The 35th European Mask and Lithography Conference

EMLC 2019

June 17 – 19, 2019
Hilton Hotel Dresden, Germany

www.emlc-conference.com
Welcome to the EMLC 2019 in Dresden

On behalf of the VDE/VDI/GMM Organisation, the EMLC 2019 Sponsors and the EMLC 2019 Organisation Committee we would like to welcome you to the 35th European Mask and Lithography Conference, EMLC 2019, at the Hilton Hotel, Dresden.

The conference annually brings together scientists, researchers, engineers and technicians from research institutes and companies from around the world to present their latest findings in mask and lithography techniques.

This year, we are proud to present the following at the EMLC 2019:

- 3 TUTORIALS + Welcome Speaker + 3 KEYNOTES + 15 INVITED + 14 ORAL + 12 POSTER
- 48 Conference Presentations

The 2 ½ day conference will begin on Monday, June 17, 2019 at 14:00 with a TUTORIAL ending at 18:30.

1st Tutorial: Andreas Erdmann, Fraunhofer IISB, Erlangen, Germany, “Alternative Lithographic Techniques for Non-IC Applications”

2nd Tutorial: Laurent Pain, CEA-LETI, Grenoble, France, “Lithography Alternative Solutions”

3rd Tutorial: Martin Sczyrba, AMTC, Dresden, Germany, “Photomask Making Processes and Technologies”

At 18:30 we will start with the first part of the Poster Session combined with a Get-Together at the Hilton piano bar.

On Tuesday, June 18, the conference starts at 9:00 and ends at 19:15, and at Wednesday, June 19, the conference starts at 9:00 and ends at 18:00.

The EMLC2019 conference is dedicated to research, technology and related processes. It provides an overview of the current state of mask and lithography technologies and future strategy. Here, mask manufacturers and users have the opportunity to familiarize themselves with the latest developments and results.

As welcome speaker Robert Franke, Director Office of Economics Development - City of Dresden presents the invited talk: “Smart City Dresden – Bringing Future Technologies on the Road”.

On Tuesday morning, June 18, the first Keynote speaker Udo Bischof, Robert Bosch GmbH, Director Engineering Sensor Process Technology (EPT) is invited. He talks about “Future Trends and Drivers for Sensor Technologies“.

The second Keynote speaker will be Nayoa Hayashi of Dai Nippon Printing, Saitama, Japan on „“Electron Multi-Beam Writing of Leading-Edge Masks and NIL Master Templates“.

As third keynote speaker Harry J. Levinson, Principal Lithographer of HJL Lithography, LLC, Saratoga, CA, USA will report on “The Potential of EUV Lithography“.

Technical Exhibition

Parallel to the EMLC2019 conference the “Technical Exhibition“ takes place as every year. The opening hours are Tuesday, June 18, from 10:00 am to 6:00 pm and Wednesday, June 19, from 10:00 am to 4:00 pm. Here mask and device manufacturers will present their companies and their products.

To support the exchange of information between conference participants and exhibitors, all coffee and lunch breaks will take place in the exhibition area.

Conference Dinner Banquet

On Tuesday evening, June 18th, 2019 after the Poster Session the Conference Dinner will take place on the cruise ship “PD Krippen“.

Cleanroom Tour

For Thursday morning, June 20th 2019, the Fraunhofer-Institut für Photonische Mikrosysteme IPMS in Dresden has agreed to organize a Cleanroom Tour from 10:00 to 12:00. A bus will take those who registered for the tour from the Hilton to the IPMS. The tour will start from the Hilton at 9:15 am. It is limited to 15 persons.

So, please enjoy the “Technical Sessions“ of the EMLC 2019 as well as the “Technical Exhibition“.

But also enjoy a visit in the beautiful city of Dresden.

