

Image guided interventions via novel cone-beam data acquisition and reconstruction methods

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C-arm based cine/fluoroscopic guidance provides simultaneous high spatial resolution (e.g. 200 micron pixel pitch) and high temporal resolution (e.g. 33 ms). These characteristics along with ease of patient access and wide availability of compatible interventional tools have positioned this technology as the defacto standard for image guidance for many interventional neurological procedures. However, these systems are subject to the limitations of projection imaging including reduced low contrast resolution and confusion due to overlapping anatomy. In order to overcome these limitations interventional computed tomography (CT) has been implemented by several of the major manufacturers. We will discuss several novel methods to improve upon the current state-of-the art including: a method for accurate surgical tool placement combining interventional CT and fluoroscopy, a technique to reduce patient dose by an order of magnitude for multiple interventional CT scans, and the potential for imaging contrast dynamics via limited angle tomography.