

## X-RAY MICROCOMPUTED TOMOGRAPHY

# X4 POSEIDON – Fruit fly

### Innovation with Integrity

The fruit fly, *Drosophila Melanogaster*, is extensively used in biomedical research due to its genetic simplicity and rapid life cycle. These small insects can be used to study gene function, genetic mutations, and developmental processes. Their genetic makeup is well known and surprisingly close to the human genome. This makes them valuable for understanding diseases, including neurodegenerative disorders like Alzheimer's and Parkinson's. Additionally, fruit flies are used to test the effects of drugs and to study the genetic basis of behaviour.

MicroCT is a powerful tool that can help in multiple aspects of the forementioned research. It is non-destructive and can achieve high resolution 3D images, creating the ability to visualise internal structures without damaging the sample. This underlines the X4 POSEIDON benchtop microCT as a valuable asset to any research on fruit flies, next to light, confocal and electron microscopy.

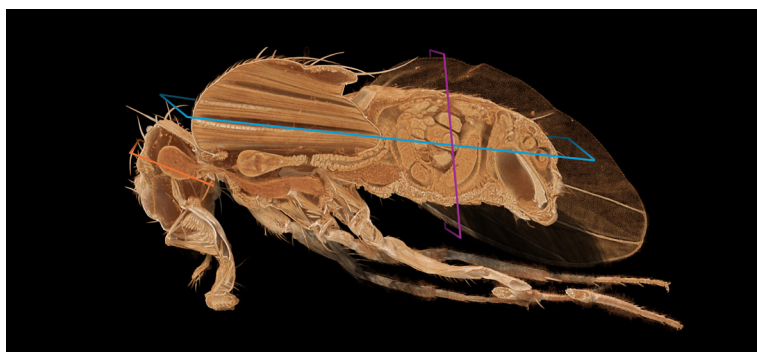
The top image shows a pseudo-coloured 3D volume rendering of two chemically dried fruit flies scanned at 2  $\mu\text{m}$  voxel size. It visualizes a wild type (WT; right) with normal compound eyes, and a genetically altered (Bar mutant (B1); left) with heart shaped compound eyes.

### Scan parameters

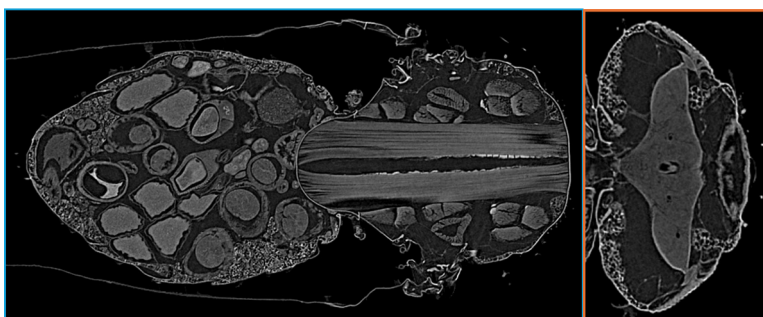
- Detector: 16 MP sCMOS
- Voxel size:  
2  $\mu\text{m}$  (2x2 binning mode)  
0.9  $\mu\text{m}$  (1x1 binning mode)
- Source: Transmission type
- Source settings:  
40 keV, 6 W (2  $\mu\text{m}$  scan)  
40 keV, 3.2 W (0.9  $\mu\text{m}$  scan)
- Filter: No filter
- Rotation step:  
0.3° over 360° (2  $\mu\text{m}$  scan)  
0.2 ° over 360° (0.9  $\mu\text{m}$  scan)
- Scan time:  
1 hour, 6 minutes (2  $\mu\text{m}$  scan)  
7 hours, 36 minutes (0.9  $\mu\text{m}$  scan)

Experience impressive quality acquisitions with the high-performance sCMOS detector of X4 POSEIDON, revealing the intricate and remarkable details of the fruit fly.

Whether this machine is used for high throughput screening or high resolution, it can showcase the brain, wings and their attachment to the thorax, compound eyes, muscles, digestive system, reproductive system, and so much more (Figures 1-3).



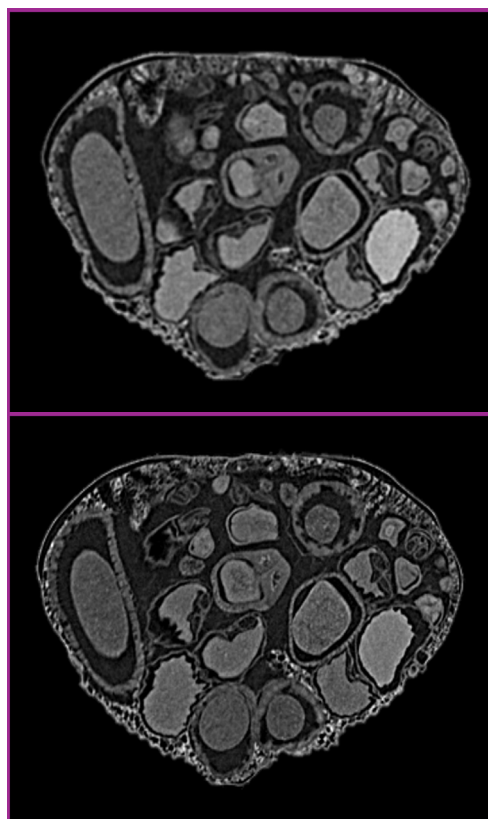
**Figure 1:** Volume rendered image of a chemically dried fruit fly, imaged at 0.9  $\mu\text{m}$  voxel size. The coloured sections show the cuts of the planar images in figures 2 and 3.



**Figure 2:** Reconstructed cross-sections of the thorax and abdomen (left) and head (right) of a chemically dried fruit fly, acquired at 0.9  $\mu\text{m}$  voxel size.

The X4 POSEIDON delivers outstanding results tailored to your research requirements, which is shown in figure 3. The fast acquisition at 2  $\mu\text{m}$  voxel size can be used for throughput screening and visualizing of the overall anatomical structures. Longer acquisition and a smaller voxel size of 0.9  $\mu\text{m}$  allows for higher resolution, resolving finer details.

The Bruker 3DxSUITE software package includes all the necessary tools for acquisition, image processing and analysis, allowing the study of this interesting creature.



**Figure 3:** Reconstructed cross-sections of the abdomen of a chemically dried fruit fly at 2  $\mu\text{m}$  voxel size (top) and 0.9  $\mu\text{m}$  voxel size (bottom).

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