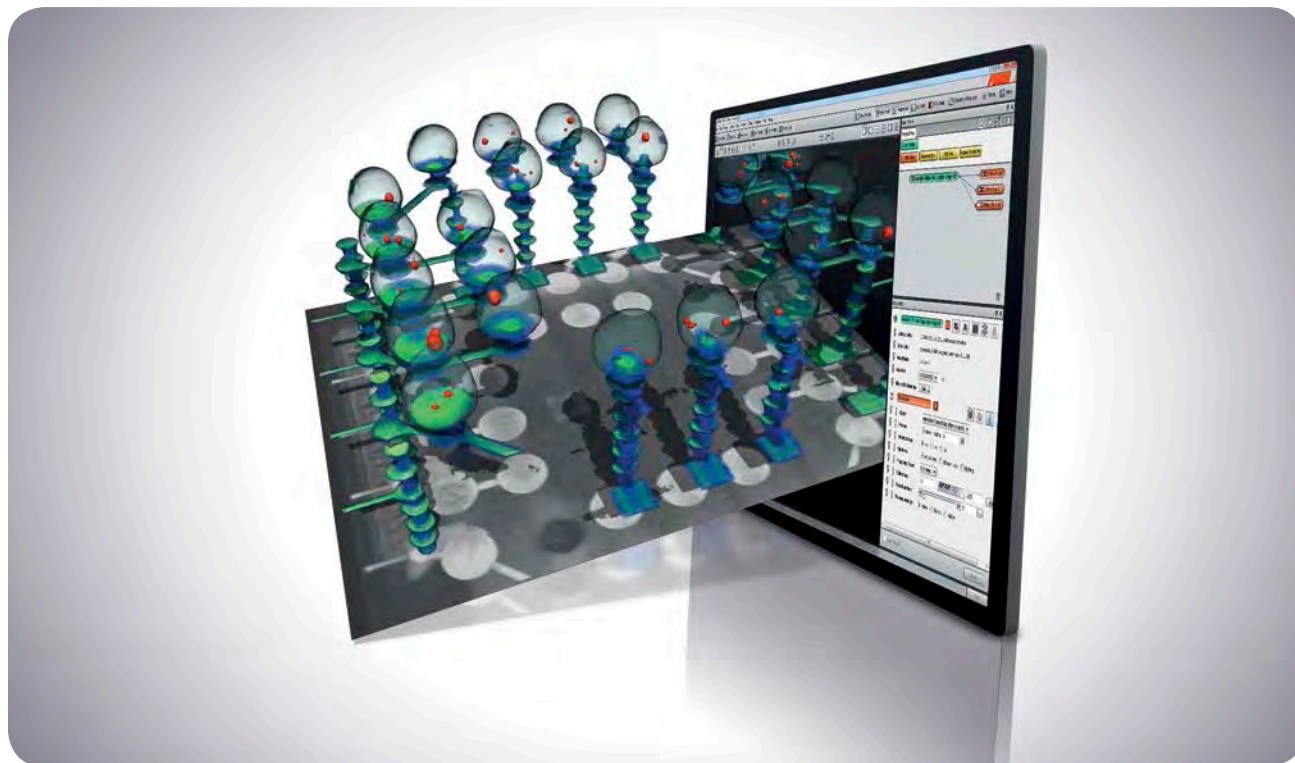


## **Avizo for Semiconductor Analysis**

Advanced 3D visualization and analysis software

Avizo® software provides powerful tools for visualizing and analyzing semiconductor materials data from tomography, microscopy, MRI, and more techniques. From defect/ flaw detection and analysis, to performance and process evaluation, and materials characterization, Avizo is used in many ways throughout all the research, design and development phases of semiconductor devices.



↑ Solder balls of a BGA (Ball Grid Array). Segmentation of voids. Courtesy of nanoX Technology Pte Ltd.

