

# Experiments on the International Space Station (ISS)

## From Ground to Orbit: Preflight Validation and Osteogenic Differentiation Studies of hMSC and Monocytes Under Microgravity Conditions

**Master – Bio / MechEng / BME / Chem**  
**Research Internship and Thesis 01.05.2026 – 30.04.2027**

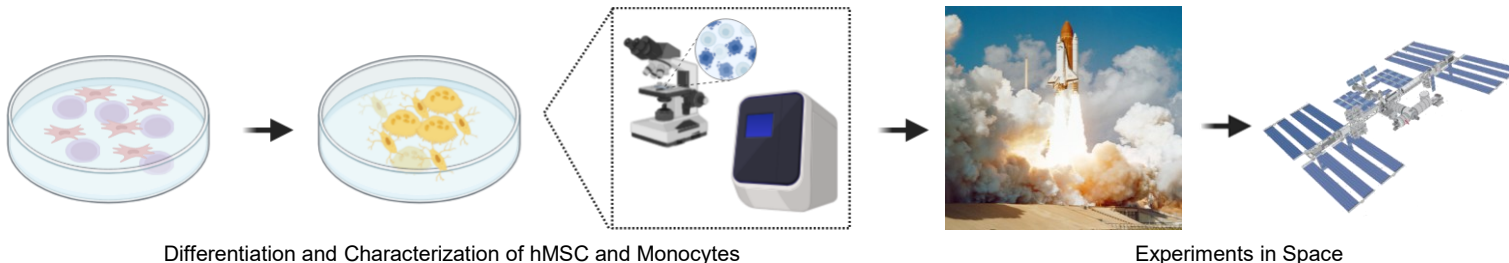
Microgravity profoundly disrupts human physiology, driving progressive muscle atrophy and skeletal demineralization through altered mechanical loading of the musculoskeletal and hematopoietic systems.

This thesis examines how these mechanical changes regulate bone progenitor cell differentiation, encompassing the validation and optimization of osteogenic protocols for human mesenchymal stem cells (MSCs) and monocytes, alongside quantitative analysis of osteogenic marker gene expression.

The project establishes the experimental foundation for studies conducted under real microgravity conditions aboard the International Space Station (ISS). You will take part in the experimental campaign, including a three-week research stay during the launch phase at the Kennedy Space Center in Cape Canaveral, Florida (Q1 2027).

**Qualifications:** Proficiency in sterile cell culture techniques, availability during this period, and a conscientious working style

**Beneficial:** Experience with bioanalytical methods, including qPCR and staining assays, space enthusiast



Differentiation and Characterization of hMSC and Monocytes

Experiments in Space