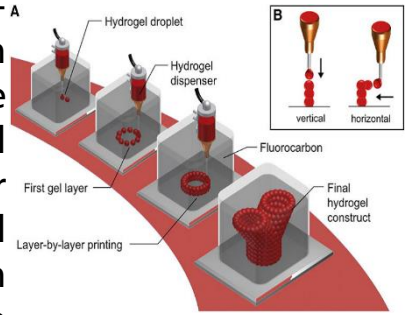
Bachelor- / Masterthesis / Study Project

Computational modeling of material behaviour in 3D-bioprinting

Recent 3D bioprinting technology allows us to print three-dimensional biocompatible hydrogel-based scaffolds where living cells are embedded. Due to its biocompatibility and relatively low cost, it has been extensively used as bioink for for cell growth, division, and reproduction.

During bioprinting, the material undergoes chemo-mechanical process such as gelation. This process in hydrogels will produce inelastic deformation (e.g., volume shrinkage), in turn responsible for residual stresses and will affect the final scaffold geometry and the cell behavior inside the biomaterial. Consequently, the structural resolution, shape fidelity and cell survival depend on properties and characteristics of the bioink during the gelation process.



The goal of this computational framework is to quantitatively predict stress distribution inside the hydrogel as a function of internal chemical reaction.

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Pre-requisitions:

- Mechanical, material science or computational engineering.
- Knowledge on continuum mechanics, FEM.
- Curiosity and self-motivation.
- English or German.

Appointment:
Personaly or Email.
with:
Curriculum vitae
Transcript of records

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