CT Scanner
CAF Central Analytical Facilities
STELLENBOSCH UNIVERSITY

CT NEWS

The Stellenbosch CT scanner facility newsletter

June 2014 **Volume 2, Number 4**

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Recent interesting scans (clickable links)

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http://blogs.sun.ac.za/ctscanner/2014/06/19/titanium-aerospace-investment-casting/

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http://blogs.sun.ac.za/ctscanner/2014/06/19/beer-mug-metrology/

Bullet dimensional measurement
http://blogs.sun.ac.za/ctscanner/2014/06/19/bullet/

Welcome

This newsletter is aimed at keeping in touch with our users and clients and we hope you find the examples interesting. They are also meant to make new users realize how you can use this technology for your own research or industrial applications. We will be sending these newsletters once a month from now on, so you can expect a lot more from us. Thank you for your support, & please send this newsletter on to your colleagues and friends !

Application of the month:

Titanium aerospace casting

In this work, a Titanium aerospace investment casting was analyzed by X-ray microCT. The geometry cast and evaluated was supplied by Boeing, and was supplied to CSIR as a design file. This geometry is used to benchmark titanium casting processes and suppliers against aerospace standards. Key features of interest are internal pockets, lugs, and varying thicknesses. Typical evaluations are dimensional, internal soundness, surface finish, and mechanical properties. The sample was supplied to the Stellenbosch University CT Scanner Facility for analysis. Traditional non-destructive test methods such as radiographic testing and ultrasound can be used to detect internal defects successfully, but X-ray microCT allows a more detailed view of the these defects as demonstrated in this technical note.

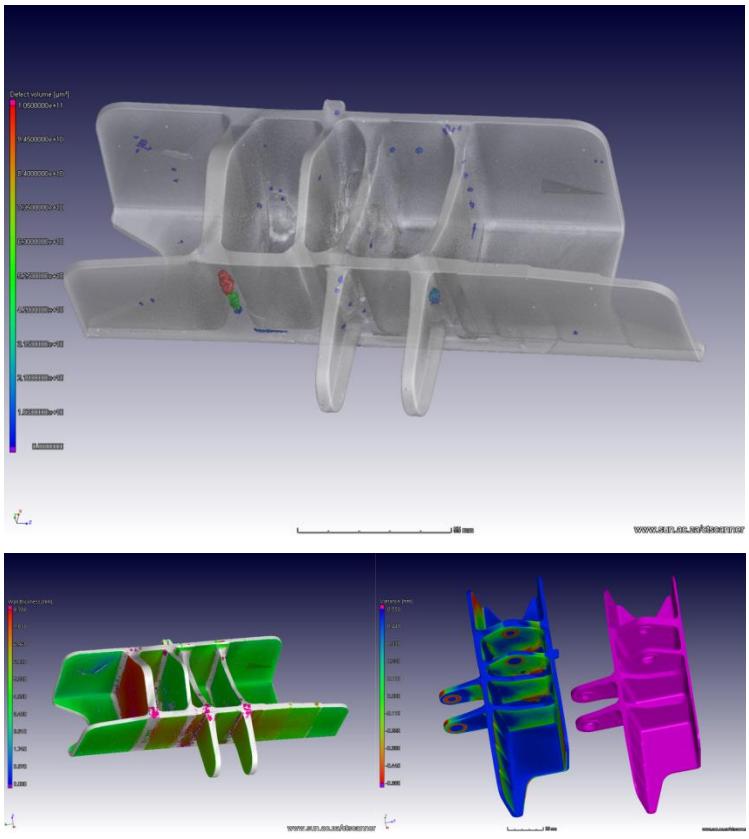

Figure 1: Advanced 3D analysis of an aerospace casting, demonstrating defect analysis (top), wall thickness analysis (left) and part-to-CAD comparison (right). Total job time including scan and analysis = 3 hrs.

