

Final Conference Program

November 18, 2024

12:00 - 13:15

Registration and Snacks

13:15 - 13:30

Opening

Session 1 – Fundamentals

Chairman: Prof. Schubert

13:30 - 13:50

Selective surface treatment using the standing-wave-PEP

*Navickaitė, K.^{a,b}; Nestler, K.^b; Sherstneva, A.^c; Langenhan, S.^d; Penzel, M.^e;
Wendler, M.^c; Burkhardt, C.^d; Volkova, O.^c; Biermann, H.^d; Zeidler, H.^{a,b}*

^a Faculty of Mechanical, Process and Energy Engineering, Institute for Machine Elements, Design and Manufacturing, Technische Universität Bergakademie Freiberg, Germany.

^b Beckmann Institute for Technology Development e.V., Chemnitz, Germany.

^c Faculty of Material Science and Technology, Institute of Iron and Steel Technology, Technische Universität Bergakademie Freiberg, Germany.

^d Faculty of Material Science and Technology, Institute of Materials Engineering, Technische Universität Bergakademie Freiberg, Germany.

^e Plasmotion GmbH, Freiberg, Germany.

13:50 - 14:10

Study of Pulse Electrochemical Machining on Conventionally and Additively
Manufactured Inconel 718 Workpieces

Frank, A.^{a,b}; Hall, T.^{a,b}; Zeiner, M.^{a,b}; Bähre, D.^{a,b}

^a Institute of Production Engineering, Saarland University, Saarbrücken, Germany

^b Center for Mechatronics and Automation Technology (ZeMA gGmbH), Saarbrücken, Germany

14:10 - 14:30

Experimental analysis on surface modification caused by short circuits in
wire-ECM

Sous, F.; Kemperle M.; Herrig, T.; Klink, A. Bergs, T.

*Manufacturing Technology Institute – MTI of RWTH Aachen University, Campus-Boulevard 30, Aachen
52074, Germany*

14:30 - 14:50

Influence of an inner flushing concept on the recording of material
characteristics in electrochemical machining of Nickel 201

Zeiner, M.^{a,b}; Frank, A.^b; Hall, T.^{a, b}; Bähre, D.^{a, b}

^a Institute of Production Engineering, Saarland University, Saarbrücken, Germany

^b Center for Mechatronics and Automation Technology (ZeMA gGmbH), Saarbrücken, Germany

14:50 - 15:20

Coffee Break

Session 2 – Application

Chairman: Prof. Bähre

15:20 - 15:40

Process design of plasma electrolytic rounding of cutting tool inserts with
consideration of efficiency

Quitze, S.^a; Martin, A.^b; Eberhardt, K.^b; Schubert, A.^a

^a Chemnitz University of Technology, Professorship Micromanufacturing Technology, Chemnitz, Germany

^b Eberhardt GmbH, Lichtenau, Germany

- 15:40 - 16:00 Generative manufacturing processes and process chains for the prototype production of tools in PECM (Rapid tooling, RT-PECM)
Hall, T.^{a,b}; Zeiner, M.^{a,b}; Frank, A.^b; Bähre, D.^{a,b};
^a Institute of Production Engineering, Saarland University, Saarbrücken, Germany
^b Center for Mechatronics and Automation Technology (ZeMA gGmbH), Saarbrücken, Germany
- 16:00 - 16:20 Influence of sample orientation on surface quality in Plasma Electrolytic Polishing (PEP)
Edaklavan Koroth, J.; Valentinčič, J.; Jerman, M.; Sabotin, I.; Lebar, A.; Drešar, P.;
Faculty of Mechanical Engineering, University of Ljubljana, Slovenia
- 16:20 - 16:40 Towards downscaling of electrochemical micromachining process
Saxena, K.^{a,b}; Arshad, M.^{a,b}; Reynaerts, D.^{a,b};
^a Micro- and Precision Engineering Group, Division Manufacturing Processes and Systems (MaPS),
Department of Mechanical Engineering, KU Leuven, Belgium
^b Member Flanders Make, Belgium
- 16:40 - 18:00 **Shop Floor Visit**
- 19:30 - 22:30 **Conference Dinner**

