

# **17<sup>th</sup> Annual Workshop on Secondary Ion Mass Spectrometry**

## **Organizing Committee:**

Greg Gillen, NIST - Chairman

Steven Hues, Motorola - Chairman

Richard Lareau, Transportation Security Admin - Chairman

# Technical Program

**Monday, Evening, May 17, 2004**

**7:00-10:15 PM** Opening reception, registration and exhibit setup

**Tuesday, May 18, 2004**

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

**8:00 - 8:15 AM** Welcome and Introductions

## **Plenary Session (Chair: Workshop Organizers)**

**8:15 - 8:45 AM** "Ion Beam Damage During Sputtering", Linda Dake, Utica College

**8:45 - 9:15 AM** "Organic Analysis by TOF SIMS", Scott Bryan, PHI

**9:15 -10:15 AM** "SIMS Quantification for Depth Profiling Overview, Recent Results for Surfaces and Insulators, and Current Problems", Fred Stevie, North Carolina State University

**10:15 -10:35 AM** Morning Break

## **Cluster SIMS: Chairs Nick Winograd and John Vickerman**

**10:35 - 11:05 AM** "Polyatomic Ion Beams for ToF-SIMS - Prospects and Challenges"- John Vickerman, UMIST

**11:05 - 1:25 AM** "Massive Gold Clusters as Projectiles for SIMS "Emile Schweikert, Texas A&M

**11:25 - 11:45 AM** "Molecular Depth Profiling of Polymer Multilayers by Time of Flight Secondary Ion Mass Spectrometry", Matt Wagner, NIST

**11:45 - 12:05 PM** "XPS Depth profiling with C<sub>60</sub>", Scott Bryan, PHI

**12:05 - 12:25 PM** "TOF-SIMS Imaging with a C<sub>60</sub> Probe" , Nick Winograd, Penn State

**12:25-12:45 PM** "Fundamentals and Applications of a New Bi-Cluster Liquid Metal Ion Source" F. Kollmer, ION- TOF GmbH

**12:45 - 1:45 PM** Lunch

**SIMS for Insulator Analysis/Isotopic and Geological Analysis (Chair: Albert Fahey)**

- 1:45- 2:05 PM** "Isotopic Measurements of Uranium", Albert Fahey, NIST
- 2:05- 2:25 PM** "Interactions of Gaseous Nitric Acid with Surfaces of Environmental Interest", D.J. Gaspar, Pacific Northwest National Laboratory
- 2:25 - 2:55 PM** "Determining Relative Sensitivities for Metals in Volcanic Glass using TOF-SIMS", Ed Vincenze, Smithsonian Institution
- 2:55-3:15PM** "Magnetic Sector Analysis of Bulk Insulators Using O<sub>2</sub><sup>+</sup> Primary Beam With Electron Beam Adjacent to Analysis Area", Fred Stevie, North Carolina State University
- 3:15 - 3:30 PM** **Afternoon Break**

**Vendor Technical Session (Chair: Fred Stevie, NC State University)**

- 3:30-3:50 AM** Introduction to the new Cameca IMS 7F and IMS 1280, Michel Schuhmacher
- 3:50-4:10 AM** Physical Electronics
- 4:10-4:30 AM** ION-TOF
- 4:30-5:10 PM** **SIMS Workshop Business Meeting and ASTM Meeting-ASTM Chair Christine Mahoney Discussion of Standards Needs for Biomaterials/Pharmaceuticals/Semiconductors**  
Dave Simons – Semiconductor Industry  
Scott Bryan – Biomaterials and Pharmaceuticals  
Kathy Lloyd – Organics and Polymers  
Albert Fahey – Instrument Standards

**Instrument Users Meetings**

**5:10 – 6:30 PM Tentative: Cameca, Ion TOF, PHI**

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

**7:00 - 10:00 PM Vendor Sponsored Banquet and After Dinner Presentations  
Chairs: Fraser Reich, Kore Technology and Fred Stevie, NC State University**

