

Technical Session (Oral)

10:15 – 11:45, 13th November (Wed.)

Room A (A1): Micro/Nano Fabrication Processes I

Session Chair: Yohei Hashimoto, Seung-Woo Kim

- A01 **Influence of micro-bubbles on wet polishing technique of single-crystal diamond**
10:15 H. Nakagami*, A. Kubota
 **Kumamoto University*
- A02 **Study on development of BAP and application to CMG process**
10:30 D. Touse*, L. Zhou, J. Shimizu, T. Onuki, H. Ojima, K. Wu
 **Ibaraki University*
- A03 **Experimental investigation on removal mechanism at tool rotational center in glass polishing**
10:45 M. Ihara*, A. Matsubara, A. Beaucamp
 **Kyoto University*
- A04 **Influence of magnetic polishing condition on polishing rate of additive manufactured titanium alloy**
11:00 T. Hirano*, T. Furuki, H. Kousaka
 **Gifu University*
- A05 **Experimental investigation on laser additive processing principle for nanostructures based on optical trapping potential**
11:15 M. Yokei*, M. Hayashi, M. Michihata, K. Takamasu, S. Takahashi
 **The University of Tokyo*

Room B (B1): Non-Traditional Manufacturing Processes I

Session Chair: Tomohisa Tanaka, Yonghua Zhao

- B01 **Fundamental investigation on reduction of surface roughness for mold material by μ s pulsed laser of 532 nm**
10:15 T. Kozaki*, Y. Okamoto, A. Okada
 **Okayama University*
- B02 **Investigation on laser drilling process of solid metal on its liquid and detection method of penetration state**
10:30 C. Kawasaki*, Y. Okamoto, N. Taura, T. Sakai, A. Okada
 **Okayama University*
- B03 **Surface smoothing of ground fused silica with mid-infrared lasers**
10:45 Y. Li*, D. Wang, T. Tan, Z. Yuan, P. Liu, Q. Xu
 **Fine Optical Engineering Research Center*
- B04 **Investigation of micro-grooving of metals by high-speed scanning of CW laser**
11:00 C. Katayama*, Y. Okamoto, T. Sakai, S. Kadonaga, A. Okada
 **Okayama University*
- B05 **Micro-groove machining on single-crystal diamond by infrared nanosecond pulsed laser**
11:15 Z. Zhang*, Q. Zhang, Q. Wang, J. Xu
 **Nanjing University of Aeronautics and Astronautics*
- B06 **Influence of initial surface state on shape change of LIPSS**
11:30 Y Wada*, T. Shinonaga, Y. Okamoto, A. Okada
 **Okayama University*

Room C (C1): Manufacturing Systems and Machine Tools I

Session Chair: Naohiko Sugita, Hyung Wook Park

- C01 **Development of automatic chatter suppression system in parallel milling by
10:15 real-time control strategy of spindle speed with observer-based chatter
 monitoring**
 S. Yamato*, K. Nakanishi, N. Suzuki, Y. Kakinuma
 **Keio University*
- C02 **Adaptive thermal displacement compensation for turning center based on deep
10:30 learning**
 K. Narimatsu*, N. Irino, S. Ibaraki
 **DMG MORI Cc., Ltd.*
- C03 **Evaluation of grinding wheel surface shape by different dressing condition
10:45 G. Uchida*, T. Yamada, K. Miura**
 **Nihon University*
- C04 **Development of sound based tool wear monitoring system in the milling of
11:00 Inconel 718**
 C.-Y. Wang*, M.-C. Lu, C.-Y. Huang, W.-C. Lin, H.-Y. Chou, F.-Z. Chen
 **Taiwan Instrument Research Institute*
- C05 **Thrust force prediction and delamination analysis for the CFRP drilling
11:15 process**
 J. Seo*, D. C. Kim, H. M. Park, H. W. Park
 **Ulsan National Institute of Science and Technology*
- C06 **Numerical calculation of running accuracy of an unbalanced rotor supported by
11:30 aerostatic bearings**
 T. Yin*, S. To
 **The Hong Kong Polytechnic University*

Room D (D1): Die Manufacturing Processes/High Speed and Precision Machining I

Session Chair: Hidetake Tanaka, Fengzhou Fang

- D01 **Feasibility study on electrochemical polishing of tungsten mold for moulding of
10:15 glass-based microfluidic chips**
 X. Zhou*, F. Wang, X. Zhang, H. Deng
 **Southern University of Science and Technology*
- D02 **Model predictive force controlled grinding with a lightweight robot
10:30 S. Haehnel*, T. Grunwald, S. Husmann, S. Stemmler, T. Bergs, D. Abel**
 **Fraunhofer Institute for Production Technology*
- D03 **Wear characteristics of the CBN abrasive in micro-cutting of YG8 cemented
10:45 carbide**
 C. Yang*, K. Chen, C. Zhu, W. Ding
 **Nanjing University of Aeronautics and Astronautics*
- D04 **Improvement of the form accuracy in internal plunge grinding by the high aspect
11:00 ratio wheel**
 T. Onishi*, Y. Nakabayashi, M. Sakakura, K. Ohashi
 **Okayama University*

- D05 **Development of a micro-structured CVD diamond grinding wheel and its performance evaluation in precision grinding of optical glass**
 11:15 B. Guo*, J. Zhang, W. Liu, Q. Zhao
 *Harbin Institute of Technology
- D06 **Investigation on the machining mechanism of sapphire in high-speed rotary ultrasonic sawing**
 11:30 X. Zhu*, Y. J. Shen, X. Wu, C Y. Chen
 *Huaqiao University

