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HEALTHY AND SUSTAINABLE RENOVATION WITH RENEWABLE MATERIALS

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BOOK OF ABSTRACTS

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EVROPSKA UNIJA
EVROPSKI SKLAD ZA REGIONALNI RAZVOJ

Keynote Address

2021

Lisanne Havinga, MSc. PhD

Assistant Professor Building Performance and Principal Scientist System Integration, Technische Universiteit Eindhoven

Lisanne Havinga is Assistant Professor at the Building Performance group at Eindhoven University of Technology (TU/e) in the Netherlands. She is also Principal Scientist System Integration of the Eindhoven Institute for Renewable Energy Systems, and part of the management team of the institute. She received her Ph.D. in 2019 from TU/e, titled 'Advancing Post-War Housing: Integrating Heritage Impact, Environmental Impact, Hygrothermal Risk and Costs in Renovation Design Decisions'. Her research focuses on developing modeling and simulation strategies to support decision-making in the energy transition of the built environment. Core topics include the optimization of renovation decisions using parametric exploration of housing variations, user behavior and renovation solutions. A holistic assessment of environmental impact, incorporating life cycle assessment and circularity, is a priority in her work. Lastly, she focuses on setting up interdisciplinary collaborations to develop multi-scale, multi-carrier, dynamic models that support system integration and decision-making across scale levels (technology-building-neighborhood-city-region-country) and sectors (mobility, industry, built environment). The evaluation of innovative technologies and their potential in addressing the key challenges of the energy transition is a priority.

In recent years, she's contributed to the development of the Climate Agreement of the Netherlands by developing 'the Renovation Accelerator', a subsidy program that was recently launched, aiming to accelerate the large-scale renovation of the housing stock. In this context, she's been an advisor and led research projects for multiple governmental organizations in the Netherlands. In addition to working for governmental organizations, she has built consortia with a wide variety of industry partners. Although she only recently was awarded her PhD thesis, she has already developed a substantial track record of publications and is already building teams of PDEngs, PhD's and postdocs on the topics 1) circularity/LCA, 2) sustainable renovation, 3) urban energy transition. She has been guest-editor for Renewable and Sustainable Energy Reviews and has authored publications for journals such as Building and Environment, Renewable and Sustainable Energy Reviews, Energy and Buildings and Journal of Cultural Heritage. She is a frequent reviewer for these and more academic journals and has been a member of several scientific committees of international conferences. She was chief editor (together with Emanuele Naboni) of the book publication 'Regenerative Design in Digital Practice'.

AGENDA

10. 6. 2021

2021

8:30 | Zoom Open

9:00 | Opening

Dr Michael Burnard, InnoRenew CoE Deputy Director

9:05-9:35 | Keynote

Lisanne Havinga, Assistant Professor, Building Performance group, Eindhoven University of Technology

9:35-11:05 | Engineering and Design

9:35 Boris Azinović, Experimental investigations of innovative seismic resistant CLT connections

9:50 Igor Gavrić, Hybrid timber-steel shear wall system for multi-story modular construction

10:05 Urban Kavka, Collecting Wood Waste Generated During Construction of InnoRenew CoE Building in Izola

10:20 Uroš Gantar, Near zero waste energy window – wooden window for reuse and cascading use

10:35 Mika Keskisalo, Form factor for efficient low carbon construction

10:50 Laetitia Marrot, Developing electrically conductive materials through thermal conversions of hemp stalk wastes

11:05-11:30 | Coffe Break

11:30-12:30 | Cultural Heritage

11:30 Janez Kosel, Growth of xerophilic fungi on model paint samples on glass and wooden supports under low humidity conditions

11:45 Ana Slavec, Social mechanisms to engage visitors in cultural heritage monuments preservation

12:00 Tim Mavrič, Towards a common framework for wood architectural heritage conservation in Slovenia – a preparatory overview

12:15 Veronika Kotradyova, Evaluation of Residential Buildings Adaptation their Interiors in a Rural Environment with a Deeper Interdisciplinary Analysis of 3 Localities in Slovakia

12:30-14:00 | Lunch

14:00-15:15 | Health and Well-being

14:00 Henrik Heräjärvi, Dependence of virgin and recycled Scots pine heart- and sapwood VOC emissions on indoor relative humidity conditions

14:15 Mateja Erce, User needs and perspectives on technologies or healthy ageing

14:30 Mark Dewsbury, Unhealthy advances in Australian building regulations

14:45 Sabina Jordan, Temperature-based approach for assessing buildings in terms of providing thermal comfort for occupants

15:00 Nastja Podrekar Loredan, Development of the School furniture suitability questionnaire (SFS-Q)

15:15-15:30 | Coffe Break

15:30-16:15 | Mixed Topics - Full Presentations

15:30 Lea Primožič, Three-pillar paradigm of sustainability and its communication in the wood industry – IKEA Group case study

15:45 Jan Vcelak, Prevention of mold formation based on continuous condition monitoring of timber constructions

16:00 Dennis Jones, The application of bicine or tricine for limiting termite attack of thermally modified wood

