Fraunhofer IWU

FRAUNHOFER INSTITUTE FOR
MACHINE TOOLS AND
FORMING TECHNOLOGY IWU

November 24–25, 2020, Fraunhofer IWU, Chemnitz, Germany

INSECT 2020

16th International Symposium on Electrochemical Machining Technology

Virtual Conference
PROGRAM

Together with:

TECHNISCHE UNIVERSITÄT
CHEMNITZ

Dear ladies and gentlemen,
dear colleagues,

It is our great pleasure to invite you to the **16th International Symposium on Electrochemical Machining Technology INSECT 2020**, which will take place on November 24-25, 2020 and which will be the first INSECT held online.

The virtual symposium would like to build on to the successful past events of the last years. Besides the lectures, INSECT 2020 offers a virtual tour and presentation of the topic related testing facilities of Fraunhofer IWU and the Chemnitz University of Technology, and enough time and opportunities for questions and expert dialogues via the conference system.

Moreover, this year the international symposium will provide a unique platform to exchange ideas and discuss and share experience among researchers and engineers who are involved in ECM technology. In addition to fundamental investigations and applied material science, the symposium also focuses on all technical and practical aspects of industrial ECM implementation and application. Hybrid processes involving ECM will be specifically emphasised this year.

We look forward to welcoming you online!

Prof. Andreas Schubert
Chemnitz University of Technology and Fraunhofer IWU, Germany

PROGRAM

TUESDAY, NOVEMBER 24, 2020

WELCOME AND INTRODUCTION

9.00 **Welcome and Introduction**
A. Schubert, Chemnitz University of Technology and Fraunhofer IWU, Germany

SESSION 1: FUNDAMENTALS

CHAIR: M. SCHNEIDER
FRAUNHOFER IKTS, GERMANY

9.15 **Surface Modification by Cathodic Hydrogenation with Electrochemical Jet**
Y. Zhao[1], G. Zhang[1], J. Xue[1], S. Kakudo[2], M. Kunieda[2]
[1] Southern University of Science and Technology, China
[2] University of Tokyo, Japan

9.35 **Features of the Discharge Between a Metal Anode and a Hollow Current Supply**
A. Popov[1], V. I. Novikov[2], M. M. Radkevich[1], M. V. Novoselov[1], S. V. Zakharov[1], V. G. Teplukhin[1]
[1] Peter the Great Saint-Petersburg Polytechnic University, Russia
[2] Saint-Petersburg State University of Architecture and Civil Engineering, Russia

PROGRAM

TUESDAY, NOVEMBER 24, 2020

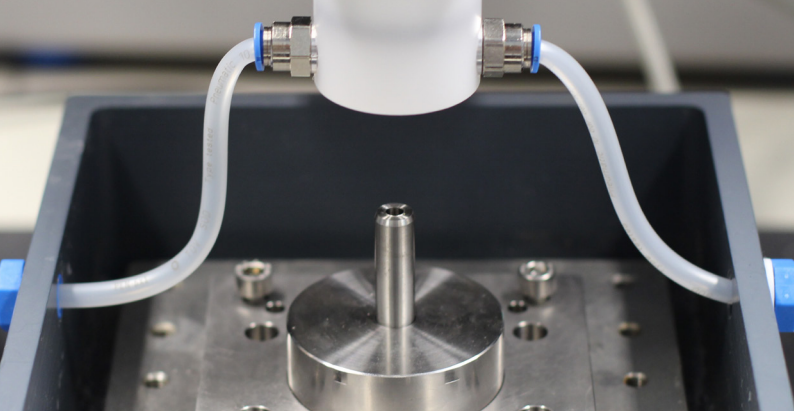
SESSION 1: FUNDAMENTALS

CHAIR: M. SCHNEIDER
FRAUNHOFER IKTS, GERMANY

9.55 **Detection of Hydrogen in Cathode Tool During Pulse Electrochemical Machining**
M. Ghasemiansafaei, M. Güner, F. Schäfer, M. Zeiner, D. Bähre
Saarland University, Germany

