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## Bachelor work

### **Topic: *Crosslinking kinectic study of alginate based hydrogels for bio-printing application***

Bio-printing is a promising tissue engineering strategy that is currently under constant development. The technique consists of 3D-printing living cells mixed with a biomaterial, usually a hydrogel. Mixtures of living cells and biopolymers, such as gelatin, fibrin, collagen and alginate, belong to the most commonly used bio-inks due to the high biocompatibility of such polymers. Our aim is to investigate rheological properties of alginate hydrogels used as carrier material of the bio-ink, which can be physically cross-linked using divalent cation salts, such as  $\text{CaSO}_4$ ,  $\text{CaCl}_2$  or  $\text{CaCO}_3$ .

In order to study the influence of the cross-linker, the gels will be systematically prepared with varying concentrations and ratio of alginate and  $\text{Ca}^{2+}$  salt. Experiments performed in a rotational rheometer will show the gelation time dependency on the sample components. As external forces may affect the crosslinking process and therefore the gel structure, experiments will also be conducted with diffusing wave spectroscopy technique, where the rheological properties are obtained from the Brownian motion of tracer particles in the surrounding material. At last, the rheological properties results obtained from both techniques will be compared, analyzed and correlated to the hydrogel composition.

Die Ergebnisse der Arbeit sind in schriftlicher Form zu dokumentieren, übersichtlich darzustellen und 3-fach abzugeben. Die Präsentation der Ergebnisse im Rahmen eines Seminars erfolgt auf freiwilliger Basis und wird bei der Notengebung nicht berücksichtigt.

Beginn: zum nächstmöglichen Zeitpunkt  
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