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# ***34th European Mask and Lithography Conference***

**Uwe F.W. Behringer  
Jo Finders**  
*Editors*

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# Contents

vii	<i>Authors</i>
ix	<i>Conference Committee</i>
xi	<i>Foreword</i>
xiii	<i>Sponsors and Cooperating Partners</i>
xv	<i>Development of closed-type EUV pellicle (Best Paper of PMJ 2018) (10807-13)</i>

---

## WAFER LITHOGRAPHY (193I AND EUV)

10775 02	<b>Multi-trigger resist for electron beam and extreme ultraviolet lithography (Invited Paper)</b> [10775-2]
10775 03	<b>Photonic superlattice multilayers for EUV lithography infrastructure (Invited Paper)</b> [10775-3]

---

## ML2, NIL, AND DSA

10775 07	<b>Performance validation of Mapper FLX-1200 (Invited Paper)</b> [10775-14]
10775 08	<b>Feasibility of monitoring a multiple e-beam tool using scatterometry and machine learning: stitching error detection</b> [10775-36]
10775 0A	<b>Application of rules-based corrections for wafer scale nanoimprint processes and evaluation of predictive models</b> [10775-23]

---

## PLENARY SESSION

10775 0C	<b>Lithography technology and trends for More than Moore devices: advanced packaging and MEMS devices (Invited Paper)</b> [10775-45]
----------	--

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## MASK PATTERNING, METROLOGY, AND PROCESS

10775 0E	<b>CK-MASK semi-manual tool for mask inspection and blowing</b> [10775-41]
----------	--

- 10775 OF      **The (almost) completely automated 12" lithography** [10775-20]
- 10775 OG      **Fast local registration measurements for efficient e-beam writer qualification and correction**  
[10775-18]

---

#### NON-IC APPLICATIONS, PLASMONICS, AND PHOTONICS

---

- 10775 OI      **Accurate determination of 3D PSF and resist effects in grayscale laser lithography** [10775-22]
- 10775 OK      **Curvilinear data processing methods and verification** [10775-38]

---

#### MASK2WAFER AND WAFER2WAFER METROLOGY

---

- 10775 ON      **On the road to automated production workflows in the back end of line** [10775-47]
- 10775 OO      **Measuring inter-layer edge placement error with SEM contours** [10775-31]
- 10775 OP      **FEM simulation of charging effect during SEM metrology** [10775-42]

---

#### USING BIG DATA/DEEP LEARNING

---

- 10775 OR      **Deep supervised learning to estimate true rough line images from SEM images** [10775-15]
- 10775 OS      **Microlens under melt in-line monitoring based on application of neural network automatic defect classification** [10775-24]

---

#### POSTER SESSION: WAFER LITHOGRAPHY (193I AND EUV)

---

- 10775 OU      **Alternative absorber materials for mitigation of mask 3D effects in high NA EUV lithography**  
[10775-46]
- 10775 OW      **Revival of grayscale technique in power semiconductor processing under low-cost manufacturing constraints** [10775-21]
- 10775 OX      **Towards fab cycle time reduction by machine learning-based overlay metrology** [10775-53]

---

#### POSTER SESSION: ML2, NANO-IMPRINT LITHOGRAPHY, AND DSA

---

- 10775 OY      **Fabrication of nanoparticles for biosensing using UV-NIL and lift-off** [10775-7]

---

**POSTER SESSION: MASK PATTERNING, METROLOGY, AND PROCESS**

---

- 10775 10     **Machine learning methods applied to process qualification** [10775-4]
- 10775 11     **Deposition durability of e-beam mask repair** [10775-12]
- 10775 13     **Maximizing utilization of large-scale mask data preparation clusters** [10775-34]

---

**POSTER SESSION: NON-IC APPLICATIONS, PLASMONICS, AND PHOTONICS**

---

- 10775 16     **Plasmonic resonances in metal covered 2D hexagonal gratings fabricated by interference lithography** [10775-8]
- 10775 17     **Approach to combine electron-beam lithography and two-photon polymerization for enhanced nano-channels in network-based biocomputation devices** [10775-37]

---

**POSTER SESSION: MASK2WAFER AND WAFER2WAFER METROLOGY**

---

- 10775 18     **Limits of model-based CD-SEM metrology** [10775-6]
- 10775 19     **Manufacturing of roughness standard samples based on ACF/PSD model programming** [10775-50]

