3D-bioprinting on organ-on-chip

Aim To design a microfluidic device compatible with Laser Induced Forward Transfer (LIFT) bioprinting technique.

During this project, the student will learn how to work with organ-on-chip devices and LIFT bioprinting in order to biofabricate an osteochondral model. The subject can be adjusted to the student's preferences.

Introduction

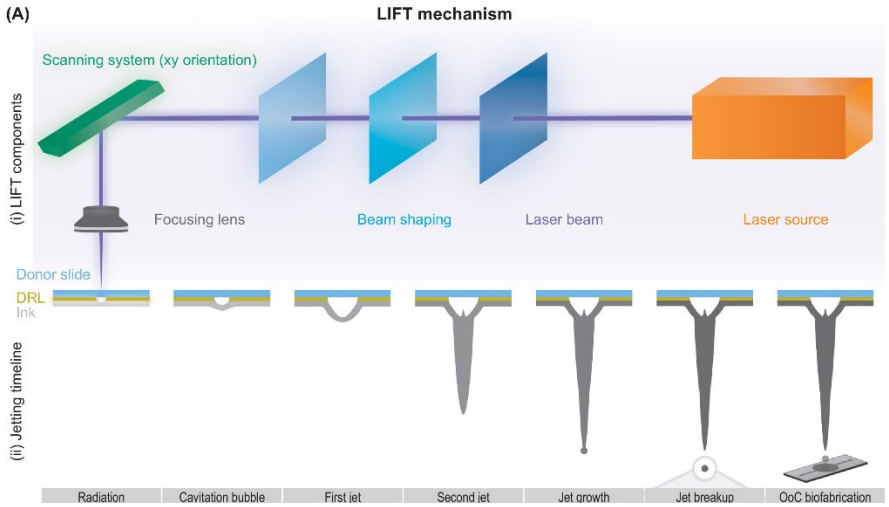

Figure 1 LIFT working principle (from Bosmans, C., Ginés Rodriguez, N. et al., (2024) Towards single-cell bioprinting: micropatterning tools for organ-on-chip development. Trends in Biotechnology)

The student will acquire cross-disciplinary skills in cell culture, biofabrication, material characterization, microscopy as well as 3D-conceptualization and fabrication of microfluidic devices. Notably, Laser induced forward transfer (LIFT) will be used, which is a state-of-the-art bioprinting tool. In brief, a laser is used to irradiate a thin layer of ink (donor), which generates a jet that is deposited onto a receiver plate placed in front the donor. This direct writing technique will be used to micropattern cells or hydrogel with high spatial control.

The student will work independently in the laboratory after a training period. They will be expected to take initiatives in the conceptualization and design of the experiments as well as the data analysis.

Daily supervisor

- PhD candidate Cécile Bosmans https://people.utwente.nl/c.m.y.m.bosmans
  Zuidhorst 133, c.m.y.m.bosmans@utwente.nl
  If interested, do not hesitate to contact me for more details

Principal Investigators

- Prof. Dr. Jeroen Leijten https://people.utwente.nl/jeroen.leijten
  Zuidhorst 145, j.c.h.leijten@utwente.nl
- Dr. Liliana Moreira Teixeira https://people.utwente.nl/l.s.moreirateixeira
  Zuidhorst 234, l.s.moreirateixeira@utwente.nl