

# **BRACCO FELLOWSHIPS EDUCATION IN RESEARCH ENROLMENT FORM**

**Name of Institution / HOSPITAL DE LA SANTA CREU I SANT PAU**

**City and Country of Institution BARCELONA**

## **RESEARCH GROUP**

Brief description of the research group and of its mission:

The vascular neuroimaging group is part of the neuroradiology section in hospital de Sant Pau (a 3rd level university hospital in Barcelona). Its mission is to advance the knowledge of neurovascular imaging and quantitative biomarkers as well as the development of artificial intelligence tools. The main project (part of a national grant) focus on the study of vessel wall features in patients with acute ischemic stroke, using spectral CT angiography (CTA).

We also collaborate with the pediatric hospital Sant Joan de Déu in 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).

**The aim of the project is to train a fellowship in the research methodology applied to the advanced quantification of neuro-vascular imaging (focusing on spectral CT vascular features, vessel wall imaging and brain lesion radiomics).**

## **TITLE OF PROPOSED RESEARCH PROJECT**

**Neurovascular radiomics: vessel wall imaging and vascular quantification in ischemic and hemorrhagic acute stroke**

## **OBJECTIVES**

- To know the different cerebral vascular diseases, as well as their qualitative classifications
- To learn a comprehensive approach of cerebral vascular imaging techniques (spectral CTA, MR angiography, perfusion,...)
- To learn how to perform advanced quantitative and radiomics vascular analysis

- To learn how to code artificial intelligence algorithms to classify cerebral vascular images

### **APPLICANT'S DUTIES**

- Vascular segmentation from spectral and conventional CTA and MRI image database
- Feature extraction from segmented images
- Preparation of representative cases
- Classification of vascular lesions 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 post-processing tools and python programming is offered to create an image classifier using AI
  - 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 adult and pediatric patients diagnosed with cerebral vascular disease (ischemia, vascular malformations, fistulas, Moya-Moya, vasculitis, ...) many of them with multiparametric vascular MRI as well as other imaging techniques (angiography, ...)
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- Project Leader: Josep Munuera
  - Members: Esther Granell, Andrea Lozano, Juan José Sanchez, Albert Pla, Mario Tecame, Abdel Hakim Moustafa