Technical Update
Feb. 2010
DCG Systems

In this issue...

DCG reviews its many 2009 activities in China, Taiwan, Europe, Japan and North America

News and Events

Announcements

- DCG Systems, Inc. forms its own marketing and support organization in Israel, with plans to include R&D in the near future.

DCG wraps up 2009 with new products and technology

With the introduction of the Meridian WaferScan, the ELITE and the Laser Voltage Imaging (LVI) option, DCG had a substantial number of new technologies to offer during 2009. The months of October and November in particular were very busy ones for DCG Systems. The following sections discuss some highlights during these very busy months. *

China

DCG and its partners presented a number of papers at the 16th IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA). Topics addressed were:

- "Full Dynamic Laser Stimulation Set Up and First Results" A. Deyine, et al. (with THALES & CNES)
- "RF Performance Increase allowing IC Timing Adjustments by use of Backside FIB Processing" R. Schlangen, et al. (with Berlin University of Technology)
- "Enhanced wafer analysis using a combination of test, emission and software net tracing" R. Portune, et al. (with Atmel)

Taiwan

In October DCG and Spirox held a joint Technical Seminar based on the theme "Next Generation Failure Analysis and Debug." Topics presented to the 130 attendees included:

- "The Role of Spirox in FA Challenges & Solutions," CJ Hsieh (Spirox EVSD)
- "DFP: The Future of FA," C. Bolger (Spirox EVSD)
- "Design-for-Test Enabled Dynamic Emission for Failure Analysis and Yield Enhancement," S. Kasapi, (NVIDIA)
- "FIB Modification of Advanced Si Devices for 45nm and Beyond," (Presented by S. Madala)
- "FA Solutions for Advanced Process Technologies," I. Niv (DCG)

Europe

DCG had a presence at the European Focused Ion Beam Users Group (EFUG) with a poster titled "Design for Edit."

DCG and SECTOR Technology jointly sponsored a booth at the 20th European Symposium on Reliability of Electron Devices, Failure Physics

The DCG/Spirox "Next Generation Failure Analysis and Debug" Seminar in Taiwan had 130 attendees.

* Many of the presentations referenced in this issue may be accessed through the DCG web site: http://www.dcgsystems.com/technology.papers.2009.html

and Analysis (ESREF) in Arcachon, France. DCG participated in the presentation of two papers:

- "Jitter Analysis of PLL-Generated Clock Propagation using Jitter Mitigation Techniques with Laser Voltage Probing," J. Liao, et al. (NVIDIA)
- "Physical Analysis, Trimming and Editing of Nanoscale IC Function with Backside FIB Processing," R. Schlangen, et al. (Berlin University of Technology)

The SECTOR Technical Seminar took place during ESREF. Attendees were introduced to the new ELITE Lock-in Thermography system and DCG's new Laser Voltage Imaging technologies. Amjad Deyine of THALES presented "From Static to Full Dynamic Laser Stimulation."

Japan

The DCG Japan Technical Seminar covered two days. Dr. Israel Niv, DCG's President and CEO, opened the seminar with a presentation titled "New Methodology for Emerging Low Product Yield Improvement." Dr. Niv illustrated the necessity of adding an additional building block to the analytical arsenal: Wafer-level Fast Failure Analysis (FFA) systems.

- Surendra Madala presented "FIB Modification of Advanced Si Devices for 45nm and Beyond."
- Steven Kasapi of NVIDIA presented "Design-for-Test Enabled Dynamic Emission for Yield Enhancement."
- Takashi Setoya from Toshiba presented "Current Yield Analysis Processes and Challenges" and "FA Workflow at Toshiba, Ohita Fab."
- Akira Shimase of Renesas presented "Failure Analysis Workflow using DCG Tools."
- Shigeru Nakajima of VAN Partners Corporation discussed "Reverse Engineering Techniques."

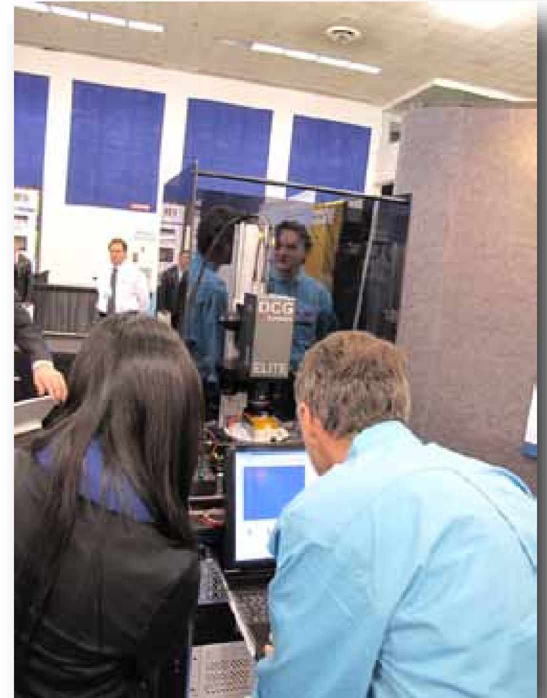
A key point in Dr. Kasapi's presentation was the need to combine Design-for-Test (DFT) and Electrical Failure Analysis (EFA). There is also a growing need for a software system optimized for yield data preparation, collection, and analysis.

