

## WOOD RESEARCH

65(1): 2020

Wood Research publishes original papers aimed at recent advances in all branches of wood science (biology, chemistry, wood physics and mechanics, mechanical and chemical processing etc.) Authors are responsible for the fact that the paper has not been published before and it is not under consideration for publication elsewhere.

### EDITORS:

Štefan ŠTELLER, Slovak Forest Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic.

Radoslav MIKULÁŠIK, Slovak Forest Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic.

### ASSOCIATE EDITOR:

Vladimír IHNÁT, Slovak Forests Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic

### EDITORIAL BOARD:

Ingo BURGERT, ETH Zürich, Institute for Building Materials, HIF E 23.2, Stefano-Franscini-Platz 3, 8093 Zürich, CH-Switzerland

Ignacio J. DIAZ-MAROTO, University of Santiago de Compostela, High School Polytechnic, University Campus s/n, 27002 Lugo, Spain

Miroslav GAŠPARIK, Czech University of Life Science in Prague, Kamýcká 1176, CZ-165 21 Praha 6 Suchdol, Czech Republic

Vladimír GRYC, Mendel University in Brno, Zemedelska 3, CZ-613 00 Brno, Czech Republic

Miha HUMAR, University of Ljubljana, Jamnikarjeva 101, SI-1001 Ljubljana, Slovenia

Jan KANÓCZ, Technical University of Košice, Letná 9, 042 00 Košice

Bohuš KASAL, Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI, Bienroder Weg 54 E, D-38108 Braunschweig, Germany

Marián KUČERA, Faculty of Environmental and Manufacturing Technology of Technical University in Zvolen, Študentská 26, 960 53 Zvolen, Slovak Republic

Jozef KÚDELA, Faculty of Wood Sciences and Technology of Technical University in Zvolen, Masarykova 24, 960 53 Zvolen, Slovak Republic

Jozef MARTINKA, Slovak University of Technology in Bratislava Faculty of Materials Science and Technology in Trnava, Jána Bottu č. 2781/25, 917 24 Trnava, Slovak Republic

Bartłomiej MAZELA, Poznań University of Life Sciences, ul. Wojska Polskiego 28, PL-60-637 Poznań, Poland

Holger MILITZ, University of Göttingen, Büsgenweg 4, D-37077, Göttingen, Germany

Róbert NÉMETH, University of Sopron, Bajcsy Zs. u. 4, H-9400 Sopron, Hungary

Roman RÉH, Technical University in Zvolen, Masarykova 24, SK-960 53 Zvolen, Slovak Republic

Ján SEDLIAČIK, Faculty of Wood Sciences and Technology of Technical University in Zvolen, Masarykova 24, 960 53 Zvolen, Slovak Republic

Alfred TEISCHINGER, Boku-University of Natural Resources and Life Sciences, Institute for Wood Technology and Renewable Materials, Konrad Lorenz Strasse 24, 3430 Tulln, Austria

### EDITORIAL OFFICE

Slovenský drevársky výskumný ústav/ Slovak Forest Products Research Institute

Dúbravská cesta 14, SK-841 04, Bratislava, Slovak Republic

Phone: 0911 728 622 E-mail: woodresearch@vupc.sk, WEB: www.woodresearch.sk

### SUBSCRIPTION INFORMATION:

Wood Research is published six times a year. Subscription rate 150 EUR (including mailing expenses). Subscription order should be sent to Slovak Forest Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic

© 2020 by SDVÚ Bratislava, Slovak Republic

All rights reserved. By submitting a manuscript, the authors agree that the copyright for their article is transferred to their publisher if and when the article is accepted for publication. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in retrieval system or transmitted in any form or by any means, photocopying, electronic, recording, etc. without the prior written permission of the publisher as mentioned in Slovak Copyright Law No 383/1997.

Issued: February 2020

IČO 31 380 051

Printed by Pulp and Paper Research Institute, Dúbravská cesta 14, Bratislava, e-mail: sekretariat@vupc.sk

