

Plenary1

Monday, 10:20 to 11:00 – MO Hall (Room A)

Plenary1

10:20 **IN-LINE MEASUREMENT OF MICRO-GEOMETRIES WITH CONFOCAL MICROSCOPY**

Tilo Pfeifer

Plenary2

Monday, 11:10 to 11:50 – MO Hall (Room A)

Plenary2

11:10 **A CRITICAL REVIEW OF MICRO-CMM PROBING TECHNOLOGY**

Richard Leach

Plenary3

Monday, 11:50 to 12:30 – MO Hall (Room A)

Plenary3

11:50 **UNCERTAINTY ESTIMATION FOR PROFILE MEASUREMENT BY MULTI-SENSORS METHOD**

Kiyoshi Takamasu

B-1 3-D Surface Texture and its Micro Characteristics

14:00 MULTI SCALE MORPHOLOGICAL METROLOGY OF PISTON-RING-CYLINDER LINER ASSEMBLY IN
RELATION TO THEIR TRIBOLOGICAL PROPERTIES (148)

F-P. Ninove, Ecole Centrale de Lyon, Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), CNRS, France

T.G. Mathia, Ecole Centrale de Lyon, Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), CNRS, France

D. Mazuyer, Ecole Centrale de Lyon, Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), CNRS, France

P.Pawlus, Rzeszow University of Technology, Department of Manufacturing Processes and Production Organization, Poland

S.Carras, ALTIMET SAS 1, bis Av. des Tilleuls, 74200 Thonon-les bains, France

J. Gruszka, MAHLE Polska, ul. Mahle 6, 63-700 Krotoszyn, Poland

14:20 CHARACTERISATION OF GEOMETRICAL PROPERTIES OF ELECTROPLATED DIAMOND TOOL (52)

Mohd Fauzi Ismail, Nagaoka University of Technology, Japan

Kazuhisa Yanagi, Nagaoka University of Technology, Japan

Hiromi Isobe, Nagaoka University of Technology, Japan

14:40 3D NATURAL SURFACE FEATURES OF NODULAR SPHEROIDAL CAST IRON AND ITS
MORPHOLOGICAL BEHAVIOUR IN ABRASIVE MANUFACTURING (150)

François-Pierre Ninove, Ecole Centrale de Lyon, Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), CNRS, France

Cezary. Rapijko, Technical University of Lodz, Lodz, Poland

Thomas G Mathia, Ecole Centrale de Lyon, Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), CNRS, France

15:00 EVALUATION OF SPREADING BEHAVIOR OF LIQUIDS ON SURFACES WITH FUNCTION-ORIENTED
3D PARAMETERS(11)

Özgür Tan, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuremberg, Germany

Albert Weckenmann, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuremberg, Germany

C-1 Optical Measurement for Geometrical Quantity Evaluation (1)

14:00 ADVANCED ABSOLUTE LENGTH METROLOGY BASED ON PULSE TRAINS' CONSTRUCTIVE INTERFERENCE – MEASUREMENTS OF METER ORDER WITH AN ACCURACY OF NANO ORDER – (1)

Dong WEI, Department of Precision Engineering, The University of Tokyo, Japan

Satoru TAKAHASHI, Department of Precision Engineering, The University of Tokyo, Japan

Kiyoshi TAKAMASU, Department of Precision Engineering, The University of Tokyo, Japan

Hirokazu MATSUMOTO, Department of Precision Engineering, The University of Tokyo, Japan

14:20 HIGH-RESOLUTION IMAGING TECHNIQUE BASED ON ACTIVE SHIFT OF OPTICAL AXIS (94)

Shin Usuki, Division of Global Research Leaders, Shizuoka University, Japan

Kenjiro T. Miura, Graduate School of Science and Technology, Shizuoka University, Japan

14:40 < KEYNOTE > MODELLING OF MEASUREMENTS FOR MEASUREMENT DATA AND UNCERTAINTY EVALUATION

Klaus-Dieter Sommer, Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany

Rüdiger Kessel, National Institute of Standards and Technology (NIST), Gaithersburg, U.S.A.

Albert Weckenmann, University of Erlangen-Nuremberg, Germany

D-1 Advanced Optoelectronic Sensors and Instrument(1)

14:00 OTDR-BASED TECHNIQUE FOR DETECTING SIGNALS OF FBG SENSORS IN THE WIDE SPECTRAL RANGE FOR MEASURING STRAIN AND TEMPERATURE (126)

Yuri Kulchin, Institute for Automation and Control Processes FEB RAS, Russia

Oleg Vitrik, Institute for Automation and Control Processes FEB RAS, Russia

Anton Dyshlyuk, Institute for Automation and Control Processes FEB RAS, Russia

Zhi Zhou, School of Civil Engineering, Dalian University of Technology, China

Jinping Ou, School of Civil Engineering, Dalian University of Technology, China

14:20 A COMPACT 2D MICRO-ANGLE SENSOR (115)

Mengdong Lian, The state key lab of fluid power transmission and control, Zhejiang University, China

Bing-Feng Ju, The state key lab of fluid power transmission and control, Zhejiang University, China

14:40 AN OPTICAL SENSOR FOR MEASUREMENT OF ANGULAR MOTIONS OF A PLANAR MOTION STAGE (15)

Hiroshi Muto, Nano-Metrology and Control Lab, Department of Nanomechanics, Tohoku University, Japan

Yusuke Saito, Nano-Metrology and Control Lab, Department of Nanomechanics, Tohoku University, Japan

Yoshikazu Arai, Nano-Metrology and Control Lab, Department of Nanomechanics, Tohoku University, Japan

Wei Gao, Nano-Metrology and Control Lab, Department of Nanomechanics, Tohoku University, Japan

15:00 ANALYSIS OF MECHANICAL ERRORS OF PLANAR CAPACITIVE SENSOR FOR TWO DIMENSIONAL DISPLACEMENT MEASUREMENT (125)

Wen Wang, Institute of Advanced Manufacturing Engineering, Zhejiang University, P.R.China

Jianping Yu, Institute of Advanced Manufacturing Engineering, Zhejiang University, P.R.China

Yaohua Wen, Institute of Advanced Manufacturing Engineering, Zhejiang University, P.R.China

Zichen Chen, Institute of Advanced Manufacturing Engineering, Zhejiang University, P.R.China

E-1 Ultra Precision Length Measurement

14:00 < KEYNOTE > ULTRAFAST OPTICS FOR ULTRAPRECISION LENGTH MEASUREMENT

Seung-Woo KIM, Korea Advanced Institute of Science and Technology (KAIST)

14:40 3D MEASUREMENTS OF MICROSTRUCTURES WITH LARGE LATERAL DIMENSIONS (20)

Martin Bretschneider, Leibniz Universität Hannover, Germany

Moritz Krauß, Leibniz Universität Hannover, Germany

Markus Kästner, Leibniz Universität Hannover, Germany

Eduard Reithmeier, Leibniz Universität Hannover, Germany

15:00 SUPER-HETERODYNE INTERFEROMETRIC LENGTH MEASUREMENT USING THE REPETITION
FREQUENCY OF AN OPTICAL FREQUENCIES COMB (47)

Hirokazu MATSUMOTO, Department of Precision Engineering, The University of Tokyo, Japan

Satoru TAKAHASHI, Department of Precision Engineering, The University of Tokyo, Japan

Kiyoshi TAKAMASU, Department of Precision Engineering, The University of Tokyo, Japan

F-1 Macrogeometric Features and Uncertainty Evaluation

14:00 AUTOCOLLIMATOR CHARACTERIZATION AND CALIBRATION AT THE PTB: CURRENT STATUS AND FUTURE PROGRESS (55)

Ralf D. Geckeler, Physikalisch-Technische Bundesanstalt, Germany

Andreas Just, Physikalisch-Technische Bundesanstalt, Germany

Michael Krause, Physikalisch-Technische Bundesanstalt, Germany

Harald Bosse, Physikalisch-Technische Bundesanstalt, Germany

14:20 REFLECTIVE PROPERTY OF TYPICAL MICRO STRUCTURES UNDER WHITE LIGHT INTERFEROMETER (152)

