Optical Microlithography XXVII

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Contents

Conference Committee
Introduction

OPTICS AND BEYOND

9052 04 The saga of sigma: Influences of illumination throughout optical generations (Invited Paper) [9052-3]
B. W. Smith, Rochester Institute of Technology (United States)

9052 05 The impact of Mask 3D and Resist 3D effects in optical lithography [9052-4]
J. Finders, ASML Netherlands B.V. (Netherlands)

9052 06 Topographic and other effects on EUV pattern fidelity [9052-5]
C. Sarma, SEMATECH Inc. (United States); T. Graves, KLA-Tencor Texas (United States); M. Neisser, SEMATECH Inc. (United States); S. Robertson, KLA-Tencor Texas (United States)

IMAGE AND PROCESS CONTROL

9052 08 Advanced OPC Mask-3D and Resist-3D modeling [9052-7]
A. Szucs, J. Planchot, V. Farys, E. Yesilada, STMicroelectronics (France); L. Depre, S. Kapasi, ASML Brion (United States); C. Gourgon, M. Besacier, LTM, CNRS, CEA (France); O. Mouraille, F. Driessen, ASML Netherlands B.V. (Netherlands)

9052 09 Study of lens heating behavior and thick mask effects with a computational method [9052-8]
N. Jia, S.-H. Yang, S. Kim, J. Choi, SAMSUNG Electronics Co., Ltd. (Korea, Republic of)

9052 0A Scanner performance predictor and optimizer in further low-k1 lithography [9052-9]

9052 0B Imaging control functions of optical scanners [9052-10]

9052 0C Experimental validation of rigorous 3D profile models for negative-tone develop resists [9052-11]
W. Gao, Synopsys, Inc. (Belgium) and IMEC (Belgium); U. Klostermann, I. Kamohara, T. Schmoeiler, Synopsys GmbH (Germany); K. Lucas, Synopsys, Inc. (United States); W. Demmerle, Synopsys GmbH (Germany); P. De Bisschop, IMEC (Belgium); J. Mailfert, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium)
Wafer sub-layer impact in OPC/ORC models for advanced node implant layers [9052-12]
J.-C. Le-Denmat, J.-C. Michel, E. Sungauer, E. Yesilada, F. Robert, STMicroelectronics (France); S. Lan, M. Feng, L. Wang, L. Depre, S. Kapasi, ASML Brion (United States)

NON-IC APPLICATIONS

193nm immersion lithography for high-performance silicon photonic circuits (Invited Paper) [9052-14]
S. K. Selvaraja, G. Winroth, S. Locorotondo, G. Murdoch, A. Milenin, C. Delvaux, P. Ong, IMEC (Belgium); S. Pathak, W. Xie, Univ. Gent (Belgium) and IMEC (Belgium); G. Sterckx, G. Lepage, IMEC (Belgium); D. Van Thourhout, W. Bogaerts, Univ. Gent (Belgium) and IMEC (Belgium); J. Van Campenhout, P. Absil, IMEC (Belgium)

Lithographic process window optimization for mask aligner proximity lithography [9052-15]
R. Voelkel, U. Vogler, A. Bramati, SUSS MicroOptics SA (Switzerland); A. Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany); N. Ünal, U. Hofmann, GeniSys GmbH (Germany); M. Hennemeyer, R. Zoberbier, SUSS MicroTec Lithography GmbH (Germany); D. Nguyen, J. Brugger, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

The solution to enhance i-line stepper applications by improving mix and match process overlay accuracy [9052-16]
Y. Sumiyoshi, R. Sasaki, Y. Hasegawa, K. Ushiku, H. Sano, A. Shigenobu, B. Takeshita, S. Miura, Canon Inc. (Japan)

Built-in lens mask lithography [9052-17]
N. Ueda, M. Sasago, A. Misaka, H. Kikuta, H. Kawata, Y. Hirai, Osaka Prefecture Univ. (Japan)

OPC ALGORITHMS

Automated sample plan selection for OPC modeling [9052-18]
N. Casati, M. Gabrani, IBM Research – Zürich (Switzerland); R. Viswanathan, IBM Microelectronics, SRDC (India); Z. Bayraktar, IBM Corp. (United States); O. Jaiswal, IBM Microelectronics, SRDC (India); D. DeMaris, IBM Research – Austin (United States); A. Y. Abdo, J. Oberschmidt, IBM Corp. (United States); A. Krause, ETH Zürich (Switzerland)

