

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

Predicting the Development of Liver Metastases in Colorectal Cancer Using Artificial Intelligence and Quantitative Imaging

OBJECTIVES

- Identify subtle imaging phenotypes on baseline CT scans associated with future development of liver metastases in patients with colorectal cancer.
- Develop AI-based radiomic models capable of detecting pre-metastatic liver microenvironment alterations before radiologically visible disease.
- Integrate imaging biomarkers with circulating tumour DNA and clinicopathological variables to improve risk prediction and patient stratification.

APPLICANT'S DUTIES

- Analyse baseline and longitudinal CT examinations from patients with colorectal cancer to identify imaging signatures associated with future liver metastases.
- Segment primary tumours and extract advanced radiomic features.
- Investigate imaging biomarkers of the pre-metastatic niche and occult metastatic disease before radiological detection.
- Contribute to the development of predictive models integrating radiomics, circulating tumour DNA and clinicopathological variables.
- Participate in validation studies using multicentre datasets and clinical trial cohorts.

APPLICANT'S BENEFITS

- Specialised training in abdominal oncologic imaging and quantitative assessment of metastatic disease.
- Experience in one of the most exciting emerging fields in radiology: prediction of invisible metastatic disease using AI.
- Exposure to imaging biomarkers, liquid biopsy and minimal residual disease monitoring.
- Development of practical skills in radiomics, machine learning and predictive modelling applicable across multiple cancer types.
- 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