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Sino Canada Health Institute Intra-Operative MRI

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Accurately targeting specific regions of interest in the brain is pivotal for the success of neurosurgical procedures. For example, the outcome of brain tumor resection is improved dramatically when surgeons are better able to define surgical borders. Interventional MRI (iMRI) helps reduce the risk of damaging critical areas of the brain and makes it possible to confirm a successful resection or determine the need for further resection prior to closing a patient's head and finalizing the surgery.

The Sino Canada Health Institute (SCHI) is developing a small, lightweight movable system for performing intra-operative magnetic resonance imaging. The scanner will be based on a rampable magnet that can be energized and moved into place over the patient for surgical procedures. When not in use, the magnet will be discharged and stored locally in a small room. Moving the scanner will be facilitated by a track mounted crawler system allowing it to be transported and positioned as needed. The use of optical guidance will ensure precise, consistent placement of the scanner to within 1mm. This will be crucial when taking post-surgery images as consistent alignment with the pre-surgery images is important. A modular approach is being explored such that this technology can be integrated into existing hospitals around the world. Highly optimized rf coil arrays will be employed to help ensure imaging quality, and in addition, novel image reconstruction techniques will be used during post-processing. This will provide the opportunity to achieve high resolution images at relatively low field strengths (of order 1T).

In this talk I will provide details about the design and development of the SCHI iMRI system. This will include technical specifications relating to the magnet mover, rf coil development, as well as provide the latest results from tests of the prototype system.

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