Technical Session (Oral)

10:15 – 11:45, 13th November (Wed.)

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
*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 μs 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 real-time control strategy of spindle speed with observer-based chatter monitoring
10:15 S. Yamato*, K. Nakanishi, N. Suzuki, Y. Kakinuma
*Keio University

C02 Adaptive thermal displacement compensation for turning center based on deep learning
10:30 K. Narimatsu*, N. Irino, S. Ibaraki
*DMG MORI Co., 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 Inconel 718
11:00 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 process
11:15 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 aerostatic bearings
11:30 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 glass-based microfluidic chips
10:15 X. Zhou*, F. Wang, X. Zhang, H. Deng
*Southern University of Science and Technology

D02 Model predictive force controlled grinding with a lightweight robot
*Fraunhofer Institute for Production Technology

D03 Wear characteristics of the CBN abrasive in micro-cutting of YG8 cemented carbide
10:45 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 ratio wheel
11:00 T. Onishi*, Y. Nakabayashi, M. Sakakura, K. Ohashi
*Okayama University
<table>
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<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>11:15</td>
<td>D05</td>
<td>Development of a micro-structured CVD diamond grinding wheel and its</td>
<td>B. Guo*, J. Zhang, W. Liu, Q. Zhao,</td>
<td>Harbin Institute of Technology</td>
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<td>performance evaluation in precision grinding of optical glass</td>
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<td>11:30</td>
<td>D06</td>
<td>Investigation on the machining mechanism of sapphire in high-speed</td>
<td>X. Zhu*, Y. J. Shen, X. Wu, C Y. Chen</td>
<td>Huaqiao University</td>
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<td></td>
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<td>ultrasonic sawing</td>
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Room E (E1): **Molding and Forming Technology**  
Session Chair: Takeyuki Abe, A Senthil Kumar

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<tbody>
<tr>
<td>10:15</td>
<td>E01</td>
<td>Deformation reconstruction of injection molded part based on stratified ICP registration and B-spline fitting</td>
<td>J. Ouyang*, Z. Qiu,</td>
<td>Tianjin University</td>
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<td>10:30</td>
<td>E02</td>
<td>Evaluation of polymer replication depth into metal surface nano pores</td>
<td>S. Kadoya*, F. Kimura, Y. Kajihara,</td>
<td>The University of Tokyo</td>
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<td>10:45</td>
<td>E03</td>
<td>Development of electrically conductive polymer-CNFs composite structure by press molding</td>
<td>S. Aikawa*, J. Yan,</td>
<td>Keio University</td>
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<td>11:00</td>
<td>E04</td>
<td>Influence of hydroxyl groups on joining strength of injection molded direct joining samples</td>
<td>S. Zhao*, F. Kimura, S. Kadoya, E. Yamaguchi, N. Horie, Y. Kajihara</td>
<td>The University of Tokyo</td>
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<td>11:15</td>
<td>E05</td>
<td>Investigation of asymmetrical plate deformation and meandering caused by unstable rolls position in hot rolling</td>
<td>H. Furumoto*, S. Kanemori, Y. Mikami, T. Sumomogi,</td>
<td>Hiroshima Kokusai Gakuin University</td>
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<td>11:30</td>
<td>E06</td>
<td>Effect of material characteristics and process parameters on wrinkling occurrence during redraw process of a beverage can using FEM simulation</td>
<td>Y. S. Kim*, V. P. Nguyen, J. J. Kim,</td>
<td>Kyungpook National University</td>
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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
*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
*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
*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 accuracy and efficiency compared to a five-axis machining
14:05 C.-C. Wei*, W.-L. Lee
*National Taiwan University of Science and Technology

C08 Image processing system with positioning and decoding function and its application in high precision image measurement
14:20 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 mechanism
*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: Jiwang Yan, Changyong Yang

D07 Fundamental cutting characteristics of hardened die steel using cBN ball-nose end mill with burnishing surface
14:05 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 material structures of CBN tools
14:20 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 planetary milling
14:50 H. Tanaka*, H. Sasai
*Sophia University

D11 Rake face temperature when machining Ti-6Al-4V under cryogenic carbon dioxide cooling
15:05 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**  
*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**  
*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*
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 lithography and wet chemical etching
*Tokyo Denki University

A13  Hydrothermal synthesis of crystalline-aligned BaTiO$_3$ nano-rods aiming at high performance piezoelectric element
16:05  H. Sakagawa*, N. Moronuki
*Tokyo Metropolitan University

A14  Fabrication of dual-periodic nanostructures with multi-exposure interference lithography using Lloyd's mirror
16:20  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 stamping
16:50  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 tool with an array through-hole structure
*Dalian University of Technology

B13  An investigation of factors affecting the surface generation of magnetic field assisted mass polishing (MAMP) of freeform surfaces
16:05  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 texture
16:35  S. Liu*, Y. Sakai, T. Tanaka, S. Aoki
*Tokyo Institute of Technology

