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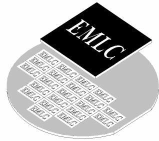

23rd European Mask and Lithography Conference

Uwe F. W. Behringer
Chair/Editor

Wilhelm Maurer
Jacques Waelpoel
Program Chairs

22–25 January 2007
Grenoble, France

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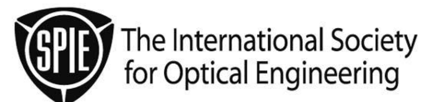

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John M. Whittey, Vistec Semiconductor Systems (USA)

Foreword

For the first time in its 23-year history, the EMLC took place outside Germany. The VDE/GMM and the EMLC Organizing Committee were invited to Grenoble, France, during last year's conference in Dresden by CEA/LETI, Minatec, and Toppan Photomasks. The EMLC2007 was held January 22 to 25, 2007, at the Minatec Conference Center in Grenoble, France.

The conference has annually brought together scientists, researchers, engineers and technologists from research institutes and companies from around the world to present papers at the forefront of mask lithography and mask technology. The three-day conference is dedicated to the science, technology, engineering, and application of mask and lithography technologies and associated processes, and gives an overview of the present status in mask and lithography technologies and the future strategy where mask producers and users have the opportunity to become acquainted with new developments and results. This year's session topics included Hyper NA and Immersion, Inspection and Defect Printability, Mask Pattering and Process, Metrology, Maskless Technologies, RET, NIL, and Mask Management and Simulation. Each year we specially focus on one kind of lithography and mask technology. Last year it was Immersion Technology, and this year the topic was Extreme Ultraviolet Lithography EUV (organized by SEMATECH). The entire Thursday afternoon session was reserved for EUV.

This year the program committee accepted 72 papers. Since the EMLC2007 had no parallel sessions we accepted 50 papers as oral presentations and 22 as posters. Regarding the submitted papers, we had a nice balance: 36 papers were submitted from European countries and 36 papers from countries from outside Europe. The largest number of papers was submitted by the USA (19), followed by Germany (18), and France (12). We had around 250 conference attendees, and 67 different companies participated in papers as authors or co-authors, which we feel demonstrates a worldwide cooperation in the lithography and photomask community.

As Welcome Speakers we were pleased to announce that Geneviève Fioraso, the Deputy Mayor in charge of Economic Development, Grenoble, France, and Nicolas Leterrier of Minalogic, "Pole de Compétitivité" who provided opening comments.

Our two keynote speakers were Dr. Paul Chipman from Toppan Photomasks; Dresden, Germany, with a presentation entitled "Mask R&D in Europe: technical and business model challenges and solutions," and Mr. Joël Hartmann from Crolles 2, Grenoble, France, who presented "Patterning solution for sub-45nm CMOS technologies: the compromise dilemma."

Microelectronics Center Grenoble-Isère

Grenoble is one of the biggest microelectronics centers in Europe. The VDE/GMM organization together with the international EMLC2007 program committee agreed with the goal to intensify the integration of the French scientists into the EMLC international community.

Grenoble (its historical name is Cularo), was founded in the third century by the Romans. Today it is one of the strongest areas in France and in Europe. Since 2000, €4 Billion has been invested with €3 billion more to be invested by the end of 2007 for the nano-technology sector in the Grenoble-Isère area. With more than 38,000 jobs in Grenoble-Isère the information and communication technology (ICT) sector is one of the largest in the area, having enjoyed spectacular growth over the last 15 years. Grenoble-Isère is France's second largest center for research, after the Paris area. It has forged an international reputation in micro- and nano-technology, drawing on powerful, complementary skills in information technology and software.

Many companies are located in the region, such as Alliance-Crolles2, CEA/Leti, Minatec, Nanotec 300, Minalogic, Nanosmart Centre (Soitec), STMicroelectronics, NXP Semiconductors, Freescale Semiconductor, Soitec, Tronic's Microsystems, e2v Semiconductors, Synopsys, HP, Mentor Graphics, Maxim, Applied Materials, ASML, KLA-Tencor, Entegris, Air Liquide Electronics Systems, Schneider Electric, MGE UPS Systems, Radiall, Thales, etc. As a result Grenoble-Isère is a key European center for innovation.

Highlights of the EMLC 2007

The award for the Best Poster of the EMLC2007, for "Damage free megasonic resonance cleaning for the 45nm design rule," was presented at the banquet at the Chateau Touvet, a castle built in the 13th century, to Steve Osborne, Eric Woster, and Hidekazu Takahashi of Sigmameltec Ltd., Japan; Valentine Baudiquez and Thomas Rode the Advanced Mask Technology Center, Germany; and Christian Chovino of Toppan Photomask, Germany.

The Best Paper award was given to the presentation titled "Predicting and correcting for image placement errors during the fabrication of EUVL masks," authored by Prof. Roxann L. Engelstad, J. Sohn, A. Mikkelson, M. Nataraju, and K. Turner from the University of Wisconsin, Madison, USA.

The second Best Paper winners are Paul M. Harder and Timothy A. Shedd from the University of Wisconsin, Madison, USA, for their paper titled "Contact angles and liquid loss behaviour of high index fluids."

The third best paper was "Progress in EUV photoresist technology," by authors Thomas I. Wallow, Ryoung-han Kim, and Bruno La Fontaine of Advanced Micro

Devices, USA; Patrick P. Naulleau, Lawrence Berkeley National Laboratory, USA; Chris N. Anderson, University of California, Berkeley, USA; and Richard L. Sandberg, University of Colorado, Boulder, USA.

The Best Paper of the EMLC 2007 qualifies to be presented at the Photomask Japan conference in April 2007 in Yokohama, Japan, and at the Photomask conference in September 2007 in Monterey, California.

The EMLC 2008 will be held in Dresden, Germany, from January 21 to 25, 2008.

Uwe F. W. Behringer

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