

18th CIRP Conference on Electro Physical and Chemical Machining (ISEM XVIII) *Tokyo, Japan* 18 - 22 April 2016

Ito International Research Center Conference



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18 – 22 April 2016 Tokyo, Japan

Welcome



On behalf of the organizing committee of the 18th CIRP Conference on Electro Physical and Chemical Machining (ISEM XVIII), I would like to thank all the authors for contributing their excellent papers to the conference. The total number of contributions is 160 from over 19 counties. Acceptance of the papers was decided based on the reports from 332 referees in total. The referees were invited not only from the Committee members, but also from amongst the authors.

The conference was originally entitled the "International Symposium for Electro-Machining" (ISEM). The first conference was held in 1960, in Czechoslovakia, followed by 56 years of glorious history. Until ISEM IX, which was held in 1989 at Nagoya in Japan, ISEM venues had been alternated between 'Eastern' and 'Western' countries every three years. After the collapse of the Berlin Wall in 1989, CIRP (the International Academy for Production Engineering) started to serve as the coordinator of ISEM since the main leaders of the Western countries were members of CIRP. Thus, ISEM now proudly takes place under the auspices of CIRP, and the conference name was changed to "CIRP Conference on Electro Physical and Chemical Machining". However, the name of ISEM, which is more familiar to us, was officially and affectionately retained.

The themes captured in this conference are becoming increasingly more important and reaching out from the 'non-conventional' toward hybrid and additive manufacturing processes. The proceedings of ISEM XVIII involve 82 papers related to electrical discharge machining (EDM), 31 papers of electrochemical machining (ECM), 13 papers of laser, 10 additive manufacturing, 6 hybrid, and other 18 papers related to ultrasonic, water jet, plasma, and nano and micro machining processes. Clearly this widening participation is evidence of ISEM's continued relevance to the global research themes which are evolving.

The ISEM XVIII conference will be held in the Hongo campus of the University of Tokyo, April 18th to 22nd, 2016. The conference will be hosted by the Japan Society of Electrical Machining Engineers (JSEME) which will celebrate its 50th anniversary in 2016. Considering that ISEM IX conference was first held in Japan, 27 years ago in Nagoya, it is a great pleasure for the Japanese research community to host ISEM again in Japan to meet old friends, welcome young researchers, and exchange our new ideas. I believe the conference and its proceedings will serve as a driving force to accelerate our vision and mission for many years to come.

On behalf of the organizing committee of ISEM XVIII, I would like to thank all the members of Advisory Committee, Scientific Committee, sponsors and authors for their considerable contributions.

Tokyo, April 2016

Unor Zaa

Prof. Masanori Kunieda Chairman of ISEM XVIII President of the Japan Society of Electrical Machining Engineers



Committee



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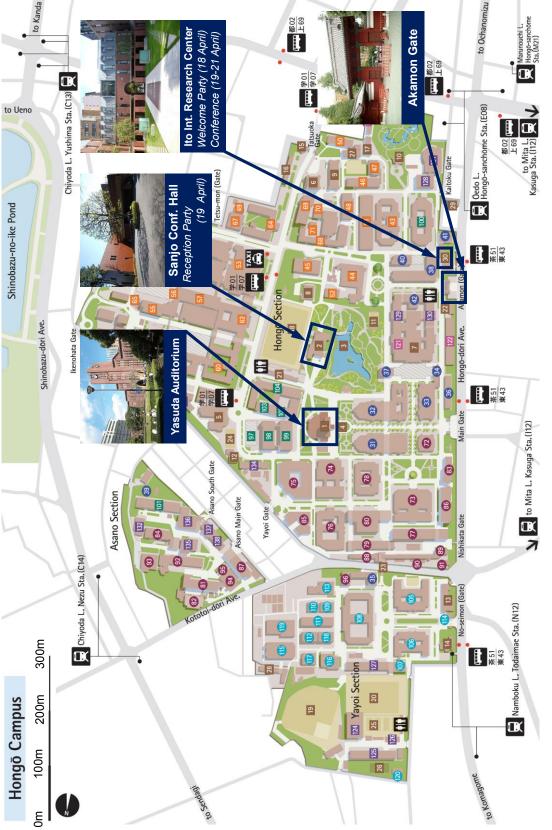
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ISEM XVIII @ The University of Tokyo Hongo Campus: 7-3-1, Hongo, Bunkyo-ku, Tokyo to Kanda (mm 都 02 上 69 Ito Int. Research Center Welcome Party (18 April) Conference (19-21 April) 学07 Chiyoda L. Yushima Sta. (C13) to Ueno

Information

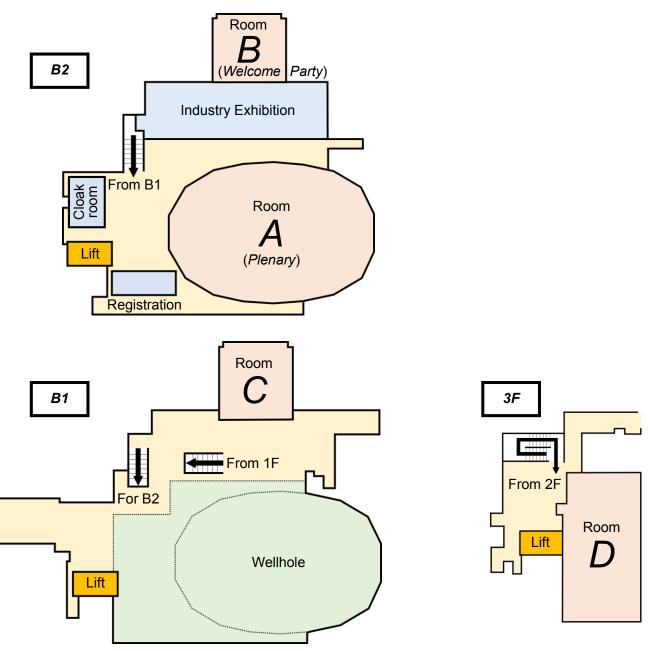


Conference Secretariat:

During the conference sessions a permanent secretariat will be open at the registration desk. The conference secretariat can be reached at isem 18@scoop-japan.com Tel. + 81 90 2753 7501 - Scoop JAPAN

ISEM XVIII

Ito International Research Center Floor Map:



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Preparing for Presentations:

Please bring your presentation to the session room. To assure a fluent transition between speakers, all presenting authors are asked to meet their session chair and to prepare their presentation in the respective session rooms at least 15 minutes before the start of the session during which they will present.

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Welcome Party

Time: 18:00 - 20:00, April 18 Place: B2, Ito Int. Research Center (see p.5 and 6)

Reception

Time: 18:00 - 20:00, April 19 Place: Sanjo Conference Hall, The University of Tokyo (see p.5)

Banquet

Time: 18:00 - 20:00, April 21 (16:30 - 17:45 Strolling the garden at Hotel Chinzanso Tokyo) Place: Jupiter Room, Plaza 4F, Hotel Chinzanso Tokyo Address: 7-10-8, Sekiguchi, Bunkyo-ku, 112-8680 Tokyo GPS Coordinates: 35.7123527, 139.7259712 Tel: +81 3 3943 1111 URL: http://www.hotel-chinzanso-tokyo.com/

Note for Movement: The chartered buses to Hotel Chinzanso Tokyo will depart from The University of Tokyo (see p.26) around 15:50. After the banquet, the chartered buses will move back to the university.