Z. Sun, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuernberg, Germany

A. Weckenmann, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuernberg, Germany

14:40 ESTIMATION OF MEASUREMENT UNCERTAINTY OF LINE EDGE ROUGHNESS BASED ON THE NEXT GENERATION GPS (154)

JIANG Zhuangde, State Key Laboratory for Manufacturing Systems Engineering, Xi'an, School of Mechanical Engineering, University of Birmingham, Edgbaston, Birmingham, UK

ZHAO Fengxia, School of Mechanical Engineering, Zhengzhou University, Zhengzhou, China

JING Weixuan, State Key Laboratory for Manufacturing Systems Engineering, Xi'an

WANG Chenying, State Key Laboratory for Manufacturing Systems Engineering, Xi'an

Philip D. Prewett, School of Mechanical Engineering, University of Birmingham, Edgbaston, Birmingham, UK

Kyle Jiang, School of Mechanical Engineering, University of Birmingham, Edgbaston, Birmingham, UK

15:00 NATURALLY GROWN SILICON STRUCTURES AS AN INTERCOMPARISON STANDARD FOR MULTISENSOR DATA FUSION IN GEOMETRICAL SURFACE CHARACTERIZATION (23)

Sophie GRÖGER, Institute of Production Measuring Technology and Quality Assurance, Chemnitz University of Technology, Germany

Michael DIETZSCH, Institute of Production Measuring Technology and Quality Assurance, Chemnitz University of Technology, Germany

B-2 Gear Metrology

15:50 COMPREHENSIVE REPRESENTATION OF PITCH DEVIATIONS SUITABLE FOR ENGAGEMENT
EVALUATION IN DIFFERENT TYPES OF GEARS (51)

Syuhei Kurokawa, Department of Mechanical Engineering, Kyushu University, Japan

Yasutsune Ariura, Faculty of Engineering, Graduate School, Kyushu University, Japan

Toshiro Doi, Department of Mechanical Engineering, Kyushu University, Japan

16:10 LASER INTERFEROMETRIC MEASURING METHOD OF INVOLUTE ARTIFACT (63)

Masaharu Komori, Kyoto University, Japan

Fumi Takeoka, Kyoto University, Japan

Aizoh Kubo, Kyoto University, Japan

Hiroshige Fujio, Kyoto University, Japan

Takehiro Ito, Kyoto University, Japan

Sonko Osawa, AIST, Japan

Osamu Sato, AIST, Japan

Toshiyuki Takatsuji, AIST, Japan

16:30 FAST ALGORITHMS FOR IN-LINE GEARWHEEL MEASUREMENTS (5)

A. Pahlke, Institute of Measurement and Automatic Control Leibniz Universität Hannover, Germany

M. Kästner, Institute of Measurement and Automatic Control Leibniz Universität Hannover, Germany

E. Reithmeier, Institute of Measurement and Automatic Control Leibniz Universität Hannover, Germany

16:50 NOVEL ARTIFACTS USING SIMPLE GEOMETRIES FOR EVALUATION OF A GEAR MEASURING
INSTRUMENT (49)

Sonko Osawa, National Metrology Institute of Japan/ AIST, Japan

Osamu Sato, National Metrology Institute of Japan/ AIST, Japan

Yohan Kondo, National Metrology Institute of Japan/ AIST, Japan

Masaharu Komori, Department of Mechanical Engineering and Science, Kyoto University, Japan

Fumi Takeoka, Department of Mechanical Engineering and Science, Kyoto University, Japan

Toshiyuki Takatsuji, National Metrology Institute of Japan/ AIST, Japan

17:10 A NOVEL METHOD & ITS REALIZATION FOR SINGLE-FLANK TESTING OF FINE-PITCH GEARS (27)

Zhaoyao Shi, College of Mechanical Engineering and Applied Electronics Technology, Beijing University of Technology, Beijing, China

Wannian Zhang, College of Mechanical Engineering and Applied Electronics Technology, Beijing University of Technology, Beijing, China

Jiachun Lin, College of Mechanical Engineering and Applied Electronics Technology, Beijing University of Technology, Beijing, China

C-2 MEMS/MOEMS application in Measurement field

15:50 FABRICATION AND CHARACTERIZATION OF A MINIATURE SELF-SENSING JOINT OF CARBON NANOTUBE BUNDLES (114)

Hsin-Ying Lin, Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan

Ding-Hao Chen, Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan

Shang-Yi Liu, Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan

Po-Ken Chung, Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan

Wen-Pin Shih, Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan

Lung-Jieh Yang, Department of Mechanical and Electromechanical Engineering, Tamkang University, Taipei County, Taiwan

16:10 COUNTING OF ELECTRIC CHARGE FOR CONTROL OF LOCAL METAL PLATING USING A SCANNING NANOPIPETTE PROBE MICROSCOPE (98)

So Ito, Graduate School of Science and Technology, Shizuoka University, Japan

Futoshi Iwata, Graduate School of Science and Technology, Shizuoka University, Japan

16:30 DESIGN AND EVALUATION OF OIL-FILLED ISOLATED HIGH TEMPERATURE PIEZORESISTIVE PRESSURE SENSOR (155)

Libo ZHAO, State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China

Zhuangde JIANG, State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China

Yulong ZHAO, State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China

Yuanhao LIU, State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China

Jianbo LI, State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China

Jingbo XU, State Petrochina Northwest Marketing Company, Lanzhou, China

Yong LI, State Key Laboratory of Tribology, Tsinghua University, Beijing, China

16:50 < KEYNOTE > FOCUS AND DOSE CONTROL FOR LITHOGRAPHY OF SEMICONDUCTOR MANUFACTURING USING MANY KIND MEASUREMENT TOOLS RESPECTIVELY

Hideki Ina, Canon Inc., Japan

D-2 Advanced Optoelectronic Sensors and Instrument(2)

15:50 ERROR ANALYSIS OF OPTICAL ACTIVITY FOR STANDARDIZATION BY DUAL ROTATING POLARIMETER (132)

Masanosuke Tanaka, ATAGO CO.,LTD., Tokyo University of agriculture and Technology, Japan

Yoshinori Nakajima, ATAGO CO.,LTD., Japan

Hideyuki Amemiya, ATAGO CO.,LTD., Japan

Yukitoshi Otani, Tokyo University of agriculture and Technology, Japan

16:10 DIMENSION MEASUREMENT OF THE INSIDE SHAPE OF SPECIAL OIL PIPE WITH THREE-DIMENTIONAL ENDOSCOPE (129)

Wei TAO, Department of Instruement Science and Technology,Shanghai Jiaotong University, China

Hui ZHAO, Department of Instruement Science and Technology,Shanghai Jiaotong University, China

Ruihong CHEN, BNA of Baosteel CO. LTD, Shanghai, China

16:30 DEVELOPMENT OF A SINGLE-SHOT LASER RANGEFINDER WITH QUADRATURE REFERENCE SIGNALS SAMPLING (87)

Masahiro Ohishi, Topcon Corporation, Japan

Fumio Ohtomo, Topcon Corporation, Japan

Yosikatsu Tokuda, Topcon Corporation, Japan

Chikao Nagasawa, Tokyo Metropolitan University, Japan

16:50 DESIGN AND REALIZATION OF DUAL WAVEGUIDE DIFFERENTIAL MAGNETOSTRICTIVE LINEAR POSITION SENSOR (112)

Yongjie Zhang, Shanghai Jiao Tong University, China

Hui Zhao, Shanghai Jiao Tong University, China

Weiwen Liu, Shanghai Jiao Tong University, China

Ruojie Tao, Shanghai Jiao Tong University, China

Wei Tao, Shanghai Jiao Tong University, China

E-2 CMM Metrology(1)

15:50 TACTILE-OPTICAL MICROPROBES FOR THREE DIMENSIONAL MEASUREMENTS OF MICROPARTS (32)

Rainer TUTSCH, Institute of Production Metrology, University of Braunschweig, Germany

