

## AbstractID: 8148 Title: Study of CT number dependence on hardware settings and post image processing in micro CT systems

**Purpose:** In recent years, micro CT systems have been emerged as a promising imaging modality for small animal model study. We report our efforts in the research investigation on the variations of CT numbers at various hardware and software settings in a commercial micro CT scanner as CT numbers are crucial to some imaging applications such as the bone mineral density evaluation.

**Method and Materials:** In this work, a commercial micro CT imaging system (SkyScan 1076) was used to acquire the projection images. A modified Feldkamp reconstruction method was integrated in the scanner. Four different phantoms including lung, adipose, muscle, and bone were imaged at various energy values and then CT numbers were calculated at the mid plane of the phantoms. Different metallic filters in the x-ray tube unit were used in the study. We also implemented two major image artifact reduction techniques (beam hardening and ring artifacts) and studied how those post image processing would effect the CT numbers.

**Results:** The variability in CT numbers for different filters was -800 to -600 HU in lung phantom, -300 to -150 HU in adipose phantom, +20 to +70 HU in muscle phantom, and +1000 to +3000 in bone phantom. Meanwhile, the CT number variations ranged from +1000 to +4000 for the bone phantom when beam hardening reduction algorithm was applied.

**Conclusion:** We have conducted a series of study for the variations in CT numbers computed from images acquired from a commercial micro CT imager at various hardware and software settings. Four uniform phantoms designed for the micro CT systems with known materials and densities were used. Imaging parameters included the x-ray imaging energies, filters, and software settings. Accurate CT numbers are important and critical to the quantification applications such as the bone density calculations and tissue characterization.