

Research Project

Name of Institution and department:

Humanitas Research Hospital and Humanitas University

Neuroradiology Dept.

Link to website:

www.humanitas.it; www.hunimed.eu

City and Country of Institution:

Milan, Italy

RESEARCH GROUP

Brief description of the research group and of its mission:

The Neuroradiology Research Group is a multidisciplinary team composed of neuroradiologists, engineers, computer scientists, and physicists, dedicated to the study of central nervous system diseases, with a primary focus on neuro-oncology, including primary brain tumors, brain metastases, and spinal tumors.

The group's research activity integrates advanced neuroimaging techniques with the development and application of artificial intelligence methods, including deep learning and radiomics. Its mission is to develop, validate, and translate innovative imaging biomarkers and computational tools into clinical practice, with the aim of enabling precise and personalized medicine in neuro-oncology.

TITLE OF PROPOSED RESEARCH PROJECT

Advanced MR Imaging and Artificial Intelligence in Neuro-Oncology

OBJECTIVES

- To provide hands-on training in advanced MR imaging techniques applied to neuro-oncology.
- To introduce fellows to quantitative imaging analysis methods, including radiomics and artificial intelligence applications in neuroradiology.
- To participate in multidisciplinary research activities focused on primary brain tumors, brain metastases, and spinal tumors.

- To gain experience in image post-processing, tumor segmentation, and imaging biomarker extraction from multiparametric MRI datasets.
- To explore the clinical applications of machine learning and deep learning models for tumor characterization and treatment response assessment.
- To contribute to ongoing research projects involving advanced neuroimaging and AI-based analysis in neuro-oncology.
- To develop familiarity with research methodologies, data interpretation, and scientific collaboration in a multidisciplinary environment.
- To encourage the integration of advanced imaging and computational approaches into precision and personalized medicine in neuro-oncology.

APPLICANT'S DUTIES

- Participate in the daily research activities of the Neuroradiology Research Group.
- Attend neuroradiology reporting sessions, multidisciplinary tumor boards, and research meetings.
- Contribute to the collection, organization, and anonymization of imaging and clinical data for research purposes.
- Assist in image post-processing, tumor segmentation, and quantitative imaging analysis using dedicated software tools.
- Collaborate with team members in ongoing projects involving advanced MRI, radiomics, and artificial intelligence applications in neuro-oncology.
- Perform literature review and support the preparation of scientific presentations, abstracts, or manuscripts.
- Comply with institutional regulations regarding patient confidentiality, data protection, and research ethics.
- Present a summary of the fellowship activities and research experience at the end of the training period.

APPLICANT'S BENEFITS

- Participation in the scientific outcomes of the project, including presentations at national and international congresses and co-authorship of scientific publications
 - Hands-on experience in advanced MR imaging techniques and quantitative neuroimaging analysis in neuro-oncology.
 - Exposure to multidisciplinary collaboration with neuroradiologists, engineers, computer scientists, physicists, and clinicians.
 - Training in radiomics, artificial intelligence, and image post-processing methodologies applied to neuroradiology research.
 - Participation in ongoing translational research projects focused on precision and personalized medicine in neuro-oncology.
 - Development of research skills, including study design, data analysis, scientific interpretation, and academic collaboration.
 - Opportunity to attend departmental educational activities, research meetings, and multidisciplinary tumor boards.
 - Integration into an active academic and research environment with exposure to current developments in advanced neuroimaging and AI applications.
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- Project Leader:
Letterio S. Politi, MD
 - Members:

Riccardo Levi, Giovanni Savini, Marco Grimaldi, Alessia Lindemann, Pietro Levoni,
Luca Cappellini, Gaia Ressa, Francesca Geroli, Daniele Ajello, Silvia Aimola,