CT Scanner
CAF Central Analytical Facilities
STELLENBOSCH UNIVERSITY

CT NEWS

The Stellenbosch CT scanner facility newsletter

March 2014 | Volume 2, Number 2

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Recent interesting scans (clickable links)

Nondestructive imaging of garlic flakes
http://blogs.sun.ac.za/ctscanner/2014/03/03/3d-nondestructive-imaging-of-garlic-flakes/

MRI scanning and 3D data visualization of nonCT data
http://blogs.sun.ac.za/ctscanner/2014/02/10/ct-and-mri-scanning/

Fire-starters proof of concept
http://blogs.sun.ac.za/ctscanner/spectroscopy/firestarters/

Digital Volume Correlation: wood block before and after
http://blogs.sun.ac.za/ctscanner/2014/02/07/digital-volume-correlation/

CT Scanning bones
http://blogs.sun.ac.za/ctscanner/2014/03/24/scanning-bones/

New Application: Digital Volume Correlation

In a unique and powerful collaboration between our facility and the Mechanical Engineering Dept at the University, we are offering a new service: Digital Volume Correlation, using the LAVision commercial software package.

The software calculates changes occurring in a sample in full 3D, making it possible to quantify and visualize changes in 3D using colour maps. A simple example is shown below of a wood block scanned at 2 microns resolution, before and after wetting, to show the regions of most expansion due to moisture absorption. Red colour indicates largest deviation, correlating roughly to inter-cellular crack regions where the water penetrated easiest.

See more images of this example and a nice animation at:

http://blogs.sun.ac.za/ctscanner/2014/02/07/digital-volume-correlation/

Welcome

There's lots of exciting news from the CT scanner facility in this edition of the newsletter. Most importantly we're acquiring a brand new **SUB-MICRON CT SCANNER**! More details to follow in the next newsletter, but just some highlights until then:

- *NRF-NEP equipment grant 2014*
- *X-ray tomography equivalent to synchrotron resolution and quality available in the laboratory*
- *Resolution range from 40 micron to 500 nm.*
- *Installation planned for July 2014*
- *Official launch planned for early August 2014*

Please browse the newsletter, click on the links to see more, and contact us today for a quote for your own scans. Thank you for your support and send this newsletter on to your colleagues and friends!

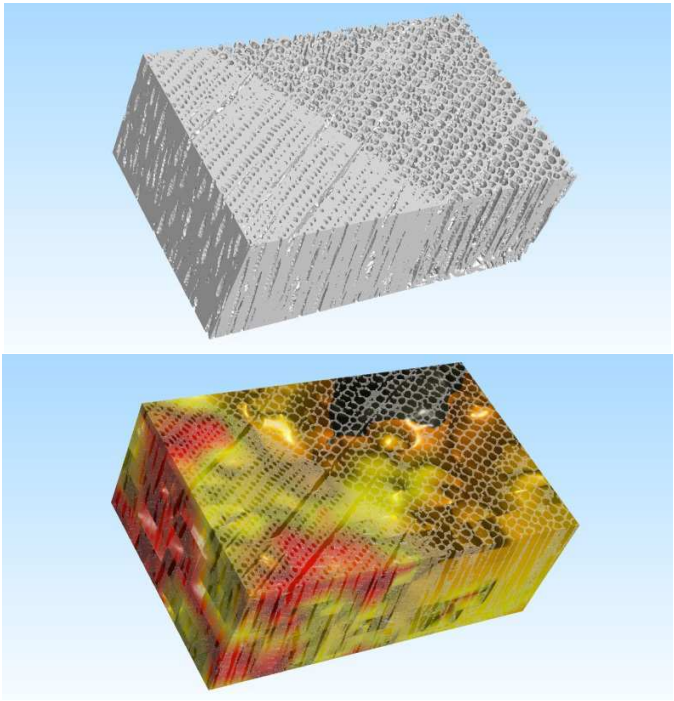

Figure 1: Digital volume correlation of a wood block before and after water absorption: colour map shows largest expansion and hence water absorption

Customer highlight:
Scanning bones

In a recent academic project, a batch of scans was done on bovine bone samples at 80 micron resolution. This works forms part of a collaborative study between UCT (RSA) and ENSAM (France) aimed at understanding mechanical strength of bone so as to improve the design of protective clothing and structure. Due to the size of sample in relation to resolution required, many samples could be scanned in one volume, reducing the total time and hence cost. Approximately 80 samples could be scanned at a time, in less than 30 minutes (excluding setup and reconstruction time). Total job time was 16 hours for approx. 320 samples, including cropping each sample into a separate volume. This totals approx. R27.50 per sample, so please stop saying CT scanning is expensive! (This excludes VAT and 7% admin fee.)

