

# Science and Engineering Research Program Project Description

**Institute:** Institute of Mechatronic Systems

**Project title:** Design Optimisation of Gripping Jaws for a Novel Lab Automation Gripper

## Project description:

One focus of research within the IMES medical engineering and image processing group is the automation of tissue engineering processes.

In cooperation with a biological and clinical partner in Göttingen, we pursue the automated manufacturing of small (10-13 mm) heart muscle tissues for implantation as well as preclinical drug screening. Cardiomyocyte-based tissues, derived from induced pluripotent stem cells (iPSC) and filled into molds, have to be handled automatically by a robot.

We developed a specific gripper based on a compliant mechanism to reduce the risk of contamination by abrasive particles emitted by the gripper. The gripper features interchangeable gripping jaws that can be adapted to different handling objects such as Petri Dishes or Falcon tubes. So far, the jaws have been 3D printed and a rubber was added to the jaws to increase the coefficient of friction and compensate for manufacturing inaccuracies due to the 3D printing.

Within this project's scope, these gripping jaws are to be optimized. The primary focus is to evaluate different structural patterns instead of rubber to increase the coefficient of friction between gripping the jaw and handling the object. The evaluation includes the experimental determination of the maximum load the gripper can securely hold on to using only a force-fit grip. Additionally, the way the gripping jaws are fixed to the gripping mechanism, currently done through screws, should be optimized to allow for an easy and maybe even automated change of jaw. Several 3D printers (FDM and SLA) and a mechanic workshop are available to manufacture prototypes.

**Required skills:** CAD experience, design & construction

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