

| Session                      | Speakers                                 | Company         | Start | Finish | Title   |
|------------------------------|--|-----------------|-------|--------|---|
| <b>June 12, 2017</b>         |  |                 |       |        |   |
|                              | Instructors                              |                 | 8:30  | 17:00  | EUVL Short Course   |
| <b>June 13, 2017</b>         |  |                 |       |        |   |
|                              | Facility Tour                            |                 | 15:00 | 17:00  |   |
|                              | Registration, Speaker Prep and Reception |                 | 17:00 | 18:30  |   |
| <b>June 14, 2017</b>         |  |                 |       |        |   |
| <b>Session 1: Keynote -1</b> | VB/All                                   | EUV Litho       | 0:20  | 8:00   | 8:20 Welcome and Introduction                                       |
|                              | P1 Obert Wood                            | GlobalFoundries | 0:40  | 8:20   | 9:00 EUV: current status & remaining challenges                     |
|                              | P3 Britt Turkott                         | Intel           | 0:40  | 9:00   | 9:40 EUV Lithography for HVM  |
|                              | Break                                    |                 | 0:20  | 9:40   | 10:00   |
| <b>Session 2: Mask</b>       |  |                 |       |        | EUV Mask Economics: Impact of mask costs on                         |
|                              | P33 Bryan Kasprovicz                     | Photronics      | 0:20  | 10:00  | 10:20 patterning strategy   |
|                              | P39 Adrian Devasahayam                   | Veeco           | 0:20  | 10:20  | 10:40 Reduction of Large Killer Defects in EUV Mask Blanks          |
|                              |  |                 |       |        | New SUBARU EUVL R&D Activities and EUV Mask                         |
|                              | P34 Takeo Watanabe                       | Univ. of Hyogo  | 0:20  | 10:40  | 11:00 Defect Inspection   |
|                              |  |                 |       |        | Anamorphic Imaging: Emulating Future Nodes of EUV                   |
|                              | P38 Marcus Benk                          | LBL             | 0:20  | 11:00  | 11:20 Lithography on the SHARP Microscope                           |
|                              |  |                 |       |        | Improved inspection ability of Coherent Scattering                  |
|                              | P31 YoungWoong Kim                       | Hanyang         | 0:20  | 11:20  | 11:40 Microscopy by applying Ptychography                           |
|                              | P32 Patrick Helfenstein                  | PSI             | 0:20  | 11:40  | 12:00 RESCAN - A standalone tool for EUV mask defect                |
| <b>Session 3: Source-1</b>   |  |                 |       |        | Rigorous 3D electromagnetic simulation of ultrahigh                 |
|                              | P37 Stuart Sherwin                       | LBL             | 0:20  | 12:00  | 12:20 efficiency EUV contact-hole printing with Chromeless          |
|                              | Lunch                                    |                 | 1:00  | 12:20  | 13:20   |
| <b>Session 3: Source-1</b>   |  |                 |       |        | kW-class picosecond thin-disk pre-pulse laser Perla for             |
|                              | P11 Akira Endo                           | HiLASE          | 0:20  | 13:20  | 13:40 efficient EUV generation                                      |
|                              |  |                 |       |        | Scalability of CO <sub>2</sub> amplifiers to generate stable > 500W |
|                              | P12 Yasui Koji                           | Mitsubishi      | 0:20  | 13:40  | 14:00 extreme ultraviolet (EUV) beams                               |
|                              | P13 Howard Scott                         | LLNL            | 0:20  | 14:00  | 14:20 Simulating EUV Production - an Overview of the                |
|                              | P14 Oscar Versolato                      | ARCNL           | 0:20  | 14:20  | 14:40 Short-pulsed Nd:YAG laser interaction with tin micro-         |

| Break                      |                       |          | 0:20 | 14:40 | 15:00 |  |
|----------------------------|-----------------------|----------|------|-------|-------|--|
| <b>Session 4: Source-2</b> | P15 Erik Hosler       | GF       | 0:20 | 15:00 | 15:20 | Next Generation Source Power Requirements: What will we need at the 3 nm node and beyond?                  |
|                            | P16 Filippou Toufexis | Stanford | 0:20 | 15:20 | 15:40 | A Compact Linac-Driven EUV Light Source utilizing a Short-Period Microwave-Driven Undulator                |
|                            | P17 Michael Feser     | Lyncean  | 0:20 | 15:40 | 16:00 | Concept for 1kW EUV Source for Lithography Based on FEL Emission in Compact Storage Ring                   |
|                            | P18 Hiroshi Kawata    | KEK      | 0:20 | 16:00 | 16:20 | Challenges to realize the EUV-FEL high power light source - Present status on the EUV-FEL R&D activities - |

