
14:08-14:26	(1091)	Duty cycle control of photoresist gratings made on multilayer dielectric substrates during development via measuring the transmitted -1st-order diffraction efficiency <u>Biyao Shen</u> , Lijiang Zeng
14:26-14:44	(1175)	Novel Polarizing Method For Light Microscopy <u>Irina Georgievna Palchikova</u> , Evgenii Sergeevich Smirnov, Natalia Vladimirovna Kamanina

Session 16 (Room D)
Machine Vision and Image Processing (I)
Chairs: Prof. Ju-Yi Lee and Prof. Ming Chang

13:00-13:25	(1005)	(Invited Paper) Machine Vision System for in-process LED Chip Mounting <u>Chao-Ching Ho</u> , Shang-Teh Wu, You-Min Chen, Chan-Fan Yang
13:25-13:43	(1012)	A Large-size Precision Measurement Method based on Sub-FOV Calibration Splicing <u>Zhenying Xu</u> , Jiachen Zhao, Jiaxiang Xu, Xiqiu Wang, Jingwei Fan
13:43-15:01	(1037)	Automatic alignment for the assembly of rotary encoder based on machine vision <u>Hsien-Huang P. Wu</u> , Shih-Yao Jian
15:01-15:19	(1169)	Markerless Indoor Augmented Reality Navigation Device Based on Wall-Floor-Boundary Image Registration and Inertial-Optical-Flow Pose Estimation <u>Chian C. Ho</u> , Bo-Kai Wang, Guan-Lung Liao
15:19-15:37	(1331)	Minutiae extraction from a fingerprint image Improving performance and accuracy for low quality fingerprint image <u>Dinh Van Binh</u> , Dang Quang Hieu, Nguyen Duc Minh

Session 17 (Room E)
Robot Vision and Automation (Special Session)
Chairs: Prof. Han-Pang Huang and Dr. Chin-Yin Chen

13:00-13:25	(1304)	(Invited Paper) Development of a Tactile Sensor System and its Integration into NTU-Hand IV Jai-Wei Yang, Han-Pang Huang, L. <u>Wei-Zhi Lin</u>
13:25-13:50	(1302)	(Invited Paper) Using 3D Matching for Picking and Placing on UR Robot Hongzhen Zhao, Chengning Zhang, Guilin Yang, <u>Chin-Yin Chen</u> , Mengbin Min
13:50-14:08	(1247)	On quantitative evaluation of vision-based 3D object pose estimation Chin-Chia Wu, <u>Yen-Chung Chang</u> , Kai-Chieh Chuang, Yu-Chen Cheng, Jwu-Sheng Hu

14:08-14:26	(1308)	Mobile-app-based Stratagem of Stair-climbing Robots on Campus Ching-Kuo Wang, Han-Pang Huang, <u>Sheng Chen</u> , Yu-Shiu Cheng, Chiu-Sung Wu
14:26-14:44	(1209)	Inline Tactile Sensing-based Part Shape Recognition for Automatic Robotic Assembly Yi-Hung Liu, <u>Yu-Tsung Hsiao</u> , Po-Ming Chen, Shih-Hao Wang, Chung-Wei Chou, Jui-Yiao Su, Yan-Chen Liu

Oral Presentations

Day 3- 24th September, 2015 (Thursday), 15:05-16:50 pm

Session 18 (Room A)		
Optical Metrology (IV)		
Chairs: Prof. Akira Shimokobe and Prof. Yuri Chugui		
15:05-15:30	(1207)	(Invited Paper) Measuring displacement field and strain field of a strain gauge using digital image correlation <u>Ching-Yuan Chang</u> , Chien-Ching Ma
15:30-15:48	(1058)	An adaptive algorithm processing speckle pattern based on wavelet analysis Dong Yang, <u>Zhan Gao</u>
15:48-16:06	(1187)	Study on the influence of beam radius on the compensation effect of common-path method <u>Yuqiong Zhao</u> , Qibo Feng, Bin Zhang, Cunxing Cui
16:06-16:24	(1116)	Probing thermal evanescent waves on dielectrics with a passive near-field microscope <u>Takafumi Yokoyama</u> , Kuan-Ting Lin, Sunmi Kim, Yusuke Kajihara
16:24-16:42	(1314)	Newton interferometer with phase-shifting and phase-scanning measurement modes <u>Shyh Tsong Lin</u> , <u>Hung Xuan Trinh</u> , Liang-Chia Chen, Sheng-Lih Yeh
Session 19 (Room B)		
Automated Optical Inspection (II)		
Chairs: Prof. Song Jun Feng and Prof. Chien-Hung Liu		
15:05-15:30	(1127)	(Invited Paper) Reducing the influence of speckle structures on laser light sectioning sensors <u>Rainer Tutsch</u> , Sida Han, Hanno Dierke
15:30-15:55	(1228)	(Invited Paper) Automated Inspection of CFRP Defects by Step-heating Thermography <u>Yuan-Fang Chen</u> , Guan-Yu Lin
15:55-16:13	(1045)	Development of A Machine-Vision Based Real-Time Surface Defect Inspection System for Precision Steel Balls <u>Yi-Ji Chen</u> , Jhy-Cherng Tsai, Ya-Chen Hsu
16:13-16:31	(1181)	Grating Scale Evaluation of Optical Encoder Based on Commercial Readheads Guan Kai Lien, Yi-Hao Wu, Chyan-Chyi Wu, Cheng-Chih Hsu, <u>I-Chen Lin</u> , Jeng-Ywam Jeng
16:31-16:49	(1252)	Multiple-layered surface measurement of mobile-phone camera modules using low-coherence interferometry <u>Chang-Yun Lee</u> , Young-Jin Kim, Seung-Woo Kim
Session 20 (Room C)		
Micro and Nano Metrology (II)		
Chairs: Prof. Kiyoshi Takamasu and Prof. Chien-Ching Ma		