10.15 **Formation of Flow-Grooves during Electrochemical Machining**
B. Rommes, A. Klink, T. Herrig, J. Vorspohl, L. Ehle, T. Bergs
RWTH Aachen University, Germany

10.45 Coffee Break



SESSION 2: PROCESSING / PROCESS CONTROL

CHAIR: M. HACKERT-OSCHÄTZCHEN
OTTO VON GUERICKE UNIVERSITY, GERMANY

11.15 **Investigation of Single Pulse Smoothing Characteristics During PECM**
A. Klink, B. Rommes, L. Heidemanns, T. Herrig
RWTH Aachen University, Germany

11.35 **Process Source Analysis of the Regulation Parameters for Simultaneous Hole Widening**
H.-P. Schulze, O. Kröning, M. Herzig
Leukhardt Schaltanlagen Systemtechnik GmbH, Germany

11.55 **New Potentials for Precise ECM Achieved by Orbiting-Kinematics**
R. Schoesau[1], F. Böttcher[1], T. Petzold[2], H. Rentzsch[1], J. Edelmann[1]
[1] Fraunhofer IWU, Germany
[2] Chemnitz University of Technology, Germany

12.25 Lunch Break

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SESSION 3: MATERIALS

CHAIR: D. REYNAERTS
KATHOLIEKE UNIVERSITEIT LEUVEN, BELGIUM

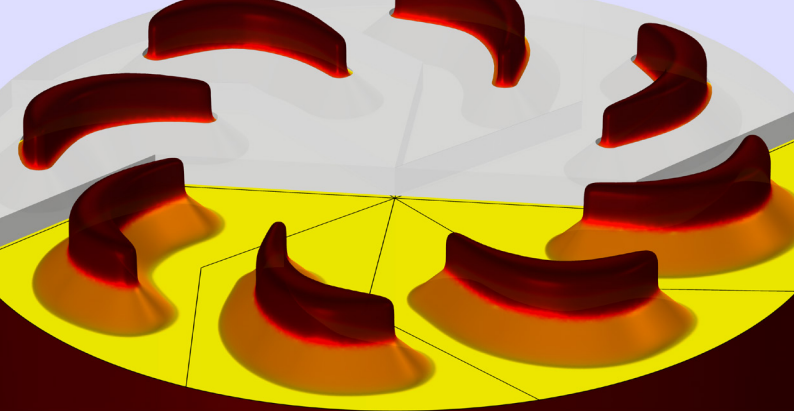
13.25 **Electrochemical Machining of Molybdenum**
M. Schneider[1], L. Šimůnková[2], A. Michaelis[1,2], W. Hoogsteen[3]
[1] Fraunhofer IKTS, Germany
[2] Technische Universität Dresden, Germany
[3] Philips Consumer Lifestyle, The Netherlands

13.45 **Experimental Study of Electrochemical Machining of Selective Laser Melted Inconel 718**
F. Herter[1], A. Ernst[1], A. Bergmann[2], D. Bähre[1]
[1] Saarland University, Germany
[2] Fraunhofer IPK, Germany

14.05 **Statistical Analysis of Jet Electrochemical Post-Processing of Additively Manufactured Workpieces**
M. Y. Zanjani[1], A. Martin[1], M. Zinecker[1], A. Schubert[1,2]
[1] Chemnitz University of Technology, Germany
[2] Fraunhofer IWU, Germany

14.25 **Pulsed Electrochemical Machining of 1.2709 Additive Manufactured Steel**
S. Schröder, T. Petzold, A. Martin, A. Schubert
Chemnitz University of Technology, Germany

