23rd International Conference & Exhibition,
Monday 12th June to Friday 16th June 2023
Technical University of Denmark,
Copenhagen, Denmark

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Poster Sessions
Wednesday 14th June 2023, 16:35 – 18:00
Thursday 15th June 2023, 12:00 – 13:00

Poster No.	ICE No.	Advances in Precision Engineering
P1.01	ICE23102	**Design, manufacturing, and integration of high precise slit assemblies for spectrometer applications** Matthias Mohaupt, Thomas Peschel, Falk Kemper, Thomas Bolz, Gerd Harnisch, Florian Müller, Christoph Damm *Fraunhofer institute for Applied Optics and Precision Engineering (IOF), Albert-Einstein-Strasse 7, D-07745 Jena, Germany*
P1.02	ICE23109	**Characterisation and investigation of ion-implanted boron-doped single crystal diamonds as temperature sensor for ultra-precision machining** E. Uhlmann[1,2], M. Polte[1,2], T. Hocke[1,2], K. Thißen[2] *[1]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany* *[2]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Germany*
P1.03	ICE23112	**Air bearing hexapod for motion and positioning in six degrees of freedom with sub-micrometer precision** Jens Matitschka[1], Brad Engel[2], Christian Rudolf[1] *[1]Physik Instrumente (PI) GmbH & Co. KG, Germany* *[2]PI (Physik Instrumente) L.P., United States*
P1.04	ICE23114	**Experimental investigation of mechanical properties of the AISI 316L stainless steel: macro- and microscale** Jelena Srnec Novak[1], Marco Pelegatti[2], Ervin Kamenar[1], Saša Zelenika[1] and Francesco De Bona[2] *[1]University of Rijeka, Faculty of Engineering & Centre for Micro- and Nanosciences and Technologies, Vukovarska 58, 51000 Rijeka, Croatia* *[2]Polytechnic Department of Engineering and Architecture, University of Udine, Via delle Scienze 206, 33100 Udine, Italy*
P1.05	ICE23140	**Modeling of very thin flexure hinges considering surface topography** Martin Wittke, Mario André Torres Melgarejo, Maximilian Darnieder, René Theska *Technische Universität Ilmenau, Department of Mechanical Engineering, Institute for Design and Precision Engineering, Precision Engineering Group*
P1.06	ICE23145	**Highly reproducible force application for a tool-changing system in nanofabrication machines** Florian Weigert[1], Matthias Wolf[1], René Theska[1] *Technische Universität Ilmenau, Department of Mechanical Engineering,* *[1]Institute for Design and Precision Engineering, Precision Engineering Group*

P1.07	**ICE23180**	**Mobility analysis of folded sheet flexure based 2-DOFs rotational platform** Vivek Chaudhary[1], Subrat[1], & Jitendra P. Khatait[1] *[1]Indian Institute of Technology Delhi, Department of Mechanical Engineering, New Delhi 110016, India*
P1.08	**ICE23182**	**Ultra-precision machining of additively manufactured lightweight freeform precision mirrors** Nicholas Yew Jin Tan[1], Jasper Dong Qiu Chua[2], Kui Liu[2], Youxiang Chew[1], A Senthil Kumar[3] *[1]Advanced Remanufacturing and Technology Centre, 3 Cleantech Loop, Singapore 637143, Singapore* *[2]Singapore Institute of Manufacturing Technology, 5 Cleantech Loop, Singapore 636732, Singapore* *[3]Department of Mechanical Engineering, National University of Singapore, 9 Engineering Drive 1, Block EA, Singapore 117576, Singapore*
P1.09	**ICE23255**	**A grouped random assembly method for precision and yield rate** Wen-Che Chang[1] and Jhy-Cherng Tsai[2] *[1,2]Department of Mechanical Engineering, National Chung Hsing University, Taichung, Taiwan*
P1.10	**ICE23291**	**Experimental investigation on non-contact polishing of microlens array mold** Linguang Li[1], Pengfei Zhang[1], Bo Pan[1], Meng Zhang[1], Jiang Guo[1] *[1]State Key Laboratory of High-Performance Precision Manufacturing, Dalian University of Technology, Dalian 116024, China*

Poster No.	**ICE No.**	**Non-Mechanical Manufacturing Processes**
P2.01	**ICE23111**	**End-to-end additive manufacturing for a structural aerospace component** Michiel Vlaeyen[1,2], Mirko Sinico[1,2], Ann Witvrouw[1,2], Serkan Yildiz[3], Fernando Gallego-Bordallo[4], Samuel Milton[5], Carlos Furtado[6], Wim Dewulf[1] [1]*Department of Mechanical Engineering, KU Leuven, 3001 Leuven, Belgium* [2]*Member of Flanders Make - Core Lab MaPS, KU Leuven, 3001 Leuven, Belgium* [3]*BMT Additive International N.V., 8020 Oostkamp, Belgium* [4]*Siemens Industry Software N.V., Interleuvenlaan 68, 3001 Leuven, Belgium* [5]*Sirris, 3590 Diepenbeek, Belgium* [6]*Asco Industries N.V., 1930 Zaventem, Belgium*
P2.02	**ICE23123**	**Elastic inflatable soft actuators for electrochemical machining on internal surfaces of metallic workpieces** Elias De Smet[1,2,3], Muhammad Hazak Arshad[1,3], Andreas De Meester[1,2], Krishna Kumar Saxena[1,3,4], Benjamin Gorissen[1,2,3], Dominiek Reynaerts[1,2,3] *[1]Micro -& Precision Engineering Group, Division Manufacturing Processes and Systems (MaPS), Department of Mechanical Engineering, KU Leuven, Belgium* *[2]Soft Robotics Group, Division Robotics and Mechatronics (RAM), Department of Mechanical Engineering, KU Leuven, Belgium* *[3]Member Flanders Make (https://www.flandersmake.be/nl), Leuven, Belgium* *[4]FWO - Research Foundation Flanders, Belgium*

