

Research Project

Name of Institution and department: Department of Radiology, Abdominal Imaging Section, Hospital Álvaro Cunqueiro, Complejo Hospitalario Universitario de Vigo / Área Sanitaria de Vigo, in collaboration with the Diagnostic Imaging Research Group, Instituto de Investigación Sanitaria Galicia Sur (IISGS).

Link to website: [Radiology Department - Área Sanitaria de Vigo](#); [IIS Galicia Sur](#)

City and Country of Institution: Vigo, Spain.

RESEARCH GROUP

The fellowship will be hosted by the Department of Radiology of Hospital Álvaro Cunqueiro, within the Área Sanitaria de Vigo, and in the Diagnostic Imaging Research Group of IIS Galicia Sur. The group conducts translational imaging research focused on abdominal oncologic imaging, quantitative imaging biomarkers, radiomics and imaging-based clinical decision support. Its mission is to improve diagnostic accuracy and patient stratification by integrating radiological expertise, standardized image analysis, reproducible radiomics workflows, and collaboration with clinical specialists, pathologists, data scientists and statisticians.

The proposed fellowship is aligned with an ongoing dual-energy CT radiomics project in pancreatic cancer. The project uses spectral CT reconstructions acquired in routine clinical practice, including iodine maps and virtual monoenergetic images, to derive reproducible quantitative biomarkers for pancreatic ductal adenocarcinoma and related pancreatic neoplasms.

TITLE OF PROPOSED RESEARCH PROJECT

Spectral dual-energy CT radiomics for improved diagnosis and characterization of pancreatic ductal adenocarcinoma: development and validation of a reproducible imaging workflow.

OBJECTIVES

- To develop and validate a reproducible dual-energy CT radiomics workflow for the detection and characterization of pancreatic ductal adenocarcinoma, using conventional CT images, iodine maps and virtual monoenergetic reconstructions.
- To standardize lesion segmentation, image preprocessing and radiomic feature extraction across spectral CT reconstructions, identifying stable and discriminative quantitative imaging biomarkers.
- To assess the robustness of spectral radiomic biomarkers and their reproducibility in comparison with conventional CT-derived features, including observer-variability assessment using repeated segmentations.
- To correlate spectral radiomic features with clinical and histopathological endpoints, including tumour type, histological grade, tumour stage and surgical resectability when available.
- To contribute to exploratory predictive modelling by integrating spectral radiomic signatures with clinical and pathological variables to support imaging-based risk stratification and clinical decision-making.

APPLICANT'S DUTIES

- Curate a pseudonymized study database of eligible patients with suspected or confirmed pancreatic cancer undergoing dual-energy CT, including demographic, clinical, CT acquisition/reconstruction and histopathological reference-standard variables.
- Review dual-energy CT examinations acquired on the centre's spectral CT platform, select the appropriate phases and reconstructions for analysis, and document image quality, artefacts and exclusion criteria.
- Perform manual or semi-automatic segmentation of pancreatic lesions in 3D Slicer according to a standardized operating procedure, with particular attention to lesion boundaries, peritumoral structures and consistency across reconstructions.
- Participate in repeated segmentation and reader-variability experiments to assess the reproducibility of radiomic biomarkers derived from conventional and spectral CT images.
- Organize segmentation files, feature-extraction outputs and data dictionaries; perform quality control of image-derived variables before statistical or machine-learning analysis.
- Attend project meetings with radiologists, clinical scientists and statistical/machine-learning collaborators, and contribute to abstracts, oral/poster presentations and manuscript preparation.

APPLICANT'S BENEFITS

- Hands-on training in abdominal oncologic imaging, with emphasis on dual-energy CT interpretation and structured radiological assessment of pancreatic neoplasms.
- Practical experience in the creation and management of pseudonymized imaging research databases under European and Spanish data-protection requirements.
- Training in reproducible radiomics workflow design, lesion segmentation in 3D Slicer, radiomic feature extraction, quality control and observer-variability analysis.
- Introduction to the statistical and machine-learning principles required for radiomics research, including dimensionality reduction, model validation and interpretation of diagnostic-performance metrics.
- Exposure to multidisciplinary translational research involving radiologists, pathologists, clinical specialists, data scientists and statisticians.
- Participation in scientific outcomes of the project, including congress presentations and peer-reviewed manuscripts, with authorship according to standard contribution.

RESEARCH TEAM

Project Leader: Milagros Otero García, MD, PhD. Head of the Department of Radiology, Complejo Hospitalario Universitario de Vigo / Área Sanitaria de Vigo and PI of the Diagnostic Imaging Research Group, IIS Galicia Sur.

Members: Boris M. Torres Núñez, MD, Radiology Resident and predoctoral researcher, Department of Radiology, Complejo Hospitalario Universitario de Vigo

Maria Aymerich López, PhD, Postdoctoral researcher, Diagnostic Imaging Research Group, IIS Galicia Sur / Fundación Biomédica Galicia Sur.

DATA GOVERNANCE AND WORKING ENVIRONMENT

The fellow will work only with pseudonymized clinical and imaging data within the approved research framework. Imaging data and derived segmentations/features will remain on SERGAS systems. The project will follow the applicable ethics approval procedures and European/Spanish data-protection requirements for health-data research.