14.55 Coffee Break



SESSION 4: SIMULATION AND MODELLING

CHAIR: H. ZEIDLER
TU BERGAKADEMIE FREIBERG, GERMANY

15.25 **Multiphysics Simulation Enabled 'Virtual Sensing' Approach for Monitoring the Parameters in the Interelectrode Gap During Tool-Based Hybrid Laser Electrochemical Micromachining**
K. K. Saxena[1], M. Wu[1,2], X. Chen[1,2], J. Qian[1], D. Reynaerts[1]
[1] Katholieke Universiteit Leuven, Belgium
[2] Guangdong University of Technology, China

15.45 **Transient Removal Simulation of the Jet Electrochemical Machining Process Based on a Finite Area Element Grid**
T. Wienand, G. Meichsner, M. Hackert-Oschätzchen
Otto von Guericke University Magdeburg, Germany

16.05 **Order Reduction of Simulation Models for the Precise Electrochemical Machining of Centrifugal Impellers**
S. Loebel[1], T. Petzold[1], P. Steinert[1], M. Zinecker[1], A. Schubert[1,2]
[1] Chemnitz University of Technology, Germany
[2] Fraunhofer IWU, Germany

PROGRAM
WEDNESDAY, NOVEMBER 25, 2020

SESSION 5: APPLICATIONS

CHAIR: A. KLINK
RWTH AACHEN UNIVERSITY, GERMANY

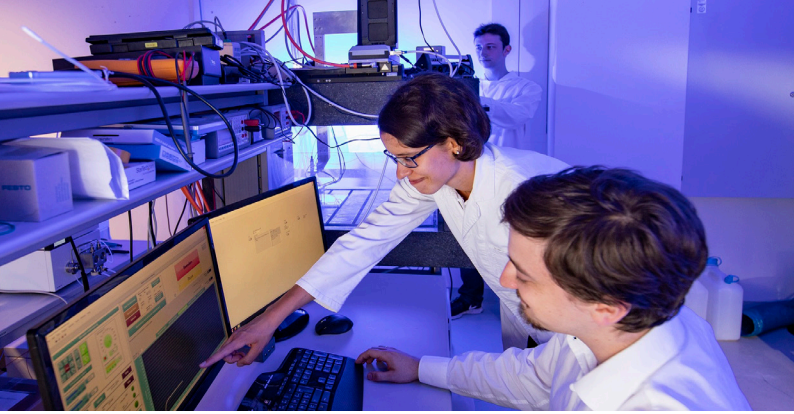
9.30 **Antibacterial Surfaces Textured by Electrolyte Jet Machining**
H. Jing[1], M. Kunieda[1], L. Romoli[2]
[1] University of Tokyo, Japan, [2] University of Parma, Italy

9.50 **Precise Processing of Multiple Actuator Elements by Pulsed Electrochemical Machining**
J. Schneider[1], T. Petzold[2], M. Uhlmann[1], A. Boehm[1], J. Edelmann[1], A. Martin[2], A. Schubert[2]
[1] Fraunhofer IWU, Germany
[2] Chemnitz University of Technology, Germany

10.10 **Pulse Electrochemical Machining (PECM) of Micro-structured Functional Surfaces**
T. Hall[1], A. Ernst[1], D. Durneata[1], H. Natter[1], M. Saumer[2], D. Bähre[1]
[1] Saarland University, Germany
[2] University of Applied Sciences Kaiserslautern, Germany

10.30 **Process Design for the Precise Electrochemical Machining of Internal Blind Hole Gears**
I. Schaarschmidt[1], P. Steinert[1], M. Zinecker[1], A. Schubert[1,2]
[1] Chemnitz University of Technology, Germany
[2] Fraunhofer IWU, Germany

11.00 Coffee Break



VIRTUAL LAB TOUR

11.30 **Current Research and Innovations in Electrochemical Machining**

11.50 **Dialogue with Experts**
J. Edelmann, Fraunhofer IWU, Germany
A. Martin, Chemnitz University of Technology, Germany
I. Danilov, Chemnitz University of Technology, Germany

