



2024 FCMN Technical Program

Monday, April 15

Tutorials

2:00 PM – 4:00 PM

Machine Learning and Its Application to Metrology

Dragan Djurdjanovic (UT Austin)

Metrology Techniques

Alain Diebold (Univ. of Albany) and Paul van der Heide (Imec)

4:30 – 6:30 PM

Advanced Packaging

Ofer Adan (Applied Materials)

Reception and Registration

7:00 – 9:00 PM

Monterey Marriott

Tuesday, April 16

Registration

7:00 AM – 8:30 AM

Conference Opening

9:00 AM

Conference Opening

J. Alexander Liddle, NIST, Conference Co-Chair

Plenary

Session Chairs: J. Alexander Liddle (NIST) and Alain Diebold (Univ. of Albany)

9:15 AM

Rick Gottscho, *LAM Research*, Big Data, Little Data, and Virtual Twins: Accelerating Process Development for Semiconductor Device Fabrication

10:00 AM

Coffee Break and Poster/Exhibit Viewing

10:30 AM

Arie den Boef, *ASML*, Metrology Initiatives at ASML and ARCNL

Emerging Materials and Devices

Session Chairs: Ajey Jacob (Univ. of Southern CA), Usha Varshney (NSF), and Christina Hacker (NIST)

11:15 AM

Xiaoqin (Elaine) Li, *University of Texas-Austin*, Ultrafast Spectroscopy of/for Nanoelectronics

11:45 AM

Daniel Schmidt, *IBM*, In-Line Metrology for Sub-2nm Technology Nodes

12:15 PM – 1:45 PM

Lunch and Poster/Exhibit Viewing

CHIPS Act & Industry Trends

Session Chairs: Paul van der Heide (Imec) and Markus Kuhn (Rigaku)

1:45 PM

Marla Dowell, *National Institute of Standards and Technology*, Advancing Measurement Science for Microelectronics: CHIPS R&D Metrology Program

2:15 PM

Zhenxin Zhong, *TFS*, Latest Developments of Automated TEM Metrology and Analysis for Semiconductor Industry

2:45 PM

Colin Ophus, *Berkeley*, Applications of Machine Learning to STEM and 4DSTEM Characterization

3:15 PM

Coffee Break and Poster/Exhibit Viewing

Microscopies: New Developments in Chemical/Property Characterization

Session Chairs: Markus Kuhn (Rigaku) and Paul van der Heide (Imec)

3:45 PM

Rudolf Haindl, *Max Planck Institute*, Coulomb-correlated Electrons in a Transmission Electron Microscope

4:15 PM

Umberto Celano, *ASU*, Scanning Probe Microscopy: Pushing the Boundaries with Multi-Probes and Reverse Tip Sample Scanning

4:45 PM

Kazuhiko Omote, *Rigaku*, X-ray Metrology for Characterizing Advanced Nanoelectronics Structure

5:15 – 6:15 PM

Poster Session (with Drinks and Hors d'oeuvres)

7:00 PM

Banquet at Hotel

Wednesday, April 17

Registration

7:45 AM – 8:30 AM

Advanced Packaging

Session Chairs: Ehrenfried Zschech (Brandenburg University of Technology Cottbus – Senftenberg, Institute of Physics) and Baohua Niu (Intel)

8:30 AM

Yan Li, *Samsung*, Fault Isolation Approaches for 3D IC Systems

9:00 AM

Matthew Andrew, *ZEISS Innovation Center*, Advances in the Use of AI for X-ray Reconstruction: Applications in Electronics Packaging

9:30 AM

Pooya Tadayon, *Intel*, Title TBD

10:00 AM

Coffee Break and Poster/Exhibit Viewing

New Developments in Chemical/Electrical Characterization

Session Chairs: Paul van der Heide (Imec) and Shinichi Ogawa (AIST)

10:30 AM

Claudia Fleischmann, *Imec*, Advances in APT Quantification and Distortion Correction Approaches

11:00 AM

Kento Sasaki, *Univ. of Tokyo*, Arrangement of Nanosized hBN Quantum Sensor Spots by Helium Ion Microscope

11:30 – 1:00 PM

Lunch and Poster/Exhibit Viewing

Patterning Metrology

Session Chairs: Ofer Adan (Applied Materials), Alan Brodie (KLA-Tencor), and Shunsuke Koshihara (Hitachi High-Tech Corporation)

