

Research Project

Name of Institution and department: Vall d'Hebron Institute of Oncology (VHIO)
Radiomics Group – Cancer Imaging and Artificial Intelligence Program

Link to website: <https://vhio.net/pf/radiomics-group/>

City and Country of Institution: Barcelona, Spain

RESEARCH GROUP

The Radiomics Group at the Vall d'Hebron Institute of Oncology (VHIO) is a multidisciplinary research team dedicated to advancing precision oncology through quantitative imaging and artificial intelligence. Led by Dr. Raquel Perez-Lopez, the group brings together radiologists, oncologists, physicists, data scientists and bioinformaticians to develop clinically relevant imaging biomarkers that improve cancer characterisation, treatment selection and response prediction. The group has an established track record in translational imaging research, international collaborations and imaging-driven clinical trials, offering fellows a unique opportunity to gain hands-on experience in radiomics, AI and biomarker development within a world-leading cancer research environment.

TITLE OF PROPOSED RESEARCH PROJECT

Imaging Biomarkers and Artificial Intelligence for Early Prediction of Treatment Response in Locally Advanced Head and Neck Cancer

OBJECTIVES

- Develop advanced radiomic models from baseline CT examinations to predict response to chemoradiotherapy in patients with locally advanced head and neck squamous cell carcinoma.
- Characterise imaging signatures associated with treatment resistance, early recurrence and metastatic progression.
- Integrate quantitative imaging biomarkers with clinical and molecular data to create explainable predictive models for personalised treatment planning.

APPLICANT'S DUTIES

- Curate and analyse multimodal CT datasets from patients with locally advanced head and neck cancer treated with chemoradiotherapy.
- Perform tumour segmentation and extraction of imaging features reflecting tumour heterogeneity and treatment response.
- Investigate imaging phenotypes associated with treatment resistance, early recurrence and metastatic spread.
- Participate in the development and validation of AI-based predictive models integrating imaging, clinical and molecular biomarkers.
- Collaborate with radiologists, oncologists, pathologists and bioinformaticians to explore the biological basis of imaging biomarkers.

APPLICANT'S BENEFITS

- Advanced training in head and neck cancer imaging, radiomics and artificial intelligence.
- Hands-on experience in developing imaging biomarkers with direct potential to guide personalised treatment decisions.
- Exposure to multimodal data integration combining imaging, liquid biopsy and molecular profiling.
- Participation in multidisciplinary tumour boards and translational research meetings focused on precision oncology.
- Opportunities for presentations at ECR and co-authorship in high-impact scientific publications.

Project Leader: Raquel Perez-Lopez

Members:

Post-doctoral researchers: Francesco Grussu, Alonso Garcia, Oscar Llorian

Pre-doctoral students: Carlos Macarro, Daniel Navarro, Maria Balaguer, Marta Buetas

Computer scientists: Adria Marcos, Camilo Monreal

Clinical research fellow: Luz Atlagich

Data manager: Christina Zatse