12.00 Lunch Break

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WEDNESDAY, NOVEMBER 25, 2020

SESSION 6: HYBRID EC-PROCESSES

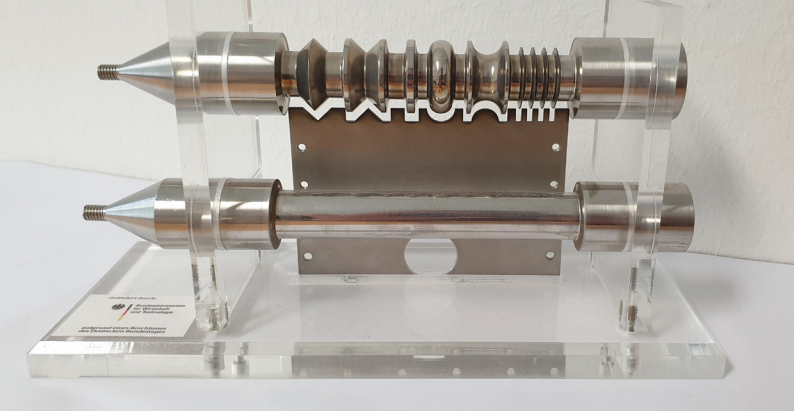
CHAIR: D. BÄHRE
SAARLAND UNIVERSITY, GERMANY

13.00 **Electrolytic Plasma Micropatterning of Plasma Sprayed Ceramic Coatings**
N. Laugel[1], D. Bogachov[1,2], A. Yerokhin[1]
[1] University of Manchester, United Kingdom
[2] Sandon Global, United Kingdom

13.20 **Hybrid Electrochemical Machining Processes**
A. Ruszaj[1,2], M. Cygnar[1], K. Furyk-Grabowska[1], M. Grabowski[2]
[1] State University of Applied Sciences, Poland
[2] Cracow University of Technology, Poland

13.40 **Workpiece Temperature during Plasma-Electrolytic Polishing**
H. Zeidler[1,2], F. Böttger-Hiller[2], M. Penzel[2,] T. Böttger[1]
[1] TU Bergakademie Freiberg, Germany
[2] Beckmann-Institute for Technology Development, Germany

14.00 **Correlation between Current Density and Ablation Rate of Jet-PeP**
S. Quitzke, A. Martin, A. Schubert
Chemnitz University of Technology, Germany



14.20 **Electrolyte Flow in Plasma-Electrolytic Polishing**
H. Zeidler[1,2], F. Böttger-Hiller[2], M. Penzel[2], T. Böttger[1], H. Leihkauf[1]
[1] TU Bergakademie Freiberg, Germany
[2] Beckmann-Institute for Technology Development, Germany

14.40 **Announcement INSECT 2021**

14.50 **Closing Remarks INSECT 2020**
A. Schubert, Chemnitz University of Technology and Fraunhofer IWU, Germany

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The International Advisory Board consists of the following experts from academia, research and industry:

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– M. Zinecker, Chemnitz University of Technology, Germany

GENERAL INFORMATION

Conference Contact
Phone +49 371 5397-1880
www.insect-symposium.de

Conference Location
Microsoft Teams
The dial-up conference link will be sent to you after receipt of payment.

Participation Fee / Registration
The participation fee amounts to 300 Euro (200 Euro Early Bird until October 31, 2020) and includes the digital conference attendance and the conference proceedings, which will be sent to you by post. Please register via the conference website www.insect-symposium.de by November 13, 2020.

Your registration will be confirmed by e-mail and by the receipt of an invoice.

Payment
We kindly ask you to pay your participation fee immediately upon receipt of the invoice; otherwise we cannot send you the dial-up conference link. Cancellations received by October 31, 2020 will be charged a cancellation fee of 50 Euro. Cancellations received after October 31, 2020 will be charged the full participation fee. The change of participant is free of charge.

Conference Language
The conference language is English.