



Contribution ID : 115

Type : Oral

## The Eclipse™ treatment planning system for microbeam radiotherapy trials at the Australian Synchrotron

*Thursday, 26 November 2015 11:50 (20)*

Before clinical trials of synchrotron microbeam radiotherapy (MRT) on humans can occur, a computerised treatment planning system (TPS) to calculate the dose distribution in the patient must be developed and validated. To satisfy this requirement, we use a research licenced version of the Eclipse™ TPS from Varian Medical Systems. This research license allows for customised dose calculation algorithms to be integrated with the clinical work-flows in Eclipse™ that are typical to modern radiotherapy.

Our treatment planning system is designed for the dynamic MRT modality that has been developed for the Imaging and Medical Beamline. It uses a pencil beam convolution algorithm for dose calculation, and allows for the design of customised conformal masks. For the treatment itself, the white beam is collimated to a 30 mm wide and 1 mm high field which illuminates the MRT collimator, which in turn produces 50 um wide vertical microbeams separated at 400 um center-to-center. The sample and a mask is then dynamically swept through this array of microbeams, producing a dose of radiation in the sample that is conformal to the mask aperture.

Dose calculation considers the sample geometry derived from conventional CT data, custom bolus structures, conformal masks, and multiple fields. Beam configurations and sample stage motions are limited so as to reflect the actual limits on the beamline. We have compared the output from the MRT TPS to measurements on the beamline, and documented our experiences in using it for planning the delivery of known doses to samples.

### Keywords

**Primary author(s) :** Dr POOLE, Christopher (School of Applied Sciences, RMIT University, Melbourne, VIC 3001, Australia)

**Co-author(s) :** Dr CROSBIE, Jeffrey (RMIT University); Prof. ROGERS, Peter (University of Melbourne Department of O&G, and Royal Women's Hospital, Parkville, VIC 3052, Australia)

**Presenter(s) :** Dr CROSBIE, Jeffrey (RMIT University)

**Session Classification :** Radiotherapy and Radiobiology

**Track Classification :** Radiotherapy and Radiobiology