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# Aalto University's approach to modern wood building innovations

Steven Collins  
Professor of practice  
Industrial Wood Construction

A long, light-colored wooden beam is positioned horizontally across the frame. It is equipped with several small sensors or transducers, each secured with a metal bracket and a screw. Black wires are connected to these sensors and run across the floor, which has several circular air vents. The background shows a clean, industrial laboratory environment with various pieces of equipment.

# Research Vision:

**Push and drive the resurgence of wood  
construction through knowledge and innovation**



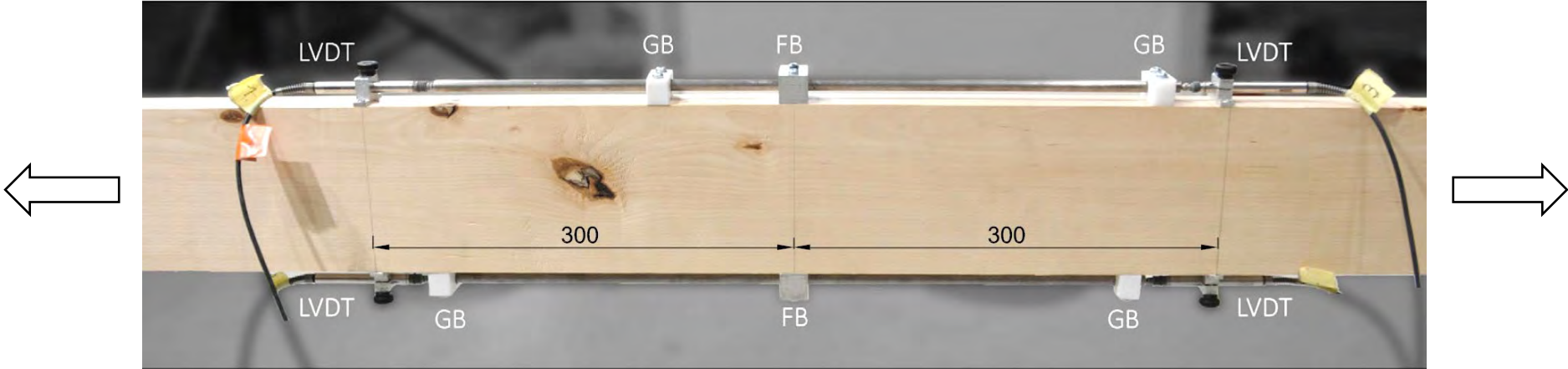
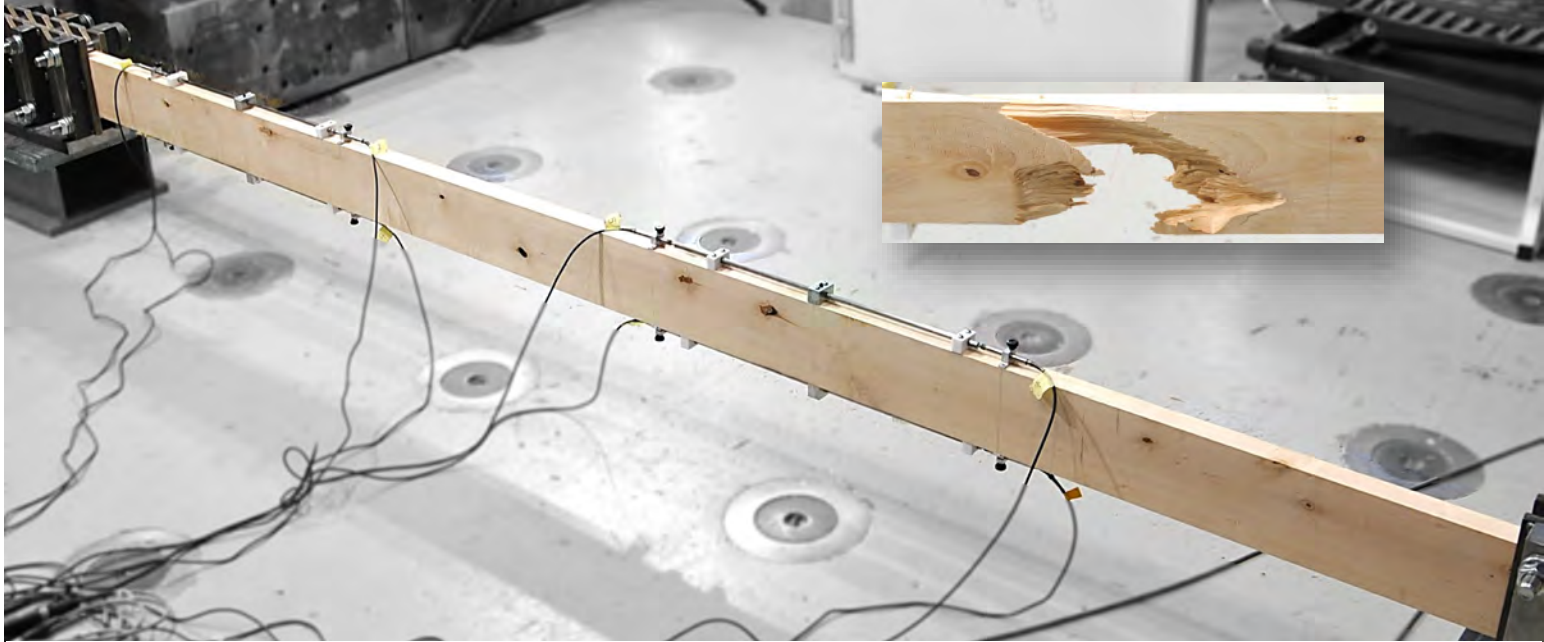
**Research  
Vision:**

