

Organization

Lecturer	Martin Ruess , Prof. Dr.-Ing. habil.
Reviews	t.b.a. support in consultation
Workload	180h project-based
Credits	6 ects
Prerequisite	ANSYS/programming skills, basic FEM
Examination	3 review presentations/defense + documented software
Language	English
Online-Resource	Moodle Kurs-Link

Seminar / review presentations

- to document the progress of the project
- to discuss open problems with peers
- 2-3 reviews during the semester

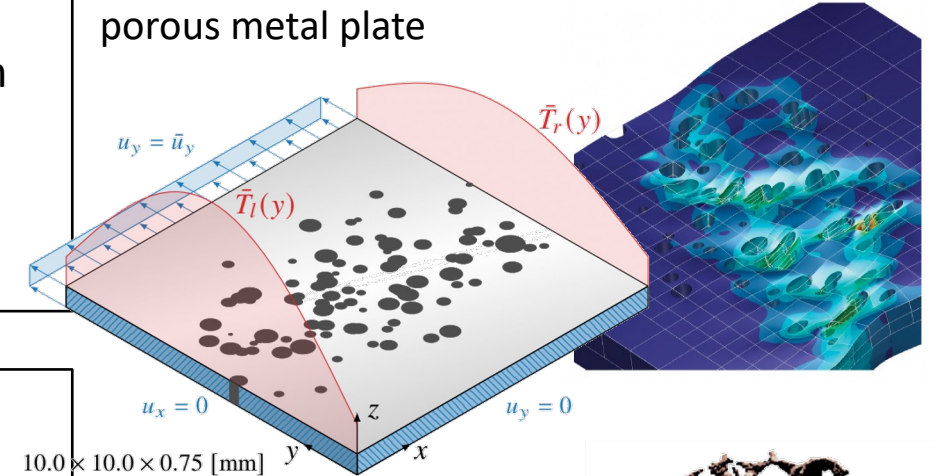
Grading aspects

- quality of the generated software/
software solution
- review performance
- final presentation / documentation

Topic 1 ANSYS modeling & analysis of research relevant models

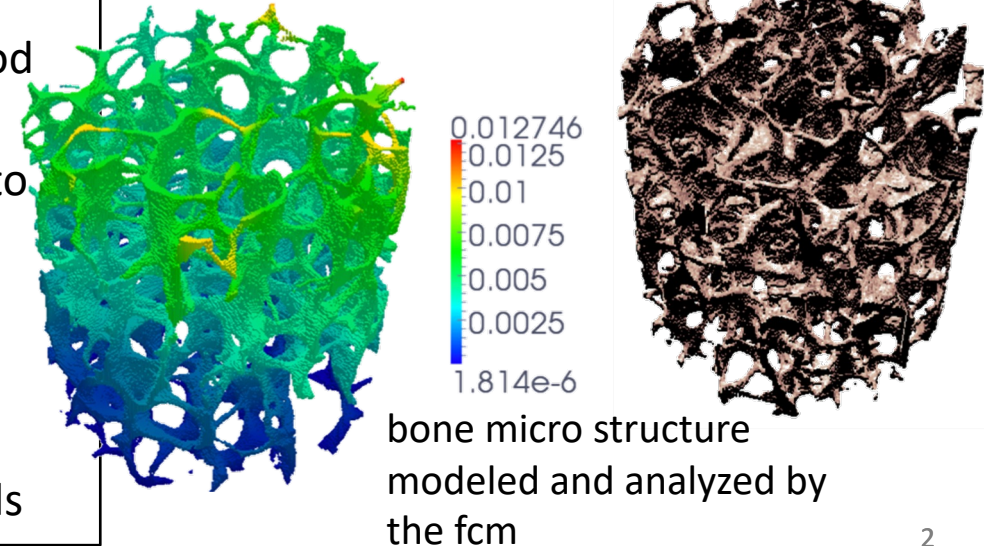
- modeling of a scientific reference model from an active field of research
- analysis, refinement and parameter study
- verification and validation (where possible)
- scientific documentation of the study results

thermo-viscoplastic analysis of a porous metal plate



Topic 2 finite cell method for complex geometries - development and testing of a novel integration scheme

- implementation of a novel integration scheme for the finite cell method (fcm) into an existing Java FEM-framework
- Implementation, careful testing and performance checks, application to complex geometries
- fcm is a novel fictitious domain method with superior performance properties compared to classical FEM
- project covers cutting-edge research in computational mechanics
- supports strong understanding of the principles of FEM-based methods



Further topics ...

- implementation of a **level-set method** to detect and represent geometric boundaries within a fictitious domain analysis method
- integration of **B-splines/NURBS** into an existing FEM-JAVA-framework to enhance isogeometric analysis capabilities
- integration of a two-way **thermo-elastic coupling** into an existing FEM-JAVA-framework
- implementation of a **high-order tetrahedral element** type into an existing FEM-JAVA-framework
- implementation of a **Newmark/generalized alpha solver** into an existing JAVA-framework
- implementation of a **web-application** of an existing JAVA-FEM truss analysis software
- ...