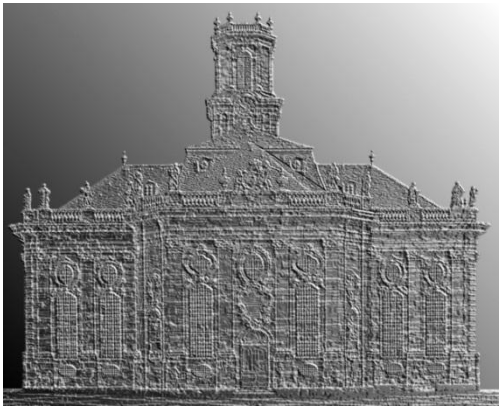
UNIVERSITÄT DES SAARLANDES

INSECT 2014

10th International Symposium on Electrochemical Machining Technology



November 13-14, 2014

Saarbrücken, Germany

Final Program

Lehrstuhl für Fertigungstechnik, Universität des Saarlandes

Dear Ladies and Gentlemen,

I am very pleased to welcome you in the name of the organizers to the International Symposium on ElectroChemical Machining Technology INSECT 2014 at Saarland University in Saarbrücken, Germany.

At the INSECT, researchers and engineers meet already for the 10th time to present research- and development results and to exchange ideas. The INSECT has established as a unique international platform to share and discuss experiences between participants from science and industry.

This year's conference deals again with practical, application-oriented topics as well as scientific problems. The topical range covers all aspects of Electrochemical Machining (ECM).

We wish you a pleasant stay in Saarbrücken and an interesting Symposium.

Prof. Dr.-Ing. Dirk Bähre
Institute of Production Engineering

Saarland University
Saarbrücken, Germany

History

Looking back to the beginning of the International Symposium on ElectroChemical Machining Technology (INSECT) first held at the Heinrich-Heine-Universität in 2004, the conference location changed throughout the last years and continues to offer scientists as well as industry a platform to present their research, to exchange ideas and contribute knowledge in the field of electrochemistry.

1. Heinrich-Heine-Universität Düsseldorf, Germany
2. Albert-Ludwigs-Universität Freiburg, Germany
3. Fraunhofer IKTS Dresden, Germany
4. Fraunhofer IWU Chemnitz, Germany
5. Fraunhofer IKTS Dresden, Germany
6. Vrije Universiteit Brussel, Belgium
7. Centre of Electrochemical Surface Technology Vienna, Austria
8. The Institute of Advanced Manufacturing Technology Krakow, Poland
9. Fraunhofer IWU Chemnitz, Germany

In 2014 we are looking forward to host the 10th INSECT at Saarland University in Saarbrücken.

Topics

- Monitoring and controlling
- Anodic dissolution and passivation
- EC macro- and micro-machining
- Fundamentals of ECM
- Materials and tools for ECM

Thursday, November 13, 2014

8:00	**Registration**
9:00	**Welcome and Introduction** D. Bähre Saarland University, Germany
9:10	Keynote **10 years INSECT - a private review** M.M. Lohrengel Heinrich-Heine-Universität Düsseldorf, Germany
9:30	Keynote **Industrial Application of Electrochemical Machining – Challenges and Requirements** M. Baumgärtner LEISTRITZ Turbomaschinen Technik GmbH, Germany
9:50	Coffee Break

Thursday, November 13, 2014

SESSION 1: MONITORING AND CONTROLLING

Chair: M. Schneider, Fraunhofer IKTS, Germany

10:10	**Pulsed Precision ECM applications in the field of consumer products and medical applications** J.R. Fransens[1], C. de Regt[1], H. Zijlstra[2] [1] Irmato Industrial Solutions, The Netherlands [2] Irmato ECM GmbH, Germany
10:35	**Evaluation of Gap Control Strategies in Jet Electrochemical Machining on Defined Shape Deviations** M. Hackert-Oschätzchen[1], A. Martin[1], G. Meichsner[2], A. Schubert[1,2] [1] Technische Universität Chemnitz, Germany [2] Fraunhofer IWU, Germany
11:00	**Geometric shaping analysis based on PECM video process observations** A. Rebschläger[1], K.U. Fink[1], T. Heib[1], D. Bähre[2] [1] Center for Mechatronics and Automation, Germany [2] Saarland University, Germany
11:25	**Advanced parts require enhanced ECM Technology** P. Matt, F. Wozniak, V. Weber, U. Burmester-Butscher Kennametal Extrude Hone GmbH, Germany
11:50	Lunch