Room E (E1): Molding and Forming Technology

Session Chair: Takeyuki Abe, A Senthil Kumar

- E01 **Deformation reconstruction of injection molded part based on stratified ICP registration and B-spline fitting**
 10:15 J. Ouyang*, Z. Qiu
 *Tianjin University
- E02 **Evaluation of polymer replication depth into metal surface nano pores**
 10:30 S. Kadoya*, F. Kimura, Y. Kajihara
 *The University of Tokyo
- E03 **Development of electrically conductive polymer-CNFs composite structure by press molding**
 10:45 S. Aikawa*, J. Yan
 *Keio University
- E04 **Influence of hydroxyl groups on joining strength of injection molded direct joining samples**
 11:00 S. Zhao*, F. Kimura, S. Kadoya, E. Yamaguchi, N. Horie, Y. Kajihara
 *The University of Tokyo
- E05 **Investigation of asymmetrical plate deformation and meandering caused by unstable rolls position in hot rolling**
 11:15 H. Furumoto*, S. Kanemori, Y. Mikami, T. Sumomogi
 *Hiroshima Kokusai Gakuin University
- E06 **Effect of material characteristics and process parameters on wrinkling occurrence during redraw process of a beverage can using FEM simulation**
 11:30 Y. S. Kim*, V. P. Nguyen, J. J. Kim
 *Kyungpook National University

14:05 – 15:35, 13th November (Wed.)

Room A (A2): Micro/Nano Fabrication Processes II

Session Chair: Nobuyuki Moronuki, Zhongjun Qiu

- A07 **Investigation on force acting on workpiece with respect to actual amount of abrasive media on the workpiece in dry gyro barrel finishing**
14:05 Y. Hashimoto*, T. Ito, Y. Nakayama, T. Furumoto, T. Koyano, A. Hosokawa
*Kanazawa University
- A08 **Blanched hole drilling in glass by two beam illumination**
14:20 D. Tokunaga*, S. Sato, H. Hidai, S. Matsusaka, A. Chiba, N. Morita
*Chiba University
- A09 **Fabrication of microtube structures using electrophoretic deposition assisted by laser trapping with a Laguerre-Gaussian beam**
14:35 S. Ozawa*, K. Nakazawa, F. Iwata
*Shizuoka University
- A10 **Micro-structuring of mold surface by femtosecond laser interference for controlling fluidic flow in microfluidic devices**
14:50 H. Zheng*, K. Ye, J. Hu, Z. Wang, X. Wang
*Shandong University of Technology
- A11 **Nanoscale surface patterning of crystalline silicon based on femtosecond laser-induced modification**
15:05 B. Kim*, H. K. Nam, K. Fushinobu, S.-W. Kim
*Korea Advanced Institute of Science and Technology

Room B (B2): Non-Traditional Manufacturing Processes II

Session Chair: Togo Shinonaga, Albert Wen-Jeng Hsue

- B07 **Generation of 3D freeform surfaces by electrolyte jet machining**
14:05 G. Zhang*, Y. Zhao*, M. Kunieda
*Southern University of Science and Technology
- B08 **Influence of surface temperature field in large-area electron beam irradiation on wear resistance of zirconia**
14:20 T. Shinonaga*, T. Sakai, M. Inoue, A. Okada
*Okayama University
- B09 **Fundamental study on surface damage repairing of AMed metal parts by large-area electron beam irradiation**
14:35 T. Watanabe*, T. Shinonaga, A. Yamaguchi, A. Okada
*Okayama University
- B10 **Change in thickness of removal and modified layers on workpiece with different material property in large-area EB irradiation**
14:50 T. Sakai*, S. Ota, T. Shinonaga, A. Okada
*Okayama University
- B11 **Fluid jet array finishing of 3D printed component**
15:05 C. Wang*, B. C. F. Cheung, L. T. Ho, J. Guo
*The Hong Kong Polytechnic University

Room C (C2): Manufacturing Systems and Machine Tools II

Session Chair: Hiroshi Usuki, Sun-Kyu Lee

- C07 **Development of a novel seven-axis machining system to study the machining**
14:05 **accuracy and efficiency compared to a five-axis machining**
C.-C. Wei*, W.-. Lee
**National Taiwan University of Science and Technology*
- C08 **Image processing system with positioning and decoding function and its**
14:20 **application in high precision image measurement**
W.-C. Pan*, W.-L. Su, H.-Y. Tsai
**National Tsing Hua University*
- C09 **Optimum design of kinetostatic performance of a 3-PUU translational parallel**
14:35 **mechanism**
Y.-J. Chiu*, Y.-C. Tseng, P.-H. Yang, Y.-S. Chen, C.-K. Sung
**National Tsing Hua University*
- C10 **Comparison of latent-image machining using 3-axis and 5-axis machining center**
14:50
T. Yamamoto*, K. Andou
**National Institute of Technology, Oita College*
- C11 **Design and control of a 5-axis manipulator for the automatic lapping process**
15:05
S. Park*, D. Koh, J. Shim, S.-K. Lee
**Gwangju Institute of Science and Technology*

