

Utilization of rigid and deformable image registration as well as enhanced contouring tools for radiotherapy is increasing rapidly, with a variety of commercially available systems providing this functionality. Such tools can facilitate image registration between images acquired in the treatment position with those that were not, adaptive re-contouring to deform contours from the original treatment planning images onto new images acquired during the treatment course, deformable dose accumulation for adaptive therapy or re-treatments, and advanced segmentation tools with the potential to improve efficiency and consistency. Understanding the strengths and limitations of a given system can help the medical physicist use the system effectively and avoid or anticipate unexpected results caused by exceeding the system's capabilities.

This presentation will step through the functionality and algorithms available for image registration and advanced contouring tools in MIM Maestro<sup>TM</sup> version 5.1 (MIM Software Inc., Cleveland, OH), as well as touch on functionality under development. Clinical examples using these tools will be presented, highlighting cases that have worked well and cases that have been challenging, including rigid and deformable registration, propagating deformed contours onto a new scan, workflows to provide consistent procedures with instructions, advanced segmentation tools, and initial experience with atlas-based contouring.

#### Educational Objectives:

1. To review the functionality and algorithms available in MIM Maestro<sup>TM</sup> for image registration and enhanced contouring.
2. To understand strengths and limitations of the MIM Maestro<sup>TM</sup> image registration and enhanced contouring tools
3. To provide some clinical examples using MIM Maestro<sup>TM</sup> for image registration and enhanced contouring