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Announcement

Think outside of the wooden box!

PhD Workshop Hamburg – COST Action FP1407

“Advanced understanding of the structural influences of bio-based lignocellulosic materials - Future industrial applications in high added value wood modification products.”

Monday 3rd – Wednesday, 5th July 2017

University Hamburg
Centre of Wood Science and Technology
Leuschnerstraße 91 c
21031 Hamburg, Germany
phd-cost.min@uni-hamburg.de

SCOPE

Wood as a porous, three dimensional, hygroscopic, viscoelastic and anisotropic bio-polymer composite is not yet understood completely. The gap in fundamental understanding of the highly complex anatomical, chemical and physical structure of lignocellulosic materials constrains the development of innovative wood-based products.

The European wood-based panel and composite sector is composed of cost-driven industries, which lack the high-performance products that are required by an emerging bio-economy. Young researchers in independent research institutions are urged to generate, deliver and connect knowledge, which then drives real innovation in the industry. Environmental friendly building materials require elevated resistance to physical and chemical factors as well as biodegrading agents. Especially wood modification and bio-composite design aim at enhancing product performance. Extending the life span of these products enables the European market to strengthen cascade utilization, hence broadening the resource base, storing carbon dioxide and saving process energy in the long-term.

The PhD workshop in Hamburg aims at connecting ideas of young researchers, active in adjacent topics such as process engineering, building physics, wood and material science. Following a holistic hands-on strategy, the programme involves specialists from the wood biology, chemistry and physics. Addressing topics such as anatomical analysis, physical and chemical modification as well as characterization, the workshop intends to cross-link the participants' competences. The environmental impact will be investigated via the assessment of wood and modified wood products.

This shall yield an advanced knowledge on how wood structure influences behaviour of renewable high-performance biomaterials. The results of the workshop may lead to ideas outside of the "wooden box", benefiting each partner institute as well as the sector as a whole.

Preliminary session contents

DESCRIPTION

The essentials of wood physics, anatomy, chemistry and processing technologies.

It is an explicit intention to host participants from different backgrounds, e.g. biotechnology, process engineering, material science etc. The basic session aims to ensure a successful communication by introducing a common terminology and a similar level of understanding. Therefore, a hands-on crash course will be held within the laboratories of Thünen and University Hamburg. The participants will be teamed up into four heterogeneous assignment groups to strengthen the social cohesion and prepare for the upcoming sessions. The assignments will relate the four topic sessions to the excursion day.

SPEAKER

Prof. Dr. A. Krause
(University Hamburg)

Prof. Dr. B. Saake
(University Hamburg)

Dr. Dr. h.c. U. Schmitt
(Thünen Institute)

0. BASIC

Wood-water relations: Is water a main component of lignocellulosic materials?

Lignocellulosic plant parts are designed and optimized to function in water-saturated conditions. Our understanding of how the three main biopolymers interact with water is based on theoretical assumptions. Alternative concepts and recent analytical methods raise new questions. The session shall shift the perspective towards the key component water and its role in wood.

Dr. Emil E. Thybring
(University of Copenhagen)

Prof. Dr. M. Fröba
(University Hamburg)

1.

Performance of wood products: What are the theoretical potentials and how do they translate into practical values?

Wood and natural fibre modification and functionalization can lead to wood products and composites with improved performances or novel properties. However, it is a difficult task to develop and implement processes, which are environmentally friendly, cheap and can be easily up-scaled. An intense discussion about the underlying concepts and existing limitations shall encourage the participants to think out of the „wooden box“. Together they will identify and elaborate the current progress, potentials, and challenges. The session aims to generate blueprints for high-performance products.

Prof. Dr. I. Burgert
(ETH Zurich)

Prof. Dr.-Ing. Jörg Müssig
(Bremen University of Applied Sciences)

2.

How do wood based products impact the environment?

3. *In this session, an environmental assessment of modified wood products shall show the participants how life cycle assessment is applied. The session is based on a general introduction, followed by a demonstration of favoured software. After that the participants get the chance to apply the knowledge to a specified product with a following group debate.*

Dr. Stefan Diederichs
(Ministry of Environment
and Energy, Hamburg)

Prof. Dr. Callum Hill
(JCH Industrial Ecology
Limited)

Advanced processing of lignocellulosic materials: Where to find higher added value?