**Push knowledge  
Drive innovation**

# **Research Topic 1: Mechanical characterisation of underutilized wood**

# Research on the engineering properties of birch

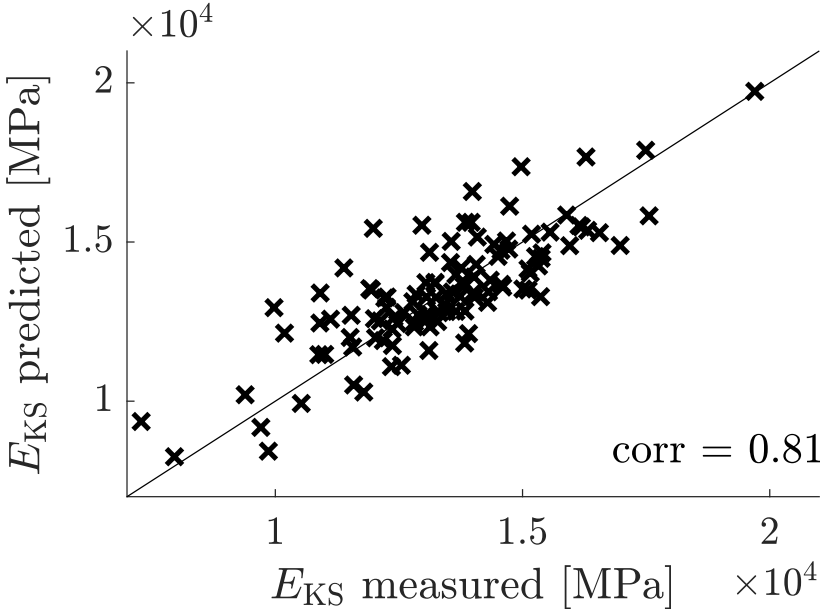
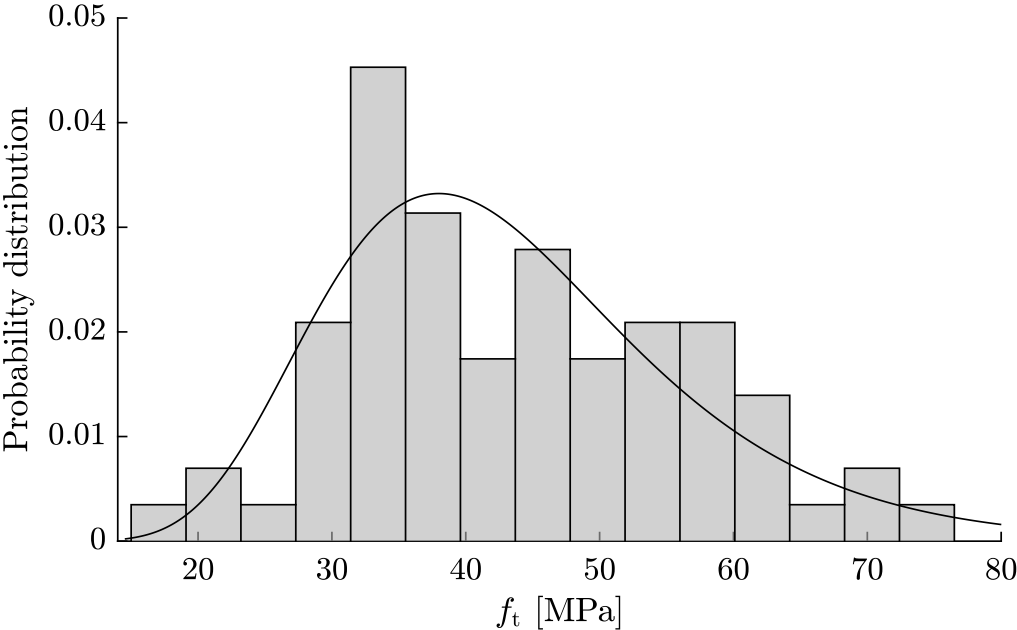
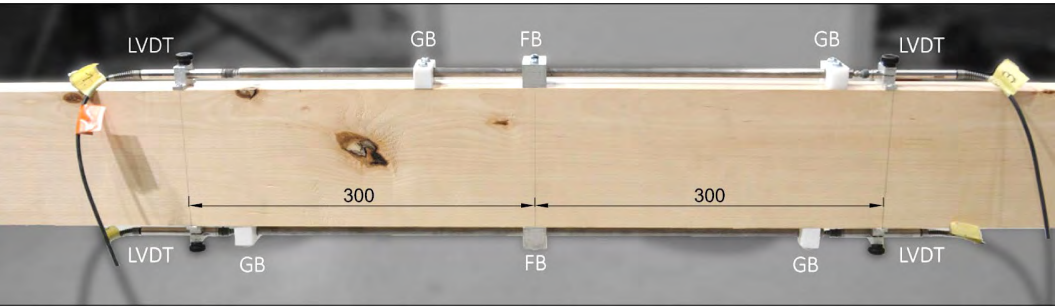
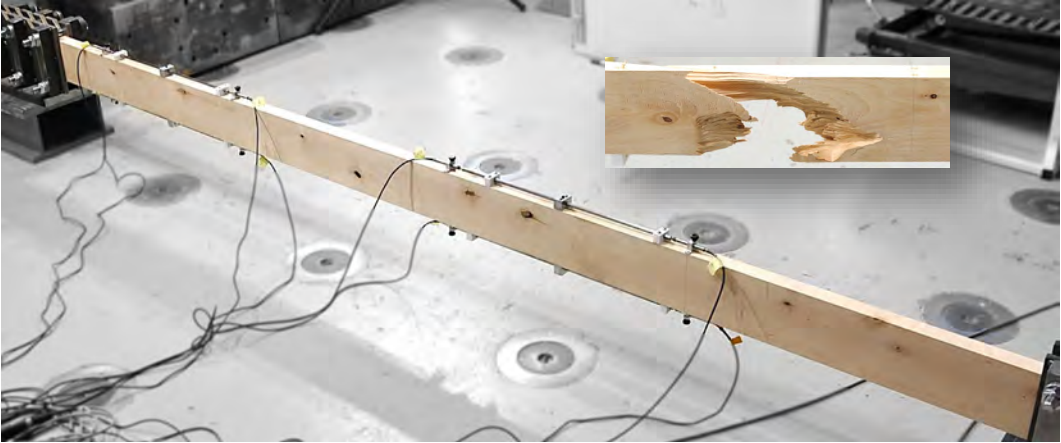
Birch  $E = 15-16 \text{ GPa}$   
Spruce  $E = 10 \text{ GPa}$

