ZEISS in the ISTFA 2024 Technical Program

San Diego, California, USA | Booth 601

Make sure to attend the ZEISS sessions in the technical program to learn how the latest innovations from ZEISS can help solve your failure analysis challenges.

Seeing beyond

Monday, October 28

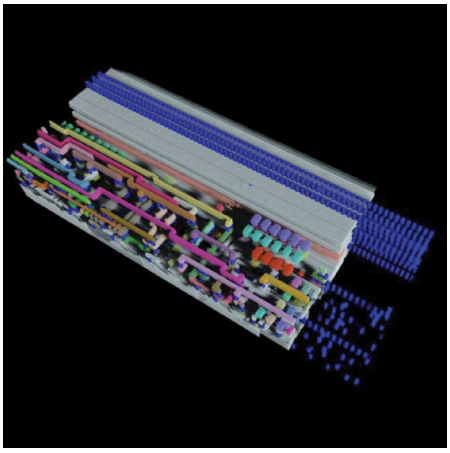
Session: Technology Specific and Featured Topics II; Room 202

10:20 am PST

Tutorial: AI-driven Advancements in Image Processing, Analysis and 3D Modeling for Fault Isolation and Failure Analysis

Dr. Flavio Cognigni et al., Carl Zeiss SpA

(co-authored with EM Microelectronics, Comet Technologies and Sapienza University of Rome)



Ever wondered how AI-powered 3D image handling can transform semiconductor failure analysis?

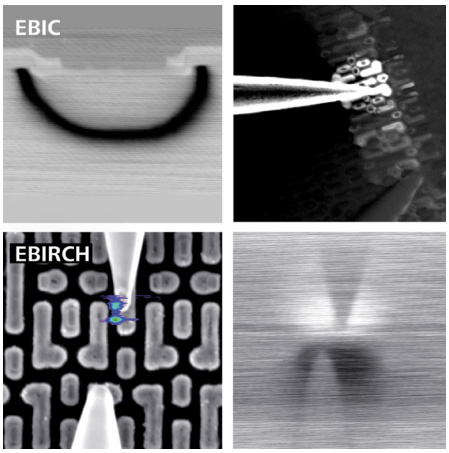
This tutorial explores AI-driven solutions for enhanced fault isolation and analysis, offering advanced workflow examples. Traditional 2D images may miss complex defects, limiting engineers' efforts. 3D techniques provide clearer visualization, spatial insight, and precise data analysis, boosting device reliability, and performance.

Session: Fault Isolation IV; Room 204

1:20 pm PST

Tutorial: Defect Localization Methods for Device Characterization and Yield Management

Greg Johnson, ZEISS Microscopy



Overwhelmed by the "alphabet soup" of acronyms for defect localization techniques in semiconductor failure analysis?

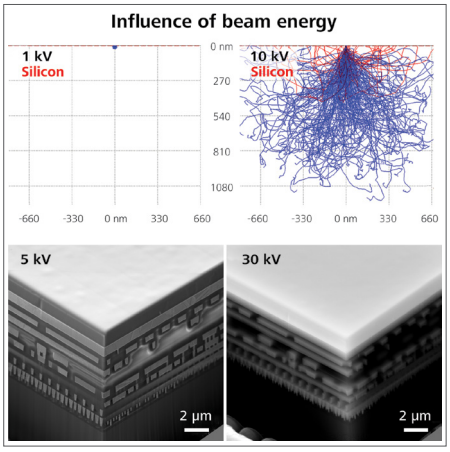
This tutorial is the one ring to rule them all: NINETEEEN signals in electron and laser defect localization of semiconductor junctions and defects will be presented in a tidy package which is heavy on cartoon diagrams and light on math.

Session: Microscopy III; The Pointe

2:20 pm PST

Tutorial: Basics and Current Aspects of Scanning Electron Microscopy

Dr. Heiko Stegmann, ZEISS Microscopy



Looking for information on basics and applications of scanning electron microscopy (SEM)?

SEM remains to be one of the most powerful techniques to characterize structure and composition of electronic devices and, particularly in combination with FIB, to analyze processing defects and device failures. In this tutorial, ZEISS will present key concepts, recent application and data processing examples, and tips for optimum utilization.