15:05-15:30	(1076)	(Invited paper) On-machine Edge Contour Measurement of a Micro Cutting Tool by Using a Diamond Edge Artifact <u>Yuan-Liu Chen</u> , Yuki Shimizu, So Ito, Wei Gao
15:30-15:48	(1097)	Self Calibration Method for Nanometer Profile Measurement on Large Aspheric Optical Surface <u>Yumi Iwago</u> , Tomohiko Takamura, Yohan Kondo, Youichi Bitou, Satoru Takahashi, Kiyoshi Takamasu
15:48-16:06	(1261)	On-line Qualification of Probe Tip Ball Diameter for Gap Width Measurement <u>So Ito</u> , Hirotaka Kikuchi, Wei Gao, Kazuhiko Takahashi, Toshihiko Kanayama, Kunmei Arakawa, Atsushi Hayashi
16:06-16:24	(1295)	Precision Measurements of Interatomic Distances in the Crystal Structures with Binding to Light Wavelength of Frequency Stabilized He-Ne Laser <u>Evgeny V. Sysoev</u> , Yuri Vasil'ievich Chugui, Vasilii V. Shirokov, Sergei V. Sitnikov, Sergei S. Kosolobov, Alexander V. Latyshev
16:24-16:42	(1297)	Multisensor Coordinate Metrology - accurate and complete measurement with tactile, optical and X-Ray tomography sensors <u>Zhichao Li</u>

Session 21 (Room D)
Machine Vision and Image Processing (II)
Chairs: Prof. Jigui Zhu and Prof. Pei-Ju Chiang

15:05-15:30	(1167)	(Invited Paper) An Online Measurement Method for the Thermal Geometric Parameters of Large Hot Forgings Based on Laser-aided Multi-view Stereo Vision <u>Wei Liu</u> , Yang Liu, Jinghao Yang, Lingli Wang, Chaonan Fan, Zhenyuan Jia
15:30-15:48	(1031)	An Algorithm to Extract The Contour Feature Points Based on The Derivative <u>Lingxiao Huang</u> , Hai Huan, Yu Zhang, Song Lu
15:48-16:06	(1065)	Development of Three-Dimensional Structured Light Scanner with Color Projection System <u>Jian-Liang Liu</u> , Chien-Sheng Liu, Jyun-Cheng Huang, Chuan-Chen Kuo, Pei-Ju Chiang
16:06-16:24	(1265)	Increasing map awareness of mobile systems using statistical maps <u>Jan Papadoudis</u> , Anthimos Georgiadis
16:24-16:42	(1303)	An Microwave Image Post Processing Method Using Support Vector Regression <u>Kao-Shing Hwang</u> , Qiao-Han Yang, <u>Ming-Hui Cheng</u> , Tsung-Chih Yu, Ho-Chung Fu

Session 22 (Room E)
Material Characterization
Chairs: Prof. Nguyen Mai Thi Phuong and Dr. Ta-Hsin Chou

15:05-15:30	(1259)	(Invited Paper) Comparison of two Metrological Approaches for the Prediction of Human Haptic Perception Annika Neumann, Daniel Frank, Thomas Vondenhoff, <u>Robert Schmitt</u>
15:30-15:48	(1057)	Characterization of Platinum Deposited on Polybenzimidazole-Modified Carbon Nanotubes <u>Yu-Chun Chiang</u> , Pai-Hsuan Wu, Heng-I Yueh
15:48-16:06	(1060)	Modeling of sheet resistance of multilayer thin films measured by four-point probe Yu-Yi Chen, Jia-Yang Juang
16:06-16:24	(1268)	A Liquid Crystal Retarder Based Dynamic Ellipsometry <u>Wen-Tse Shih</u> , Mei-Li Hsieh, Yu Faye Chao
16:24-16:42	(1289)	A New Computational Method for Contact Deformation of Arbitrary Logarithmic Crowned Roller-Raceway Contact <u>Zhenzhi He</u> , Yuxue Chen, Minghui Shao, Fuzhu Li

Industry Technical Session

Day2-23rd September (Wednesday) 11:20-12:00am

Chair: Prof. Ming Chang

Presentation time:

Each company will present for 6 minutes with 2-minutes change over to the next company.

Time	Speakers
11:20-11:28	Optodyne, Inc.
11:28-11:36	Mitutoyo Co., Ltd.
11:36-11:44	Taylor Hobson Ltd.
11:44-11:52	Gallant Precision Machining (GPM) Co., Ltd.
11:52-12:00	Samwell Testing Inc.