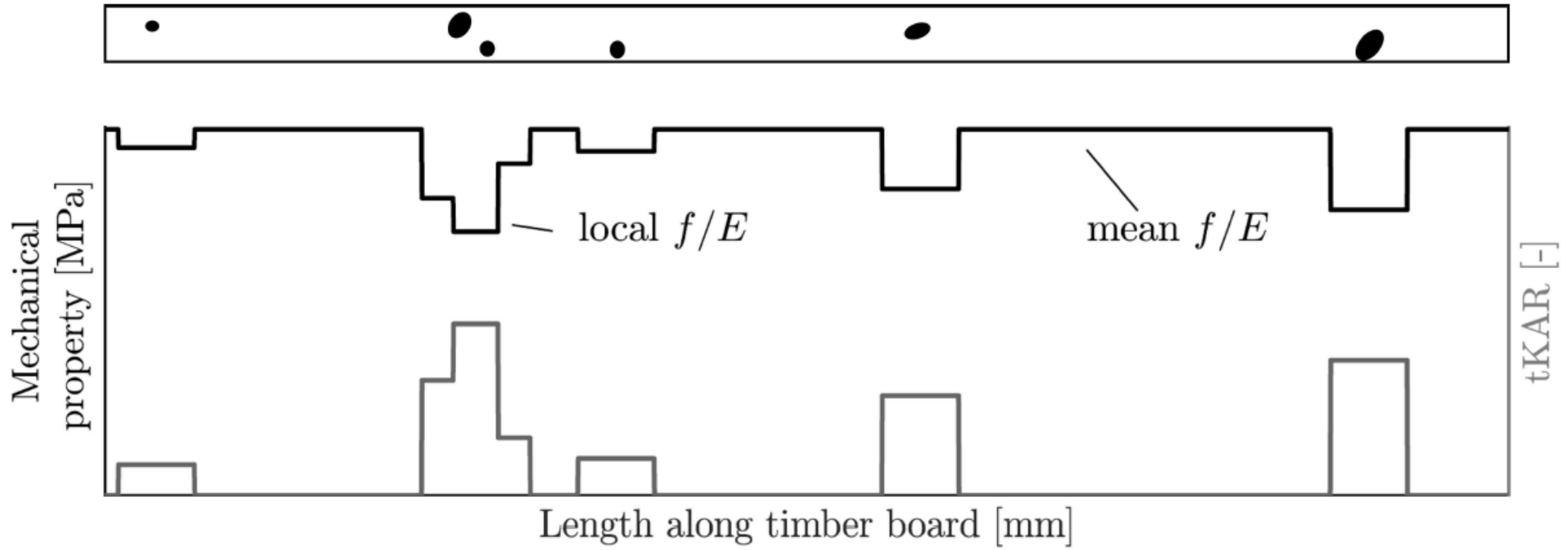


**A!**

# Research

## Birch strength and stiffness





**A!**

# **Research Topic 2: Wood product optimization**

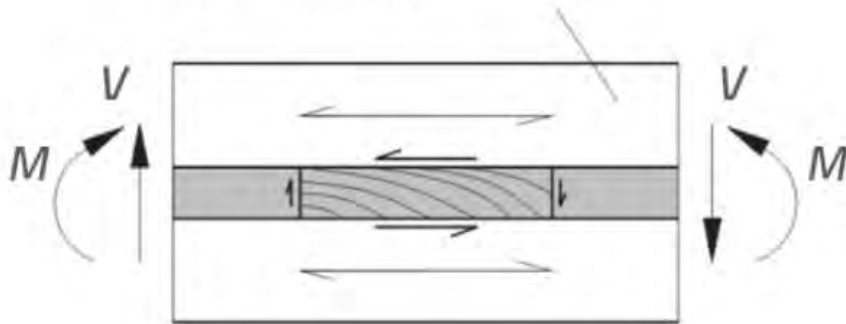
A close-up photograph of several stacked wooden planks, likely made of softwood, showing their natural grain and texture. The planks are arranged horizontally and slightly offset from each other. The