Room D (D2): Die Manufacturing Processes/High Speed and Precision Machining II

Session Chair: Jiawang Yan, Changyong Yang

- D07 **Fundamental cutting characteristics of hardened die steel using cBN ball-nose end**
14:05 **mill with burnishing surface**
M. Okada*, H. Minamidani, M. Shinya, H. Watanabe, T. Miura, M. Otsu
**University of Fukui*
- D08 **High speed machining of Inconel 718 with high pressure coolant focusing on**
14:20 **material structures of CBN tools**
C. Liu*, T. Sugihara, T. Enomoto
**Osaka University*
- D09 **Modeling tool flank wear based on entropy generation in dry cutting of Inconel 718**
14:35
X. Song*, Y. Takahashi, W. He, T. Ihara
**Chuo University*
- D10 **Improvement of boring quality of CFRP and evaluation of tool wear by inclined**
14:50 **planetary milling**
H. Tanaka*, H. Sasai
**Sophia University*
- D11 **Rake face temperature when machining Ti-6Al-4V under cryogenic carbon dioxide**
15:05 **cooling**
H. Bussho*, M. Sato
**Tottori University*
- D12 **Formability of an aluminum alloy sheet in a gas-blow forming process**
15:20
C.-W. Liu*, S. Lee, T.-C. Chang
**National Central University*

Room E (E2): Green Manufacturing I

Session Chair: Fuminobu Kimura, Ta-Hsin Chou

- E07
14:05 **Investigation on Action Mechanism of Lubricants based on their adsorption behavior in near-dry machining of titanium alloy**
T. Wakabayashi*, H. Isozaki, Y. Mimura, T. Atsuta, Y. Matsushima
**Kagawa University*
- E08
14:20 **Effect of temperature difference between ambient and machine tool to thermal load of spindle cooling unit**
K. Mori*, D. Kono, A. Matsubara
**Kyoto University*
- E09
14:35 **Investigation of the chip curl radius of 0.2% C and AISI 304 steel during turning under sustainable lubricant**
K. C. Wickramasinghe*, I. Perera, H. Punchihewa, H. Sasahara
**Tokyo University of Agriculture and Technology*
- E10
14:50 **Heterogeneous microstructure evolution and mechanical properties in Ti-6Al-4V alloy components deposited by plasma arc additive manufacturing without post heat treatment**
J. Lin*, H. Huang, Z. Chen, Z. Zhu, B. Xu, X. Wu, D. Guo
**Shenzhen University*
- E11
15:05 **Development of ultrasonic assisted electrochemical mechanical polishing: Preliminary study on slurryless electrochemical mechanical polishing of sliced 4H-SiC (0001) surface**
X. Yang*, X. Yang, K. Kawai, K. Arima, K. Yamamura
**Osaka University*

15:50 – 17:05, 13th November (Wed.)

Room A (A3): Micro/Nano Fabrication Processes III

Session Chair: Kai Egashira, Byunggi Kim

- A12 **Fabrication of a stent-like complicated structure using synchronized scan rotation**
15:50 **lithography and wet chemical etching**
T. Horiuchi*, K. Ito, Y. Suzuki, A. Yanagida, H. Kobayashi
*Tokyo Denki University
- A13 **Hydrothermal synthesis of crystalline-aligned BaTiO₃ nano-rods aiming at high**
16:05 **performance piezoelectric element**
H. Sakagawa*, N. Moronuki
*Tokyo Metropolitan University
- A14 **Fabrication of dual-periodic nanostructures with multi-exposure interference**
16:20 **lithography using Lloyd's mirror**
S. Masui*, M. Michihata, K. Takamasu, S. Takahashi
*The University of Tokyo
- A15 **Fabrication of three dimensional high aspect ratio structure by talbot lithography**
16:35
R. Ezaki*, Y. Mizutani, Y. Makiura, H. Yokota, Y. Takaya
*Osaka University
- A16 **Investigation of fabrication method for micro/nano structure of Au using oily ink**
16:50 **stamping**
M. Terano*, M. Yoshino, Y. Iwasa, S. Chimura, N. Okada, H. Ikeda
*Okayama University of Science

Room B (B3): Non-Traditional Manufacturing Processes III

Session Chair: Kazuya Yamamura, Quanli Zhang

- B12 **Photochemical mechanical polishing of gallium nitride wafer using a polishing**
15:50 **tool with an array through-hole structure**
L. Ou*, R. Kang, K. Shi, D. Guo, Z. Dong
*Dalian University of Technology
- B13 **An investigation of factors affecting the surface generation of magnetic field**
16:05 **assisted mass polishing (MAMP) of freeform surfaces**
L. T. Ho*, C. F. B. Cheung, C. Wang, Y. M. Loh
*The Hong Kong Polytechnic University
- B14 **Surface enhancement using hydrodynamic cavitation abrasive finishing process**
16:20
A. P. Nagalingam*, T. W. David, H. Kumar Yuvraj, S.-H. Yeo
*Nanyang Technological University
- B15 **Development of micro ultrasonic knurling (MUK) to manufacture micro surface**
16:35 **texture**
S. Liu*, Y. Sakai, T. Tanaka, S. Aoki
*Tokyo Institute of Technology
- B16 **Polishing performance of a novel polishing tool in magnetically driven internal**
16:50 **finishing process**
J. Zhang*, M. Jin, H. Wang
*National University of Singapore

Room C (C3): Metrology I

Session Chair: Tatsuya Kume, Young-Jin Kim

- C12
15:50 **Monitoring of fine-dust precursors using differential optical absorption spectroscopy (DOAS) in ultraviolet range**
J. Lee*, H. Vu, T. Vu, H. Nguyen
**Seoul National University of Science and Technology*
- C13
16:05 **High sensitivity MEMS displacement sensor device for planar shape measurement by deposition of piezoelectric materials**
K. Murayama*, Y. Tamaru, H. Shimizu
**Kyushu Institute of Technology*
- C14
16:20 **A reference based data method for the evaluation of aspherical and freeform fitting algorithms**
Y. Arezki*, H. Nouria, N. Anwer, C. Mehdi-Souzani
**Laboratoire Commun de Metrologie*
- C15
16:35 **Evaluation and optimization for measuring inner shape of small glass holes from a technology management point view**
A. Ogawa*, T. Takahashi, E. Higuchi
**Mejiro University*
- C16
16:50 **An impact study on re-definition of SI units to testing and certification industry in Hong Kong**
S.-L. Mak*, W.-F. Tang, C.-Ho Li, H. K. Lau
**SL Mak*

