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## Recent interesting scans (clickable links)

### Human skull

<http://blogs.sun.ac.za/ctscanner/2014/05/11/skull/>

### Fibre orientation analysis

<http://blogs.sun.ac.za/ctscanner/2014/05/19/fibre-orientation-analysis/>

### Abalone shell with coral

<http://blogs.sun.ac.za/ctscanner/2014/05/19/abalone-shell/>

### Rock porosity

<http://blogs.sun.ac.za/ctscanner/2014/05/19/rock-porosity/>

### Nondestructive testing of solder connections

<http://blogs.sun.ac.za/ctscanner/2014/05/19/nondestructive-analysis-of-solder-joints/>

## Application of the month:

## Fibre orientation analysis

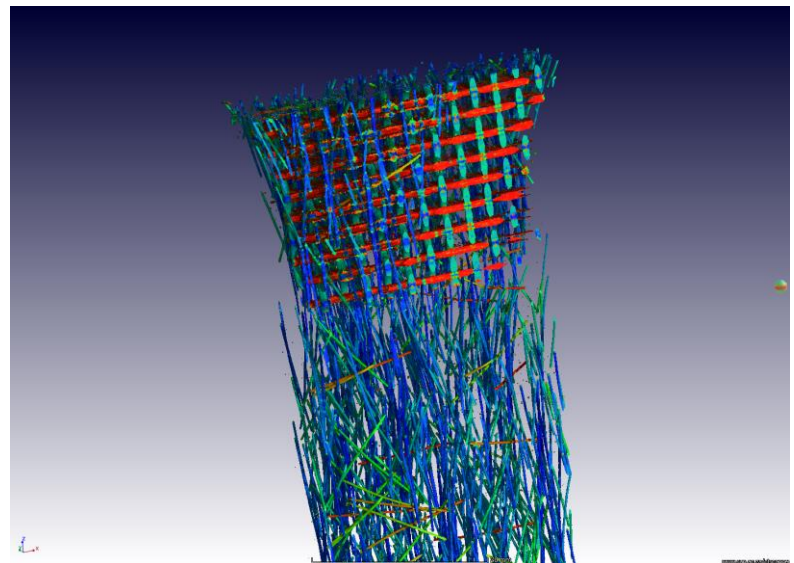
Metal fibres (wires) and mesh are often used to reinforce concrete structures, but the angles of these fibres and their separation can affect the strength of the structure, hence full 3D analysis of the fibre orientation can be very useful in understanding material performance. This example shows colour coding for 3D angle orientation, ie. the red fibres are all in a horizontal plane (both left-right and into the plane of the image), while blue is vertical, see the colour-sphere to the right of the image. This kind of analysis is possible in any scan where the fibres can be clearly visualized and separated from the rest of the material.

## Welcome

In this edition of the newsletter we introduce you to our new analyst, our new equipment and new available facilities. The application of the month shows the analysis of fibre orientations in 3D, and the customer highlight shows how pomegranates can be analyzed nondestructively by microCT.

Other recent examples that can be seen by clicking the links to our website (see left margin) are an abalone shell with coral on top, porosity of a rock fragment, a human skull and testing of solder connections inside large components.

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 please send this newsletter on to your colleagues and friends!



**Figure 1: 3D fibre angle analysis of metal fibres and mesh in concrete (concrete has been removed for clear image)**

## Publication highlight: *Pomegranates*

The nondestructive analysis of Pomegranate fruits was demonstrated with microCT scans in a recent project by Dr Lembe Magwaza and Prof Linus Opara. Lembe completed his PhD recently on non-destructive measurement and prediction of citrus fruit quality and is now a Lecturer at the University of KwaZulu-Natal where he is continuing his research on non-invasive detection and quantification of fruit quality. The ability to visualize the internal features without physical sectioning holds some advantages such as being able to virtually see cut-views from all angles rather than just one or two. Volume measurements can also be made quantitatively of different internal components. Read the paper and see more images at the link below.

### More information:

<http://www.sciencedirect.com/science/article/pii/S0925521414000957>

### Special offers

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

### Contact Us

<http://www.sun.ac.za/ctscanner>

Staff scientist – Anton du Plessis, PhD

[anton2@sun.ac.za](mailto:anton2@sun.ac.za)

Analyst – Stephan le Roux, MSc

[lerouxsg@sun.ac.za](mailto:lerouxsg@sun.ac.za)