1:00 PM

Jonghyeok Park, Samsung Electronics, Wide-area Delaying Based 3D Tomography Solution as a Window into the Semiconductor Manufacturing

1:30 PM

Eugen Foca, *Carl Zeiss SMT GmbH*, 3D Metrology and Inspection of Advanced NAND and DRAM Devices Via Full 3D Characterization with FIB-SEM Tomography

2:00 PM

Matt Hettermann, *EUVTech*, Measuring the Complex Behavior of Phase in the EUV Regime and Implications for Phase Shift Masks

2:30 PM

Coffee Break and Poster/Exhibit Viewing

Advanced Manufacturing Metrology – Defects

Session Chairs: Tuyen Tran (Intel), Ye Feng (Intel), and Steve Consiglio (TEL Technology Center)

3:00 PM

ByoungHo Lee, *Hitachi High-Tech Corporation*, MI(Metrology&Inspection)'s Deliverable Solutions for Next Journey

3:30 PM

Shay Wolfling, *Nova*, Advanced and Future Logic Device Architectures: Challenges and Solutions in Materials Metrology

4:00 PM

Hamed Sadeghian, Nearfield Instrument, Revolutionizing EUV Lithography Metrology for Sub-3nm Nodes: Validation of a Novel AFM System for Precise 3D Characterization in HVM

4:30 – 6:00 PM

Poster Session (with Drinks and Hors d'oeuvres)

Thursday, April 18

Registration

8:00 AM – 8:30 PM

Plenary

Session Chairs: J. Alexander Liddle (NIST) and Alain Diebold (Univ. of Albany)

8:30 AM

G. Dan Hutcheson, *Techinsights*, The State of the Semiconductor Industry – Economics and Geopolitics

EUV and Advanced Patterning

Session Chairs: Alain Diebold (Univ. of Albany), Christina Hacker (NIST), Jin Zhang (Lam Research)

9:15 AM

Nigel Smith, *Nanometrics*, New Directions for Optical Critical Dimension Metrology

9:45 AM

Christina Porter, *ASML*, Soft X-Ray Scatterometry for 3D CD Metrology on Individual GAA Nanosheets

10:15 AM

Coffee Break and Poster/Exhibit Viewing

10:45 AM

Guillaume Freychet, *CEA Leti*, Overview Of Critical Dimension Small Angle X-ray Scattering (CD-SAXS)

Tomographies: New Developments in 3D Analysis

Session Chairs: Frank de Jong (Thermo Fisher) and Ehrenfried Zschech (Brandenburg University of Technology Cottbus – Senftenberg, Institute of Physics)

11:15 AM

Michael Reisinger, *KAI GmbH*, Understanding the Damage and Microstructural Evolution in Cu Metallizations During Thermomechanical-Fatigue

11:45 AM

Nicolas Gauquelin, *Univ. Antwerp EMAT*, Advances in 3D Tomography and 4DSTEM: Perspectives to Study Semiconductor Devices

12:15 – 1:45 PM

Lunch and Poster/Exhibit Viewing

1:45 PM

Tony Levi, *Univ. of Southern California*, Chip Scan: 3D X-ray Imaging of CMOS Circuits

2:15 PM

Eric Van Cappellen, *Thermo Fisher Scientific*, Integrating Atom Probe Tomography and Transmission Electron Microscopy into a Single Instrument

Spintronics-Based Devices

Session Chair: Jean-Paul Barnes (CEA-Leti)

2:45 PM

Amanda Petford-Long, *Argonne National Lab*, Advanced Electron Microscopy Based Metrology Approaches

3:15 PM

Coffee Break and Poster/Exhibit Viewing

3:45 PM

Rafal Dunin-Borkowski, *Ernst Ruska Centre for Microscopy and Spectroscopy with Electrons*,
Characterization of Magnetic Textures in Materials for Spintronics-based Devices

4:15 PM

Siamak Salimy, *Hprobe*, MRAM End of Line Magnetic Testing: From Single Bit Properties to Full Memory Qualification

4:45 PM

Conference End

Posters

001, Characterization of Crystal Structure and Morphology of Ultra-Thin 2D MoS₂ Layers Using X-ray Metrology

Lixia Rong, Hao-Ling Tang, Luc Thomas, Hanson Kwok, Michael Phillips, Hongwen Zhou, Qinyi Fu, Lavinia E. Nistor, Jaesoo Ahn, and Mahendra Pakala