Industry Exhibition

Time: Morning of April 19 - Evening of April 21 Place: B2, Ito Int. Research Center (see p.5 and 6)

Plenary Talk





Emerging Another Age of Discovery in Solar System Enabled through Round Voyage Technology Represented by Hayabusa Mission

Prof. Junichiro Kawaguchi Senior Fellow, former Hayabusa project manager, JAPAN AEROSPACE EXPLORATION AGENCY (JAXA)



Advanced Stamping Technology to Realize the High Accurate Automotive Parts

Mr. Kozo Hirabayashi CEO, SYVEC CORPORATION



Electrical-Machining Technology Contributing the High Temperature and Efficiency Gas Turbine

Mr. Tadao Ichikawa Deputy General Manager, Takasago Blade & Combustion Parts Manufacturing Department, Turbine Global Products Integration Division, Turbine Products Headquarters, MITSUBISHI HITACHI POWER SYSTEMS, LTD.

Invited Evening Seminar





From 5:15 PM to 6:00 PM, April 19th, 2016, Room A

Smart Technologies for Manufacturing of the Future

The talk will highlight how digitalization and adaptive networked production might provide added value for industry. The talk will also reflect what the role of production science in this arena might be. Case studies from research and industry are taken as good practice examples.

Prof. Dr.-Ing. Dr.-Ing. E.h. Dr. h.c. Dr. h.c. Fritz Klocke

- 1950 Born October 10 in Vlotho.
- 1973 1976 Production engineering studies at Technical University Berlin.
- 1977 1981 Assistant at the Institute for Machine Tools and Production Engineering, Technical University Berlin.
- 1982 Doctorate in engineering.
- 1984 1994 Ernst Winter & Sohn GmbH & Co., Norderstedt.
- 1985 Award of Otto Kienzle Medal by the Universities Production Engineering Group.
- 1995 Director of the Chair of Manufacturing Technology at the Institute for Machine Tools and Production Engineering (WZL) of the RWTH Aachen and director of the Fraunhofer Institute for Production Technology, Aachen.
- 2001 2002 Dean of the Faculty for Mechanical Engineering.
- 2006 Honorary Ph.D. by the University of Hannover.
- 2007 2008 President of the International Academy for Production Engineering (CIRP).
- 2009 Honorary Ph.D. by the University of Thessaloniki.
- 2010 Honorary Ph.D. by the Keio University.
- 2010 Award of Fraunhofer Medal.
- 2012 Fellow of the Society of Manufacturing Engineers (SME).
- 2014 Eli Whitney Productivity Award (SME).
- 2014 Fellow of RWTH Aachen University.

Married to Prof. Dr.-Ing. Martina Klocke, 3 children.

Program Chart



Day 0, Monday, April 18, 2016		
15:00	Registration	
18:00	Welcome Darty (Deem D)	
20:00	Welcome Party (Room B)	

Day 1, Tuesday, April 19, 2016					
8:20	Registration				
Plenary Session	Room A				
8:45 12:10		Opening Ceremony Plenary Talk			
Parallel Sessions	Room A	Room A Room B Room C Room D			
13:30 15:10	EDM 1: Experimental Analysis				
15:30 17:10	EDM 3: Machining Conditions AM 1: High Energy Beam ECM 2: Titanium Alloy and Sintered Alloy EDM 4: Difficult-to-machine Materials				
17:15 18:00	Invited Evening Seminar (Room A)				
18:00 20:00	Reception (Sanjo Conference Hall)				

	Day 2, Wednesday, April 20, 2016				
Parallel Sessions	Room A	Room B	Room C	Room D	
9:00	EDM 5: Control	EDM 6: PCD	ECM 3: Advances in ECM	Hybrid Processes	
10:20					
12:00	EDM 7: Coating	EDM 8: Turbine Blade	Micromachining 1: Chemical Process	Plasma Processes	
13:30 15:10	EDM 9: Surface Integrity	ECM 4: Modeling	LBM 2: Advanced Materials	EDM 10: Drilling	
15:30				Ū.	
15:30	EDM 11: Wire-EDM	ECM 5: Flexible Machining	LBM 3: Surface	EDM 12: Equipment	

	Day 3, Thursday, April 21, 2016				
Parallel Sessions	Room A	Room B	Room C	Room D	
9:00 10:20	EDM 13: Heat Affected Zone	EDM 14: Milling	Micromachining 2: EDM	ECM 6: Equipment	
10:40 12:00	EDM 15: Gap Phenomena in WEDM	EDM 16: Applications	AM 2: FDM	ECM 7: Micro ECM	
13:00 14:20	EDM 17: Tool Electrode	EDM 18: Modeling	ECDM	USM	
14:40 15:40	EDM 19: Advances in EDM	EDM 20: Pulse Generators	Electrodeposition	Abrasive Machining	
17:00 20:00	Banquet (Hotel Chinzanso Tokyo)				

