

## **Abstract**

Applying mathematical models to real situations often requires the use of discrete geometrical models of the solution domain. In some cases destructive measurement of the objects under examination is acceptable, but in biomedical applications the measurements come from imaging techniques such as X-ray, computer tomography (CT), or magnetic resonance imaging (MRI). A necessary early step in the modeling process is then to extract from these images the measurements (locations and distances) that form the basis of the geometrical model.

In this paper we describe the construction of a geometrical model of the human thorax based on the high resolution MRI scan of a single subject. We outline the scanning procedure, the image collection and conversion to computerized image files, the segmentation of the images into boundary nodes, and the connection of these nodes into surface, and then volume, meshes. Included are brief descriptions of the tools developed at the CVRTI for this project, as well as our experiences in creating and using them. The result of this work was a pair of models at two different levels of spatial resolution, which set new standards in the area of bioelectric field modeling and the application of these models has been described previously [1, 2].