P2.03	**ICE23126**	**Plasma electrolytic polishing of additively manufactured metallic glass** Kristina Navickaitė[1,2], Klaus Nestler[1], Falko Böttger-Hiller[1], Michael Penzel[1,2], Henning Zeidler[1,2] *[1]Beckmann Institute for Technology Development e.V., Annaberger Str. 73, 09111 Chemnitz, Germany* *[2]Technical University Bergakademie Freiberg, IMKF, Chair for Additive Manufacturing, Agricolastrasse 1, 09599 Freiberg, Germany*
P2.04	**ICE23130**	**Investigation of process parameters in CuAl8 deposition under the influence of different material deposition angles via CMT-based WAAM process** Abid Shah[1], Henning Zeidler[1], Stefan Krinke[1] *[1]Technische Universität Bergakademie Freiberg, IMKF, Chair of Additive Manufacturing, Agricolastraße 1, 09599 Freiberg, Germany*
P2.05	**ICE23141**	**A method for developing predictive models of quality metrics and gas flow variables for 316L PBF-LB/M printed components based on image analysis** L.N. Frandsen[1], C.K. Kristensen[1], L. Haahr-Lillevang[2], C.G. Klingaa[2], S. Mohanty[3], M.M. Pedersen[1] *[1]Department of Mechanical and Production Engineering, Aarhus University, Katrinebjergvej 89 G-F, 8200 Aarhus N, Denmark* *[2]Center for Industrial 3D-printing, Danish Technological Institute, Kongsvang Allé 29, 8000 Aarhus C, Denmark* *[3]Department of Mechanical Engineering, Technical University of Denmark, Produktionstorvet, Building 425, 2800 Kgs. Lyngby, Denmark*
P2.06	**ICE23142**	**Dual color tomographic volumetric printing for stiffness-graded scaffold** Bin Wang [1], Einstom Engay [2], Yi Yang [3], Aminul Islam[1] *[1]Department of Mechanical Engineering, Technical University of Denmark* *[2]National Center for Nano Fabrication and Characterization, Technical University of Denmark* *[3]Department of Chemistry, Technical University of Denmark*
P2.07	**ICE23155**	**Experimental study on composite 3D printing process with pam 3D print** Song Hyeon Ju[1,2], Kyeongeun Song[1], Kangwoo Shin[1], Tae-Gon Kim[1], Seong Hyeon Kim[1], Seok-Woo Lee[1], Jungsoo Nam[1] *[1]Smart Manufacturing System R&D Department, Korea Institute of Industrial Technology (KITECH), Republic of Korea* *[2]School of Mechanical Engineering, Chung-Ang University, Republic of Korea*
P2.08	**ICE23159**	**Simple sensor manufacturing by Laser Powder Bed Fusion of conductive polymer blends** Christian Leslie Budden[1], Frederik Grønborg[1,2], Anders Frem Wolstrup[3], Aakil Raj Lalwani[1,4], Tiberiu Gabriel Zsurzsan[3], Anders Egede Daugaard[5], and David Bue Pedersen[1] *[1]Department of Civil and Mechanical Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark* *[2]Bjørn Thorsen A/S, Hellerup, Denmark* *[3]Department of Electrical and Photonics Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark* *[4]LEGO System A/S, Billund, Denmark* *[5]Department of Chemical and Biochemical Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark*

P2.09	**ICE23171**	**Magnetic field assisted batch nano-polishing of optical glass** Chunjin Wang[1], Yee Man Loh[1], Chi Fai Cheung[1], Lai Ting Ho[1] *[1]State Key Laboratory of Ultraprecision Machining Technology, Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China*
P2.10	**ICE23174**	**Additive manufacturing of glass: post process surface treatment of DLP parts** Meike Denker[1], Moritz Lamottke[1], Toni Böttger[1], Tihitnaw Degu[2], Dimitrios Alevras[3], Tamar Rosental[3], Sindy Fuhrmann[2], Shlomo Magdassi[3], Henning Zeidler[1] *[1]Institute for Machine Elements, Engineering Design and Manufacturing, Chair of Additive Manufacturing, Technische Universität Bergakademie Freiberg, Germany* *[2]Institute for Glass and Glass Technologies, Technische Universität Bergakademie Freiberg, Germany* *[3]Casali Center of Applied Chemistry, Hebrew University of Jerusalem, Israel*
P2.11	**ICE23176**	**Direct additive manufacturing of hydrophobic microstructures using soft polymer** Myka Mae Duran[1,2], Yang Zhang[1], Aminul Islam[1,2] *[1]Department of Civil and Mechanical Engineering, Technical University of Denmark, Denmark* *[2]Centre for Acoustic-Mechanical Micro Systems (CAMM), Technical University of Denmark*
P2.12	**ICE23187**	**Surface modification of tungsten carbide cobalt tool electrodes by heat treatment under nitrogen atmosphere for electro-discharge drilling** E. Uhlmann[1, 2], B. Camin[3], J. Polte[1, 2], M. Polte[1, 2], J. Streckenbach[2], N.C. Dinh[2] *[1]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany* *[2]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Germany* *[3]Faculty I, Materials Engineering, Hochschule Bremerhaven, Germany*
P2.13	**ICE23196**	**A systematic comparison between green and infrared laser for laser powder bed fusion of pure copper through a benchmark artefact** W.E. Alphonso[1], M. Bayat[1], V.K. Nadimpalli[1], J.H.Hattel[1] *[1]Department of Mechanical Engineering, Technical University of Denmark*
P2.14	**ICE23197**	**Investigation of achievable form tolerance of parts produced by polymer additive manufacturing processes for biopharmaceutical industry** Zicheng Zhu[1], Florian Hupp[2], Shan Lou[3], Kelechi Anowa[3], Weidong Liu[3], Wenhan Zeng[3], Neil Hancox[1], Jeremy Pullin[1], Lukas Raddatz[2] *[1]Sartorius Stedim Lab Ltd., Sperry Way, Stonehouse Park, Stonehouse, Gloucestershire, GL10 3UT, United Kingdom* *[2]Sartorius Stedim Biotech GmbH, August-Spindler-Straße 11, 37079 Göttingen, Germany* *[3]EPSRC Future Metrology Hub, University of Huddersfield, Queensgate, Huddersfield, HD1 3DH, United Kingdom*

P2.15	**ICE23204**	**Influence of head orientation on bead geometry and penetration in wire laser additive manufacturing with coaxial technology** Clément Roch[1], Christophe Tournier[1], Sylvain Lavernhe[1], Adel Abbas[1] *[1]Université Paris-Saclay, ENS Paris-Saclay, LURPA, 91190, Gif-sur-Yvette, France*
P2.16	**ICE23215**	**An unsupervised learning method for pulse classification in electrical discharge machining** Ming Wu[1,2,3], Jun Qian[1,3], Long Ye[1,3], Dominiek Reynaerts[1,3] *[1]Department of Mechanical Engineering, KU Leuven, 3001 Leuven, Belgium* *[2]Department of Computer Science, KU Leuven, 3001 Leuven, Belgium* *[3]Member Flanders Make, 3001 Leuven, Belgium*
P2.17	**ICE23216**	**Insights into the secondary laser processing of laser powder bed fusion IN718 alloys** Sarvesh Kumar Mishra[1], Moloy Sarkar[1], Vijay Mandal[1], Gaizka Gomez Escudero[2], Haizea Gonzalez Barrio[2], Amaia Calleja[2], J Ramkumar[1,3], Luiz Norberto Lopez de Lacalle[2,4] *[1]Department of Mechanical Engineering, Indian Institute of Technology-Kanpur, 208016, Kalyanpur, Uttar Pradesh, India* *[2]Department of Mechanical Engineering, Enparantza Torres Quevedo Ingeniariaren, University of the Basque Country (UPV-EHU), 48013 Bilbao, Spain* *[3]School of Medical Research and Technology (MEDTECH), Indian Institute of Technology-Kanpur, 208016, Kalyanpur, Uttar Pradesh, India* *[4]Center for Advanced Aerospace Fabrication (CFAA), Parque Tecnológico de Bizkaia, 202, 48170, Zamudio, Basque Country, Spain*
P2.18	**ICE23222**	**Investigation of laser scanning parameters on the geometry of laser ablated hollow microneedle cavities** Tim Evens[1], Pol Vanwersch[1,2], Sylvie Castagne[2], Albert Van Bael[1] *[1]KU Leuven, Department of Materials Engineering, Diepenbeek Campus, Belgium* *[2]KU Leuven, Department of Mechanical Engineering and Flanders Make @KU Leuven-MaPS, Belgium*
P2.19	**ICE23230**	**Evaluation of surface roughness and periodical layers in material jetting** Ali Payami Golhin[1], Aditya Suneel Sole[2], Are Strandlie[1] *[1]Department of Manufacturing and Civil Engineering, Norwegian University of Science and Technology, 2815 Gjøvik, Norway* *[2]Department of Computer Science, Norwegian University of Science and Technology, 2815 Gjøvik, Norway*
P2.20	**ICE23237**	**Analysis of various graphite types for electrical discharge finishing** E. Uhlmann[1,2], M. Polte[1,2], T. Hocke[1,2], K. Thißen[1], R. Bolz[2], J. Streckenbach[1] *[1]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Pascalstr. 8-9, Berlin, 10587, Germany* *[2]Fraunhofer Institute for Production Systems and Design Technology IPK, Pascalstr. 8-9, Berlin, 10587, Germany*

