1067-92-1810 **Jue Wang*** (wangj@union.edu), 807 Union St., Schenectady, NY 12308, and **Yongjian Yu**.
Blood Vessel Segmentation in Volumetric Ultrasound.

Real-time 3D ultrasound imaging has been used to visually guide clinicians inserting central catheters into the blood vessels of premature infants being cared in neonatal intense care unit (NICU) for the delivery of medicine to the hearts. However, it is challenging to visualize the moving blood vessels in the raw images due to the heavy speckle noise and low spatial resolution.

We have developed a 3D blood vessel segmentation method to provide more clinically meaningful views of the catheter in real-time ultrasound. The segmentation proceeds in two steps: a center-line detection, followed by cross-section delineations. A sequential Monte Carlo approach is used to trace the 3D vessel. It is seen as the maximum a posterior (MAP) path of a group of particles driven by both an intrinsic stochastic dynamics and a statistical image data model. The data driven likelihood ratio for vessel extraction is computed using local regional measurements. The cross-sectional contour at each center-line position is then estimated using energy minimization and regularization. It is based on an area-weighted mean difference binary flow with elliptical shape constrains and parameter bounds. The efficacy of the approach is demonstrated using static phantom and in vivo animal datasets. (Received September 21, 2010)