

Mechanical Characterization of Pressurized Cellular Solid: Potato Parenchyma

Academic Year: 2025–2026

Supervisors: P. Lacorre and L. Tadrist (loic.tadrist@univ-amu.fr)

Host Laboratory: Institut des Sciences du Mouvement UMR7287, SBI Team

Location: Aix-en-Provence (IUT Aix campus)

Duration: 6 months

Salary: Yes, around 600€/month

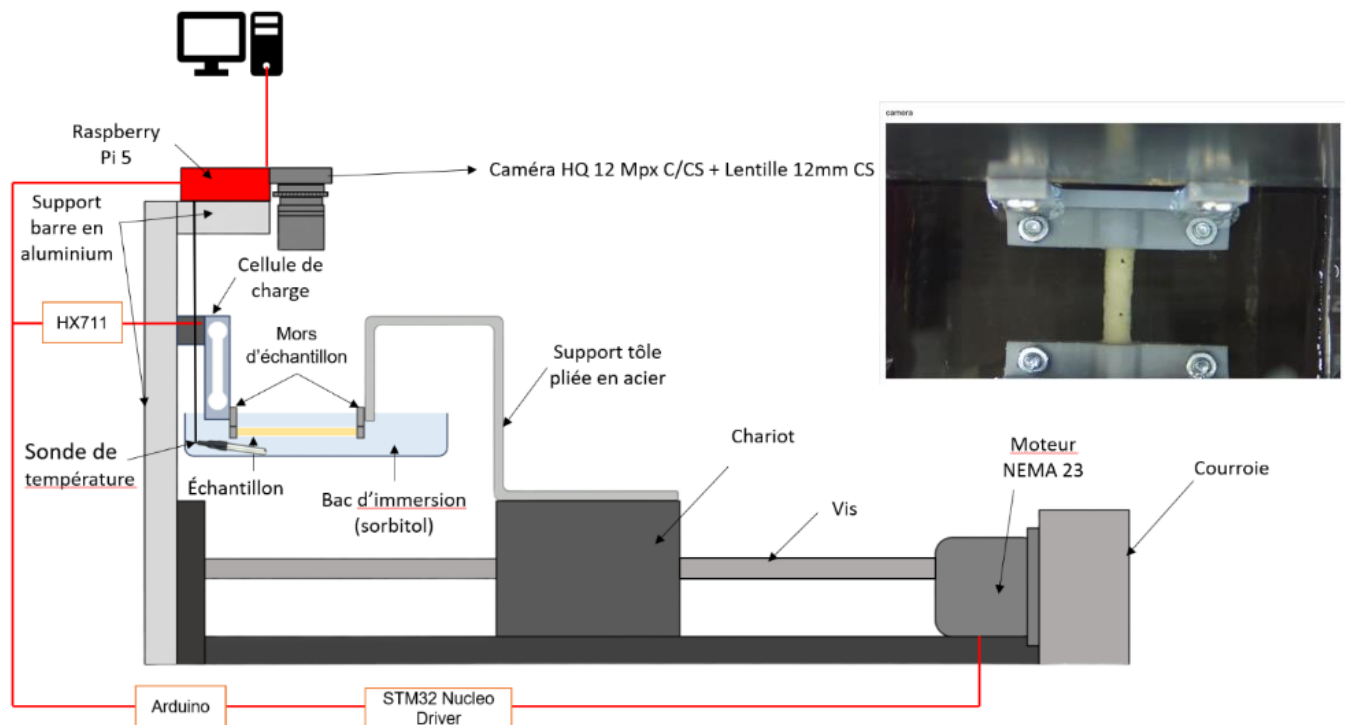
Recommended Level: Bachelor of Engineering

Required Skills: Microfabrication, Microelectronics

Summary:

Pressurized cellular solids are widely found in biological systems. In plants, changes in turgor pressure directly influence mechanical properties such as stiffness and rigidity. This 12-week internship, conducted within the Bio-Inspired Systems (SBI) team at the Institut des Sciences du Mouvement (ISM), aims to design and implement a test bench for characterizing the mechanical properties of potato parenchyma, used as a model biological material.

The intern will analyse the existing experimental setup and design a new folded sheet metal support, along with 3D-printed resin jaws, to improve the reliability of mechanical tests. They will also contribute to the installation of an optical acquisition system and the development of MATLAB scripts for processing experimental data. This work will enable the measurement of Young's modulus and Poisson's ratio in samples, while developing a diverse skill set: CAD design, manufacturing, prototyping, 3D printing, and data acquisition and processing.



Internship Tasks:

1. **Develop MATLAB scripts** to automate data processing and analysis (Young's modulus, Poisson's ratio).
2. **Conduct mechanical tests** on potato parenchyma samples and analyze the results.
3. **Document the process and results** in a technical report, including recommendations for future improvements.
4. **Write a scientific article.** Create figures and start writing comparing experimental data on potato parenchyma and physical theory.

Work Environment:

The Institut des Sciences du Mouvement (ISM) is a multidisciplinary research unit. The laboratory's research focuses on the study of locomotion in living organisms from various perspectives. The Bio-Inspired Systems (SBI) team at ISM aims to study principles and strategies derived from biological systems to inspire and design innovative technological systems.