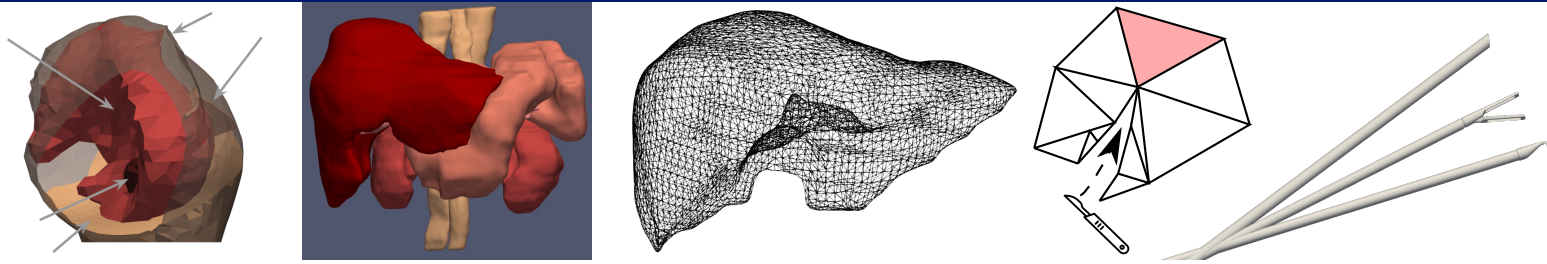# Student Research Assistant Position

Advancing Simulation Methods: Tissue Manipulation and Remeshing

Context

Accurately predicting deformations of organs and their internal structures under manipulation is essential for surgical navigation systems. In our group, data-driven approaches have been developed to address this challenge but are currently limited to the start of a surgery, as the simulated training data lack tissue manipulations. This project aims to overcome this limitation by incorporating cuts into the simulations. The role also includes running the data generation pipeline to create updated training data that accounts for these new features.

Tasks

- Familiarization with the in-house data generation pipeline
- Implementation of cut simulations with a known path (simple case)
- Implementation of cut simulations without a known path, including remeshing
- Implementation of communication between an external mesher and the simulation, including adaptation of the simulation to mesh changes between timesteps (matrix updates)

Requirements

- Programming experience in Python, C++
- Skill in quickly adapting to new frameworks, interfaces, and concepts
- Interest in FEM simulations and basic soft tissue mechanics
- Optional: Experience with the Simulation Open Framework Architecture (SOFA)

Further details:
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