Room D (D3): High Speed and Precision Machining I

Session Chair: Takashi Onishi, Dongjin Wu

- D13
16:05 **Fabrication of germanium grism for infrared spectroscopy by diamond fly cutting**
T. Hosobata*, N. Ebizuka, T. Kamizuka, M. Takeda, Y. Yamagata
**RIKEN*
- D14
16:20 **Study on cutting characteristics in polycrystalline diamond ball-end milling of hardened materials**
P. Kasuriya*, T. Watanabe, T. Goto, M. Jin
**Nippon Institute of Technology*
- D15
16:35 **A study on on-machine shaping of diamond tool to realize highly efficient ultraprecision cutting**
N. Yokoyama*, M. Xu, K. Nakamoto, Y. Takeuchi
**Tokyo University of Agriculture and Technology*
- D16
16:50 **Finite element investigation on ductile cutting characteristics of reaction-bonded silicon carbide**
J. Zhang*, L. Han, J. Zhang, Y. Yan, T. Sun
**Harbin Institute of Technology*

Room E (E3): Green Manufacturing II

Session Chair: Toshiaki Wakabayashi, Junjie Zhang

- E12 **Additive process for high precision double- side flexible printed circuit boards by gravure offset printing technology**
15:50 Y.-W. Lin*, Y.-M. Wang, C.-H. Lien, L.-Y. Chen, Y.-F. Chang, J.-C. Chen, D.-J. Yao, T.-H. Chou
 **Industrial Technology Research Institute*
- E13 **Integration between 3D printing and sustainable product development**
16:05 R. Yamaguchi*, A. S. Ullah, A. Kubo
 **Kitami Institute of Technology*
- E14 **Generation of particles on the exit surface of fused silica in high-energy laser damage**
16:20 Q. Bai*, R. Shen, J. Liu, Y. Guo, F. Zhang
 **Harbin Institute of Technology*
- E15 **Performance of binder-free green composite using bamboo fibers and powders extracted with a machining center**
16:35 T. Fujimoto*, T. Hirogaki, E. Aoyama, K. Ogawa
 **Doshisha University*
- E16 **An interaction analysis for sustainable machining parameters using social network analysis approach**
16:50 H. Zhou*, W. S. Yip, S. To
 **The Hong Kong Polytechnic University*

17:20 – 18:35, 13th November (Wed.)

Room A (A4): Micro/Nano Fabrication Processes IV

Session Chair: Futoshi Iwata, Akshay Chaudhari

- A17 **Dieless punching of ultrasmall-diameter holes**
17:20 H. Hamafuji*, S. Araki, K. Egashira, K. Yamaguchi, M. Ota
**Kyoto Institute of Technology*
- A18 **Development of electro-adhesive pillar array for handling micro-parts**
17:35 R. Nishimura*, H. Anzai, K. Sakurai, Y. Kakinuma
**Keio University*
- A19 **Design of an autostereoscopic display for smartphones**
17:50 L. Li*, W.-B. Lee, Y.-C. Chen, M.-C. Ng, M.-K. Chan
**The Hong Kong Polytechnic University*
- A20 **Ultrasonic assistance on the generation of hydroxyl radicals in ultrafine bubble suspended water**
18:05 K. Shimada*, K. Suzuki, M. Mizutani, T. Kuriyagawa
**Tohoku University*
- A21 **Effect of manufacturing method on the strength of FW-CFRP**
18:20 D. Tabuchi*, T. Sajima, E. Kondo, T. Tane, N. Noguchi
**Kagoshima University*

Room B (B4): Non-Traditional Manufacturing Processes IV

Session Chair: Kazuto Yamauchi, Yasuhisa Sano, Swee-Hock Yeo

- B17 **Fabrication of ultra-small mirrors for soft-X-ray nano-focusing by differential deposition**
17:20 T. Shimamura*, H. Mimura
**The University of Tokyo*
- B18 **Development of ultraprecise figure correction and measurement techniques for fabrication of Wolter mirror mandrel for neutron microscope**
17:35 S. Arakawa*, K. Kawai, K. Arima, D. Yamazaki, R. Maruyama, H. Hayashida, K. Soyama, K. Yamamura
**Osaka University*
- B19 **Dynamic control of mold temperature for metal-plastics direct joining using injection molding**
17:50 F. Kimura*, Y. Kajihara
**The University of Tokyo*
- B20 **Development of micro drilling process without rotary motor by vibration mode control**
18:05 T. Chiga*, Y. Sakai, T. Tanaka
**Tokyo Institute of Technology*
- B21 **Development of new micro laser stir welding process with liquid-solid phase shift**
18:20 W. Ichikawa*, Y. Sakai, T. Tanaka
**Tokyo Institute of Technology*

Room C (C4): Metrology II

Session Chair: Moeto Nagai, Shu-lun Mak

- C17 **The three-dimensional information capture and reconstruction for grinding wheel surface topography based on shape from focus**
17:20 J. Tang*, Z. Qiu, R. Xin, L. Fu, R. Xin
*Tianjin University
- C18 **Pulse interval calibration of an optical frequency comb compressed by an etalon**
17:35 T. Kume*, H. Yasuda, T. Mibe, M. Michihata, K. Takamasu
*High Energy Accelerator Research Organization
- C19 **High precision measurement of etalon absolute length using optical comb pulsed interference**
17:50 S. Masuda*, T. Takamura, S. Takahashi, H. Matsumoto, K. Takamasu
*The University of Tokyo
- C20 **Comb-rooted generation of ultra-narrow multiple optical frequencies**
18:05 B. S. Kim*, H. Jang, D.-C. Shin, Y.-J. Kim, S.-W. Kim
*Korea Advanced Institute of Science and Technology
- C21 **Frequency-comb-referenced measurement of small thermo-dynamic motions with a picometer resolution**
18:20 Y.-J. Kim*, S.-W. Kim
*Korea Advanced Institute of Science and Technology