Applied Materials, Inc., 3050 Bowers Avenue, Santa Clara, CA

002, Complementary Field-Effect Transistors (CFET): Metrology Challenges and Solutions

J. Bogdanowicz¹, A.-L. Charley¹, M. Saib¹, M. Beggiato¹, G. Lorusso¹, V. Brissonneau¹, E. Dupuy¹, R. Loo^{1,5}, Y. Shimura¹, A. Akula¹, H. Arimura¹, BT Chan¹, D. Zhou¹, N. Horiguchi¹, S. Biesmans¹, P. Leray¹, J. Hung², I. Turovets², S. Wei³, P. Hönicke⁴, and R. Ciesielski⁴

¹imec, Kapeldreef 75, 3001 Leuven, Belgium

²Nova Ltd., 5 David Fikes St., Rehovot 7632805, Israel

³Hitachi High-Tech Corp., 552-53, Shinkocho, Hitachinaka-shi, Ibaraki, Japan

⁴Physikalisch-Technische Bundesanstalt (PTB), Abbestr. 2-12, 10587 Berlin, Germany

⁵Ghent University, Department of Solid-State Sciences, Krijgslaan 281, building S1, 9000 Ghent, Belgium

003, Asymmetry of Junction Line Defect Distribution in WS₂-WSe₂ Lateral / Vertical Hetero-structures Revealed by TERS Imaging

Andrey Krayev¹, A. Edward Robinson¹, Peng Chen², Xidong Duan³, Zhengwei Zhang³, and Xiangfeng Duan⁴

¹HORIBA Scientific, 359 Bel Marin Keys Blvd, Novato, CA94949, USA

²Southern University of Science and Technology, Shenzhen, China

³Department of Applied Chemistry, Hunan University, China

⁴Department of Chemistry and Biochemistry, University of California, Los Angeles, USA

004, Atom Probe Tomography Using an Extreme Ultraviolet Pulsed Light Source

Luis Miaja-Avila, Benjamin W. Caplins, Jacob M. Garcia, Ann N. Chiaramonti, and Norman A. Sanford
National Institute of Standards and Technology, Boulder, CO, USA

005, Merging Integrated Photonics and Electron Beams: μ eV-Electron-Spectroscopy and Single-Particle Heralding

A. Feist^{1,2}, G. Huang^{3,4}, G. Arend^{1,2}, Y. Yang^{3,4}, J.-W. Henke^{1,2}, A. S. Raja^{3,4}, F. J. Kappert^{1,2}, R. N. Wang^{3,4}, H. Lourenço-Martins^{1,2}, Z. Qiu^{3,4}, J. Liu^{3,4}, O. Kfir^{1,2}, T.J. Kippenberg^{3,4}, and C. Ropers^{1,2}

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²IV. Physical Institute – Solids and Nanostructures, University of Göttingen, Göttingen, DE

³Institute of Physics, Swiss Federal Institute of Technology Lausanne, Lausanne, CH

⁴Center for Quantum Science and Engineering, EPFL, Lausanne, CH

006, Characterization of 2D Transition Metal Dichalcogenide Layers by Combined TOF-SIMS and in-situ AFM

Rita Tilmann¹, Stefan Heiserer², Valentina Spampinato^{1,3}, Yuanyuan Shi^{1,4}, Jill Serron¹, Albert Minj¹, Benjamin Groven¹, Georg S. Duesberg², Thomas Hantschel¹, Paul A.W. van der Heide¹, and Alexis Franquet¹

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²University of the Bundeswehr Munich & Center for Integrated Sensor Systems (SENS), Institute of Physics, EIT2, Neubiberg, Germany

³Università degli Studi di Catania, Dipartimento di Scienze Chimiche, Viale A. Doria 6, Catania, Italy

⁴School of Microelectronics, University of Science and Technology of China, Hefei, China