Uwe Behringer, UBC Microelectronics, Germany
EMLC2019 Conference Chair
EMLC 2019 Chairs

Conference Chairs
Behringer, Uwe, UBC Microelectronics, Ammerbuch, Germany
Finders, Jo, ASML, Veldhoven, The Netherlands

Co-Conference Chairs
Connolly, Brid, Toppan Photomasks GmbH, Dresden, Germany
Gale, Chris, Applied Materials, Dresden, Germany
Hayashi, Naoya, DNP, Saitama, Japan

Program Chairs
Stolberg, Ines, Vistec Electron Beam, Jena, Germany
Erdmann, Andreas, Fraunhofer IISB, Erlangen, Germany

Co-Program Chairs
Peters, Jan Hendrik, bmbg Consult Radebeul, Germany
Sarlette, Daniel, Infineon, Dresden, Germany
Program Committee

Ehrmann, Albrecht, Carl Zeiss SMT, Oberkochen, Germany
Farrar, Dave, Hoya Corporation, London, UK
Galler, Reinhard, Equicon, Jena, Germany
Jonckheere, Rik, IMEC vzw, Leuven, Belgium
Kapilevich, Izak, Applied Materials Inc., Santa Clara, CA, USA
Le Gratiet, Bertrand, STMicroelectronics, Crolles, France
Levinson, Harry, Globalfoundries, Santa Clara, CA, USA
Loeschner, Hans, IMS Nanofabrication GmbH, Vienna, Austria
Muehlberger, Michael, Profactor GmbH, Steyr-Gleink, Austria
Pain, Laurent, CEA-LETI, Grenoble, France
Ronse, Kurt, IMEC, Leuven, Belgium
Savari, Serap, Texas A&M University College Station, USA
Scheruebl, Thomas, Carl Zeiss SMT GmbH, Jena, Germany
Schnabel, Ronald, VDE/VDI-GMM, Frankfurt am Main, Germany
Schulze, Steffen, Mentor Graphics Corp., Wilsonville, OR, USA
Seltmann, Rolf, Dresden, Germany
Tschinkl, Martin, AMTC, Dresden, Germany
Waelpoel, Jacques, ASML, Veldhoven, The Netherlands
Wiley, Jim, Santa Clara, CA, USA
Wolf, Hermann, Photronics MZD GmbH, Dresden, Germany
Wurm, Stefan, ATICE LLC, Albany, NY, USA
Yoshitake, Shusuke, NuFlare, Yokohama, Japan
Zurbrick, Larry, Keysight Technologies, Santa Clara, CA, USA

Organizers

VDE/VDI-Society Microelectronics Microsystems and Precision Engineering (GMM)
Dr. Ronald Schnabel
Stresemannallee 15,
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e-Mail: gmm@vde.com
During the conference:
Phone: +49 171 4695 118

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Fax: +49-7073-50216
e-Mail: uwe.behringer.ubc@t-online.de
Program

Monday, June 17th, 2019

14:00 - 18:30  **EMLC2019 Tutorials**

14:00 - 15:20  **Welcome and Introduction of the 1st Tutorial Speaker**
by Uwe Behringer, UBC, EMLC 2019 Conference Chair

1st TUTORIAL:
“Alternative Lithographic Techniques for Non-IC Applications”
Andreas Erdmann, Fraunhofer Institute for Integrated Systems and Device Technology IISB, Erlangen, Germany

15:20 - 15:45  **Coffee Break**

15:45 - 17:05  **Introduction of the 2nd Tutorial Speaker**
by Jo Finders, ASML, EMLC 2019 Conference Chair

2nd TUTORIAL:
“Lithography Alternative Solutions”
Laurent Pain, CEA-LETI, Grenoble, France

17:05 - 18:25  **Introduction of the 3rd Tutorial Speaker**
by Martin Tschinkl, AMTC, EMLC 2019 Session Chair

3rd TUTORIAL:
“Photomask Making Processes and Technologies”
Martin Sczyrba, Advanced Mask Technology Center GmbH & Co. KG, Dresden, Germany

18:25 - 18:30  **Announcements:**
Uwe Behringer/EMLC2019 Conference Chair

18:30 - 20:00  **Get Together & 1st Poster Session**
Details of the 1st Poster Session:
see Session 5, pages 12 - 14

