BMT Institut für Biomedizinische Technik
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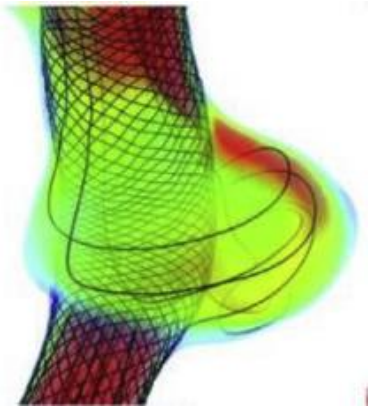
Student Project Announcement

Investigation of Compliance Effect on Hemodynamics in Cerebral Aneurysms with Fluid-Structure Interaction (FSI) Analysis

Background:

Cerebral aneurysms represent a critical health concern, with potentially severe consequences for patients. However, comprehending the complex interplay between fluid dynamics and the mechanical properties of the vessel wall, known as compliance, is vital for proper understanding of rupture risk and treatment efficacy of implants. Fluid-structure Interaction (FSI) simulations offer a robust platform to explore and interpret the behavior of fluid dynamics in anatomical models.

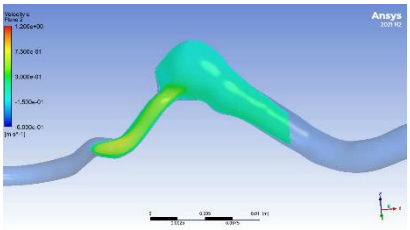


Source:
*h*ttps://doi.org/10.1016/j.medntd.2019.100018

Objective

The main objective of this project is to investigate how the compliance of cerebral aneurysm models affects fluid dynamics. Blood flow through various cerebral aneurysm models will be simulated in Ansys Fluent, applying boundary conditions consistent with in vitro test setups. Additionally, they will validate their simulation results by comparing them with data from two standardized models and one anatomical model.

Tasks:



1. Literature review and report of the state of the art
2. Develop cerebral aneurysm models with varying degrees of compliance
3. Apply appropriate boundary conditions based on in vitro test setups
4. Conduct FSI simulations to analyze fluid dynamics within the models
5. Validate simulation results by comparing them with data from two standardized models and one anatomical model
6. Interpret and analyze results, drawing conclusions on the impact of compliance on fluid dynamics

Start: Immediately

Supervisors:

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