Poster Presentations I

Day2-23rd September 2015 (Wednesday) 13:00-14:00 pm

Topic	Poster ID	Paper ID	Paper Title
Automated Optical Inspection	P1-01	1108	AOI Based on Open Source for Tire Inner Liner Defects Ching-Hung Lin, Ke-Wei Shie
	P1-02	1160	Using XXY table to construct a verticality calibrator and its error analysis Jui-Chang Lin, Cheng-Jen Lin
	P1-03	1212	Development of novel stroboscopic optical mapping (SOM) methodology for high-resolution analysis of murine cardiomyopathy Liang-Chia Chen, Thanh-Hung Nguyen, Yu-Cheng Chang, Yu-Jun Lai, Hung-I Yeh
	P1-04	1203	Two-degree-of-freedom displacement measurement system based on double diffraction gratings Zhengang Lu, Peipei Wei, Jialei Jing, Jiubin Tan, Xiping Zhao
Calibration and Machine Tool Performance	P1-05	1003	Investigations on Roughness Measurements on the Machined Surface, Energy Dissipations During Machining Processes, Estimations of Tool Reliability and the Utilization of the Exponential Energy Reliability Method (EERM) Mark Christian E. Manuel, Kuan-Ting Chen, Chung-Heng Liang, Po-Ting Lin
	P1-06	1024	A study on step-by-step calibration of robot based on multi-vision measurement Rui Li, Yang Zhao
	P1-07	1038	Measuring vertex curvature radius error of conicoid with partial compensation interferometry and aberration analysis Tengfei Li, Qun Hao, Yao Hu, Shaopu Wang, Yuhan Tian, Jingxian Wang
	P1-08	1164	Investigation of Delta Robot 3D Printer for a Good Quality of Printing Cheng-Tiao Hsieh
	P1-09	1179	Calibration of Measuring Systems for the Expert Evaluation of Color Characteristics Irina Georgievna Palchikova, Evgenii Sergeevich Smirnov, Alexander Fedorovich Alejnikov, Yuri Vasil'ievich Chugui
	P1-10	1198	Dynamic Calibration for Measurement System of Form Measuring Instruments Based on Elliptical Standard Jingzhi Huang, Tenghui Guo, Zhongpu Wen, Jiubin Tan, Tao Sun
	P1-11	1263	A New Calibration Method of Volumetric Error for Large Coordinate Measuring Machine Yanting Zhang, Ping Yang, Yinbiao Guo
	P1-12	1338	Development of Simple Compensation Technique, which Uses Non-Bar System, for the Rotary Axes of Five-Axis CNC Machine Tools Wen-Yuh Jywe, Tung-Hui Hsu, Chia-Ming Hsu, Yu-Wei Chang, Shu-Yu Yang

Machine Vision and Image Processing	P1-13	1010	View Factor Determination Based on Stereo Vision for Correction of Infrared Thermography Measurements Mark Christian E. Manuel, Shu-Ping Lin, Po-Ting Lin, Yu-Hsien Tu
	P1-14	1028	Error Analysis and System Optimization of Pose Measurement with Monocular Vision Based on Point Feature Model Zhongyu Wang, Zhenjian Yao, Qiyue Wang
	P1-15	1104	Image stitching technology for smart transnasal endoscope with positioning system Chien-Kai Chung, Yi-Ju Chen, Wen-Tse Hsiao, Shih-Feng Tseng, Feng-Yi Hsu
	P1-16	1106	Specular Highlights Detection from Endoscopic Images for Shape Reconstruction Chia-Hsiang Wu, Mei-Yun Su
	P1-17	1107	Surface Deformation Measurement Using Point Set Registration Chia-Hsiang Wu, Siao-Wei Jheng
	P1-18	1189	Implementation of An Embedded Facial Recognition System Ching-Min Lee, Yan-Ming Li, Jen-Kai Hsueh, I-Chun Wu
Micro and Nano Metrology	P1-19	1020	A Nano Measurement Machine Equipped with a 3D Piezo-Resistive Micro Tactile Probe Lihua Lei, Yuan Li, Li Jian, Yunxia Fu, Guofang Fan
	P1-20	1043	Broad-beam scanning exposure along the grating vector to make gratings with large size Donghan Ma, Lijiang Zeng
	P1-21	1048	Improvement of variation propagation control in mechanical assembly using optimization-build assembly technique Chuanzhi Sun, Lei Wang, Jiubin Tan, Bo Zhao, Guoliang Jin, Xiping Zhao
	P1-22	1067	Development of metrological frame composed of two linear stages Akira Sugihara, Shogo Tomizawa, Miyu Ozaki, Ryoshu Furutani
	P1-23	1109	Calibrating the XY-magnification of Atomic Force Microscope at the Sub-nanometer Scale by Highly Ordered Pyrolytic Graphite Bo-Ching He, Wei-En Fu, Gwo-Jen Wu
	P1-24	1113	Pilot Comparison Study of Particle Size for Nanomaterial in Cosmetic and Food Guo-Dung Chen, Han-Fu Wang, Pei-Jia Lu, Chia-Ding Liao, Yu-Ting Fang, Shou-Chieh Huang
	P1-25	1140	Accurate diameter measurement of microsphere based on analysis for polarization of whispering gallery mode resonance Akifumi Kawasaki, Masaki Michihata, Atsushi Adachi, Yasuhiro Takaya
Material Characterization	P1-27	1185	Measurement of Insulated Gate Bipolar Transistor without Using Curve Tracer Hsin-Chia Yang, Yen-Wei Chiu, Sung-Ching Chi, Chien-Li Wang, You-Liang Ju
	P1-28	1129	Characterizing the Coefficient of Thermal Expansion of Highly Dimensionally Stable Materials for Space Applications Ruven Spannagel, Thilo Schuldt, Jose Sanjuan, Martin Gohlke, Rick Burow, Fabian Hufgard, Ewan Fitzsimons, Ulrick Johann, Dennis