Program

Tuesday, June 18th, 2019

09:00 - 09:10  **Welcome and Introduction**
Uwe Behringer, UBC Microelectronics, Ammerbuch, Germany
EMLC 2019 Conference Chair

**INVITED**

09:10 - 09:35  **Greetings from the City of Dresden**
Robert Franke, Director Office of Economics Development – City of Dresden, Dresden, Germany

**Smart City Dresden - Bringing Future Technologies on the Road**

09:35 - 10:30  **Session 1: 1st Plenary Session**
Chair: Uwe Behringer, UBC Microelectronics, Germany
Co-Chair: Stefan Wurm, ATICE LLC, USA

09:35 - 10:05  **1st KEYNOTE:**
Future Trends and Drivers for Sensor Technologies
Udo Bischof, Robert Bosch GmbH, Engineering Process Technology (ETP), Reutlingen, Germany

**INVITED**

10:05 - 10:30  **Best Poster of BACUS Photomask Technology 2018**
Multiple exposure on single blank for electron-beam writer characterization
André Eilert, Michael Finken, Christian Bürgel, Mark Herrmann, Ronald Hellriegel, Rico Nesterl, Oliver Löffler, Frank Hübenthal, Rico Büttner, and Katja Steidel, Advanced Mask Technology Center GmbH & Co. KG, Dresden, Germany

10:30 - 11:00  **Coffee Break**
11:00 - 12:25

**Session 2: 2nd Plenary Session**

*Chair: Brid Connolly, TOPPAN, Germany*
*Co-Chair: Jed Rankin, GLOBALFOUNDRIES, USA*

11:00 - 11:30  **2nd KEYNOTE:**
**Electron Multi-Beam Writing of Leading-Edge Masks and NIL Master Templates**
Naoya Hayashi, Dai Nippon Printing Co., Ltd., Fujimino, Saitama, Japan

11:30 - 12:00  **3rd KEYNOTE:**
**The Potential of EUV Lithography**
Harry J. Levinson, HJL Lithography, Saratoga, CA, USA

**INVITED**
12:00 - 12:25  **Best Paper of PMJ 2019**
*aquaSAVE™: Antistatic Agent for Electron Beam Lithography*
Takahiro Mori, Akira Yamazaki, Mitsubishi Chemical Corporation, Toyohashi, Aichi, Japan

**12:25 - 14:00 Lunch Break**

14:00 - 16:00

**Session 3: Mask Patterning, Metrology, and Process**

*Chair: Martin Tschinkl, AMTC, Germany*
*Co-Chair: Jan Hendrik Peters, BMBG, Germany*

**INVITED**
14:00 - 14:25  **Continuous challenges for next era of lithography”**
Masahiro Hashimoto, HOYA Group, Blanks Division, Nagasaka, Hokuto, Yamanashi, Japan

**INVITED**
14:25 - 14:50  **MBMW-201 – The multi-beam mask writer advanced to the 2nd tool generation**
Annette Schnettelker, Mathias Tomandl, Christof Klein, Hans Loeschner, Elmar Platzgummer, IMS Nanofabrication GmbH, Vienna, Austria

14:50 - 15:15  **MPC for Multi-Beam Mask Writers**
Ingo Bork, Peter Buck, Mentor, A Siemens Business, Fremont, CA, USA

**INVITED**
15:15 - 15:40  **Multi-beam mask writer MBM-1000**
Hiroshi Matsumoto, H. Kimura, R. Ueba, K. Yasui, N. Nakayamada, NuFlare Technology, Inc., Yokohama, Japan

15:40 - 16:00  **Necessity is the mother of invention: support vector machines for CD control**
Christian Bürgel, Martin Sczyrba, Clemens Utzny, Advanced Mask Technology Center GmbH & Co. KG, Dresden, Germany

