



# SCHOOL

## ESTRO Mobility Grant Report:

### Development of MRI-based Radiomics for Glioblastoma

*Institute visited: Maastrou, Maastricht, The Netherlands*

*Period of visit: 3 February 2020 to 6 March 2020*

#### Background and Aim:

Glioblastoma (GBM) is a highly aggressive and infiltrative malignant astrocytoma, with a median survival time of approximately 12-15 months. It can be characterised by its highly heterogeneous nature, with distinct intratumoural niches and intertumoural phenotypes. Recent investigations have highlighted the potential for magnetic resonance imaging (MRI)-based radiomics to discern potential phenotypes. This technique could become a key enabler of investigations towards individualised radiotherapy by opening up the possibility of tumour phenotype classification in both retrospective and prospective studies.

I visited Maastrou through the use of a European Society for Radiotherapy and Oncology (ESTRO) mobility grant for six weeks. I was hosted by Dr Leonard Wee and Professor Andre Dekker, who taught me about MRI-based radiomics, necessary workflow pipelines and potential applications for treatment of GBM. I chose to visit Maastrou given its track record in computed tomography (CT)- and MRI-based radiomics, as well as the staff members' focus on development of clinical support decision tools using results from radiomics.

#### Content of Visit:

During my visit I focused on gaining knowledge on the entire radiomics pathway, from pre-processing and data curation to deployable clinical support decision tools. For pre-processing and data curation I attended various seminars on findable, accessible, interoperable and reusable (FAIR) data, with additional investigations into MRI normalisation. An understanding of the benefits of employing FAIR data will enable me to support development of data pre-processing workflows at Leeds Cancer Centre (LCC) for current and future investigations.

I gave a seminar regarding GBM, difficulties with delineation, and on-going work at LCC to simulate infiltration and tumour-growth patterns. Alongside this seminar, one-to-one tutorials on radiomics at Maastrou enabled numerous discussions on potential applications of radiomics and machine learning for treatment of GBM. Given the complexity of MRI-based radiomics for GBM, LCC and Maastrou are seeking future collaborative work to solve potential complications.

To understand potential applications of clinical decision support tools, I attended presentations on Maastrou's methods of employing predictive modelling within clinical practice. The knowledge gained will enable discussions at LCC on potential approaches to development and employment of these tools at LCC both within and outside the realm of GBM.

#### Summary and Future Work

This mobility grant has been invaluable and has enabled me to gain a much greater understanding of preparation of clinical datasets for radiomics, development of individual radiomics pathways, and subsequent employment of these results in clinical practice, than I had before. This experience will be employed at LCC to establish the local feasibility of MRI-radiomics.

I am very grateful to Dr Wee and Professor Dekker for their support and time during this visit; their help was invaluable and enabled me to gain understanding of the nuances and complexities related to radiomics, an area I wish to investigate in future. I would additionally like to thank ESTRO for this wonderful opportunity. The experience and knowledge gained will enable LCC and Maastrou to build a collaborative research environment on GBM and MRI-based radiomics.



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