			Weise, Claus Braxmaier
	P1-29	1130	Development using X-ray image defect inspection on process parameter optimization of magnesium matrix composites vacuum casting Song-Jeng Huang, Chien-Cheng Lin, Fang-Jung Shiou, Jheng-Yang Huang
	P1-30	1170	An investigation on the humping ferro-damp induced under non-uniform magnetic field density Je-Ee Ho, Ling-Tzu Lien
	P1-31	1254	Cutting strengthened glass by sub-surface cracks using ultrashort laser pulses Yunseok Kim, Sanguk Park, Joonho You, Seung-Woo Kim
Optical Metrology	P1-32	1030	Hybrid Fiber Fabry-Perot refractive index sensor assisted by wavelength interrogation Tingting Wang, Yixian Ge, Chuang Zhang
	P1-33	1051	Full-field Refractive Index Variation Measurement Based on Phase-shift Interferometry and SPR Phase Detection You-Shen Lin, Ming-Hung Chiu
	P1-34	1055	A wide range three-axis grating encoder for stage motion measurement Feng Wen, Jian Guan, Jiubin Tan, Jie Lin
	P1-35	1066	Development of the interferometer using optical fiber circulator Kiyotaka Chikaraishi, Noa Kobayashi, Kisuke Nakamura, Miyu Ozaki, Ryoshu Furutani
	P1-36	1069	A simple system for Simultaneously Measuring Five-Degree-of-Freedom Geometric Motion Errors Cunxing Cui, Qibo Feng, Bin Zhang, Yuqiong Zhao
	P1-37	1070	Thermal expansion coefficient measurement of Slavich PFG-01 holographic plate Chih-Ching Chen, Ching-Tang Meng, Guan-Kai Lien, Yi-Hao Wu, Cheng-Chih Hsu, Chyan-Chyi Wu
	P1-38	1100	Micro-Displace Sensor Based on Self-Mixing Interference of a fiber Laser System Hui Hao, Dongmei Guo, Qingyu Ma
	P1-39	1122	Sensitivity of areal parameter generation to Gaussian filter selection Baofeng He, Petzing Jon, Zhaoyao Shi
	P1-40	1162	Development of a New Destructive Web Thickness Image Measurement System for Microdrills Fang-Jung Shiou, Ruei-Yuang Wu, Geo-Ry Tang
	P1-41	1119	Relationship between coordinate transformation uncertainty and arrangement of common reference points in large-scale metrology Yu Ren, Jiarui Lin, Yin Guo, Yongjie Ren, Linghui Yang, Jigui Zhu
	P1-42	1244	Research on Polyhedral Cooperative Target Used for Large Space Laser Multi-lateration Coordinate Measuring System Hongying Zhang, Xiaofen Yu
	Sensors and Actuators	P1-43	1019
P1-44		1027	Application of Wireless Control Techniques to Intelligent Home

			System Cong-Hui Huang, Yih-Feng Su, Yuh-Sheng Su, Jheng-Han Lin, Wei-Hao Su, Yu-Tang Su
	P1-45	1040	Analysis on collapse voltage of CMUT considering anisotropy of the membrane Zhikang Li , Libo Zhao, Zhiying Ye, Yingjie Hu, Yulong Zhao, Zhuangde Jiang, Liwei Lin
	P1-46	1042	Localization of Mecanum Wheeled Mobile Robots Using Sensor Fusion Technique Seong-Bae Park, Sang Won Yoon, Jong Shik Kim
	P1-47	1053	Parameter Design of the Beads Filling Pressure Ulcer-Preventing Cushion Dian Wang, Zhiyong Mao, Ping Cai
	P1-48	1081	A measuring method on the micro-clearance of a precision spherical joint based on spherical differential capacitive sensor Min Zhang, Wen Wang, Keqing Lu, Zongwei Fan, Lin Cheng
	P1-49	1090	A small-sized and battery-supplied data acquisition system for electromagnetic launcher to measure pulsed magnetic fields Ronggang Cao, Xiangcai Xu
	P1-50	1098	Wireless Sensing Technique for Industrial Analog Sensor with 4-20 mA Analog Output Using WiFi Protocol Ming Jong Tsai, Ali Jaya, Wei Lun Hong, R.C. Chu
Advanced Measurement Technology	P1-51	1023	A method of Objects Classification for Autonomous Driving using 3D LiDAR Sensor and Number of Projected Points Huilin Yin, Xiaohan Yang, Chao He
	P1-52	1036	The Development of a Novel Experimental Apparatus for Measuring the Performance of a Piston Seal in a Pneumatic Cylinder Ho Chang, Chou-Wei Lan
	P1-53	1044	Brain Activation Energy Evaluation Based on EEG-NIRS Measurement System Ya-Wen Tang, Yue-Der Lin
	P1-54	1046	Geometrical specification of cutting edge and measuring strategy for evaluation Keiji Houjou, Kazuhisa Yanagi
	P1-55	1052	Research on axial multi-focus scanning in confocal microscopy with liquid crystal spatial light modulator Limin Zou, Mengjiao Zhou, Baokai Wang, Mingshu Pang, Xuemei Ding, Liying Wu
	P1-56	1082	Design and simulation of an aerostatic spindle Dingcheng Zhao, Wen Wang, Keqing Lu, Zongwei Fan, Min Zhang
	P1-57	1085	Uncertainty in Gauge Block Calibration by Mechanical Tactile Methods (Case study: for Dissimilar Gauge in length) Sarwat Z. A. Zahwi, Dalia S.Z. Zahwi, Sherif E. Hussein
	P1-58	1103	Study Performance of the High-temperature Blackbody Source Hsin-Yi Ko, Chien-Chih Yeh
	P1-59	1143	Experimental Study on Formation of the Microstructure on Copper Film Using Ultraviolet Nanosecond Laser