DCG presented papers on several topics at the 29th LSI Test Symposium, held Nov. 11-13, 2009):

- "Meridian-IV laser voltage imaging and probing options," S. Motegi, et al.
- "A Next generation circuit edit system," S. Motegi, et al.
- "Contact to diffusions for advanced backside circuit edit," H. Tanaka, et al.
- "Characterization of transistor by use of backside FIB circuit edit, K. Goshima, et al. (with Sanyo)

North America

Those who attended the 35th International Symposium for Testing and Failure Analysis (ISTFA) in San Jose, California, (Nov. 15-19, 2009) could not help but notice a large number of people wearing distinctive turquoise DCG shirts. DCG represented a significant presence at the exhibition.



The new DCG Systems ELITE Lock-in Thermography system was demonstrated on actual customer devices at ISTFA.

A major milestone for DCG was the ongoing booth demonstration of DCG's "hot" new lock-in thermography product: The ELITE. Setting up the ELITE took less than an hour, after which DCG performed live demos on actual customer devices. The ELITE was continuously busy throughout the two day exhibition, even during the normally slow presentation session periods. In fact, demos continued even after normal exhibition hours ended.

We will feature the technical details and advantages of lock-in thermography in our next DCG Technical Newsletter.

After the ISTFA technical sessions ended, DCG invited customers to our Fremont, California facility for a Technical Seminar. Attendees were treated to technology demonstrations of DCG's current diagnostic solutions. Two lucky people even won raffle prizes: Two Xbox 360 ELITE game systems!

Christian Schmidt of the Fraunhofer

DCG Systems President and CEO Israel Niv speaks to attendees at dinner during the week of ISTFA

Rudolf Schlangen of Berlin University of Technology (BUT) presents new Focused Ion Beam analytical methods at the DCG Technical Seminar in Fremont, California.

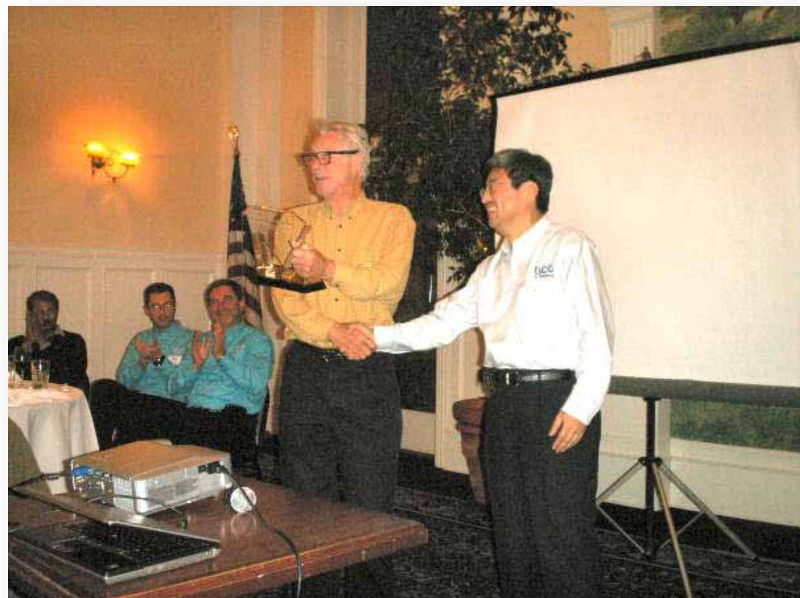
Shahid Ansari of Sun Microsystems walks away with one of two Xbox ELITE raffle prizes. A second Xbox was won by Kevin Berger of Analytical Solutions.

Institute for Material Mechanics of Materials presented "Defect localization on IC level and at fully packaged devices using Lock-in Thermography." Of particular interest was the application of lock-in thermography to the 3-dimensional *non-destructive* analysis of fully packaged devices, including stacked-die multi-chip modules.

Dr. Keith A. Serrels of the Heriot Watt University School of Engineering and Physical Sciences presented "Advanced Optical Probing for the 22nm node and beyond." Dr. Serrels discussed the advantages of Two-Photon Absorption Imaging and a variety of "optical super-resolution techniques" utilizing SIL imaging, Polarization-sensitive imaging and Pupil-function engineering. Also discussed was 3-dimensional imaging using an aplanatic SIL.

Dr. Rudolf Schlangen, of the Berlin University of Technology, presented "Increasing the Local Operating IC Speed with Backside FIB processes." Schlangen demonstrated how FIB preparation can actually be used to increase device speed in order to allow high speed testing of engineering samples.

Magdalena Sienkiewicz of Freescale, France, presented "Application of Laser Stimulation Techniques to Analog ICs Debug." Sienkiewicz noted that the use of standard digital oriented analytical techniques may not assist with failure location on an analog or mixed-mode device. A methodology was presented which



Tam Anayama presents Ken Wilshire with a "Lifetime Achievement Award"