

Program

(status as of March 19, 2025)

Thursday, May 22

12:00: Welcome and lunch

- 14:00 – 14:15: **Welcome and introduction**, Andreas Erdmann (Fraunhofer IISB, Germany)
- 14:15 – 14:40: **Physics is all you need: Self-supervised learning for inverse lithography**, Hans-Christian Ruiz (ASML, Netherlands)
- 14:40 – 15:05: **DNN based approaches for EUV mask inspection**, Paolo Ansuinelli, Suman Saha, Luis Felipe Barba Flores, Benjamín Béjar Haro, Yasin Ekinci, Iacopo Mochi (PSI, Switzerland)
- 15:05 – 15:30: **AIMS[®] EUV: A holistic approach to EUV mask qualification**, Matthias Roesch, Maximilian Albert, Grizelda Kersteen, Andreas Verch, Klaus Gwosch, Renzo Capelli (Zeiss SMT, Germany)

15:30 – 16:00: Coffee break

- 16:00 – 16:25: **Kinetic modeling of radical inhibition in tomographic volumetric 3D printing**, Quinten Thijssen, Antonio Jaén Ortega, Roniérik Pioli Vieira, Sandra Van Vlierberghe (Ghent University, Belgium)
- 16:25 – 16:50: **Recent computational advances in tomographic volumetric additive manufacturing**, Felix Wechsler, Viola Sgarminato, Christophe Moser (EPFL, Lausanne, Switzerland)
- 16:50 – 17:15: **Accelerating the characterization of nanostructures through novel forward simulations and neural network approaches**, Vinh-Binh Truong¹, Analia Fernandez Herrero¹, Philipp Hönicke², Victor Soltwisch² (¹PTB, Germany, ²HZB, Germany)

17:30: Poster session

- **Is it time to adopt the bright field mask in EUV?**, Shih-Hsiang Liu (ASML, Netherlands)
- **Mask optimization for BEUV lithography**, Ziqi Li^{1,3}, Lisong Dong¹, Xu Ma², Iacopo Mochi³, Yasin Ekinci³, and Yayi Wei¹ (¹Chinese Academy of Sciences, China, ²Beijing Institute of Technology, China, ³PSI, Switzerland)
- **A Convolution-Variation-Separated Rigorous Formulation for Mask3D and Hopkins Imaging**, Song Zhang, David H. Wei (Quantica Computing LLC, USA)
- **Full GPU implementation of RCWA with optimized eigenvalue problem for efficient simulation of curvilinear mask structures**, Peter Evanschitzky (Fraunhofer IISB, Germany)
- **Analytical Waveguide Model for EUV Masks: Insights and Comparison with RCWA**, Varun Jadhav, Andreas Erdmann (Fraunhofer IISB, Germany)
- **Modeling and simulation of mechanical effects in two-photon lithography**, Alap Mundayoor, Andreas Erdmann, and Valeriia Sedova (Fraunhofer IISB, Germany)
- **Modeling of two-photon lithography including oxygen diffusion using a generalized compact model**, Yuan Yu, Valeriia Sedova; Christian Schwemmer; Andreas Erdmann (Fraunhofer IISB, Germany)
- **Agnostic Compensation of periodic Errors in Position Sensing**, Christian Schwemmer, Martin Jäntschi (Fraunhofer IISB, Germany)
- **Boosting Light Extraction from Si Vacancy Color Centers in SiC**, Mostafa Kotkat, Christian Schwemmer, M.Scharin-Mehlmann, P.Berwian, A.Erdmann (Fraunhofer IISB, Germany)

18:30: Dinner

- 20:00 – 20:20: **20 years Fraunhofer Simulation Workshop**
- 20:20 – 21:10 pm: **Not so Artificial Intelligence: Leveraging Physics Informed Computation to Understand Stochastics and Enable Novel Metrologies (Keynote)**, Patrick Naulleau (EUV Tech Inc. and Berkeley Lab, USA)

Friday, May 23

- 9:00 – 9:25: **An eigendecomposition-free RCWA implementation for high-performance parallel computing**, Frank van der Ceelen, Yifeng Shao, Wim Coene (TU Delft, Netherlands)
- 9:25 – 9:50: **Rigorous electromagnetic simulation for EUV lithography and CNN reproducing electromagnetic simulations**, Hiroyoshi Tanabe, Masayuki Shimoda and Atsushi Takahashi (Institute of Science Tokyo, Japan)
- 9:50 – 10:15: **Physics-informed deep learning for 3D modeling of light diffraction from optical metasurfaces**, Vlad Medvedev (Fraunhofer IISB, Germany)

