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Session Chairs

1 Keynote Session
Kafai Lai, IBM Corporation (United States)
Andreas Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)

2 Optics and Beyond
Will Conley, Cymer, an ASML company (United States)
Bernd Geh, Carl Zeiss SMT Inc. (United States)

3 Image and Process Control
Tsai-Sheng Gau, Taiwan Semiconductor Manufacturing Company Ltd. (Taiwan)
Carlos Fonseca, Tokyo Electron America, Inc. (United States)

4 Non-IC Applications
Andreas Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)
Kazuhiro Takahashi, Canon Inc. (Japan)

5 OPC Algorithms
Sachiko Kobayashi, Toshiba Corporation (Japan)
Xuelong Shi, Semiconductor Manufacturing International Corporation (China)

6 Multiple Patterning and SMO
Geert Vandenberghe, IMEC (Belgium)
Young Seog Kang, SAMSUNG Electronics Company, Ltd. (Korea, Republic of)

7 Overlay Measurement and Control: Joint Session with Conference 9050
Alexander Starikov, I&I Consulting (United States)
Pary Baluswamy, Micron Technology, Inc. (United States)

8 OPC Modeling
Yuri Granik, Mentor Graphics Corporation (United States)
Peter D. Brooker, Synopsys, Inc. (United States)

9 Pattern-Aware Techniques: Joint Session with Conference 9053
Luigi Capodieci, GLOBALFOUNDRIES Inc. (United States)
Jongwook Kye, GLOBALFOUNDRIES Inc. (United States)

10 Mask Topography Modeling
Daniel Sarlette, Infineon Technologies Dresden (Germany)
Brian J. Grenon, RAVE LLC (United States)

11 DSA Design for Manufacturability: Joint Session with Conferences 9049 and 9053
Michael A. Guillorn, IBM Thomas J. Watson Research Center (United States)
Bruce W. Smith, Rochester Institute of Technology (United States)

12 Toolings
Soichi Owa, Nikon Corporation (Japan)
Reinhard Voelkel, SUSS MicroOptics SA (Switzerland)

Introduction

This year we celebrate the 27th year of the Optical Microlithography conference. During the last few decades of tremendous success of the semiconductor industry, optical lithography has been the main enabling technique behind the continuous growth of component density in integrated circuits defined by Moore's Law. In the VLSI area many of us have witnessed the previously unanticipated advance in extending optical lithography to pattern features with size much smaller than the wavelength of exposure.

The success of this continuous scaling so far by extending optical lithography comes from mainly the more holistic optimization of the lithography process. Technology scaling has been enabled by different technology elements that are covered by this conference. They are: first, physical scaling due to exposure tool, mask, photoresist and process advancement; second, computational scaling to lower the k1 value by algorithmic and modeling advances, as well as high performance computing tools; third, the higher level of integration of both lithography and etch process in multiple patterning techniques; and fourth, the advancement of advanced material technique, like Directed Self-Assembly (DSA) as a complementary lithography approach.

With the delay of EUV Lithography for High Volume Manufacturing (HVM), optical lithography technologies, such as 193nm immersion lithography technology, together with a variety of multiple patterning technologies are rapidly becoming the dominant approaches for 32nm, 22nm, 14nm, and 10nm technology nodes. Alternative lithography technologies, such as Directed Self-Assembly (DSA), have also quickly attracted more attention and are being considered as possible complementary approach for 7nm node and beyond.

Meanwhile, advances in optical lithography become increasingly important for several non-IC areas including silicon-photonics, flat panel displays, and other applications. Although these applications mostly involve larger feature sizes, they have their own challenges such as extraordinary CD control, unusual profile shapes, and ultralow line-edge roughness.

We will continue to strive to make the SPIE Optical Microlithography conference remain as the premiere optical lithography conference in the world and provide the best platform for the lithography community to exchange ideas and success.

This proceedings volume collects selected papers presented at the 27th Optical Microlithography Conference (OM XXVII), held 25–27 February 2014, as part of the SPIE Advanced Lithography Symposium 2014. There were 12 oral sessions in the OM XXVII, and a large poster session.

Session 1: Keynote session
Session 2: Optics and Beyond
Session 3: Image and Process Control
Session 4: Non-IC Applications
Session 5: OPC Algorithms

Session 6: Multiple Patterning and SMO
Session 7: Overlay Measurement and Control: Joint Session with Conference 9050
Session 8: OPC Modeling
Session 9: Pattern-Aware Techniques: Joint Session with Conference 9053
Session 10: Mask Topography Modeling
Session 11: DSA Design for Manufacturability: Joint Session with Conferences 9049 and 9053
Session 12: Toolings

We would like to take this opportunity to thank all members of the SPIE 2014 Advanced Lithography Symposium Committee for their help in organizing another very successful SPIE Optical Microlithography Conference. The dedication, enthusiasm, and efforts of many volunteers, keynote speakers, invited speakers, and authors of contributed papers of OM XXVII were essential for the success of the conference. We like to thank everyone, along with members and volunteers of the SPIE community for their support and efforts.

Kafai Lai
Andreas Erdmann