19th Annual Workshop on Secondary Ion Mass Spectrometry

Organizing Committee:

Steven Hues, Micron Technology - Chairman
Greg Gillen, NIST - Chairman
Richard Lareau, DHS, Science & Technology - Chairman

Tuesday – May 16, 2006

Tutorial Program

9:00 – 10:00 **Joe Bennett** (ATDF) "Characterization of High-k and Low-k Dielectric Materials Using SIMS"

10:00 – 10:30 Break

10:30 – 11:30 **Fred Stevie** (NCSU) Backside SIMS Analysis

11:30 – 1:00 Lunch

1:00 – 2:00 **Birgit Hagenhoff** (Tascon) A Practical Guide to SIMS Analysis of Organic Materials"

2:00 – 3:00 **Nick Winograd** (Penn State) Mechanistic Aspects of Cluster SIMS

3:00 – 3:30 Break

3:30 – 4:30 **John Vickerman** (The University of Manchester) Opportunities and Challenges of Bioimaging Analysis

6:00-10:00 PM **Opening reception and registration**

Wednesday – May 17, 2006

Technical Program

7:00 - 8:00 AM **Continental Breakfast**

8:00 - 8:10 AM **Welcome and Introductions**

8:10 - 8:40 AM "Imaging and Differentiation of Cells and Tissues by ToF-SIMS", Kuang Jen Wu, Lawrence Livermore National Lab

8:40 - 9:10 AM "Desorption Electrospray Ionization: Mechanisms and Applications"
Andre Venter, Purdue University

9:10 - 9:40 AM "DART: A New Desorption/Ionization Mass Spectral Technique that can be used for the Analysis of Organics on Conventional and Nonconventional Surfaces" David Sparkman Consultant to JEOL

9:40 – 9:55 AM **Morning Break**

Nanomaterials and SIMS (Chair: Amy Walker)

9:55 - 10:15 AM **"**SIMS of Nanoparticles"- Dan Gaspar, UMIST

10:15 - 10:35 AM "The Identification of Reactants and Products in a Modified Polymer Material "Greg Fisher, PHI

10:35 - 10:55 AM "Analysis of Thin Organic Films using Gold Cluster and C_{60} Ion Beams", Scott Bryan, PHI

10:55 - 11:15 AM "Nanoparticle-Enhanced SIMS (NE-SIMS) Imaging of Peptides on Self-Assembled Monolayers" Tae Geol Lee, Korea Research Institute of Standards and Technology

11:15 – 11:35 "UV Photopatterned Self-Assembled Monolayers: Applications in Molecular/Organic Electronics and Biomaterials" 'Chuanzhen Zhou, Washington University

11:35 – 12:45 PM **Lunch**

Isotopic Metrology (Chair: Al Fahey)

12:45- 1:30 PM **"**Electrostatic Peak Switching at High Mass Resolution"**,** Georges Slodzian, Universite Paris Sud

1:30- 1:50 PM "Precision Isotopic Measurements of Anthropogenic Uranium with the CAMECA IMS-1270" Al Fahey, NIST

1:50 – 2:10 PM "The UCLA MegaSIMS: an accelerator secondary ion mass spectrometer for the analysis of captured solar wind", Kevin McKeegan, UCLA

2:10 – 2:30 PM "SIMS Analysis of Polymers Labeled with Deuterium and ^{13}C" Shane Harton, NCSU

2:30 – 2:45 PM **Break**

Fundamentals (Chair: Peter Williams)

2:45 – 3:05 PM **"**Dependence of Ion Yield Enhancement on Temperature and Time in MetA-S-SIMS" Roel De Mondt, University of Antwerp

3:05 – 3:25 PM "Prompt In-Situ Emission of Gold Adducts from Single Impacts of Large Gold Clusters on Organic Solids" C. Guillermier, Texas A&M University

3:25 - 3:45 PM "Oxygen-Induced Chemical Surface Segregation during SIMS Depth Profiling" Richard Sobers Jr., Arizona State University