Shot overlap model-based fracturing for edge-based OPC layouts [9052-20]
S. Jiang, A. Zakhvor, Univ. of California, Berkeley (United States)

11nm logic lithography with OPC-lite [9052-21]
M. C. Smayling, Tela Innovations, Inc. (United States); K. Tsujita, Canon Inc. (Japan); H. Yaegashi, Tokyo Electron Ltd. (Japan); V. Axelrad, Sequoia Design Systems, Inc. (United States); R. Nakayama, Canon Inc. (Japan); K. Oyama, A. Hara, Tokyo Electron Ltd. (Japan)

Model-based OPC using the MEEF matrix II [9052-22]
J. Lei, L. Hong, G. Lippincott, J. Word, Mentor Graphics Corp. (United States)
### MULTIPLE PATTERNING AND SMO

**9052 0O**  
**Immersion lithography extension to sub-10nm nodes with multiple patterning** [9052-23]  
S. Owa, S. Wakamoto, M. Murayama, Nikon Corp. (Japan); H. Yaegashi, K. Oyama, Tokyo Electron Ltd. (Japan)

**9052 0P**  
**Hybrid lithography for triple patterning decomposition and E-beam lithography** [9052-24]  
H. Tian, Univ. of Illinois at Urbana-Champaign (United States); H. Zhang, Synopsys, Inc. (United States); Z. Xiao, M. F. Wong, Univ. of Illinois at Urbana-Champaign (United States)

**9052 0Q**  
**Metal1 patterning study for random-logic applications with 193i, using calibrated OPC for litho and etch** [9052-25]  
J. Mailfert, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium); J. Van de Kerkhove, P. De Bisschop, IMEC (Belgium); K. De Meyer, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium)

**9052 0R**  
**Pattern fidelity in multiple-patterning process** [9052-26]  
M. Yamato, S. Natori, S. Yamauchi, A. Hara, K. Oyama, H. Yaegashi, Tokyo Electron Ltd. (Japan)

**9052 0S**  
**Joint optimization of source, mask, and pupil in optical lithography** [9052-27]  
J. Li, E. Y. Lam, The Univ. of Hong Kong (Hong Kong, China)

**9052 0T**  
**Efficient source polarization optimization for robust optical lithography** [9052-28]  
X. Ma, J. Gao, C. Han, Y. Li, L. Dong, L. Liu, Beijing Institute of Technology (China)

### OVERLAY MEASUREMENT AND CONTROL: JOINT SESSION WITH CONFERENCE 9050

**9052 0U**  
**Characterization and mitigation of overlay error on silicon wafers with nonuniform stress** [9052-29]  
T. Brunner, V. Menon, C. Wong, N. Felix, M. Pike, O. Gluschenkov, M. Belyansky, IBM Corp. (United States); P. Vukkadala, S. Veeraraghavan, S. Klein, C. H. Hoo, J. Sinha, KLA-Tencor Corp. (United States)

**9052 0V**  
**Analysis of overlay errors induced by exposure energy in negative tone development process for photolithography** [9052-30]  

### OPC MODELING

**9052 0W**  
**Hybrid OPC modeling with SEM contour technique for 10nm node process** [9052-31]  
K. Hitomi, Hitachi America, Ltd. (United States); S. Halle, M. Miller, I. Graur, N. Saulnier, D. Dunn, IBM Corp. (United States); N. Okai, Hitachi America, Ltd. (United States); S. Hotta, A. Yamaguchi, Hitachi, Ltd. (Japan); H. Komuro, T. Ishimoto, S. Koshihara, Y. Hojo, Hitachi High-Technologies Corp. (Japan)
Improving 3D resist profile compact modeling by exploiting 3D resist physical mechanisms [9052-32]
Y. Fan, Synopsys, Inc. (United States); C.-E. R. Wu, Synopsys Taiwan Ltd. (Taiwan); Q. Ren, H. Song, Synopsys, Inc. (United States); T. Schmoeller, Synopsys GmbH (Germany)

Resist profile simulation with fast lithography model [9052-33]
Y.-Y. He, C.-S. Chou, Y.-P. Tang, W.-C. Huang, R.-G. Liu, T.-S. Gau, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan)