**16:00 - 16:30 Break**

16:30 - 17:45

**Session 4: Optical Lithography “More Moore” (193i and EUV) – Part 1**

*Chair: Jo Finders, ASML, The Netherlands*
*Co-Chair: Albrecht Ehrmann, Carl Zeiss SMT, Germany*

**INVITED**
16:30 - 16:55  **EUVL is being inserted in manufacturing in 2019. What are the mask related challenges remaining?**
Kurt Ronse, Rick Jonckheere, Emily Gallagher, Vicky Philipsen, Eric Hendricks, Ryoung han Kim, IMEC, Leuven, Belgium

**INVITED**
16:55 - 17:20  **High-NA EUV lithography – pushing the limits**
Claus Zahlten¹, Jan van Schoot², Peter Kuerz¹, Winfried Kaiser¹
¹ Carl Zeiss SMT GmbH, Oberkochen, Germany
² ASML Netherlands B.V., Veldhoven, The Netherlands
17:20 - 17:45
INVITED
EUV Lithography: Update on Scanner and Infrastructure Progress
Jo Finders, ASML Netherlands B.V., Veldhoven, The Netherlands

17:45 - 19:00
Session 5: 2nd Poster Session
Chair: Reinhard Galler, Equicon, Germany
Co-Chair: Hans Loeschner, IMS Nanofabrication, Austria

Poster: Optical Lithography – More Moore (193i&EUV)

INVITED
P-1 Best Poster of BACUS EUV Lithography 2018 and Update
Progress in EUV resists for Contact Holes Printing using EUV Interference lithography
Xiaolong Wang¹, Li-Ting Tseng¹, Michaela Vockenhuber¹, Iacopo Mochi¹, Lidia van Lent-Protasova², Rolf Custers¹, Gijsbert Rispens², Rik Hoefnagels², Yasin Ekinci¹
¹ Paul Scherrer Institute, Villigen PSI, Switzerland
² ASML Netherlands B.V., Veldhoven, The Netherlands

P-2 Investigation of lithographic effects due to particles on high-NA EUV mask pellicle
Lokesh Devaraj¹, Gerardo Bottiglieri¹, Andreas Erdmann², Felix Wahlisch³, Michiel Kupers¹, Eelco van Setten¹, Timon Fliervoet¹
¹ ASML Netherlands B.V., Veldhoven, The Netherlands
² Fraunhofer Institute for Integrated Systems and Device Technology IISB, Erlangen, Germany

P-3 A new concept to qualify pattern shift on EUV scanners
Pim van den Berg¹, Lieve van Look², Gijs van Swaaij¹, Tasja van Rheë¹, Guido Schieffelers¹, Joost Gielis¹
¹ ASML Netherlands B.V., Veldhoven, The Netherlands
² IMEC, Leuven, Belgium

P-4 Alternative mask materials for low-k1 EUV imaging
Frank J. Timmermans, Claire van Lare, Jo Finders, ASML Netherlands B.V., Veldhoven, The Netherlands

P-5 Progress in imaging performance with EUV pellicles

P-6 Ion Beam Etch of High-k Absorber Materials for High-NA EUV Masks
Katrina Rook, Narasimhan Srinivasan, Vincent Ip, Meng H. Lee, Tania Henry, Veeco Instruments, Plainview, NY, USA

P-7 Haze and pellicle material selection for haze free

P-8 Reduce probability of wafer intra-field process (printing) defects for logic & DRAM applications
Yael Sufrin¹, Avi Cohen¹, Ofir Sharioni¹, Rolf Seiltmann²
¹ Carl Zeiss SMT GmbH, Bar Lev Industrial Park, Misgav, Israel
² RS litho, Dresden, Germany
Poster: Optical Lithography – More than Moore

P-9  Influence of the dose assignment and fracturing type on the pattern exposure by the variable shape e-beam writer: simulation vs. experiment
Varvara Brackmann¹, Michael Friedrich¹, Clyde Browning², Norbert Hanisch¹, Benjamin Uhlig¹
¹ Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany
² ASELTA Nanographics, Grenoble, France

