CT Scanner CAF Central Analytical Facilities STELLENBOSCH UNIVERSITY

CT NEWS

The Stellenbosch CT scanner facility newsletter

"more than just a scan"

April 2015

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Recent interesting scans (clickable links)

Sneak preview of next month's feature: a medical implant
http://blogs.sun.ac.za/ctscanner/medical-implant/

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Previous newsletters with many more examples
http://blogs.sun.ac.za/ctscanner/introduction/

3D printing examples and services
http://blogs.sun.ac.za/idea2product

Micro CT of maize kernels

Maize is a staple food in South Africa and in Africa. One of the factors affecting the milling quality and efficiency is the maize hardness – in this study MicroCT was used to investigate hardness in maize kernels using full 3D information as well as a density calibration. This work also includes the first published image from our newly installed nanoCT scanner, which is particularly well suited to small samples like maize kernels and similar small biological samples. See more images here:

http://blogs.sun.ac.za/ctscanner/maize-kernel-analysis/

Read the full publication here:

http://link.springer.com/article/10.1007%2Fs11947-015-1502-3

Welcome

Welcome to our April newsletter. As always we want to share what we can do for you. In this newsletter we focus on **spectroscopy**.

Our spectroscopy lab offers easy to use instruments for students, but also useful for industrial applications. We have instruments that are simple and fast, nondestructive, and allow the analysis of materials using the techniques: Near Infrared (NIR), Raman and UV/Vis spectroscopy. All these instruments are portable making them suitable for field studies.

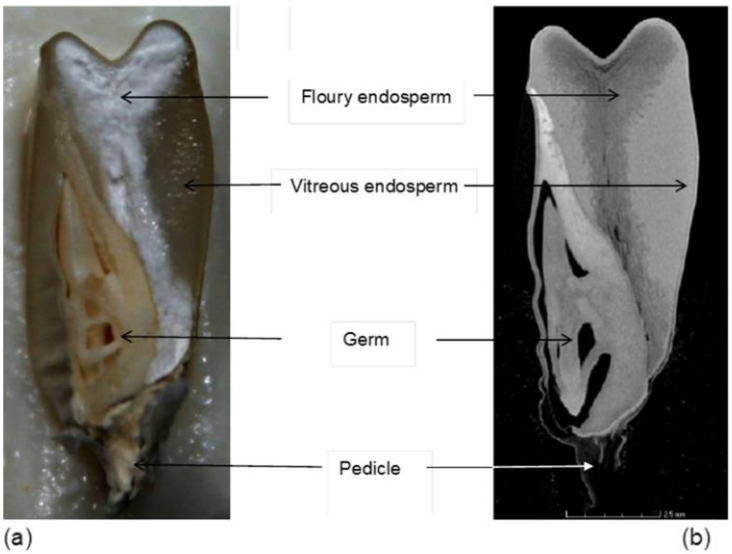

Figure 1: MicroCT of a maize kernel (corn): (a) digital photograph of cut sample and (b) nondestructive CT Slice image

Spectroscopy lab

Spectroscopy is the study of the interaction between matter and electromagnetic radiation. In its simplest form a spectrometer splits light into its component wavelengths and measures each component. Thanks to a variety of small, easy to use spectrometers of different varieties we can help you to measure anything from NIR spectra of honey, to Raman spectra of polymers, to UV/Vis spectra of paint coatings, etc.

The combination of X-ray CT imaging in 3D with spectroscopy allows a whole new dimension of materials investigations as shown in Figure 2, where a coffee cup CT scan showed very dense composition on the surface paint layer. Subsequent spectroscopy analysis confirmed high lead concentrations.

Besides materials investigations, you can also characterize light sources using spectrometers. This is called photometry and in the simplest case we offer the handheld portable Jaz spectrophotometer.

Dr Anina Guelpa (Figure 3) received her PhD recently and is now a post-doc at the CT Facility and at Food Science. She is an expert in NIR spectroscopy and its combination with X-ray CT.

News & events

There are some important events upcoming, please join us for these:

- **TRAINING:** Advanced 3D image analysis 3-day workshop on 20-22 May. Spots are limited, book now. R3000 pp. This includes all 3 days, course notes and superior 3D analysis skills. Only 4 spots remaining, book now.
- **2nd national microCT conference IMGRAD** (imaging with radiation): 10-11 September, first announcement: http://blogs.sun.ac.za/ctscanner/imgrad2015/
  The first 10 abstracts submitted get free registration, so hurry.

Figure 2: Measuring lead in paint on the surface of a coffee cup: the red colour in the CT image (right) corresponds to 1-2 % lead concentration confirmed by spectroscopic analysis post-CT. This work is in progress.

Figure 3: Dr Anina Guelpa is now a post doc at the CT Facility and Food Science.

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