In vivo dosimetry for brachytherapy

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Co-supervisors (Physics post docs):
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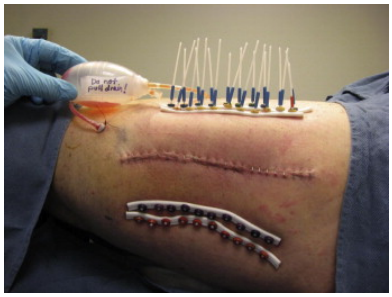
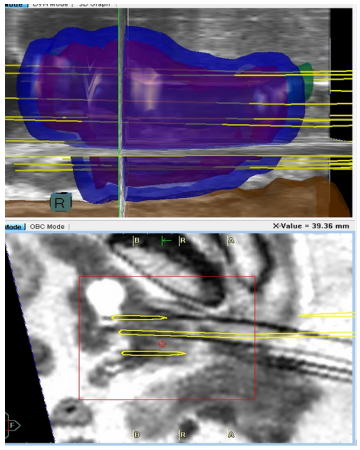
Projects within:
- Physics
- Engineering

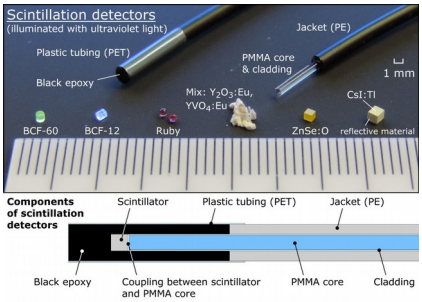
Other members:
1 PhD (Physics)
1 Msc (Engineer)
3 Bsc (Engineers)

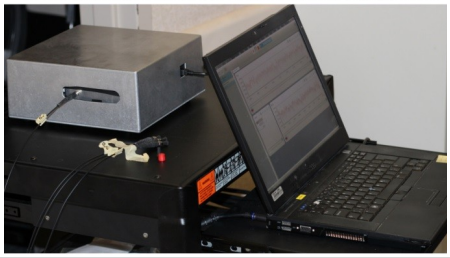
Brachytherapy:

Brachytherapy (BT) is a radiotherapy modality in which a sealed radioactive source irradiates the tumour from the inside. The source is inserted in to the tumour through hollow catheters inserted by medical doctors. Inside each catheter, the source will dwell at around 10 different positions for a selected time period to give the best possible dose distribution. BT has excellent clinical results, but like in any other medical treatment, errors and incidents do happen in BT. Treatment monitoring is therefore required.



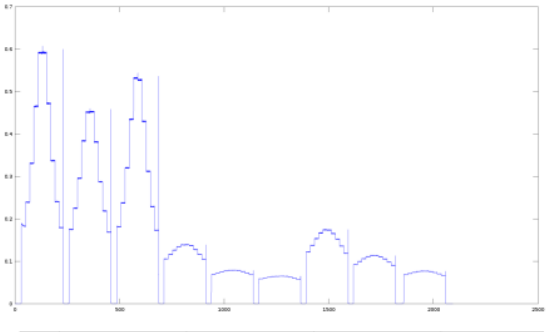






In vivo dosimetry:

In vivo dosimetry is the direct measurement of radiation dose delivered to the patient and is the most common type of treatment monitoring in radiotherapy. Our group has developed a prototype which facilitates real-time in vivo dosimetry through small crystals inserted directly into the tumour. The novel system has at least 4-fold improved error detection sensitivity as compared to current state-of-the-art in vivo dosimetry systems for BT.



Possible Competencies:

- Programming: C++, MatLab, C#
- Analysis of patient data
- Statistics
- Mechanical stress tests
- Radiation detection

Projects:

The projects are all related to improving and exploring the usage of our in vivo dosimetry system. The type of projects however varies much in aims and methods. The projects cover:

- Analysis of data from patient data to extract clinically relevant information.
- Performing phantom measurements to investigate the error detection capability of the system.
- Developing user interfaces and easy control of the system.
- Investigating signal output of the system in extreme conditions.
- Optimisation of the individual components of the system, e.g. crystals, photo detectors.