More information:

http://blogs.sun.ac.za/ctscanner/2014/03/24/scanning-bones/

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Special offers

Student training workshop: the next training workshop is on the 9th of April and will focus on BASICS AND PRACTICAL CT SCANNING

This workshop covers all basic theory, examples and practical training on how X-ray imaging works, how 3D images and analysis works, how to do a CT scan and how to plan a CT scan project. Special effort is made on volume data analysis.

Cost: R1500 per student

Test scan offer: Test scans for new users are done at R1000 for a simple scan (sample 5-100 mm diameter). Test scans for commercial and private clients R2000.

We will beat any quote for microCT scan or nondestructive testing and analysis of your parts / samples.

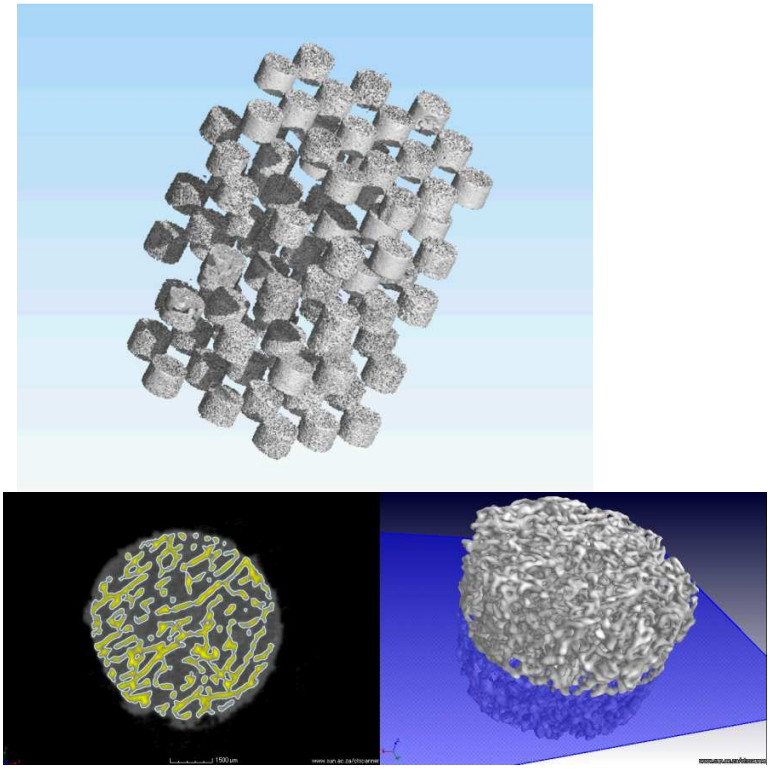

Figure 2: (top) A single scan containing approximately 80 samples and (bottom) the data from one sample with a slice image showing the surface fit on bone material.

3D movie:
http://blogs.sun.ac.za/ctscanner/files/2014/03/MOVIE1.avi

People & News

The latest addition to our team is Jakob Petren, who joins us from Sweden as an exchange student (Diplom). He is working on advanced custom analysis of CT data, aiming to reduce image artefacts for specific types of scans.