P2.21	**ICE23238**	**Highly-efficient plasma-assisted polishing technique with auto-dressing** Rongyan Sun[1,2], Tong Tao[1], Atsunori Nozoe[3], Junji Nagahashi[3], Kenta Arima[1], Kazuya Yamamura[1,2] *[1]Department of Precision Engineering, Graduate School of Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka, 565-0871, Japan* *[2]Research Center for Precision Engineering, Graduate School of Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka, 565-0871, Japan* *[3]MIZUHO CO., LTD, 82 Fukurojiri Terada Joyo, Kyoto, 610-0121, Japan*
P2.22	**ICE23242**	**Implementation of a handling system for using carbon fibres as tool electrodes in micro-ED drilling** E. Uhlmann[1, 2], M. Polte[1, 2], S. Yabroudi[1] , S. Lezama[1] *[1]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Germany* *[2]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany*
P2.23	**ICE23243**	**Characteristics of ion beam converged by magnetic quadrupole lens in ion beam figuring for optical fabrication** Hideo Takino[1], Ryo Hashimoto[1], and Hiroaki Yagami[1] *[1]Chiba Institute of Technology*
P2.24	**ICE23244**	**Automated manufacturing of drug-coated balloons for coronary artery disease** E. Uhlmann[1,2], C. Hein[1], S. Schlüter[1], Y.Wang[1], G.Dürre[1] *[1]Fraunhofer Institute for Production systems and Design Technology IPK, Germany* *[2]Institute for Machine Tools and Factory Management IWF, Technical University Berlin, Germany*
P2.25	**ICE23249**	**Optimization of dielectric oil resistivity for high-performance wire EDM** Shixian Liu[1], Akira Okada[2], Tomohiko Kitamura[3] *[1]Graduate School of Natural Science and Technology, Okayama University* *[2]Faculty of Natural Science and Technology, Okayama University* *[3]Idemitsu Kosan Co., Ltd.*
P2.26	**ICE23262**	**Tensile specimen design for LB-PBF Inconel truss-based lattice structures: Manufacturing and experimental validation** Ahmed Tawfik[1], Guillaume Meyer[2,3], Philip Sperling[4], Paul Bills[1], Christian Mittelstedt[2,3] and Liam Blunt[1] *[1]University of Huddersfield, Department of Engineering and Technology, School of Computing and Engineering, Huddersfield, United Kingdom* *[2]Lightweight Construction and Design, Department of Mechanical Engineering, Technical University of Darmstadt, Darmstadt, Germany* *[3]Additive Manufacturing Center, Technical University of Darmstadt, Darmstadt, Germany* *[4]Volume Graphics, Heidelberg, Germany*
P2.27	**ICE23275**	**Pulsed exposure in Mask Projection Vat Photopolymerization** Gwendoline A. E. Anand[1], Jon Spangenberg[1], David Bue Pedersen[1] *[1]Technical University of Denmark, Department of Civil and Mechanical Engineering, Denmark*

P2.28	**ICE23276**	**Uncertainty evaluation of diameter measurement in float-zone crystal growth production** Tingting Chen[1], Guido Tosello[1], Lars Conrad-Hansen[2], Matteo Calaon[1] *[1]Technical University of Denmark, Produktionstorvet, 2800 Kgs. Lyngby, Denmark* *[2]Topsil GlobalWafers, Siliciumvej 1, 3600 Frederikssund, Denmark*
P2.29	**ICE23278**	**In-process monitoring of selective thermoplastic electrophotographic process by laser profiling system and digital fingerprint** Shuo Shan[1], Hao-Ping Yeh[1], Marta Rotari[2], Kenneth Ælkær Meinert[1], Jesper Henri Hattel[1], David Bue Pedersen[1], Murat Kulahci[2], Hans Nørgaard Hansen[1], Yang Zhang[1], Matteo Calaon[1] *[1]Department of Mechanical Engineering, Technical University of Denmark, Building 427A, Produktionstorvet, 2800 Kgs. Lyngby, Denmark* *[2]Department of Applied Mathematics and Computer Science, Technical University of Denmark, Building 324, Richard Petersens Plads, 2800 Kgs. Lyngby, Denmark*
P2.30	**ICE23279**	**Characterization of Digital Light Processing and Two-Photon Polymerization 3D printing technologies for micro-manufacturing** Komeil Saeedabadi[1], Guido Tosello[1], Babak Rezaei[2], Ada-Ioana Bunea[2], Stephan Sylvest Keller[2], Matteo Calaon[1] *[1]Technical University of Denmark, Department of Civil and Mechanical Engineering, DK-2800 Kgs. Lyngby, Denmark* *[2]Technical University of Denmark, DTU Nanolab – National Centre for Nano Fabrication and Characterization, DK-2800 Kgs. Lyngby, Denmark*
P2.31	**ICE23280**	**Thermo-mechanical model for a selective thermoplastic electrophotographic process for dimensional defects** Hao-Ping Yeh[1], Marta Rotari[2], Shuo Shan[1], Kenneth Ælkær Meinert[1], Jesper Henri Hattel[1], Murat Kulahci[2,3], David Bue Pedersen[1], Matteo Calaon[1] *[1]Department of Civil and Mechanical Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark* *[2]Department of Applied Mathematics and Computer Science, Technical University of Denmark, Kgs. Lyngby, Denmark* *[3]Department of Business Administration, Technology and Social Sciences, Luleå University of Technology, Luleå, Sweden*
P2.32	**ICE23296**	**Application of laser doppler vibrometry to characterize the laser drilling process** Eckart Uhlmann[1,2], Christoph Hein[1], Luiz Schweitzer[1,3] *[1]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany* *[2]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Germany* *[3]University Medicine Greifswald, Department of Orthopedics and Orthopedic Surgery, Germany*