P-10  Detection and mitigation of furnace anneal induced distortions at the wafer edge
Leon Van Dijk¹, Anne-Laure Charley², Maarten Stokhof³, Ronald Otten¹, Sven Van Elshocht², Bert Jongbloed³, Philippe Leray², Richard van Haren¹
¹ ASML Netherlands B.V., Veldhoven, The Netherlands
² IMEC, Leuven, Belgium
³ ASM International, Leuven, Belgium

P-11  Chrome mask fabrication on Al2O3 substrate for new generation devices based on AlGaN/GaN heterostructure
Kornelia Indykiewicz, Bartlomiej Paszkiewicz, Agnieszka Zawadzka, Regina Paszkiewicz, Wroclaw University of Science and Technology, Wroclaw, Poland

19:20  Meet at the Hilton Lobby for boat cruise

19:30 – 23:00

EMLC 2019 Conference Dinner
on board the cruise ship “Krippen”
<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Program</th>
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<tbody>
<tr>
<td>10:20 - 10:40</td>
<td>Software-based optimization methods for the ULTRA Semiconductor Maskwriter</td>
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<td>Matthias Wahl(^1), Ulrich Hofmann(^2), Nezih Unal(^2), Steffen Diez(^1)</td>
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<td>(^1) Heidelberg Instruments Mikrotechnik GmbH, Heidelberg, Germany</td>
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<td>(^2) GenISys GmbH, Taufkirchen, Germany</td>
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<td>10:40 - 11:10</td>
<td>Coffee Break</td>
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<td>11:10 - 12:30</td>
<td>Session 8: Optical Lithography “More Moore” (193i and EUV) – Part 2</td>
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<td>Chair: Jo Finders, ASML, The Netherlands</td>
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<td>Co-Chair: Albrecht Ehrmann, Carl Zeiss SMT, Germany</td>
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<td><strong>INVITED</strong></td>
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<td>11:10 - 11:35</td>
<td>Best Paper of BACUS Photomask Technology 2018</td>
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<td>Andreas Erdmann, Faunhofer IISB, Erlangen, Germany on behalf of Vicky Philipsen, IMEC, Leuven, Belgium.</td>
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<td><strong>Novel EUV mask absorber evaluation in support of next-generation EUV imaging</strong></td>
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<td>Vicky Philipsen(^1), Vu Luong(^1), Karl Opsomer(^1), Erich Hendrickx(^1), Andreas Erdmann(^2), Peter Evanschitzky(^2), Robbert van de Kruijfs(^3), Zahra Heidarnia-Fathabad(^3), Frank Scholze(^4), Christian Laubis(^4)</td>
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<td></td>
<td>(^1) IMEC, Leuven, Belgium</td>
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<td>(^2) Fraunhofer IISB, Erlangen, Germany</td>
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<td>(^3) University of Twente, Twente, The Netherlands</td>
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<td>(^4) PTB, Braunschweig, Germany</td>
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<td>11:35 - 11:55</td>
<td>Quantifying global and local CD variation for an advanced 3D NAND layer</td>
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<td>Paolo Alagna(^1), Will Conley(^1), Yaobin Feng(^2), Zhiyang Song(^2), Dean Wu(^2), Simon Hsieh(^1), James Bonafede(^1), Stephen Hsu(^3), Junwei Lu(^3), Victor Peng(^3), Beeri Nativ(^4), Ijen van Mil(^4), Herman Nicola(^4), Shao-Shun Zhou(^4), Karel Arkema(^4), Fei Jia(^4)</td>
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<td></td>
<td>(^1) Cymer (ASML), San Diego, USA,</td>
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<td>(^2) Yangtze Memory Technologies Co., Ltd. (YMTC), Wuhan, China,</td>
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<td>(^3) ASML Brion, San Jose, USA,</td>
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<td>(^4) ASML Netherlands B.V., Veldhoven, The Netherlands</td>
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<tr>
<td>11:55 - 12:15</td>
<td>High-NA EUV imaging: challenges and outlook</td>
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<td>Bartosz Bilski(^1), Jörg Zimmermann(^1), Matthias Rösch(^1), Jack Liddle(^1), Eelco van Setten(^2), Gerardo Bottoglieri(^2), Jan van Schoot(^2)</td>
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<td>(^1) Carl Zeiss SMT GmbH, Oberkochen, Germany</td>
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<td>(^2) ASML Netherlands B.V., Veldhoven, The Netherlands</td>
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<td>12:15 - 12:35</td>
<td>Enhanced Wafer Overlay Residuals Control; Deep Sub-Nanometer at Sub-Millimeter Lateral Resolution</td>
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<td>Philippe Leray(^1), Eren Canga(^1), Avi Cohen(^2), Vladimir Dmitriev(^2), Kuhan Gorhad(^2), Yael Sufrin(^2)</td>
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<td></td>
<td>(^1) IMEC, Leuven, Belgium,</td>
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<tr>
<td></td>
<td>(^2) Carl Zeiss SMT GmbH, Bar Lev Industrial Park, Misgav, Israel</td>
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<tr>
<td>12:35 - 14:00</td>
<td>Lunch Break</td>
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</tbody>
</table>
14:00 - 15:00