Monday, October 28

(continued)

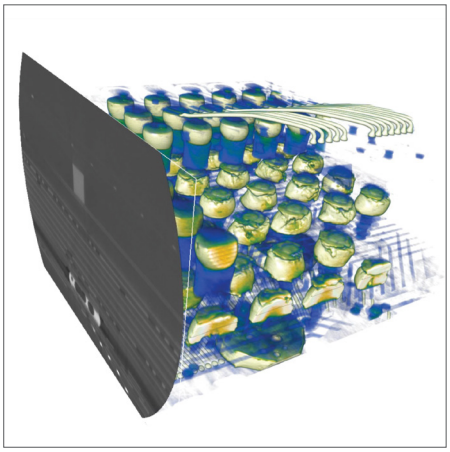
Session: Package and Physical Analysis Challenges II; Room 204 2:20 pm PST

Tutorial: Fundamentals and Emerging Capabilities of 3D X-ray Microscopy for Semiconductor Advanced Package Failure Analysis

Cheryl Hartfield, FASM, ZEISS Microscopy

Semiconductor package complexity drives the adoption of 3D X-ray imaging as an essential FA technique.

Learn about basic principles, use cases, state-of-art capability, and future directions of 3D X-ray imaging for advanced packaging in this tutorial.



Tuesday, October 29

Session: Case Studies: FA Process and Workflows; Room 204 1:20 pm PST

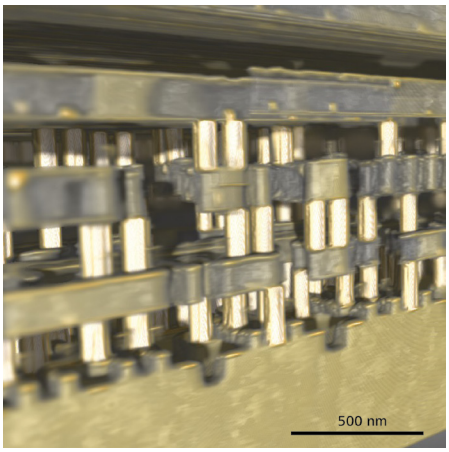
Integrating Multimodal Microscopy and Artificial Intelligence Solutions for Laser Dicing Process Induced Defect Identification

Dr. Flavio Cognigni et al., Carl Zeiss SpA

(co-authored with EM Microelectronics, Comet Technologies and Sapienza University of Rome)

Laser beam deviation in high dislocation density areas during stealth dicing may compromise device functionality due to local modifications where it is reflected.

This research addresses the issue using an AI-powered multimodal microscopy workflow to identify laser-induced defects. By combining IR analysis with XRM and FIB-SEM tomography, this approach enhances the reliability of silicon wafer dicing and improves semiconductor manufacturing.



Session: Power Devices (Si, SiC, GaN); The Pointe 2:30 pm PST

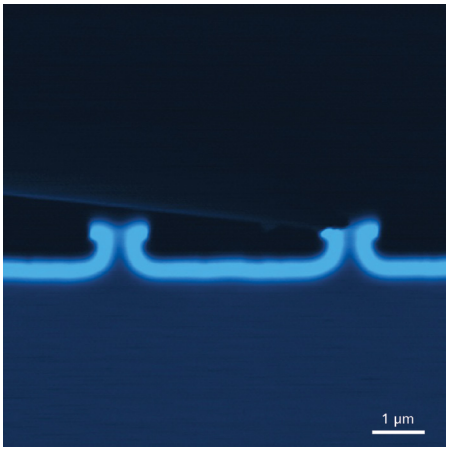
Top-down Junction Analysis in SiC MOSFET

Greg Johnson et al., ZEISS Microscopy

(co-authored with STMicroelectronics and Kleindiek Nanotechnik)

Interested in understanding p/n junctions in power semiconductors?

This paper presents the different and complementary signals from the failure analysis techniques of OBIRCH, EBIC, and EBIRCH for silicon carbide (SiC) MOSFETs. A novel EBIC technique that images buried junctions through the device's gates is also discussed.



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Wednesday, October 30

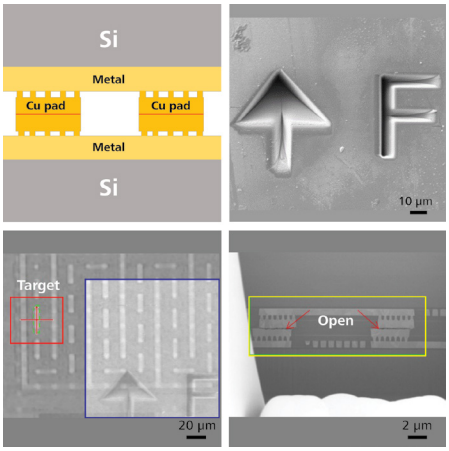
Session: Package Level Fault Isolation; Room 202

11:00 am PST

A Correlative Microscopic Workflow Powered by Artificial Intelligence to Accelerate Failure Analysis of Next-Generation Semiconductor Packages

Dr. Allen Gu et al., ZEISS Microscopy

(co-authored with ASE)



Are you looking for failure analysis solutions in next-generation semiconductor packages?

