

Micro X-Ray Computed Tomography

Small Animal Imaging and Nondestructive Testing

An x-ray micro-computer tomography (micro-CT) system (named MicroCAT™) was developed at ORNL to improve the ability of biologists to study the anatomy of mice without having to sacrifice the animals. Mutagenized mice can be screened for internal anatomic phenotypes using this micro-CT technology. This system can scan small animals at resolutions as high as 18 microns. The image on the upper right shows a surface rendering of a segmented micro-CT data set from a laboratory mouse scan. With proper administration of x-ray contrast agents organs such as brain, lungs, spleen, liver, kidneys, and colon are visible. The images on the lower right show high-resolution bone CT scans of an excised rat spine. This technology opens the door for biologists to study the anatomic effects of disease and to measure the effectiveness of new drug therapies for treating conditions involving obesity, cancer, osteoporosis, and arthritis, just to name a few examples.

The success of this development effort put ESTD in position to compete for and win two follow-on small animal imaging projects funded by DOE and NIH that both employ the existing MicroCAT technology and extend ESTD's medical imaging capabilities to a nuclear modality: single-photon emission computed tomography (SPECT) which allows monitoring of physiologic processes within the animal.

Capabilities and Tools

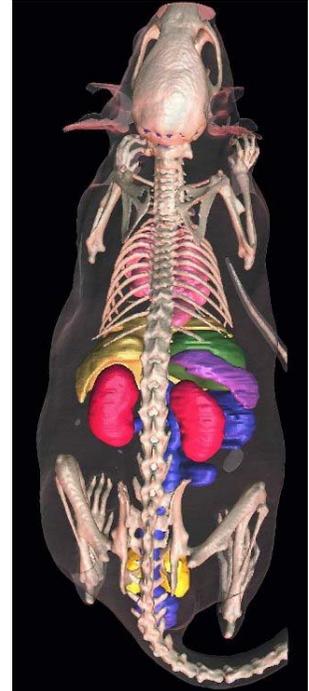
- Small Animal CT Imaging
- Advanced Tomographic Reconstruction
- Small-specimen Non-destructive Testing



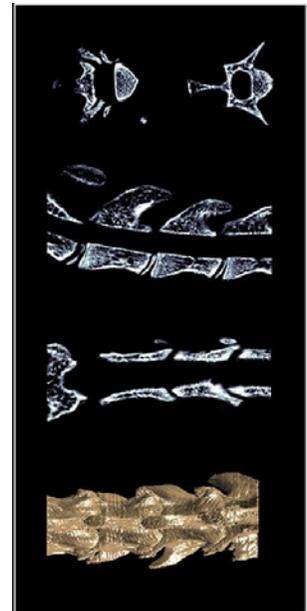
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Rendering of segmented mouse
micro-CT data set.



High-resolution x-ray CT of rat
spine (ex-vivo) showing cortical
and trabecular bone structure.



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