BRUKER MICRO-CT ACADEMY

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In this issue:

Welcome

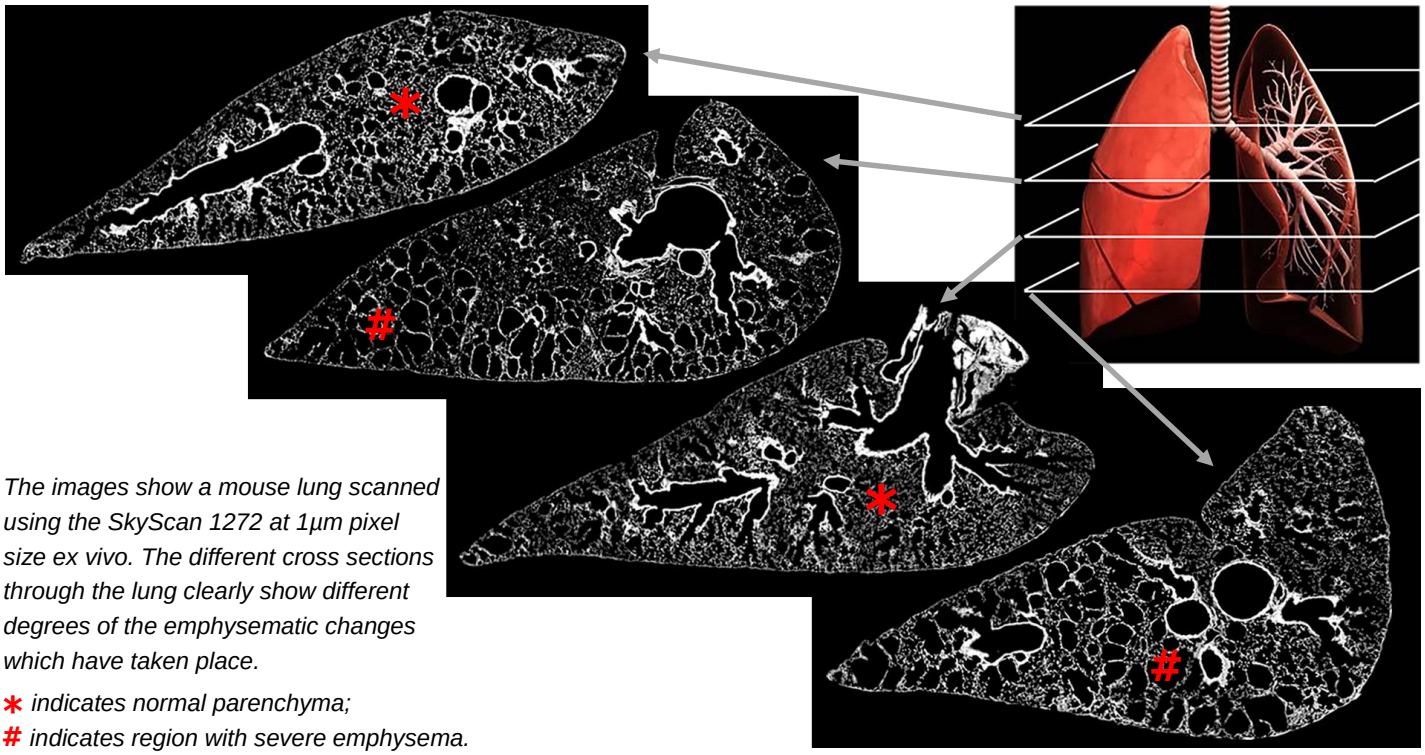
Welcome to the November edition of the Bruker microCT Academy newsletter. In this issue we will take a deep dive in the analysis of lung morphology using high resolution microCT. The dates for the **User Meeting in 2017** are fixed! We warmly invite you to join us in the heart of Brussels from June 12 till 15!

Analysing high resolution lung microCT datasets

Historically researchers apply time consuming step serial sectioning and subsequent staining and imaging using light microscopy to analyse the lung morphometry. The data obtained using histology is limited to 2D and, as the pathology is often patchy, the results can be biased and incomplete due to heterogeneous pathological phenotypes. Obtaining an overall status of the entire lung is crucial for reliable and complete data. For instance, when screening the lung for metastasis: these can easily be missed when only a few cross sections are made.