Jakob working on custom data analysis and processing

Contact Us

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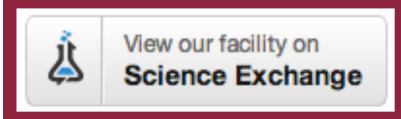


Services & Events

Latest additions to our facility:

- 3D visualization and analysis with VGStudio 2.2 additional modules including:
  - Automatic defect analysis: colour-coding voids
  - Part to CAD comparison: colour coded deviation image
  - Fibre orientation: Fibre angles colour coded
  - Wall thickness analysis: colour coded wall thickness of parts
- Proof of concept studies:
  - Not sure what technique you need?
  - Have a problem you have no idea how to solve?
  - Send it to us! We will test your samples with various locally available techniques and even advise on methods we do not offer, to best solve your problem

Events:

- For local researchers and students, a reminder of our free CAF Student Symposium tomorrow 27 March ! Program available here:

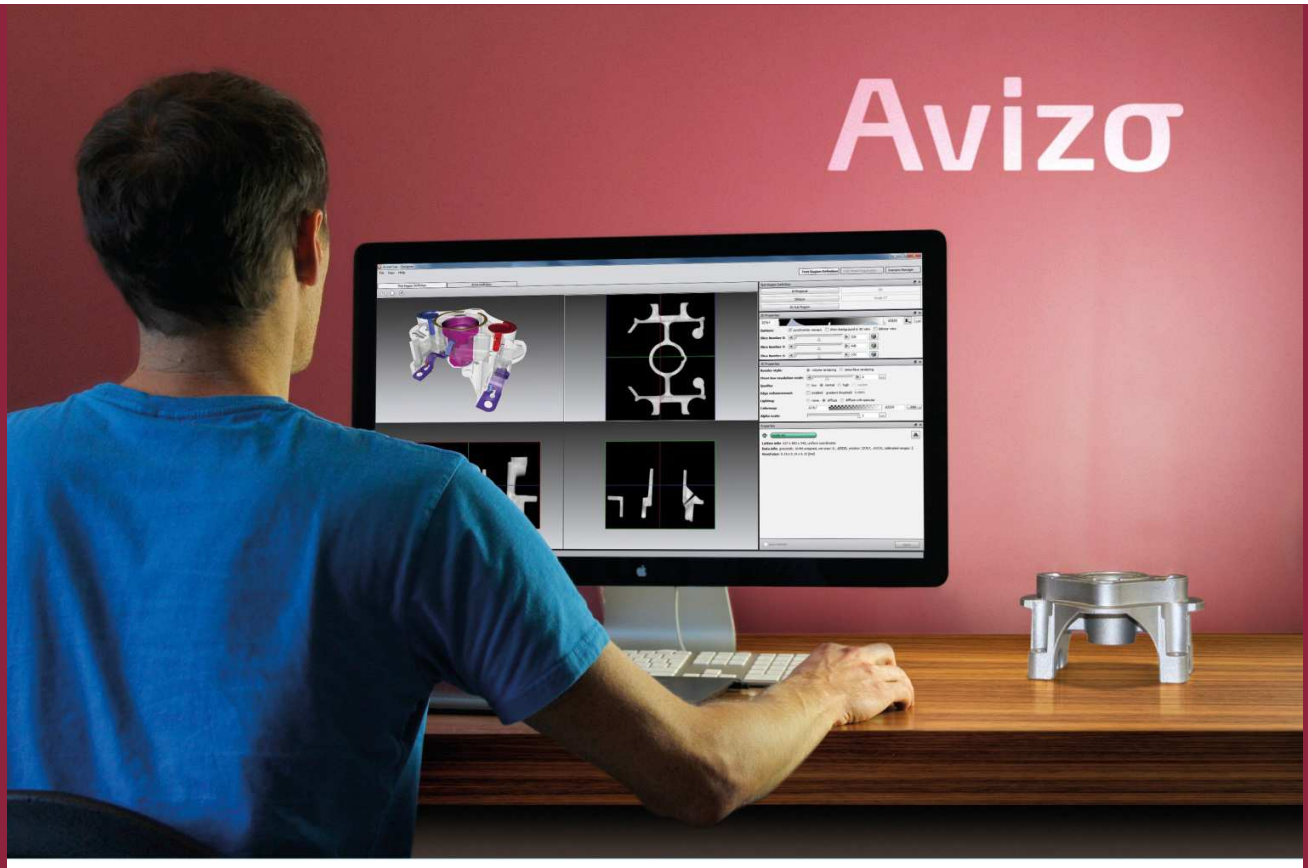
http://blogs.sun.ac.za/caf/training-and-events-2014/2014-student-symposium/