Day 4, Friday, April 22, 2016		
8:00	Technical Tour	
18:00		

Program April 19



Day 1, Tuesday, April 19, 2016			
8:20			
8:45	Registration		
Plenary	Roc	om A	
Session			
8:45	Opening Ceremony: Prof. Masanori Kunieda, Gener Prof. Mamoru Mitsuishi, Dean of Graduate School o		
9:20		y Talk 1	
	Title: Emerging Another Age of Discovery in Solar S	•	
	Prof. Jun'ichiro Kawaguchi (Japan Aerospace Explo	ration Agency : JAXA)	
	Chairperson: Prof. Takashi Nakamura (Nagoya Insti	tute of Technology)	
10:10	Coffee	Break	
10:30	Plenar	y Talk 2	
	Title: Advanced Stamping Technology to Realize the	High Accurate Automotive Parts	
	Mr. Kozo Hirabayashi (SYVEC CORPORATION)		
	Chairperson: Prof. Akihiro Goto (Shizuoka Institute o		
11:20		y Talk 3	
	Title: Electrical-Machining Technology Contributing t		
	Mr. Tadao Ichikawa (MITSUBISHI HITACHI POWER SYSTEMS, LTD.) Chairperson: Prof. Akihiro Goto (Shizuoka Institute of Science and Technology)		
12:10	Lunch Break		
12.10	Lunch	Break	
-	Lunch Room A	Break Room B	
Parallel			
-	Room A	Room B	
Parallel	Room A EDM 1: Experimental Analysis	Room B LBM 1: Pulsed Laser	
Parallel Sessions 1	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao	Room B LBM 1: Pulsed Laser Chairperson: Prof. Volodymyr Kovalenko	
Parallel Sessions 1	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao Special Focus Talk	Room B LBM 1: Pulsed Laser Chairperson: Prof. Volodymyr Kovalenko Special Focus Talk Formation of Periodic Nanostructures with Femtosecond Laser for Creation of New	
Parallel Sessions 1	Room AEDM 1: Experimental AnalysisChairperson: Prof. Wan-Sheng ZhaoSpecial Focus TalkExperimental Study on Debris Evacuation During Slot EDMing	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional Biomaterials	
Parallel Sessions 1	Room AEDM 1: Experimental AnalysisChairperson: Prof. Wan-Sheng ZhaoSpecial Focus TalkExperimental Study on Debris Evacuation DuringSlot EDMingIzaro Ayesta, Olatz Flaño, Borja Izquierdo, Jose	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional BiomaterialsTogo Shinonaga, Shono Kinoshita, Yasuhiro	
Parallel Sessions 1 13:30	Room AEDM 1: Experimental AnalysisChairperson: Prof. Wan-Sheng ZhaoSpecial Focus TalkExperimental Study on Debris Evacuation During Slot EDMing	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional Biomaterials	
Parallel Sessions 1	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao Special Focus Talk Experimental Study on Debris Evacuation During Slot EDMing Izaro Ayesta, Olatz Flaño, Borja Izquierdo, Jose Antonio Sanchez, Soraya Plaza	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional BiomaterialsTogo Shinonaga, Shono Kinoshita, Yasuhiro	
Parallel Sessions 1 13:30	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao Special Focus Talk Experimental Study on Debris Evacuation During Slot EDMing Izaro Ayesta, Olatz Flaño, Borja Izquierdo, Jose Antonio Sanchez, Soraya Plaza	Room B LBM 1: Pulsed Laser Chairperson: Prof. Volodymyr Kovalenko Special Focus Talk Formation of Periodic Nanostructures with Femtosecond Laser for Creation of New Functional Biomaterials Togo Shinonaga, Shono Kinoshita, Yasuhiro Okamoto, Masahiro Tsukamoto, Akira Okada Break	
Parallel Sessions 1 13:30 14:00	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao Special Focus Talk Experimental Study on Debris Evacuation During Slot EDMing Izaro Ayesta, Olatz Flaño, Borja Izquierdo, Jose Antonio Sanchez, Soraya Plaza Short	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional BiomaterialsTogo Shinonaga, Shono Kinoshita, YasuhiroOkamoto, Masahiro Tsukamoto, Akira Okada	
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Parallel Sessions 1 13:30 14:00	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao Special Focus Talk Experimental Study on Debris Evacuation During Slot EDMing Izaro Ayesta, Olatz Flaño, Borja Izquierdo, Jose Antonio Sanchez, Soraya Plaza Short Observation of Material Removal from Discharge	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional BiomaterialsTogo Shinonaga, Shono Kinoshita, YasuhiroOkamoto, Masahiro Tsukamoto, Akira OkadaBreakInfluence of Pulse Duration on Processing Characteristics of Transparent Conductive Film	
Parallel Sessions 1 13:30 14:00	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao Special Focus Talk Experimental Study on Debris Evacuation During Slot EDMing Izaro Ayesta, Olatz Flaño, Borja Izquierdo, Jose Antonio Sanchez, Soraya Plaza Short Observation of Material Removal from Discharge Spot in Electrical Discharge Machining Shinya Hayakawa, Yusuke Kusafuka, Fumihiro	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional BiomaterialsTogo Shinonaga, Shono Kinoshita, YasuhiroOkamoto, Masahiro Tsukamoto, Akira OkadaBreakInfluence of Pulse Duration on ProcessingCharacteristics of Transparent Conductive FilmContaining Silver Nanowires by ns Pulsed FiberLaserMasafumi Oshita, Norio Nishi, Yasuhiro Okamoto,	
Parallel Sessions 1 13:30 14:00	Room A EDM 1: Experimental Analysis Chairperson: Prof. Wan-Sheng Zhao Special Focus Talk Experimental Study on Debris Evacuation During Slot EDMing Izaro Ayesta, Olatz Flaño, Borja Izquierdo, Jose Antonio Sanchez, Soraya Plaza Short Observation of Material Removal from Discharge Spot in Electrical Discharge Machining	Room BLBM 1: Pulsed LaserChairperson: Prof. Volodymyr KovalenkoSpecial Focus TalkFormation of Periodic Nanostructures withFemtosecond Laser for Creation of NewFunctional BiomaterialsTogo Shinonaga, Shono Kinoshita, YasuhiroOkamoto, Masahiro Tsukamoto, Akira OkadaBreakInfluence of Pulse Duration on ProcessingCharacteristics of Transparent Conductive FilmContaining Silver Nanowires by ns Pulsed FiberLaser	

Room C	Room D	_
ECM 1: Surface	EDM 2: Dry EDM	Parallel
Chairperson: Dr. Henning Zeidler	Chairperson: Prof. Kai Egashira	Sessions 1
Some Problems of Surface Roughness in Electrochemical machining (ECM)	High-efficient Dry Hybrid Machining of EDM and Arc Machining	13:30
Jerzy Kozak, Maria Zybura-Skrabalak	Yang Shen, Yonghong Liu, Wan-Yun Sun	
Study on Effect of ECM Conditions on Wettability	A Comparative Study on Machining Capabilities of	13:50
of Machined Surface	Wet and Dry Nano-scale Electro-machining	
Ken Maeda, Wataru Natsu	Muhammad P. Jahan, Kamlakar P. Rajurkar, Ajay	
	P. Malshe	
Study on Electrochemical Machining of Oil Pocket	Dependence of Crater Formation in Dry EDM on	14:10
on Sliding Surface with Electrolyte Suction Tool	Electrical Breakdown Mechanism	
Yuki Takashima, Wataru Natsu	Felipe Tadeu Barata de Macedo, Moritz Wiessner,	
	Christoph Hollenstein, Friedrich Kuster, Konrad	
	Wegener	

	Day 1, Tuesday, April	19, 2016
14:30	Experimental Investigation of EDM Parameters on	Pulsed Laser Cutting of Magnesium-Calcium for
	TiC/Ni Cermet Machining	Biodegradable Stents
	Yerui Feng, Yongfeng Guo, Zongfeng Li	M. P. Sealy, Y. B. Guo, J. F. Liu, C. Li
14:50	Analyzing of Discharge Wave Oscillation	Machining on Rear Surface of a Silicon Substrate
	Mechanism in Electrical Discharge Machining	by an Infrared Femtosecond Laser via Non-linear
		Absorption Processes
	Dongbo Wei, Shichun Di, Yukui Wang, Zhenlong	Khanh Phu Luong, Rie Tanabe, Yoshiro Ito
17.10	Wang	
15:10	Coffee	Break
	Room A	Room B
Parallel	EDM 3: Machining Conditions	AM 1: High Energy Beam
Sessions 2	Chairperson: Dr. Adam. Clare	Chairperson: Prof. Hiroyuki Narahara
15:30	Research on Maintaining Voltage of Spark	Evanescent Light Exposing System under
	Discharge in EDM	Nitrogen Purge for Nano-Stereolithography
	Vinshang Fan Jiahang Pai Qiang Li Chaoijang	Vuki Suzuki, Hirovuki Toboro, Maaaki Miabibata
	Yinsheng Fan, Jicheng Bai, Qiang Li, Chaojiang Li, Yan Cao, Zhengkai Li	Yuki Suzuki, Hiroyuki Tahara, Masaki Michihata, Kiyoshi Takamasu, Satoru Takahashi
15:50	Advanced Sensor Signal Feature Extraction and	Development of a Hybrid Multi-tasking Machine
	Pattern Recognition for Wire EDM Process	Tool: Integration of Additive Manufacturing
	Monitoring	Technology with CNC Machining
	Alessandra Caggiano, Roberto Perez, Tiziana	Taku Yamazaki
10.10	Segreto, Roberto Teti, Paul Xirouchakis	
16:10	Study on Characteristic of Multi-spark EDM Method by Using Capacity Coupling	Fabrication of Polymer Micro Needles for Transdermal Drug Delivery System using DLP
		Based Projection Stereo-lithography
	Xiaodong Yang, Kai Yang, Yutao Liu, Lei Wang	Zulfiqar Ali, Erkan Bugra Türeyen, Yigit Karpat,
		Melih Çakmakcı
/		
16:30	Study on the Effect of External Hydrostatic Pressure on Electrical Discharge Machining	Rapid Fabrication of Eutectic Ceramic Structures
	Tomohiro Koyano, Shodai Suzuki, Akira	by Laser Engineered Net Shaping Fangyong Niu, Dongjiang Wu, Guangyi Ma,
	Hosokawa, Tatsuaki Furumoto	Jiangtian Wang, Juan Zhuang, Zhuji Jin
16:50	Optimizing Machining Parameters of Compound	Development of Multichannel Gas-powder
	Machining of Inconel 718	Feeding System Coaxial with Laser Beam
	Hang Dong, Yonghong Liu, Yang Shen, Xiaolong	Volodymyr Kovalenko, Jianhua Yao, Qunli Zhang,
	Wang	Mykola Anyakin, Xiaodong Hu, Ruslan Zhuk
17:15	Invited Evening S	Seminar (Room A)
	Title: Smart Technologies for Manufacturing of the F	
	Prof. Fritz Klocke (RWTH Aachen, Laboratory for Ma	achine Tools and Production Engineering (WZL))
18:00		
	Reception (Sanjo	Conference Hall)

