



Fraunhofer
IWU

FRAUNHOFER INSTITUTE FOR
MACHINE TOOLS AND
FORMING TECHNOLOGY IWU

Chemnitz, November 12–13, 2013

INSECT 2013
INTERNATIONAL SYMPOSIUM
ON ELECTROCHEMICAL MACHINING
TECHNOLOGY

Final Program



TECHNISCHE UNIVERSITÄT
CHEMNITZ



HEINRICH HEINE
UNIVERSITÄT DÜSSELDORF



Dear Ladies and Gentlemen,
dear Colleagues,

It is our great pleasure to welcome you to the 9th International Symposium on ElectroChemical Machining Technology INSECT 2013 at the Fraunhofer Institute for Machine Tools and Forming Technology IWU in Chemnitz, Germany.

The 9th International Symposium on ElectroChemical Machining Technology INSECT 2013 ties up to the successful past conferences in Düsseldorf (2004), Freiburg (2005), Dresden (2006), Chemnitz (2007), Dresden (2009), Brussels (2010), Vienna (2011) and Crakow (2012).

This international symposium will provide a unique platform to exchange ideas as well as to discuss and share experience among researchers and engineers who are involved in ECM technology. Besides fundamental investigations of the electrode/electrolyte interface and applied material science, the conference also focuses on all technical and practical aspects of ECM implementation and application in industry.

We wish you a pleasant and interesting stay in Chemnitz!

Prof. Andreas Schubert

Fraunhofer IWU / Technische Universität Chemnitz

TUESDAY
NOVEMBER 12, 2013

WELCOME AND INTRODUCTION

Chair: A. Schubert, Fraunhofer IWU, Germany

8.00 **Registration**

9.00 **Welcome and Introduction**

A. Schubert

Fraunhofer IWU, Germany

9.05 **Rounding and Deburring of Injection System
Components – ECM and Alternative Processes**

S. Schammer, T. Austel, R. Garn, [A. Lenk](#)

Continental Automotive GmbH, Germany

9.30 **(P)ECM in Industry –
From Research and Development to Production**

H.-H. Wolters

ECM Technologies BV, The Netherlands

9.55 Coffee Break

TUESDAY

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SESSION 1: INDUSTRIAL APPLICATIONS

Chair: K.P. Rajurkar, University of Nebraska-Lincoln,
United States of America

10.15 **2D Synchrotron Microradiography Measurements
of Slag Inclusions in Stainless Steel Shaving Caps for
ECM Applications**

W. Hoogsteen, I.F.R. Poweleit, L. Helfen
Philips Consumer Lifestyle, The Netherlands

10.40 **Precise Electrochemical Machining of Nickel Base
Integrated Blade Compressor Rotors**

A. Platz, N. Feiling
MTU Aero Engines Holding AG, Germany

11.05 **Edge Rounding of Micro Bores by Inverse Jet
Electrochemical Machining**

B. Hommel¹, F. Jähn¹, M.Scharrnbeck², R. Garn³,
A. Lenk³, M. Hackert-Oschätzchen⁴, G. Meichsner⁵,
A. Schubert^{4,5}

¹ SITEC Industrietechnologie GmbH, Germany

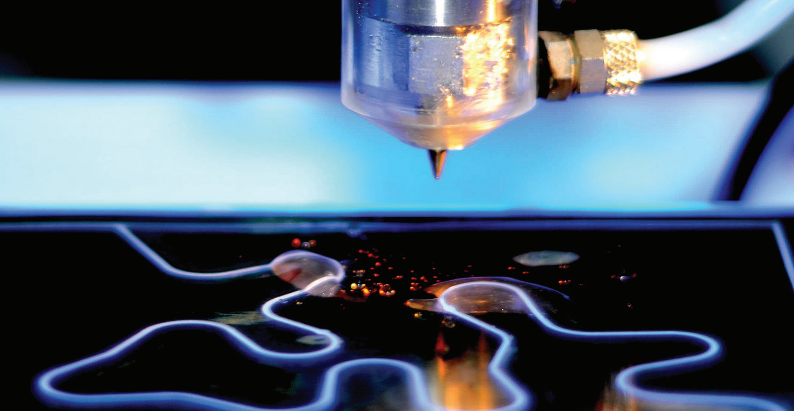
² SITEC Automation GmbH, Germany

³ Continental Automotive GmbH, Germany

⁴ Technische Universität Chemnitz, Germany

⁵ Fraunhofer IWU, Germany

11.30 Lunch



SESSION 2: PROCESS DESIGN

Chair: M. Brussee, PEMTec SNC, France

12.30 Benefits and Drawbacks Using Plastic Based Materials Produced by Additive Manufacturing Technologies in the Electrochemical Environment

