

## **Where are we and what is the future for helical/spiral CT?**

The introduction of helical/spiral CT nearly 20 years ago enables, for the first time in CT history, the coverage of an entire human organ in a single breath-hold. It offers a more uniform sampling along the patient long axis and allows clinicians to follow the contrast uptake in an organ. Nearly ten years later, the introduction of multi-slice CT offers a truly isotropic spatial resolution anytime and anywhere. Operator is no longer forced to make a choice between coverage and spatial resolution along the z-axis. Its debut has changed the way radiologists scan patients and visualize images. With a significantly improved coverage, CT imaging has moved beyond the three-dimensional spatial domain and included the fourth dimension of temporal domain.

Multi-slice helical/spiral CT also found its way into the cross-modality imaging devices such as PET/CT or SPECT/CT. CT has become such an integral part of these devices that nearly all of the PET scanners built today include CT. These advancements inspired many new clinical applications such as cardiac imaging, perfusion, and more recently dual energy acquisitions. In the past ten years of CT history can be characterized by the "slice war", new technological advancements nowadays are no longer constrained to the simple slice count. Many new frontiers, such as functional or physiological imaging, are now appearing on the horizon and are actively pursued by researchers around the world.

In this talk, we will briefly review technological advances, technical challenges, and clinical impact associated with the helical/spiral scanning, multi-slice CT, and PET/CT. We will discuss recent advances in the areas of cardiac imaging, dual energy imaging, 4D CT, and perfusion. We will conclude with a futuristic look at the CT.