9th Workshop on Artificial Organs, Biomaterials and Tissue Engineering

OBI - ARARAQUARA

Biofabrication and 3D Printing of Biomaterials: Fundamentals, Technologies, and Applications in Tissue Engineering

This short course aims to introduce the fundamental principles and applications of 3D printing of biomaterials in tissue engineering and regenerative medicine, covering topics ranging from additive manufacturing concepts to the development of three-dimensional scaffolds for tissue regeneration.

3D printing technology has emerged as a highly promising tool in the biomedical field, enabling the fabrication of structures with controlled architecture, tunable properties, and significant potential for applications in bone, skin, and other tissue regeneration strategies.

Throughout the course, participants will explore the main classes of biomaterials used in biofabrication, including natural biopolymers, synthetic polymers, and bioactive composites. Different 3D printing techniques applied to tissue engineering will also be presented, highlighting their advantages, limitations, and biomedical applications.

In addition to the theoretical content, participants will gain exposure to various 3D printing technologies, including:

- Fused Deposition Modeling (FDM) printers;
- Photopolymer resin-based printing systems;
- Direct Ink Writing (DIW) technologies.

The operating principles of each technology, their applications in biomaterials research, and representative examples of fabricated structures will be discussed, providing participants with a comprehensive overview of current biofabrication strategies and their role in advancing regenerative medicine.