



Eberswalde University  
for Sustainable  
Development

# Working Group 'Chemistry and Physics of Wood'

Development | Application | Networks



*'The goal of the DANUBE research network is to collaborate with the wood industry to develop methods of improving the properties of wood, using few or no fossil-derived or environmentally harmful substances, and to bring the new wood products to an application-ready state.'*

*Prof. Dr.-Ing. Alexander Pfriem*



## What we research

We make the use of wood more sustainable. Our objective is to provide wood with special properties and to extend its field of application. At the same time, we want to use less wood for the same application. This means the use of wood becomes more economical and sustainable, and possesses a strong potential for innovation.

We conduct fundamental materials research and development to modify wood, and we explore the chemical and physi-

cal processes of modification. Thanks to improved measuring methods in wood physics and based on detailed measuring results, we can, for instance, present the latest developments in wood drying processes. Beyond that, we investigate the chemical and ultrastructural properties of wood. To achieve useful and sustainable applications, we are looking for wood-technology-oriented process technologies. In short, we want to make wood even better.

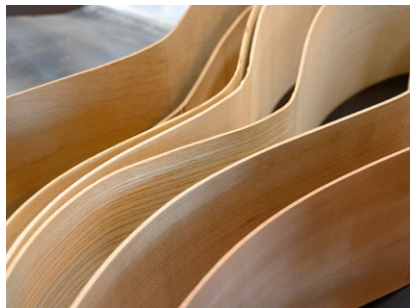


## Wood used in acoustics – regional woods that can reflect sound

Jointly with our project partners, we improve the tonal and optical properties of domestic wood through thermal modification. This provides an alternative to tropical woods protected under CITES, which up to now have been commonly used for making musical instruments.

Our SubMat4Music network project brings scientists, resonance-wood producers and dealers as well as instrument makers together to use modified wood. The objective is to open up new

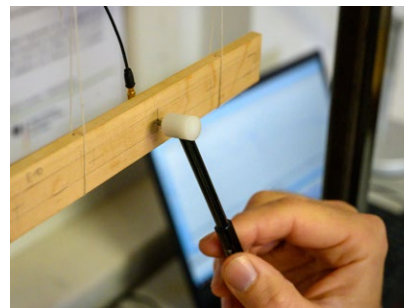
sonic possibilities and to exchange experience in the network. We have reproduced and improved the acoustic properties of resonance wood to provide durable products that are highly appreciated by our customers. Our vision is to develop technical solutions within the network, to share knowledge between theoreticians and practitioners, and to provide sustainable solutions.



Sample material



Production of guitar ribs



Examination of vibration properties



### RESEARCH PROJECT 'THERMAL GUITAR'

*Thermal modification: improving the sound and optical appearance of domestic woods and substituting them for endangered tropical woods.*

*Fingerboard: increasing hardness and enhancing abrasion resistance; applying new technology for rib bending.*





#### RESEARCH PROJECT 'WOODEN BIKE'

*Design-focused development of wood materials and testing of mechanical properties: testing deformation behaviour, torsion, and spring-back effect.*

*Adjusted CNC machining process technology to ensure consistent manufacturing quality.*

*Surfaces development: selection of appropriate adhesives and coatings for the production of weather-proof material compounds.*

Examples of our research and development activities

## Wooden e-bike & bamboo rollator – wood moves them forward

We use wood and wooden materials to develop mobility solutions. We reduce the carbon footprint by replacing metals with natural wood materials. As a result, adapted wood materials are created by means of materials testing and process technology solutions. In developing a rollator, the research project

aims to develop a prototype that meets the demands of bio-economics. In addition, we aim to comply with the three pillars of sustainability: economic viability, environmental protection, and social equity. And our rollator must meet the high demands of customers using age-related walking aids (rollators).



Pressing the workpiece.



Glue-laminated ash lamellae.



CNC processing.

## Joint research and development work

Our research projects tackle application-oriented issues raised by industrial and commercial enterprises. The objective of our networks is to develop methods of improving the properties of wood in collaboration with the wood industry. We seek to achieve these improvements by using few or no fossil-derived or environmentally harmful substances and to make them ready for application. This will thus open up exciting possibi-

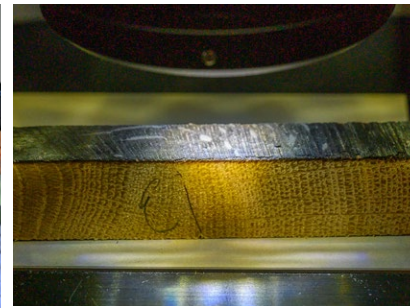
ties for German educational and research institutes to collaborate with companies engaged in the wood industry as well as with local enterprises and research institutes in the associated countries. We connect traditional knowledge with modern know-how. Our vision is to implement innovation in the sustainable use of wood through international knowledge transfer.



Sample material



Microscopic study of wooden surface



Sample material dried in vacuum dryer



Current research and development projects until 2021



## Exchange and initiation

In our networks, we are engaged in three main areas:

- Exchange among scientists and experts on knowledge transfer and research project initiation.
- Involvement of other partners such as users, students, or stakeholders in seminars and workshops on wood quality, the use of wood, improvement of wood properties, new materials and their applications.
- Participation in conferences and publications in media adjusted to the specific topic.

Come and join us! Become part of our networks and work with us to make wood even better

For our world. For our climate.

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### IMPRINT

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