Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Performance Assessment of Ultra-High Resolution CT in Texture-based Metrics of Bone Health[1] GENGXIN SHI, SHALINI SUBRAMANIAN, QIAN CAO, JEFFREY SIEWERDSEN, WOJTEK ZBIJEWSKI, Johns Hopkins Univ, Dept of Biomedical Engineering — Recently, a new generation of ultra-high-resolution CT (UHR CT) scanners has been introduced. UHR MDCT enables visualization of about 150 um details, offering substantial improvement over conventional MDCT. We study the effect of UHR imaging and reconstruction kernel on metrics of image texture (Gray-Level Co-occurrence and Run Length features). The texture features provide promising biomarkers in applications ranging from oncology to orthopedics, but might not be reproducible across imaging protocols. Human bone samples were scanned inside cylinder and thorax phantoms in the UHR mode at 375mAs - 5mAs and in the Normal Resolution (NR) mode at 50mAs. The data was reconstructed with the following kernels: FC30 (sharp reference images), FC30 with iterative denoising, FC50, and FC81. Mean texture values of regions of interest distributed through the bone were used to assess reproducibility in terms of correlation and concordance with the reference image. The results indicate that the bone texture features obtained from CT exhibit sensitivity to imaging dose and spatial resolution. Texture-based bone biomarkers established in NR CT may not be directly transferable to UHR CT; similarly, texture biomarkers identified in normal/high-dose data may not be reproducible in low-dose scans.

Gengxin shi
Johns Hopkins Univ, Dept of Biomedical Engineering

Date submitted: 31 Jan 2020   Electronic form version 1.4