More info: http://blogs.sun.ac.za/ctscanner/2014/06/19/titanium-aerospace-investment-casting/

Highlight: Beer mug metrology

A beer mug was acquired from Germany during a training visit, and it was decided to use this as an example for dimensional measurement or metrology using X-ray CT. The simple process employs best-fit planes and cylinders in this case to determine the height and diameter of the mug, though any distances or angles could be determined in principle. In this case a plane was fit to the indicated level of 500 ml, and the internal volume measured using a volume analysis tool, as 500.45 ml. We congratulate our German beer mug manufacturers on this accuracy and feel the beer was worth the money.

More information:

http://blogs.sun.ac.za/ctscanner/2014/06/19/beer-mug-metrology/

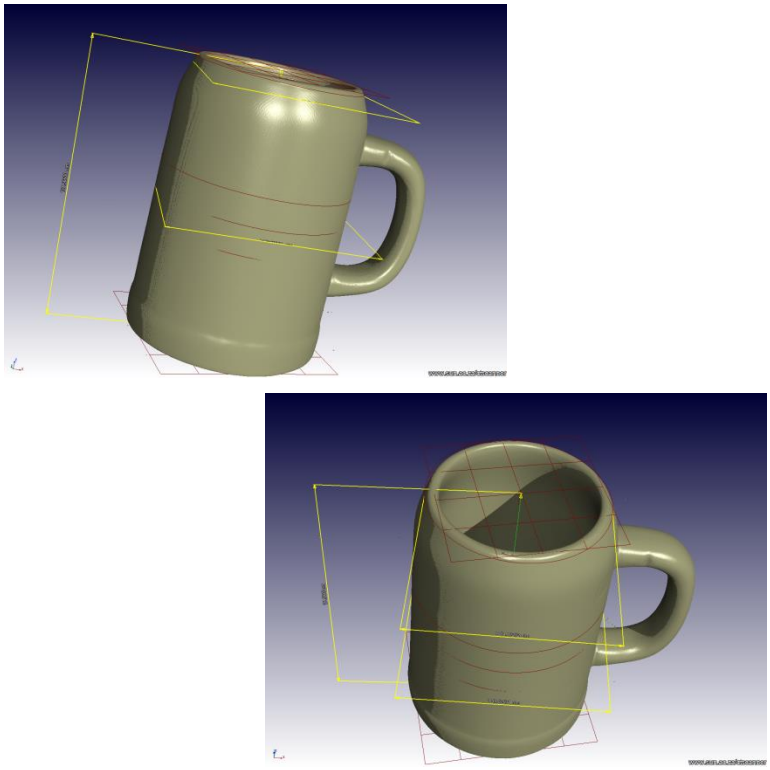

Figure 2: Dimensional measurements of a German beer mug, using best-fit cylinders and planes, rather than individual points.

Special offers

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

We now offer slice-by-slice manual segmentation of your CT data sets (from any facility).

People: Anton & Stephan visiting Germany

Anton & Stephan visited Germany early in June for advanced training in 3D data analysis using Volume Graphics VGStudioMax 2.2 (all modules). As you might have seen in the highlight example above, many additional analysis capabilities have been acquired, which will translate into faster, more efficient and more advanced analysis possible in shorter times for you, our clients and users.

Figure 3: Anton and Stephan doing exhausting training in Germany

Contact Us

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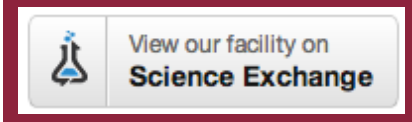

Acknowledgements

The CT scanner equipment acquisitions were 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.

To subscribe or unsubscribe from this mailing list, please send an email with the subject line "subscribe" or "unsubscribe" to anton2@sun.ac.za

Services and Events

Submicron CT Scanner workshop and launch - 15 September 2014

Coupled to this, an NIR training event with international presenters, is planned. Details to follow.