background is dark with out-of-focus circular light spots (bokeh) in shades of purple, blue, and white, suggesting an indoor setting with decorative lighting.

Hardwood in CLT?

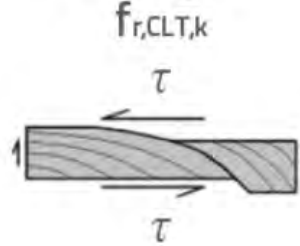
# Rolling shear behaviour in detail



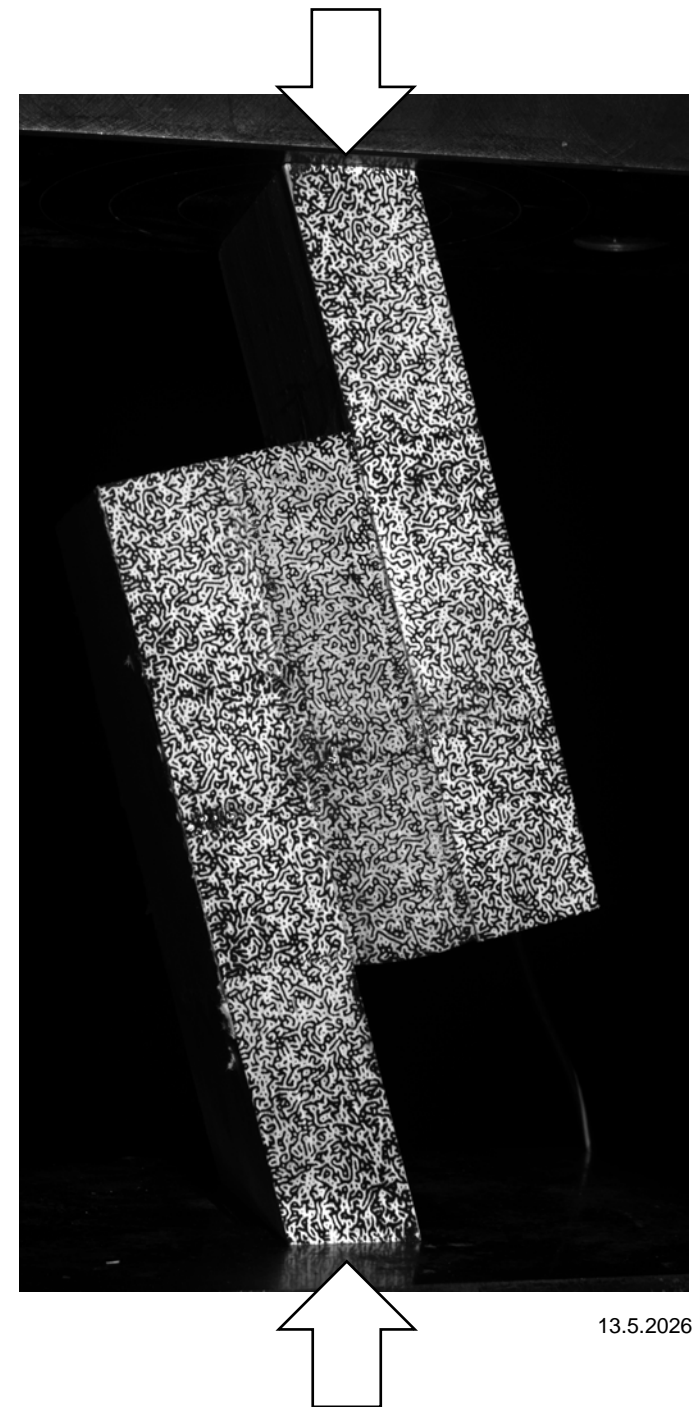
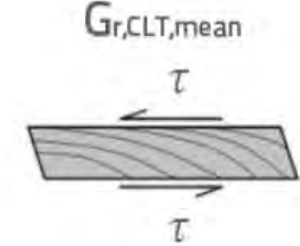
Shear strength  $f_{v,CLT,k}$   
Shear stiffness  $G_{CLT,mean}$