007, Hard X-ray Photoelectron Spectroscopy (HAXPES) in Material Development

T. Sloboda¹, S. Eriksson¹, M. Lundwall¹, P. Amann^{1,2}, M. Masatake³, B. Krömker², T. Wiell¹, B. Gerace⁴, A.

J. Yost⁴, T. Nishihara⁵, and T. Hashimoto¹

¹Scienta Omicron AB, Danmarksgratan 22, 75323 Uppsala, Sweden

²Scienta Omicron GmbH, Limburger Strasse 75, 65232 Taunusstein, Germany

³Scienta Omicron Inc. 6-17-10 Minami-Oi Shinagawa-ku, 140-0013 Tokyo, Japan

⁴Scienta Omicron Inc. 3222 E. 1st Ave, #521, Denver, CO 80206 United States

⁵School of Science and Technology, Meiji University, 214-8571 Kawasaki, Japan

008, Analysis of Alternative Dopants for Organic Light-Emitting Diodes Layers Using a Correlative TOF-SIMS & XPS Protocol

C. Guyot, J.P. Barnes, O. Renault, and T. Maindron

Univ. Grenoble Alpes, CEA, Leti, F-38000 Grenoble, France

009, Spatially Resolved Chemical Metrology on EUV Resist

Komal Pandey¹, Quentin Evrard², Albert M. Brouwer², C.B. Chuang¹, Maarten van Es¹, and Diederik J. Maas¹

¹TNO, Stieltjesweg 1, 2628CK, Delft, The Netherlands

²University of Amsterdam, Science Park 904, 1090 GD Amsterdam, The Netherlands

010, Development of a Double Mirror CC-Cs-corrector for Low-Voltage SEM

Diederik Maas^{1,2}, Maurice Krielaart¹, Léon van Velzen¹, and Pieter Kriut¹

¹Delft University of Technology, Applied Sciences, Lorentzweg 1, Delft, 2628 CJ, The Netherlands,

²Netherlands organisation of Applied Science (TNO), Stieltjesweg 1, Delft, 2628 CK, The Netherlands

011, The Interface Study of Photoresist/Underlayer Using Hybrid R-ray Reflectivity and X-ray Standing Wave Approach

Atul Tiwari¹, Roberto Fallica², Marcelo D. Ackermann¹, and Igor A. Makhotkin¹

¹Industrial Focus Group XUV Optics, MESA+ Institute for Nanotechnology, University of Twente, Drienerlolaan 5, 7522 NB Enschede, The Netherlands

²IMEC, Kapeldreef 75, 3001 Leuven, Belgium

012, Paradigm Shift: Conical Frustum Arrays for Electron-Beam Goniometry

A. C. Madison¹, K. A. Cochran², J. S. Villarrubia¹, D. A. Westly¹, R. G. Dixon¹, C. R. Copeland¹, J. D. Gerling², A. D. Brodie², J. A. Liddle¹, L. P. Muray², and S. M. Stavis¹

¹National Institute of Standards and Technology, Gaithersburg, Maryland 20899

²KLA Corporation, Milpitas, California 95035

013, Automation of Precession-Assisted Nanobeam Diffraction and 4D-STEM Measurements for Multimodal Characterization of Semiconductor Devices

Daniel Němeček¹ and Robert Stroud²

¹TESCAN GROUP, Libušina třída 21, 62300 Brno, Czech Republic

²TESCAN GROUP, 765 Commonwealth Dr #101, Warrendale, PA 15086, USA

014, Self Focusing SIMS to Enable Boron Quantification in Small Si and SiGe Structures

Alexis Franquet¹, Valentina Spampinato^{1,2}, and Paul A.W. van der Heide¹

¹IMEC, Kapeldreef 75, 3001 Leuven, Belgium

²Università degli Studi di Catania, Dipartimento di Scienze Chimiche, Viale A. Doria 6, 95125 Catania, Italy

015, Etching Monitoring of Advanced Forksheet Devices Using AKONIS SIMS Tool

A-S. Robbes¹, O. Dulac¹, K. Soulard¹, M. Adier¹, S. Choi¹, D. Jacobson², A. Merkulov³, R. Tilmann³, P.A.W. van der Heide³, and A. Franquet³

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²CAMECA Instruments Inc., 5500 Nobel Drive, Madison, WI, USA

³IMEC, Kapeldreef 75, 3001 Leuven, Belgium

016, In-situ and Ex-situ Diagnostics for Ion Measurement and Control for RF-driven Plasma Tools

A. Verma¹, T. Gilmore¹, and D. Simpson²

¹Impedans Ltd, Chase House, City Junction Business Park, Northern Cross, Dublin, D17 AK63, Ireland

²Centre for Light Matter Interactions, School of Mathematics and Physics, Queen's University Belfast, UK

