Associate Professorship of Computational Mechanics and Professorship of Wood Technology
Department of Geo, Civil and Environmental Engineering
Technical University of Munich

HFM TUM

Modeling: ★★★★★
Mathematics: ★★★☆☆
Programming: ★★★☆☆
Science: ★★★★☆

Software Lab:

Advanced modeling of biological materials

Setting

Biological materials such as wood and soft tissues exhibit complex material behaviour like anisotropy, strain-rate, moisture and temperature dependency. Although basic models for biological materials are available in commercial FE-codes, they are only capable to cover some aspects of the complex material behaviour. User-defined models are needed to extend the basic models for more complex loading scenarios. Moreover, having a good knowledge about these materials will ease the prediction of the post elastic behaviour for other composites and fibrous materials. Therefore, the application of the developed material model can be extended for other materials as well.
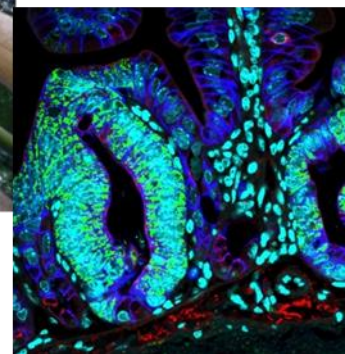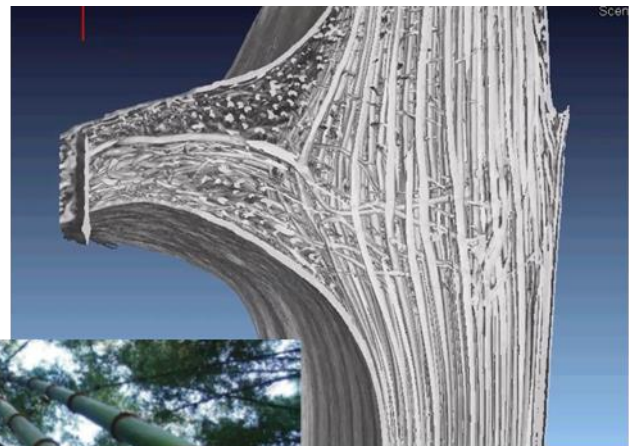
Task

Extend existing material model for biological tissues to:

- Cover temperature and moisture variation effects
- Include strain-rate-dependency effects
- Verify the model in simple standard load cases

Software to use

- LS-DYNA or ABAQUS
- FORTRAN for user-defined material modelling

Supervisors

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References
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[2] Holzapfel, G., Biomechanics of soft tissue, The handbook of materials behavior models, 2001