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- 08:30 - 08:40 **Coffee**

Session 3 – Simulation

Chairman: Prof. Hackert-Oschätzchen

- 08:40 - 09:00 Eco-friendly electrochemical polishing via stamp flushing
Sri Satya Omkar, D.^a; Chaitanya, G.^b; Girish Kant, G.^a; Divyansh P.^b
^a Department of Mechanical Engineering, Birla Institute of Technology and Science Pilani, Rajasthan, India
^b School of Mechanical Sciences, Indian Institute of Technology, Bhubaneswar, India
- 09:00 - 09:20 A homogenized description for electrochemically induced material dissolution
Schmidt, A.^a; van der Velden, T.^b; Ritzert, S.^b; Reese, S.^{b,c}; Waimann, J.^a
^a Institute of Mechanics of Materials, Ruhr-University Bochum, Bochum, Germany
^b Institute of Applied Mechanics, RWTH Aachen University, Aachen, Germany
^c University of Siegen, Siegen, Germany
- 09:20 - 09:40 Simulation-based investigation of flushing-induced workpiece deflection in electrochemical machining
Tchoupe Sambou, E.^a; Petersen, T.^a; Herrig, T.^a; Klink, A.^a; Bergs, T.^{a,b}
^a Manufacturing Technology Institute – MTI, RWTH Aachen University, Aachen, Germany
^b Fraunhofer Institute for Production Technology IPT, Aachen, Germany
- 09:40 - 10:00 Modelling of the vapor-gas-envelope formation during plasma electrolytic polishing
Danilov, I.; Schaarschmidt, I.; Steinert, P.; Schubert, A.
Chemnitz University of Technology, Chemnitz, Germany

10:00 - 10:30

Coffee Break

Session 4 – Techtalk and Application

Chairman: Dr.-Ing. Herrig

10:30 - 10:50 Multiphysics Modeling to Improve Process Control and Understanding of Electrochemical Machining

Dr. Sperber, J.

Comsol Multiphysics GmbH, Göttingen, Germany

10:50 - 11:10 Electrochemical Jet Edge Break – A customer-centric innovation

Urquhart-Shirra, J.

Texture Jet Ltd., Nottingham, UK

11:10 - 11:30 Development and Outlook of (P)ECM-Manufacturing Applications in the Aviation Industry

Bayer, K.; Feiling, N.

MTU Aero Engines AG, München, Germany

11:30 - 11:50 Development of Electrochemical Machining (ECM) Methods for Refractory Alloys

Moran, A.^a; Kiss, I.^b; Li, J.^c; Hall, T.^a; Inman, M.^a

^a *Faraday Technology, Inc., Englewood, OH USA*

^b *Saint Louis University, St. Louis, MO USA*

^c *Washington University in St. Louis, St. Louis, MO USA*

11:50 - 13:00

Lunch Break

Session 5 – Materials

Chairman: Dr.-ir. Saxena

13:00 - 13:20 Solid-State Electrochemistry of SiC Ceramics - Experiment vs. Simulation

Lein, T.^a; Šimůnková, L.^a; Danilov, I.^b; Schaarschmidt, I.^b; Martin, A.^b; Kutzer-Schulze, C.^a; Schneider, M.^c; Schubert, A.^b;

^a *TU Dresden, Inst. Mat. Sci., Dresden, Germany*

^b *TU Chemnitz, Professorship Micromanufacturing Technology, Chemnitz, Germany*

^c *Fraunhofer IKTS, Dresden, Germany*

13:20 - 13:40 Research on the Plasma Electrolytic Polishing Formulas for Stainless Steel

Mei-Yi, L.; Tzu Hung, W.; Chen hui, C.; Ci-Jie, J.; Tzu-Hong, C.;

Metal Industries Research & Development Centre, Taichung, Taiwan, Republic of China (R. O. C.)

13:40 - 14:00 Influence of contact resistance on Cu- and Al-Elements after Plasma-electrolytic Processing

Schulze, H.-P.; Herzig, M.; Kröning, O.; Darawish, H.

Leukhardt Schaltanlagen Systemtechnik GmbH, Gustav-Ricker-Straße 62, 39120 Magdeburg, Germany

14:00 - 14:30

Coffee Break

Session 6 – Hybrid Processes

Chairman: Dr.-Ing. Klink

14:30 - 14:50 Setup for flat jet electrochemical cleaning of weld seams

Martin, A.^a; Quitzke, S.^a; Krzyzanek, M.^b; Seelke, A.^b; Bergmann, N.^c; Schubert, A.^a

^aChemnitz University of Technology, Professorship Micromanufacturing Technology, Chemnitz, Germany

^bElektroanlagenbau Harting, Calau, Germany

^cFriedrich Motorsport, Lichtenfels, Germany

14:50 - 15:10 Investigating the by-products generated during ECM and Laser-ECM of NbC-Ni

Arshad, M.^{a,b}; Saxena, K.^{a,b}; Reynaerts, D.^{a,b}

^a Micro- and Precision Engineering Group, Division Manufacturing Processes and Systems (MaPS), Department of Mechanical Engineering, KU Leuven, Belgium

^b Member Flanders Make, Belgium

15:10 - 15:30

Closing Remarks