Poster No.	ICE No.	Measuring Instruments and Machine Tools
P3.01	ICE23105	**Numerical analysis of different turbine designs for high-frequency spindles** Andreas Lange[1], Nicolas Altherr [1], Benjamin Kirsch[1], Jan C. Aurich[1] *[1]Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau; Institute for Manufacturing Technology and Production Systems*
P3.02	ICE23116	**Development of an angular position detection method to accurately characterize high speed spindles without encoders** Tobias Mayer[1], Andreas Lange[1], Alexander Schulz[1], Benjamin Kirsch[1], Jan C. Aurich[1] *[1]RPTU in Kaiserslautern; Institute for Manufacturing Technology and Production Systems*
P3.03	ICE23120	**A comparison of the performance of tool pre-setting optical systems: On- and off-machine tool assessment** Amrozia Shaheen[1], Nicolaj Elias Nielsen[2] and Giuliano Bissacco[1] *[1]Technical University of Denmark, Department of Mechanical Engineering, 2800 Kgs. Lyngby, Denmark* *[2]LEGO System A/S, Aastvej 1, 7190, Billund, Denmark*
P3.04	ICE23146	**Investigation of the sensitivity of a high-precision weighing cell to disturbances caused by the adjustment system** Mario André Torres Melgarejo, Martin Wittke, René Theska *Technische Universität Ilmenau, Department of Mechanical Engineering, Institute for Design and Precision Engineering, Precision Engineering Group*
P3.05	ICE23149	**Magnetically levitated planar motion stage with atomic resolution for metrological high-speed scanning probe microscopy** Rudolf Krueger[1], Rainer Gloess[1] *[1]Physik Instrumente (PI) GmbH & Co. KG, Auf der Roemerstrasse 1, 76228 Karlsruhe, Germany*
P3.06	ICE23157	**Marker detection in blurred images for high-precision measurement** Kenji Terabayashi[1], Yuuki Hamamoto[2], Kazuya Ogasawara[2], Takaaki Oiwa[2], Tohru Sasaki[1] *[1]Graduate School of Science and Engineering, University of Toyama* *[2]Department of Mechanical Engineering, Shizuoka University*
P3.07	ICE23158	**Aerostatically sealed non-contacting paperboard porosity measurement device** Mikael Miettinen, Valtteri Vainio, Onni Leutonen, Petteri Haverinen, Tuomas Tiainen, Raine Viitala *Aalto University, Espoo, Finland*
P3.08	ICE23179	**Effects of geometric and assembly errors of angular contact ball bearing spindles on its kinematic motion error** I. Berrotaran[1], B. Iñigo[1], I. Heras[2], H. Urreta[1] *[1]IDEKO member of Basque Research and Technology Alliance, Elgoibar (Basque Country), Spain* *[2]Euskal Herriko Unibertsitatea (EHU-UPV) Dept. Mechanical Engineering, Bilbao (Basque Country), Spain*

P3.09	**ICE23183**	**Tool wear monitoring in milling processes using a sensory tool holder** Alexander Schuster[1], Andreas Otto[1], Hendrik Rentzsch[1], Steffen Ihlenfeldt[1] *[1]Fraunhofer Institute for Machine Tools and Forming Technology IWU, Reichenhainer Str. 88, 09126 Chemnitz, Germany*
P3.10	**ICE23186**	**Experimental setup for long term high-precision static friction tests for clamping systems of rotary tables in cutting machine tools** Sebastian Wieland[1], Richard Zschech[2], Jörg Schneider[1], Jens Müller[2], Jan Edelmann[1] *[1]Fraunhofer Institute for Machine Tools and Forming Technology IWU, Chemnitz, Germany* *[2]Dresden University of Technology, Institute Of Mechatronic Engineering, Dresden, Germany*
P3.11	**ICE23203**	**Miniature flexure-based goniometer with minimized parasitic motion** Elwin Vree[1], Hendrik-Marten Meyer[2], and Jan de Jong[1] *[1]Precision Engineering Lab, University of Twente, Enschede, The Netherlands* *[2]SmarAct GmbH, Oldenburg, Germany*
P3.12	**ICE23214**	**Air gap pressure distribution measurement device** Valtteri Vainio[1], Jaakko Majuri[1], Mikael Miettinen[1], Raine Viitala[1] *[1]Department of mechanical engineering, Aalto University*
P3.13	**ICE23219**	**The influence of an energetic field on the diamond turning process of distinct metals** T. Zielinski[1], O. Riemer[1] *[1]Leibniz Institute for Materials Engineering, Laboratory for Precision Machining, Badgasteiner Str. 3, 28359 Bremen, Germany*
P3.14	**ICE23231**	**Design of an absolute distance interferometer for the dynamic calibration of large-volume coordinate measurement machines** Hongdan Yan[1], Paul Köchert[1], Patrik Knigge[1], Jan Blohm[1], Tobias Meyer[1], Günther Prellinger[1], Martin Stein[1], Daniel Heißelmann[1], Florian Pollinger[1] *[1]Physikalisch-Technische Bundesanstalt (PTB), Bundesallee 100, 38116 Braunschweig, Germany*
P3.15	**ICE23234**	**Ultrasound image tracking using deep learning mask R-CNN in radiotherapy** Yu-Chia Wang[1], Sen-Ting Cheng[1], Ai-Ho Liao[2] and Ho-Chiao Chuang[1] *[1]Department of Mechanical Engineering, National Taipei University of Technology, Taipei 106344, Taiwan* *[2]Graduate Institute of Biomedical Engineering, National Taiwan Univerity of Science and Tchnology, Taipei 106355, Taiwan*
P3.16	**ICE23246**	**Injection mould measurement system for increasing manufacturing control and production quality** Eckart Uhlmann[1,2], Luís Gonzaga Trabasso[3], Robert Bolz[1], Luiz Schweitzer[1], Christoph Hein[1], Diego de Souza[3] *[1]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany* *[2]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Germany* *[3]SENAI Innovation Institute for Manufacturing Systems and Laser Processing, Brazil*

P3.17	**ICE23251**	**Insulation of heat sources by additively manufactured parts** Judy Ratte[1], Frank Schmaljohann[1], Frank Löffler[1] *[1]Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig*
P3.18	**ICE23261**	**Increasing the workpiece precision through volumetric compensation of the milling machine geometry** Georg Mahlfeld[1], Nico Schulz[2], Heinrich Schwenke[2], Daniel Raschke[2], Klaus Dröder[1] *[1]Institute of Machine Tools and Production Technology, Technische Universität Braunschweig, Germany* *[2]Hexagon AICON ETALON GmbH, Germany*
P3.19	**ICE23263**	**A study on the construction of digital twin and disturbance estimation model for parallel link mechanism robot** Akari Tawa, Takumi Nozaki, Yoshitaka Morimoto, Akio Hayashi, Hidetaka Yamaoka *Kanazawa Institute of Technology*
P3.20	**ICE23264**	**Design considerations for a high speed X-ray chopper** Byron Knapp, Dan Oss, and Dave Arneson *Professional Instruments Company, Hopkins, Minnesota, USA*
P3.21	**ICE23302**	**Diffractometer platform for X-ray synchrotron reflectometry** G. Olea, N. Huber, R. Schneider, J. Demberger *HUBER Diffraction and Positioning GmbH&Co.KG, Germany*
P3.22	**ICE23303**	**Indirect compensation strategy to minimise spatial thermal errors caused by activity of the milling machine rotary table** Daniel Divíšek[1], Martin Mareš[1], Otakar Horejš[1], Seung Min Jeong[2] *[1]Czech Technical University in Prague, Faculty of Mechanical Engineering, Department of Production Machines and Equipment, RCMT, Horská 3, 128 00 Prague, Czech Republic* *[2]DN Solutions, Haewon-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea*