Modeling the lithography of ion implantation resists on topography [9052-34]
G. Winroth, DG Research & Innovation (Belgium) and IMEC (Belgium); A. Vaglio Pret, IMEC (Belgium) and KLA-Tencor Corp. (Belgium); M. Ercken, IMEC (Belgium); S. A. Robinson, J. J. Biafore, KLA-Tencor Texas (United States)

Fast detection of novel problematic patterns based on dictionary learning and prediction of their lithographic difficulty [9052-37]
F. de Morsier, IBM Research – Zürich (Switzerland); D. DeMaris, IBM Research - Austin (United States); M. Gabrani, N. Casati, IBM Research – Zürich (Switzerland)

Pattern-based full-chip process verification [9052-38]
C. Ying, Y. Kwon, P. Fornari, G. Perçin, A. Liu, Cadence Design Systems, Inc. (United States)

Characterization of 1D layout technology at advanced nodes and low k1 [9052-39]
V. Axelrad, Sequoia Design Systems, Inc. (United States); K. Mikami, Canon Inc. (Japan); M. Smayling, Tela Innovations, Inc. (United States); K. Tsujita, Canon Inc. (Japan); H. Yaegashi, Tokyo Electron Ltd. (Japan)

Availability study of CFD-based Mask3D simulation method for next generation lithography technologies [9052-41]
M. Takahashi, Toshiba Corp. (Japan); Y. Kawabata, Toshiba Information Systems Corp. (Japan); T. Washitani, S. Tanaka, S. Maeda, S. Mimotogi, Toshiba Corp. (Japan)

Rapid accurate improvement in 3D mask representation via input geometry optimization and crosstalk [9052-42]
D. Fryer, M. Lam, K. Adam, C. Clifford, M. Oliver, C. Zuniga, J. Sturtevant, Mentor Graphics Corp. (United States); C. Wang, GLOBALFOUNDRIES Inc. (United States); S. Mansfield, IBM Corp. (United States)

Fixing the focus shift caused by 3D mask diffraction [9052-43]
B. Yenikaya, C. Chuyeshov, O. Bakir, Y. Han, Cadence Design Systems, Inc. (United States)

Impact of topographic mask models on scanner matching solutions [9052-44]
J. K. Tyminska, Nikon Research Corp. of America (United States); J. Pomplun, JCMwave GmbH (Germany); S. P. Renwick, Nikon Research Corp. of America (United States)
Computational lithography platform for 193i-guided directed self-assembly [9052-46]
K. Lai, M. Ozlem, IBM Corp. (United States); J. Pitera, IBM Research - Almaden (United States); C. Liu, A. Schepis, D. Dechene, A. Krasnoperova, D. Brue, J. Abdallah, IBM Corp. (United States); H. Tsai, M. Guillorn, IBM Thomas J. Watson Research Ctr. (United States); J. Cheng, G. Doerk, M. Tjio, IBM Research - Almaden (United States); R. Topalogu, M. Fahkry, N. Lafferty, IBM Corp. (United States)

Applying ILT mask synthesis for co-optimizing design rules and DSA process characteristics [9052-47]
T. Dam, W. Stanton, Synopsys, Inc. (United States)

Rigorous simulation and optimization of the lithography/directed self-assembly co-process [9052-48]
T. Fühner, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany); U. Welling, M. Müller, Georg-August-Univ. Göttingen (Germany); A. Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)

Critical assessment of the transport of intensity equation as a phase recovery technique in optical lithography [9052-49]
A. Shanker, Univ. of California, Berkeley (United States); M. Sczyrba, Advanced Mask Technology Ctr. GmbH Co. KG (Germany); B. Connolly, F. Kalk, Toppan Photomasks, Inc. (Germany); A. Neureuther, L. Waller, Univ. of California, Berkeley (United States)

Extremely long life and low-cost 193nm excimer laser chamber technology for 450mm wafer multipatterning lithography [9052-50]

Immersion scanners enabling 10nm half-pitch production and beyond [9052-52]
H. Egashira, Y. Uehara, Y. Shirata, Y. Shibazaki, J. Ishikawa, T. Funatsu, M. Ohba, Nikon Corp. (Japan)

Improvements in bandwidth and wavelength control for XLR 660xi systems [9052-93]
W. Conley, H. Dao, D. Dunlap, Cymer, an ASML company (United States); R. Flores, Canon Inc. (United States); M. Lake, K. O’Brien, A. Russin, A. Simic, J. Thonnes, B. Wehrung, J. Wyman, Cymer, an ASML company (United States)

