

## **BRACCO FELLOWSHIPS - EDUCATION IN RESEARCH**

### **Project 10:**

#### **Performance validation of a deep learning powered automatic segmenter in an immunotherapy-treated cohort**

**NAME OF INSTITUTION:** Netherlands Cancer Institute - Antoni van Leeuwenhoek, Department of Radiology, Amsterdam/THE NETHERLANDS

#### **RESEARCH GROUP AND ITS MISSION:**

Immunotherapy is a major breakthrough in cancer therapy. Immune checkpoint blockers are increasingly being used for a wide array of tumour types. This new treatment option presents with a unique set of challenges from the imaging perspective. This project focuses on the evaluation of automatic (deep learning powered) segmentation algorithms in the context of immunotherapy treated patients. This study will take place within the Immunotherapy Imaging Team of the Department of Radiology at the Netherlands Cancer Institute (NKI) under the supervision of Prof. Regina Beets-Tan. The NKI is the only Comprehensive Cancer Center in The Netherlands (Amsterdam). It is a well-organized and dynamic cancer research institute accommodating over 50 research groups and advanced core facilities. It is an internationally renowned center covering fundamental, translational and clinical cancer research.

#### **OBJECTIVES:**

- Validate the use of automatic segmentation to identify lesions of interest
- Evaluate the potential use of automatic segmentation algorithms within the scope of a broader deep learning radiomics pipeline in cancer patients treated with immunotherapy

#### **APPLICANT'S DUTIES:**

- Collect and analyse CT imaging data of an immunotherapy treated cohort of urothelial carcinoma in collaboration with the Immunotherapy Imaging Team of Radiology.
- To collaborate on an interdisciplinary project to develop a deep learning-powered automatic segmentation algorithm.

- Evaluation of the automatic segmentation algorithm developed in-house and provide feedback to improve its performance.
- Identify and label lesions of interest (i.e. new metastases, pseudoprogession) on the image from the radiological perspective.

**APPLICANT'S BENEFITS:**

- Participation on scientific outcomes of the project i.e. presentations to congresses or publications of papers
- Applicant will receive first-hand exposure to cutting-edge quantitative/radiomic techniques
- Applicant will also receive exposure to artificial intelligence (primarily machine learning and deep learning) in medical contexts
- Applicant will be embedded in the relevant artificial intelligence activities of the department

Project Leader: Prof. Dr. Regina Beets-Tan, MD PhD

Members: Immunotherapy Imaging Team, NKI: Dr. Zuhir Bodalal (Elkarghali), Stefano Trebeschi, Teresa Bucho, PD Dr. Thi Dan Linh Nguyen-Kim