High resolution microCT images provide reliable and full 3D data on which the morphometric analysis can be done.

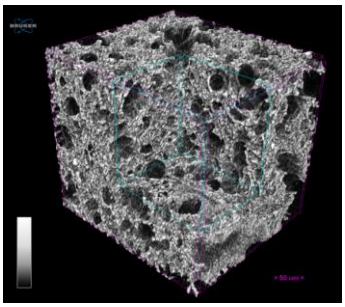
In the method note "*MN096_Analysing high resolution lung microCT datasets*" a detailed step by step protocol describes how to perform structural analysis of the lung. SkyScan software CTAn allows the automatic 3D structure thickness and structure separation analysis from high resolution scans. Structure thickness provides an insight in the distribution of the wall thickness of the airways and / or vasculature of the lungs. In addition, structure separation results in an output of the distribution of the airway diameters, similar as the mean chord length used in histo-pathological analysis. Both types of analysis also allow the possibility to visualize the results in 3D using the SkyScan CTVox volume rendering software.



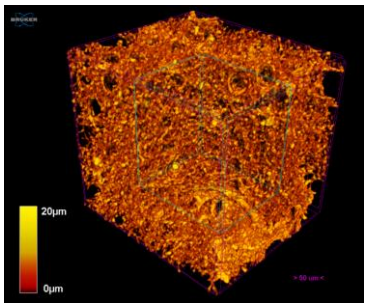
The images show a mouse lung scanned using the SkyScan 1272 at 1µm pixel size ex vivo. The different cross sections through the lung clearly show different degrees of the emphysematic changes which have taken place.

* *indicates normal parenchyma;*
\# *indicates region with severe emphysema.*

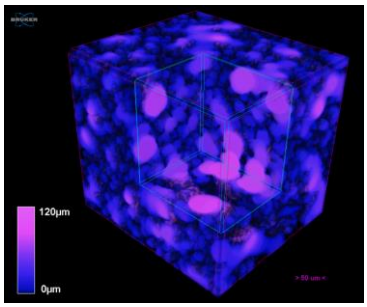
The 3D volume rendering representation of mouse lung parenchyma with a virtual box cut, scanned with SkyScan 1272:



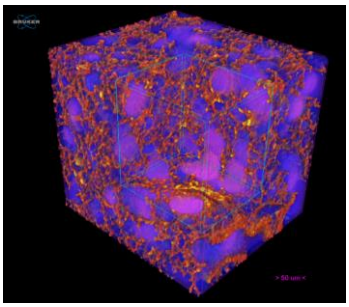
Grey scale 3D volume rendering image, where the grey scale reflects the density of the structure.



Color-coded structure thickness distribution ranging from 0- 20µm diameter, representing the thickness of alveolar membranes.



Color-coded structure separation distribution ranging from 0-120µm diameter, representing the diameters of the airways.



Overlay of structure thickness and structure separation. Note the complementary overlap in 3D of both structure and airways.

Bruker microCT news

Reserve the dates! Our annual **microCT User Meeting** will be held in the center of Brussels, from June 12 till 15! More information will be available shortly through our website.

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!

2016:

IASLC	Dec. 04 – 07	Vienna, Austria
Zoology	Dec. 16 – 17	Antwerp, Belgium

2017:

iCT	Feb. 07 – 09	Leuven, Belgium
ORS	Mar. 19 – 22	San Diego, USA
IADR	Mar. 22 – 25	San Francisco, USA
AACR	Apr. 01 – 05	Washington DC, USA
EMIM	Apr. 05 – 07	Cologne, Germany
Interpore	May 08 – 11	Rotterdam, The Netherlands
ECTS	May 13 – 16	Salzburg, Austria

Image of the month

3 orthogonal reconstructed slices through a mouse femoral bone scanned ex vivo at the SkyScan 1276 in vivo microCT at 2.8µm pixel size. The top right image represents a pseudo-coloured volume rendered 3D model virtually cut along the long axis.