Session 9: Novel Applications of Lithographic Patterning
Chair: Daniel Sarlette, INFINEON, Germany
Co-Chair: Harry J. Levinson, HJL Lithography, USA

14:00 - 14:20 Nanoimprinting of Antireflective Moth-Eyes on Freeform Surfaces
Michael J. Haslinger, et al., A.R. Moharana, E. Guillén, D. Fechtig, M. Mühlberger, PROFACTOR GmbH, Austria

14:20 - 14:40 Theoretical impact of the optical lithography mask grade on silicon photonics transmission losses
Loïc Perraud, Patrick Quéméré, Sébastien Bérard-Bergery, Aurélien Fay, CEA-LETI, Grenoble, France

14:40 - 15:00 Energy Filter for Ion Implantation in Power Semiconductor Device Manufacturing
Michael Rüb¹,², Shavkat Akhmadaliev³, Constantin Csato¹, Florian Krippendorf¹
¹ mi²-Factory GmbH, Jena, Germany
² Ernst-Abbe-Hochschule Jena, Jena, Germany
³ Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany

15:00 - 15:30 Coffee Break

15:30 - 16:35
Session 10: Modeling / Simulations
Chair: Andreas Erdmann, Fraunhofer IISB, Germany
Co-Chair: Rolf Seltmann, RS litho, Germany

15:30 - 15:55 INVITED
Optical micro- and nano-structures with (sub-)nanometer accuracy
Martin Heusinger¹, M. Banasch², D. Michaelis³, T. Flügel-Paul³, E.B. Kley¹,², U. D. Zeitner¹,³
¹ Friedrich Schiller University Jena, Jena, Germany
² Vistec Electron Beam GmbH, Jena, Germany
³ Fraunhofer IOF, Jena, Germany

15:55 - 16:15 Mask defect assessment from SEM images aided by deep learning methods
Peter Evanschitzky, Andreas Erdmann, Fraunhofer Institute for Integrated Systems and Device Technology IISB, Erlangen, Germany

16:15 - 16:35 Modeling of CAR alternatives for EUV lithography
Ulrich Welling¹, Joren Severi², Danilo de Simone², Hans-Jürgen Stock¹
¹ Synopsys GmbH, Aschheim, Dornach, Germany
² IMEC, Leuven, Belgium
16:35 - 18:00

**Session 11: Using AI, Big Data, and Fab Automation**

*Chair: Bertrand Le-Gratiet, STMicroelectronics France*
*Co-Chair: Serap Savari, Texas A&M University, USA*

**INVITED**

16:35 - 17:00  
**Applying Big Data technologies to high tech manufacturing**  
*Dirk Ortloff, camLine GmbH, Petershausen, Germany*