Estimation of 1D proximity budget impacts due to light source for advanced node design [9052-54]
R. C. Peng, T. Wu, H. H. Liu, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan)
In situ aberration measurement method using a phase-shift ring mask [9052-55]
X. Wang, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate School of the Chinese Academy of Sciences (China); S. Li, Shanghai Institute of Optics and Fine mechanics (China); J. Yang, F. Tang, G. Yan, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate School of the Chinese Academy of Sciences (China); A. Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)

A defocus measurement method for an in situ aberration measurement method using a phase-shift ring mask [9052-57]
S. Li, Shanghai Institute of Optics and Fine Mechanics (China); X. Wang, J. Yang, F. Tang, G. Yan, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate School of the Chinese Academy of Sciences (China); A. Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)

Alternative method for variable aspect ratio vias using a vortex mask [9052-58]
A. R. Schepis, Z. Levinson, A. Burbine, B. W. Smith, Rochester Institute of Technology (United States)

Process window enhancement using advanced RET techniques for 20nm contact layer [9052-59]
Y. Ping, S. McGowan, GLOBALFOUNDRIES Inc. (United States); Y. Gong, Y. M. Foong, GLOBALFOUNDRIES Singapore (Singapore); J. Liu, GLOBALFOUNDRIES Inc. (United States); J. Qiu, V. Shu, B. Yan, J. Ye, P. Li, H. Zhou, T. Pandey, J. Liang, C. Aquino, S. Baron, S. Kapasi, ASML Brion (United States)

Mitigating mask roughness via pupil filtering [9052-60]
B. Baylav, C. Maloney, Z. Levinson, Rochester Institute of Technology (United States); J. Bekaeht, IMEC (Belgium); A. Vaglio Pret, IMEC (Belgium) and KLA-Tencor Corp. (Belgium); B. Smith, Rochester Institute of Technology (United States)

POSTERS: MULTIPLE PATTERNING

Understanding the critical challenges of self-aligned octuple patterning [9052-61]
J. Yu, W. Xiao, W. Kang, Y. Chen, Peking Univ. (China)

A generalized edge-placement yield model for the cut-hole patterning process [9052-62]
P. Zhang, C. Hong, Y. Chen, Peking Univ. (China)

Dual photoresist complimentary lithography technique produces sub-micro patterns on sapphire substrates [9052-63]
C.-M. Chang, S.-F. Tseng, C.-T. Lee, W.-T. Hsiao, Instrument Technology Research Ctr. (Taiwan); J.-L. A. Yeh, Instrument Technology Research Ctr. (Taiwan) and National Tsing Hua Univ. (Taiwan); D. Chiang, Instrument Technology Research Ctr. (Taiwan)
POSTERS: NON-IC APPLICATIONS

9052 1S  TCO less dye-sensitized solar cell lithographic methods for injecting the electrolyte
[9052-65]
Institute (Korea, Republic of)

9052 1T  UV-LED exposure system for low-cost photolithography [9052-66]
M. K. Yapici, I. Farhat, Khalifa Univ. of Science, Technology and Research (United Arab
Emirates)

9052 1U  Micro-optics: enabling technology for illumination shaping in optical lithography [9052-67]
R. Voelkel, SUSS MicroOptics SA (Switzerland)

POSTERS: OPC ALGORITHMS

9052 1W  Model-based pattern dummy generation for logic devices [9052-70]
J. Jang, C. Kim, S. Ko, S. Byun, H. Yang, D. Yim, SK Hynix, Inc. (Korea, Republic of)

9052 1X  Adaptive OPC approach based on pattern grouping algorithm [9052-71]
International Co., Ltd. (Taiwan)

9052 1Y  Study of the pattern aware OPC [9052-72]
S.-S. Yeh, Powerchip Semiconductor Corp. (Taiwan); A. Zhu, J. Chen, B. Yenikaya,
Cadence Design Systems, Inc. (United States); Y.-S. Chang, C.-C. Lin, Powerchip
Semiconductor Corp. (Taiwan)

POSTERS: OPC VERIFICATION

9052 20  Full-chip model-based OPC verification by using rigorous resist 3D model [9052-74]
D. Kong, T. You, C. Kim, H. Yang, D. Yim, SK Hynix, Inc. (Korea, Republic of)

