Experimental biomechanics is an interdisciplinary and challenging research topic. Since technical standards for biological tissue testing are yet to be defined by international norms, in-house developed systems are very common. In order to analyze mechanically induced cell processes, we have developed a compressive-bioreactor system providing real-time information on the displacements and forces applied to cell-seeded scaffolds throughout the duration of the culture period.

During the testing process a periodical exchange of the culture medium is necessary. The aim of this thesis is to design and install an automated exchange system for the culture medium as well as its control system. The developed system is to be tested and evaluated regarding its application.

The Institute of General Mechanics is an educational and research institute, teaching core and elective courses in mechanical engineering, biomedical engineering, and international master programs. Moreover, the institute runs in-house testing structural and biomechanical laboratories as well as mechanical and electrical construction workshops to provide and deliver state of the art theoretical modeling, numerical simulations, and experimental validations.