Rolling shear strength

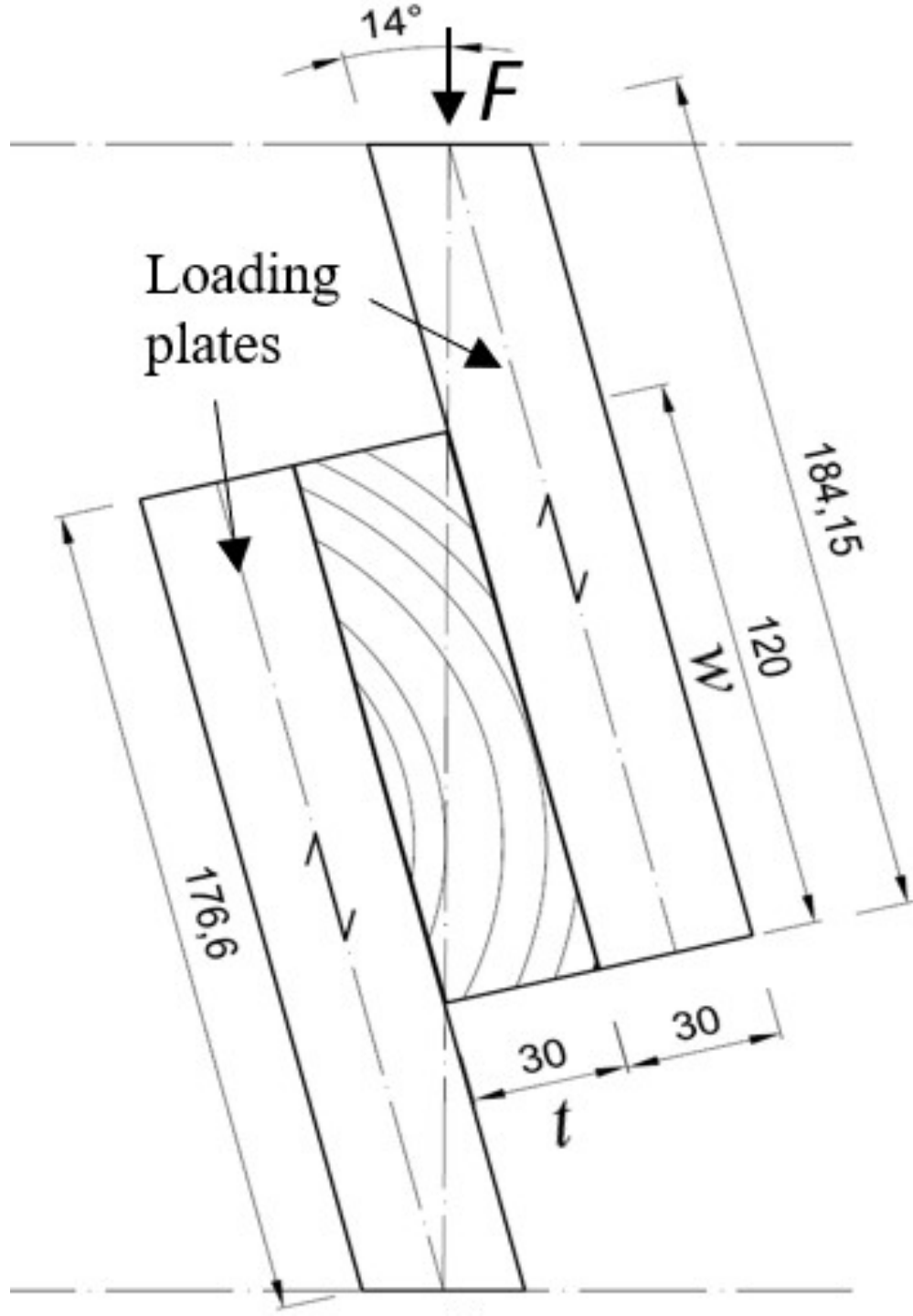