			Xing Fu, Hui Qi, Yuwen Zhao, Dong Xu
P1-60	1146	An Inspection Method to Develop the Focus Property of Dielectric Liquid Lens	Wen-Ning Chuang, Min-Wei Hung, Hsin-Yi Tsai, Kuo-Cheng Huang
P1-61	1216	Efficient evaluation method of cell's viability using dielectrophoresis	Ryosuke Komai, Keisyu Aritoshi, Kozo Taguchi
P1-62	1217	Photocatalytic activity and visible-light response of TiO₂ thin film doped with nitrogen by using urea	Chuya Ogawa, Kozo Taguchi
P1-63	1218	A study of making Dye Sensitized Solar Cell Using MK- II dye by Electrophoretic Deposition Method	Kanta Sugii, Kazuaki Tamiya, Kozo Taguchi
P1-64	1219	Investigation of the effect of ultrasound on cell growth	Yusuke Tamai, Kozo Taguchi
P1-65	1220	Preparation of CNT counter electrode by electrophoresis for dye-sensitized solar cell	Kazuaki Tamiya, Kanta Sugii, Kozo Taguchi
P1-66	1018	Designing, modelling, geometric and noise- and vibration analysis of new type spiroid worm gear drive	Illés Dudás, Sándor Bodzás
P1-67	1061	Laser interferometer based 3-DOF measurement system for dynamic contouring measurement of five-axis CNC machine tools	Chien-Hung Liu, Wen-Yuh Jywe, Yi-Tung Li, Hau-Wei Lee
P1-68	1312	Simultaneously Measuring Multi-DOF Thermal Deformation Errors of a Linear Stage using Multi-DOF Laser Encoder	Hau-Wei Lee, Chung-Hsiang Cheng, Chien-Hung Liu
P1-69	1161	Challenge for the traceable dimensional measurement using CMM in factory floor	Osamu Sato, Kazuya Matsuzaki, Hiroyuki Fujimoto, Sonko Osawa, Makoto Abe, Toshiyuki Takatsuji
P1-70	1272	Digital Measurement and Control Technology of Grey Predictor-Based Inverse Hyperbolic Sliding Function for Solar PV Inverters	En-Chih Chang, Rong-Ching Wu, Guan-Yu Chen, Pei-Shan Wang, Kuo-Yuan Liao

Poster Presentations II

Day3-24th September 2015 (Thursday) 11:00-12:00

Topic	Poster ID	Paper ID	Paper Title
Nano-scale Measurement	P2-1	1054	The Polycrystalline Nanowire FET Measurement System using Pulsed-Gate Voltage Chien-Hung Chen, Tai-Shan Liao, Yuh-Shyong Yang, Chi Hung Hwang
	P2-3	1093	Ultrathin High-k Multilayer Thin Films Thickness Evaluation by X-ray Reflectivity and Electron Energy Loss Spectrum Yun-San Chien, Wei-En Fu
	P2-4	1102	Self-mixing interferometer based on sinusoidal wavelength modulation

			Dongmei Guo
	P2-5	1111	The measurement of complex surface using 3D piezoresistive tactile probe Zhichao Wu, Tong Guo, Jinping Chen, Xing Fu, Xiaotang Hu
In-process and Inline Metrology	P2-6	1015	Standardize Test Method of Reliability Evaluation for c-Si Photovoltaic Product Shu-Tsung Hsu, Yean-San Long, Teng-Chun Wu
	P2-7	1016	Standardization of Current - Voltage Test Method for DSSC Products Shu-Tsung Hsu, Yean-San Long, Teng-Chun Wu
	P2-8	1159	A Case Study of Developing SEMI PV Standards in Taiwan (2009~2014) Shu-Tsung Hsu, Yean-San Long, Teng-Chun Wu
	P2-9	1196	Design of a MEMS device for scanning profile measurement with three cantilever displacement sensors Hiroki Shimizu, Takahiro Akiyoshi, Shinya Yanagihara, Yuuma Tamaru, Akiyoshi Baba
Intelligent Instruments for Automation	P2-10	1034	High Precision Manufacturing of a Novel NiTi Self-expanding Stent with Pulsed Fiber Laser Bor-Hann Huang, Chun-Yi Ko, Yu-Han Cheng, Han-Yu Lee, Hao-Ming Hsiao
	P2-11	1083	Research on Femtosecond Laser Tracking Measurement System Deng-feng Dong, Wei-hu Zhou, Zi-li Zhang, Dabao Lao, Rong-yi Ji, Wen-ji She
	P2-12	1101	Combination of double scale measurements for large scale surface profile measurement Eiki Okuyama, Masaguki Ito
	P2-13	1133	Study on Temperature Rise Modeling of Main Motor of Hot Rolling Mill Based on Support Vector Machines Yi Gao, Ping Cai, Feng Chen, Ru Qin
	P2-14	1148	A reactive virtual instrument model and its application in virtual instrument browser Zhiqiang Gao, Jianhao Du, Lingsong He
	P2-15	1222	A system for clearance measurement of bearings before and after assembling Nicolas Meier, Anthimos Georgiadis
	P2-16	1250	Pulse Waveforms Measured at the Finger as Indicator of Endothelial Function Yu-Nian Ou, Chun-Keng Lin, Cheuk-Kwan Sun, Hsien-Tsai Wu
	P2-17	1329	High-resolution Real-time Visual Inspection System for Micro Assembly Bing-yin Zhang, Mu-zheng Xiao, Zhi-jing Zhang, Ting-hai Qin
Machine Vision and Image Processing	P2-18	1190	Accurate 3-D Surface Profilometry Using Novel Boundary Edge Detection on Digital Image Correlation Liang-Chia Chen, Ching-Wen Liang, Huan-Yu Tseng, Shyh-Tsong Lin
	P2-19	1227	A Cost-Effective and Versatile X-Ray CT Automation System for Artifact Analysis Tung-Ho Chen, Chien-Chi Huang
	P2-20	1239	Globally Optimal Estimate for Relative Orientation in Large-scale Photogrammetry