Matthias ANDRAES, Werth Messtechnik GmbH, Siemensstraße, Gießen

Ulrich NEUSCHAEFER-RUBE, Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig

Marcus PETZ, Institute of Production Metrology, University of Braunschweig, Germany

Thomas WIEDENHOEFER, Werth Messtechnik GmbH, Siemensstraße, Gießen

Mark WISSMANN, Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig

16:10 CALIBRATION OF ARTICULATED ARM COORDINATE MEASURING MACHINE CONSIDERING MEASURING POSTURE (18)

Hiroyuki Hamana, Tokyo Denki University, Japan

Mitsushi Tominaga, Tokyo Denki University, Japan

Miyu Ozaki, Tokyo Denki University, Japan

Ryoshu Furutani, Tokyo Denki University, Japan

16:30 INSPECTION OF SPATIAL CAMS USING COORDINATE MEASURING MACHINE (40)

Jiachun Lin, College of mechanical engineering and applied electronics technology, Beijing University of Technology, P.R.China

Zhaoyao Shi, College of mechanical engineering and applied electronics technology, Beijing University of Technology, P.R.China

Lin Tang, College of mechanical engineering and applied electronics technology, Beijing University of Technology, P.R.China

16:50 DEVELOPMENT OF MICRO CONTACT DETECTION PROBE FOR MICRO-HOLE QUALITY CONTROL (163)

Ichiro Ogura, National Institute of Advanced Industrial Science and Technology (AIST), Japan

Yuichi Okazaki, National Institute of Advanced Industrial Science and Technology (AIST), Japan

17:10 DESIGN AND CONTROL OF 3-DOF ACTIVE SCANNING PROBE USING PARALLEL LINK MECHANISM (145)

Takashi HARADA, Kinki University, Japan

Ke Dong, Graduate School of Science and Engineering, Kinki University, Japan

F-2 Uncertainty Evaluation and Traceability(1)

15:50 < KEYNOTE > CALIBRATION OF SURFACE PLATES USING AUTOCOLLIMATOR, LASER SYSTEMS AND COORDINATE MEASURING MACHINES (CMMS)

Sarwat Zaki Ahmed ZAHWI, National Institute for Standards of Egypt

16:30 ERROR BUDGETING OF A THERMALLY STABLE CALIBRATION SETUP FOR TWO-DIMENSIONAL SENSORS (116)

José A. Yagüe-Fabra, University of Zaragoza, Spain

José Antonio Albajez, University of Zaragoza, Spain

Juan José Aguilar, University of Zaragoza, Spain

Margarita Valenzuela, University of Zaragoza, Spain

Sinué Ontiveros, University of Zaragoza, Spain

16:50 METROLOGICAL COMPATIBILITY AND STATISTICAL CONSISTENCY (157)

Raghu N Kacker, National Institute of Standards and Technology (NIST), USA

Rüdiger Kessel, National Institute of Standards and Technology (NIST), USA

Klaus-Dieter Sommer, Physikalisch-Technische Bundesanstalt (PTB), Germany

17:10 RE-CALIBRATION EVALUATION UTILIZING DATA MINING METHODS (160)

Adriana HORNIKOVA, Institute for Production Engineering and Laser Technology, Austria, University of Economics in Bratislava, Dolnozemska cesta 1/b, 852 35 Bratislava, Slovakia

M. Numan DURAKBASA, Institute for Production Engineering and Laser Technology, Austria

Friedrich BLEICHER, Institute for Production Engineering and Laser Technology, Austria

Plenary4

Tuesday, 9:00 to 9:40 – MO Hall (Room A)

Plenary4

**9:00 THE ROLE OF METROLOGY IN THE EXCHANGE OF GOODS AND IN THE DEVELOPMENT OF
MANUFACTURING TECHNOLOGIES – THE BACKGROUND FOR IMEKO TC 14**

Albert Weckenmann

Plenary5

Tuesday, 9:40 to 10:20 – MO Hall (Room A)

Plenary5

9:40 MACHINE VISION APPLICATIONS IN METROLOGY

Ramamoorthy Balakrishnan

B-3 Optical Measurement for Geometrical Quantity Evaluation (2)

10:30 3D MEASUREMENT OF THE INNER SHAPE OF ACCELERATOR CAVITIES (104)

Kazuhiro Enami, Mechanical Engineering Center, High Energy Accelerator Research Organization, Tsukuba, JAPAN

Tatsuya Kume, Mechanical Engineering Center, High Energy Accelerator Research Organization, Tsukuba, JAPAN

Yasuo Higashi, Mechanical Engineering Center, High Energy Accelerator Research Organization, Tsukuba, JAPAN

Kenji Ueno, Mechanical Engineering Center, High Energy Accelerator Research Organization, Tsukuba, JAPAN

10:50 DESIGN AND CALIBRATION OF COORDINATE MEASURING SYSTEM BASED ON SCANNING LASER PLANE (107)

Dabao LAO, National State Key Laboratory of Precision Measuring Technology and Instruments in Tianjin University of China, CHINA

Xueyou YANG, National State Key Laboratory of Precision Measuring Technology and Instruments in Tianjin University of China, CHINA

Jigui ZHU, National State Key Laboratory of Precision Measuring Technology and Instruments in Tianjin University of China, CHINA

11:10 RESOLUTION CHARACTERISTICS OF SUPER-RESOLUTION OPTICAL INSPECTION USING STANDING WAVE ILLUMINATION (134)

Ryota Kudo, Department of Precision Engineering, The University of Tokyo, Japan

Shin Usuki, Division of Global Research Leaders, Shizuoka University, Japan

Satoru Takahashi, Department of Precision Engineering, The University of Tokyo, Japan

Kiyoshi Takamasu, Department of Precision Engineering, The University of Tokyo, Japan

11:30 PROFILE MEASUREMENT OF LARGE ASPHERIC OPTICAL SURFACE BY SCANNING DEFLECTOMETRY WITH ROTATABLE MIRROR
-COMPENSATION METHODS FOR ROTATION OF ROTATABLE MIRROR- (17)

Muzheng Xiao, Department of precision engineering, School of engineering, the University of Tokyo, Japan

Satomi Jujo, Department of precision engineering, School of engineering, the University of Tokyo, Japan

Satoru Takahashi, Department of precision engineering, School of engineering, the University of Tokyo, Japan

Kiyoshi Takamasu, Department of precision engineering, School of engineering, the University of Tokyo, Japan

11:50 OPTICAL 3D-CHARACTERIZATION FOR MULTISCALE WORKPIECES (19)

Laura Shaw, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuremberg, Germany

Albert Weckenmann, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuremberg, Germany

C-3 Pre-, In-, Post process measurement

10:30 < KEYNOTE > IN-PROCESS FORM PROFILE MEASUREMENT FOR PRECISION CONTROL IN MANUFACTURING

Yongsheng Gao, Hong Kong University of Science and Technology

11:10 RESEARCH REGARDING MEASURING THE LASER BEAM DURING LASER PROCESSING (106)

Camil Octav CHETREANU DON, Tehnical University Cluj Napoca, Romania

Gabriel DUMITRU

11:30 DUAL-WAVELENGTH SIMULTANEOUS PHASE SHIFTING INTERFEROMETRY (SPSI) FOR ONE-SHOT MEASUREMENT (69)

Liang-Chia Chen, Graduate Institute of Automation Technology, National Taipei University of Technology, Taiwan

Sheng-Lih Yeh, Department of Mechanical Engineering, Lunghwa University of Science and Technology

Yan-Chao Liao, Graduate Institute of Automation Technology, National Taipei University of Technology, Taiwan

Abraham Mario Tapilouw, Graduate Institute of Automation Technology, National Taipei University of Technology, Taiwan

11:50 THE SIMULATION AND INSPECTION FOR THE STARTING PHENOMENON OF SLIT COATING PROCESS ON GLASS SUBSTRATE (117)

Ta-Hsin Chou, Industrial Technology Research Institute, Taiwan R.O.C.

Wen-Hsien Yang, Industrial Technology Research Institute, Taiwan R.O.C.

Kuei-Yuan Cheng, Industrial Technology Research Institute, Taiwan R.O.C.

