



Contribution ID: 178

Type: oral

## The X-Ray CT Component of the NanoSPECT/CT Small-Animal Imaging System

*Wednesday, 10 May 2006 16:00 (15 minutes)*

In previous works we have presented our multiplexing multi-pinhole SPECT imaging technique and its extensive applications in small-animal molecular imaging. SPECT combined with X-ray CT introduces anatomical information and improves acquisition (helps define axial region of interest), reconstruction (attenuation correction) and data analysis (aids segmentation). In this work we present a description of an X-ray CT upgrade to a dedicated small-animal SPECT system (the NanoSPECT). The NanoSPECT houses up to four gamma cameras outfitted with multi-pinhole apertures providing submillimeter SPECT resolution. The X-ray source and detector are mounted on the back of the high-precision gantry and thus share the same axis of rotation as the SPECT system. Helical scanning is employed by both modalities and is performed by translating of the animal through the SPECT and CT fields of views. The system is capable of acquiring partial- or full-body mouse and rat images ranging from 40 to 270mm. This variable axial-length feature is also present in the SPECT modality. The X-ray source is a 90kVp microfocus (18 $\mu$ m) tube. The X-ray detector is made up of a 1024x2048 array of 48 $\mu$ m pixels (49.2x98.6mm<sup>2</sup>) and reads out at a rate of 2.7fps. The geometric magnification of the system is 1.3 providing a reconstructed CT resolution below 150 $\mu$ m (below 1.0 mm for SPECT). Reconstructions are performed using a ray-tracing based filtered backprojection and the system is setup for image acquisitions ranging from quick low-dose to high-resolution studies. We will present a wide range of dual-modality phantom and animal studies.

**Author:** Dr LACKAS, Christian (Research Center Juelich)

**Co-authors:** Dr HOPPIN, Jack (Research Center Juelich); Dr SCHRAMM, Nils (Research Center Juelich)

**Presenter:** Dr LACKAS, Christian (Research Center Juelich)

**Session Classification:** Other Modalities

**Track Classification:** S3\_S4 others modalities