017, Improving Self-Focusing SIMS On Hybrid SIMS Instruments – Instrumental Aspects and Method Development

T. Grehl¹, S. Kayser¹, J. Zake¹, D. Rading¹, A. Pirkel¹, H. Arlinghaus¹, V. Spampinato^{2,3}, and A. Franquet²

¹IONTOF GmbH, 48149 Muenster, Germany

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018, Towards a Better Understanding of GaN Based HEMT Electrical Response Thanks to XPS, nano-Auger and STEM-EDX Multi-technique Approach

K. Gaffar¹, S. Béchu¹, G. Patriarche², and M. Bouttemy¹

¹Institut Lavoisier de Versailles, UVSQ, Université Paris-Saclay, CNRS, UMR 8180, 45 avenue des Etats-Unis, 78035 Versailles CEDEX, France

²C2N, Université Paris-Saclay, CNRS, Palaiseau, France

019, EBIC Mapping of Threshold Voltage Distribution During Device Turn-on in SiC MOSFETs

Greg M. Johnson¹, Andreas Rummel², and Heiko Stegmann³

¹Carl Zeiss Microscopy, Dublin, CA

²Kliendiek Nanotechnik, Reutlingen, Germany

³Carl Zeiss Microscopy GmbH, Munich, Germany

020, Coming of Age of Computational SEM

Benjamin D. Bunday, Shari Klotzkin, Douglas Patriarche, and Yvette Ball

AMAG nanometro, Schenectady, NY, 12303, USA

021, Effective Pupil Apodization in Digital Holographic Microscopy

T. Cromwijk^{1,2}, M. Noordam^{1,2}, S. Witte^{1,2}, J. F. de Boer², A. den Boef³

¹Department of Physics and Astronomy, and LaserLaB, Vrije Universiteit, The Netherlands

²Advanced Research Center for Nanolithography (ARCNL), The Netherlands

³ASML Netherlands B.V., The Netherlands

022, Polarization Sensitive Digital Holographic Microscopy

M. L. Noordam^{1,2}, T. Cromwijk^{1,2}, J. F. de Boer², and A. J. den Boef^{1,2,3}

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³ASML Netherlands B.V., De Run 6501, 5504 DR Veldhoven, The Netherlands

023, Combining In-Line Atomic Force Microscopy and Scatterometry for Metrology of 3D Holographic Patterns in Roll-to-Roll Nanoscale Manufacturing

Barbara Groh¹, Kwon Sang Lee¹, Shashank Venkatesan², Luis Arturo Aguirre¹, Sofia Frey¹, Liam G. Connolly³, Michael Baldea², Chih-Hao Chang¹, and Michael Cullinan¹

¹Walker Department of Mechanical Engineering, University of Texas at Austin

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³Microsystems and Nanotechnology Division, Physical Measurement Laboratory, National Institute of Standards and Technology

024, Dark Uncertainty in Hybrid Metrology for Semiconductor Manufacturing

Ronald G. Dixon, Adam L. Pintar, R. Joseph Kline, Thomas A. Germer, John S. Villarrubia, and Samuel M. Stavis

National Institute of Standards and Technology, Gaithersburg, Maryland 20899

025, GaN/InGaN μ LEDs Study by Cathodoluminescence and Photo-Sensitive Kelvin Probe Force Microscopy

Palmerina González-Izquierdo, Névine Rochat, Davide Zoccarato, Fabian Rol, Julia Simon, Patrick Le Maitre, Marion Volpert, Matthew Charles, Matthieu Lafossas, Simona Torrenco, Narciso Gambacorti, and Łukasz Borowik

Univ. Grenoble Alpes, CEA, Leti, F-38000 Grenoble, France

026, 3D Corner Residue Monitoring for CFET Gate Patterning Using CD-SEM

Wei Sun¹, Emmanuel Dupuy², Il Gyo Koo², BT Chan², Gian Lorusso², Janusz Bogdanowicz², Anne-Laure Charley², Jef Geypen², Patrick Carolan², Kei Sakai¹, Zhenghan Li¹, and Miki Isawa¹

¹Hitachi High-Tech Corp., 552-53, Shinkocho, Hitachinaka-shi, Ibaraki, Japan

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027, Fluorescence-Guided Sub-micron Optical Photothermal Infrared Spectroscopy (O-PTIR) for the Localization and Identification of Defects and Contaminants