Yu-Chen Chang, Yuan Ze University, Taiwan R.O.C.

Thomas Luo, Yuan Ze University, Taiwan R.O.C.

D-3 Quality Control

10:30 GEOMETRY ASSURANCE AND QUALITY CONTROL PLANNING BY QAM (142)

Richard Lindqvist, Royal Institute of Technology, KTH Production Engineering, Stockholm, Sweden

Karl-Johan Karlsson, Volvo Construction Equipment, Eskilstuna, Sweden

Stefan Hedman, Volvo Construction Equipment, Eskilstuna, Sweden

Lars Mattsson, Royal Institute of Technology, KTH Production Engineering, Stockholm, Sweden

10:50 SUSTAINABLE QUALITY ASSURANCE BY ASSURING COMPETENCE OF EMPLOYEES (54)

Teresa Werner, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuremberg, Germany

Albert Weckenmann, Chair Quality Management and Manufacturing Metrology, University Erlangen-Nuremberg, Germany

11:10 INTRODUCING QUALITY CONTROL LOOPS FOR THE INTEGRATED ANALYSIS AND DESIGN OF STABLE PRODUCTION SYSTEMS (147)

Robert Schmitt, Laboratory for Machine Tools and Production Engineering WZL, RWTH Aachen University, Germany

Tilo Pfeifer, Laboratory for Machine Tools and Production Engineering WZL, RWTH Aachen University, Germany

Sebastian T. Stiller, Laboratory for Machine Tools and Production Engineering WZL, RWTH Aachen University, Germany

Patrick Beaujean, Laboratory for Machine Tools and Production Engineering WZL, RWTH Aachen University, Germany

11:30 CAPABLE PRODUCTION PROCESSES BY DYNAMIC TOLERANCING (31)

Rainer Tutsch, Institute of Production Metrology, University of Braunschweig, Germany

Carlos Hernandez, Institute of Production Metrology, University of Braunschweig, Germany

11:50 EQUIPP – EXCHANGE OF QUALITY MEASUREMENT PROCESS PLANS (144)

Richard Lindqvist, Royal Institute of Technology, KTH Production Engineering, Stockholm, Sweden

John Horst, NIST, Gaithersburg, USA

Robert Brown, Mitutoyo America Corporation, USA

Lars Mattsson, Royal Institute of Technology, KTH Production Engineering, Stockholm, Sweden

E-3 CMM Metrology (2)

10:30 METHOD FOR A TRACEABLE GEOMETRY ASSESSMENT OF ARBITRARILY SHAPED SCULPTURED SURFACES (74)

Markus Bartscher, Physikalisch-Technische Bundesanstalt, Braunschweig and Berlin, Germany

Marko Neukamm, Physikalisch-Technische Bundesanstalt, Braunschweig and Berlin, Germany

Michael Krystek, Physikalisch-Technische Bundesanstalt, Braunschweig and Berlin, Germany

10:50 A THREE LASER INTERFEROMETERS AND ONE AUTOCOLLIMATOR SYSTEM FOR MEASURING THE YAW AND STRAIGHTNESS ERRORS OF A X-Y STAGE ON HIGH PRECISION CMM (58)

Ping Yang, Precision Engineering, The University of Tokyo, Tokyo, Japan

Shusaku Shibata, Precision Engineering, The University of Tokyo, Tokyo, Japan

Tomohiko Takamura, Precision Engineering, The University of Tokyo, Tokyo, Japan

Satoru Takahashi, Precision Engineering, The University of Tokyo, Tokyo, Japan

Kiyoshi Takamasu, Precision Engineering, The University of Tokyo, Tokyo, Japan

Osamu Sato, Advanced Industrial Science and Technology, Tokyo, Japan

Sonko Osawa, Advanced Industrial Science and Technology, Tokyo, Japan

Toshiyuki Takatsuji, Advanced Industrial Science and Technology, Tokyo, Japan

11:10 MOBILE MULTI-LATERATION MEASURING SYSTEM FOR HIGH ACCURATE AND TRACABLE 3D MEASUREMENTS OF LARGE OBJECTS (25)

Klaus Wendt, Physikalisch-Technische Bundesanstalt Braunschweig und Berlin, Germany

Matthias Franke, Physikalisch-Technische Bundesanstalt Braunschweig und Berlin, Germany

Frank Härtig, Physikalisch-Technische Bundesanstalt Braunschweig und Berlin, Germany

11:30 EFFICIENT MULTIPLE-MEASUREMENT TECHNIQUE FOR ROTATIONALLY SYMMETRIC MEASURANDS (67)

Osamu Sato, AIST, Japan

Yohan Kondo, Tokyo Institute of Technology, Japan

Sonko Osawa, AIST, Japan

Toshiyuki Takatsuji, AIST, Japan

11:50 ISARA 400: ENABLING ULTRA-PRECISION COORDINATE METROLOGY FOR LARGE PARTS (53)

Henny Spaan, IBS Precision Engineering, The Netherlands

Rilpho Donker, IBS Precision Engineering, The Netherlands

Ivo Widdershoven, IBS Precision Engineering, The Netherlands

F-3 Uncertainty Evaluation and Traceability (2)

10:30 METHODOLOGY FOR UNCERTAINTY ESTIMATION OF COORDINATE MEASUREMENTS (159)

Władysław JAKUBIEC, University of Bielsko-Biala, Poland

Wojciech PŁOWUCHA, University of Bielsko-Biala, Poland

10:50 ANALYSIS AND DESIGN OF THE BEST LAYOUT BASED ON THE NETWORK MEASUREMENT OF WMPS (110)

Zhi XIONG, Tianjin University, State Key Laboratory of Precision Measuring Technology and Instruments of Tianjin, China

Ji Gui ZHU, Tianjin University, China

Yong Jie REN, Tianjin University, China

Da Bao LAO, Tianjin University, China

Lei GENG, Tianjin University, China

Xue You YANG, Tianjin University, China

Sheng Hua YE, Tianjin University, China

11:10 UNCERTAINTY IN 3D METROLOGY INTEGRATED WITH THE PROCESS OF PRODUCT AND MEASUREMENT REALIZATION (37)

Christian R. Baldo, Institute for Technological Research (IPT), Brazil

Alvaro J. Abackerli, Institute for Technological Research (IPT), Brazil

Gustavo D. Donatelli, Reference Centres in Technology Innovation (CERTI), Brazil

Francisco A. Arenhart, Reference Centres in Technology Innovation (CERTI), Brazil

11:30 A MORE GENERAL TYPE A EVALUATION (35)

Rüdiger Kessel, National Institute of Standards and Technology (NIST), USA

Raghu N Kacker, National Institute of Standards and Technology (NIST), USA

Klaus-Dieter Sommer, Physikalisch-Technische Bundesanstalt (PTB), Germany

11:50 PROPOSAL OF A CYLINDRICAL STANDARD TO EVALUATE THE UNCERTAINTY OF MEASUREMENT FOR MICRO GEAR MEASUREMENTS (30)

Gisela Lanza, wbk Institute of Production Science, Karlsruhe Institute of Technology, Germany

Benjamin Viering, wbk Institute of Production Science, Karlsruhe Institute of Technology, Germany

B-4 Intelligent Micro and Nano Metrology (1)

15:20 MEASUREMENT OF LONG-TERM DIMENSIONAL STABILITY OF GLASS CERAMICS USING A HIGH-PRECISION LINE SCALE CALIBRATION SYSTEM (161)

Akira Takahashi, Instruments Company, Nikon Corporation, Japan

15:40 NON-CONTACT REMOTE MEASUREMENTS OF RING GAUGE USING A LOW-COHERENCE INTERFEROMETER (43)

Nobuyuki Ohsawa, Tosei Engineering Corp. Auto Metrology Division, Japan

Hirokazu Matsumoto, Dept. Prec. Eng., The University of Tokyo, Japan

Akiko Hirai, NMIJ, National Institute of Advanced Industrial Science and Technology, Japan