021 808 9389

### Physical address for sample deliveries:

CT Scanner Facility, Room 1046

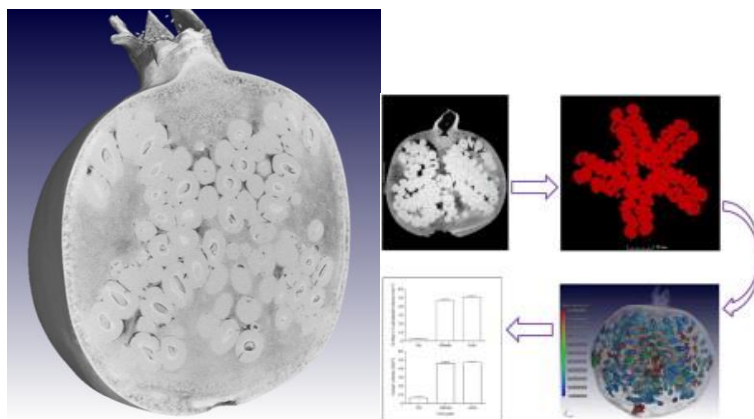
PO Sauer building - Dept Forestry and Wood Science

Bosman Street, Stellenbosch

7602



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**Figure 2: Virtually cutting open a pomegranate fruit for nondestructive analysis.**

## People: Introducing Stephan

Stephan le Roux has been appointed full time Analyst in the CT Scanner Facility since April 2014. Many of you will already have met him during his 1-year internship at the facility. Besides his experience at our facility, he comes with a pedigree: he holds an MSc in environmental geochemistry, and hence has experience in the geosciences as well as in the use of various analytical tools.

Though his main interest is to assist users of the facility and keep the facility running optimally, he also works on a project involving the development of microCT to geological ore grading, for his PhD (part time).

Please feel free to contact Stephan directly for CT Scan services, or for advice specifically in the analysis of rocks, soils and sediments. [LeRouxSG@sun.ac.za](mailto:LeRouxSG@sun.ac.za) or 021 808 9389



**Stephan in the new High Performance Analysis Centre**

## Services & Events

Save the date:

**Submicron CT Scanner workshop and launch – 15 September 2014**

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

### Events:

- CAF Mid-year training:
  - 7 July CT Training
  - 11 July NIR training

<http://academic.sun.ac.za/saf/training.html>

Applications close this Friday

Training is free for students!

## 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.

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## Introducing NEW facilities

### 1. Submicron CT Scanner

A **General Electric Phoenix Nanotom-S** was ordered as part of our NRF/NEP grant to extend our X-ray CT facility into the submicron resolution regime. This grant was obtained by Prof Marena Manley in close collaboration with dr Anton du Plessis of the CT Scanner unit, CAF. Prof Manley uses NIR spectroscopy and hyperspectral imaging as well as X-ray imaging, to investigate food products nondestructively. The new submicron CT scanner allows CT scans to be done at resolutions down to **500 nm**, and includes a sample stage for sample heating and cooling, as well as tension and compression. It also comes with a 3 year maintenance contract including all consumables. This will allow us to keep our prices low (same as the current system), making it accessible for more researchers. We thank all our co-users and supporters who supported this grant application, and we welcome everyone to a special 1-day workshop and launch on **15 September 2014 – save the date!**

### 2. High Performance Analysis Centre

The first CAF High Performance Centre is operational! We offer full time access to **3 dedicated analysis workstations** with multiple CPUs and 64 – 128 Gb RAM each, for advanced analysis. This is mainly for CT data analysis and we offer both VGStudioMax 2.2 and Avizo Fire 8.0 for our clients, but other software packages can also be installed, so please enquire about this. Access fees will be charged, which include an intern or analyst always on hand, as well as after-hours access possible. Access fees will be charged on annual, monthly or daily rates. **Existing clients can finish their current analyses at no charge.** Special rates for the rest of 2014 are: R7 500 until end December 2014, R2500 per month, or R500 per day. Commercial rates are double, and all clients that spend more than R25 000 in the year at our facility can use the analysis facility free of charge.

<http://blogs.sun.ac.za/ctscanner/hpac/>

### 3. Spectroscopy Lab

In collaboration with Narich and Ocean Optics (see [www.narich.co.za](http://www.narich.co.za)), we now offer the ability to do NIR spectroscopy using the NIRQuest spectrometer from 900-2500 nm. This is coupled to chemometric software (GRAMS). In addition to this we also offer the more standard UV-Vis absorption spectroscopy using the Ocean Optics USB4000+ from 300 – 900 nm. We also still offer X-ray spectroscopy using the Niton handheld analyzer. We gratefully acknowledge support from Attie Esterhuysen ([www.us-tech.co.za](http://www.us-tech.co.za)) for local support for the Niton and a recent calibration upgrade for rare earth elements and Tantalum. For more information please see

<http://blogs.sun.ac.za/ctscanner/spectroscopy/>

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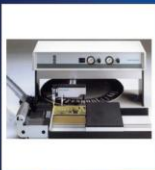
HAND SOLDERING



WAVESOLDERING



MANUAL PICK & PLACE



LASER MARKING/WELDING



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SCREEN PRINTERS AND CONSUMABLES



LABELS



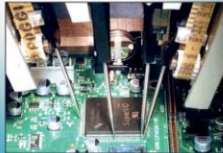
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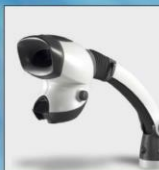
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Contact Zetech on  
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