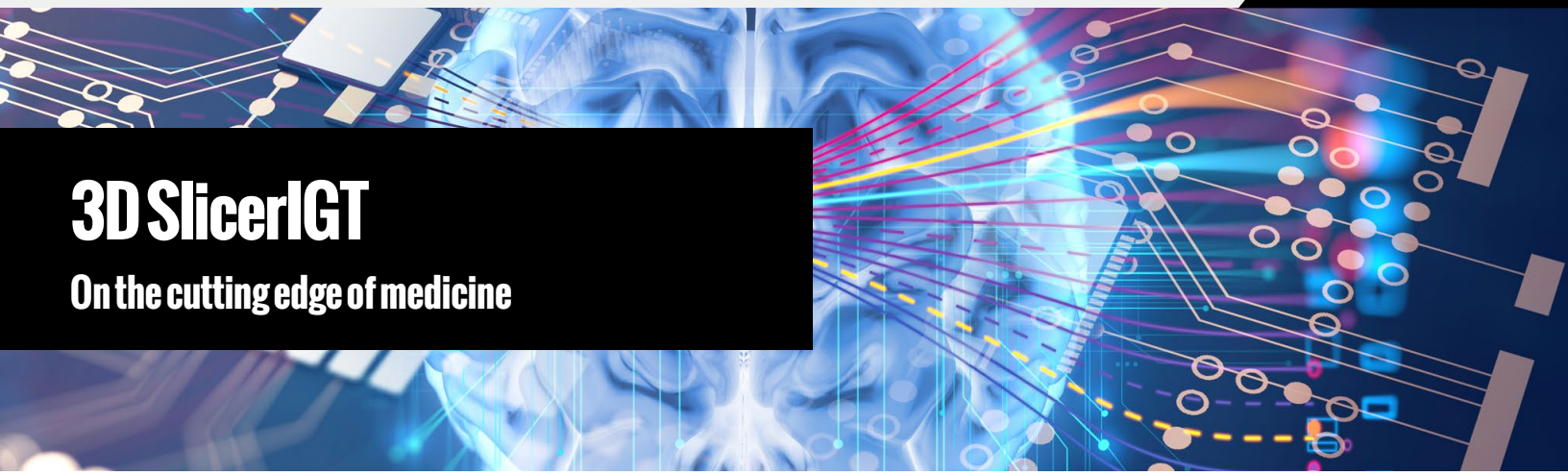
slicerigt.org



3D SlicerIGT

On the cutting edge of medicine

Medicine often benefits from new technology developed for other purposes – months after X-rays were discovered, they were being used on the battlefield to locate bullets within soldiers. Similarly, sensor hardware originally designed for consumer products like smart-phone cameras is now being applied in image-guided therapy (IGT), which uses MRIs, CT-scans, ultrasounds, and other digital imaging technologies to help surgeons operate more precisely and treat internal conditions without surgical incisions.

Even though IGT is transforming the process of medical interventions by introducing treatments that are more accurate, less invasive, and in some cases never-before-possible, the frenetic change of consumer technology is not well-suited to the more measured pace of medical advancement. This makes it difficult to create new IGT technology that can save lives. A new software platform may soon change that.

SlicerIGT is a software toolkit that supports image-guided therapy (IGT) research through the rapid development of IGT-related applications.

Mapping images to patients in real time

SlicerIGT is a software toolkit that supports IGT research through the rapid development of IGT-related applications. It has an open software architecture that makes it easy to customize for new procedures and new hardware. It is built as an extension to a project called 3D Slicer, which is the largest and most widely used open-source platform for medical image visualization and data analysis in the world. 3D Slicer pulls together numerous digital imaging technologies to create a three-dimensional picture of the human body over time. As powerful as it is, however, 3D Slicer lacks any connection to therapeutic use – which is precisely where SlicerIGT comes in.

SlicerIGT links the rich digital imaging of 3D Slicer to the human patient. It works with a multitude of imaging devices (e.g. laparoscopes), body position tracking tools (e.g. electromagnetic beacons), tissue destruction and tissue repair instruments (e.g. scalpels and skin staplers) by mapping them all onto a real-time 3D visualization of the patient's body.

Open source medical research

SlicerIGT is made possible through contributions from an international community of researchers from several disciplines including engineering and biomedicine, and is currently being led by researchers at Queen's University.

Software Evolution

While it was designed to aid in the development of image-guided therapies, the CANARIE-funded SlicerIGT project also contributes powerful capabilities back to the broader medical community through the CANARIE Research Software Registry:

- Segment Editor – a body model editor that allows medical specialists to fine-tune virtual body geometries created from scanned images.
- Multidimensional Data – an image analysis tool that allows researchers to examine changes in body structures over time, useful for examining various body processes such as tumour growth.
- Matlab Bridge – link to mathematical software that allows researchers to integrate sophisticated tools into 3D Slicer for image processing and the identification of elements of the human body.

As an open-source research prototyping platform, SlicerIGT is currently used in medical research and training in numerous areas such as brain, breast, and spinal surgery. Once field-tested and approved, the possibilities for clinical applications of SlicerIGT procedures are virtually endless.

Image-guided therapy helps to make surgeries less invasive and more precise. SlicerIGT helps to create and test these therapies, streamlining the medical invention process. The end result leads to faster medical discoveries, better treatments, and more positive outcomes for everyone.

Platform: SlicerIGT

Description	Software toolkit for rapid development of image-guided therapy systems - for minimally invasive medical procedures, where operators rely on computer-generated images rather than direct sight of the target organs.
Contributor(s)	Queen's University
Research Subject	Biomedical technology
Supports Separate Projects	Yes
Software License	BSD 3-Clause
To Learn More	https://science.canarie.ca/res/143