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

Biological Translation of CT-Derived Tumour Habitats into MRI and Histopathological Correlates

OBJECTIVES

• Identify and characterise intratumoral imaging habitats using advanced CT radiomics and spatial heterogeneity analysis.
• Translate CT-derived habitats into biologically interpretable MRI-based phenotypes and establish spatial correspondence across imaging modalities.
• Correlate imaging habitats with histopathology, tumour microenvironment features, vascularity, cellularity and molecular characteristics to define non-invasive tumour phenotypes.

APPLICANT'S DUTIES

- Generate and analyse tumour habitat maps from CT and MRI examinations using advanced radiomic and spatial imaging techniques.
- Investigate intratumoral heterogeneity and identify imaging-defined tumour ecosystems associated with specific biological characteristics.
- Perform multimodal image registration and radiology-pathology correlation analyses.
- Explore relationships between imaging habitats, tumour microenvironment, vascularity, cellularity and molecular features.
- Contribute to the development of biologically interpretable imaging biomarkers for precision oncology.

APPLICANT'S BENEFITS

- Unique training at the forefront of next-generation cancer imaging and tumour ecosystem characterisation.
- Exposure to advanced concepts including habitat imaging, spatial radiomics, imaging phenotypes and radiology-pathology correlation.
- Opportunity to bridge radiology with tumour biology, gaining insights rarely available during conventional radiology training.
- Experience working with cutting-edge computational imaging methods and explainable artificial intelligence.
- 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