17:00 - 17:20  
**A machine learning method for efficient design optimization and parameter reconstruction**  
*Philipp-Immanuel Schneider¹, M. Hammerschmidt¹, X. Garcia Santiago¹,³, L. Zschiedrich¹, S. Burger¹,²*  
¹ JCMwave GmbH, Berlin, Germany  
² Zuse Institute Berlin (ZIB), Berlin,  
³ Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

17:20 - 17:40  
**Towards a visualization of deep neural networks for rough line images**  
*N. Chaudhary, Serap A. Savari, Texas A&M University, College Station, TX, USA*

17:40 - 18:00  
**Speed up of rigorous 3D resist simulation: using machine learning**  
*Dereje S. Woldeamanual, Thomas Mülders, Hans-Jürgen Stock, Synopsys GmbH, Aschheim, Germany*

18:00  
**Thanks to Presenters and Participants and Announcement of EMLC 2020 in Leuven/Belgium**  
*Uwe Behringer, UBC Microelectronics, Germany*

**End of EMLC 2019 conference**
**Conference Information**

**Conference Hours**
- Monday, June 17th, 2019, Tutorial: 02:00 pm to 06:00 pm
- Tuesday, June 18th, 2019: 09:00 am to 05:45 pm
- Wednesday, June 19th, 2019: 09:00 am to 06:15 pm

**Registration Hours**
- Monday, June 17th, 2019, Tutorial: 01:00 pm to 06:00 pm
- Tuesday, June 18th, 2019: 08:00 am to 05:00 pm
- Wednesday, June 19th, 2019: 08:00 am to 06:00 pm

**Technical Exhibition**
Parallel to the conference presentations – on Monday from 05:00 to 06:00 pm as well as on Tuesday and Wednesday we offer you to take part in the technical exhibition.

If you intend to participate in the technical exhibition as an exhibitor, please contact:

UBC Microelectronics
Dr. Uwe Behringer
Auf den Beeten 5,
72119 Ammerbuch, Germany
Phone: +49 171-455-3196
Fax: +49 7073-50216
e-Mail: uwe.behringer.ubc@t-online.de

**EMLC 2019 Best Poster Award and EMLC 2019 Best Paper Award**

Members of the EMLC 2019 Program Committee will elect the EMLC 2019 Best Poster.

The EMLC 2019 Best Paper Award will be selected by EMCL 2019 Program Committee members from oral presentations provided that a publication manuscript will be submitted to SPIE until July 2nd 2019.

The winners of the EMLC 2019 Best Poster Award and of the EMLC 2019 Best Paper Award will be invited to talk either at the BACUS 2019 Conference or at the PMJ 2020 Conference.

**General Information**

**EMLC 2019 Office**

For detailed information please contact:

VDE/VDI-Society Microelectronics Microsystems and Precision Engineering (GMM)
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60596 Frankfurt am Main, Germany
Phone: +49 69-6308-227
Fax: +49 69-6308-9828
e-Mail: gmm@vde.com

During the conference:
Phone: +49 171 4695 118

**Conference Fees**

<table>
<thead>
<tr>
<th></th>
<th>until May 18th, 2019</th>
<th>after May 18th, 2019</th>
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</thead>
<tbody>
<tr>
<td>Non-Members</td>
<td>€ 630.00</td>
<td>€ 690.00</td>
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<tr>
<td>VDE, VDI Members*</td>
<td>€ 600.00</td>
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<tr>
<td>Lecturer**</td>
<td>€ 490.00</td>
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<tr>
<td>Students***</td>
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<td>€ 200.00</td>
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<td>Exhibitor Ticket</td>
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<tr>
<td>Tutorials on June 17</td>
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<tr>
<td>Tutorials – Fee for Students</td>
<td>€ 50.00</td>
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<td>Cleanroom Tour at</td>
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<tr>
<td>Fraunhofer IPMS on June 20</td>
<td>€ 50.00</td>
<td>€ 50.00</td>
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* Participants claiming for the membership fee must attach a copy of their membership card to the registration form.
** Only one person per paper
*** A photocopy of the student card must be attached.