Room D (D4): High Speed and Precision Machining II

Session Chair: Tatsuya Sugihara, Qingliang Zhao

- D17 **A study on tool path generation for ultraprecision cutting of free form surface with micro texture**
17:20 T. Hirano*, K. Nakamoto, Y. Takeuchi
*Tokyo University of Agriculture and Technology
- D18 **Chatter suppression in ultra-precision cutting of thin material substrates**
17:35 Y. Saito*, Y. Sasaki, M. Hiraoka, M. Kubota, J. Yan
*Keio University
- D19 **Cutting force prediction in drilling of rolled titanium alloy with multi-flute drills**
17:50 S. Tamura*, T. Matsumura
*Ashikaga University
- D20 **Proposal for a workpiece monitoring framework for accurate end-milling**
18:05 D. Wu*, K. Teramoto, J. Zeng
*Muroran Institute of Technology
- D21 **On-machine estimation of workholding situation for thin-walled parts**
18:20 J. Zeng*, K. Teramoto, D. Wu
*Muroran Institute of Technology

Room E (E4): Automation and Robotics / Mechatronics I

Session Chair: Tadahiko Shinshi, Lei Chen

- E17 **Measurement of 2D positioning accuracy of a SCARA-type robot over the entire workspace**
17:20 M. Tomita*, S. Ibaraki
 **Hiroshima University*
- E18 **Calibration of rotary axis angular positioning deviations on an industrial robot by using a laser tracker**
17:35 N. Zhao*, S. Ibaraki
 **Hiroshima University*
- E19 **Sound feature analysis for detecting abnormal sound events: A case study of glass breaking sounds**
17:50 K. Fujita*, K. Sasaki
 **The University of Tokyo*
- E20 **Investigation of joint motion errors in skillful rotation operation of working plate to control rolling ball motion with a dual arm robot**
18:05 M. Nakamura*, T. Hirogaki, E. Aoyama, T. Mase, W. Wu
 **Doshisha University*
- E21 **Basic study on dressing simulation using mechanical cloth properties obtained by simple measurement**
18:20 Y. Akatsuka*, H. Aoyama
 **Keio University*

8:45 – 10:30, 14th November (Thu.)

Room A (A5): Micro/Nano Fabrication Processes V

Session Chair: Masato Okada, Chi-Fai Cheung

- A22 **Ultra-precision cutting of polymer containing cellulose nanofibers**
8:45 Y. Kamada*, J. Yan
*Keio University
- A23 **Direct fabrication of segmented fresnel lens by ultra-precision diamond shaping**
9:00 N. Y. J. Tan*, D. W. K. Neo, X. Zhang, K. Liu, A. S. Kumar
*National University of Singapore
- A24 **Cutting of cemented tungsten carbide micropins**
9:15 R. Nara*, E. Koya, K. Egashira, K. Yamaguchi, M. Ota
*Kyoto Institute of Technology
- A25 **Design and development of 3D non-resonant tool system for vibration assisted machining**
9:30 A. Chaudhari*, A. Kulkarni, A. . Kumar
*National University of Singapore
- A26 **Development and testing of a compact precision cutting device in an electron microscope**
9:45 Y. Nakade*, N. Yamashita, H. Mizoguchi, S. K. Chee, H. Yokota
*RIKEN
- A27 **A study on conventional cutting and ultrasonic vibration cutting of spinel**
10:00 Z. Shi*, Q. Zhao, B. Guo
*Harbin Institute of Technology

Room B (B5): Non-Traditional Manufacturing Processes V

Session Chair: Tomohiro Koyano, Jung-Chou Hung

- B22 **Fundamental study on machining of internal space shapes by EDM**
8:45 S. Li*, Y. Inaba, A. Okada, A. Yamaguchi
*Okayama University
- B23 **Fundamental study on fine wire EDM characteristics using γ -phase brass coated steel wire**
9:00 M. Miyoshi*, A. Okada, T. Enomoto, Y. Natsumeda
*Okayama University
- B24 **EDM drilling of high aspect ratio holes with super dielectric fluid**
9:15 M. T. Islam*, A. S. Kumar
*National University of Singapore
- B25 **Fundamental investigation on EDM characteristics of lanthanum hexaboride applied for electron emission parts**
9:30 K. Fujii*, Y. Ikeuchi, A. Okada
*Okayama University
- B26 **Influence of discharge current waveform on material removal rate in EDM**
9:45 M. Shinohara*, M. Kunieda
*The University of Tokyo

- B27 **Stability and accuracy of wire-EDM processes through circularly ultrasonic vibration modules**
10:00 A. W.-J. Hsue*, Z.-S. Su, Y.-L. Lin
 *National Kaohsiung University of Science and Technology