Masatoshi Arai, Tokyo Seimitsu Co., LTD Metrology Company, Japan

Tohru Shimizu, Tosei Engineering Corp. Auto Metrology Division, Japan

Takashi Kikuchi, Tosei Engineering Corp. Auto Metrology Division, Japan

16:00 A NOVEL SCANNING TUNNELING MICROSCOPY FOR LONG RANGE AND HIGH ASPECT RATIO MEASUREMENT (108)

Yuan-Liu Chen, The state key lab of fluid power transmission and control, Zhejiang University, China

Bing-Feng Ju, The state key lab of fluid power transmission and control, Zhejiang University, China

16:20 STRUCTURALIZATION OF METAL NANOPARTICLES BY PHOTOINDUCED AGGREGATION (135)

Kok Foong Lee, Department of Mechanical Engineering, Osaka University, Japan

Terutake Hayashi, Department of Mechanical Engineering, Osaka University, Japan

Yasuhiro Takaya, Department of Mechanical Engineering, Osaka University, Japan

16:40 MEASUREMENT OF ABSOLUTE OPTICAL THICKNESS DISTRIBUTION OF SEMICONDUCTOR WAFER USING A WAVELENGTH TUNING INTERFEROMETER (131)

Yangjin Kim, Korea Institute of Machinery and Materials, Korea

Kenichi Hibino, National Institute of Advanced Science and Technology, Japan

Youichi Bitou, National Institute of Advanced Science and Technology, Japan

Sonko Osawa, National Institute of Advanced Science and Technology, Japan

Naohiko Sugita, The University of Tokyo, Japan

Mamoru Mitsauishi, The University of Tokyo, Japan

C-4 Analytical Method for Uncertainty Evaluation

15:20 < KEYNOTE > ANALYTICAL METHOD OF CALCULATING THE MEASUREMENT ACCURACY

Ryszard Jablonski, Warsaw University of Technology

16:00 PROBABILITY DESCRIPTION OF TWO-PROCESS SURFACE TOPOGRAPHY (85)

Wiesław GRABOŃ, Rzeszow University of Technology, Poland

Paweł PAWLUS, Rzeszow University of Technology, Poland

16:20 SOFTWARE DATUM FOR CROSS-AXIS MOTION MEASUREMENT OF X-STAGE BASED ON LEAST UNCERTAINTY CRITERION (88)

Eiki OKUYAMA, Akita University, Japan

Hiroshi TAKAHASHI, Akita University, Japan

Hiromi ISHIKAWA, Akita University, Japan

16:40 EVALUATION METHOD OF CONDITIONED POLISHING PAD SURFACE TOPOGRAPHY APPLYING FOURIER TRANSFORM ANALYSIS (93)

Keiichi Kimura, Kyushu Institute of Technology, Japan

Panart Khajornrungruang, Kyushu Institute of Technology, Japan

Takahisa Okusono, Kyushu Institute of Technology, Japan

D-4 Optical Measurement for Geometrical Quantity Evaluation (3)

15:20 FREE SPECTRAL RANGE MEASUREMENT OF FABRY-PEROT CAVITY USING FREQUENCY MODULATION AND NULL METHOD UNDER OFF RESONANCE CONDITION (70)

M. AKETAGAWA, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

T. YASHIKI, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

S. KIMURA, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

H. IWATA, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

T. Q. BANH, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

15:40 DEVELOPMENT OF A CONSTANT TEMPERATURE/“AIR—REFRACTIVE—INDEX” CHAMBER USING FABRY-PEROT CAVITY (71)

Tuan Quoc Banh, Graduate School, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

Yuria Ohkubo, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

Masato Aketagawa, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

16:00 IN-SITU LATERAL CONFOCAL MEASUREMENT FOR ROLL-TO-ROLL THIN-FILM FABRICATION (68)

Liang-Chia Chen, National Taipei University of Technology, Taiwan

Sheng-Han Chen, National Taipei University of Technology, Taiwan

Yi-Wei Chang, National Taipei University of Technology, Taiwan

Zhi-Kai Li, National Taipei University of Technology, Taiwan

Shih-Hsuan Kuo, Industrial Technology Research Institute, Taiwan

16:20 INFLUENCES OF SURFACE PARAMETERS ON LASER 3D SCANNING (26)

Nermina Zaimovic-Uzunovic, University of Zenica, Bosnia and Herzegovina

Samir Lemes, University of Zenica, Bosnia and Herzegovina

16:40 NEW OPTICAL DISTANCE MEASUREMENT WITHOUT A PRISM REFLECTOR USING AN OPTICAL FREQUENCY COMB LASER (62)

Kazumasa Isaka, The graduate school of engineering at the University of Tokyo, Japan

Satoru Takahashi, The graduate school of engineering at the University of Tokyo, Japan

Kiyoshi Takamasu, The graduate school of engineering at the University of Tokyo, Japan

Hirokazu Matsumoto, The graduate school of engineering at the University of Tokyo, Japan

E- 4 CMM Metrology (3)

15:20 HIGH PRECISION TACTILE PROBING SIZE AND FORM MEASUREMENTS WITH A MICRO-CMM (6)

Michael Neugebauer, Physikalisch-Technische Bundesanstalt (PTB), Germany

Frank Härtig, Physikalisch-Technische Bundesanstalt (PTB), Germany

Otto Jusko, Physikalisch-Technische Bundesanstalt (PTB), Germany

15:40 EXPERIMENTAL EVALUATION OF TECHNIQUES FOR OUTLIER RECOGNITION AND ELIMINATION ON FORM MEASUREMENT PROFILES (78)

Felipe L. PROBST, Reference Centers in Technology Innovation (CERTI), Brazil

Francisco A. ARENHART, Reference Centers in Technology Innovation (CERTI), Brazil

Gustavo D. DONATELLI, Reference Centers in Technology Innovation (CERTI), Brazil

Robert SCHMITT, Werkzeugmaschinenlabor (WZL) of RWTH-Aachen, Germany

Susanne NISCH, Werkzeugmaschinenlabor (WZL) of RWTH-Aachen, Germany

16:00 VERIFICATION OF INTERIM CHECK METHOD OF CMM (7)

Yusuke ASANO, Tokyo Denki University, Japan

Ryoshu FURUTANI, Tokyo Denki University, Japan

Miyu OZAKI, Tokyo Denki University, Japan

16:20 EVALUATION METHOD FOR MICRO-CMM SPHERICAL STYLUS TIPS USING MICRO-EDM ON-MACHINE MEASUREMENT (60)

Dong-Yea, Sheu, National Taipei University of Technology, Taiwan

Richard Leach, National Physical Laboratory, UK

F-4 Tolerance, Testing, Test Planning

15:20 EVALUATION OF THE MEASUREMENT ALGORITHM FOR OUT-OF-ROUNDNESS MEASUREMENT WITH CMM (149)

Michal WIECZOROWSKI, Poznan University of Technology, Poland

Bartosz GAPINSKI, Poznan University of Technology, Poland

Thomas MATHIA, Ecole Centrale de Lyon, France

15:40 ESTABLISHMENT OF A PRIMARY LEVEL LAB FACILITY AT MEASUREMENT STANDARDS LABORATORY TO CALIBRATE AIR VELOCITY SENSORS (81)

Fazil Syed, King Fahd University of Petroleum & Minerals, Kingdom of Saudi Arabia

Faheem Mohammad, King Fahd University of Petroleum & Minerals, Kingdom of Saudi Arabia

Federico Cejalvo, King Fahd University of Petroleum & Minerals, Kingdom of Saudi Arabia

16:00 MEASUREMENT UNCERTAINTY IN THE ASSESSMENT OF CONFORMITY (76)

Michael KRYSTEK, Physikalisch-Technische Bundesanstalt, Germany

Klaus-Dieter SOMMER, Physikalisch-Technische Bundesanstalt, Germany

W. Tyler ESTLER, National Institute of Standards and Technology, USA

16:20 DESIGN AND VERIFICATION OF BONDING MODULES FOR PCB BONDERS (95)

Tien-Tung Chung, National Taiwan University, Taiwan (R.O.C.)