A. Rebschläger¹, O. Weber¹, B. Heitkamp²

¹ Center for Mechatronics and Automatization, Germany

² PEMTec SNC, France

12.55 Resource-Efficient Design of Precise Electrochemical Machining

A. Schubert^{1,3}, G. Meichsner¹, L. Boenig²,

M. Hackert-Oschätzchen³, M. Krönert³, J. Edelmann¹

¹ Fraunhofer IWU, Germany

² Boenig Präzisionswerkzeugbau GmbH, Germany

³ Technische Universität Chemnitz, Germany

13.20 Investigation of the Energy Consumption for the Pulse Electrochemical Machining (PECM) Process

M. Swat¹, A. Rebschläger², D. Bähre¹

¹ Saarland University, Germany

² Center for Mechatronics and Automatization, Germany

13.45 Study of Current Efficiency for Pulse Electrochemical Machining of Nickel Alloy

L. Gu, Y. Zhang, K. P. Rajurkar

University of Nebraska-Lincoln, United States of America

14.10 Coffee Break

TUESDAY

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SESSION 3: APPLICATIONS

Chair: A. Schubert, Fraunhofer IWU, Germany

14.30 **Investigation on the Influence of the Microstructure by Pulse Electrochemical Machining of Cast Iron**

O. Weber¹, D. Bähre²

¹ Center for Mechatronics and Automatization, Germany

² Saarland University, Germany

14.55 **Precise Electrochemical Machining of Rotating Workpieces**

M. Hackert-Oschätzchen¹, L. Boenig², G. Meichsner³,
M. Zinecker¹, M. Krönert¹, A. Schubert^{1,3}

¹ Technische Universität Chemnitz, Germany

² Boenig Präzisionswerkzeugbau GmbH, Germany

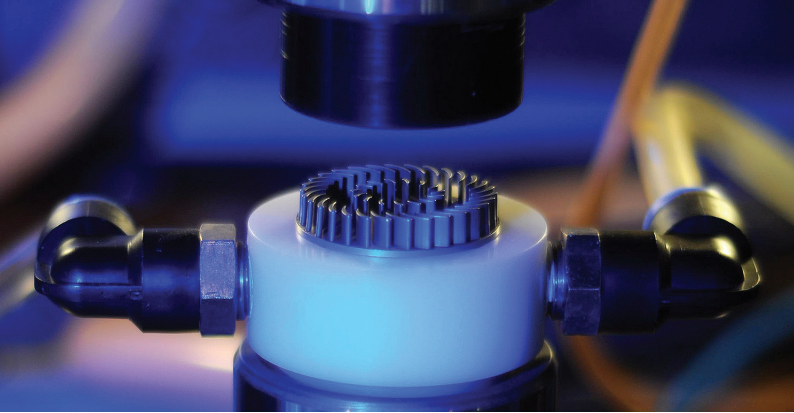
³ Fraunhofer IWU, Germany

15.20 **Jet Electrochemical Machining of Selective Laser Melted Metals for Micro Injection Moulds**

H. Zeidler¹, A. Martin¹, M. Hackert-Oschätzchen¹,
G. Meichsner², A. Schubert^{1,2}

¹ Technische Universität Chemnitz, Germany

² Fraunhofer IWU, Germany



15.45 **Electrochemical Technology of Packages for Multichip Modules**

V. Sokol, V. Yakovtseva, [V. Shulgov](#)

Belarusian State University of Informatics and Radioelectronics (BSUIR) Minsk, Belarus

16.10 **Visit of the Precision- and Micromachining Laboratories at Fraunhofer IWU**

17.30 Bus transfer to the August Horch Museum Zwickau

18.30 Guided tour through the Museum

20.00 **Conference Dinner with Presentation of the Best Paper Award**

22.15 Bus transfer back to the hotels
Mercure Hotel Kongress Chemnitz
Chemnitzer Hof
Seaside Residenz Hotel Chemnitz

and Fraunhofer IWU

WEDNESDAY

NOVEMBER 13, 2013

SESSION 4: FUNDAMENTALS OF ECM I

Chair: M. M. Lohrengel, Heinrich-Heine-Universität
Düsseldorf, Germany

9.00 **Electrochemical Micromachining of Passive Electrodes –
Application to Bulk Metallic Glasses**