Room C (C5): Metrology III

Session Chair: Ryo Koike, Jeong Seok Oh

- C22 **3D surface measurement for tens-nanometers-scale groove using entanglement photons**
8:45 C. Zhang*, Y. Mizutani, Y. Takaya
 *Osaka University
- C23 **3D freeform surface measurements by a single shot polarized lateral shearing interferometry based on spatial phase shifting technique**
9:00 K.-N. Joo*, Y. B. Seo, H. B. Jeong, H.-G. Rhee, Y.-S. Ghim
 *Chosun University
- C24 **Simple phase meter using field-programmable gate array and phase-locked loop for heterodyne interferometers with picometer resolution**
9:15 T. D. Nguyen*, Q. A. Duong, M. Higuchi, D. Wei, M. Aketagawa
 *Nagaoka University of Technology
- C25 **Measurement and analysis of the stepwise curved surface of diffractive optical elements by a constant speed confocal probe**
9:30 L. L. Zhu*, Y. Dong, Z. Li, X. Zhang, F. Fang
 *Tianjin University
- C26 **Real time displacement measurement with sinusoidal frequency/phase modulation interferometer using phase determination method**
9:45 M. Higuchi*, M. Aketagawa
 *Nagaoka University of Technology
- C27 **Multi-target 3D surface profilometry using a femtosecond laser by scanning repetition rate**
10:00 J. Park*, Y. Lu, D. Bian, D. Kim, L. Yu, S.-W. Kim
 *Korea Institute of Industrial Technology

Room D (D5): IoT/AI/Big data / Service Engineering

Session Chair: Yukie Nagai, Wing-bun Lee

- D22 **Thermal displacement prediction of machine tool spindle by neural network model**
8:45 M.-Q. Hong*, M.-S. Tsai, C.-C. Cheng, Y.-S. Lu, S.-S. Yang
 *National Chung-Cheng University
- D23 **Using machine-learning approach to detect anomalous vibrations of press working machine**
9:00 K. Inagaki*, T. Fukui, S. Hayamizu
 *Gifu University
- D24 **Automatic defects classification from AOI images based on image processing and deep learning**
9:15 H.-Y. Tsai*, Y.-W. Lin, W.-L. Su
 *National Tsing Hua University

- D25
9:30 **Study on data-mining method from radius end mill tool catalog data based on Bayesian network**
K. Yamada*, A. Asakura, T. Hirogaki, E. Aoyama, H. Kodama
**Doshisha University*
- D26
9:45 **Extraction of product risk information from product reviews**
H. Taguchi*, H. Narahara
**Kyushu Institute of Technology*
- D27
10:00 **Verification of avoidance from dangerous source/display in booting system for necessary safety check using augmented reality technology and computer graphics**
K. Mitsuhashi*
**Polytechnic University of Japan*
- D28
10:15 **Automatic generation system of apparel design based on tacit preference of customer**
Y. Inoue*, H. Aoyama
**Keio University*

Room E (E5): Automation and Robotics /Mechatronics II

Session Chair: Soichi Ibaraki, Hung-Yin Tsai

- E22
8:45 **Miniaturized omni-directional mobile mechanism for pipe inspection robots operating in a small and narrow space**
S. Mikami*, M. Mizukami, N. Hanajima, Y. Fujihira
**Muroran Institute of Technology*
- E23
9:00 **A new motion attempt classifier for lower body exoskeleton using biomechanical sensors**
D. Gao*, T.-F. Lu, L. Chen
**The University of Adelaide*
- E24
9:15 **Magnetization improvement of multipole ring magnet by double-sided laser assisted heating and its application to a high torque micro slice motors**
K. Nagai*, D. Han, T. Shinshi
**Tokyo Institute of Technology*
- E25
9:30 **Design and experiment of a high-bandwidth fast steering mirror**
J. Zhong*, L. Li, R. Nishida, T. Shinshi
**Tokyo Institute of Technology*
- E26
9:45 **Development of fine feed table for non-contact support and positioning with squeezed-air effect**
Y. Tamaru*, T. Matsumoto, H. Shimizu
**Kyushu Institute of Technology*

10:15 – 12:00, 14th November (Thu.)

Room A (A6): Additive Manufacturing System I

Session Chair: Hiroyuki Sasahara, Sharif Ullah

- A28 **Ultrasonically excitation on multiple lubrications**
10:45 J. Ishimatsu*, H. Isobe
*Universiti Teknologi Malaysia
- A29 **Design of pore morphology in porous metal manufactured via selective laser melting**
11:00 S. Ishibashi*, M. Chuzenji, T. Mizoi, M. Tsukuda, H. Maehana, K. Shimada, M. Mizutani, T. Kuriyagawa
*Tohoku University
- A30 **High-precision forming method based on process analysis of selective laser sintering with milling**
11:15 N. T. Nguyen*, H. Aoyama, I. Araie
*Keio University
- A31 **Developing systems for additive manufacturing-based porous-structure fabrication**
11:30 H. Kiuno*, A. S. Ullah, A. Kubo
*Kitami Institute of Technology
- A32 **Effect of thickening and surface active agents on foam stainless steel fabrication in directed energy deposition**
11:45 T. Matsumoto*, R. Koike, Y. Kakinuma, Y. Oda
*Keio University

Room B (B6): Non-Traditional Manufacturing Processes VI

Session Chair: Akira Okada, Lai Ting Ho

- B28 **Aspherical Shape Figuring on reaction-sintered silicon carbide by plasma chemical vaporization machining**
10:30 R. Sun*, Y. Ohkubo, K. Kawai, K. Arima, K. Yamamura
*Osaka University
- B29 **Etching characteristics of a Ge surface using plasma chemical vaporization machining toward damage free finishing of the inner walls of a Ge channel-cut crystal**
10:45 S. Matsumura*, Y. Morioka, T. Hirano, Y. Sano, T. Osaka, S. Matsuyama, M. Yabashi, K. Yamauchi
*Osaka University
- B30 **Study on mechanism of stamp flushing method for precision ECM**
11:00 M. Nakamura*, M. Kunieda
*The University of Tokyo
- B31 **Surface texturing of tungsten carbide cutting tools by electrochemical machining**
11:15 T. Koyano*, M. Takabatake, A. Hosokawa, T. Furumoto, Y. Hashimoto
*Kanazawa University
- B32 **Preliminary study on slurryless electrochemical mechanical polishing of sliced 4H-SiC (0001) surface**
11:30 X. Yang*, X. Yang, K. Kawai, K. Arima, K. Yamamura
*Osaka University
- B33 **A method to generate floating gap in electrochemical machining by fluid pressure**
11:45 C.-F. Hu*, J.-C. Hung, Z.-W. Fan
*Feng Chia University