B16  Polishing performance of a novel polishing tool in magnetically driven internal finishing process
16:50  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. Nouira, 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*

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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** 15:50
- **Additive process for high precision double- side flexible printed circuit boards by gravure offset printing technology**
  *Industrial Technology Research Institute

**E13** 16:05
- **Integration between 3D printing and sustainable product development**
  R. Yamaguchi*, A. S. Ullah, A. Kubo
  *Kitami Institute of Technology

**E14** 16:20
- **Generation of particles on the exit surface of fused silica in high-energy laser damage**
  Q. Bai*, R. Shen, J. Liu, Y. Guo, F. Zhang
  *Harbin Institute of Technology

**E15** 16:35
- **Performance of binder-free green composite using bamboo fibers and powders extracted with a machining center**
  T. Fujimoto*, T. Hirogaki, E. Aoyama, K. Ogawa
  *Doshisha University

**E16** 16:50
- **An interaction analysis for sustainable machining parameters using social network analysis approach**
  H. Zhou*, W. S. Yip, S. To
  *The Hong Kong Polytechnic University
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
*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

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<tr>
<td>17:20</td>
<td>C17</td>
<td>The three-dimensional information capture and reconstruction for grinding wheel surface topography based on shape from focus</td>
<td>J. Tang*, Z. Qiu, R. Xin, L. Fu, R. Xin</td>
<td><em>Tianjin University</em></td>
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<tr>
<td>17:35</td>
<td>C18</td>
<td>Pulse interval calibration of an optical frequency comb compressed by an etalon</td>
<td>T. Kume*, H. Yasuda, T. Mibe, M. Michihata, K. Takamasu</td>
<td><em>High Energy Accelerator Research Organization</em></td>
</tr>
<tr>
<td>17:50</td>
<td>C19</td>
<td>High precision measurement of etalon absolute length using optical comb pulsed interference</td>
<td>S. Masuda*, T. Takamura, S. Takahashi, H. Matsumoto, K. Takamasu</td>
<td><em>The University of Tokyo</em></td>
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<tr>
<td>18:05</td>
<td>C20</td>
<td>Comb-rooted generation of ultra-narrow multiple optical frequencies</td>
<td>B. S. Kim*, H. Jang, D.-C. Shin, Y.-J. Kim, S.-W. Kim</td>
<td><em>Korea Advanced Institute of Science and Technology</em></td>
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<tr>
<td>18:20</td>
<td>C21</td>
<td>Frequency-comb-referenced measurement of small thermo-dynamic motions with a picometer resolution</td>
<td>Y.-J. Kim*, S.-W. Kim</td>
<td><em>Korea Advanced Institute of Science and Technology</em></td>
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# Room D (D4): **High Speed and Precision Machining II**

**Session Chair:** Tatsuya Sugihara, Qingliang Zhao

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<tr>
<td>17:20</td>
<td>D17</td>
<td>A study on tool path generation for ultraprecision cutting of free form surface with micro texture</td>
<td>T. Hirano*, K. Nakamoto, Y. Takeuchi</td>
<td><em>Tokyo University of Agriculture and Technology</em></td>
</tr>
<tr>
<td>17:35</td>
<td>D18</td>
<td>Chatter suppression in ultra-precision cutting of thin material substrates</td>
<td>Y. Saito*, Y. Sasaki, M. Hiraoka, M. Kubota, J. Yan</td>
<td><em>Keio University</em></td>
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<tr>
<td>17:50</td>
<td>D19</td>
<td>Cutting force prediction in drilling of rolled titanium alloy with multi-flute drills</td>
<td>S. Tamura*, T. Matsumura</td>
<td><em>Ashikaga University</em></td>
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<td>18:05</td>
<td>D20</td>
<td>Proposal for a workpiece monitoring framework for accurate end-milling</td>
<td>D. Wu*, K. Teramoto, J. Zeng</td>
<td><em>Muroran Institute of Technology</em></td>
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<tr>
<td>18:20</td>
<td>D21</td>
<td>On-machine estimation of workholding situation for thin-walled parts</td>
<td>J. Zeng*, K. Teramoto, D. Wu</td>
<td><em>Muroran Institute of Technology</em></td>
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</tbody>
</table>
Room E (E4): Automation and Robotics / Mechatronics I  
Session Chair: Tadahiko Shinshi, Lei Chen

E17  17:20  **Measurement of 2D positioning accuracy of a SCARA-type robot over the entire workspace**  
M. Tomita*, S. Ibaraki  
*Hiroshima University

E18  17:35  **Calibration of rotary axis angular positioning deviations on an industrial robot by using a laser tracker**  
N. Zhao*, S. Ibaraki  
*Hiroshima University

E19  17:50  **Sound feature analysis for detecting abnormal sound events: A case study of glass breaking sounds**  
K. Fujita*, K. Sasaki  
*The University of Tokyo