R. Sueptitz, M. Uhlemann, J. Eckert, A. Gebert,
Ch. Becker

Leibniz Institute for Solid State and Materials Research
Dresden, Germany

9.25 **ECM of SiC-Based Ceramics – A First Approach**

M. Schneider¹, N. Schubert², A. Michaelis^{1,2}

¹ Fraunhofer IKTS, Germany

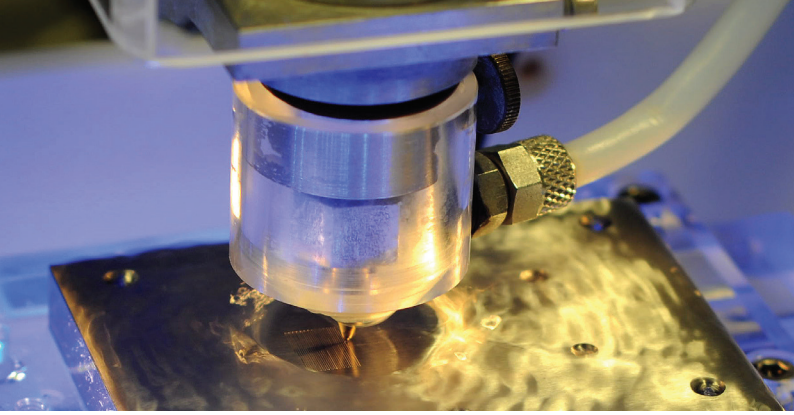
² Technische Universität Dresden, Germany

9.50 **Quantification of Gaseous Products During ECM**

M. Manko, M. M. Lohrengel, K.P. Rataj

Heinrich-Heine-Universität Düsseldorf, Germany

10.15 Coffee Break



SESSION 5: FUNDAMENTALS OF ECM II

Chair: M. Schneider, Fraunhofer IKTS, Germany

10.35 Classification of Materials During Anodic Dissolution Regarding ECM Conditions

M. M. Lohrengel, M. Manko, T.R. Munninghoff, K.P. Rataj
Heinrich-Heine-Universität Düsseldorf, Germany

11.00 Scanning Droplet Cell Microscopy for Electrochemical Depth Profiling

A.W. Hassel, J.P. Kollender, M. Voith, M. Hafner
Johannes Kepler University Linz, Austria

11.25 ECM of Cemented Carbides with Various Microstructures

N. Schubert¹, M. Schneider², A. Michaelis^{1,2}

¹ Technische Universität Dresden, Germany

² Fraunhofer IKTS, Germany

11.50 Lunch

WEDNESDAY

NOVEMBER 13, 2013

SESSION 6: SIMULATION AND MODELING

Chair: J. Deconinck, Vrije Universiteit Brussel, Belgium

12.50 **A New Approach to Simulating the Nano-Second Pulse Electrochemical Micro-Machining: The Pulse Shortcut Strategy**

E. L. Hotoiu, J. Deconinck

Vrije Universiteit Brussel, Belgium

13.15 **A Model Based Quality Control System for Laser Chemical Finishing of Micro Forming Tools**

P. Zhang¹, S. Mehrafsun², G. Goch¹, F. Vollertsen²

¹ University of Bremen, Germany

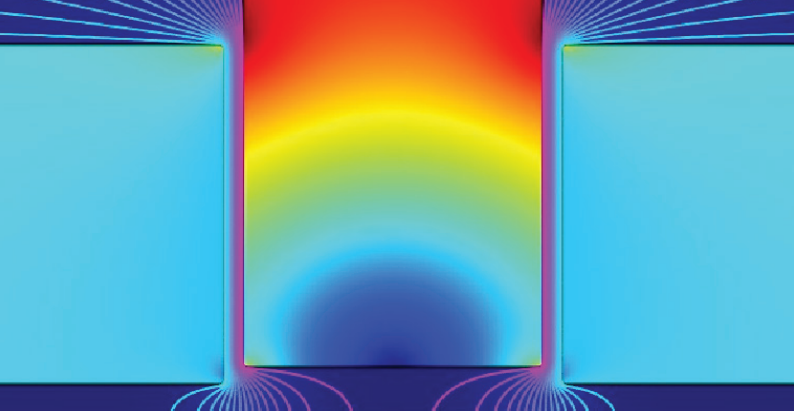
² Bremer Institut für angewandte Strahltechnik GmbH, Germany

13.40 **Analysis of the Simulation Accuracy of Electrochemical Machining Processes Based on the Integration Level of Different Physical Effects**

F. Klocke, M. Zeis, S. Harst, T. Herrig, A. Klink

RWTH Aachen University, Germany

14.05 Coffee Break



SESSION 7: HYBRID ECM PROCESS

Chair: A. Klink, RWTH Aachen University, Germany

14.25 Investigations on Electrochemical Assistance of Microturning Process

M. Grabowski, S. Skoczypiec, A. Ruszaj
Cracow University of Technology, Poland

14.50 Changes on Surfaces of Electrodes in Aqueous Electrolytic Solutions at High Voltages

H. Zeidler, W. Meyer, C. Löser, W. Adamitzki, K. Nestler
BECKMANN-INSTITUT für Technologieentwicklung e. V.,
Germany

15.15 Announcement INSECT 2014

D. Bähre, Saarland University, Germany

15.20 Closing Remarks

A. Schubert, Fraunhofer IWU, Germany

CITY MAP



Conference location

Fraunhofer Institute for Machine Tools and
Forming Technology IWU
Reichenhainer Strasse 88
09126 Chemnitz, Germany

Conference office

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