Room C (C6): Metrology IV

Session Chair: Yasuhiro Takaya, Ki-Nam Joo

- C28 **Versatile CGHs for ultra-precision test of freeform surfaces**
10:30 S. Chen*, H. Hu, C. Song, F. Shi
 *National University of Defense Technology
- C29 **The development of novel coordinate measuring machine based on trigonal pyramid mechanism:-The proposal and design note-**
10:45 A. Winarno*, A. Nugroho
 *Vocational College Gadjah Mada University
- C30 **Analysis and applications of focus variation technique**
11:00 L. Yuan*, T. Guo, Z. Qiu
 *Tianjin University
- C31 **Evaluation of characteristics of ball lens and uniaxial stability in laser tracker**
11:15 H. Nakajima*, S. Masuda, A. Winarno, T. Takamura, H. Matsumoto, S. Takahashi, K. Takamasu
 *The University of Tokyo
- C32 **3D coordinate measurement system based on multilateration and absolute distance measurement**
11:30 J. S. Oh*, S. Kim, S.-H. Han, Q. K. Nguyen, C. H. Park, W. Kim, S.-W. Kim
 *Korea Institute of Machinery and Materials
- C33 **Areal micro-topography measurement of a multi-layer surface subjected to multi-step, advanced topography modification**
11:45 X. Feng*, N. Senin, R. Su, S. Ramasamy, Z. Du, J. Yang, R. Leach
 *Shanghai Jiao Tong University

Room D (D6): Bio/Medical Applications / Nano/Bio Technology / MEMS/ NEMS I

Session Chair: Takashi Nisisako, Meiyun Chen

- D29 **Experimental and computational study on efficient intracellular delivery through microdroplet-based electroporation**
10:45 M. Ishii-Teshima*, H. Kurita, R. Numano, M. Nagai, T. Shibata
 *Toyohashi University. of Technology
- D30 **Bidirectional electroosmotic pumps in micronozzle array for massively parallel manipulation of single cells**
11:00 M. Nagai*, K. Kato, S. Soga, T. Shibata
 *Toyohashi University. of Technology
- D31 **Fabrication and characterization of parallelized microfluidic devices for multiplex genetic diagnosis**
11:15 D. Natsuhara*, K. Takishita, K. Tanaka, A. Kage, M. Nagai, Y. Mizukami, N. Saka, T. Shibata
 *Toyohashi University. of Technology
- D32 **Hydrogel microparticles for anti-biofouling application synthesized via in-situ microfluidic method**
11:30 Y. Liu*, T. Nisisako
 *Tokyo Institute of Technology

D33 **Fabrication of nanostructured poly-pyrrole as a scaffold of cultured cell**
11:45 Y. Kato*, S. Serizawa, A. Kaneko
 *Tokyo Metropolitan University

Room E (E6): Surface Properties and Characterization I

Session Chair: Daisuke Kono, Haedo Jeong

E28 **A study on the damage layer removal of single crystal silicon wafer after**
10:15 **atmospheric -pressure plasma etching**
 W. Guo*, A .S. Kumar, X. Zhang, H. Deng
 *National University of Singapore

E29 **Investigation on the micro-pit topography in polishing of W-Ni-Fe alloy**
10:30 X. Shi*, Z. Jin, J. Guo, Z. Jiao
 *Dalian University of Technology

E30 **Dependence of thermal evanescent waves on metal film thickness**
10:45 Y. Liang*, A. Kikuchi, K.-T. Lin, F. Kimura, Y. Kajihara
 *The university of Tokyo

E31 **Development of femtosecond laser-induced wet treatment and characterization of**
11:00 **treated surface**
 M. Takashima*, K. Katahira, A. Ezura, J. Komotori
 *Keio University

E32 **Observation of biological tissues using label free charge imaging method based on**
11:15 **scanning ion conductance microscopy**
 Y. Katsura*, Y. Mizutani, T. Ushiki, K. Nakazawa, F. Iwata
 *Shizuoka University

E33 **Effects of cutting conditions on the surface roughness of the Ti6Al4V alloy in**
11:30 **ultra-precision machining**
 Z. Zhao*, S. To
 *The Hong Kong Polytechnic University

E34 **Development of an atomic force microscope combined with a scanning electron**
11:45 **microscope for evaluation of electronic devices**
 T. Uruma*, K. Terao, N. Satoh, H. Yamamoto, K. Nakazawa, F. Iwata
 *Shizuoka University

15:45 – 17:00, 14th November (Thu.)