After dinner sales presentations

## Wednesday, May 18, 2004

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

### Semiconductor Characterization- (Joe Bennett and Jerry Hunter)

- 8:00-8:30 AM** "Depth Profiling As in SiGe", Paul Ronsheim, IBM
- 8:30-8:50 AM** "Variations in B and As RSFs in HfSiO Films"  
Meredith Beebe, International SEMATECH
- 8:50-9:10 AM** "Data Processing Complexity of Depth Profiles in Compositionally Varying Layers" Temel H. Buyuklimanli, Evans East
- 9:10-9:30 AM** "Characterization of SiON Gate Dielectrics by SIMS: Comparison of TOF and Dynamic SIMS Measurements" Gary Mount, Charles Evans & Associates
- 9:30- 9:50** "Boron Depth Profiles Using a Magnetic Sector with Impact Energies Down to 200 eV", STMicroelectronics,
- 9:50 - 10:20** **AM Morning Break**

### Biomaterials Characterization (Chair: Christine Mahoney and Matt Wagner)

- 10:20- 10:40 PM** "TOF-SIMS Analysis of Model Biomaterial Surfaces: What We Can Learn from SIMS on SAMs", Dan Graham, University of Washington
- 10:40 - 11:00 PM** "Characterization of Bacillus Endospores studied by TOF-SIMS", Kuang Jen Wu, Lawrence Livermore National Laboratory
- 11:00 - 11:20 PM** "ToF-SIMS Analysis of Commercial Hydrogels Using Cryogenic Sample Handling Techniques" Daniel J. Hook, Bausch and Lomb
- 11:20 - 11:40 PM** "Depth Profiling in PLLA/Pluronic Blends using Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS)", Christine Mahoney, NIST
- 11:40-12:00 PM** "Characterization of Peptides in Films and on Beads with C<sub>60</sub>" Juan Cheng, Penn State
- 12:00 – 1:00 PM** **Lunch**

## TOF SIMS - ( )

**1:00- 1:20 PM** "Investigations of Contamination in the Surface Analysis Lab", Michaelleen L. Pacholski, Rohm and Hass

**1:20-1:40 PM** "TOF-SIMS Chemical Imaging Applications in the Pharmaceutical Industry", Kurt Wolf, Evans East.

**1:40-2:10** " Qualitative Comparison of Bulk and Surface Modifications of x-Irradiated PTFE, Gregory Fisher, Los Alamos National Lab.

## Molecular Dynamics/Fundamentals (Chair: Peter Williams, ASU)

**2:30 - 2:50 PM** "Formation and Emission of Ions from Water Ice Bombarded by Energetic Particles", Barbara Garrison, Penn State

**2:50 - 3:10 PM** "Microscope Insights into the Sputtering of Ag(111) Induced by C<sub>60</sub> and Ga<sup>+</sup> Bombardment, Edward Smiley, Penn State University

**3:10 - 3:30 PM** "Principal and Resolved Factors in SIMS Data Interpretation: PCA and MCR" Richard Ericson, 3M

**3:30 - 3:50 PM** "Dependence of Ion Beam Induced Segregation of Gold in Silicon on the Concentration and Distribution of Near Surface Oxygen", Richard Sobers, ASU

## 4:00 - 5:30 PM - Poster Session (Chair: TBD)

1. "Application of Time Interpolation to SIMS Isotopic Ratio Measurements" David Simons and Kevin Coakley, NIST
2. "Thermal Stability of Si and Mg-Implanted GaAs and InP under High-energy Laser Annealing as Evaluated by SIMS." Peter Chi, NIST
3. "SIMS backside analysis: Sample Preparation and Application" Eric Windsor, NIST
4. "SIMS Support for the Development of BiCMOS process and its Transfer to Manufacturing by Developing in-line Monitoring Capabilities" T. Budri, National Semiconductor
5. "A Comparison of Quadrupole, Magnetic Sector and TOF-SIMS for Sodium Analysis in a Flat Panel Display Glass and in Silica Coated Flat Panel Display Glass", G. Guryanov, Corning.
6. "Determination of Silicon Content in Hafnium Silicates", Joe Bennett, International Sematech
7. "3D Molecular Imaging", Greg Gillen, Matt Wagner, Christine Mahoney, NIST
8. "Initial Results with the ExxonMobil NanoSIMS" W.C. Horn, W.A. Lamberti, ExxonMobil Research & Engineering Company