16:15 | Closing

AGENDA

11. 6. 2021

2021

8:30 | Zoom Open

9:00 | Opening

Dr Michael Burnard, InnoRenew CoE Deputy Director

9:05-10:20 | Mixed Topics - Short Presentations

9:05 Filip Majstorović, Strengthening of flax textile-reinforced cement-based composite materials by the addition of pozzolans

9:10 Viktor Bukovszki, Smart contract affordances for energy communities

9:15 Petra Horvat, Relevant knowledge management approaches in the civil engineering research organizations and short overview of current situation in selected Slovenian public research organizations

9:20 Anja Jutraz, Renovation of outdoor school environment to ensure healthy environment for pupils

9:25 Lei Han, Creep Behaviour of Densified Wood

9:30 Tamás Storcz, ANN Supporting EDS Building Optimisation

9:35 Kaja Kastelic, Assessing spinal posture while back supported sitting: a review of techniques used

9:40 Sidra Aslam, Mutable and Privacy-aware Decentralized Ledger for Data Management in Wood Supply Chain Environments

9:45 Esakkiammal Sudha Esakkimuthu, Optimization of polyphenols extraction from spruce bark

9:50 Ozlem Ozgenc, Increasing The Weathering Durability of The Wood Surface with Tree Bark Extractive Solution

9:55 Kelly Peeters, Extraction of phenolic compounds to determine its concentration in olive mill waste water

10:00 Vesna Starman, Education for a Sustainable Future

10:05 Erwin M. Schau, Metrics for LCA and carbon footprint of bio-based materials and processes: New indicators and normalisation factors for EN15804

10:10 Luca Versino, Perspectives of wood-based products for acoustic purposes in building

10:15 Václav Sebera, Electric guitar neck from densified poplar? Experimental and numerical analysis

10:20-10:50 | Coffe Break

10:50-12:05 | Information and Computing Technology

10:50 Richard Acquah, BIM Based Simulation Of Fire And Smoke Spread In Timber Buildings

11:05 Zsolt Ercsey, Sensitivity Analysis Supporting Building Optimisation

11:20 Kristóf Roland Horváth, Simulation Database Development Supporting Building Optimisation

11:35 Adam Katona, Evaluation and optimizationof different wind tower geometries for passiveair conduction systems with CFD simulations

11:50 Sebastjan Meža, Circular Economy And BIM In Civil Engineering

12:05 | Closing

Agenda

Cultural Heritage | 11:30-12:30

2021

Cultural Heritage

Growth of xerophilic fungi on model paint samples on glass and wooden supports under low humidity conditions

Janez Kosel [1], Jakub Sandak [2,3], Anna Sandak [2,4], Lea Legan [1], Klara Retko [1], Maša Kavčič [1], Črtomir Tavzes [1], Miklos Krész [2,3], Polonca Ropret [1]

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In museums, xerophilic fungi can grow and thrive on a wide range of art objects. Their dispersion is affected by the regular movement of museum staff and visitors, and by the ventilation system. Many works of art, such as panel paintings and polychromed wooden sculptures, are composed of an array of different organic substances, including traditional cellulose-based support materials, protein-, lipid-based and other types of adhesives, binders, coatings, and colouring agents, which all represent nutrient-rich media prone to colonization by xerophilic fungi (Grabek-Lejko et al., 2017). In contrast, the presence of metal ions (e.g., lead, zinc, chromium, etc.) in some pigments' chemical composition can increase the resistance of a paint layer to biodeterioration. Surprisingly, the xerophilic potential of fungi isolated from museums' indoor environments has never been addressed properly. To assess this fungal trait, most studies only use simple selective solid media with high concentrations of sodium chloride or glucose, which lower the water activity of a medium (Koutsoumanis and Sofos, 2005). Therefore, our aim was to carefully investigate 11 fungal strains isolated from cultural heritage institutions' interiors for their potential to grow on painted heritage items at low relative humidity (xerophilic potential). The isolates were inoculated onto model samples made of wooden and glass supports coated with a layer of egg tempera paint. Different paints, prepared with egg binder and assorted traditional artists' pigments (lead white, Prussian blue, carmine lake and verdigris) were investigated. Model samples were subjected to 50, 60 and 70 % relative humidity. Fungal development was carefully monitored by fluorescent microscopy. Our results show that relative humidity of 50 or 60 % can still support mould growth and biodeterioration (incubation of 3 months), especially in the case of paints on wooden supports containing Prussian blue pigment. Indeed, wood, by absorbing moisture (hygroscopic material), enables the development of favourable microclimatic conditions for mould growth.

Keywords: Aspergillus, Penicillium, xerophilic fungi, pigments

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Koutsoumanis, K.P., Sofos, J.N., 2005. Effect of inoculum size on the combined temperature, pH and a w limits for growth of Listeria monocytogenes. Int. J. Food Microbiol. 104, 83–91. https://doi.org/10.1016/j.ijfoodmicro.2005.01.010

Poyatos, F., Morales, F., Nicholson, A.W., Giordano, A., 2018. Physiology of biodeterioration on canvas paintings. J. Cell. Physiol. https://doi.org/10.1002/jcp.26088