FAKULTÄT FÜR
BAU- UND UMWELTINGENIEURWESEN
INSTITUT FÜR MECHANIK DER
WERKSTOFFE UND STRUKTUREN

WoodComp3D

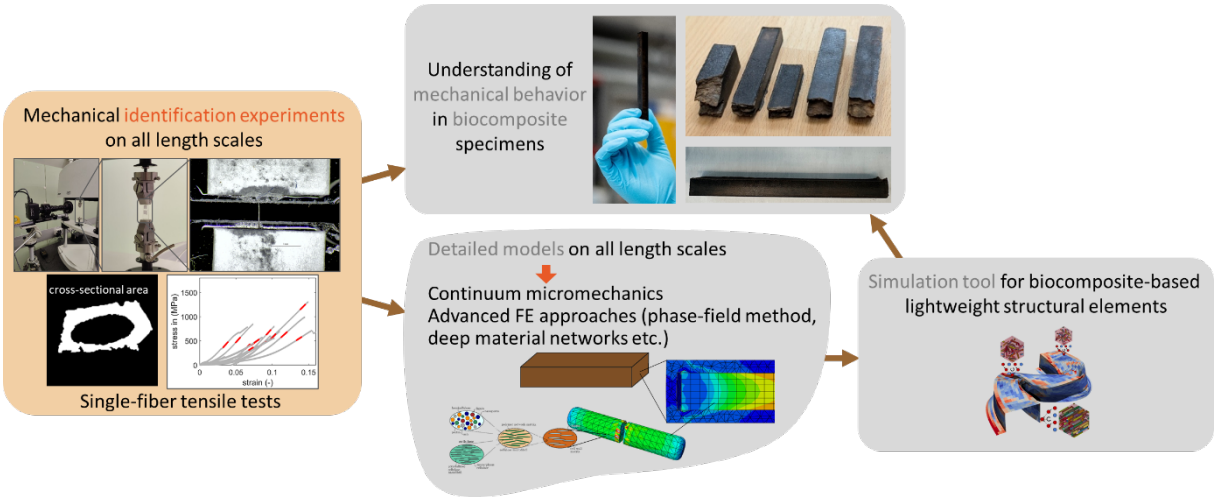
Master's Thesis

Experimental single-fiber testing for wood-based biocomposites

The Christian Doppler Laboratory for Next-Generation Wood-Based Biocomposite (WoodComp3D) develops processes for producing and characterizing sustainable biocomposite materials from sawmill by-products. Our goal is to create a biocomposite material using the main constituents of wood (fibers, lignin, extractives, etc.) with significant mechanical properties and, in parallel, a production and design concept for next-generation biocomposite elements.

A key step in this development is understanding the **mechanical behavior of single fibers** obtained from innovative pulping and activation processes. Such single-fiber tests provide crucial input for characterizing fiber integrity, strength, and bonding potential, parameters that strongly influence the performance of the final biocomposite.

In this thesis, experimental methods for **single-fiber tensile tests** will be applied and further developed. Modern evaluation techniques will be used to extract fiber-level properties. The work is embedded in an interdisciplinary team of civil engineers, process engineers, and chemists, contributing experimental data that will also serve as validation for multiscale simulation models of the CD laboratory.



This thesis will contribute to the mechanical identification of fiber-level properties (left), which will be used as input for advanced multiscale simulation approaches (middle, bottom) to develop 3D material models for biocomposite elements (right) and improve the understanding of the mechanical behavior of this new type of material (top).

Supervisor & Team at IMWS:
Markus Lukacevic, Head of CD laboratory | Gabriel Unsinn, PhD Candidate | Luis Zelaya, Postdoc
Contact: markus.lukacevic@tuwien.ac.at
For more information on the CD laboratory, please see: https://woodcomp3d.at