4. *The European wood, wood-based panel and composite sector is to its largest part a cost-driven industry which, in consequence, lacks high performance products required by a competitive bio-economy. In this session, the key speakers will provide a general overview on markets and product classes as well as on scientific knowledge transfer to push innovative technologies from research into the industry.*

Prof. Dr. M. Irle
(Ecole Supérieure du Bois,
Nantes)

Hugo Piccin
(Faurecia)

Best-practice examples of wood/lignocellulosic utilization: Which high-value products are currently being researched or produced?

5. *Within recent decades, various wood composite categories and wood modification methods have been subject of intensive research. However, only relatively few of the scientifically proven concepts have been converted into a marketed product. Wood plastic composite resp. natural fibre reinforced composites or acetylated and thermally modified wood are some of the rare examples of successful market introduction. Other topics such as the industrial utilization of hardwood and increased use of secondary wood resources, despite being subject of extensive research and interest, have shown less dynamic development. In this session, we aim to disclose factors that may foster or restrain the market success of innovative wood products.*

**Prof. Dr. Dr. h.c. A.
Teischinger**
(University of Natural
Resources and Life
Sciences, Vienna)

Timetable

	Time	Monday	Tuesday	Wednesday	Thursday
morning	8:00 - 12:00	Reception and basic session	2. Session	4. Session	Complementary Innovawood event (voluntary)
lunch	12:00 - 13:00	Lunch	Lunch	Lunch	
afternoon	14:00 - 18:00	1. Session	3. Session	5. Session	
evening	18:00 - open	Get together + dinner	Guide through Institute + dinner	Dinner + discussions	

Organization board



M. Sc. Julius Gurr

Research associate / PhD. Student
UHH Centre of wood science and
technology
Research group:
Prof. Dr. Andreas Krause

Research topics:

-*In situ* polymerization of olefins in wood

Lectures:

-Wood physics
-Construction science



M. Sc. Oliver Mertens

Research associate / PhD. Student
UHH Centre of wood science and
technology
Research group:
Prof. Dr. Andreas Krause

Research topics:

-Processing technologies and material
characterization of wood plastic composites

Lectures:

-Wood engineering and construction
-Construction science



M. Sc. Goran Schmidt

Research associate / PhD. Student
UHH Centre of wood science and
technology
Research group:
Prof. Dr. Jörg B. Ressel

Research topics:

-Lignocellulosic composites and processing
technologies in lesser developed countries

Lectures:

-Wood quality evaluation
-Elasticity and strength theory



M. Sc. Martin Nopens

Research associate / PhD. Student
UHH Centre of wood science and
technology
Research group:
Prof. Dr. Andreas Krause

Research topics:

-Wood-water relations

Lectures:

-Woodworking machinery
-Construction science

VENUE & TRANSPORT

The workshop will take place in Hamburg-Bergedorf, about 30 min away from Hamburg-City and 50 min away from the Hamburg-Airport with public transportation. Visiting Hamburg-City will be possible as a recreational activity. Travel arrangements to and from Hamburg will be made by the participants individually. During the event transportation will be provided.

APPLICATION

The target group for this workshop are researchers in the PhD phase and early post-doc researchers. The COST FP1407 will reimburse 15 selected participants with the fix grant of 750 EUR. The priority will be given to EU13 and gender balance.

Application should be sent as a single document pdf containing **CV**, **motivation letter** (max. 150 words) and a **research abstract** (max. 150 words). Please send us your application latest by **1st June, 2017** to the e-mail address: phd-cost.min@uni-hamburg.de. The successful candidates will be announced on 5th June, 2017. Participants can receive a certificate about 4 ECTS.

COMPLEMENTARY EVENT BY INNOVAWOOD

InnovaWood (IW) integrates European networks in the Forest, Wood-based and Furniture industries into a more effective mechanism to support innovation in these sectors. Hence, IW is the perfect partner to additionally offer a complementary event following the PhD workshop. Successful applicants will have the opportunity to join the IW excursion event at their own costs. In your applications, please mention whether you are interested to join.



The event takes place on **Thursday, 6th July, 2017, from 8 am – 4 pm** and comprises three industry visits at Ilim Timber, Huettemann and Egger as well as a workshop afternoon.
