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● Welcome

This third issue will focus on the scanner settings and the analysis of a live mouse lung. We will discuss the different synchronization strategies and how this can overcome movement artifacts. In the method note we explain in detail how custom processing can be applied to successfully analyze the lung volumes at different stages of the breathing cycle.

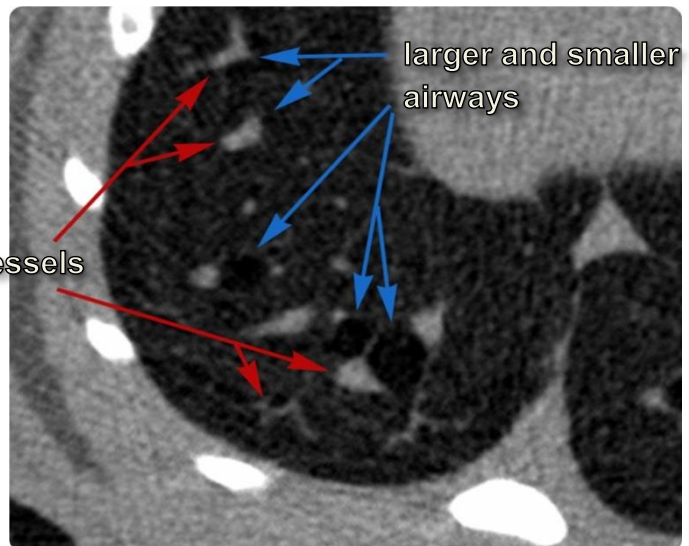
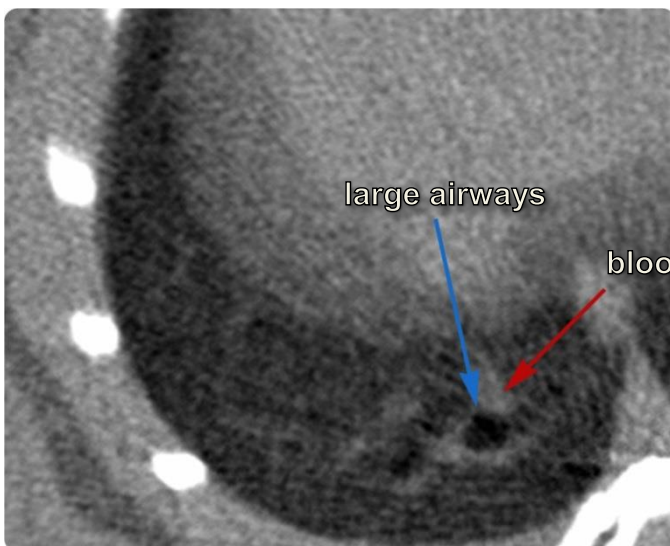
We organize on a regular basis 5-day User Training courses at Bruker microCT headquarter, Kontich, Belgium. We invite you to check the course program at: <http://www.bruker-microct.com/company/training.htm>

● Gated Lung Imaging and Analysis

Keeping the object stable during the scan is one of the crucial requirements to obtain images without movement artifacts. However, when scanning the chest area of live animals this is of course not possible. In order to compensate for movement artifacts using synchronization strategies, care must be taken to optimize the anesthesia, resulting in a continuous breathing pattern throughout the scan.

Synchronizing image acquisition with breathing movement can be done in two ways: pro-spective and retro-spective synchronization. Both types of synchronization are possible with the SkyScan in vivo scanners. When aiming for the optimal image quality, a pro-spective synchronized scan, combined with intubating the animals and ventilating them using a small animal ventilator will result in optimal stability of the chest during image acquisition. Although this will result in the best image quality, it is also an invasive and time consuming procedure.

