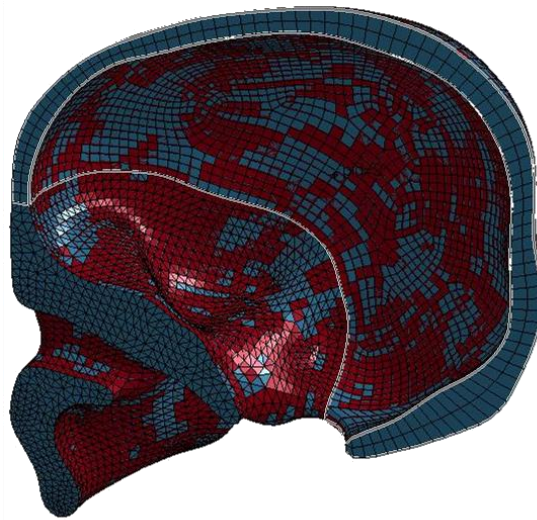


Modelling skull fracture

The Vehicle Safety Division at Chalmers conducts research on different injury types using experimental and numerical techniques. Head injuries are of particular relevance due to the consequences of any impact to the head. Although autonomous vehicles may reduce the number of crashes in the future, there are still serious head injuries arising in crashes involving pedestrians and cyclists that are difficult for current autonomous systems to eliminate.

Injuries are difficult to explicitly model in any research setting and Chalmers is developing finite element models of the human body to enhance our understanding of injury mechanisms and the thresholds for external loads to induce an injury. The current internal models at Chalmers for investigating head injuries need more development and a first area of interest is with regards to the modelling of fracture of the skull.



Objectives:

Using an existing skull model from Chalmers, the project team will develop material properties and a fracture prediction technique that can be implemented in Chalmers head models. The project shall result in the following outcomes:

- 1) Library of experimental data use to calibrate a skull model
- 2) Adapting of material and element descriptions that can simulate fracture
- 3) Verification of model behaviour based on the library identified in 1)
- 4) Comparison of the model to actual injury cases to identify fracture prediction capabilities

Student qualifications

Students from the MPAUT and MPAME with a good background in structure mechanics will be considered first. Students from other programs will be considered if they can demonstrate previous course work or practical experience relevant for the project.

A team of 2 students is recommended for the project.

Supervisor: Robert Thomson, Division of Vehicle Safety, Dept. of Mechanics and Maritime Sciences