			Mingli Dong, Wei Li, Peng Sun, Jun Wang, Bixi Yan
	P2-22	1288	Study on Measuring Method and Experiment of Arc Fault Detection Device Jian-hong Yang, Ren-cheng Zhang, Li Huang
	P2-23	1319	Improved Fruit Fly Optimization Algorithm-based Free-form Surface Parts Quality Inspection with Maximin Distance Sampling Taifeng Li, Quanke Pan, Peigen Li, Liang Gao, Yuewei Bai
Micro and Nano Metrology	P2-26	1144	Effects of Actuating Waveform and Surface Characteristics on Piezoelectrically Driven and Deposited Inkjet Droplets Chia-Yen Chan, Kuan-Cheng Shih, Ting-Ming Huang, Fong-Zhi Chen
	P2-27	1234	A multi-segments stitching method for profile measurement of large scale aspheric surface within submicrometer accuracy Shiwei Ye, Ping Yang, Zhenzhong Wang, Yanting Zhang, Yunfeng Peng
	P2-28	1242	On-machine Measurement of Compound Eye Lens Array Shun Yao Yang, Wu-Le Zhu, Bing-Feng Ju
	P2-29	1243	Development of a Micro/Nano Coordinate Measuring Machine Qiangxian Huang, Rui Zhang, Jian Mei, Ruijun Li, Kuang Chao Fan, Yeta Fei, Zhouping Cui
	P2-30	1287	Efficient selective dismantlement of protoplast cell with femtosecond laser Takuma Tamura, Kozo Taguchi
	Nano-scale Measurement	P2-32	1157
P2-33		1214	Probe calibration for white light interference based AFM Wenjun Yang, Xiaojun Liu, Wenlong Lu, Nengguo Yu, Suping Chang, Liangzhou Chen
P2-34		1233	A synthetic interferometer for micro/nanometer displacement measurement Junbao Chen, Ming Wang, Hongbin Zhu, Dongmei Guo, Hui Hao
P2-35		1264	Nanosteps Preparation Based on Focused Ion Beam Technique Chenyong Wang, Weixuan Jing, Yijun Zhang, Ming Liu, Qijing Lin, Shuming Yang, Zhuangde Jiang
P2-36		1282	A novel measurement method for Brownian diffusion of nano-abrasives in CMP slurry Terutake Hayashi, Toshiki Seri, Syuhei Kurokawa
Optical Metrology	P2-37	1156	Measurement of the spectral transmittance of a stripe filter Ho-Lin Tsay, Po-Han Huang, Kun-Huan Wu, Ting-Ming Huang
	P2-38	1202	Research on water cooling technique for frequency stabilized He-Ne laser Pengcheng Hu, Jie Feng, Yu Zhang, Jiubin Tan, Wenguo Yang
	P2-39	1236	Two-color heterodyne interferometry of optical frequency combs for absolute distance measurement Guanhao Wu, Lei Liao, Guangyao Xu
	P2-40	1241	Research on Calculation Method of Spherical Plain Bearing Friction Temperature Field Genghu Gao, Minghua Jiao, Yanguo Yin, Jianwei Yu
	P2-41	1249	Selection of repetition frequencies in absolute distance measurement with dual-comb lasers

			Kai Ni, Qian Zhou, Guanhao Wu, Yang Li, Mingfei Xu, Luofeng Shen, Hao Dong
	P2-42	1275	Performance Measurement and Reliable Test of Beam-Expansion Optical Wireless System Shien-Kuei Liaw, Yi-lin Yu, Huai-Ching Wang, Yen-Ting Lin, Zabih Ghassemlooy
	P2-43	1286	Cavity filtering of femtosecond frequency comb modes Jutta Mildner, Karl Meiners-Hagen, Florian Pollinger
	P2-44	1317	Measurement of Refractive index of liquids using low-coherence fiber-optic Fabry-Perot interferometer Shyh-Tsong Lin, Nguyen Van Hung, Liang-Chia Chen
	P2-45	1323	Theory and Experiment Study on Laser Self-Mixing Interference with Multiway Feedback External Cavity Yu Zhang, Hai Huan, Dongdong Xu, Lingxiao Huang, Song Lu
Sensors and Actuators	P2-46	1112	Development of a tensile test machine for metal-polymer direct joining Shotaro Kadoya, Fuminobu Kimura, Yusuke Kajihara
	P2-47	1128	Wireless input technology based on MEMS inertial measurement unit - a survey Zhenxian Fu, Guangying Zhang, Yurong Lin, Xinglin Chen, Yang Liu
	P2-48	1135	Self-sensing Giant Magnetostrictive Actuator for Active Vibration Isolation Yuanyuan Yang, Lei Wang, Jiubin Tan, Xiaoyu Zhu, Bo Zhao, Guoliang Jin, Xiping Zhao
	P2-49	1139	Miniature Optical fiber Fabry-Perot temperature sensor based on Bimetallic Diaphragm Yixian Ge, Tingting Wang, Jiahong Zhang
	P2-50	1208	Analytical characterization of ameliorated cartwheel flexible hinges Shuai Cai, Jianwei Wu, Jiwen Cui, Huiping Ma, Jiubin Tan
	P2-51	1256	A Single ZnO Nanowire Based Ultrahigh Sensitive Strain Sensor Hao Zhao, Xiaojun Liu, Liangzhou Chen, Suping Chang, Ming Chang
	P2-52	1266	Inductor-Hall Sensor Detection Device for Dental Implant Osseointegration Ru-Zhen Mou, Chin-Sung Chen, Min-Chun Pan
	P2-53	1301	Fabrication of diamond like carbon films for MSM ultraviolet sensor with high detecting performance Chii-Ruey Lin, Da-Hua Wei, Minh-Khoa BenDao, Shi-Jie Liao
	P2-54	1330	Development and evaluation of a combined three-component micro force sensor with a lower uncertainty Tinghai Qin, Xin Jin, Zhijing Zhang, Bingyin Zhang
	Advanced Measurement Technology	P2-55	1225
P2-56		1230	Power Quality Measurements of a Horizontal Axial Small Wind Turbine Yu-Jen Liu, Yen-Chang Chen, Pei-Hsiu Lan, Tsang-Pin Chang
P2-57		1257	High-Efficiency Wide-Voltage Range Battery Charger with Cost-Effective Power Sensing Circuit for Solar-Powered Micro Electric Vehicles