- Basics and practical CT Scanning 1-day course
  - 9 April, R1500 per student
  - Booking essential, places limited
  - Email: anton2@sun.ac.za
- CAF Mid-year training
  - 7-11 July

http://blogs.sun.ac.za/caf/training-and-events-2014/

Acknowledgements

The CT scanner equipment acquisition was made possible with grants from the National Research Foundation and Stellenbosch University. The Department of Science and Technology Internship program is also acknowledged for its support of this facility. We encourage and welcome any form of sponsorship or support in order to keep delivering the best quality.



3D visualization and analysis software for industrial inspection & NDT

Avizo® is an advanced tool for materials characterization, materials testing and analysis, rapid prototyping, reverse engineering, defect/flaw detection and analysis, quality control, CFD visualization.

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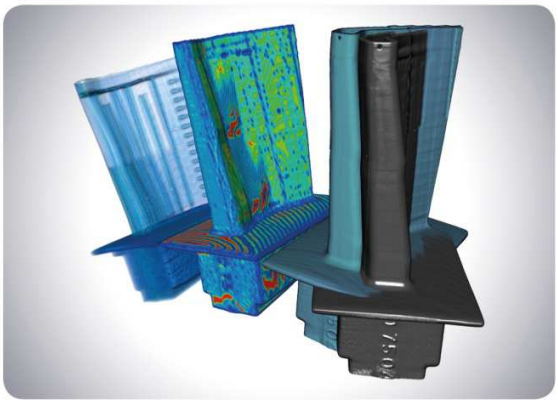
3D visualization and analysis software for industrial inspection & NDT

Avizo® provides powerful tools for visualizing and analyzing multi-modal 3D data. From defect/flaw detection and analysis, in-line inspection automation or single parts inspection, to performance and process evaluation, and materials characterization, Avizo is used in many ways throughout all the research, design and development phases of materials or products. Its 2D/3D image review software tools and workflow offer high-performance capabilities to NDT specialists across a wide range of fields – in aviation and aerospace, automotive, electronics, construction, and manufacturing.

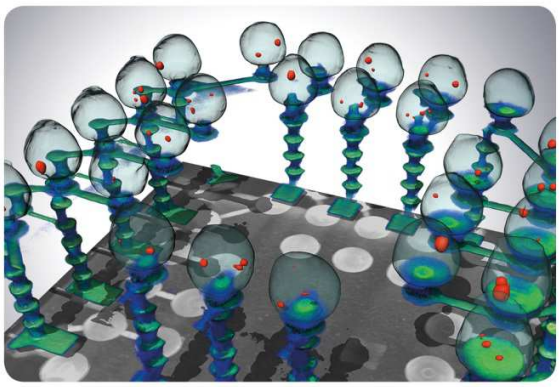
All-in-one software application. Avizo is a comprehensive, integrated software tool for material and object structures analysis. It provides all the visualization and analysis features required at each stage of your prototyping, production and control processes: 3D data exploration, segmentation, quantitative analysis, measurement, porosity study, wall thickness analysis or comparison with CAD models.

Interactive 3D visualization. Avizo allows the import and fusion of 2D and 3D image data from multiple sources, enabling direct interactive 3D visualization and exploration.

High-end interactive visualization techniques, including slicing and volume or surface rendering, provide detailed insights into material and object 3D structures at any scale.



↑ **Turbine blade.** Courtesy of GE Aviation.



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

Integrate your know-how. Avizo is much more than a ready-to-use software application. Avizo is actually an extensible 3D analysis software framework that can be customized using the built-in scripting language and can be extended by developing custom add-ons and modules, to implement specific tasks and workflows.

Cooperative expertise and development. FEI Visualization Sciences Group is your partner in creating solutions using Avizo. We can help you quickly and effectively master all of Avizo's capabilities through focused training.

Our consultants can help you analyze your specific tasks and workflows, and leverage your know-how and specific expertise to get them implemented in Avizo.

Learn more at AVIZO3D.COM

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