Poster No.	**ICE No.**	**Mechatronics**
P4.01	**ICE23107**	**Grasp-oriented human hand model for use in rehabilitation robotics** Tomislav Bazina[1], Ervin Kamenar[1], Saša Zelenika[1] and Tea Schnurrer Luke Vrbanić[2] *[1]University of Rijeka, Faculty of Engineering, Vukovarska 58; Centre for Micro- and Nanosciences and Technologies & Centre for AI and Cybersecurity, Radmile Matejčić 2, 51000 Rijeka, Croatia* *[2]University of Rijeka, Faculty of Medicine & Clinical Hospital Centre - Physical and Rehabilitation Medicine, Braće Branchetta 20, 51000 Rijeka, Croatia*
P4.02	**ICE23115**	**Active disturbance rejection based on periodic disturbance estimator for machine tools** Anna-Carina Kurth[1], Thomas Gorius[1] *[1]Carl Zeiss SMT GmbH, Oberkochen, Baden-Württemberg, Germany*

P4.03	**ICE23144**	**Study of auto-tuning of PID control parameter using PSO algorithm for active vibration isolation** Ilkyun An[1], Mijin Kim[1], Jaehyun Park[3], Kihyun Kim[2], Hyo-Young Kim[2] *[1]Department of IT Semiconductor Engineering, Tech University of Korea, Republic of Korea* *[2]Department of Mechatronics Engineering, Tech University of Korea, Republic of Korea* *[3]Manufacturing System R&D Group, Korea Institute of Industrial Technology, Republic of Korea*
P4.04	**ICE23161**	**Modeling of machine structure based on multiple reduced-order flexible bodies for successive update of boundary parameters** Issei Ota[1], Shuntaro Yamato[1] *[1]Kyoto University, Nishikyo-ku Kyotodaigaku Katsura C3, Kyoto, 615-8530, Japan*
P4.05	**ICE23165**	**Digital twin of dynamic error of a collaborative robot** Charlie Walker, Xichun Luo, Abhilash P M, Qi Liu, Rajeshkumar Madarkar, Erfu Yang *Centre for Precision Manufacturing, DMEM, University of Strathclyde, Glasgow, UK*
P4.06	**ICE23165**	**Control frequency and voltage for large displacement inchworm using piezoelectric actuator** Hayata Takashima[1], Akihiro Torii[1], Suguru Mototani[1], Kae Doki[1] *[1]Aichi Institute of Technology, Japan*
P4.07	**ICE23181**	**Dynamical simulation of an under-actuated surface composed by spherical rotors during sorting operations** Edoardo Bianchi[1], Oliver J. Jorg[2], Gualtiero Fantoni[2], Francisco Javier Brosed Dueso[1], José A. Yagüe Fabra[1] *[1]University of Zaragoza, Department of Design and Manufacturing Engineering, Calle Maria de Luna 3, 50018 Zaragoza* *[2]University of Pisa, Department of Civil and Industrial Engineering, Largo Lucio Lazzarino, 56122 Pisa*
P4.08	**ICE23209**	**Characteristics of acoustic levitation system using piezoelectric actuator** Ryosuke Kawai [1], Hayata Takashima [1], Akihiro Torii [1], Suguru Mototani [1], Kae Doki [1] *[1]Aichi Institute of Technology, Japan*
P4.09	**ICE23211**	**Closed-loop chamfer measurement and control for automated robotic deburring processes** Mikel Gonzalez[1], Adrián Rodríguez[1], Octavio Pereira[1], L. Norberto López de Lacalle[1] *[1]CFAA – Aeronautics Advanced Manufacturing Centre, University of the Basque Country (UPV/EHU), Biscay Science and Technology Park, Ed. 202, 48170 Zamudio, Spain*

P4.10	**ICE23221**	**Data-driven learning methods for industrial robot stiffness model identification** Tae Hwa Hong[1], Kyeongeun Song[1], Jungsu Nam[1], Tae-Gon Kim[1], Seok-Woo Lee[1], and Seong Hyeon Kim[1] *[1]Smart Manufacturing System R&D Department, Korea Institute of Industrial Technology (KITECH), Republic of Korea*
P4.11	**ICE23225**	**Balance control of quadruped robot by Deep Q-Network** Shih-Chieh Chen, Jau-Liang Chen *National Chung Hsing University, Department of Mechanical Engineering, Taic hun*
P4.12	**ICE23232**	**Algorithm for reconstruction of time signals and Artificial Neural Networks for taxonomy of thrombi in Ventricular Assist Devices** Thiago Santos[1], Dennis Toufen[2], Eduardo Bock[1], Marcelo Barboza[1], Jose Ricardo[1] and Bruno Santos[1] *[1]Laboratory of Bioengineering and Biomaterials, Federal Institute of Education, Science, and Technology of Sao Paulo – IFSP, 01109-010, Sao Paulo, Brazil)* *[2]Federal Institute of Education, Science, and Technology of Sao Paulo – IFSP, 07115-000, Guarulhos, Sao Paulo, Brazil*
P4.13	**ICE23233**	**Stabilization and optimization of dynamic property for sub-nanometre resolution on ultraprecision positioning mechanism driven by preloaded ball screw** Shigeo Fukada[1], Yuta Toyoshima[1], Shinya Aoki[1] *[1]Shinshu University, Japan*
P4.14	**ICE23277**	**Review of the application piezoelectric actuators for SRF cavity tuners** Yuriy Pischalnikov, Crispin Contreras-Martinez *Fermi National Accelerator Laboratory, Batavia, IL, USA*
P4.15	**ICE23192**	**Semi-automatic process control for efficient refurbishment of turbine blades** E. Uhlmann[1,2], J. Polte[1,2], C. Mühlich[2], S. Mönchinger[2], P. Ebrahimi[3] *1Technische Universität Berlin, Institute for Machine Tools and Factory Management IWF, Germany* *[2]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany* *[3]Gestalt Robotics GmbH, Germany*

Poster No.	**ICE No.**	**Metrology**
P5.01	**ICE23117**	**Analysis of the fidelity of the Computed Tomography 3D triangulated model of Madygenerpeton pustulatum fossil skull** Yaroslav Garashchenko[1], Ilja Kogan[2], Miroslaw Rucki[3] *[1]National Technical University «Kharkiv Polytechnic Institute», Department of Integrated Technologic Process and Manufacturing, Kharkiv, Ukraine* *[2]TU Bergakademie Freiberg, Freiberg, Germany* *[3]Kazimierz Pulaski University of Technology and Humanities in Radom, Poland*

