



MSc/BSc Project

Computational models for cellular mechanics in biofabrication

Biofabrication, the 3D printing of living cells, is a fascinating new approach to produce living artificial tissue and to overcome the shortage of donor organs in hospitals. Currently, however, the widespread use of this technology is prevented by the high percentage of cells being killed or damaged by mechanical stresses during printing. The SFB/TRR 225 at the Universities of Würzburg, Erlangen and Bayreuth addresses this problem in a joint effort by around 20 research groups from chemistry, biology, medicine and physics.

The current project is part of this effort and aims to develop a computational scheme which allows efficient and accurate computer simulations of biofabrication. Using this novel tool in collaboration with our experimental colleagues we will thrive to understand the physical origin of mechanical cell damage and its biological consequences. Based on these insights we will finally develop new techniques to enable the biofabrication of living cells with nearly 100% survival rate.

Simulations will be run using existing simulation packages which will need to be extended by the prospective candidate. Analysis tools will be written by the candidate in C/C++. The required supercomputer resources will be provided by the local computing cluster available at the University of Bayreuth as well as by projects on national supercomputing systems such as SuperMUC and JURECA.

For applications or further information please contact: Stephan Gekle, stephan.gekle@uni-bayreuth.de, or see our website biofluid.physik.uni-bayreuth.de