---

**POSTER SESSION: USING BIG DATA/DEEP LEARNING**

---

- 10775 1A     **Research on data augmentation for lithography hotspot detection using deep learning** [10775-35]



# Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Abaidi, Mohamed, 0P	Heller, Marcel, 0W
Ache, Oliver, 0G	Herrmann, Mark, 10
Albinus, Lars, 0F	Holfeld, Christian, 11
Arnold, Jens, 0F	Iessi, Umberto, 0E
Bayle, Sébastien, 0K	Ishikawa, Hisako, xv
Belissard, Jordan, 18	Jager, Remco, 07
Besacier, Maxime, 19	Jourlin, Yves, 16
Bichotte, Maxime, 16	Kaiser, Dieter, 0W
Bidault, Laurent, 0S	Kampfe, Thomas, 16
Biyajima, Tsuneaki, xv	Kandel, Daniel, 08
Blancquaert, Yoann, 07, 08, 19	Kaspar, Corinna, 0I
Borisov, Vadim, 1A	Kazazis, D., 02
Boudaa, F., 0A	Kim, Stephen, 13
Brandt, Pieter, 07	Kohmura, Kazuo, xv
Bringoltz, Barak, 08	Koret, Roy, 08
Browning, Clyde, 0K	Korten, T., 17
Brueckl, Hubert, 0Y	Krome, Thorsten, 11
Chartoire, J., 0A	Kuchar, F., 03
Chaudhary, Narendra, 0R	Labbaye, Thibault, 08
Dansberg, Michel, 07	Labbé, Stéphane, 18
Dawson, G., 02	Lakcher, Amine, 0S
de Boer, Guido, 07	Lam, Auguste, 0X
Delachat, F., 0A	Landis, Stéfan, 07, 08
Diez, St., 17	Larrañaga, Maialen, 0X
Domann, G., 17	Laske, Frank, 0G
Ducoté, Julien, 0S	Le-Gratiet, Bertrand, 0S
Egodage, Kokila, 0N	Leserri, Andrea, 0E
Ekinci, Y., 02	Lindberg, F., 17
Erdmann, Andreas, 0I	Linke, H., 17
Feick, Henning, 0W	May, M., 0A
Ferrario, Francesco, 0E	McClelland, A., 02
Figueiro, Nivea, 08	McNamara, J., 0U
Finders, J., 0U	Meinecke, Ch., 17
Fritsche, Silvio, 0F	Meisels, R., 03
Garetto, Anthony, 0N	Meusemann, Stefan, 10
Ger, Avron, 08	Milléquant, Matthieu, 0K
Gergaud, Patrice, 19	Mitrach, Michael, 0F
Gilgenkrantz, Pascal, 13	Mitteramskogler, Tina, 0Y
Göhler, Tim, 11	Morgana, Nicolo, 0W
Groß, M., 17	Mortini, Etienne, 0S
Gusmini, Andrea, 0E	Mourier, Lucie, 08
Habel, Steffen, 0F	Muehlberger, Michael, 0Y
Han, Runyuan, 0G	Nesladek, Pavel, 11
Han, Wooil, 13	Nguyen, Duy Duc, 0P
Hasibi, Faegheh, 0X	Okubo, Atsushi, xv
Haslinger, Michael J., 0Y	Onanuga, Temitope, 0I
Haupt, Ronny, 08	Ono, Yosuke, xv
Hazart, Jérôme, 18	Ostrovsky, Alain, 0S
Heldt, G., 17	Pain, Laurent, 07, 08