		Ching-Ming Lai, Da-Sheng Lee, Yu-Huei Cheng, Yuan-Chih Lin
P2-58	1267	Assessment of Post-Stroke Rehab through Inertial Sensing Hsin-Ta Li, Heng-Yi Chi, Jheng-Jie Huang, Min-Chun Pan
P2-59	1064	Plasmonic trapping of sub-micro objects with metallic antenas Eishi Sugawara, Jun-ichi Kato, Yutaka Yamagata, Miyu Ozaki, Ryoshu Furutani
P2-60	1279	Study of Parametric Analysis on Flow Field of Pneumatic Proportional Valve Yu-Li Chen, Tzong-Hann Shieh, Chun-Liang Yeh, Hao-Ting Lin, Ping-Cheng Yu, Po-Hsun Yu
P2-61	1306	Measurement of Cell Response to External Stimuli Using Dielectrophoresis Chip Kozo Taguchi, Ryo Kido
P2-62	1332	Evaluation of measurement uncertainty for torque standard machine using air rotary bearing Vu Van Duy, Vu Toan Thang, Pham Van Hung
P2-63	1333	A hollow-core metal-cladding waveguide sensor and its applications Yang Wang, Meizhen Huang, Biao Song, Kehui Wang, Ye Zou, Xi Liu
P2-64	1335	Synchronization to re-construct 3D surface of machinery components acquired by structured-light technique Nguyen Thi Phuong Mai, Pham Hong Tuan, Nguyen Ngoc Tu
P2-65	1336	The measurement of the total light flux on wafer-level LED by utilizing the miniature integrated sphere combined the designed lenses group Luan-Ying Chen, Kao-Der Chung, Chen-Chin Cheng
P2-66	1337	Effects of gold film thickness and annealing temperature on morphology of nanodot array thermally aggregated on patterned substrate Truong Duc Phuc, Yoshino Masahiko
P2-67	1340	Performance Improvement of Large-Area Inverted polymer solar cell by Roll-to-Roll Slot-Die-Coated Process Hou-Chin Cha, Yu-Ching Huang, De-Han Lu, Cheng-Wei Chou, Zheng-Lin Yu, Chia-Te Yen, Chih-Min Chuang, Charn-Ying Chen, Cheng-Si Tsao
P2-68	1341	Performance of Large-Area Inverted Polymer Solar Cells improved by Embedded Inject-printed Ag Grid De-Han Lu, Yu-Ching Huang, Cheng-Wei Chou, Hou-Chin Cha, Zheng-Lin Yu, Chia-Te Yen, Chih-Min Chuang, Charn-Ying Chen, Cheng-Si Tsao
P2-69	1105	New Performance Method of Capacity Effect from High to Low Level Lighting for DSC device Yean-San Long, Shu-Tsung Hsu, Teng-Chun Wu

GIS NTU International Center Floor Plan



Traffic Information

Airport Information:

[Taoyuan International Airport](#) (as known as TPE) is an international airport serving Taipei city but located in Taoyuan city.

TPE Airport to GIS NTU Convention Center (Conference Venue)

By Taxi:

Taxis between Taipei and TPE are readily available.

Service Hours: Taxis are available at TPE Airport 24 hours a day.

Trip Duration: 45~60 mins

Charge: The set charge between Taipei and TPE is around TW\$1,200. It takes approximately 45 minute. Please note that taxis do not accept credit cards.

By HSR(high-speed rail):

Step 1. Shuttle bus to THSR (Taiwan High Speed Rail) Taoyuan Station

Taoyuan International Airport provides a THSR shuttle bus service connecting between the airport and THSR station, providing comfortable, convenient, low-cost and practical transportation option for travelers. For shuttle information, please [click here](#).

Step 2. THSR Taoyuan Station to Taipei Main Station

Operation Hours : 06:20 ~ 23:45

Trip Duration: 20 mins

Charge: TW\$160

For THSR information, please [click here](#).

Step 3. Taipei Main Station to GIS NTU Convention Center

Transfer by taxi or by Taipei MRT(Metro Rapid Transit).

1. By Taxi : About 20 minutes.

2. Please be aware that Taipei MRT recently change their routes. To transfer from Songshan Airport Station to Gongguan Station via the latest routing system. You may first take the Brown Line and transfer from Songshan Airport Station to Nanjing Fuxing Station (2 stops). Then take the Green Line and transfer to Gongguan Station (9 stops). Exit at the Gongguan Station Exit 2 and turn left. Walk along Roosevelt Road for 2 minutes then you will find GIS BTU Convention Center on your left hand side.

For Taipei MRT information, please [click here](#).

Airport Information:

[Songshan Airport](#) (TSA Airport)

TSA Airport to GIS NTU Convention Center:

By Taxi : Take a taxi for about 20 minutes. Around \$200NT dollars.

By MRT : Please be aware that Taipei MRT recently change their routes.