Room A (A7): Additive Manufacturing System II

Session Chair: Keita Shimada, Sandy, Suet To

- A33
15:45 **Deposited metal shape control based on numerical simulation for wire and arc additive manufacturing**
T. Abe*, J. Kaneko, H. Sasahara
**Saitama University*
- A34
16:00 **Effect of substrate temperature on microstructure and evolution of austenitic 304 stainless steel deposited by pulsed laser wire feeding**
Y.-X. Sang*, J.-Z. Su, M.-Z. Xiao, Z.-J. Zhang, X. Jin, Q.-Y. Fu
**Beijing Institute of Technology*
- A35
16:15 **Metal additive manufacturing of aluminum alloy by friction surfacing**
N. Fujita*, K. Takada, H. Sasahara
**Tokyo University of Agriculture and Technology*
- A36
16:30 **Double-weld-overlay cladding to make an undiluted surface on cylindrical-outer layer using stainless steel and Ni-based wire**
H. Nagamatsu*, H. Sasahara
**Tokyo University of Agriculture and Technology*
- A37
16:45 **Systematic determination of layer height in directed energy deposition**
H. Yamaguchi*, D. Kono, I. Yamaji, Y. Oda, A. Matsubara
**Kyoto university*

Room B (B7): Precision Machine Design

Session Chair: Takazo Yamada, Tzu-Chi Chan

- B34
15:45 **Design and control of a segmented fast steering mirror utilizing piezoelectric actuators**
R. Nishida*, D. Han, J. Zhong, T. Shinshi
**Tokyo Institute of technology*
- B35
16:00 **Design improvements by using multilayer perceptron on a self-compensation restrictor for hydrostatic bearings**
Y. H. Huang*, W. C. Kao, C. Y. Yang, C. K. Sung
**National Tsing Hua University*
- B36
16:15 **Influence of traveling-load induced by a read-head carriage on error of measuring gap in a magnetic encoder**
P. L. Huang*, J. R. Wu, C. K. Chang, J. Y. Chang, C. K. Sung
**National Tsing Hua University*
- B37
16:30 **Identification method of geometric deviations for multi-tasking machine tools with a swivel tool spindle head in vertical position**
Y. Yao*, K. Nishizawa, N. Kato, M. Tsutsumi, K. Nakamoto
**Tokyo University of Agriculture and Technology*
- B38
16:45 **Complex-axes diamond cutting prototype for generation of hierarchical micro/nano-structures**
Z. Zhaung*, Suet To, Z. Zhu
**The Hong Kong Polytechnic University*

Room C (C7): Optical Applications

Session Chair: Takuya Hosobata, Agustinus Winarno

- C34 **Measurement of microcrack on machined glass surface based on Fourier analysis of laser backscattering pattern**
15:45 S. Namikawa*, Y. Mizutani, G. Hagiwara, S. Kawarabata, Y. Takaya
 *Osaka University
- C35 **Snapshot full Stokes imaging polarimeter by two polarization cameras**
16:00 S. Shibata*, M. Suzuki, N. Hagen, Y. Otani
 *Utsunomiya University
- C36 **Development of adaptive X-ray focusing system based on concave mirror and convex mirror**
16:15 H. Yamaguchi*, S. Matsuyama, J. Sonoyama, K. Akiyama, H. Nakamori, Y. Sano, Y. Kohmura, M. Yabashi, T. Ishikawa, K. Yamauchi
 *Osaka University
- C37 **Implementation of a passive spectroscopic system for passive near-field imaging**
16:30 R. Sakuma*, K.-T. Lin, S. Kim, F. Kimura, Y. Kajihara
 *The University of Tokyo
- C38 **3D surface profile measurement of materials with varying reflection coefficients by single shot interferometry**
16:45 T. Sato*, Y. Tsukiyama, I. Nitta
 *Niigata University

Room D (D7): Bio/Medical Applications / Nano/Bio Technology / MEMS/ NEMS II

Session Chair: Takayuki Shibata, Yaguo Li

- D34 **Creation of pressure sensor based on P(VDF-TrFE) nanosheet**
15:45 H. Harazaki*, G. K. Mani, K. Tsuchiya
 *Tokai University
- D35 **Polymeric particles of controlled morphologies synthesized via microfluidic Janus droplets**
16:00 S. Xu*, T. Nisisako
 *Tokyo Institute of Technology
- D36 **MEMS power generator for low-frequency- vibration energy harvesting**
16:15 M. Kine*, D. Han, T. Shinshi, S. Kadota
 *Tokyo Institute of Technology
- D37 **Development of a double layer metal nano-structure for the SERS substrate with NPF and chemical etching process**
16:30 C. Ye*, Y. Nakagawa, T. Yamamoto, M. Yoshino
 *Tokyo Institute of Technology
- D38 **MEMS-based electromagnetic membrane actuator utilizing bonded magnets with fine-pitch stripe pattern and large-cross-section meandering coil**
16:45 C. Qi*, D. Han, T. Shinshi
 *Tokyo Institute of Technology

Room E (E7): Surface Properties and Characterization II

Session Chair: Kazutoshi Katahira, Hui Deng

- E35 **Effect of diamond shape of CMP Conditioner on pad profile control**
15:45 H. Jeong*, D. Lee, S. Jeong, H. Cho, H. Kim
 **Pusan National University*
- E36 **Surface step height reduction according to pattern size in planarization process**
16:00 S. Jeong*, K. Lee, D. Lee, S. Shin, H. Jeong
 **Pusan National University*
- E37 **Improvement of contact stiffness by controlling distribution of real contact area**
16:15 Y. Jorobata*, D. Kono, I. Yamaji, A. Matsubara
 **Kyoto University*
- E38 **Microstructure control of pure iron by metal cutting technique**
16:30 F. Nagashima*, Y. Nakagawa, M. Terano, A. Ito, S. Torizuka, M. Yoshino
 **Tokyo Institute of Technology*
- E39 **Temperature dependence of the growth process of grain boundary steps formed on ultra-precision finished polycrystalline copper surface**
16:45 T. Usuki*, H. Kawakami, T. Tokuyama, T. Miyagawa
 **Osaka City University*