Day 1, 7	uesday, April 19, 2016	
Fabrication and Experimental Verification of Electrochemical Machining Tool for Complex- shaped Hole	Machining Characteristics of a Hybrid Process of EDM in Gas Combined with Ultrasonic Vibration and AJM	14:30
Hidehiro Nomura, Dahai Mi, Wataru Natsu	Yan-Cherng Lin, Jung-Chou Hung, Han-Ming Chow, A-Cheng Wang, Jyun-Ting Chen	
Flow Field Design in Electrochemical Machining of Diffuser Dong Zhu, Zhouzhi Gu, Tingyu Xue, Di Zhu	Comparative Analysis of Dry-EDM and Conventional EDM for the Manufacturing of Micro Holes in Si ₃ N ₄ -TiN <i>Eckart Uhlmann, Tassilo-Maria Schimmelpfennig,</i>	14:50
Coffee	Ivan Perfilov, Jan Streckenbach, Luiz Schweitzer	15:10
Room C	Room D	
ECM 2: Titanium Alloy and Sintered Alloy	EDM 4: Difficult-to-machine Materials	Parallel
Chairperson: Prof. Zuyuan Yu	Chairperson: Prof. Ajay P. Malshe	Sessions 2
Special Focus Talk Electrochemical Machining of High Temperature Titanium Alloy Ti 60 Zhengyang Xu, Xuezhen Chen, Zesheng Zhou, Peng Qin, Di Zhu	Surface Characterization, Material Removal Mechanism and Material Migration Study of Micro EDM Process on Conductive SiC <i>Krishna Kumar Saxena, Sanjay Agarwal, Sanchit</i> <i>Kumar Khare</i>	15:30
16:00-16:10 Short Break	Challenge to EDM Slicing of Single Crystal SiC with Blade Electrode Utilizing a Reciprocating Worktable Yonghua Zhao, Masanori Kunieda, Kohzoh Abe	15:50
Results of Surface Integrity and Fatigue Study of PECM and PEO Processed γ-TiAl for Turbine Applications <i>Fritz Klocke, Tim Herrig, Markus Zeis, Maximilian</i> <i>Holsten 1, Andreas Klink</i>	Experimental Study of EDM-Drilling and Shaping of SiSiC and SiC <i>Mikhail Kliuev, Umang Maradia, Marco Boccadoro,</i> <i>Roberto Perez, Josef Stirnimann, Konrad</i> <i>Wegener</i>	16:10
Electrochemical Dissolution Behavior of Titanium and Titanium-based Alloys in Different Electrolytes Dirk Baehre, Alexander Ernst, Konstantin Weißhaar, Harald Natter, Moritz Stolpe, Ralf Busch	Basic Characteristics of Electrical Discharge on CFRP by Using Thermal Camera Yoshiaki Akematsu, Kazuro Kageyama, Hideaki Murayama	16:30
Diamond-ECM Grinding of Sintered Hard Alloys of WC-Ni Vladimir Andreevitch Mogilnikov, Michael Yakovlevitch Chmir, Yuri Sergeevitch Timofeev, Vladimir Sergeevitch Poluyanov	EDM of Insulating Ceramics by Electrical Conductive Surface Layer Control <i>Hiromitsu Gotoh, Takayuki Tani, Naotake Mohri</i>	16:50
Invited Evening Seminar (Room A) Title: Smart Technologies for Manufacturing of the Future		
Prof. Fritz Klocke (RWTH Aachen, Laboratory for Machine Tools and Production Engineering (WZL)) Reception (Sanjo Conference Hall)		

Program April 20



	Day 2, Wednesday, April 20, 2016			
–	Room A	Room B		
Parallel	EDM 5: Control	EDM 6: PCD		
Sessions 3	Chairperson: Prof. Albert Shih	Chairperson: Prof. Takayuki Tani		
9:00	Special Focus Talk	Electrical Discharge Machining of PCD in		
	Angular Movement Ratio Planning of the Rotary	Ultrapure Water		
	Axes for Shrouded Blisks Multi-Axis EDM			
	Hao Chen, Xue-Cheng Xi, Wan-Sheng Zhao	Daisuke Yanagida, Hisashi Minami, Koji Watanabe		
9:20		The Prediction of Surface Finish and Cutting		
		Speed for Wire Electro-discharge Machining of		
	9:30-9:40 Short Break	Polycrystalline Diamond		
		Marco Galindo-Fernandez, Carl Diver, Wayne		
		Leahy		
9:40	A New Model of WEDM-CNC System with	The Grain Size Effect of Polycrystalline Diamond		
	Digitizer/player Architecture	on Surface Integrity by Using Micro EDM		
	Wansheng Zhao, Junmin Zheng, Xuecheng Xi, Mo	Tzu-Yao Tai, Khanh Toan Nguyen		
	Chen, Hao Chen, Weiwen Xia, Guangwei			
	Huang, Junqi Wang, Xumuye Tao			
10:00	Fast and Stable Electrical Discharge Machining	Fabrication of PCD Mechanical Planarization		
	(EDM) by Two-step-ahead Predicted Control	Tools by using µ-Wire Electrical Discharge		
		Machining		
	Ming Zhou, Jianyang Wu, Jianwei Yang, Dechen	Samad Nadimi Bavil Oliaei, Yigit Karpat		
10:20	Yao			
10.20	Coffee Break			
Parallel	Room A	Room B		
Sessions 4	EDM 7: Coating	EDM 8: Turbine Blade		
	Chairperson: Prof. Jiwang Yan	Chairperson: Dr. Andreas Klink		
10:40	Mechanism of Defect Generation in the TiC Layer	Dressing of Graphite Electrodes for EDM of Seal		
	and Si Layer by Electrical Discharge Coating	Slots in Nickel-base Alloy MAR-M247		
	Nobuyuki Sumi, Chihiro Kato, Keita Shimada,	Eckart Uhlmann, David Carlos Domingos		
	Takashi Yuzawa, Hiroyuki Teramoto, Masayoshi Minutani, Tounamoto Kuringgoung			
11:00	Mizutani, Tsunemoto Kuriyagawa	EDM Drilling and Chaping of Cooling Holes in		
11:00	The Coating Technology with the Wire Electrode	EDM Drilling and Shaping of Cooling Holes in Inconel 718 Turbine Blades		
	Takashi Mitsuyasu, Keisuke Tasaki, Masatoshi	Mikhail Kliuev, Marco Boccadoro, Roberto Perez,		
	Takashi Milsuyasu, Keisuke Tasaki, Masaloshi Kawano	Walter Dal Bó, Josef Stirnimann, Friedrich		
	Nawano	Kuster, Konrad Wegener		
11:20	Improvement in Surface Characteristics by EDM	Blasting Erosion Arc Machining of Turbine Blisk		
11.20	with Chromium Powder Mixed Fluid	Flow Channel with Laminated Electrode		
	Ryota Toshimitsu, Akira Okada, Ryoji Kitada,	Chunliang Wang, Jipeng Chen, Lin Gu, Wansheng		
	Yasuhiro Okamoto	Zhao		
	1			