9. Using ToF-SIMS as a High Throughput Screening Tool for Light-Weight Hydrogen Storage Materials, V.S. Smentkowski, and J.P. Lemmon, General Electric Global Research Center
10. "Cluster Primary Ion Bombardment Facilitates ToF-SIMS Analysis of Biological/Tissue samples", V.S. Smentkowski<sup>1</sup>, A. Schnieders<sup>2</sup>, F. Kollmer<sup>3</sup>, R. Kersting<sup>4</sup>, J.A. Ohlhausen<sup>5</sup>, P.G. Kotula<sup>5</sup>, and M.R. Keenan<sup>5</sup>, General Electric Global Research Center
11. "Multi-ion Emission from Massive Gold Cluster Impacts"  
G. J. Hager, R. D. Rickman, S. V. Verkhoturov, and E. A. Schweikert  
Texas A&M University
12. "Secondary Ion and Coincidental Ion Yields Produced by keV Polyatomic Carbon Clusters"  
J. E. Locklear, S.V. Verkhoturov, and E.A. Schweikert, Texas A&M University
13. "SIMS Depth Profiles of SiGe Layers in Fully Processed Si Wafers." Y.H. Lu, Taiwan Semiconductor
14. "Numerical Approach for Resolving Mass Interferences in Ion Mass Spectrometry", Alexander Pivovarov, Shiva Technologies Inc
15. "SIMS Study of Ta/Cu and Co/Cu Nanostructures". R. Liu, Department of Physics, National University of Singapore
16. "Qualitative Comparison of Bulk and Surface Modification of  $\alpha$ -Irradiated PTFE", Gregory Fisher, Los Alamos National Laboratory
17. "Comparative Analysis of Pt/Ru Catalyst Sample using TOF-SIMS and Laser SNMS", A. Schnieders, Ion TOF, USA
18. "Fluorine Chamber Contamination in Dynamic SIMS Quadrupole Instruments", C. Blackmer-Krasinski, Micron Technology

Development of a Thermo-Ionization Source for Efficient Imaging of Alkaline Earth Elements and Metal Containing Molecules" Christelle Guillimier

Quantitative Analysis of Hydrogenated Amorphous Silicon-Germanium Alloys, Robert Reedy, NREL

Understanding Oxygen Enhancement of Secondary Ion Yields of Silicon: Comparison of Experimental Results from Si and Theoretical Model, J. Lorincik, ASU

Multiply Charged Molecular Ions Produced by Sputtering, K. Franzreb, ASU

Mapping Applications of Full Wafer SIMS for sub-90nm semiconductor technology, M. Juhel, STM Microelectronics

**6:00 PM Workshop Excursion and Dinner – Location to be determined**

# Thursday, MAY 20, 2004

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

## Imaging (Chairman Greg Gillen-NIST)

- 8:00- 8:20 AM** "NanoSIMS Applications in Catalysis"  
W.A. Lamberti, ExxonMobil Research & Engineering Company,
- 8:20- 8:40 PM** "High Spatial Resolution Imaging of Biological Tissues", Claude Lechene,  
Harvard Medical School
- 8:40-9:10 PM** "Analysis of TOF-SIMS Spectral Series and Spectral Image Series Using  
AXSIA", Tony Ohlhausen, Sandia National Laboratory
- 9:10-9:30 PM** "Large Area TOF-SIMS Chemical Mapping: Opportunities and Challenges",  
Kathy Lloyd, Dupont Corporate Center
- 9:30- 9:50 AM** "High Lateral Resolution SIMS in Material Science: Various Applications of  
the NanoSIMS, F. Horreard, Cameca
- 9:50- 10:10 Morning Break**

## Instrumentation Chairman- Steve Hues, Motorola

- 10:10 - 10:30 AM** "Towards Isotope Ratio Measurement with an Electrometer Array on the  
Cameca IMS xf" Peter Williams, Arizona State University
- 10:30 - 10:50 AM** "Eucentric Rotating Stage for Cameca IMS-wF and Sc-Ultra, P. Peres,  
Cameca"
- 10:50 - 11:10 AM** "Full Wafer Analysis of Ion Implanted Wafers" Drew Evans, Full Wafer  
Analysis
- 11:10 - 11:30 AM** "Development of C<sub>60</sub> Ion Beam Systems", Rowland Hill, Ionoptika
- 11:30 - 11:50 PM** "TOF SIMS Studies Using a Newly Developed C<sub>60</sub><sup>+</sup> Primary Ion Gun:  
Fundamental Aspects and Applications, Rudolf Mollers, Ion -TOF
- 11:50-12:10 PM** "The Carnegie Super SIMS: A Progress Report", L.R. Nittler, Carnegie  
Institution
- 12:10 PM** Closing Remarks