Thursday, November 13, 2014

SESSION 2: ANODIC DISSOLUTION AND PASSIVATION – Part I

Chair: A. Klink, RWTH Aachen University, Germany

12:50 **The effect of solvents on the surface quality during ECM of WC**
N. Schubert[1], L. Simunkova[2], M. Schneider[2], A. Michaelis[1,2]
[1] Technische Universität Dresden, Germany
[2] Fraunhofer IKTS, Germany

13:15 **Determination of the gas generation during precise electrochemical machining**
G. Meichsner[1], L. Boenig[2], M. Hackert-Oschätzchen[3], M. Krönert[3], J. Edelmann[1], A. Schubert[1,3]
[1] Fraunhofer IWU, Germany
[2] Boenig Präzisionswerkzeugbau GmbH, Germany
[3] Technische Universität Chemnitz, Germany

13:40 **The effect of the heat treatment of an ASTM A693 stainless steel on the ECM behavior in sodium nitrate and sodium nitrite electrolyte**
W. Hoogsteen
Philips Consumer Lifestyle, The Netherlands

14:05 Coffee Break

Thursday, November 13, 2014

SESSION 3: EC MACRO- AND MICRO MACHINING

Chair: M. Hackert-Oschätzchen, Technische Universität Chemnitz, Germany

14:25 **Servo Feeding Control System used in Micro Electrochemical Machining with Electrostatic Induction Feeding Method**
W. Han, M. Kunieda
University of Tokyo, Japan

14:50 **Stencil Fabrication by Through Mask Electrochemical Micromachining of Stainless Steel**
H.-Y. Ryu[1], J.-B. Ahn[1], J.-G. Park[1,2]
[1] Department of Bio-Nano Technology, Hanyang University, Korea
[2] Department of Materials Engineering, Hanyang University, Korea

15:15 **Electrochemical micromachining of passivized Fe-based bulk metallic glasses in aqueous solutions**
S. Horn, M. Uhlemann, M. Stoica, J. Eckert, A. Gebert
Leibniz IFW, Germany

15:40 **Electrolyte Jet Machining for Surface Texturing of Inconel 718**
J. Mitchell-Smith[1], J.W. Murray[1], M. Kunieda[2], A. T. Clare[1],
[1] University of Nottingham, United Kingdom
[2] University of Tokyo, Japan

Thursday, November 13, 2014

Social Program & Tour

16:05	Bus transfer to the **World Cultural Heritage Site 'Völklinger Hütte'**
16:45	**Guided tour**
18:15	Bus transfer to the Conference Dinner
19:00	**Conference Dinner at Victor's Residenz-Hotel Saarbrücken with presentation of the Best Paper Award**
22:00	Bus transfer to the city center ('Rathaus' - en: Townhall) of Saarbrücken **and** Saarland University

Friday, November 14, 2014

SESSION 4: FUNDAMENTALS OF ECM – Part I

Chair: A. Rebschläger, Center for Mechatronics and Automation, Germany

8:30	**Shaping of super magnets by ECM - $Nd_2Fe_{14}B$ as an example** B. Fürderer, M. Manko, M.M. Lohrengel Heinrich-Heine-Universität Düsseldorf, Germany
8:55	**Temperature measurement under near-ECM conditions** M. Schneider[1], N. Schubert[2], A. Michaelis[1,2] [1] Fraunhofer IKTS, Germany [2] Technische Universität Dresden, Germany
9:20	**Fundamental Study of ECM Gap Phenomena using Transparent Electrode** Y. Shimazaki, T. Kitamura, M. Kunieda University of Tokyo, Japan
9:45	Coffee Break