Chin-Te Lin, National Taiwan University, Taiwan (R.O.C.)

Hsun-Fu Chian, National Taiwan University, Taiwan (R.O.C.)

Shou-Heng Chen, National Taiwan University, Taiwan (R.O.C.)

Kuang-Chao Fan, National Taiwan University, Taiwan (R.O.C.)

16:40 MORPHOLOGICAL CRITERIA FOR MICRO TOLERANCING IN MANUFACTURING PROCESSES OF ASSEMBLY JOINTS UNDER FRETTING CONDITIONS (143)

K.J. Kubiak, Institute of Engineering Thermofluids Surfaces and Interfaces, School of Mechanical Engineering - University of Leeds, United Kingdom

T.G. Mathia, Laboratoire de Tribologie et Dynamique des Systèmes, Ecole Centrale de Lyon, France

S. Carras, ALTIMET SAS I, France

B-5 Novel Method for Medical and Biological Measurement

9:00 PERSPECTIVE SENSORY MEASUREMENT METHOD BY USING MULTI VIEW POINT 3D
GLASS-FREE DISPLAY (39)

Yoshihito Kikuchi, Hokkai-Gakuen University, Japan

Takahiro Yamanoi, Hokkai-Gakuen University, Japan

9:20 PHOTONIC BIOSENSOR FOR LAB-ON-A-CHIP APPLICATIONS (28)

Stefanie Demming, Institut für Mikrotechnik, Technische Universität Braunschweig, Germany

Andreu Llobera, Institut für Mikrotechnik, Technische Universität Braunschweig, Germany, Centre Nacional de Microelectrònica(IMB-CNM, CSIC), Spain

Victor Javier Cadarso, Centre Nacional de Microelectrònica(IMB-CNM, CSIC), Spain

Jahir Orozco, Centre Nacional de Microelectrònica(IMB-CNM, CSIC), Spain

Cesar Fernández-Sánchez, Centre Nacional de Microelectrònica(IMB-CNM, CSIC), Spain

Ralph Wilke, Institut für Mikrotechnik, Technische Universität Braunschweig, Germany

Stephanus Büttgenbach, Institut für Mikrotechnik, Technische Universität Braunschweig, Germany

9:40 DEVELOPMENT OF AFM SYSTEM HAVING MULTI-FUNCTIONAL TOOLS FOR MEASUREMENT AND
MANIPULATION UNDER SEM OBSERVATION (100)

Hideyuki Ko, Faculty of Engineering, Shizuoka University, Japan

*Hisayuki Aoyama, Department of Mechanical Engineering and intelligent systems, University of
Electro-Communications, Japan*

Tatsuo Ushiki, Graduate School of Medical and Dental Sciences, Niigata University, Japan

Futoshi Iwata, Faculty of Engineering, Shizuoka University, Japan

10:00 TECHNIQUE FOR SEPARATELY MEASURING VISCOUS AND ELASTIC FORCES OF A CELL USING
AN OPTICALLY MANIPULATED MICROPROBE (36)

Ryosuke Tsutsumi, Faculty of Engineering, Kagawa University, Japan

Kazuhiro Gesho, Faculty of Engineering, Kagawa University, Japan

Akira Nishiyama, Faculty of Medicine, Kagawa University, Japan

Shoichi Gohtani, Faculty of Agriculture, Kagawa University, Japan

Ichirou Ishimaru, Faculty of Engineering, Kagawa University, Japan

C-5 Machine Vision and Image Processing

9:00 HARD- AND SOFTWARE SYSTEMS FOR EVALUATION OF NEW MULTI CHANNEL IMAGE PROCESSING ALGORITHMS (65)

Martin Correns, Department of Quality Assurance, Ilmenau University Of Technology, Germany

Maik Schumann, Department of Quality Assurance, Ilmenau University Of Technology, Germany

Maik Rosenberger, Department of Quality Assurance, Ilmenau University Of Technology, Germany

Matthias Rückwardt, Department of Quality Assurance, Ilmenau University Of Technology, Germany

André Göpfert, Department of Quality Assurance, Ilmenau University Of Technology, Germany

Gehard Linß, Department of Quality Assurance, Ilmenau University Of Technology, Germany

9:20 DEVELOPMENT OF SHAPE MEASUREMENT SYSTEM USING WHOLE-SPACE TABULATION METHOD FOR ELECTRONIC PACKAGE (99)

Motoharu Fujigaki, Faculty of Systems Engineering, Wakayama University, Japan

Akihiro Masaya, Faculty of Systems Engineering, Wakayama University, Japan

Yoshiharu Morimoto, Moire Institute, Japan

Tadashi Misaka, YASUNAGA CORPORATION, Japan

Minoru Inada, YASUNAGA CORPORATION, Japan

Ryosuke Murakami, Graduate School of Systems Engineering, Wakayama University, Japan

9:40 A NOVEL TECHNOLOGY-MATCHING-BASED METHOD FOR DETECTING EDGES OF MICRO ACCESSORIES (127)

Weiren Wu, Beijing Institute of Technology, School of Mechanical and Vehicular Engineering, China

Li Jiang, Beijing Institute of Technology, School of Mechanical and Vehicular Engineering, China

Zhijing Zhang, Beijing Institute of Technology, School of Mechanical and Vehicular Engineering, China

Xin Jin, Beijing Institute of Technology, School of Mechanical and Vehicular Engineering, China

10:00 THE PERFORMANCES OF A VISION INSPECTION SYSTEM WITH DIFFERENT INTERFACE CAMERAS (141)

Qi Li, The School of Instrument Science and Opto-electronics Engineering, China

Rong-Sheng Lu, The School of Instrument Science and Opto-electronics Engineering, China

Yan-qiong Shi, The School of Instrument Science and Opto-electronics Engineering, China

Qing-ping Yu, The School of Instrument Science and Opto-electronics Engineering, China

Ning Liu, The School of Instrument Science and Opto-electronics Engineering, China

D-5 Intelligent Micro and Nano Metrology (2)

9:00 DEVELOPEMENT OF AN AUTO-FOCUS SYSTEM BY THE MOIRÉ METHOD (113)

Ju-Yi Lee, Institute of Opto-Mechatronics Engineering, National Central University, Taiwan

Yu-Ju Lin, Institute of Opto-Mechatronics Engineering, National Central University, Taiwan

Yung-Hsing Wang, Industrial Technology Research Institute, Taiwan

Chien-Sheng Liu, Industrial Technology Research Institute, Taiwan

9:20 ULTRA-PRECISION SCANNING TUNNELING MICROSCOPE FOR MEASUREMENT OF HIGH-ASPECT RATIO STRUCTURES (21)

Shigeaki Goto, Nano-Metrology and Control Laboratory, Tohoku University, Japan

Wei Gao, Nano-Metrology and Control Laboratory, Tohoku University, Japan

9:40 DESIGN OF AN ACTIVE PROBE FOR A CONTACT-TYPE MEASURING DEVICE USING LASER INTERFEROMETRY SYSTEM (138)

Yung-Tien Liu, National Kaohsiung First University of Science and Technology, Taiwan, R.O.C

Han-Lin Wu, National Kaohsiung First University of Science and Technology, Taiwan, R.O.C

Yutaka Yamagata, The Institute of Physical and Chemical Research (RIKEN), Japan

10:00 SPINDLE RADIAL MOTION ERROR MEASUREMENT USING TWO-DIMENSIONAL ATOMIC ENCODER (72)

Patamaporn Chaikool, Department of Information Science and Control Engineering, Nagaoka University of Technology, Japan

Masato Aketagawa, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

Eiki Okuyama, Department of Mechanical Engineering, Akita University, Japan

Jaratsri Soeatuptim, Department of Mechanical Engineering, Nagaoka University of Technology, Japan

Nusorn Nimnual, Department of Mechatronics Engineering, Pathumwan Institute of Technology, Thailand

E-5 Nano Photonics in Intelligent Measurement

9:00 DETECTING TERAHERTZ NEAR-FIELD RADIATION WITHOUT EXTERNAL ILLUMINATION (80)

