4D Extended Cardiac-Torso (XCAT) Phantom Version 2.0

The 4D XCAT phantom was developed to provide virtual patients for medical imaging research. The XCAT software includes a pair of highly detailed male and female anatomies for subjects that are 50th percentile in terms of height/weight and organ volumes. Each anatomy is defined using non-uniform rational b-splines (NURBS) and includes thousands of defined structures as well as parameterized models for the beating heart and respiratory motions. Users can define numerous parameters to create normal and abnormal anatomical and motion variations to simulate a patient population for research. The program includes several functions that work with the phantoms: (1) a main phantom function to create voxelized versions of the phantoms, (2) a cardiac defect function to model regional motion defects as well as perfusion defects, (3) a cardiac plaque function to model plaques in the coronary vessels, (4) a lesion function to model spherical lesions in the body, (5) an anatomy altering function to create anatomical variations from the template male and female anatomies, and (6) a vectors function to output motion vectors from the phantoms.

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