POSTERS: OPC MODELING

9052 21  Effect of mask 3D and scanner focus difference on OPC modeling and verification
[9052-75]
G. Ning, GLOBALFOUNDRIES Malta (United States) and GLOBALFOUNDRIES Dresden
(Germany); J. Cheng, GLOBALFOUNDRIES Singapore (Singapore); S. Kropinov,
GLOBALFOUNDRIES Dresden (Germany); L. C. Litt, D. Zhang, P. Ackmann,
GLOBALFOUNDRIES Malta (United States); Y. M. Foong, GLOBALFOUNDRIES Singapore
(Singapore)

9052 22  Combining lithography and etch models in OPC modeling [9052-76]
L. Zavyalova, L. Luan, H. Song, Synopsys, Inc. (United States); T. Schmoeller, Synopsys GmbH
(Germany); J. Shiely, Synopsys, Inc. (United States)
Fast integral rigorous modeling applied to wafer topography effect prediction on 2x nm bulk technologies [9052-77]
J.-C. Michel, STMicroelectronics (France) and Lab. Hubert Curien, CNRS, Univ. Jean Monnet Saint-Étienne (France); J.-C. Le Denmat, STMicroelectronics (France); A. Tishchenko, Y. Jourlin, Lab. Hubert Curien, CNRS, Univ. Jean Monnet Saint-Étienne (France)

Bringing SEM contour based OPC to production [9052-78]
F. Weisbuch, GLOBALFOUNDRIES Dresden (Germany); K. K. Koh, GLOBALFOUNDRIES Singapore (Singapore); K. Jantzen, Mentor Graphics Corp. (United States)

A stochastic approach to SRAF printing prediction [9052-79]
A. Lutich, GLOBALFOUNDRIES Dresden (Germany)

Resist toploss modeling for OPC applications [9052-81]
C. Zuniga, Y. Deng, Mentor Graphics Corp. (United States)

Improving on-wafer CD correlation analysis using advanced diagnostics and across-wafer light-source monitoring [9052-82]
P. Alagna, Cymer, an ASML company (Belgium); O. Zurita, G. Rechtsteiner, I. Lalovic, Cymer, an ASML company (United States); J. Bekaert, IMEC (Belgium)

Study on abnormal intra-field CD uniformity induced by Efese-tilt application upon complex leveling scheme [9052-83]
G. Deng, J. Hao, B. Cai, B. Xing, X. Yao, Q. Zhang, T. Li, Y.-S. Lin, Q. Wu, X. Shi, Semiconductor Manufacturing International Corp. (China)

Pattern environment impact on wafer of metal layers with high-NA process on advanced node [9052-84]
C. T. Huang, Y. F. Cheng, M. J. Chen, United Microelectronics Corp. (Taiwan)

Effective simulation for robust inverse lithography using convolution-variation separation method [9052-86]
W. Lv, S. Liu, X. Zhou, H. Wei, Huazhong Univ. of Science and Technology (China)

Hybrid inverse lithography techniques for advanced hierarchical memories [9052-87]
POSTERS: TOOLINGS

9052 2E  Technology for monitoring shot-level light source performance data to achieve high-optimization of lithography processes [9052-88]

9052 2F  A temperature control algorithm of immersion liquid for immersion lithography [9052-89]
J. He, X. Li, M. Lei, B. Chen, J. Wang, Huazhong Univ. of Science and Technology (China)

9052 2G  Novel wafer stepper with violet LED light source [9052-90]
Y.-C. Ting, Far East Univ. (Taiwan); S.-L. Shy, National Nano Device Labs. (Taiwan)

9052 2H  Illumination system without scanning slit for lithographic tools [9052-91]
Y. Zhang, A. Zeng, Y. Wang, M. Chen, S. Zhang, Q. Yuan, H. Huang, Shanghai Institute of Optics and Fine Mechanics (China)

9052 2I  Glass ceramic ZERODUR enabling nanometer precision [9052-92]
R. Jedamzik, C. Kunisch, J. Nieder, T. Westerhoff, SCHOTT AG (Germany)

9052 2J  Advanced excimer laser technologies enable green semiconductor manufacturing [9052-94]
H. Fukuda, Y. Yoo, Y. Minegishi, N. Hisanaga, T. Enami, Gigaphoton Inc. (Japan)

9052 2K  Flexible power 90W to 120W ArF immersion light source for future semiconductor lithography [9052-51]

Author Index
Conference Committee

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Reinhard Voelkel, SUSS MicroOptics SA (Switzerland)
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
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