### Poster Papers

17:00 18:00

|                                 |                           |                |  |  |  |  |
|---------------------------------|---------------------------|----------------|--|--|--|--|
| <b>Session 5: Poster Papers</b> | P25 Takeo Watanabe        | Univ. of Hyogo |  |  |  | Large Collector Mirror Reflectometer for the High Power EUV Light Source Achievement   |
|                                 | P35 Aamod Shankar         | LBL            |  |  |  | Measuring aberrations with mask roughness  |
|                                 | P36 Yow-Gwo Wang          | LBL            |  |  |  | Impact of tool design on defect detection sensitivity for EUV actinic blank inspection.                                      |
|                                 | P40 Xiangzhao Wang        | SIOM           |  |  |  | Variable Separation Method for Three-dimensional EUVL mask diffraction simulation  |
|                                 | P51 Fallica Roberto Alfio | PSI            |  |  |  | Estimation of lithographically-relevant secondary EUV Lithography Research and Development Activities at University of Hyogo |
|                                 | P52 Takeo Watanabe        | Univ. of Hyogo |  |  |  |  |

### Additional Poster Papers to be Announced

### Thursday, June 15, 2017

|                              |                     |                   |      |      |      |   |
|------------------------------|---------------------|-------------------|------|------|------|---|
|                              | Vivek Bakshi        | Announcemnts      | 0:10 | 8:00 | 8:10 |   |
| <b>Session 6: Keynote -2</b> | P4 Margaret Murnane | Univ. of Colorado | 0:40 | 8:10 | 8:50 | Tabletop Coherent EUV Sources and Applications: Full Field Sub-Wavelength Imaging at 13.5nm and Materials Metrology |
|                              | P2 Hakaru Mizoguchi | Gigaphoton        | 0:40 | 8:50 | 9:30 | High Power HVM LPP-EUV Source with Long Collector Mirror Lifetime   |

|  |     |                   |           |   |                          |       |
|--|-----|-------------------|-----------|---|--------------------------|-------|
|  |     |                   |           | EUV Lithography: Progress in LPP Source Power Scaling and Availability  |                          |       |
|  | P5  | Igor Fomenkov     | Cymer     | 0:40  | 9:30                     | 10:10 |
| Break                                      |     |                   |           | 0:20  | 10:10                    | 10:30 |
| <b>Session 7: Optics and Contamination</b> |     |                   |           |   |                          |       |
|  | P21 | Norbert Bowerings | TNO       | 0:30  | 10:30                    | 11:00 |
|  |     |                   |           | EUV optics life time research, past, present and future   |                          |       |
|  |     |                   |           | The future of EUV lithography: enabling Moore's law in the next decade  |                          |       |
|  | P22 | Jan van Schoot    | ASML      | 0:20  | 11:00                    | 11:20 |
|  | P23 | Jack Liddle       | Zeiss     | 0:20  | 11:20                    | 11:40 |
|  | P24 | Ladislav Pina     | RITE      | 0:20  | 11:40                    | 12:00 |
| Lunch                                      |     |                   |           | 1:00  | 12:00                    | 13:00 |
| <b>Session 8: Resist and Patterning -1</b> |     |                   |           |   |                          |       |
|  | P47 | Greg McIntyre     | IMEC      | 0:20  | 13:00                    | 13:20 |
|  |     |                   |           | EUV developments at imec  |                          |       |
|  |     |                   |           | Reactivity of Metal Oxalate EUV Resists as a Function of the Central Metal  |                          |       |
|  | P41 | Greg Denbeaux     | Ualbany   | 0:20  | 13:20                    | 13:40 |
|  | P43 | Yoshi Hishiro     | JSR       | 0:20  | 13:40                    | 14:00 |
|  | P50 | Jason Stowers     | Inpria    | 0:20  | 14:00                    | 14:20 |
|  |     |                   |           | Novel EUV resist development for sub-7 nm node  |                          |       |
|  |     |                   |           | Metal Oxide Photoresists: Breaking Paradigms in EUV Fundamental aspects of PSCAR breaking RLS trade-off and photon shot noise comparing with CAR and non- |                          |       |
|  | P46 | Seiichi Tagawa    | Osaka     | 0:20  | 14:20                    | 14:40 |
| Break                                      |     |                   |           | 0:20  | 14:40                    | 15:00 |
| <b>Session 9: Resist and Patterning -2</b> |     |                   |           |   |                          |       |
|  | P42 | Alex Hexemer      | LBL       | 0:20  | 15:00                    | 15:20 |
|  |     |                   |           | Towards Real-Time Analysis of Morphologies using Scattering   |                          |       |
|  |     |                   |           | Extreme ultraviolet induced chemical reactions in photoresists and model systems  |                          |       |
|  | P44 | Sonia Ortega      | ARCNL     | 0:20  | 15:20                    | 15:40 |
|  |     |                   |           | Fundamentals of X-Ray Excitation and Relaxation in EUV Resists (Tentative Title)  |                          |       |
|  | P45 | Frank Ogletree    | LBL       | 0:20  | 15:40                    | 16:00 |
|  | P48 | Dan Slaughter     | LBL       | 0:20  | 16:00                    | 16:20 |
|  | P70 | Vivek Bakshi      | EUV Litho | 0:20  | 16:20                    | 16:40 |
|  |     |                   |           | Meeting Summary   |                          |       |
|  |     |                   |           | 16:45   | Depart for Dinner Cruise |       |