1093-78-329   **Miao-jung Yvonne Ou*** (mou@math.udel.edu), 408 Ewing Hall, University of Delaware, Newark, DE 19716, and **Wai-Yip Chan**, **Yen-Hsi Richard Tsai**, **Seong Jun Kim** and **Luis Cardoso**. *Fast Algorithms for Computing the Effective Dielectric Properties of Cancellous Bone from Micro-CT scans.*

Cancellous bone is a two-phase composite with solid trabeculae and bone marrow. Effective properties of cancellous bones are important in assessing bone health. Computation of the effective dielectric properties is carried out by solving partial differential equations in the domain constructed from micro-CT scans. Due to the very complex microstructure of the trabeculae, traditional meshing softwares fail to handle the meshing task. A state-of-the-art 3D segmentation algorithm was applied to a stack of micro-CT scans of cancellous bone, followed by the construction of the signed distance function of the 3D structure. We developed a meshing algorithm modified from Matlab-based DISTMESH, which can efficiently generate high-quality boundary mesh for the cancellous bone. Finally, the partial differential equations were solved by the Boundary Element Method (BEM) accelerated by the Fast Multipole Method (FMM), which is an O(N) fast algorithm. This talk presents the key ideas of the algorithms, the implementations and the numerical results. (Received August 19, 2013)