Master Internship position at the Center for Biomedical and Healthcare Engineering, Mines Saint-Etienne – Laboratoire SAINBIOSE INSERM UMR 1059

BIOMECHANICAL CHARACTERIZATION OF AORTIC VALVES

Keywords: Mechanical testing, Aortic valve, Biomechanics

Academic context: The research group at Mines Saint-Etienne leads major international research projects in the domain of soft tissue and fluid biomechanics in the cardiovascular system through a longstanding collaboration with the University Hospital in Saint-Etienne. This internship is part of a collaborative project between the University of Saint-Etienne (LIBM), Mines Saint-Etienne and the University Hospital of Saint-Etienne.

Scientific context: Calcific aortic valve disease (CAVD) is a progressive condition in which calcium deposition within the valve leaflets severely alters the mechanical properties of the valve. These alterations increased stiffness, collagen disorganization, and extracellular matrix remodeling are suspected to influence post-operative outcomes. However, the underlying biomechanical mechanisms and their relationship with patient clinical profiles remain poorly understood.

Project summary: This project aims to characterize the biomechanical properties of human aortic valves. For this, the mechanical response of patients' aortic valve, collected during surgery, will be obtained via bi-axial tensile testing. This experimental approach will be complemented by computational modelling.
Such approach will focus on investigating how mechanical properties including elasticity, resistance to deformation, and collagen content vary with the degree of calcification and patient clinical characteristics.

Student profile: Background in Mechanical Engineering or Biomechanics, curiosity for medical applications

Administrative aspects: This internship is funded for 6 months, starting in the first trimester of 2027.

If you are interested, send a curriculum vitae and a short cover letter describing potential previous research experience and interests. Please, submit via email with "Aortic Valve internship" on the subject line to Fanette Chassagne, PhD (fanette.chassagne@emse.fr).