Yusuke Kajihara, The University of Tokyo, Japan Science and Technology Agency (JST), CREST, Japan

Keishi Kosaka, The University of Tokyo, Japan

Susumu Komiyama, The University of Tokyo, Japan

9:20 HEIGHT MEASUREMENT OF A PARTICLE IN EVANESCENT FIELD CONTROLLING PENETRATION DEPTH (139)

Takayuki Kurihara, The University of Tokyo, Japan

Ryuichi Sugimoto, The University of Tokyo, Japan

Ryota Kudo, The University of Tokyo, Japan

Satoru Takahashi, The University of Tokyo, Japan

Kiyoshi Takamasu, The University of Tokyo, Japan

9:40 THIN FILM THICKNESS MEASUREMENT BY SURFACE PLASMON RESONANCE USING MODIFIED OTTO'S CONFIGURATION COMBINED WITH ELLIPSOMETRY (64)

Yasuhiro Mizutani, The University of Tokushima, Japan

Tetsuo Iwata, The University of Tokushima, Japan

10:00 STUDY OF PHOTO-DRIVEN LEVER BEAMS FABRICATED BY TWO-PHOTON POLYMERIZATION FOR SENSOR APPLICATIONS (97)

Chih-Lang Lin, Central Taiwan University of Science and Technology, Taiwan

Tien-Tung Chung, National Taiwan University, Taiwan (R.O.C.)

Chin-Te Lin, National Taiwan University, Taiwan (R.O.C.)

Yue-Lun Yang, Central Taiwan University of Science and Technology, Taiwan

Patrice L. Baldeck, Joesph Fourier University, France

F-5 Intelligent Measurement Algorithm and Simulation(1)

9:00 CLOSED LOOP CONTROL FOR A PARALLEL MICROROBOT BASED ON INTEGRATED CAPACITIVE POSITION SENSORS (22)

Christoph Boese, Institute for Microtechnology, Technische Universität Braunschweig, Germany

Marco Feldmann, Project Manager Competence Centre, Olympus Winter & Ibe GmbH, Germany

Stephanus Büttgenbach, Institute for Microtechnology, Technische Universität Braunschweig, Germany

9:20 EXTRACTION OF GEOMETRICAL PRIMITIVES FROM A SET OF CONTOUR POINTS (29)

Maik Schumann, Ilmenau University of Technology, Germany

Alexander Schlegel, Ilmenau University of Technology, Germany

Jörg Bargenda, Ilmenau University of Technology, Germany

Maik Rosenberger, Ilmenau University of Technology, Germany

Gerhard Linß, Ilmenau University of Technology, Germany

9:40 SURFACE TOPOGRAPHY AFTER VAPOUR BLASTING FORECASTING (79)

Pawel Pawlus, Rzeszow, University of Technology Department of Manufacturing Processes and Production Organisation, Poland

Rafal Reizer, University of Rzeszow Institute of Technology, Poland

Lidia Galda, Rzeszow, University of Technology Department of Manufacturing Processes and Production Organisation, Poland

Andrzej Dzierwa, Rzeszow, University of Technology Department of Manufacturing Processes and Production Organisation, Poland

Wieslaw Grabon, Rzeszow, University of Technology Department of Manufacturing Processes and Production Organisation, Poland

B-6 X-Ray Application for 3-D Measurement

10:30 A TEST OBJECT FOR CALIBRATION AND ACCURACY ASSESSMENT IN X-RAY CT METROLOGY (86)

Kim Kiekens, Groep T – International University College Leuven, Belgium

Frank Welkenhuyzen, K.U.Leuven, Department of Mechanical Engineering, Belgium

Ye Tan, Groep T – International University College Leuven, Belgium

Philip Bleys, K.U.Leuven, Department of Mechanical Engineering, Sirris ,Belgium

Wim Dewulf, Groep T – International University College Leuven, Belgium

André Voet, De Nayer Instituut, Belgium

Jean-Pierre Kruth, K.U.Leuven, Department of Mechanical Engineering, Leuven, Belgium

10:50 REPRODUCIBILITY OF DIMENSIONAL MEASUREMENTS PERFORMED BY COMPUTED TOMOGRAPHY (158)

Vitor Camargo Nardelli, LABMETRO – Federal University of Santa Catarina, Brazil

Gustavo Daniel Donatelli, Center of Metrology and Instrumentation (CMI), CERTI Foundation, Brazil

Carlos Alberto Schneider, Center of Metrology and Instrumentation (CMI), CERTI Foundation, Brazil

Christian Niggemann, Laboratory for Machine Tools and Production Engineering (WZL), Chair of Metrology and Quality Management, RWTH Aachen University, Germany

Robert Schmitt, Laboratory for Machine Tools and Production Engineering (WZL), Chair of Metrology and Quality Management, RWTH Aachen University, Germany

11:10 PROFILE MEASUREMENT OF POLISHED SURFACE WITH RESPECT TO A LATTICE PLAIN OF SILICON CRYSTAL USING A SELF-REFERENCED LATTICE COMPARATOR (151)

Hiroyuki FUJIMOTO, National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology (NMIJ/AIST), Japan

Atsushi WASEDA, National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology (NMIJ/AIST), Japan

Xiaowei CHANG, Photon Factory, High Energy Accelerator Research Organization (KEK), Japan

C-6 Optical Measurement for Geometrical Quantity Evaluation (4)

10:30 MONITORING OF DRYING PROCESS OF PAINT BY DIGITAL HOLOGRAPHY (133)

Masayuki Yokota, Faculty of Science and Engineering, Shimane University, Japan

Yoshiki Kimoto, Faculty of Science and Engineering, Shimane University, Japan

Ichirou Yamaguchi, Toyo Seiki Seisaku-sho Ltd., Japan

10:50 INFLUENCE ANALYSIS OF THE ELASTIC MEMBRANE'S ARC LENGTH CHANGE ON THE AIR ISOLATION UNIT'S STIFFNESS (130)

Chao Xia, Harbin institute of technology, China

Jiubin Tan, Harbin institute of technology, China

11:10 EVALUATION TECHNOLOGY OF MICRO THREE-DIMENSIONAL STRUCTURE USING PHASE-SHIFTING DIGITAL HOLOGRAPHY (137)

Yoshiaki Kiyama, Department of Mechanical Engineering, Osaka University, Japan

Terutake Hayashi, Department of Mechanical Engineering, Osaka University, Japan

Yasuhiro Takaya, Department of Mechanical Engineering, Osaka University, Japan

D-6 Pre-, In-, Post process measurement (2)

10:30 COMBINATION OF MULTI-SENSOR TECHNOLOGY AND MULTIPLE MEASUREMENT STRATEGIES IN MICRO - AND NANOMETROLOGY (75)

Eberhard Manske, Ilmenau University of Technology, Germany

Gerd Jäger, Ilmenau University of Technology, Germany

Tino Hausotte, Ilmenau University of Technology, Germany

10:50 VERIFICATION OF GENERATION AND REMOVAL PROCESS OF SURFACE BRITTLE FILM, IN POLISHING PROCESS USING WATER SOLUBLE FULLERENOL (136)

Kazumasa Kano, Department of Mechanical Engineering, Osaka University, Japan

Terutake Hayashi, Department of Mechanical Engineering, Osaka University, Japan

Yasuhiro Takaya, Department of Mechanical Engineering, Osaka University, Japan

Ken Kokubo, Division of Applied Chemistry, Graduate School of Engineering, Osaka University, Japan

11:10 INVESTIGATION ON SLURRY FLOW AND TEMPERATURE IN POLISHING PROCESS OF QUARTZ GLASS SUBSTRATE (92)

Panart KHAJORNRUNGRUANG, Kyushu Institute of Technology, Japan

Nagisa WADA, Kyushu Institute of Technology, Japan

Ryuji YUI, Kyushu Institute of Technology, Japan

Keiichi KIMURA, Kyushu Institute of Technology, Japan

11:30 A PIEZODRIVEN THREE DIMENSIONAL MICROPOSITIONING STAGE FOR NANO-MANUFACTURING (128)

