

International Workshop on EUV Lithography 2016

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13 - 16 June 2016

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2016 International Workshop on EUV Lithography

*CXRO, LBNL, Berkeley, CA, USA
June 13-16, 2016*

Workshop Agenda

Monday, June 13, 2016

Short Courses

EUV LithographyN/A
by Vivek Bakshi (EUV Litho, Inc.), Patrick Naulleau (LBNL) and Jinho Ahn (Hanyang University)

8:30 AM -5:00 PM (Building 66 – Room 316)

Tuesday, June 14, 2016

Registration and Reception

3:30 PM- 5:00 PM CXRO Tour (Building # 2, Fourth floor)

5:00 PM- 6:30 PM Registration, reception & Speaker Prep (Building 54, Bay View Cafeteria)

Wednesday, June 15, 2016

8:30 AM Welcome and Introduction

Welcome to LBL
Mike Witherell, Director, LBL

[Introduction to Agenda \(Intro-1\)](#)N/A
Vivek Bakshi
EUV Litho, Inc., Austin, TX, USA

Session 1: Keynote – 1

Session Chair: Patrick Naulleau (CXRO)

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Harry J. Levinson
GLOBALFOUNDRIES

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Britt Turkot
Intel Corporation

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Session Co-chairs: H. Mizoguchi (Gigaphoton) and Padraig Dunne (UCD)

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Gigaphoton Inc. Hiratsuka facility, JAPAN

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[Koji Yasui](#)¹, Naoyuki Nakamura², Jun-ichi Nishimae², Masashi Naruse³, and Masato Matsubara³

¹*Mitsubishi Electric Corporation, Head quarter, Tokyo, Japan*

²*Mitsubishi Electric Corporation, Advanced technology R&D center, Hyogo, Japan*

³*Mitsubishi Electric Corporation, Nagoya works, Nagoya, Japan*

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Konstantin Koshelev, Alexander Vinokhodov, Mikhail Krivokorotov, Oleg Yakushev, [Samir Ellwi](#), Denis Glushkov, Pavel Seroglazov
RnD-Isan, Moscow, Russia and ISTEQ B.V., Eindhoven, the Netherlands

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F. O'Reilly^{1,2}, G. Wielgoszewski², J. Howard², F. McGrath², R. Byrne², A. Mahon², O. Hammad², T. McEnroe², T. McCormack¹, G. O'Sullivan¹, E. Sokell¹, P. Dunne¹, N. Kennedy¹, K. Fahy², P. Sheridan²

1 University College Dublin, School of Physics, Dublin, Ireland

2 SiriusXT Ltd, Science Centre North, Belfield, Ireland

Lunch 11:50 AM – 1:00 PM

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Session Chairs: Alex Murokh (Radiabeam) and Erik R. Hosler (GLOBALFOUNDRIES)

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Erik R. Hosler, Obert R. Wood II

GLOBALFOUNDRIES, 400 Stone Break Road Extension, Malta, NY 12020

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Alex Murokh

Radiabeam

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Ryukou Kato

High Energy Accelerator Research Organization (KEK), Tsukuba, Ibaraki, 305-0801 Japan

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Session Chair: Regina Soufli (LLNL) and Ladislav Pina (Rigaku)

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Jan van Schoot¹, Eelco van Setten¹, Gerardo Bottiglieri¹, Kars Troost¹, Sascha Migura², Jens-Timo Neumann², Bernhard Kneer², Winfried Kaiser²

¹ASML, De Run 6501, 5504 DR Veldhoven, Netherlands

²Carl Zeiss SMT GmbH, Rudolf-Eber-Straße 2, 73447 Oberkochen, Germany

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Regina Soufli¹, Jeff Robinson¹, Eberhard Spiller², Monica Fernández-Perea¹, Eric Gullikson³, Luc Girard⁴, Lou Marchetti⁴, John Kincade⁴

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³Lawrence Berkeley National Laboratory, Berkeley, CA 94720

⁴Zygo Corporation, Extreme Precision Optics, Richmond, CA 94806

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Joost W.M. Frenken

*Advanced Research Center for Nanolithography (ARCNL)
Science Park 110, 1098 XG, Amsterdam, The Netherlands*

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Ryan Miyakawa, Henry Wang, Weilun Chao, and Patrick Naulleau

