1037-00-194 **Simon K. Alexander*** (simon@math.uh.edu), Department of Mathematics, University of Houston, 651 PGH, Houston, TX 77004-3008, and **Robert Azencott**, **Saurabh Jain** and **Manos Papadakis**. *Multiscale Three Dimensional Image Analysis: Texture Segmentation and Biomedical Applications.* Preliminary report.

Three dimensional biomedical imaging techniques are becoming increasingly important in many areas of clinical practise and research. This size of such data sets pose challenges for processing and interpretation. Multiscale representations are a natural approach to address both the physical structure of the data, and computational complexity. We describe advances in a program of research into three dimensional texture segmentation applications. Our approach has several aspects and goals. We need computational efficiency in large 3D data sets. We also need flexible modelling of tissue types and first rate segmentation capabilities. Here we describe an algorithm in the style of Gibbs/Markov random fields that is general, natively 3D, practically efficient, and tuneable to particular biomedical data sets. Particular focus is given to application dependent properties, and how to handle this appropriately. These considerations lead to design constraints on the construction of multiscale representations (frames, Bessel families) constructing a higher dimensional (than the original data) vector space in which data clustering allows for practical segmentation. (Received February 01, 2008)