# Avizo

## Key Features

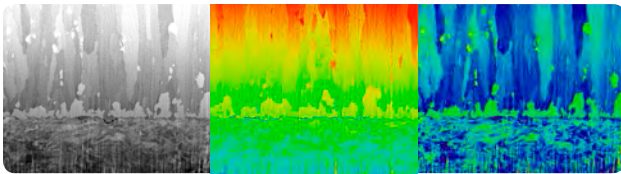
**Avizo** delivers advanced 3D imaging workflows for scientists and engineers who require insight into the details of materials properties on full 3D structures, at any scale and size.

### Advanced solution for:

- Void analysis
- Short / Open circuits
- Die cracks
- Packaging defects
- Solder related defects
- Failure detection

### Import and process

- Handle any modality, at any scale, of any size:
  - X-ray tomography: CT, micro-/nano-CT, synchrotron
  - Microscopy: electron and optical
  - Other acquisition techniques (MRI, radiography, etc.)
- Support for multi-data/multi-view, multi-channel, time series, very large data
- Scaling, calibration, conversion, re-sampling
- Image enhancement, comprehensive filtering and convolution, Fourier frequency transforms
- Image stacks alignment, registration, arithmetic, correlation, fusion



↑ **FIB/SEM imaging of Tin (Sn) Whiskers and Hillocks.** Shadowing correction. Courtesy of M. Williams, K-W. Moon, W. Boettinger - NIST, National Institute for Standards and Technology, Metallurgy Division

### Visualize and explore

- Interactive high-quality volume visualization
- Orthogonal, oblique, cylindrical, and curved slicing
- Contouring and iso-surface extraction
- Data features highlighted on-the-fly with image filtering (contrast control, histogram equalization, dynamic colormap and opacity on slices or volumes, etc.)

### Segment

- Thresholding and auto-segmentation, object separation, automatic labeling
- Morphological processing, including watershed and basins
- 3D surface reconstruction and tetrahedral grid generation
- Skeletonization

### Analyze and measure

- Built-in measurements, including counts, volumes, areas, perimeters, aspect ratios, and orientations
- User-defined measures
- Automatic individual feature measurements, 3D localization, and spreadsheet selection
- Automated statistics, distributions graphs
- Feature filtering using any measurement criterion
- Geometry registration, measurements and comparison
- Void detection and measurement
- Bridge with Matlab® and LabView
- Pre-processing for structural and flow simulations

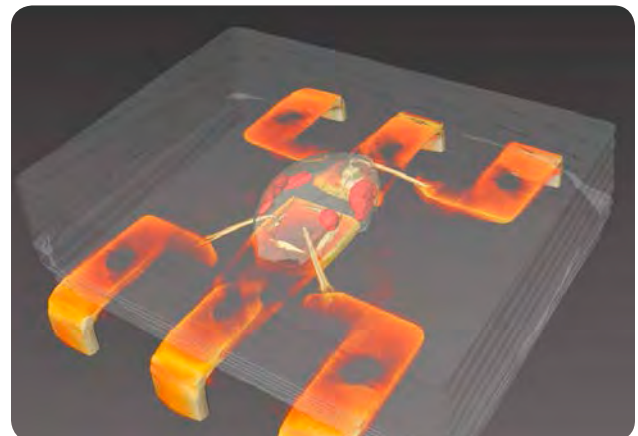
### Present

- Video generation
- Advanced key frame and object animation
- Annotations, measures legends, histograms, and curves plots
- Export spreadsheets, 3D models, high-quality images