Center for X-ray Optics, Lawrence Berkeley National Lab, 1 Cyclotron Rd, Berkeley, CA 94720

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Luc Girard¹, Lou Marchetti¹, Jim Kennon², Bob Kestner², Regina Soufli³, Eric Gullickson⁴

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²Akumen Engineering, LLC. (former employees of Zygo EPO)

³Lawrence Livermore National Laboratory, 7000 East Avenue, Livermore, CA 94550

⁴Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720

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Torsten Feigl¹, Marco Perske¹, Hagen Pauer¹, Tobias Fiedler¹, Uwe Zeitner², Robert Leitel², Hans-Christoph Eckstein², Philipp Schleicher², Sven Schröder², Marcus Trost², Stefan Risse², Christian Laubis³, Frank Scholze³

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² Fraunhofer IOF, Albert-Einstein-Str. 7, 07745 Jena, Germany

³ PTB Berlin, Abbestr. 2-12, 10587 Berlin, Germany

Adjourn: Time off for Networking

End Day 1

Thursday, June 16, 2016

Welcome and Announcements (Intro-2)N/A

Vivek Bakshi
EUV Litho, Inc.

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Session Chair: Patrick Naulleau (CXRO)

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Igor Fomenkov
Cymer LLC, An ASML Company, San Diego, CA 92127, USA

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Michael Yeung¹, Eytan Barouch² and Hye-Keun Oh³

¹Fastlitho, 123 E. San Carlos Street, #251, San Jose, CA 95112

²Boston University, 15 St. Mary's Street, Boston, MA 02215

³Hanyang University, Ansan, Gyeonggi 426-791, Republic of Korea

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P. Evanschitzky, A. Erdmann
Fraunhofer IISB, Schottkystrasse 10, 91058 Erlangen, Germany

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Session Chair: Ken Goldberg (LBNL)

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H. Kinoshita, T. Harada, Y. Nagata, T. Watanabe and K. Midorikawa
University of Hyogo, Japan

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Henry Kapteyn
KMLabs Inc., 1855 S. 57th Court, Boulder, CO 80301 USA

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Dong Gon Woo¹, Seongchul Hong¹, Hoon Jo², Whoi-Yul Kim², and Jinho Ahn¹

¹Department of Materials Science and Engineering

²Department of Electronics and Computer Engineering

Hanyang University, 222 Wangsimni-ro, Seongdong-gu, Seoul 133-791, Korea

Lunch 11:20 PM (90 Minutes)

Steering Committee working lunch meeting (Closed meeting)

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Session Chair: Jim Wiley (ASML)

Extreme Ultraviolet Mask Manufacturing: Challenges and Opportunities (P52) (Invited)N/A

Bryan Kasprovicz¹, Henry Kamberian²

¹Photronics Inc., Allen, Texas, USA

²Photronics Boise nanoFab, Boise, Idaho, USA

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Ted Liang

Intel Mask Operations, 3065 Bowers Avenue, Santa Clara, CA USA

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Patrick Naulleau

CXRO

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Ivin Varghese and Charles W. Bowers

Eco-Snow Systems, RAVE N.P. Inc., 4935A Southfront Rd., Livermore, CA, USA 94551

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Session Co-Chairs: Stephen Meyers (Inpria) and Yoshi Hishiro (JSR)

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Chemical Sciences Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Rd, Berkley, CA 94720, USA

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Amrit Narasimhan, Steven Grzeskowiak, Greg Denbeaux, Robert Brainard
SUNY Polytechnic Institute, Albany NY 12203

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D. Frank Ogletree
*Molecular Foundry, Materials Sciences Division, Lawrence Berkeley National Laboratory, 1
Cyclotron Road, Berkeley CA 94720 USA*

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Session Co-Chairs: Robert Brainard (SUNY) and Frank Ogletree (LBNL)

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Seiichi Tagawa^{1,2} and PSCAR Collaboration Members

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²*Institute of Scientific and Industrial Research, Osaka University, Ibaraki, Osaka 567-0047, Japan*

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Hiroki Yamamoto¹, Hiroto Kudo², and Takahiro Kozawa¹

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Stephen T. Meyers, Andrew Grenville

Inpria Corporation, 2001 NW Monroe Avenue, Corvallis, OR, USA 97330

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Yoshi Hishiro
JSR

2016 EUVL Workshop SummaryN/A

Vivek Bakshi
EUV Litho, Inc.

