

Dual-energy CT can be expected to play a new and evolving role in cardiovascular imaging. Clinical uses already reported include 1) direct CT angiography, whereby the dual energy algorithm identifies and removes bone in a 3-D CT angiographic dataset, allowing direct visualization of iodinated vessels without the need for user intervention to remove overlying bony anatomy, 2) removal of small hard plaques within vessels, allowing more rapid and clearer visualization of patent lumens in MIP projections, and 3) visualization of the perfused blood volume, also referred to as blood pool imaging, to demonstrate focal perfusion deficits. Dual energy bone and plaque removal techniques can be applied in retrospectively-gated cardiac imaging, suppressing the appearance of calcified plaque and providing improved visualization of stenotic lumens. Additionally, dual-energy CT can be used to identify and remove calcified plaque prior to image reconstruction in order to reduce the effects of calcium blooming, which creates artificial elevation of CT numbers in voxels adjacent to calcified objects, often obscuring the dimensions of the true lumen for large or dense coronary artery calcifications. Finally, using projection-spacedual-energy methods, mono-energetic CT images can be calculated, which greatly reduce beam hardening effects and increase the accuracy of CT number measurements. The use of dual-energy CT techniques is being explored for the evaluation of myocardial perfusion deficits.

Attendees of this presentation can expect to learn about:

- 1) the technical approaches to dual-energy cardiac CT currently implemented or under investigation on commercial CT systems,
- 2) current clinical uses of dual-energy CT in cardiovascular imaging and
- 3) areas of future investigation.