P5.02	**ICE23124**	**Measurement platform with a multi-functional MEMS-SPM head for high-throughput characterisation of nanostructured materials** Christian Kuhlmann[1], Zhi Li[1], Ole Willke[1], Radovan Papadic[1], Uwe Brand[1] *[1]Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Germany*
P5.03	**ICE23127**	**The investigation of the combination of the object orientation to evaluate the measurement uncertainty of the X-ray CT using the analysis of variance** Kazuya Matsuzaki[1], Mari Watanabe[1], Osamu Sato[1] *[1]Research Institute for Engineering Measurement, National Metrology Institute of Japan (NMIJ), National institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan*
P5.04	**ICE23131**	**A new data fusion algorithm for point cloud registration** Zhongyi Michael Zhang, Sofia Catalucci, Adam Thompson, Samanta Piano *Manufacturing Metrology Team, Faculty of Engineering, University of Nottingham, UK*
P5.05	**ICE23134**	**An intelligent surface segmentation approach based on U-Net for structured and freeform surface characterisation** Weixin Cui [1], Wenhan Zeng[1], Shan Lou[1], Paul J. Scott[1], Xiangqian Jiang[1] *[1]EPSRC Future Metrology Hub, Centre for Precision Technologies, School of Computing and Engineering, University of Huddersfield, Huddersfield, HD1 3DH, UK*
P5.06	**ICE23138**	**Rapid step height measurements by polarized dual low coherence scanning interferometry** Hyo Mi Park[1] and Ki-Nam Joo[1] *[1]Department of Photonic Engineering, Chosun University, 309 Pilmun-daero, Dong-gu, Gwangju 61452, South Korea*
P5.07	**ICE23143**	**Design and manufacturing of transfer artefacts of monocrystalline silicon** Katharina Lehrmann[1], Daniel Hagedorn[1], Rudolf Meeß[1], Stephan Metschke[1], Alexander Ruhz[1] *[1]Physikalisch-Technische Bundesanstalt, Braunschweig, Germany*
P5.08	**ICE23148**	**Characterization of micro spheres through AFM surface scans** Erik Oertel & Eberhard Manske *[1]Institut of Process Measurement and Sensor Technology, Technische Universität Ilmenau, Ilmenau 98694, Germany*
P5.09	**ICE23162**	**Fluorescence-based measurements of material removal and process temperature during laser chemical machining** Dirk Stöbener[1,2], Merlin Mikulewitsch[1], Andreas Fischer[1,2] *[1]University of Bremen, Bremen Institute for Metrology, Automation and Quality Science (BIMAQ), Linzer Str. 13, 28359 Bremen, Germany* *[2]University of Bremen, Center for Materials and Processes (MAPEX), P.O. box 33 04 40, 28334 Bremen, Germany*

P5.10	**ICE23163**	**Accuracy improvement for 6-axis serial robot using double ball-bar** Seung-han Yang[1], Heung-ki Jeon[1], Seong-hwan Kweon[2], Kwang-il Lee[3] *[1]School of Mechanical Engineering, Kyungpook National University, Daegu, 41566, Republic of Korea* *[2]Digital Design & Digital Manufacturing R&D Center, Kyungpook National University, Daegu, 41566, Republic of Korea* *[3]School of Mechanical Automotive Engineering, Kyungil University, Daegu, 38428, Republic of Korea*
P5.11	**ICE23164**	**A novel energy resolved X-ray computed tomography instrument for aviation security: Preliminary metrological investigation** Steffen Sloth[1,3], Danilo Quagliotti[2], Leonardo De Chiffre[2], Morten Christensen[3], Henning F. Poulsen[1] *[1]Department of Physics, Technical University of Denmark, Fysikvej Building 307, 2800 Kongens Lyngby, Denmark* *[2]Department of Civil and Mechanical Engineering, Technical University of Denmark, Koppels Allé Building 404, 2800 Kongens Lyngby, Denmark* *[3]Exruptive A/S, Højnæsvej 75, 2610 Rødovre, Denmark*
P5.12	**ICE23170**	**Comparison of coherence scanning interferometry, focus variation and confocal microscopy for surface topography measurement** Helia Hooshmand, Mingyu Liu, Athanasios Pappas, Adam Thompson, Richard Leach, Samanta Piano *Manufacturing Metrology Team, Faculty of Engineering, University of Nottingham, Nottingham, United Kingdom*
P5.13	**ICE23189**	**Measurement of powder spreading dynamics in additive manufacturing** Samuel Ferris[1], Adam Thompson[1], Ian Maskery[2], Steven Hall[3], Samanta Piano[1] *[1]Manufacturing Metrology Team, Faculty of Engineering, University of Nottingham, UK* *[2]Centre for Additive Manufacturing, Faculty of Engineering, University of Nottingham, UK* *[3]Manufacturing Technology Centre, Coventry, UK*
P5.14	**ICE23191**	**Towards task-specific uncertainty assessment for imaging confocal microscopes** Jesus Paredes[1], Gorka Kortaberria[1] *[1]Department of Mechanical Engineering, Tekniker, 20600 Eibar, Spain*
P5.15	**ICE23193**	**Refining gear measurement uncertainty calculations by using the Welch-Satterthwaite equation for effective degrees of freedom** Denis Sexton[1], Sofia Catalucci[1], Robert Frazer[2], Andy Sharpe[3], Samanta Piano[1] *[1]Manufacturing Metrology Team, Faculty of Engineering, University of Nottingham, UK* *[2]National Gear Metrology Laboratory (NGML), Department of Engineering, Newcastle University, UK* *[3]Manufacturing Technology Centre (MTC), UK*
P5.16	**ICE23202**	**Edge detection and surface inspection for roll-to-roll and slot-die coating based on machine vision approach** Mothana Hassan[1], Liam Blunt[1], Hussam Muhamedsalih[1] *[1]EPSRC Future Metrology Hub/ Centre for Precision Technologies (CPT), University of Huddersfield UK*

P5.17	**ICE23224**	**Estimation of optimal sample orientation for accurate industrial computed tomography scanning** Ibon Holgado[1], Naiara Ortega[1,2], Soraya Plaza[1,2], José A. Yagüe-Fabra[3], Herminso Villarraga-Gómez[4] *[1]Aeronautics Advanced Manufacturing Center (CFAA), Parque tecnológico de Bizkaia, 202, 48170 Zamudio, Spain* *[2]Department of Mechanical Engineering, Aeronautics Advanced Manufacturing Center (CFAA), Faculty of Engineering of Bilbao, Plaza Ingeniero Torres Quevedo 1, 48013 Bilbao, Spain* *[3]I3A, Universidad de Zaragoza, María de Luna 3, E-50018 Zaragoza, España* *[4]Carl Zeiss Industrial Quality Solutions, LLC, Wixom, MI, USA*
P5.18	**ICE23228**	**Uncertainty propagation of field areal surface texture parameters using the metrological characteristics approach** Athanasios Pappas[1], Lewis Newton[2], Adam Thompson[1], Helia Hooshmand[1] and Richard Leach[1] *[1]Manufacturing Metrology Team, Faculty of Engineering, University of Nottingham, UK* *[2]Manufacturing Technology Centre, Coventry, UK*
P5.19	**ICE23239**	**Investigation of effect of voxel size choice for the measurement and analysis of porous coatings** Christopher Jackson[1], Ahmed Tawfik[1], Paul Bills[1] *[1]EPSRC Future Metrology Hub, The University of Huddersfield, HD1 3DH*
P5.20	**ICE23240**	**Calibration of a low-accuracy magnetic linear encoder** Marko Katić[1], Marko Horvatek[1] [1]*Faculty of mechanical engineering and naval architecture, University of Zagreb*
P5.21	**ICE23241**	**Improving surface and porosity analyses of laser powder bed fusion parts through CT-based three-dimensional metal powder characterization** F. Zanini, S. Carmignato *Department of Management and Engineering, University of Padova, Vicenza, Italy*
P5.22	**ICE23248**	**Broadband chromatic light source and inspection system for fluorescence imaging** HyungTae Kim[1], Juhea Kim[1] and Dong-Wook Lee[1] *[1]Research Institute of Convergence Technology, KITECH, South Korea*