5:50- 7:00 PM Poster Session

7:30 -9:30 PM Dinner

Session 11: Poster Session (5:50 PM - 7:00 PM)

Session Chairs: Vivek Bakshi (EUV Litho Inc.) and Patrick Naulleau (CXRO)

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Yow-Gwo Wang^{a,b}, Andy Neureuther^{a,b}, Patrick Naulleau^b

^aDepartment of Electrical Engineering and Computer Sciences, University of California, Berkeley, CA USA 94720; ^bCenter for X-ray Optics, Lawrence Berkeley National Laboratory, Berkeley, CA USA 94720

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Aamod Shanker¹, AntoineWojdyla², Gautam Gunjala¹, Jonathan Dong³, Markus Benk², Andy Neureuther¹, Kenneth Goldberg², Laura Waller¹

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³ D´epartement de Physique, Ecole Normale Sup´erieure, Paris 75005, France

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¹Department of Nanoscale Semiconductor Engineering

²Department of Materials Science and Engineering

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4. CSM with Ptychography (P55 Poster)N/A

Dong Gon Woo¹, Seongchul Hong¹, Hoon Jo², Whoi-Yul Kim², and Jinho Ahn¹

¹Department of Materials Science and Engineering

²Department of Electronics and Computer Engineering

Hanyang University, 222 Wangsimni-ro, Seongdong-gu, Seoul 133-791, Korea

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¹Changchun Institute of Optical, Fine Mechanics and Physics, Chinese Academy of Sciences, 3888 Dong Nanhu Road, Changchun, China, 130033

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Norbert Koster, Edwin te Sligte, Freek Molkenboer, Alex Deutz, Peter van der Walle, Pim Muilwijk, Wouter Mulckhuyse, Bastiaan Oostdijck, Christiaan Hollemans, Björn Nijland, Peter Kerkhof, Michel van Putten

TNO, Stieltjesweg 1, 2628 CK Delft, The Netherlands

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²Oleg Kostko, ¹D. Frank Ogletree, ¹Deirdre L. Olynick, ²D. Slaughter, ²Bo Xu, ³Patrick Naulleau

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²Chemical Sciences Division, Lawrence Berkeley National Laboratory

³Center for X-ray Optics (CXRO), Lawrence Berkeley National Laboratory

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Jarich Haitjema

*Nano photochemistry Group, Advanced Research Center for Nanolithography (ARCNL),
The Netherlands*

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Suchit Bhattarai^a, Andrew R. Neureuther^a, Patrick P. Naulleau^b

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^b*Center for X-Ray Optics, Lawrence Berkeley National Laboratory, Berkeley, CA, USA 94720*

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Robert Brainard^a, Gregg Gallatin^b, and Mark Neisser^c

^a*SUNY Polytechnic Institute*

^b*Applied Math Solutions, LLC*

^c*Whitehouse Station, NJ*

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Wang Xinbing, Yao Liwei and Zuo Duluo

*Wuhan National Laboratory for Optoelectronics, Huazhong University of Science Technol
Technology, Wuhan, 430074, China*

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Konstantin Koshelev^{1,2}, Alexander Vinokhodov¹, Mikhail Krivokorytov¹, Yuri Sidelnikov², Oleg Yakushev¹, Denis Glushkov³, Pavel Seroglazov³, Samir Ellwi³

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²*Institute for Spectroscopy RAS, Troitsk, 142090 Russia*

³*ISTEQ, 5656 AG Eindhoven*

13. Laboratory Cryo Soft X-ray Tomography: Progress in the Development of a Commercial Microscope (P37)N/A

Kenneth Fahy¹, Fergal O'Reilly^{1,2}, Tony McEnroe¹, Felicity McGrath¹, Jason Howard¹, Aoife Mahon¹, Ronan Byrne¹, Osama Hammad¹, and Paul Sheridan¹

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²*School of Physics, UCD, Belfield, Dublin 4, Ireland*

14. Light Source Development at Energetiq (P38)N/A

Stephen F. Horne, Donald K Smith, Matthew M Besen, Paul A Blackborow, Deborah S Gustafson, Matthew J. Partlow, Huiling Zhu

Energetiq Technology, Inc.

15. Commercial Poster – Sponsor Product DescriptionN/A

Arnd Baurichter

Research-Instruments, Germany

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