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Alexander Starikov
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The Diana Nyyssonen Memorial Award for Best Paper

Dr. Diana Nyyssonen was a pioneer of dimensional metrology. Diana's interests in optics and metrology go back to her 1960s job, alongside G. O. Reynolds, J. B. DeVelis, and B. J. Thompson, at Technical Operations in Burlington, Massachusetts. She joined the Image Optics and Photography Section of the Metrology Division at the National Bureau of Standards (NBS) in 1969. Sponsored by NBS, she attended the Institute of Optics at the University of Rochester, completing her Ph.D. and Thesis on microdensitometry of photographic emulsions in 1975.

Dr. Nyyssonen's modeling of thin films observed by a microscope demonstrated that line/space width much smaller than two-point resolution limits can be measured. She produced accurate model-based measurements in the photomasks, establishing the first critical dimension standards for the microelectronics industry and the foundation of today's dimensional metrology. Diana left NBS in 1985 to form her own metrology company, then joined IBM in East Fishkill, New York.

Not stopping the development of accurate optical modeling of thick films with NBS and other teams, she started projects on metrology with scatterometry and interference microscopy, modeled imaging in low-voltage CD-SEM, and spearheaded the establishment of CD-AFM. Dr. Diana Nyyssonen's personal contributions to the field, as well as her collaborations and mentorships in industry, consortia, and academia, accelerated and influenced the development of basic technology and metrology applications with optical microscopy and scatterometry, SEM, and AFM.

SPIE conference on Metrology, Inspection, and Process Control for Microlithography is the leading international forum for the discussion and presentation of technical advances in the broader field of semiconductor metrology. The Diana Nyyssonen Memorial Award for the Best Paper at this conference recognizes the most significant current contributions.

Due to the conference's long history, significant attendance and high paper counts, to win this award requires a very significant new contribution to the field. The selection of the best paper is initiated during the conference by nomination, followed by extensive review by the program committee. It is based on both the technical merit and persuasiveness of the oral presentation, and the overall quality of the published paper. Past award winners include leading international researchers in the area of semiconductor metrology and process control, whose contributions have fundamentally improved the way semiconductors are manufactured.

We are pleased to honor the winners of the Diana Nyyssonen Memorial Award for the Best Paper of 2011, as well as those who have won in previous years:

2011
Shiano Ono, Miyuki Yamane, Mitsuo Ogasawara, Akira Katakami, Jiro Yugami, Masanari Koguchi, Hiroyuki Shinada, Hiroshi Kakibayashi, Kazuto Ikeda, and Yuzuru Ohji, "High-precision edge-roughness measurement of transistor gates using three-dimensional electron microscopy combined with marker-assisted image alignment", Proc. SPIE, Vol. **7971**, 79710M (2011).

2010
David Laidler, Koen D'havé, Anne-Laure Charley, Philippe Leray, Shaunee Cheng, Mircea Dusa, Peter Vanoppen, and Paul Hinnen, "A single metrology tool solution for complete exposure tool setup", Proc. SPIE, Vol. **7638**, 763809 (2010).

2009
Benjamin Bunday, Aaron Cordes, John Allgair, Vasiliki Tileli, Yohanan Avitan, Ram Peltinov, Maayan Bar-zvi, Ofer Adan, Eric Cottrell, and Sean Hand, "Phenomenology of electron-beam-induced photoresist shrinkage trends", Proc. SPIE, Vol. **7272**, 72721B (2009).

2008
Alok Vaid, Rohit Pal, Matthew Sendelbach, Shahin Zangooie, Kevin Lensing, and Carsten Hartig, "Scatterometry as technology enabler for embedded SiGe process", Proc. SPIE, Vol. **6922**, 69220U (2008).

2007
Matthew Sendelbach, Javier Ayala, and Pedro Herrera, "Predicting electrical measurements by applying scatterometry to complex spacer structures", Proc. SPIE, Vol. **6518**, 651825 (2007).

2006
Masafumi Asano, Takahiro Ikeda, Toru Koike, and Hideaki Abe, "In-line CD metrology with combined use of scatterometry and CD-SEM", Proc. SPIE, Vol. **6152**, 61521V (2006).

2005
John S. Villarrubia and Benjamin D. Bunday, "Unbiased estimation of linewidth roughness", Proc. SPIE, Vol. **5752**, 480 (2005).

2004
Christopher P. Ausschnitt, "A new approach to pattern metrology", Proc. SPIE, Vol. **5375**, 51 (2004).

2003
John S. Villarrubia, Andras E. Vladar, and Michael T. Postek, "Simulation study of repeatability and bias in the CD-SEM", Proc. SPIE, Vol. **5038**, 138 (2003).

2002
Jon L. Opsal, Hanyou Chu, Youxian Wen, Yia-Chung Chang, and Guangwei Li, "Fundamental solutions for real-time optical CD metrology", Proc. SPIE, Vol. **4689**, 163 (2002).

2001
Sylvain Muckenhirn, A. Meyyappan, Kelvin Walch, Mark J. Maslow, Geert Vandenberghe, and Johannes van Wingerden, "SPM characterization of anomalies in phase-shift mask and their effect on wafer features", Proc. SPIE, Vol. **4344**, 188 (2001).