2015 PHOTOMASK TECHNOLOGY

Call for Papers
Submit Abstracts by 13 April 2015
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Monterey Conference Center and Monterey Marriott
Monterey, California, USA

Conference: 29 September–1 October 2015
Exhibition: 29–30 September 2015
Present your work in Monterey

SPIE Photomask Technology 2015, the premier worldwide technical meeting for the photomask industry.

Call for Papers.

SPIE. PHOTOMASK TECHNOLOGY

LOCATION
Monterey Conference Center and Monterey Marriott
Monterey, California, USA

DATES
Conference: 29 September–1 October 2015
Exhibition: 29–30 September 2015

TECHNOLOGIES

Mask Making:
- Mask data preparation
- Substrates and materials
- Patterning tools and processes
- Resist and resist processing
- Etch techniques
- Metrology
- Inspection
- Repair
- Cleaning, contamination, and haze
- Simulation of mask making

9-inch Glass:
- Impact of 450mm wafers on reticle and infrastructure
- Tool developments to support larger blanks
- Material developments

Emerging Mask Technologies:
- EUV mask making
- EUV mask inspection and repair
- EUV mask infrastructure
- EUV mask application
- Nanoimprint mask making
- Nanoimprint mask application
- Pixelated masks
- Alternative mask technologies
- Grey-scale masks
- Direct-write, ML²

Mask Business:
- Mask manufacturing control
- Mask shop management
- Mask management in wafer fabs
- Business aspects of masks
- Infrastructure challenges
The 35th Annual SPIE Photomask Symposium, organized by SPIE and BACUS, the International Technical Group of SPIE, provides the forum to present the newest findings, to discuss the most exciting trends, and to ponder reliable solutions in this rapidly developing industry and their effects on the lithography.

In 2015, mask making and mask makers continue to support the requirements for more complex optical extensions to realize 10 nm and below. These elements will continue to put pressure on the industry. The mask makers must excel at optical multiple patterning, EUV, NIL, DSA and all the other varieties of photolithography to support the wafer technology with patterning solutions. As EUV lithography continues to move closer to volume manufacturing we shall focus on EUV reticles and related infrastructures as a key enabler. We also continue to discuss how 450mm wafers implementation, scaling of non-IC patterning such as display panel and MEMS, will impact the mask industry.

As Symposium Chair and Symposium Co-Chair, we urge you to participate by submitting your abstracts, and to encourage your colleagues to participate, and most of all, encourage your company to continue to support Photomask Technology.

Hope to see you again in Monterey!

Naoya Hayashi
Dai Nippon Printing Co., Ltd.
2015 Symposium Chair

Bryan S. Kasprowicz
Photronics, Inc.
2015 Symposium Co-Chair

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Photomask Technology 2015 (PM101)

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The 35th Photomask Symposium, organized by SPIE and BACUS, the International Technical Group of SPIE, provides the forum to present citing trends, and to ponder development of reliable solutions and their effects on semiconductor lithography.

As EUV lithography moves closer to manufacturing insertion we still must drive optical mask to continue to drive leading edge technology and will last longer into the sub-10nm nodes. In addition, there is a strong push for more focus on the infrastructure needs for mask manufacturing including the potential impact of the move to 450mm wafers, and for mask metrology related EUV mask production. What are the changes for reticles that allow the industry to stay on Moore’s Law and the cost roadmap?

As mask makers we must continue to focus on providing mask solutions for EUV, multiple patterning, complex OPCed masks, NIL, DSA, and the other varieties of photolithography in an environment in which the continuously tightening litho error budget increases the burden on the mask.

Suggested topics for submissions include, but are not limited to:

**Mask Making**
- mask data preparation
- substrates and materials
- patterning tools and processes
- resist and resist processing
- etch techniques
- metrology
- inspection
- repair
- cleaning, contamination, and haze
- simulation of mask making
- mask process correction

**Larger Glass, Smaller Fields, and Materials for 450mm Wafer**
- impact of 450mm wafers on reticle and infrastructure
- tool developments to support larger blanks
- material developments
- interactions with magnifications
- impact of stitching for mask making and design

**Emerging Mask Technologies**
- EUV mask making
- EUV mask inspection and repair
- EUV mask infrastructure
- EUV mask application
- nano-imprint mask making
- nano-imprint mask application
- pixelated masks
- alternative mask technologies
- grey-scale masks
- masks for DSA patterning
- direct-write, ML2