3:45 - 4:05 PM Panel Discussion on Ionization Phenomena in Molecular SIMS

Backside SIMS Analysis (Chair: Fred Stevie)

4:05 – 4:25 PM "Thermal Stability Studies of High-k Gate stacks using Backside SIMS"
Robert Wallace, University of Texas at Dallas

4:25 - 4:45 PM "Device-Specific Backside SIMS Sample Preparation" Paul Ronsheim, IBM

4:45 - 5:05 PM "Backside SIMS Applied to the Study of High-k Layer Intermixing" Joe
Bennett, ATDF

Instrument Users Meetings

5:15 – 6:30 PM **Cameca, Ion TOF, PHI**

Vendor Dinner

6:30 - 7:00 PM **Social Mixer**

7:00 - 10:00 PM **Vendor Dinner**

Posters

“Nanovolume Analysis with SIMS Using Massive Projectiles” Zhen Li, Stanislav V. Verkhoturov, Emile A. Schweikert, Texas A&M University

“Practical Methods of Improving Productivity in a SIMS Laboratory”, Jeff Chen and Stephen Schauer, Freescale Semiconductor

“CN^- Emission under C60 Bombardment” J.E. Locklear, C. Guillermier, S.V. Verkhoturov, and E.A. Schweikert, Texas A&M University

“Characterization of Gunpowder Samples with Time-of-Flight Secondary Ion Mass Spectroscopy (TOF-SIMS)” Christine Mahoney, Greg Gillen, and Albert Fahey, NIST

“Cluster dependence of Secondary Ion Emission” J. Matsuo, S. Ninomiya, K. Ichiki, T. Aoki, and T. Toshio, Kyoto University

"SIMS and Semiconductors; Current Applications for Implant Characterization" Chantelle Krasinski and Wendy Morinville, Micron Technology

"Molecular Depth Profiling and Dynamic Imaging with TOF-SIMS and Cluster Ion Beams" by Juan Cheng, Caiyan Lu, Shawn Parry and Nicholas Winograd", Penn State University

Thursday – May 18, 2006

Technical Program

7:30 - 8:00 AM Continental Breakfast

Semiconductors (Chair: Joe Bennett)

8:00 - 8:20 AM **"**Oxygen Flooding Technique Application for Shallow Depth Profiling in High-k Dielectrics and SiGe Alloy-Based Structures", A. Merkulov, Cameca

8:20 - 8:40 AM "Defect Analysis: Tools for Locating and Characterizing" K.F. Willey,
Rohm and Hass Company

8:40 - 9:00 AM "SIMS Research at NREL: Helping Realize Clean Energy from the
Sun", R.C. Reedy, NREL

9:00 - 9:20 AM "Characterization of HfO_2 Films with Low Energy Cs^+ Primary Beams in an IMS 7f SIMS" R Liu, University of Manitoba

9:20 - 9:40 AM **Morning Break**

9:40 - 10:00 AM "Combined SIMS STEM-EDX Study for the 2-D Characterization of As Dopant Profiles" J-P Barnes, CEA-DRT-Leti CEA/GRE

10:00 - 10:20 AM "Investigation of Growth Characteristics of ALD Al_2O_3 Films on Thermal SiO_2 Substrates by TOF-SIMS" E. Adem, Spansion

10:20 - 10:40 AM "SIMS use in Semiconductor Manufacturing at Intel" James Reinhart,
Intel

Workshop Sponsor Session (Chair: Fred Stevie)

10:40-11:00 AM **Physical Electronics**

"New Ion Gun and Software Developments from Physical Electronics", Scott Bryan, PHI

11:00-11:20 AM **Cameca Instruments**

"Improvement of SIMS Analysis Repeatability in New Generation Cameca IMS-7f Instruments" P. Peres, Cameca Instruments