Day 2, Wednesday, April 20, 2016		
Room C	Room D	_
ECM 3: Advances in ECM	Hybrid Processes	Parallel
Chairperson: Dr. Grzegorz Skrabalak	Chairperson: Prof. Kamlakar P. Rajurkar	Sessions 3
Fabrication of an Electrode Insulation Layer for	Investigation of Modified Cutting Insert with	9:00
Electrochemical Machining by Using Hot Dip	Forced Coolant Application in Machining of Alloy	
Aluminizing and Micro-arc Oxidation Method	718	
Jung-Chou Hung, Jhih-Yang Ku, Ming-Der Ger,	Nageswaran Tamil Alagan, Tomas Beno, Anders	
Zhi-Wen Fen	Wretland	
Energetic Analysis of the Anodic Double Layer	The Influence of Electrochemical Assistance on	9:20
during Electrochemical Machining of 42CrMo4	the Cutting Forces in Microturning Process	0.20
Steel	The outling roles in Microtanning roless	
	Schootion Skoozunica Marcin Crohowski Adam	
Fritz Klocke, Simon Harst, Markus Zeis, Andreas	Sebastian Skoczypiec, Marcin Grabowski, Adam	
Klink	Ruszaj	0:40
Study on Electrochemical Machining of Sintered	Electrical Discharge Conditioning for Indexable	9:40
Carbide	Insert Grinding	
Akihiro Goto, Atsushi Nakata, Nagao Saito	Stephan Scholze, Karl Mayrhofer, Walter Pfluger	
High Aspect Ratio Deep Spiral Tube	Laser-assisted Machining of Zirconia Ceramics	10:00
Electrochemical Machining Technology	Using a Diamond Bur	
Lin Tang, Zhijian Fan, Ganggang Zhao, Feng	Toru Kizaki, Yusuke Ito, Shota Tanabe, Yangjin	
Yang, Sen Yang	Kim, Naohiko Sugita, Mamoru Mitsuishi	
Coffee Break		10:20
Room C	Room D	Derellel
Micromachining 1: Chemical Process	Plasma Processes	Parallel
Chairperson: Prof. Wataru Natsu	Chairperson: Prof. Mu-Tian Yan	Sessions 4
Selection and Optimization of Electrolyte for Micro	Special Focus Talk	10:40
Electrochemical Machining on Stainless Steel 304	Plasma Electrolytic Polishing - an Overview of	
C C	Applied Technologies and Current Challenges to	
	Extend the Polishable Material Range	
Guodong Liu, Yong Li, Quancun Kong, Hao Tong	Klaus Nestler, Falko Böttger-Hiller, Wolfgang	
	Adamitzki, Günther Glowa, Henning Zeidler,	
	Andreas Schubert	
Study of Micro Groove Machining by Micro ECM		11:00
		11.00
Chuangchuang Chen, Jianzhong Li, Shicheng	11:10-11:20 Short Break	
Zhan, Zuyuan Yu, Wenji Xu	TI. 10-TI.20 SHOLL DIEAK	
Zhan, Zuyuan Tu, Wenji Au		
Research on Multiple Wires Electrochemical	High-spatial Resolution Figuring by Pulse Width	11:20
Micromachining with Ultra-short Voltage Pulses	Modulation Controlled Plasma Chemical	11.20
Micromachining with Olira-Short Vollage Fulses		
Viselang Fang Dang Li Varatin Zang Di Zi	Vaporization Machining	
Xiaolong Fang, Peng Li, Yongbin Zeng, Di Zhu	Kazuya Yamamura, Yoshiki Takeda, Shogo	
	Sakaiya, Daisuke Funato, Katsuyoshi Endo	

Day 2, Wednesday, April 20, 2016		
11:40	Morphology and Wear Behaviour of Single and Multi-layer Electrical Discharge Coatings James W Murray, Adam T. Clare	Investigations on Vibration-Assisted EDM- Machining of Seal Slots in High-Temperature Resistant Materials for Turbine Components – Part II Eckart Uhlmann, David Carlos Domingos
12.00	Lunch	Break
Parallel	Room A EDM 9: Surface Integrity	Room B ECM 4: Modeling
Sessions 5	Chairperson: Prof. Bert Lauwers	Chairperson: Dr. Anjali K. M. DeSilva
13:30	Special Focus Talk Process Signatures of EDM and ECM Processes - Overview from Part Functionality and Surface Modification Point of View Andreas Klink	Study on Parameter Determination for ECM Equivalent Circuit and Its Verification Naoaki Nagashima, Wataru Natsu
13:50	14:00-14:10 Short Break	Simulation of Micro ECM for Complex-shaped Holes Dahai Mi, Wataru Natsu
14:10	A Comparative Study on White Layer Properties by Laser Cutting vs. Electrical Discharge Machining of Nitinol Shape Memory Alloy <i>C. H. Fu, J. F. Liu, Y. B. Guo, Q. Z. Zhao</i>	Modeling of Electrochemical Machining through a Monolayer Colloidal Crystal Mask for Metal Surfaces Nanostructuring Vladimir Volgin, Victor Lyubimov, Inna Gnidina, Tatyana Kabanova, Alexey Davydov
14:30	Research on the Surface Quality of the Blasting Erosion Arc Machined Stainless Steel Yingmou Zhu, Jipeng Chen, Hui Xu, Lin Gu, Wansheng Zhao	The Mechanism of ECM Technology Design for Curvilinear Surfaces <i>Tomasz Paczkowski, Jaroslaw Zdrojewski</i>
14:50	An Experimental Investigation of Enhancement Surface Quality of Micro-holes for Be-Cu Alloys Using Micro-EDM with Multi-diameter Electrode and Different Dielectrics Shuliang Dong, Zhenlong Wang, Yukui Wang, Hongzheng Liu	Characteristics of Different Transparent and Conductive Materials Applied for Observation of ECM Gap Phenomena <i>Fuchen Chu, Tomoyuki Shimasaki, Masanori</i> <i>Kunieda</i>
15:10	Coffee	Break