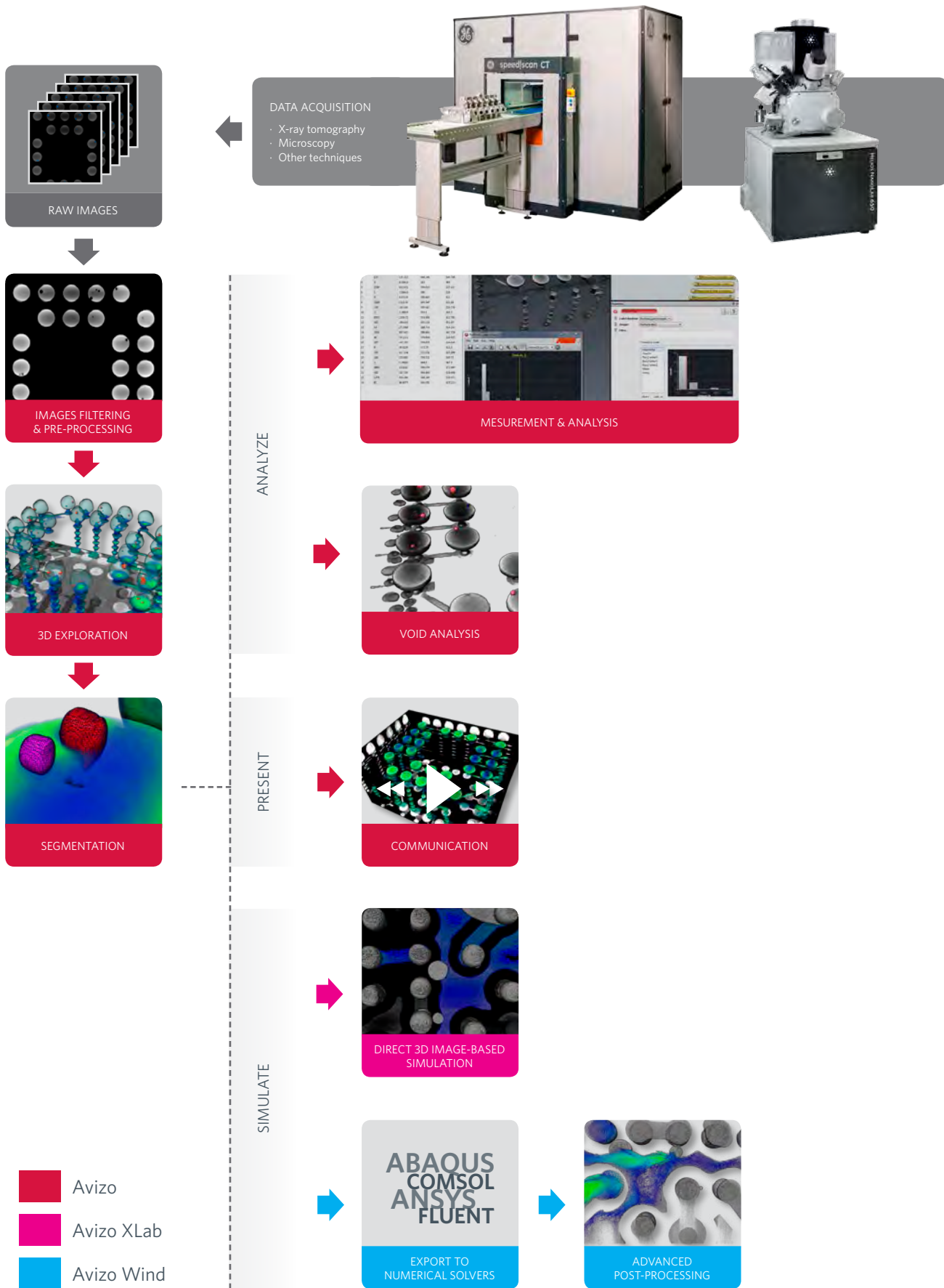
### Simulate

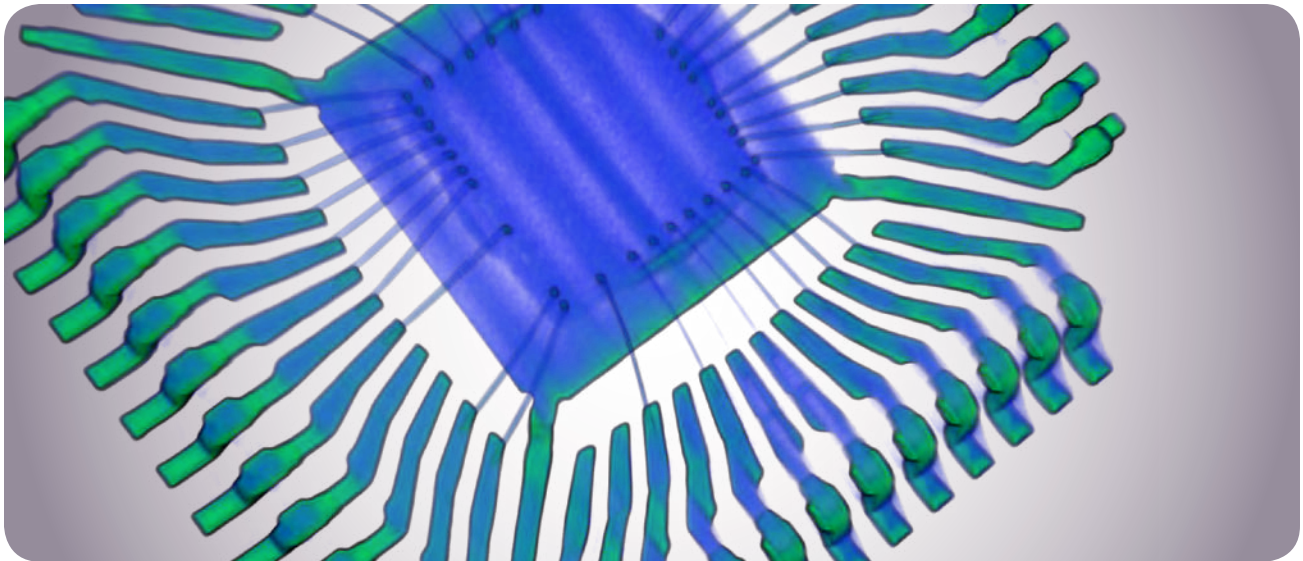
Image-to-simulation workflows:

- 3D image-based meshing for Finite Element and CFD simulations, export to FEA/CFD solvers\* and advanced post-processing of simulation results\* (\*with Avizo Wind).
- Direct 3D image-based simulation: electrical resistivity and thermal conductivity computation with Avizo XLab.



↑ **Void in silicon.** Courtesy of NanoX Technology Pte Ltd





↑ **Microprocessor.** Courtesy of NNFC Korea

**All-in-one software application.** Avizo is a powerful, multifaceted software for visualizing, manipulating, and understanding scientific and industrial data in industrial inspection and electronics, materials science, and natural resources.

For electronics/semiconductors, Avizo provides a comprehensive, multimodality digital lab for advanced 2D and 3D visualization, materials characterization, reconstruction of 3D models, void analysis and calculation of physical properties.

For natural resources, industrial inspection and materials science, please read the relevant literature published on our website.

**Customize and expand Avizo** Avizo high-end visualization and analysis software offers a flexible, configurable research and analysis studio. More than just a ready-to-use software application, Avizo is the ideal software framework for custom 2D/3D analysis applications.

Avizo's expandability makes it an ideal open framework for organizations that require rapid software customization to address their specific 2D/3D data visualization and

analysis needs. Use the built-in scripting language to customize Avizo and easily automate tasks and workflows.

Use the Avizo XPand extension to create new custom components such as file readers and writers, to integrate computation routines, and even to develop new visualization modules.

#### **Powerful eXtensions for building solutions**

- XLab enables the computation of material physical properties based on 3D images.
- XPand enables the creation of custom extensions using the C++ Avizo open framework.
- XLVolume manages and visualizes up to several terabytes of data, increasing the available system memory.
- XSkeleton delivers advanced automatic tools for network reconstruction.
- XScreen and XTeam enable collaborative, high-resolution and immersive environments.
- XReaders provides import capabilities for the most popular CAD formats.

Avizo is available for Windows®, Mac OS®, and Linux.

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