Friday, November 14, 2014

SESSION 5: MATERIALS AND TOOLS FOR ECM

Chair: M. Kunieda, University of Tokyo, Japan

10:00	**PhoGaTool: A new Process Chain for Manufacturing of ECM Tools** H. Natter[1], M. Weinmann[1], W. Munief[2], O. Weber[3], D. Bähre[3], M. Saumer[2] [1] Physical Chemistry, Saarland University, Germany [2] University of Applied Sciences Kaiserslautern, Germany [3] Institute of Production Engineering, Saarland University, Germany
10:25	**Electrochemical machinability of additive manufactured materials** H.-H. Wolters ECM Technologies BV, The Netherlands
10:50	**Removal efficiency and gap evolution of electrolytic copper in Pulse Electrochemical Machining** P. Steuer[1,2], A. Ernst[2], D. Bähre[2] [1] Center for Mechatronics and Automation, Germany [2] Saarland University, Germany
11:15	**Electrochemical Metal Working Machine (P)ECM Technology** **More than just deburring!** R. Keller EMAG ECM GmbH, Germany
11:40	Lunch

Friday, November 14, 2014

SESSION 6: ANODIC DISSOLUTION AND PASSIVATION – Part II

Chair: A.W. Hassel, Johannes Kepler University Linz, Austria

12:40 **Precise machining of complex series production parts**
M. Brussee[1], J. Kraft[1], S. Winkler[2]
[1] PEMTec SNC, France
[2] Fraunhofer IWU, Germany

13:05 **Research and application of an electrochemical surface treatment for metallic workpieces by means of aqueous electrolyte solution stream under high electrical potential and partial establishment of a plasma**
W. Adamitzki, G. Glowa, N. Laugel, C. Loeser, K. Nestler, H. Zeidler
BECKMANN-Institut für Technologieentwicklung e.V., Germany

13:30 **Experimental Analysis on Surface-related Process Performance during Precise Electrochemical Machining (PECM) of the Gamma Titanium Aluminide TNM-B1 for Turbine Applications**
F. Klocke, M. Holsten, M. Zeis, A. Klink
RWTH Aachen University, Germany

13:55 Coffee Break

Friday, November 14, 2014

SESSION 7: FUNDAMENTALS OF ECM – Part II

Chair: H. Natter, Saarland University, Germany

14:15 **Surface studies and in-depth characterization by FT-SDCM with coupled downstream analytics**
M. Hafner[1], J.P. Kollender[2], A.I. Mardare[2], A.W. Hassel[1,2]
[1] Christian Doppler Laboratory for Combinatorial Oxide Chemistry, Austria
[2] Johannes Kepler University Linz, Austria

14:40 **Experimental and Numerical Analysis of Gas Evolution and Transport during Electrochemical Machining and their Effect on Material Removal**
F. Klocke, M. Zeis, T. Herrig, S. Harst, A. Klink
RWTH Aachen University, Germany

15:05 **Announcement INSECT 2015**

15:15 **Closing Remarks**
D. Bähre
Saarland University, Germany

Advisory Board

Location

The 10th INSECT will be held at the Aula, Building A3 3, at Saarland University.

Saarland University
Campus A3 3 – Aula
66123 Saarbrücken
Germany

Auspice

The INSECT 2014 is organized under the auspices of

- Universität des Saarlandes
- Heinrich-Heine-Universität Düsseldorf
- International Society of Electrochemistry

UNIVERSITÄT DES SAARLANDES

HEINRICH HEINE UNIVERSITÄT DÜSSELDORF

Registration

Please use the online registration form provided at

www.lft.uni-saarland.de

(→ INSECT 2014)

Please register by no later than November 7, 2014. The registration process is handled by the Office for Knowledge and Technology Transfer of Saarland University (KWT).

Registration Fees

Regular: 300 € (360 € after July 31, 2014)

Students: 170 € (200 € after July 31, 2014)

Students must show an adequate document at the conference desk.
The registration fee includes the coffee breaks, two lunches and the conference proceedings. Furthermore, an outstanding guided tour and the conference dinner are included.

Conference Organization

Prof. Dirk Bähre
Saarland University

Hans Kuhn
PEMTec SNC

Andreas Rebschläger
ZeMA gGmbH