Day 2, W	ednesday, April 20, 2016	
Fast Patterned Graphene Ribbons via Soft-	Development of Ion Beam Sputtering Deposition	11:40
Lithography	System for Complex Shaped X-ray Mirror	
Liangze Wang, Jia Zhang, Na Liu, Yukui Wang,	Hiroto Motoyama, Mitsuru Nagayama, Hidekazu	
Pingan Hu, Zhenlong Wang	Mimura	
		12:00
Lunch	Break	
Room C	Room D	Parallel
LBM 2: Advanced Materials	EDM 10: Drilling	Sessions 5
Chairperson: Prof. Yoshiro Ito	Chairperson: Dr. Tomohiro Koyano	
Special Focus Talk	Study on Influence of Electrode Material on Hole	13:30
Quality and Productivity Considerations for Laser	Drilling in Micro-EDM	
Cutting of LiFePO ₄ and LiNiMnCoO ₂ Battery		
Electrodes		
Adrian H.A. Lutey, Alessandro Fortunato, Simone	Yulei Fu, Takumu Miyamoto, Wataru Natsu,	
Carmignato, Alessandro Ascari, Erica Liverani,	Wansheng Zhao, Zuyuan Yu	
Giacomo Guerrini		
	Simultaneous Machining of Polygonal	13:50
	Microelectrode and Microholes Using Tandem	
14:00-14:10 Short Break	EDM Mechanism	
	Takayuki Tani, Hiromitsu Gotoh, Atsutoshi Hirao,	
	Naotake Mohri	
Tribological Performance of Laser Patterned	High Speed EDM and Laser Drilling of Advanced	14:10
Cemented Tungsten Carbide Parts	Alloys	
Shiqi Fang, Thomas Herrmann, Andreas	Mohammad Antar, Dimitrios Chantzis, Sundar	
Rosenkranz, Carsten Gachot, Fernando Garcia	Marimuthu, Philip Hayward	
Marro, Frank Mücklich, Luis Llanes, Dirk Bähre		
Experimental Study of Laser Etching on Al ₂ O ₃ -SiC	The Phenomenon of Polarity in EDM Drilling	14:30
Composite Ceramics	Process Using Water Based Dielectrics	
Bingbing Xie, Genfu Yuan, Daming Zhang	Markus Munz, Matthias Risto, Ruediger Haas	
Investigation of Shielding Gas Supplying Method	Optimization of the EDM Drilling Process to	14:50
in Vertical-position Laser Welding of Pure Titanium	Increase the Productivity and Geometrical	
	Accuracy	
Kazuo Yokohara, Yasuhiro Okamoto, Akira Okada,	Matthias Risto, Ruediger Haas, Markus Munz	
Hikotaro Ochiai, Ryosuke Kimura, Shozo Ono,		
Masayuki Akase		
Coffee	Break	15:10
Conee	brouk	

Day 2, Wednesday, April 20, 2016		
Derellel	Room A	Room B
Parallel Sessions 6	EDM 11: Wire-EDM	ECM 5: Flexible Machining
363510115 0	Chairperson: Dr. Jun Qian	Chairperson: Prof. Jerzy Kozak
15:30	Machining of Metal Foams with Varying	Special Focus Talk
	Mesostructure using Wire EDM	Electrolyte Jet Machining of Titanium Alloys Using
		Novel Electrolyte Solutions
	Alexander Martin Matz, Dennis Kammerer,	Alistair Speidel, Jonathon Mitchell-Smith, Darren
	Norbert Jost, Kai Oßwald	Walsh, Matthias Hirsch, Adam Clare
15:50	Analysis of Wire-EDM Finishing Cuts on Large	
	Scale ZrO ₂ -TiN Hybrid Spark Plasma Sintered	
	Blanks	16:00-16:10 Short Break
	Frederik Vogeler, Bert Lauwers, Eleonora Ferraris	
16:10	On the Influence of Wire-lag on the Wire EDM of	Fabrication of Micro Rods of Cemented Carbide
	Low-radius Free-form Geometries	by Electrolyte Jet Turning
	Aintzane Conde, Jose Antonio Sanchez, Soraya	Kotaro Miyoshi, Masanori Kunieda
	Plaza, Jose Maria Ramos	
16:30	Semi-empirical Modeling of Surface Roughness in	Electrochemical Jet Machining of Titanium:
	Wire Electro-discharge Machining of Ceramic	Overcoming Passivation Layers with Ultrasonic
	Particulate Reinforced Al Matrix Composites	Assistance
	Nilesh G. Patil, Prakash K. Brahmankar	Jonathon Mitchell-Smith, Adam T. Clare
16:50	On the Effects of Wire Electrode and Ceramic	Generation of Complex Surfaces by
	Volume Fraction in Wire Electrical Discharge	Superimposed Multi-dimensional Motion in
	Machining of Ceramic Particulate Reinforced	Electrochemical Machining
	Aluminium Matrix Composites	
	Nilesh G. Patil, Prakash K. Brahmankar, Dinesh	Andreas Schubert, Matthias Hackert-
	G. Thakur	Oschätzchen, André Martin, Sebastian Winkler,
		Danny Kuhn, Gunnar Meichsner, Henning Zeidler,
		Jan Edelmann
Free Evening		

Day 2, W	ednesday, April 20, 2016	
Room C	Room D	
LBM 3: Surface	EDM 12: Equipment	Parallel
Chairperson: Dr. Yasuhiro Okamoto	Chairperson: Dr. Shinya Hayakawa	Sessions 6
A Study of Thickening Phenomenon in Laser	A Magnetic Suspension Spindle System for Micro	15:30
Bending Zone of a Metal Laminated Plate	EDM	
Xuyue Wang, Xupeng Ma, Zihui Li, Rui Wang	Yongfeng Guo, Zebin Ling	
Study on Thermal Stress Cleavage of Chemically	A Jump Motion Velocity Planning Algorithm with	15:50
Strengthened Glass by CO ₂ Laser Beam	Continuous Jerk for Electrical Discharge	
	Machining	
Hisashi Ogi, Tatsuaki Furumoto, Tomohiro	Hongda Liu, Hao Chen, Xuecheng Xi, Wansheng	
Koyano, Akira Hosokawa	Zhao	
Surface Property Modification of Alumina Sprayed	Study of Vibration Assisted Inclined Feed Micro-	16:10
Coatings using Nd:YAG Laser	EDM Drilling	
Ryoko Moriya, Mabito Iguchi, Shunichi Sasaki,	Yunn-Shiuan Liao, Hao-Wen Liang	
Jiwang Yan		
Surface Manufacturing Under Pulse Fiber Laser	The Quantitative Research of Size Effects in	16:30
	Piezoelectric Self-adaptive Micro-EDM	
Sergey Aleksandrovich Kochergin, Yuri	Qingyu Liu, Xiuzhuo Fu, Qinhe Zhang, Kan Wang,	
Alexseevich Morgunov, Boris Petrovich Saushkin	Guang Zhu, Jianhua Zhang	
Removal of the Heat Affect Zone Created by EDM	Surface Roughness Research of Piezoelectric	16:50
with Pico-second LASER Machining	Self-adaptive Micro-EDM	
Georg Wälder* 1, Jacques Richard	Xiuzhuo Fu, Liying Gao, Qinhe Zhang, Qingyu Liu	
Free Evening		

