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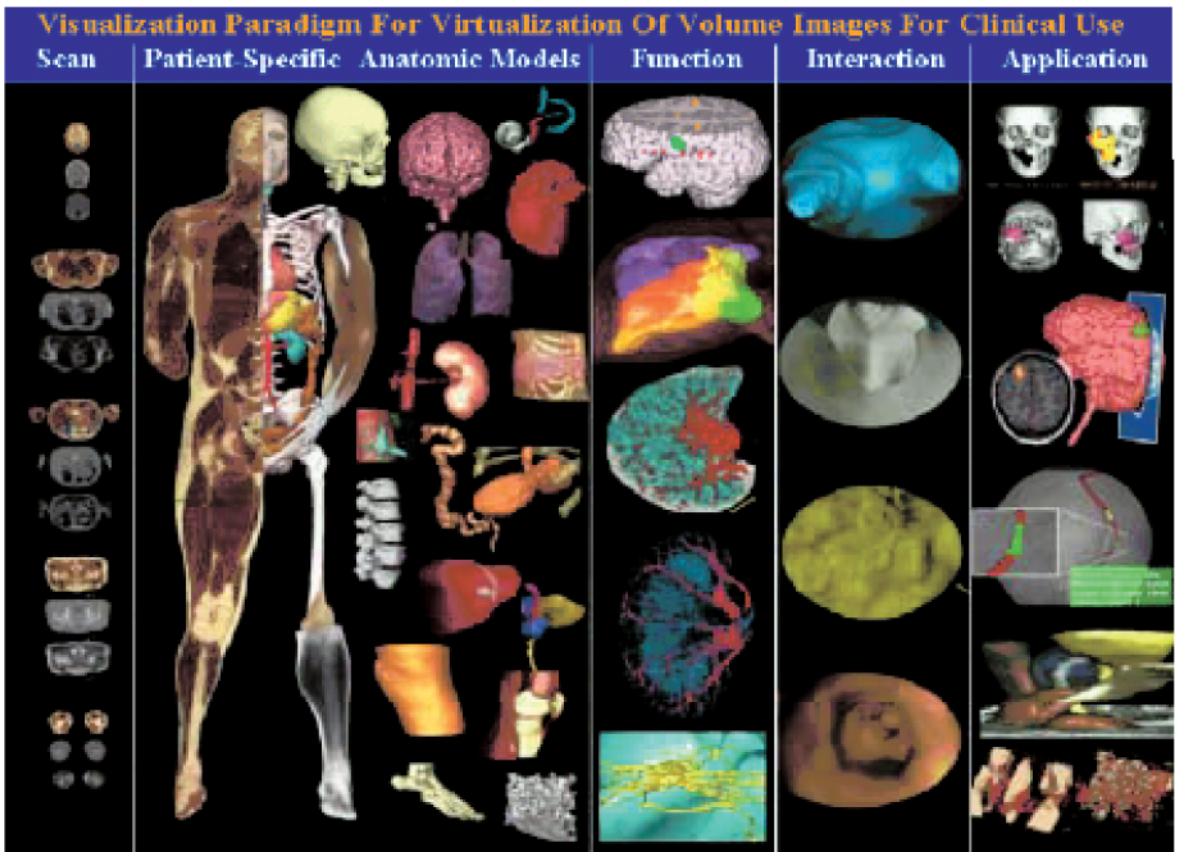
Visualization of Patient-Specific Volume Images In Image-Guided Diagnosis and Therapy

Robb, R.[1)]

1) Scheller Professor in Medical Research Professor of Biophysics and Computer Science Director, Biomedical Imaging Resource Mayo Foundation/Clinic



An exciting and rapid evolution is underway for imaging and visualizing the human body from physically visible to realistically virtual to fully functional forms, extending from micro to macro orders of scale. A major goal is to integrate and synthesize for visualization and quantitative analysis both structure and function of all living tissues from image data sets that span this wide range of scale – from molecules to complete organ systems. The procedure includes patient- specific volume scans converted to accurate high resolution anatomic and physiologic models which can be used in real-time for a variety of clinical applications, as depicted in the figure. This rapid and accurate virtualization of all body tissues and structures of interest and their functions, regardless of dimensional size and/or separation, will be so faithful as to render the virtual representations indistinguishable from the real objects. The image fusion of functional properties and physical characteristics with anatomic and micro structures will provide rapid and accurate analysis of structure to function relationships, including expression of cell function at the organ level, connecting specific micro-cellular level mechanisms and/or abnormalities with specific diseases and malfunctions at the macro-organ level. Such capabilities will provide synchronous detection, differentiation and treatment of disease and is expected to become the evolutionary successor of current image-guided diagnosis and therapy.