11:20-11:40 AM **ION TOF**

"Recent Advances in TOF-SIMS: From Cluster Ion Sources to Fully Automated Semiconductor Tools" Ewald Niehuis, ION-TOF GmbH

11:40- 12:50 PM **Lunch**

12:50 – 1:35 PM **ASTM Meeting- (Chair: Christine Mahoney)**

"Repeatability and Constancy of the Relative Intensity Scale in Static SIMS" Ian Gilmore, National Physical Laboratory

Instrumentation (Chair: Scott Bryan)

1:35 - 1:55 PM "Application of Ion Detectors in SIMS" Dave Simons, NIST

1:55 - 2:15 PM "Mechanistic Study of Electron Beam Charge Compensation During Magnetic Sector SIMS Profiling of Insulators with O_2^+ Beams" Z. Zhu, NCSU

2:15 - 2:35 PM "Depth Profiling with Ga^+ Bombardment: a Comparison of Depth Profiling Results on Thin Multi–Layer Metal Stacks Analyzed with both ToF and Quadrapole SIMS" Clive Jones, Millbrook Instruments

2:35 - 2:50 PM **Afternoon Break**

Cluster SIMS (Chair: Chris Szakal)

2:50- 3:10 PM "Cluster and Proton Formation Subsequent to the Sputtering Event" John Vickerman, The University of Manchester

3:10 - 3:30 PM "Sputtering of Benzene Induced by C_6H_6, $C_{10}H_8$, C_{20}, C_{60}, C_{120}, and C_{180} Is Bigger Better?" E.J. Smiley, Penn State University

3:30 - 3:50 PM "Using Water Ice to Quantitate SIMS Surface Sensitivity" Chris Szkal,
Penn State University

3:50 - 4:10 PM **"**MCs^+ Depth Profiling Using Cluster Primary Ions" E. Niehuis, ION-TOF

4:10 - 4:30 PM "SIMS with Massive Gold Projectiles" E.A. Schweikert, Texas A&M
University

6:30- 10:00 PM **Workshop Banquet**

Friday – May 19, 2006

Technical Program

7:30 - 8:00 AM **Continental Breakfast**

Depth Profiling of Organic Materials (Chair: Greg Gillen)

8:00- 8:20 AM "TOF-SIMS Imaging of Single Cells in a Sugar Matrix" Shawn Parry, Penn State University

8:20- 8:40 AM "Low Temperature Depth Profiling of Drug Eluting Stent Coatings with Cluster SIMS" Christine Mahoney, NIST

8:40- 9:00 AM **Morning Break**

Biological Material Characterization (Chair: Kuang Jen Wu)

9:00- 9:20 AM "ToF-SIMS Characterization of Proteins on PEG Surfaces" David Castner, University of Washington

9:20- 9:40 AM "Current thoughts on Bioimaging with Cluster Ion Beams", Nick Winograd**,** Penn State University

9:40 - 10:00 AM "SIMS Analysis of Biological Materials Using Cluster Ion Sources" Birgit Hagenhoff, Tascon

10:00 - 10:20 AM "Distinguishing Stereo- and Structural Isomers with ToF-SIMS and Multivariate Statistical Analysis" Elena Berman, Lawrence Livermore National Laboratory

10:20 - 10:40 AM "Three Dimensional Imaging of Organic Materials Using Cluster SIMS" Greg Gillen, NIST

10:40 - 11:00 AM "VUV Single-Photon Post-Ionization of Phenylalanine Desorbed by a C_{60}^+ Ion Gun" L. Belau, Lawrence Berkeley National Laboratory

11:00 - 11:20 AM "Biomaterial Analysis with Large Ar Cluster Ions" Jiro Matsuo, Kyoto University

11:20 - 11:40 AM	“Chemical Imaging of Biological Materials by NanoSIMS Using Isotopic and Elemental Labels” Peter Weber, Lawrence Livermore National Laboratory
11:40 – 12:00 PM	Closing Remarks
12:00 PM	**Close**