Park, Minyoung, 13  
 Pastol, Anne, 0X  
 Peijster, Jerry, 07  
 Perraud, L., 0A  
 Philipot, Antoine-Regis, 0S  
 Pizzagalli, Amandine, 0C  
 Popescu, C., 02  
 Postnikov, Serguei, 0K  
 Pradelles, Jonathan, 07, 08  
 Quemere, P., 0A  
 Rademaker, Guido, 07, 08  
 Reche, Jérôme, 19  
 Reuter, D., 17  
 Rey, Stéphane, 08  
 Robinson, A. P. G., 02  
 Roeth, Klaus-Dieter, 0G  
 Roth, J., 02  
 Ruhm, Matthias, 0O  
 Sailer, Holger, 0I  
 Sanchez, Francisco, 08  
 Savari, Serap A., 0R  
 Schatz, Jirka, 0O  
 Scheible, Jürgen, 1A  
 Schiavone, Patrick, 0K, 0P  
 Schneider, Jens, 0W  
 Schotter, Joerg, 0Y  
 Schrittwieser, Stefan, 0Y  
 Schulz, Kristian, 0N  
 Schulz, St. E., 17  
 Sendelbach, Matthew, 08  
 Servin, Isabelle, 07  
 Seyfert, Jens, 0F  
 Shifrin, Michael, 08  
 Shoshi, Astrit, 0Y  
 Slot, Erwin, 07  
 Steenbrink, Stijn, 07  
 Steenhusen, S., 17  
 Steigerwald, Hendrik, 0G  
 Stephan, Mario, 0F  
 Tabbone, Gilles, 0N  
 Taneichi, Daiki, xv  
 Teyssedre, H., 0A  
 Theis, W., 02  
 Timmermans, F. J., 0U  
 Tortai, Jean-Herve, 0P  
 Triki, Faouzi, 18  
 Tsao, Min, 13  
 Ushkov, Andrei A., 16  
 Utzny, Clemens, 10  
 van Dijk, Leon, 0X  
 van Haren, Richard, 0X  
 van Lare, C., 0U  
 van Setten, E., 0U  
 Verrier, Isabelle, 16  
 Weisbuch, François, 0O  
 Wieland, Marco, 07  
 Wolfling, Shay, 08  
 Yeddulapalli, S. S., 0R



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## Foreword

On behalf of VDE/VDI-GMM, the EMLC2018 sponsors, and the EMLC2018 organizing committee, we welcome you to the proceedings from the 34th European Mask and Lithography Conference, EMLC2018, at the MINATEC Conference Centre in Grenoble, France.

The conference has annually brought together scientists, researchers, engineers, and technologists from research institutes and companies from around the world to present innovations at the forefront of mask lithography and mask technology. The two-and-a-half-day conference is dedicated to the science, technology, engineering, and application of mask and lithography technologies and associated processes, giving an overview of the present status in mask and lithography technologies and the future strategy where mask producers and users have the opportunity of becoming acquainted with new developments and results. This year's sessions were: Wafer Lithography (193i and EUV), Mask Patterning, Metrology, and Process, Non-IC Applications, Plasmonics, and Photonics, Nano-Imprint Lithography and DSA, Mask2Wafer and Wafer2Wafer Metrology, and Using Big Data/Deep Learning.

Marie-José Salat, representative of Grenoble-Alpes Métropole, was welcome speaker.

### Tutorials

Paul van Adrichem from ASML Netherlands B.V. (Netherlands) gave a "Review of OPC / RET / SMO." This first tutorial provided an overview of advanced optical proximity correction, resolution enhancement technology, as well as source-mask-optimization.

Aviram Tam from Applied Materials PDC (Israel) gave the second tutorial on the "Inspection Challenges in the EUV Area." This tutorial covered the use cases for blank inspection, pattern inspection, outgoing inspection, and the possible solution for DUV mask inspection, e-Beam MI, actinic blank inspection, on-wafer qualification, and how those evolve in each of the different scenarios for pellicle (no pellicle/detachable/13.5nm only/193nm friendly).

The first keynote speaker was Olivier Noblanc from ST Microelectronics (France). His talk was titled, "Technology for Optical Sensors."

The second keynote speaker was Laurent Pain from CEA-LETI (France). His presentation was on "The Battle Field of Lithography."

The third keynote speaker was Frédéric Boeuf from ST Microelectronics (France). He presented the newest technologies on "Silicon Photonics."

As every year, we invited the authors of the Best Poster of BACUS (SPIE Photomask Technology) 2017 and the Best Paper from PMJ (Photomask Japan) 2018 to present their papers.

### **Technical Exhibition**

Parallel to the conference presentations, a technical exhibition took place on Tuesday and Wednesday where companies (mask suppliers, material suppliers, and equipment suppliers) exhibited their companies and products. To foster the exchange between the conference attendees and the exhibitors, the exhibition area was also the place for all coffee and lunch breaks.

We hope that you enjoyed the tutorials and technical sessions of the EMLC2018 as well as the technical exhibition, but also allowed yourself take in the beautiful city of Grenoble.

**Uwe F.W. Behringer**  
EMLC2018 Conference Chair

## Sponsors and Cooperating Partners

The 34th European Mask and Lithography Conference, EMLC 2018, would like to express its sincere appreciation to all the sponsors and cooperating partners below for their support.



