

# GUEST EDITORIAL

## EMERGING LITHOGRAPHIC TECHNOLOGIES

This issue of the *Journal of Microlithography, Microfabrication, and Microsystems* contains a series of papers on evolving technologies. In January 2004, SEMATECH hosted a Lithography Forum that examined a number of technologies that have been prominent in the last few years. This two-day meeting brought together over 350 experts from around the world to listen to reviews of the technologies, ask questions, and reflect on the responses. The development progress of other technologies was presented in a poster session. The output of the forum was the results of a survey that the attendees completed. This special section captures elements of the presentations as a summary of the technology status in 2004.

The technologies presented were 193-nm immersion, 157-nm lithography, extreme ultraviolet lithography (EUVL), electron projection lithography (EPL), charged particle maskless lithography (CP-ML2), optical maskless lithography (O-ML2), and nano-imprint lithography. As most people reading this are aware, immersion has become the focus of near-term development for manufacturing insertion in the next few years. The papers in this special section are published in the reverse order of the presentations.

The nano-imprint lithography overview presented by Grant Willson et al. of the University of Texas at Austin covers the history of the development of step-and-flash imprint

lithography (SFIL). It also covers other imprint techniques that have evolved.

In the O-ML2 review, Hans Martinsson of Micronic Laser Systems provides details of the application of optical deflectors to maskless lithography.

In the EPL paper, Masako Yamabe of Fujitsu, who was the EPL session organizer, provides a historical perspective of the development of the technology with all progress that has been made through mid-2004.

Peter Silverman of Intel, who was the EUVL session organizer, provides the perspective of the development of EUV for manufacturing insertion.

The 157-nm lithography review by me is a summary of the state of the development as of mid-2004.

The emergence of immersion lithography has dominated the research over the last year. A summary of the technology would be like trying to paint a picture of a horse running a race—every time you look up everything has changed. The upcoming SPIE Microlithography conference will provide significant evidence of the progress that has been made even in the few months since this editorial was written.

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