3 year Post-doc Position
on
"Analysis of CT angiographic images for the detection and characterization of abdominal aortic aneurysms"

Context & Motivations : Abdominal aortic aneurysm (AAA), defined as a localized dilatation of the aorta, is a life-threatening condition and it has become a serious health public challenge worldwide, associated with high rates of mortality and hospitalization. There is currently no pharmacological treatment for AAA and the only curative treatment is currently based on surgery which can be performed using open or endovascular aortic aneurysm repair (EVAR). The decision to treat relies on a balance between the operative risk and the risk of progression and rupture of the aneurysms.

No biomarker has proven yet enough sensitivity or specificity to be used in clinical practice for the diagnosis, for the prognosis or the follow-up of patients with AAA. However, some risk factors of AAA rupture have been identified such as large AAA diameter, high growth rate, smoking or hypertension, but the main challenge remains the unpredictability of AAA progression.

The project PREDICTA funded by the French research funding agency (ANR) aims at identifying new biomarkers, and to combine them in a new innovative platform to guide clinicians in the therapeutic decision making.

Post-doc Topics : The objective of the post-doc is to develop AI methods to automatically segment all relevant structures of the vascular system around the AAA including visceral and lumbar and iliac arteries, and then to extract relevant geometric, clinical and biological features that are predictive of the AAA progression and rupture. The segmentation will be based on an in-house annotated database of CT angiographies complemented by a larger one originating from European hospitals. Already existing shape features and novel ones will be automatically extracted segmented images with the objective to train a classifier to discriminate healthy from diseased aorta and to predict the risk of aneurysm progression and rupture but also the risk of post-operative complications after EVAR. Those predictive models will also make use of demographics, clinical, and biological (RNA and micro-RNA) variables in order to further explore the potential patient stratification.

Localisation : This 3-year post-doctoral position will be supervised by Dr Hervé Delingette within the Epione research team at Inria in Sophia Antipolis, France in close collaboration with Dr Juliette Raffort-Lareyre at the University Hospital of Nice.

Required Competences
- PhD degree and strong experience in statistical learning, or biomedical imaging are required
- Solid programming and IT skills are necessary (Python or C++, bash scripting).
- Strong communication skills with fluent English (written and spoken)

Contact Persons:
Please send a CV and motivation letter to:
Hervé Delingette (Inria), Juliette Raffort-Lareyre (Nice University Hospitals),