Program April 21



	Day 3, Thursday, April	21, 2016
	Room A	Room B
Parallel	EDM 13: Heat Affected Zone	EDM 14: Milling
Sessions 7	Chairperson: Prof. Yigit Karpat	Chairperson: Prof. Jose Sanchez
9:00	Special Focus Talk	Research on the Depth Error in Micro Electrical
	Analysis of Micro Fin Deformation Due to Micro EDM	Discharge Milling
	Zahiruddin Mohd, Masanori Kunieda	Zhengkai Li, Jicheng Bai, Xi Zhu
9:20		Research on the Equivalent Plane Machining with
		Fix-length Compensation Method in Micro-EDM
	9:30-9:40 Short Break	Jingyu Pei, Zhaowei Zhou, Lenan Zhang,
		Xiaoshun Zhuang, Shukun Wu, Yietian Zhu, Jun
		Qian
9:40	Thinning Process of Recast Layer in Hole Drilling	Micro EDM Milling with Electrochemical
	and Trimming by EDM	Fabrication of Ultra-thin Microtools and Mapping of
		Electrical Microdischarges
	Chao Jiang Li, Yong Li, Hao Tong, Lei Zhao	Michel Cabrera, Rabah Dahmani, Yasmina
		Layouni, Vincent Semet
10:00	Investigations on Surface Integrity of Heat Treated	Precision Micro-EDM Milling of 3D Cavities by
	42CrMo4 (AISI 4140) Processed by Sinking EDM	Incorporating In-situ Pulse Monitoring
	Fritz Klocke, Sebastian Schneider, Lisa Ehle,	Jun Wang, Jun Qian, Eleonora Ferraris, Dominiek
40.00	Heiner Meyer, Lars Hensgen, Andreas Klink	Reynaerts
10:20	Coffee Break	
Parallel	Room A	Room B
Sessions 8	EDM 15: Gap Phenomena in WEDM	EDM 16: Applications
003310113-0	Chairperson: Dr. Umang Maradia	Chairperson: Prof. Yuebin Guo
10:40	Effect of Wire Breakage on the Process Energy	Friction Characteristics of Textured Surface
	Utilisation of EDM	Created by Electrical Discharge Machining Under
		Lubrication
	Janaka Ranganath Gamage, Anjali K. M. DeSilva	Keishi Yamaguchi, Yasuhiro Takada, Yuki
		Tsukuda, Minoru Ota, Kai Egashira, Tatsuro Morita
11:00	Dynamic Distribution of Discharge Products	Surface Magnetic Flux Density Patterning in EDM
	Influenced by Composition of Dielectric in WEDM	of Permanent Magnets
	Narrow Slit Were Observed and Exploration of Its	
	Mechanism	
	Ciwen He	Hideki Takezawa, Naoki Hirakawa, Naotake Mohri

Day 3, T	⁻ hursday, April 21, 2016	
Room C	Room D	
Micromachining 2: EDM	ECM 6: Equipment	
Chairperson: Prof. Katsushi Furutani	Chairperson: Prof. Hidekazu Mimura	Sessions 7
Investigation of Ablation Behaviour in Micro-EDM	Electrochemical Machining of Multiple Slots with	9:00
of Nonconductive Ceramic Composites ATZ and	Low-frequency Tool Vibrations	
Si ₃ N ₄ -TiN		
Andreas Schubert, Henning Zeidler, Ralf Kühn,	Jia Liu, Xiaochen Jiang, Di Zhu	
Matthias Hackert-Oschätzchen, Sebastian		
Flemmig, Nico Treffkorn		
Fabrication of Micro/nanoelectrode Using	Development of a New Generator for	9:20
Focused-ion-beam Chemical Vapor Deposition,	Electrochemical Micro-machining	
and Its Application to Micro-ECDM		
Dengji Guo, Xiaoyu Wu, Jianguo Lei, Bin Xu, Reo	Nicola Giandomenico, Olivier Meylan	
Kometani, Feng Luo		
Micro-EDM with Controlled Pulse Train Method	The Development of a Pulsed Power Supply for	9:40
using Small Feeding Capacitance		3.40
Norliana Mohd Abbas, Masanori Kunieda	Tobias Mole, Brian McDonald, Sean Mullery,	
	Carl Diver, David Tormey	
Complex Rotary Structures Machined by Micro-	Developing a Process Chain with WEDG	10:00
WEDM	Technology and Pulse ECM to Fabricate Ultra	
	Micro Pins	
Yukui Wang, Xiang Chen, Weimin Gan, Zhenlong	Jian Yuan Wang, Dong Yea Sheu	
Wang, Cheng Guo		
Coffee	Break	10:20
Room C Room D		
AM 2: FDM	ECM 7: Micro ECM	Parallel
Chairperson: Prof. Satoru Takahashi	Chairperson: Prof. Zhengyang Xu	Sessions 8
Special Focus Talk	Influence of Machining Conditions on Machining	10:40
Influence of Inter-layer Cooling Time on the Quasi-	Characteristics of Micro-rods by Micro-ECM with	
static Properties of ABS Components Produced	Electrostatic Induction Feeding Method	
via Fused Deposition Modelling		
Matthias Faes, Eleonora Ferraris, David Moens	Wei Han, Masanori Kunieda	
	Fabrication of 3D Microelectrodes by Combining	11:00
	Wire Electrochemical Micromachining and Micro-	
11:10-11:20 Short Break	electric Resistance Slip Welding	
	Jianguo Lei, Xiaoyu Wu, Bo Wu, Bin Xu, Dengji	
	Guo, Jinming Zhong	

	Day 3, Thursday, April	21. 2016
11:20	High-speed Observation of Thin Wire Movement	Structure and Composition of the White Layer in
11.20	in Fine Wire EDM	the Wire-EDM-Process
	Takuya Kamei, Akira Okada, Yasuhiro Okamoto	Fritz Klocke, Lars Hensgen, Andreas Klink, Lisa
		Ehle, Alexander Schwedt
11:40	Clarification of Gap Phenomena in Wire EDM	Numerical and Experimental Studies of Electro-
	Using Transparent Electrodes	Thermal Machining for Melting Notch Tip in Steel
		Strip
	Azumi Mori, Masanori Kunieda, Kohzoh Abe	Thomas Jin-Chee Liu, Chun-Der Cheng, Ji-Fu
		Tseng, Li-Wei Chen, Po-Heng Chen
12:00	Lunch	Break
	Room A	Room B
Parallel	EDM 17: Tool Electrode	EDM 18: Modeling
Sessions 9		-
40.00	Chairperson: Prof. Hideki Takezawa	Chairperson: Prof. Yong Li
13:00	Special Focus Talk	A Thermo-hydraulic Modeling for the Formation
	Performance and Limitations of the Conventional	Process of the Discharge Crater in EDM
	Electrode Materials for Erosion of High Aspect	
	Ratio Microcavities	
	Umang Maradia, Marco Taborelli, Jens Boos,	Jiajing Tang, Xiaodong Yang
	Henning Buettner, Josef Stirnimann, Marco	
	Boccadoro, Konrad Wegener	
13:20		Study on the Distribution of Removal Material of
		EDM in Deionized Water and Gas with Molecular
	13:30-13:40 Short Break	Dynamics Simulation
		Xiaoming Yue, Xiaodong Yang
13:40	An Investigation on Surface Integrity in EDM	Modeling of White Layer Formation in Electric
	Process with a Copper Tungsten Electrode	Discharge Machining (EDM) by Incorporating
		Massive Random Discharge Characteristics
	Syed Asger Hussain Rizvi, Sanjay Agarwal	J. F. Liu, Y. B. Guo
14:00	Electrical Discharge Machining for Complex Cavity	Potentials of the Phase Field Approach for
14.00		
	with a Porous Electrode	Modeling Modifications in Material Microstructure
		During Electrical Discharge Machining
	Yi Jiang, Qi Li, Linglei Kong, Xueliang Ping,	Fritz Klocke, Mehnoush Mohammadnejad, Markus
	Wansheng Zhao	Zeis, Andreas Klink
14:20	Coffee Break	
Dorollol	Room A	Room B
Parallel	EDM 19: Advances in EDM	EDM 20: Pulse Generators
Sessions 10	Chairperson: Prof. Yunn-Shiuan Liao	Chairperson: Dr. Zahiruddin Mohd
14:40	The Latest Technology of Wire-cut EDM	Development of a Pulse Generator for Rough
		Cutting of Oil-based Micro Wire-EDM
	Yushi Takayama, Yoshinori Makino, Yan Niu,	Mu-Tian Yan, Tsung-Chien Lin
	Hiroyuki Uchida	ing han ran, roung onion Em
	r moyuki olinua	