To transfer from Taipei Main Station to Gongguan Station via the latest routing system. You may first take the Red Line and transfer from Taipei Main Station to Chiang Kai-Shek Memorial Hall Station (2 stops). Then take the Green Line and transfer to Gongguan Station (3 stops). Exit at the Gongguan Station Exit 2 and turn left. Walk along Roosevelt Road for 2 minutes then you will find GIS BTU Convention Center on your left hand side.

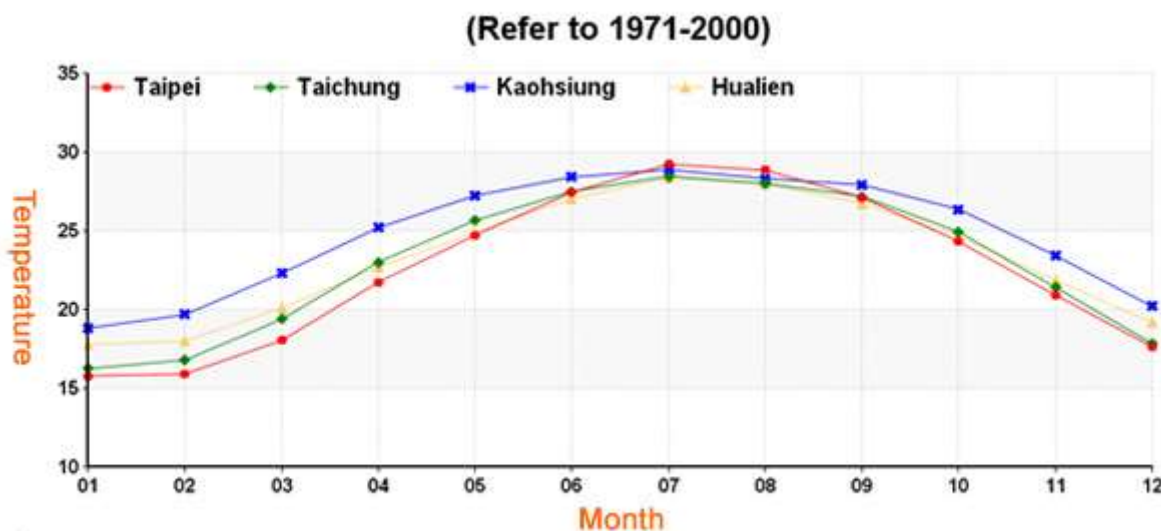
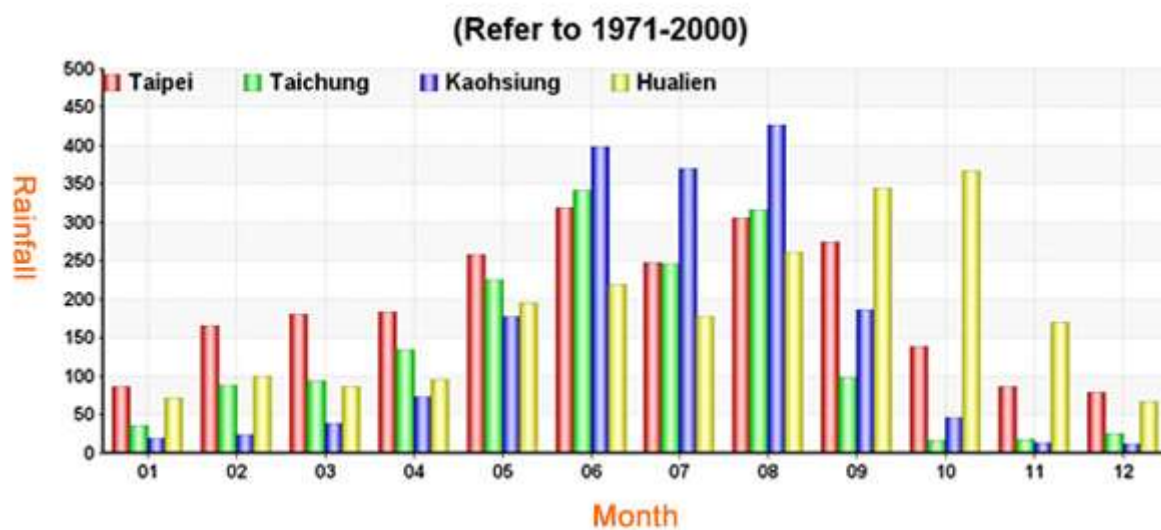
For Taipei MRT information, please [click here](#).



Weather Information

If you are from a high-latitude country, you can leave your winter coat behind when coming to Taiwan and enjoy the pleasant warmth of the sun. Don't worry too much about getting burned by the dazzling sun, so long as you take prudent precautions; the sun may not be as stinging hot as it seems. Furthermore, Taiwan is surrounded by the ocean; and the ocean breezes, which are the reasons for Taiwan's humid weather, will surely make you completely forget the dry cold back home.

If you are from a low-latitude country, you will certainly revel in the comfortable warmth of Taiwan's sun. The coolness that hangs in the air will be a welcome change from the simmering heat of your native country. You can do some hiking in the mountains, immersing yourself in the beautiful trees of the forest while inhaling the pure and fresh air that blows across the island of Taiwan.



Taiwan enjoys warm weather all year round. In summer and autumn the weather is relatively stable. Taiwan is extremely suitable for traveling, as the annual average temperature is a comfortable 22 degrees Celsius. We suggest you keep an eye on weather reports, because weather conditions are often severe and unpredictable when typhoons hit Taiwan. During the autumn (September to October), you can wholeheartedly enjoy the cool and comforting weather. In short, Taiwan, where it always seems to be spring, is your perfect travel destination!