This paper reports an AI-powered correlative microscopic workflow, where non-destructive X-ray imaging and FIB-SEM analyzing techniques are combined to solve the accessibility problem of deeply buried defects. A deep-learning based reconstruction method significantly shortens the time-to-results of the correlative workflow.

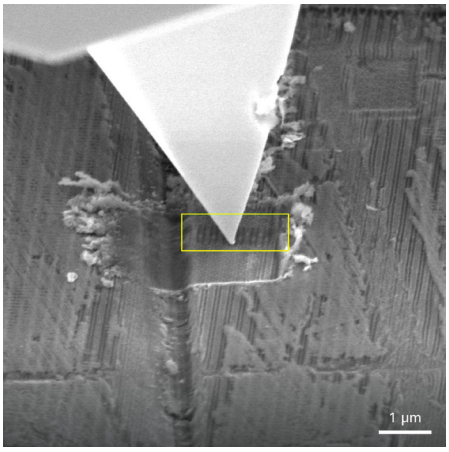
Session: Scanning Probe Analysis; Room 202

3:00 pm PST

AFM-in-SEM for Precise Endpoint Delayering

Greg Johnson et al., ZEISS Microscopy

(co-authored with DoubleFox)



Do you have a critically important device next to a gross polishing scratch introduced by delayering?

This paper discusses the use of AFM-in-SEM in delayering samples under vacuum, with real-time feedback as to device measurements with AC based conductive AFM. Also presented are measurements to detect the moment of cut through an internal node of an advanced-node SRAM.

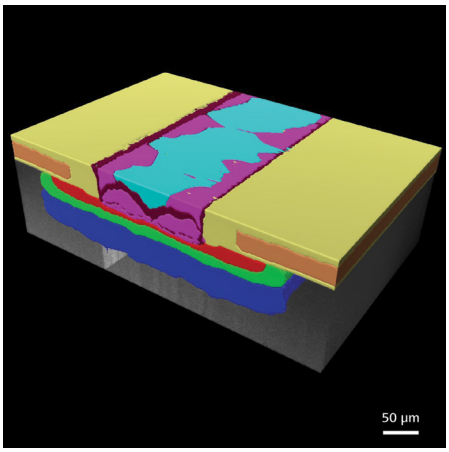
Thursday, October 31

Session: AI Applications for Failure Analysis; Room 202

9:00 am PST

Few-shot AI Segmentation of Semiconductor Device FIB-SEM Tomography Data

Dr. Heiko Stegmann et al., ZEISS Microscopy



Learn how to take full advantage of FIB-SEM tomography data using artificial intelligence (AI)-based image segmentation.

Manual analysis of SEM images of semiconductor devices by experts with specialized knowledge can hardly keep up with the large amounts of data provided by automated SEM workflows, especially in FIB-SEM tomography. In this paper, we show how AI segmentation based on manual labeling of a few images only enables better inspection of such data.

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Friday, November 1

Session: Nanoprobing, Electrical Characterization II; Room 202

10:00 am PST

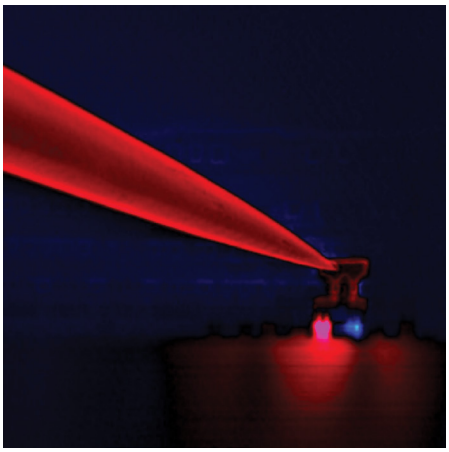
Consideration of a Ga-FIB in Lamella Sample Prep for EBIC/EBAC Analysis of Advanced-node SRAMs

Greg Johnson et al, ZEISS Microscopy

(co-authored with Kleindiek)

Presented by Dr. Lorenz Lechner

Ga-FIB is the established workhorse for the preparation of samples in semiconductor failure analysis. An understanding of Ga+ beam material interactions can enable effective semiconductor processing. We use the power of nanoprobing to investigate parameters in Ga-FIB sample prep on shorting and p/n junction imaging.



ZEISS Microscopy Solutions for Failure Analysis

ZEISS VersaXRM 3D X-ray Microscope

Image buried defects and package structures non-destructively

ZEISS Crossbeam laser FIB-SEM

Rapidly access site-specific features buried deeply within IC packages

ZEISS Crossbeam FIB-SEM

Achieve versatile, efficient imaging and processing for high-resolution 2D and 3D insights

ZEISS GeminiSEM FE-SEM

Perform versatile, high-resolution imaging and characterization

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