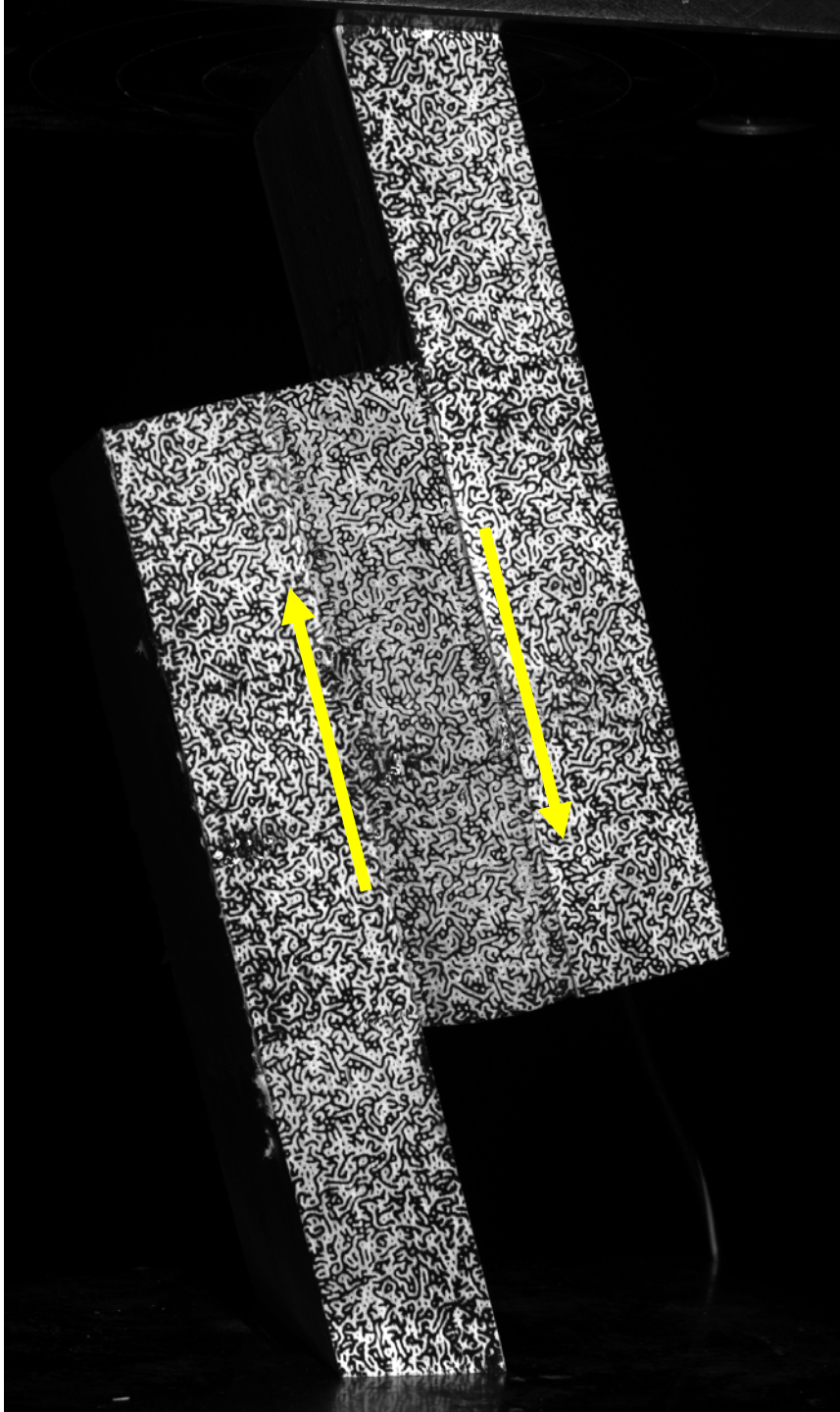


