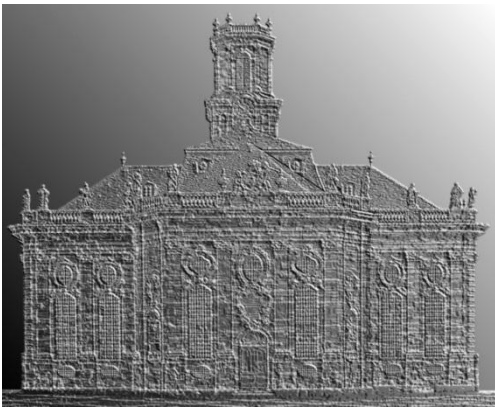




UNIVERSITÄT  
DES  
SAARLANDES

## **INSECT 2014**

### **10<sup>th</sup> 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 10<sup>th</sup> 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 10<sup>th</sup> 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<sup>1</sup>, C. de Regt<sup>1</sup>, H. Zijlstra<sup>2</sup>  
<sup>1</sup> Irmato Industrial Solutions, The Netherlands  
<sup>2</sup> Irmato ECM GmbH, Germany
- 10:35 | **Evaluation of Gap Control Strategies in Jet Electrochemical Machining on Defined Shape Deviations**  
M. Hackert-Oschätzchen<sup>1</sup>, A. Martin<sup>1</sup>, G. Meichsner<sup>2</sup>, A. Schubert<sup>1,2</sup>  
<sup>1</sup> Technische Universität Chemnitz, Germany  
<sup>2</sup> Fraunhofer IWU, Germany
- 11:00 | **Geometric shaping analysis based on PECM video process observations**  
A. Rebschläger<sup>1</sup>, K.U. Fink<sup>1</sup>, T. Heib<sup>1</sup>, D. Bähre<sup>2</sup>  
<sup>1</sup> Center for Mechatronics and Automation, Germany  
<sup>2</sup> 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<sup>1</sup>, L. Simunkova<sup>2</sup>, M. Schneider<sup>2</sup>,  
A. Michaelis<sup>1,2</sup>  
<sup>1</sup> Technische Universität Dresden, Germany  
<sup>2</sup> Fraunhofer IKTS, Germany
- 13:15 | **Determination of the gas generation during precise electrochemical machining**  
G. Meichsner<sup>1</sup>, L. Boenig<sup>2</sup>, M. Hackert-Oschätzchen<sup>3</sup>, M. Krönert<sup>3</sup>, J. Edelmann<sup>1</sup>, A. Schubert<sup>1,3</sup>  
<sup>1</sup> Fraunhofer IWU, Germany  
<sup>2</sup> Boenig Präzisionswerkzeugbau GmbH, Germany  
<sup>3</sup> 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<sup>1</sup>, J.-B. Ahn<sup>1</sup>, J.-G. Park<sup>1,2</sup>  
<sup>1</sup> Department of Bio-Nano Technology, Hanyang University, Korea  
<sup>2</sup> 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<sup>1</sup>, J.W. Murray<sup>1</sup>, M. Kunieda<sup>2</sup>, A. T. Clare<sup>1</sup>,  
<sup>1</sup> University of Nottingham, United Kingdom  
<sup>2</sup> University of Tokyo, Japan

Thursday, November 13, 2014

**Social Program & Tour**

- |       |   |
|-------|---|
| 16:05 | Bus transfer to the<br><b>World Cultural Heritage Site<br/>'Völklinger Hütte'</b>                                     |
| 16:45 | <b>Guided tour</b>  |
| 18:15 | Bus transfer to the Conference Dinner   |
| 19:00 | <b>Conference Dinner at<br/>Victor's Residenz-Hotel Saarbrücken<br/>with presentation of the<br/>Best Paper Award</b> |
| 22:00 | Bus transfer to the city center ('Rathaus' -<br>en: Townhall) of Saarbrücken<br><b>and</b> 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 -  $\text{Nd}_2\text{Fe}_{14}\text{B}$  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<sup>1</sup>, N. Schubert<sup>2</sup>, A. Michaelis<sup>1,2</sup>  
<sup>1</sup> Fraunhofer IKTS, Germany  
<sup>2</sup> 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<sup>1</sup>, M. Weinmann<sup>1</sup>, W. Munief<sup>2</sup>, O. Weber<sup>3</sup>, D. Bähre<sup>3</sup>, M. Saumer<sup>2</sup>  
<sup>1</sup> Physical Chemistry, Saarland University, Germany  
<sup>2</sup> University of Applied Sciences Kaiserslautern, Germany  
<sup>3</sup> 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<sup>1,2</sup>, A. Ernst<sup>2</sup>, D. Bähre<sup>2</sup>  
<sup>1</sup> Center for Mechatronics and Automation, Germany  
<sup>2</sup> 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<sup>1</sup>, J. Kraft<sup>1</sup>, S. Winkler<sup>2</sup>  
<sup>1</sup> PEMTec SNC, France  
<sup>2</sup> 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<sup>1</sup>, J.P. Kollender<sup>2</sup>, A.I. Mardare<sup>2</sup>, A.W. Hassel<sup>1,2</sup>  
<sup>1</sup> Christian Doppler Laboratory for Combinatorial Oxide Chemistry, Austria  
<sup>2</sup> 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**

- Bähre D., Lehrstuhl für Fertigungstechnik, Universität des Saarlandes, Germany
- Baumgärtner M., Leistriz Turbomaschinen Technik GmbH, Germany
- Brussee M., PEMTec SNC, France
- Deconinck J., Vrije Universiteit Brussel, Belgium
- Gmelin T., EMAG ECM GmbH, Germany
- Hackert-Oschätzchen M., Technische Universität Chemnitz, Germany
- Hassel A.W., Johannes Kepler Universität Linz, Austria
- Hoogsteen W., Philips Consumer Lifestyle, The Netherlands
- Lohrengel M.M., Heinrich-Heine-Universität Düsseldorf, Germany
- Natter H., Lehrstuhl für Physikalische Chemie, Universität des Saarlandes, Germany
- Rebschläger A., ZeMA - Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Germany
- Schneider M., Fraunhofer IKTS, Germany
- Schubert A., Fraunhofer IWU, Germany
- Wengerek S., Robert Bosch GmbH, Germany

## Location

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

Saarland University  
[Campus A3 3 – Aula](#)  
66123 Saarbrücken  
Germany



Aerial Photograph, Winkler

## Auspice

The INSECT 2014 is organized under the auspices of

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



## Registration

Please use the online registration form provided at

[www.lft.uni-saarland.de](http://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