Day 3. T	hursday, April 21, 2016	
Improvement and Evaluation of the Interlaminar	Microelectrochemical Machining at the Ultrasmall	11:20
Bonding Strength of FDM Parts by Atmospheric-	Interelectrode Gaps with the Use of the Packets of	
Pressure Plasma	Nanosecond Voltage Pulses	
Hiroyuki Narahara, Yota Shirahama, Hiroshi	Victor Lyubimov, Vladimir Volgin, Alexey	
Koresawa	Venevtsev, Inna Gnidina	
	Finishing of Micro-EDMed Surface based on	11:40
Process Planning for the Fuse Deposition	5	11:40
Modeling of Ankle-Foot-Othoses	Scanning Micro Electrochemical Flow Cell	
Yuan Jin, Yong He, Albert Shih	Cheng Guo, Jun Qian, Dominiek Reynaerts	
Lunch	Break	12:00
Room C	Room D	_
ECDM	USM	Parallel
Chairperson: Prof. Akihiro Goto	Chairperson: Prof. Minoru Ota	Sessions 9
Special Focus Talk	Material Removal Modes of Quartz Crystals by	13:00
Electrochemical, Electrodischarge and	Micro USM	
Electrochemical-discharge Hole Drilling and		
Surface Structuring Using Batch Electrodes		
Grzegorz Skrabalak, Andrzej Stwora	Guodong Li, Zuyuan Yu, Jiawen Song, Can Li,	
Grzegorz Griabalak, Anarzej Grwora	Jianzhong Li, Wataru Natsu	
	Sianzhong Li, Walaru Nalsu	
13:30-13:40 Short Break	Feasibility Study on Ultrasonic Vibration Assisted Milling for Squamous Surface	13:20
13.30-13.40 Short break	Guocan Tao, Jianhua Zhang, Xuehui Shen, Lijuan Bai, Chao Ma, Jinjun Wang	
Prototyping of Acceleration Sensor by Using	Ultrasonic Surface Strengthening of Train Axle	13:40
Lathe-type Electro-chemical Discharge Machine	Material 30CrMoA	
Katsushi Furutani, Shunsuke Kojima	Qinjian Zhang, Jianguo Cao, Huiying Wang	
Investigation of Hybrid Electrochemical Discharge	Fundamental Machining Characteristics of the In-	14:00
Drilling Process by Using a Passivating Electrolyte	base-plane Ultrasonic Elliptical Vibration assisted	
	Turning of Inconel 718	
Margareta Coteață, Nicolae Pop, Hans-Peter	Qiang Wang, Yongbo Wu, Jia Gu, Dong Lu,	
Schulze, Laurențiu Slătineanu, Oana Dodun	Yuebo Ji, Mitsuyoshi Nomura	
Coffee	Break	14:20
Room C Room D		Derellal
Electrodeposition	Abrasive Machining	Parallel
Chairperson: Prof. Kazuya Yamamura	Chairperson: Prof. Kenichiro Horio	Sessions 10
Influence of Residual Stress of Electrodeposited	Cutting of Food Products by Ice-particles in a	14:40
Layer on Shape Replication Accuracy in Ni Electroforming	Water-jet	
Takehiro Kume, Satoru Egawa, Gota Yamaguchi, Hidekazu Mimura	Joseph McGeough	

Day 3, Thursday, April 21, 2016		
15:00	Effects of Some Process Parameters on the	Pulse Generator for Obtaining Surfaces of Small
	Impulse Force in Single Pulsed EDM	Dimensions by Electrical Discharge Machining
	Min Zhang, Qinhe Zhang, Guang Zhu, Qingyu Liu,	Margareta Coteață, Alexandru Floca, Oana
	Jianhua Zhang	Dodun, Nicolae Ionescu, Gheorghe Nagîţ,
		Laurențiu Slătineanu
15:20	Technological and Economic Investigations on the	Development of a New Generator for Die Sinking
	Application of Metal Infiltrated Graphite Electrodes	Electrical Discharge Machining
	for the Sinking EDM of Cemented Carbides	
	Fritze Klocke, Maximilian Holsten, Andreas Klink	Nicola Giandomenico, Florian-Henri Gorgerat,
		Bertrand Lavazais
15:40		
	Move to Hotel C	Chinzanso Tokyo
16:30		
17:00		
	Strolling the garden at	Hotel Chinzanso Tokyo
18:00		
	Banquet (Hotel C	Chinzanso Tokyo)
20:00		

Day 3, T	hursday, April 21, 2016	
Numerical Study of Localized Electrochemical Deposition for Micro Electrochemical Additive Manufacturing <i>Abishek Kamaraj, Spencer Lewis, Murali</i> <i>Sundaram</i>	Elucidating the Rheological Effect of Gel Abrasives in Magnetic Abrasive Finishing Shih-Hsien Chou, A-Cheng Wang, Yan-Cherng Lin	15:00
Experimental Investigations into Nano-finishing of Freeform Surfaces Using Negative Replica of the Knee Joint <i>Leeladhar Nagdeve, V. K. Jain, J. Ramkumar</i>	Development of Advanced Abrasive Electrical Discharge Grinding (AEDG) System for Machining Difficult-to-cut Materials Jerzy Kozak, Maria Zybura-Skrabalak, Grzegorz Skrabalak	15:20
Move to Hotel Chinzanso Tokyo		15:40 16:30
Strolling the garden at Hotel Chinzanso Tokyo		17:00
Banquet (Hotel Chinzanso Tokyo)		18:00
		20:00

Technical Tour April 22



ISEM XVIII is pleased to offer four separate technical tours for the attendees in which you will have an opportunity to see the latest manufacturing technologies in Japan.

Departure Point

The square in front of the Faculty of Medicine Building No. 2 (No. 44 in following map), the same place as the departure point of the banquet buses.



Schedule

8:00	Depart from The University of Tokyo (Please be punctual)
8:00-10:00	Transfer to site1 by chartered bus
10:00-12:00	Visiting site 1
12:00-13:00	Lunch at site 1
13:00-14:00	Transfer to site 2 by chartered bus
14:00-16:00	Visiting site 2
16:00-18:00	Transfer to The University of Tokyo

Note for Tour

- All participants are required registration in advance. Your course is printed on your name badge.
- \bigcirc No payment is needed for chartered bus or lunch.
- Participants are not permitted to take photos or videos inside the factories.
- $\bigcirc\,$ Please wear long sleeves and long pants.
- $\bigcirc\,$ Please do not wear heel or skirt for the safety.
- $\bigcirc\,$ Please refrain from smoking inside the factory.

Courses

TT-1: MAKINO Milling Machine co., Ltd. and FANUC corporation

URL: http://www.makino.co.jp/en/index.html

URL: http://www.fanuc.co.jp/eindex.htm

TT-2: NISSAN Motor co., Ltd.

URL: http://www.nissan-global.com/EN/COMPANY/ URL: http://www.nissan-shatai.co.jp/EN/

TT-3: TOSHIBA Machine co., Ltd.

URL: http://www.toshiba-machine.co.jp/en/index.html

TT-4: JATCO Ltd. and AMADA co., Ltd.

URL: http://www.jatco.co.jp/ENGLISH/index.html URL: http://www.amada.co.jp/english/index.html

Detailed information of each course is available at ISEM XVIII website.

The schedule of technical tours may be changed without notice. Please check the latest information at information desk.

















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