Rolling shear stiffness



**A!**

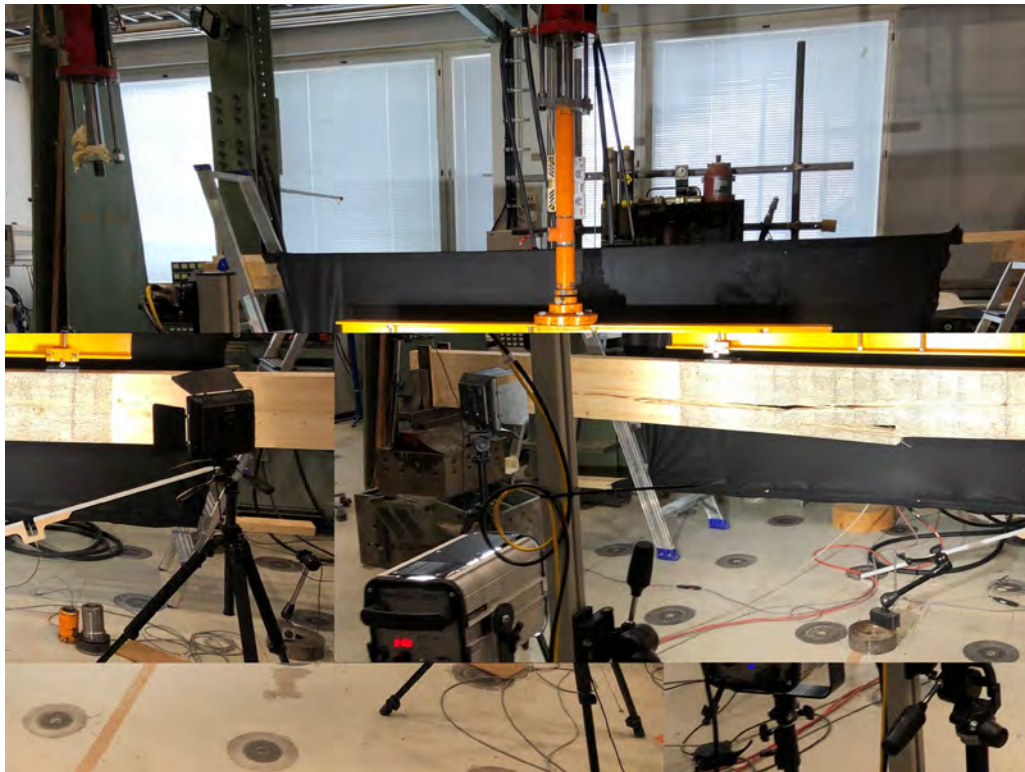
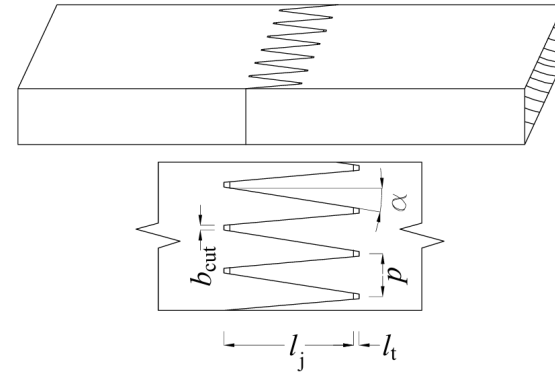
**A!**