E20  18:05  **Investigation of joint motion errors in skillful rotation operation of working plate to control rolling ball motion with a dual arm robot**  
M. Nakamura*, T. Hirogaki, E. Aoyama, T. Mase, W. Wu  
*Doshisha University

E21  18:20  **Basic study on dressing simulation using mechanical cloth properties obtained by simple measurement**  
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  Ultraprecision 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
*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
*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
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 10:45  Ultrasonically excitation on multiple lubrications
J. Ishimatsu*, H. Isobe
*Universiti Teknologi Malaysia

A29 11:00  Design of pore morphology in porous metal manufactured via selective laser melting
*Tohoku University

A30 11:15  High-precision forming method based on process analysis of selective laser sintering with milling
N. T. Nguyen*, H. Aoyama, I. Araie
*Keio University

A31 11:30  Developing systems for additive manufacturing-based porous-structure fabrication
H. Kiuno*, A. S. Ullah, A. Kubo
*Kitami Institute of Technology

A32 11:45  Effect of thickening and surface active agents on foam stainless steel fabrication in directed energy deposition
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 10:30  Aspherical Shape Figuring on reaction-sintered silicon carbide by plasma chemical vaporization machining
R. Sun*, Y. Ohkubo, K. Kawai, K. Arima, K. Yamamura
*Osaka University

B29 10:45  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
*Osaka University

B30 11:00  Study on mechanism of stamp flushing method for precision ECM
M. Nakamura*, M. Kunieda
*The University of Tokyo

B31 11:15  Surface texturing of tungsten carbide cutting tools by electrochemical machining
T. Koyano*, M. Takabatake, A. Hosokawa, T. Furumoto, Y. Hashimoto
*Kanazawa University

B32 11:30  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

B33 11:45  A method to generate floating gap in electrochemical machining by fluid pressure
*Feng Chia University
### Room C (C6): Metrology IV

Session Chair: Yasuhiro Takaya, Ki-Nam Joo

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Institutions</th>
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<tbody>
<tr>
<td>10:45</td>
<td>The development of novel coordinate measuring machine based on trigonal pyramid mechanism: The proposal and design note-</td>
<td>A. Winarno*, A. Nugroho</td>
<td>*Vocational College Gadjah Mada University</td>
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<tr>
<td>11:00</td>
<td>Analysis and applications of focus variation technique</td>
<td>L. Yuan*, T. Guo, Z. Qiu</td>
<td>*Tianjin University</td>
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<tr>
<td>11:30</td>
<td>3D coordinate measurement system based on multilateration and absolute distance measurement</td>
<td>J. S. Oh*, S. Kim, S.-H. Han, Q. K. Nguyen, C. H. Park, W. Kim, S.-W. Kim</td>
<td>*Korea Institute of Machinery and Materials</td>
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<td>11:45</td>
<td>Areal micro-topography measurement of a multi-layer surface subjected to multi-step, advanced topography modification</td>
<td>X. Feng*, N. Senin, R. Su, S. Ramasamy, Z. Du, J. Yang, R. Leach</td>
<td>*Shanghai Jiao Tong University</td>
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### Room D (D6): Bio/Medical Applications / Nano/Bio Technology / MEMS/ NEMS I

Session Chair: Takashi Nisisako, Meiyun Chen

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<th>Time</th>
<th>Title</th>
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<tbody>
<tr>
<td>10:45</td>
<td>Experimental and computational study on efficient intracellular delivery through microdroplet-based electroporation</td>
<td>M. Ishii-Teshima*, H. Kurita, R. Numano, M. Nagai, T. Shibata</td>
<td>*Toyohashi University. of Technology</td>
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<tr>
<td>11:00</td>
<td>Bidirectional electroosmotic pumps in micronozzle array for massively parallel manipulation of single cells</td>
<td>M. Nagai*, K. Kato, S. Soga, T. Shibata</td>
<td>*Toyohashi University. of Technology</td>
</tr>
<tr>
<td>11:30</td>
<td>Hydrogel microparticles for anti-biofouling application synthesized via in-situ microfluidic method</td>
<td>Y. Liu*, T. Nisisako</td>
<td>*Tokyo Institute of Technology</td>
</tr>
</tbody>
</table>
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 atmospheric-pressure plasma etching
10:15  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 treated surface
11:00  M. Takashima*, K. Katahira, A. Ezura, J. Komotori
*Keio University

E32  Observation of biological tissues using label free charge imaging method based on scanning ion conductance microscopy
11:15  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 ultra-precision machining
11:30  Z. Zhao*, S. To
*The Hong Kong Polytechnic University

E34  Development of an atomic force microscope combined with a scanning electron microscope for evaluation of electronic devices
11:45  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**  
  *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**  
  *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**  
  *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**  
  *Tokyo University of Agriculture and Technology

- **B38**  
  16:45  
  **Complex-axes diamond cutting prototype for generation of hierarchical micro/nano-structures**  
  Z. Zhhaung*, 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  
*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**  
*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