Photomask Technology 2014

Paul W. Ackmann
Naoya Hayashi
Editors

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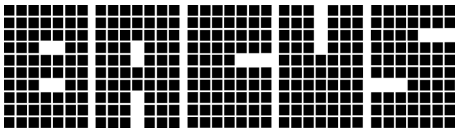

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Introduction

MONTEREY, California, USA — Highlights at the recent SPIE "Photomask Technology 2014". The event ran 16-18 September at the Monterey Conference Center and Monterey Marriott, and was sponsored by SPIE.

We concluded Photomask 2014 on Thursday September 18th after three very information packed sessions. We started with keynote speaker Martin van den Brink, President and CTO of ASML, who said that extreme ultraviolet (EUV) source technology is reaching performance levels that enable introduction into production lines in select cases at the 10-nanometer node, and that progress is such that it should soon be ready for full-scale introduction at the 7-nanometer node and ended with EUV mask making advances.

Photomask Technology this year included more than 70 presentations on mask making, EUV, mask data preparation, 9-inch glass, emerging mask technologies, mask business, and related topics. Paul Ackmann (GlobalFoundries) was symposium chair, and Naoya Hayashi (Dai Nippon Printing) was symposium co-chair

Van den Brink's talk detailed ASML's steady and substantial progress over the past several months improving the technology for eventual scale-up in semiconductor manufacturing. The challenge, he said, is implementing affordable scaling to create lower cost and improved performance. This can be achieved through holistic lithography immersion driving productivity and yield with multiple patterning, and with EUV technology driving productivity and improving operational cost to enable 2D patterning and simpler processing. He also explained the extendibility of EUV lithography with higher NA tool.

We co-located with the SPIE "Scanning Microscopies" conference run by Michael Postek. This was the first time that the SPIE Scanning Microscopies conference was held in Monterey. This had very good synergy and helped with the overall attendance. The joint sessions provided an interesting insight between metrology and mask making.

Scanning Microscopies brought approximately 50 more presentations to the conference, in areas such as nanomaterials, optical and particle beam, scanned probe, and imaging. Symposium chairs were Michael Postek and Dale Newbury (National Institute of Standards and Technology), Frank Platek (U.S. Food and Drug Administration), and Tim Maugel (University of Maryland, College Park).

Awards were again presented during the Banquet on Wednesday Evening. Jim Wiley, EUV Infrastructure Executive Strategist at ASML, was presented with the 2014 Photomask Lifetime Achievement Award in recognition of contributions to the photomask industry, particularly in the area of photomask defect characterization, printability, and publication. Dan Meisburger of Tec-Start Consulting was awarded

the 2014 BACUS Prize in recognition of his work and influence in the development of the high-speed electron beam mask inspection system. Linda He Yi of the Nanoelectronics Lab in the Department of Electrical Engineering at Stanford University was awarded the 2014 BACUS Scholarship.

Thursday continued the panel discussion format chaired by Naoya Hayashi. Hayashi-san pulled together a very good panel on data complexity with industry experts. The panel was focused on the expansion of data for advanced nodes. Panel members from the industry and their messages were as follows:

Mask Complexity: How to solve the issues

Peter Buck (Mentor Graphics): Embracing Mask Complexity

Bala Thumma (Synopsis): We are not at the breaking point yet!

Laurent Tau (TSMC): Fab concerns in Mask Technology

ShusukeYoshitake (NuFlare): Mask Writing Throughput Improvement

Shuichiro Ohara (Nippon Control Systems): Challenges in Mask Data Preparation

Dong-Hoon Chung (Samsung): Issues on Inspection and Metrology

Yalin Xiong (KLA-Tencor): Mask Inspection for 10nm and 7nm Nodes

Daniel Chalom (IMS Nanofabrication AG): How to reduce the mask writing time?

Members of the Photomask Technology and Advanced Lithography community around the world were saddened to hear of the death of **Oliver Kienzle**, CEO and Head of the Strategic Business Unit Semiconductor Metrology Systems at Carl Zeiss SMS GmbH.

We lost Oliver shortly after Photomask Technology 2014. Dr. Kienzle died in Germany on 27 September.

He will be greatly missed.