The conference fee includes admission to all sessions as well as to the daily coffee-breaks, lunches and conference banquet dinner as well as one copy of the proceedings.
Conference Registration

To register for EMLC 2019, please visit the website of the conference which is www.emlc-conference.com.

You may either register online or via telefax. To benefit from the “early-bird-discount”, VDE Conference Services must receive the form before May 18, 2019.

Payment of Conference Fee

Payment for registration, including bank charges and processing fees, must be made in Euro. The conference fee has to be fully paid in advance by credit card. Your registration can only be confirmed if VDE-Conference Services has recorded receipt of your full payment.

Cancellation

In case of cancellation, provided that written notice has been given to VDE-Conference Services before May 18, 2019, the registration fee will be fully refunded less a handling fee of EURO 80.00. After May 18, 2019, no refund will be made. Proceedings will then be sent to the registrant after the conference.

Conference Venue

Hilton Dresden,
An der Frauenkirche 5,
01069 Dresden, Germany
Phone: +49 351/86420
Fax: +49 351/8642-725
www.hilton.com/

The Hilton Dresden is located in the heart of the old town, next to the Frauenkirche.

Transport

By Air

Getting to and from Dresden airport:
Bus Service, typical minimum charge is EURO 8,00
Limousine, typical minimum charge is EURO 70,00
Taxi, typical minimum is EURO 25,00

By train

From Frankfurt in 5 hours; from Berlin in 3 hours.

By car

From the A14/A4 (coming from Chemnitz/Leipzig), take exit 78 towards Dresden Altstadt. Follow the B6 signs in direction of Zentrum. At the Bremer/Hamburger Strasse junction, turn left into Bremer Strasse. Drive along the Elbe riverbank until you see signs for the Hilton Dresden hotel on your right. The 4-mile journey normally takes around 10 minutes from exit 78 to the hotel forecourt.
**Parking**

Parking at the Hilton Hotel costs EURO 21.00 per day. There is a valet service at no extra charge. Please book your parking space when booking your room at the hotel.

**Hotel Reservation**

As to recommendations for hotel bookings, please visit the conference homepage [www.emlc-conference.com](http://www.emlc-conference.com) and click the website “accommodation”.

All payments related to accommodation have to be made in the hotel before departure.

**Conference Dinner and River Cruise on June 18th 07:30 pm – 11:00 pm**

Enjoy the Conference Dinner on Tuesday evening, June 18th, 2019 after the Poster Session on board the cruise ship „PD Krippen“.

*Schedule:*

- 07:20 pm Gathering at the Hilton Lobby
- 07:30 pm boarding
- 07:45 pm – 11:00 pm Cruise on board the “Krippen” and Conference Dinner
- 11:00 pm End of the cruise

**Cleanroom Tour at the Fraunhofer IPMS on June 20, 2019**

*Schedule:*

- 09:15 am Bus Departure at the Hilton Hotel
- 10:00 am – 12:00 am Cleanroom Tour at Fraunhofer IPMS Maria-Reiche-Str. 2 01109 Dresden

The Cleanroom Tour is limited to max. 15 persons. Participants have to register for it.

**Insurance**

The organisers may not be held responsible for any injury to participants or damage, theft and loss of personal belongings.

**Passport and Visa Requirements**

Foreign visitors entering France have to present a valid Identity Card or Passport. Delegates who need a visa should contact the French consular offices or embassies in their home countries. Please note that neither the VDE-Conference Services nor the VDE/VDI-Society Micro-electronics, Microsystems- and Precision Engineering (GMM) or the supporting bodies are able to extend any „Invitation“ for application of visa.
The VDE/GMM and the members of the EMLC 2019 Program Committee of the 35th European Mask and Lithography Conference 2019 would like to thank all the sponsors and cooperating partners mentioned below for their support.

Cooperating Partners

Sponsors