Wen Wang, Institute of Advanced Manufacturing Engineering, Zhejiang University, P.R.China, Center for Precision Metrology, UNC Charlotte, USA

Robert J. Hocken, Center for Precision Metrology, UNC Charlotte, USA

Zhu Zhu, Institute of Advanced Manufacturing Engineering, Zhejiang University, P.R.China

Zichen Chen, Institute of Advanced Manufacturing Engineering, Zhejiang University, P.R.China

E-6 Geometrical Product Specification and Form Test

10:30 THE FACTORS AFFECTING SURFACE ROUGHNESS MEASUREMENTS OF THE MACHINED FLAT AND SPHERICAL SURFACE STRUCTURES – THE GEOMETRY AND THE PRECISION OF THE SURFACE (119)

M. Numan Durakbasa, Vienna University of Technology, Austria

P. Herbert Osanna, Vienna University of Technology, Austria

Pinar Demircioglu, Adnan Menderes University, Turkey

10:50 COMPLETE GEOMETRICAL PRODUCT SPECIFICATION FOR THE UNAMBIGUOUS VERIFICATION OF FUNCTIONAL PROPERTIES (24)

Sophie GRÖGER, Institute of Production Measuring Technology and Quality Assurance, Chemnitz University of Technology, Germany

Michael DIETZSCH, Institute of Production Measuring Technology and Quality Assurance, Chemnitz University of Technology, Germany

11:10 CURRENT SITUATION AND PROBLEMS FOR REPRESENTATION OF TOLERANCE AND SURFACE TEXTURE IN 3D CAD MODEL (48)

Fumiki Tanaka, Graduate school of Information Science and Technology Hokkaido University, Japan

11:30 RESEARCH ON INCREASING THE ACCURACY OF CYLINDRICITY MEASUREMENTS BY THE V-BLOCK METHOD (44)

Stanisław Adamczak, Kielce University of Technology, Poland

Dariusz Janecki, Kielce University of Technology, Poland

Krzysztof Stepień, Kielce University of Technology, Poland

F-6 Intelligent Measurement Algorithm and Simulation(2)

10:30 LONG DISTANCE STRAIGHTNESS MEASUREMENT USING A LEVEL (103)

Tatsuya Kume, High Energy Accelerator Research Organization (KEK), Japan

Eiki Okuyama, Faculty of Engineering and Resource Science, Akita University, Japan

Masanori Satoh, High Energy Accelerator Research Organization (KEK), Japan

Tsuyoshi Suwada, High Energy Accelerator Research Organization (KEK), Japan

Kazuro Fufukawa, High Energy Accelerator Research Organization (KEK), Japan

10:50 A METHOD FOR DETERMINING THE MEDIAN LINE OF A MEASURED CYLINDER (105)

Dariusz Janecki, Kielce University of Technology, Poland

Jarosław Zwierzchowski, Kielce University of Technology, Poland

Poster Session

NEW DETECTION TECHNIQUE FOR TIMING OF CONTACT AND NONCONTACT OF ATHLETE'S
FOOT WITH GROUND IN SPORTS (2)

Koichi Kurita, Kochi National College of Technology, Japan

A HIGH-STABLE PRESSURE SENSOR BASED ON A SOI HETEROSTRUCTURE AND MEMS
TECHNOLOGY FOR MEASURING AIRCRAFT SPEED-ALTITUDE DATA (3)

Leonid SOKOLOV, Federal State Unitary Enterprise Institute of Aircraft Equipment (NIIAO), Russia

QA FOR BLOOD CHEMICAL ANALYSIS BY ISO-GUM (4)

Yasuo IWAKI, Chaos Applied Research Office Kyoto, Japan

PARAMETERS SELECTION FOR CMM CONTACT MEASUREMENTS OF FREE-FORM SURFACES
SHAPE DEVIATIONS (12)

Andrzej Werner, Bialystok University of Technology, Poland

Malgorzata Poniatowska, Bialystok University of Technology, Poland

ANALYSIS OF GEOMETRIC DEVIATIONS OF FREE-FORM SURFACES DETERMINED IN
COORDINATE MEASUREMENTS (13)

Malgorzata Poniatowska, Bialystok University of Technology, Poland

Andrzej Werner, Bialystok University of Technology, Poland

GENERATION AND ASSESSMENT OF RANDOM SURFACE TEXTURE IN A WIDE AREA (16)

Yoshikazu KOBAYASHI, College of Engineering, Nihon University, Japan

Kenji SHIRAI, College of Engineering, Nihon University, Japan

Kiyotaka KAWASAKI, Graduate Student, College of Engineering, Nihon University, Japan

Poster Session

A MULTI-PROBE SURFACE ENCODER FOR MOSAIC XY GRATING (42)

Koji Hosono, School of Engineering, Tohoku University, Japan

Akihide Kimura, Department of Nanomechanics, Tohoku University, Japan

Wei Gao, Department of Nanomechanics, Tohoku University, Japan

Lijiang Zeng, State Key Laboratory of Precision Measurement Technology and Instruments, Department of Precision Instruments, Tsinghua University, China

INVESTIGATING METHODS OF MATHEMATICAL MODELLING OF MEASUREMENT AND ANALYSIS OF SPHERICAL SURFACES (45)

Stanisław Adamczak, Kielce University of Technology, Poland

Dariusz Janecki, Kielce University of Technology, Poland

Krzysztof Stepień, Kielce University of Technology, Poland

DEVELOPMENT OF A SYSTEM FOR COMPLEX GEOMETRY PARTS MEASURING USING A ROBOT AND A TRIANGULATION LASER PROBE (46)

J.J. Aguilar, Desing and Manufacturing Engineering Department, C.P.S. University of Zaragoza, Zaragoza, Spain

D. Guillomía, Desing and Manufacturing Engineering Department, C.P.S. University of Zaragoza, Zaragoza, Spain

C. Cajal, Desing and Manufacturing Engineering Department, C.P.S. University of Zaragoza, Zaragoza, Spain

F.J. Brosed, Desing and Manufacturing Engineering Department, C.P.S. University of Zaragoza, Zaragoza, Spain

ACCURACY ANALYSIS OF DIFERENT PROBES USED IN ARTICULATED ARM COORDINATE MEASURING MACHINES (56)

Jorge Santolaria, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

Juan José Aguilar, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

Agustín Brau, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

Lorenzo Vila, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

Poster Session

COMPARATIVE ANALYSIS OF INTERNATIONAL STANDARDS FOR PERFORMANCE EVALUATION OF
ARTICULATED ARM COORDINATE MEASURING MACHINES: ASME B89.4.22-2004
AND VDI 2617_9-2009 (57)

Jorge Santolaria, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

Juan José Aguilar, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

Ana Cristina Majarena, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

David Samper, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

Jesús José García, Design and Manufacturing Engineering Department, C.P.S. Universidad de Zaragoza, Spain

TWO-WAVELENGTH LASER INTERFEROMETER SYSTEM WHICH REDUCES THE EFFECT OF THE
REFRACTIVE INDEX OF AIR (66)

Kaoru Miyata, Mitutoyo Corporation, Japan

Hidekazu Oozeki, Mitutoyo Corporation, Japan

Hideyuki Nakagawa, Mitutoyo Corporation, Japan

Hiroki Masuda, Mitutoyo Corporation, Japan

Hisayoshi Sakai, Mitutoyo Corporation, Japan

THE MEASUREMENT OF CURVATURES BY USING MOIRÉ FRINGES AND MULTI-WAVELENGTH
SELF-IMAGE EFFECT OF GRATINGS (73)

Jing-Heng Chen, Department of Photonics, Feng Chia University, Taiwan

Kun-Huang Chen, Department of Electrical Engineering, Feng Chia University, Taiwan

Shou-Wei Kuo, Department of Photonics, Feng Chia University, Taiwan

Wei-Lun Wu, Department of Photonics, Feng Chia University, Taiwan

Fan-Hsi Hsu, Department of Photonics, Feng Chia University, Taiwan

Yung-Tsung Chang, Department of Electrical Engineering, Feng Chia University, Taiwan

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