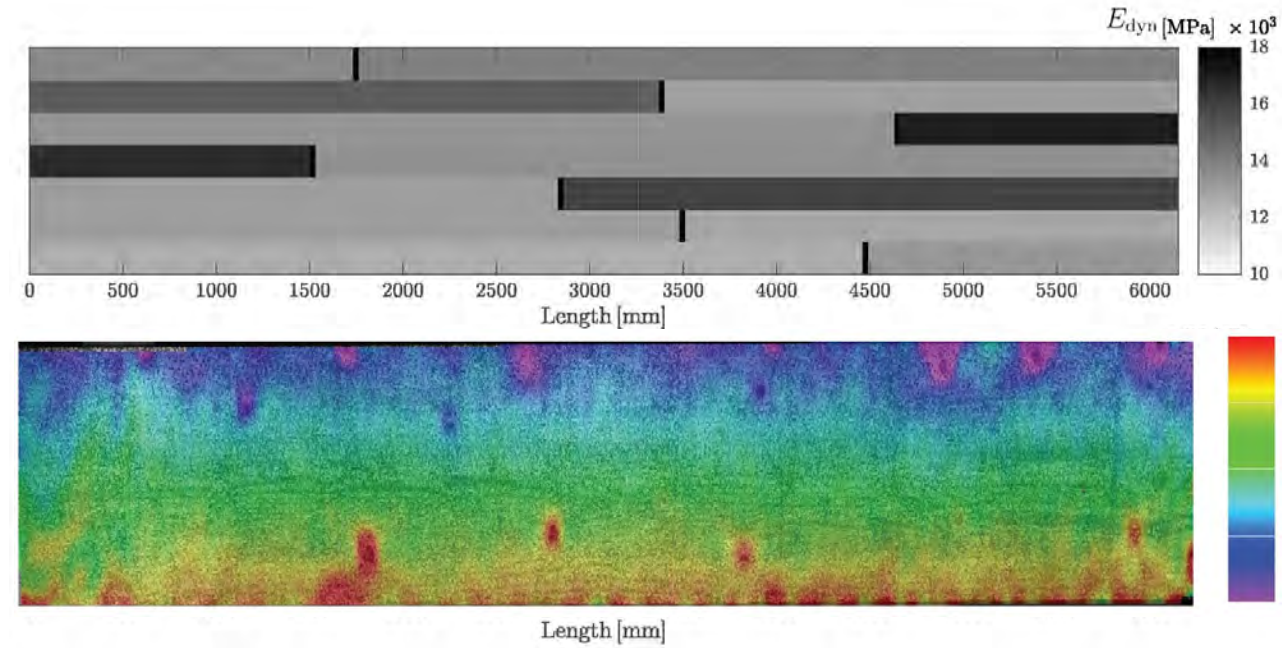
# Optimization of GLT



# Optimization of GLT



Images: Farid Vafadar



# **Research Topic 3: Circular and cascading use of wood**

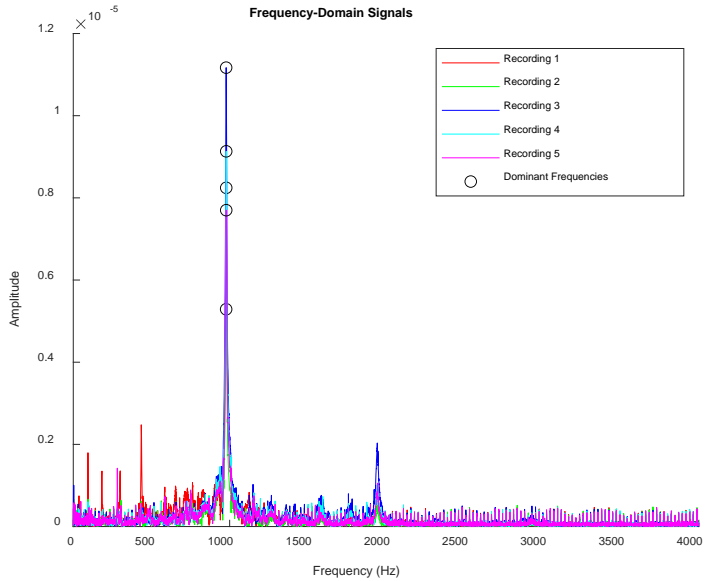
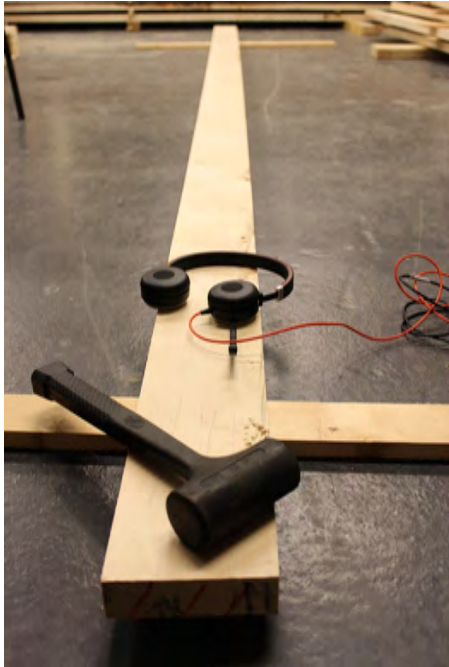


Image: Gengmu Ruan



**A!**

# Quality assessment and reuse methods for salvaged wood materials



A!

# Aalto Wood Construction Group



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HAMK

- Mechanical characterisation of **underutilized** wood resources
- Optimized and efficient wood products (GLT, TCC, plywood)  
See more from their posters!
- Circular/cascading of wood resources

# Experimental Log House

Log house(s) will be built in Otaniemi to study:

- Sink or settlement
- Shakes and splits
- Weather-tightness
- Energy Efficiency
- Durability



Image: Kiiruna Talot

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**Thank you!**



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# Professor of Practice

- Project collaborations with XAMK and wood construction industry
- Strengthen national and international level research activities
- Strengthen RDI activities at the Noheva Technology Park
- The R&D activities of companies are supported through research activities, theses, and the supervision of dissertations



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