Job ADVERT: Our colleagues at the Wits CT scanner facility need an operator, see the job ad here: https://www.linkedin.com/jobs2/view/16328409

Please support our advertiser, Zeiss South Africa. For more information:

http://www.zeiss.com/xrm

Local representative: Veno.naidoo@zeiss.com

- ZEISS XRM for mining solutions
- ZEISS introduces new breed of imaging solutions into QA/QC for education and industry
- Visit us at the IMA conference during 1 – 5 September 2014 and view some of these products

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ZEISS XRM for mining solutions

Mineral Processing with 3D X-ray Microscopy

3D X-ray Microscopes (XRM) enable rapid 3D characterization of ores for geometallurgical composition during exploration, inspection of plant feeds in comminution and flotation circuits, and ore characterizaton for exploration in addition to liberation analysis of precious metals in tailing and heap leaching operations.

Unique advantages of XRM in mineral processing include:

- Rapid 3D mineralogy and liberation analysis
- Minimal sample preparation
- Large volume statistics for high resolution characterization of tailings (PGMs, Au, Ag, Cu)
- Dual energy for mineralogical distinction between common mineral pairs such as chalcopyrite and magnetite or galena and platinum
- Particle damage assessment during comminution for assessment of high pressure grinding rollers (HPGR)
- Non-destructive measurements of grain dissolution over time during heap leaching
- Coal washability analysis
- Correlate to SEM-based mineral analysis

Link: **http://pages.microscopy.zeiss.com/ZEISS-South-Africa-Newsletter-Mining-Whitepaper-Registration.html**

ZEISS introduces new breed of imaging solutions into QAQC and education

Primotech

Quick and reproducible analysis in both the routine and educational setting

In routine applications, you can quickly and reproducibly analyze your products within the production process, in an educational setting, **Primotech** and the iPad imaging app **Matscope** transform classical learning environments into digital classrooms.

The encoded nosepiece turret, which is unparalleled in this class of devices, automatically recognizes the attached objective and adjusts the indicated scalings in the image, reducing sources of error.

Smartzoom 5

A complete, digital, automated solution for industry

The ZEISS **Smart Zoom 5** combines smart workflow with intelligent design to delivery fast, reliable analysis for the QA/QC industries.

It combines automation with motorization and factory calibrated components to deliver a robust plug-and-play solution in a self-aware digital microscope designed for production environments.

Visit us at the 21st International Mineralogical Association Meeting

Sandton Convention Centre,
South Africa September 1st – 5th 2014
(Booth #63)
www.ima2014.co.za

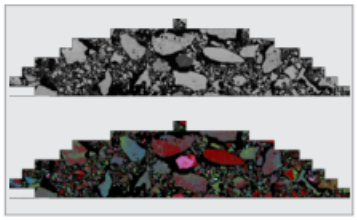
The IMA 2014 meeting in Sandton, Johannesburg is fast approaching and as always, ZEISS is supporting this important technical event.

ZEISS will be holding a Lunch & Learn workshop during the meeting to highlight the latest developments in our mining solutions portfolio.

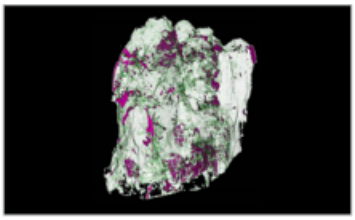
The Lunch & Learn will consist of 3 short talks discussing the latest developments in process mineralogy from both the 2D and 3D perspectives and lunch with be provided for all participants. Talks will be given by both ZEISS mineralogists and independent users of our solutions. The preliminary title of the talks will be:

- **Mineralogic Mining: A Quantitative EDS Based Automated Mineralogy Solution**
- **Mixed Spectral Signature (Boundary Phase) Resolution with ZEISS Mineralogic**
- **Comminution Studies - 3D X-ray Assessment of Cracks and Damage after Crushing**

Invitations to this lunchtime meeting are on a first come, first serve basis and spaces are limited.
We will send out a registration link nearer the time so be sure to register promptly when you receive it.



Relic Hematite reacting with flux to form Calcium Ferrite/Acicular SFCA



Comminution Studies -3D X-ray assessment of cracks and damage after crushing

*Click to find out more about **ZEISS Xradia Versa XRM** and **ZEISS SIGMA HD FE-SEM***

If you would like us to get in contact with you, please click **here**.

Carl Zeiss Microscopy

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