As an alternative, retro-spective synchronization can be applied. This synchronization strategy acquires multiple projection images at every rotation step. In addition, a time stamp of both the breathing pattern and the image acquisition is logged, allowing a post-scan sorting of the images into a number of bins in which the breathing cycle is divided. The advantage of the retro-spective synchronization is that it compensates for irregular breathing patterns throughout the scan. The output is a 4-dimensional dataset: 3D at multiple phases of the breathing pattern, allowing functional analysis of lung parameters such as tidal volume, and functional residual capacity. The method note "[MN005 Lung analysis in vivo after synchronized scanning](#)" describes in detail the scanning parameters, the sorting of the data into the different phases of the breathing cycle and a step by step analysis of the datasets resulting in the quantitative result of the air volume in the lungs at different phases of the breathing cycle.



Cross-section through the mouse thorax of a mouse scanned without (left) and with (right) pro-spective synchronization using a SkyScan1076, pixel size 35 μ m.

● Bruker micro-CT News

Last week we held our annual microCT User Meeting in Ostend, Belgium. With over 90 users participating from 23 different countries, and more than 60 scientific contributions, this event turned out to be a great success. We sincerely thank all the authors for submitting their scientific abstracts! The beautiful location in the historical royal Thermae Palace at the Belgian coast combined with the nice weather allowed for the perfect networking opportunity! All abstracts can be freely downloaded from our website at:

<http://www.bruker-microct.com/company/usersmeeting2014a.htm>

Winners of the year:

- Best oral presentation: Gregory Pyka, KULeuven, Belgium, "Evaluation of Credibility and Limitations of the Non-Rigid Registration of Micro-CT Images as a Tool for Local Strain Analysis"
- Best poster: Bartosz Leszczynski, Jagellonian University, Poland, "3D visualization of the air within macerated human temporal bone"
- Best movie: Javier Alba-Tercedor, University of Granada, Spain, "Anatomy (Head) of the Glassy-Winged Sharpshooter"
- Best picture: María Candás, Universidade de Santiago de Compostela, Spain, "Doris"

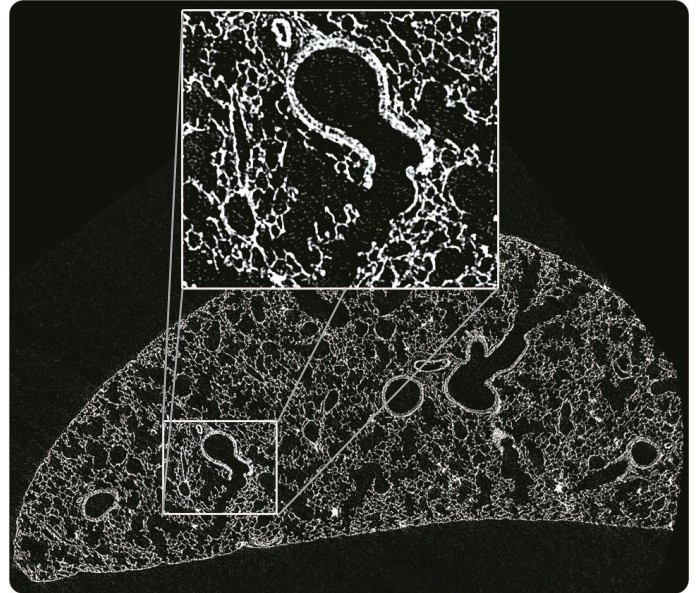
We hope to welcome you once again next year!

2014 Micro-CT User Meeting

Click the image for downloading the full-size format.



● Image of the Month



Cross-section through mouse lung; SkyScan1172, 1µm pixel size + insert to show details

● Upcoming Events

Bruker microCT will participate with an exhibit in the forthcoming conferences. Please click the link below for more information. We hope to see you there!

- [ATS](#) May 16-21, San Diego, USA
- [ECTS](#) May 17-20, Prague, Czech Rep.
- [INTERPORE](#) May 27-30, Milwaukee, USA
- [ESMI conference](#) June 4-6, Antwerp, Belgium
- [TERMIS EU](#) June 10-13, Genova, Italy
- [BRS](#) June 25-26, Sheffield, UK
- [3D Materials Science](#) June 29-July 2, Annecy, France