

Internship Position (master student or equivalent)

Software Engineer in Biomechanics

About us: In the CFL research team at Cemef - Mines Paris, a new ambitious ERC-awarded project (CURE) has recently started with the aim of simulating a variety of biomechanical phenomena involved in cardiovascular diseases. The team originally specializes in CFD, HPC and AI developments, which will be applied to improve patient-specific treatment through high-fidelity simulations of haemodynamics. Here we aim to understand and improve the analysis of cardiovascular diseases such as brain aneurysms through numerical simulations.

Goal: Biomechanical simulations require a diverse and multi-disciplinary array of processing tasks. These range from the obtention of medical data to the postprocessing and evaluation of complex multiphysics simulations. In order to facilitate this process we are hiring a motivated master-level student to improve the efficiency of our aneurysm risk estimation pipeline in order to apply our modelling tools to large patient cohorts with minimal human intervention. This includes:

- Semi-automatic vasculature segmentation from medical imaging (3DSlicer, VMTK)
- Geometry preprocessing and meshing
- Automatized CFD simulation set-up
- Data analysis and postprocessing

This internship offers a great opportunity to deal with real medical data, studying diseases whose treatment remains a challenge for our health system. The intern will not only learn a lot about the numerics/coding aspects but also about the medical world and its specificities.

Required skills:

- Studies engineering, computer science, mathematics or similar.
- Advanced coding: scientific and object-oriented python, bash.
- Image processing, data processing.
- Fluent English.

Environment and conditions: The internship will take place in Sophia-Antipolis (on the French Côte d'Azur) for 4-6 months. A compensation of around 1000 euros/month is proposed. The intern will work hand-in-hand with two PhD students, which will be in charge of guiding and supervising the project. Additionally, the intern will have the opportunity to consult the medical partners (CHU Nice, LMU Munich) regularly during the course of the project.

