

BRACCO FELLOWSHIPS EDUCATION IN RESEARCH ENROLMENT FORM

Name of Institution / Hospital Sant Joan de Déu

City and Country of Institution / Barcelona

RESEARCH GROUP

The Pediatric Imaging Research group is member of the Sant Joan de Déu Research Institute (Barcelona Pediatric Hospital Sant Joan de Déu). Its mission is to advance the knowledge of pediatric radiological imaging specific and quantitative biomarkers as well as the development of artificial intelligence tools. One of the main areas of research is the study of pediatric cerebral vascular imaging. We have two national projects in the development of pediatric vascular biomarkers as well as the creation of a pediatric cerebral vascular MRI biobank (including 400 MRI of pathological patients). We have had the participation of 3 bioengineering students who have done their master's thesis in these project lines.

The aim of the project is to train a fellowship in the research methodology applied to the advanced quantification of pediatric cerebral vascular imaging (MRI).

TITLE OF PROPOSED RESEARCH PROJECT

Development of an AI tool for the quantification and feature extraction of brain vascular-MRI in a pediatric cohort.

OBJECTIVES

- To know the different pediatric cerebral vascular diseases, as well as their qualitative classifications
- To acquire a comprehensive knowledge of cerebral vascular imaging techniques in paediatrics
- To learn how to perform advanced semi-automatic vascular image processing
- To learn how to code artificial intelligence algorithms to classify cerebral vascular images

APPLICANT'S DUTIES

- Vascular segmentation from paediatric MRI image database

- Correlation analysis between manual and automatic segmentation
- Preparation of problem cases for specific analysis and presentations
- Classification of vascular malformations following the current qualitative classifications according to each disease (vascular malformations, fistulas, stenosis).
- Database curation (radiological data).

APPLICANT'S BENEFITS

- Participation on scientific outcomes of the project i.e. presentations to congresses or publications of papers
 - A specific one-to-one training in python programming is offered to create an image classifier using AI
 - Specific one-to-one training is offered in artificial intelligence algorithms (segmentation and extraction of vascular features) using specific software (MevisLab, XNAT,...)
 - Mentoring by a senior radiologist specialist in cerebral vascular imaging
 - Participate in the committees of cerebral vascular diseases of the hospital during the stay.
 - Access for study to a database of more than 400 pediatric patients diagnosed with cerebral vascular disease (ischemia, vascular malformations, fistulas, MoyaMoya, vasculitis,...) many of them with multiparametric vascular MRI as well as other imaging techniques (angiography, . ..)
- Project Leader: Josep Munuera
 - Members: Ignacio Barber, Emili Inarejos, Jordi Muchart, Marta Gomez-Chiari, Sandra Bernaus, Christian-Otto, Christian Mata