Eoghan Dillon and Michael K. F. Lo

Photothermal Spectroscopy Corp. 325 Chapala Street, Santa Barbara, CA, 93101

028, Crystal Orientation Quantification In Less Than 10 Seconds

D. Lopez¹, L.Grieger², M. Van der Haar², and D. Beckers²

¹Malvern Panalytical Inc., 2400 Computer Drive, Westborough, MA, 10581, United States

²Malvern Panalytical B.V., Lelyweg 1, 7600AA Almelo, The Netherlands

029, Instrument Development for Spectroscopic Ellipsometry and Diffractometry in the EUV

S. L. Moffitt¹, B. M. Barnes¹, T. A. Germer¹, S. Grantham¹, E. L. Shirley¹, M. Y. Sohn¹, D. F. Sunday², and C. Tarrio¹

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030, Defect Localization in metallization on Advanced Packages Using Magnetic Imaging

T. Venkatesan^{1,2}, Nesco Lettsome¹, Jeet Patel¹, Solomon Saul¹, Fred Cawthorne¹, Fred Wellstood¹, Steve Garrahan¹, and Henri Lezec³

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²CQRT, Department of Physics and Astronomy, University of Oklahoma, Norma OK 73019

³NIST Gaithersburg, 100 Bureau Dr., Gaithersburg, MD 20899

031, DUV-Vis-NIR OCD Metrology for BCD Semiconductor Manufacturing Yield Enhancements

Jeffrey W. Roberts¹, John C. Lam¹, Nikolaos Pallikarakis¹, Kostas Florios¹, Marco Colli², Matteo Lombardo², and Marcello Ravasio²

¹n&k Technology San Jose, CA, USA

²STMicroelectronics Agrate Brianza MB, Italy

032, Nanoscale 3D X-Ray Imaging of Integrated Circuits using a Hybrid Electron/X-Ray Microscope

Nathan Nakamura^{1,2}, Joseph W. Fowler^{1,2}, Zachary H. Levine³, Paul Szypryt^{1,2}, and Daniel S. Swetz¹

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033, Pushing the Speed and Resolution Limits of 3D X-ray for In-Line Metrology in Wafer Level Integration and Offline Defect Characterization

S.H. Lau, Sheraz Gul, Jeff Gelb, Tianzhu Qin, Sylvia Lewis, and Wenbing Yun

Sigray Inc, 1590 Solano Way, Suite A, Concord, CA 94520

034, Dopant and Thin Film Metrology using Laboratory-Based Micro-XRF in the Low Z and Low Energy Range

Benjamin Stripe, Frances Y. Su, Michael Lun, Tinchi Leung, Ian Spink, Sylvia Lewis, and Wenbing Yun

Sigray, Inc., 1590 Solano Way, Suite A, Concord, CA, United States

035, New Development of X-ray Assisted Device Alteration (XADA) for Circuit Debugging: A Solution for Backside Power Delivery (BPD)

Sylvia Lewis, Benjamin Stripe, Frances Su, Michael Lun, Quoc Nguyen, Mark Cordier, Stuart Coleman, S.H. Lau, and Wenbing Yun

Sigray, Inc., 1590 Solano Way, Suite A, Concord CA 94520

036, Solving the Metrology Challenges of High Aspect Ratio Features Using 3D Tomography

Shawn Sallis, Tian Lian, Jin Zhang, Ying Gao, and Osman Sorkhabi

Lam Research Corporation, 4400 Cushing Parkway, Fremont, California 94538

037, Extreme Brightness X-ray Sources for Semiconductor Metrology

J. Hållstedt, E. Espes, G. Gopakumar, D. Nilsson, T. Dreier, B. A. M. Hansson, L. Kjellberg, and N. Kumar Iyer

Excillum AB, Jan Stenbecks Torg 17, 164 40 Kista, Sweden

038, Nanofocus X-ray Source for Improved Resolution in Advanced Packaging Metrology

T. Dreier, J. Hållstedt, E. Espes, G. Gopakumar, D. Nilsson, B. A. M. Hansson, and L. Kjellberg

Excillum AB, Jan Stenbecks Torg 17, 164 40 Kista, Sweden

039, Advancing High-Density 3D NAND TEM Sample Preparation with Ultrafast fs-Laser Milling in FIB-SEM-Laser Systems

Arun Prabha¹ and Cheryl Hartfield²

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