**Mask Application**
- double- and multiple-patterning
- resolution enhancement techniques and OPC
- source/mask optimization
- design for manufacturability
- patterned media
- display panel
- simulation and modeling
- inverse lithography technology
- MEMS patterning

**Mask Business**
- mask manufacturing control
- mask shop management
- mask management in wafer fabs
- business aspects of masks
- infrastructure challenges

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**Important Dates**

Abstract Due Date: 13 April 2015
Acceptance Notices: 25 May 2015
Manuscript Due Date: 31 August 2015
BACUS Lifetime Achievement Award 2014
presented to
James N. Wiley, EUV Infrastructure Executive Strategist, ASML US Inc.
In the recognition of his contributions to the Photomask industry especially in the area of photomask defect characterization, printability, and publication. Jim has been a long-time supporting member of the Bay Area Chrome User Society (BACUS) since its founding days and has served in many leadership roles over the decades of his involvement within the BACUS organization.

BACUS Prize 2014
presented to
Dr. Dan Meisburger, Tec-Start Consulting
In recognition of his contribution to the Photomask Industry through his work and influence to develop and commercialize the world’s first high-speed electron beam mask inspection system.

Photomask 2014
Best Paper Awards

1ST PLACE
Mask data processing in the era of multibeam writers, Frank E. Abboud, Michael Asturias, Maesh Chandramouli, Intel Corp. (USA); Yoshihiro Tezuka, Intel Kabushiki Kaisha (Japan) ............... 9235-31

2ND PLACE
Characterization of a new polarity switching negative tone e-beam resist for 14nm and 10nm logic node mask fabrication and beyond, Thomas B. Faure, Amy E. Zweber, Luisa D. Bozano, Martha I. Sanchez, Ratnam Sooriyakumaran, Linda K. Sundberg, IBM Corp. (USA) .............. 9235-24

3RD PLACE
Performance of GFIS mask repair system for various mask materials, Fumio Aramaki, Tomokazu Kozakai, Osamu Matsuda, Anto Yasaka, Hitachi High-Tech Science Corp. (Japan); Shingo Yoshikawa, Koichi Kanno, Hiroyuki Miyashita, Naoya Hayashi, Dai Nippon Printing Co., Ltd. (Japan) ........... 9235-14

Photomask 2014
Best Poster Awards

1ST PLACE
Using rule-based shot dose assignment in model-based MPC applications, Ingo Bork, Peter D. Buck, Lin Wang, Mentor Graphics Corp. (USA); Uwe Mueller, Mentor Graphics GmbH (Germany) .......................... 9235-62

2ND PLACE
Study of high sensitivity DUV inspection for sub-20nm devices with complex OPCs, Sang-Hoon Han, Hong Yul Jung, Sunpyo S. Lee, In-Yong Kang, Gisung Yoon, Dong Hoon Chung, Chan-Uk Jeon, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Yulia Brand, Yair Eran, Yoad Bar-Shean, Alexander Chereshnya, Applied Materials, Ltd. (Israel); Chung Ki Lyu, Applied Materials, Ltd. (Korea, Republic of) ...................... 9235-75

3RD PLACE
Recent results from EUVL patterned mask inspection using projection electron microscope system, Ryoichi Hirano, Susumu Iida, Tsuyoshi Amano, Tensueo Terasawa, Hidehiro Watanave, EUVL Infrastructure Development Ctr., Inc. (Japan); Masahiro Hatakeyama, Takeshi Murakami, Shoji Yoshikawa, Kenji Terao, EBARA Corp. (Japan) ......................... 9235-47
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- Attend the meeting.
- Make the presentation as scheduled in the program.
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- Please also submit a **300-word text summary** suitable for early release. If accepted, this summary text will be published prior to the meeting in the online or printed programs promoting the conference.
- Only original material should be submitted.
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- Commercial papers, papers with no new research/development content, and papers where supporting data or a technical description cannot be given for proprietary reasons will not be accepted for presentation in this conference.
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- The contact author will receive notification of acceptance and presentation details by e-mail no later than: **Please note date change—12 June 2015.**
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Patterning, EUV, metrology, materials, inspection/repair, mask business, next-generation technologies

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