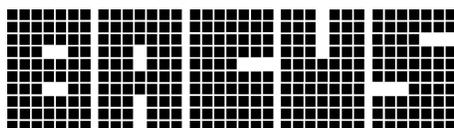


Photomask Technology 2011

**Wilhelm Maurer
Frank E. Abboud**
Editors

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M. Pereira, M. Maji, B. Gangadhar, R. R. Pai, I. Nigam, A. Parchuri, SoftJin Technologies Pvt. Ltd. (India)

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C.-W. Wu, C.-C. Liao, C.-L. Shih, Nanya Technology Corp. (Taiwan); C.-H. Chang, S. Hsu,
H.-Y. Liu, Z. Li, ASML Brion Technologies, Inc. (United States)
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H. Zhang, Y. Du, M. D. F. Wong, Univ. of Illinois at Urbana-Champaign (United States);
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M. Fakhry, IBM Almaden Research Ctr. (United States); Y. Granik, K. Adam, Mentor Graphics
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M. Sczyrba, Advanced Mask Technology Ctr. GmbH & Co. KG (Germany); A. Ho,
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John M. Whittey, KLA-Tencor Corporation (United States)

Special Session Opening Remarks

Frank E. Abboud, Intel Corporation (United States)

Robert J. Socha, ASML US, Inc. (United States)

Special Session: Is it too late to panic? EUV is Real!

Frank E. Abboud, Intel Corporation (United States)

Robert J. Socha, ASML US, Inc. (United States)

Best Paper and Poster Awards, and Prize Drawing

Wilhelm Maurer, Infineon Technologies AG (Germany)

Frank E. Abboud, Intel Corporation (United States)

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Introduction

This proceedings volume contains accepted papers from the SPIE conference on Photomask Technology 2011. The conference was arranged through the Bay Area Chrome Users Society (BACUS) and held as part of the 31st International Symposium on Photomask Technology, 19–22 September 2011 in Monterey, California, United States.

This year's conference introduced, as a new feature, a total of six invited papers in addition to the annual invited Mask Industry Assessment presentation by SEMATECH, and the best paper by EMLC 2011. These invited papers started corresponding key sessions with the insight of a competent, savvy expert in the corresponding field. During these invited presentations no parallel presentations were given, so every participant had a real chance to get a comprehensive overview of the key subjects in each field of Photomask.

The primary technical subject of this year's conference has been the arrival of EUV in the mainstream of mask technology. To affirm this statement, the program presented only topics very specific to EUV in two dedicated EUV sessions. All "regular" mask-related topics of EUV, e.g.: mask substrates, mask inspection, etc.; and results reported on EUV mask topics, in particular on mask defects, on their printability, potential prevention, and options to repair, were the basis of lively discussions, which could be overheard in many instances outside of the conference rooms. Everybody seriously involved in mask topics cannot get around EUV masks anymore, but has to find her/his potential contribution there.

The exact same statement was provided by Thursday's special session titled "Is it too late to panic? ... EUV is real!" Bob Socha and Frank Abboud collected a distinguished group of invited speakers, who presented their personal knowledge and viewpoint on specific EUV topics, and in a concluding panel discussion gave their assessment of the achievements and challenges with regard to EUV masks.

One additional highlight of the conference surely has been the keynote presentation by Walden C. Rhines, Chairman and Chief Executive Officer of Mentor Graphics, "Bucking the trend: driving changes in how EDA and the semiconductor industries work together," which provided deep insight into long term trends of the semiconductor industry from the viewpoint of EDA. In contrast to photomasks, EDA was up to now able to keep their 2% share of the semiconductor industry. Mask making may take a lesson or two from EDA's score book!

We thank all of the authors for providing and discussing their insights. We also thank all the members of the program committee for their hard work in helping to make this year's conference a success through their efforts, ranging from reviewing abstracts through chairing sessions. Our sponsors also deserve special thanks for their continued support of Photomask Technology. The SPIE

staff has our gratitude for their tireless efforts in organizing the conference and ensuring that things ran smoothly as well as their efforts to provide for a timely publication of these proceedings.

We hope you find the papers contained in this proceedings informative and helpful in your professional endeavors.

Wilhelm Maurer
Frank E. Abboud

P.S.

If you are searching for one of the presentations in Monday's Photomask Japan (PMJ) Session or for one of the posters from PMJ, these are already published in the SPIE Proceedings 7748.

Thursday Special Session Schedule

Is it too late to PANIC? EUV is real*

Session Chairs and Panel Moderators: **Frank E. Abboud**, Intel Corporation (United States); **Robert J. Socha**, ASML US, Inc. (United States)

Theme and purpose: EUV is real

"Almost everything in mask making will likely change with EUV: materials, blank inspection, writer compensation, etch processes, metrology, inspection, repair, cleaning, and material handling."

"Opportunities for new innovations and businesses can possibly be the catalyst to push our industry into a new and vibrant industry."

"We need to lead the way and see how we can capitalize on this opportunity."

"We need to get off the short list!"

"Our panel intends to bring this topic to an open and vibrant discussion to get to the real issues for implementation and to weigh pros and cons."

Panelists:

William H. Arnold, ASML US, Inc. (United States)

Vivek K. Singh, Intel Corporation (United States)

Hiroaki Morimoto, Toppan Printing Company, Ltd. (Japan)

Sheng-Ji (Angus) Chin, Taiwan Semiconductor Manufacturing Company Ltd. (Taiwan)

Byung-Gook Kim, SAMSUNG Electronics Company, Ltd. (Korea, Republic of)

Ram Peltin, Applied Materials (Israel)

Brian L. Haas, KLA-Tencor Corporation (United States)

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Yoshiaki Ikuta, Asahi Glass (Japan)

Open Discussion

* For information about the BACUS technical group go to: www.SPIE.org/BACUSHome