10:15 – 10:45: Coffee break

- 10:45 – 11:10: **Multiphoton absorption polymerization: Fundamentals, kinetics, and potential alternatives**, John T. Fourkas, John S. Petersen, Nicholas Fisher, Nikos Liaros, Mac Cohen, Sandra Gutierrez-Razo, Anders Dollard, and Julio Argueta (Univ. of Maryland, USA)
- 11:10 – 11:35: **Physics-based deep learning network for inverse lithography in two-photon polymerization**, Valeriia Sedova¹, Thomas Le Deun², Joël Rovera², Jonas Wiedenmann³, Kevin Heggarty², Andreas Erdmann¹ (¹Fraunhofer IISB, Germany, ²IMT Atlantique, France, ³Heidelberg Instruments Mikrotechnik GmbH, Germany)
- 11:35 – 12:00: **A machine learning approach to structure precompensation in 3D μ -printing**, Sven Enns, Nicholas Lang, Julian Hering-Stratemeier, Georg von Freymann (RPTU Kaiserslautern, Fraunhofer ITWM, Germany)

12:00: Lunch

- 13:30 – 13:55: **EUV diffraction orders and absorber dielectric index: comparison of analytical and simulation approach**, Martin Burkhardt, Rajiv Sejpal (IBM Research, USA)
- 13:55 – 14:20: **Mask absorber impact on local MEEF for pitch 32 nm hexagonal contact hole printing with low-n EUV masks**, Andreas Frommhold, Vicky Philipsen (imec, Belgium)
- 14:20 – 14:45: **High NA Stitching: Model and OPC assessment by using low-n mask**, Dongbo Xu¹, Qinglin Zeng¹, Xuefeng Zeng¹, Werner Gillijns², Shibing Wang¹, Germain Fenger¹ (¹Siemens EDA, Belgium, ²imec, Belgium)
- 14:45 – 15:10: **Efficient aerial image simulations of rotated 1D patterns in anamorphic systems for lens aberration reconstruction from in-resist measurements**, Bas van Meerten, Dennis Stoel, Hilbert van Loo, Laurens de Winter (ASML, Netherlands)

15:30 pm: Special event and dinner

Saturday, May 24

- 9:00 – 9:25: **Modeling and characterization of EUV resists**, Takahiro Kozawa (SANKEN, Osaka University, Japan)
- 9:25 – 9:50: **Multi-trigger resists: Modeling and simulation results**, Thiago J. dos Santos¹, Andreas Erdmann¹, Alex P. G. Robinson^{2,3}, Alexandra McClelland², Carmen Popescu², Bernardo Oyarzún⁴,

Joost van Bree⁴, and Mark van de Kerkhof⁴ (¹Fraunhofer IISB, Germany, ²Irresistible Materials, UK, ³University of Birmingham, UK, ⁴ASML, Netherlands)

- 9:50 – 10:15: **Tuning resist profile and pattern variability with depth of focus and absorption**, Christoph Hauenstein¹, Bernardo Oyarzun Rivera¹, Luc van Kessel¹, Joost van Bree¹, Ruben Maas¹, Vincent Renaud², Tatiana Kovalevich², Bhavishya Chowrira² (¹ASML, Netherlands, ²IMEC, Belgium)

10:15 – 10:45: Coffee break

- 10:45 – 11:10: **Inverse mask design for displacement Talbot lithography**, Zhixin Wang, Stefan Rietmann, Li Wang, Harun H. Solak (Eulitha, Switzerland)
- 11:10 – 11:35: **From physics-based optimization to augmented deep learning optimization in grayscale photolithography mask**, Merlin Moreau, Jean-Baptiste Henry, Stéphane Bonnet (Univ. Grenoble Alpes, CEA, Leti, France)
- 11:35 – 12:00: **Modeling spectral behavior of grayscale lithography for broadband imaging and display**, Aamod Shanker^{1,2}, Arka Majumdar¹, Diogo Aguiam² (¹University of Washington, USA, ²Iberian Nanotechnology Laboratory, Portugal)
- 12:00 – 12:10: **Concluding remarks**

12:30: Lunch