P5.23	**ICE23259**	**Traceability issues for contact probe and stylus instrument measurements** Tanfer Yandayan[1], Murat Aksulu[1], Gian Bartolo Picotto[2], Milena Astrua[2], Rafael Muñoz[3], Aelio A. Arce[3], Ezzat Oraby[4], Anna Trych-Wildner[5],Łukasz Ślusarski [5], Piotr Sosinowski[5], Gorana Baršić [6],Vedran Šimunović [6], Denita Tamakjarska[7], Fernanda Saraiva[8], Slobodan Zelenika[9], Faisal AL-Qahtani[10] *[1]TUBITAK Ulusal Metroloji Enstitüsü (TUBITAK UME), Dimensional Lab. Gebze-Kocaeli, Türkiye* *[2]Istituto Nazionale di Ricerca Metrologica (INRIM), Torino, Italy* *[3]Centro Español de Metrología (CEM), Madrid, Spain* *[4]National Institute of Standards (NIS), Cairo, Egypt* *[5]Central Office of Measures / Glówny Urzad Miar (GUM), Warsaw, Poland* *[6]Faculty of Mechanical Engineering and Naval Architecture (FMENA), Zagreb, Croatia* *[7] Bulgarian Institute of Metrology (BIM), Sofia, Bulgaria* *[8]Instituto Português da Qualidade (IPQ), Caparica, Portugal* *[9]Directorate of Measures and Precious Metals (DMDM), Belgrade, Serbia* *[10]Saudi Standards, Metrology and Quality Organization/National Measurement and Calibration Center (SASO-NMCC), Riyadh, Saudi Arabia*
P5.24	**ICE23260**	**Selection of relevant mode of thin and soft parts measurements on machines with multisensor possibility** Wiktor Harmatys[1], Adam Gąska[1], Piotr Gąska[2], Maciej Gruza[1], Michael Marxer[3] *[1]Cracow University of Technology, Faculty of Mechanical Engineering, Laboratory of Coordinate Metrology, al. Jana Pawla II 37, 31-864 Cracow, Poland* *[2]Department of Manufacturing Systems, Faculty of Mechanical Engineering and Robotics, AGH University of Science and Technology, al. Mickiewicza 30, 30-059 Krakow, Poland* *[3]Eastern Switzerland University of Applied Sciences, Institute for Production Metrology, Materials and Optics, Werdenbergstrasse 4, CH-9471 Buchs SG, Switzerland*
P5.25	**ICE23281**	**Combined computer-aided part inspection and fixture planning** Sif Eddine Sadaoui[1], Oussama Remil[2], Karim Belouettar[1], Brahim Mahiddini[1], Oussama Adjoul[2] [1]*Laboratoire des Techniques Avancées de Fabrication et Contrôle, Ecole Militaire Polytechnique, Bordj El-Bahri, Algiers 16111, Algeria* [2]*Laboratoire de conception des systèmes mécaniques, Ecole Militaire Polytechnique, Bordj El-Bahri, Algiers 16111, Algeria*
P5.26	**ICE23284**	**A development approach for a standardized quality data model using asset administration shell technology in the context of autonomous quality control loops for manufacturing processes** Ali Bilen[1], Florian Stamer[1], Marvin Carl May[1], Gisela Lanza[1] *wbk – Institute for Production Science1, Karlsruhe Institute for Technology, Kaiserstr. 12, 76131 Karlsruhe, Germany*
P5.27	**ICE23292**	**Case study of X-ray Computed Tomography performance in polymeric additive manufacturing features evaluation** D. Gallardo[1], L.C Díaz-Pérez[1], J.A. Albajez[1], J.A. Yagüe-Fabra[1], R. Jiménez[2], M. Torralba[2] *[1]I3A, Universidad de Zaragoza, Zaragoza, Spain* *[2]Centro Universitario de la Defensa, Zaragoza, Spain*

P5.28	**ICE23301**	**Capacitance analysis of a shielded sphere-flat capacitor in a high precision electrostatic force balance** Sven Schulze[1,2], Kumar Arumugam[1], Stephan Schlamminger[1], René Theska[2], Gordon Shaw[1] *[1]National Institute of Standards and Technology, Gaithersburg* *[2]Technische Universität Ilmenau*

Poster No.	ICE No.	Mechanical Manufacturing Processes
P6.01	**ICE23104**	**Indirect workpiece cooling system for micro milling based on a Peltier element** Sonja Kieren-Ehses[1], Tobias Mayer[1], Benjamin Kirsch[1], Jan C. Aurich[1] *[1]Institute for Manufacturing Technology and Production Systems, TU Kaiserslautern, Gottlieb-Daimler-Str., 67653 Kaiserslautern, Germany*
P6.02	**ICE23106**	**Semi-deterministic manufacturing process for roughness standards for involute gears** Rudolf Meeß, Martin Stein, Dorothee Hüser, Stefan Verhülsdonk *Physikalisch-Technische Bundesanstalt (PTB), Bundesallee 100, 38116 Braunschweig, Germany*
P6.03	**ICE23118**	**Effect of drawbar dynamics on tool point FRF of multipurpose aerostatic spindle** Jooho Hwang[1], Dang Chi Cong[1], Jongyoup Shim[1] *[1]Department of Ultra-Precision Machines & Systems, Korea Institute of Machinery and Materials, 156, Gajeongbuk-Ro, Yuseong-Gu, Daejeon 34103, Republic of Korea*
P6.04	**ICE23128**	**Wear mechanism of single crystal diamonds in ultra-precision cutting of graphite for air bearing applications** E. Uhlmann[1,2], M. Polte[1,2], T. Hocke[1,2], F. Felder[1] *[1]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Germany* *[2]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany*
P6.05	**ICE23135**	**Analysis of gallium phosphide nanoindentation by means of molecular dynamics simulations** M.R.P.M. Tavares[1,2], D.A. Rolon[1], J. Kober[1], A. Misturini[3], S. Kühne[1], R. B. Schroeter[1], D. Oberschmidt[1] *[1]Technische Universität Berlin, Department of Micro and Precision Devices MFG, Germany* *[2]Federal University of Santa Catarina, Laboratory of Precision Engineering, Brazil* *[3]Universidad Politecnica de Valencia, Spain*
P6.06	**ICE23137**	**Accounting for elastic recovery during micro-scratching of a brittle material in the ductile regime** Yan Jin Lee and Hao Wang *Department of Mechanical Engineering, College of Engineering and Design, National University of Singapore*

P6.07	**ICE23147**	**Precise cutting of cemented carbide with nanopolycrystalline diamond in ductile regime** Eckart Uhlmann[1,2], Mitchel Polte[1,2], Toni Hocke[1], Casey Polte[1], Julian Polte[1,2] *[1]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Pascalstr. 8-9, Berlin, 10587, Germany* *[2]Fraunhofer Institute for Production Systems and Design Technology IPK, Pascalstr. 8-9, Berlin, 10587, Germany*
P6.08	**ICE23151**	**Surface texture on micromilling of a Ti6Al4V alloy for biomedical implants** Cleiton L. F. de Assis[1], Guilherme R. Mecelis[2], Eraldo J. da Silva[2], Alessandro R. Rodrigues[2], Reginaldo T. Coelho[2] *[1]Federal Institute of São Paulo, Campus Votuporanga – Brazil* *[2]University of São Paulo, Campus São Carlos – Brazil*
P6.09	**ICE23152**	**Cutting tool wear during precision boring operations in lathe of a grade 4 titanium for biomedical implants** Ivan M. Baberge[1], Cleiton L. F. de Assis[2], Ricardo S. Signorelli[1], Juno Gallego[1] *[1]São Paulo State University, Campus Ilha Solteira – Brazil* *[2]Federal Institute of São Paulo, Campus Votuporanga – Brazil*
P6.10	**ICE23156**	**Precision grinding of BK7 glass with coarse-grained diamond grinding wheels** Barnabás Adam[1,2], Oltmann Riemer[1,2], Kai Rickens[1], Carsten Heinzel[1,2] *[1]Leibniz Institut für Werkstofforientierte Technologien IWT, Laboratory for Precision Machining LFM, Badgasteiner Straße 2, 28359 Bremen, Germany* *[2]MAPEX Center for Materials and Processes, University of Bremen, Germany*
P6.11	**ICE23178**	**Effect of lead addition on machinability of brass and its mechanism** Kosuke Sumiyoshi[1], Hiroo Shizuka[1], Katsuhiko Sakai[1], Takuro Ando[1], Kazuhito Kurose[2], Hisanori Terui[2] *[1]Shizuoka University, 3-5-1 Johoku Naka-ku Hamamatsu Shizuoka 432-8561 Japan* *[2]Kitz Metalworks Corporation, 7377 Kobayakawa Miyagawa Chino Nagano 391-8555 Japan*
P6.12	**ICE23185**	**Wireless cutting force sensing system mounted on a rotary cutting tool holder using a semiconductor strain sensor** Hiroo Shizuka[1], Katsuhiko Sakai[1], Takuto Kawai[1], Karin Yamamoto[1], Kentaro Miyajima[2], Manabu Aso[2], Yoshikazu Ishitsuka[2], Masashi Watanabe[2], Katsutoshi Fukagawa[3], Mitsuhiro Kawabata[3] *[1]Shizuoka University,3-5-1 Johoku Naka-ku Hamamatsu Shizuoka 432-8561 Japan* *[2]GloselCo.,Ltd., 1 Kanda Tsukasa-machi 2-chome Chiyoda-ku Tokyo 101-0048 JAPAN* *[3]NT Tool Co.,Ltd., 1-7-10 Yoshikawa-cho Takahama City Aichi 444-1386 Japan*
P6.13	**ICE23188**	**Design, manufacture and characterisation of X-ray Computer Tomography (XCT) calibration artefacts for space hardware qualification** Joel Keen[1], Nick Tucker[1], Younes Chahid[2], Carolyn Atkins[2] *[1]University of Lincoln, School of Engineering, Brayford Pool, Lincoln, Lincolnshire, LN6 7TS, UK* *[2]STFC UK Astronomy Technology Centre, Edinburgh, EH9 3HJ, UK*

P6.14	**ICE23207**	**Feasibility test of a flexible PCB with embedded strain gauges to measure cutting forces on the tool holder** Shashwat Kushwaha[1,2], Yigit Ozcan[1,2], Jun Qian[1,2], Dominiek Reynaerts[1,2] *[1]Department of Mechanical Engineering, KU Leuven, Celestijnenlaan 300,Leuven 3001, Belgium* *[2]Member Flanders Make, Belgium*
P6.15	**ICE23208**	**DEM simulation of centrifugal disc finishing using smoothed particle hydrodynamics** E. Uhlmann[1,2], J. Polte[1], Y. Kuche[1], T. Hocke[2] *[1]Fraunhofer Institute for Production Systems and Design Technology IPK, Germany* *[2]Institute for Machine Tools and Factory Management IWF, Technische Universität Berlin, Germany*
P6.16	**ICE23235**	**Precision machining of microholes and microwalls on ultra-hard materials and analysis of mechanical signals using electro-discharge and mechanical machining system** Tae-Jin Je[1], Eun-Ji Gwak[1], Jongkeun Sim[1], Chan-Woo Lee[1], Dong-hyun Seo[1], Jun Sae Han[1], Doo-Sun Choi[1] *[1]Department of Nano-Manufacturing Technology, Korea Institute of Machinery & Materials (KIMM), 156, Gajeongbuk-ro, Yuseong-gu, Daejeon , 34103, Republic of Korea*
P6.17	**ICE23254**	**Investigations in drilling of difficult-to cut materials using twist drills with solid binderless diamond tips** Benjamin Clauß[1], Alex Mironow[2], Murat Yildirim[2] and Andreas Schubert[1] *[1]Professorship Micromanufacturing Technology, Department of Mechanical Engineering, Chemnitz University of Technology, Reichenhainer Str. 70, 09126 Chemnitz, Germany* *[2]DTS GmbH - Diamond Tooling Systems, Hans-Geiger Straße 11a, 67661 Kaiserslautern, Germany*
P6.18	**ICE23271**	**Simulation and experimental study on material removal mechanism in milling of 70wt% Si/Al composite** Lianjia Xin[1], Guolong Zhao[1], Zhiwen Nian[1], Liang Li[1], Ning He[1] *[1]College of Mechanical and Electrical Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, P. R. China*
P6.19	**ICE23289**	**Comparison of binderless carbide with conventional carbide as a cutting material for milling** E. Uhlmann, C. Hein, M. Dargin *Fraunhofer Institute for Production Systems and Design Technology IPK, Berlin*
P6.20	**ICE23293**	**Laser-induced selective activation of polyimide for robust electroless plating** Jun Ren[1], Dongya Li[1], Yang Zhang[2], and Yu Liu[1] *[1]School of Mechanical Engineering, Jiangnan University, Wuxi, 214122, China* *[2]Department of Mechanical Engineering, Technical University of Denmark, 2800 Lyngby, Denmark*

P6.21	**ICE23294**	**Machining of Ti6Al4V using laser textured cutting tool under Ionic liquid (IL) lubrication condition** Sampad Biswas[1], Chetan[1], Animesh Mandal[2] *[1]School of Mechanical Sciences, IIT Bhubaneswar, Argul, Odisha (752050), India* *[2]School of Minerals, Metallurgical & Materials Engineering, IIT Bhubaneswar, Argul, Odisha (752050), India*