**WOOD RESEARCH**  
**Volume 65, Number 1, 2020**

**CONTENTS**

1. JIAN WEN, ZHAOXI LI, JIANG XIAO: Noise removal in tree radar b-scan images based on shearlet .....	01
2. DUŠAN JOKANOVIĆ, DRAGICA VILOTIĆ, VESNA NIKOLIĆ JOKANOVIĆ, SARA LUKIĆ, TATJANA ČIRKOVIĆ-MITROVIĆ: Site influence on anatomical structure of bald cypress. ....	13
3. JURAJ GIGAC, MÁRIA FIŠEROVÁ, MAROŠ KOVÁČ, MONIKA STANKOVSKÁ: Paper substrates for inkjet printing of uhf rfid antennas .....	25
4. WEI YAN, WANSI FU, BIN ZHANG, JIANBO ZHOU: Hygrothermal effect on axial compressive properties of bionic bamboo element .....	37
5. PETAR ANTOV, VIKTOR SAVOV, NIKOLAY NEYKOV: Sustainable bio-based adhesives for eco-friendly wood composites. A review .....	51
6. ZEHUI JU, QIAN HE, TIANYI ZHAN, HAIYANG ZHANG, LU HONG, XIAONING LU: Calculation of sound insulation of softwood samples at normal incidence and comparison with experimental data. ....	63
7. MARCIN JAKUBOWSKI, ARKADIUSZ TOMCZAK, TOMASZ JELONEK, WITOLD GRZYWIŃSKI: Variations of wood properties of birch ( <i>Betula pendula</i> Roth) from a 23-year old seed orchard. ....	75
8. CAGLAR ALTAY, ERGUN BAYSAL, HILMI TOKER, TURKAY TURKOGLU, MUSTAFA KUCUKTUVEK, AHMET GUNDUZ, HUSEYIN PEKER: Effects of natural weathering on surface characteristics of scots pine impregnated with wolmanit CX-8 and varnished .....	87
9. KRISZTIÁN ANDOR, BERTALAN BELLOVICS: Analysis of modulus of elasticity of spruce beams under bending with and without fibre reinforcement. ....	101
10. TOMASZ BIADAŁA, RAFAŁ CZARNECKI, DOROTA DUKARSKA: Water resistant plywood of increased elasticity produced from European wood species. ....	111
11. SHUPIN LUO, LI GAO, WENJING GUO: Effect of face layer manipulation on the density profile and properties of low density particleboard .....	125
12. MIROSLAV HÁJEK, PAVLA VRABCOVÁ: Consideration of forest ecosystem services in environmental management accounting .....	135
13. CANDAN KUS SAHIN, BUSRA ONAY: Alternative wood species for playgrounds wood from fruit trees .....	149
14. ZHONGHUA ZHAGN, BOMING XU: Tang dynasty chair feature design based on Kansei evaluation and eye tracking system .....	161
15. ANDERSON RENATO VOBORNIK WOLENSKI, RODRIGO GUERRA PEIXOTO, VERONIKA FEDOTOVA, ANDRÉ LUÍS CHRISTOFORO, FRANCISCO ANTONIO ROCCO LAHR: <i>Short note:</i> Shear strength estimation model for tropical wood species .....	175

## TO THE MEMORY OF DR.H.C. PROF. RNDR. MARIÁN BABIAK, PH.D.

### EDITOR OF WOOD RESEARCH JOURNAL



Recently, the Wood Science world said farewell to one of its loveliest members, Professor Marián Babiak. I would like to share a few memories of the man who was known to many of us, and whose name was, for so many years, associated with this Wood Research Journal.

#### **Teacher at the Technical University (TU) in Zvolen**

Professor Babiak's passion for sharing his knowledge and working with students were clear from the beginning of his career. As a graduate student, from 1972, he lectured, taught labs and examined on the theory of heat and mass transfer and wood anisotropy at the Faculty of Wood Science and Technology in Zvolen. With the help of tensors, he taught new aspects of wood anisotropy and, as a result, received from students the honorary title of 'Tensor'. During his career, he taught subjects such as Wood Science, Wood Physics, Wood Mechanics, Wood Drying Theory, Modelling and Theory of Similarities, among others.

He published several sets of lecture notes in Wood Science subjects, and was co-author of the textbook Structure and Wood Properties, which received an award from the rector of the Technical University (TU) in Zvolen.

Professor Babiak supervised a number of graduate students at the TU Zvolen, the Czech University of Life Science (CULS) in Prague and at the University of Sopron, Hungary.

After social and economic changes in Slovakia in the late eighties, Professor Babiak became the first Dean of the Faculty of Wood Science and Technology at the TU in Zvolen in 1990. Later, he served as Vice-dean for the Faculty and Vice-rector for research and development for the university and, in 2001, he was appointed by the President of the Slovak Republic as a full professor. He was a vital part of the Department of Wood Science throughout his career, and led the Department from 2010 to 2014. The last years of his career, he worked as a professor for the CUSL, but even he retired, he functioned at the TU in Zvolen as an emeritus professor.

#### **Research and Development at the TU in Zvolen**

Wood science was intertwined throughout Professor Babiak's career, from 1976, when he defended his graduate study in 'Heat transfer in wood and measurement of thermal characteristics'. His professional life showed that science has no borders. In the years before 1990, he acquired knowledge both of Western countries and the communist world, visiting the USA and the former Soviet Union, and working with Professors Siau, Skaar, Sergovsky and Subin, and his life-long friend, Professor Ugolev.

From 1997 to 2000, he collaborated with the University of Hamburg and University of Sopron within the 5<sup>th</sup> Framework programme project Inco-Copernicus, which helped to move the research at the Department of Wood Science forward. Later in his career, he helped to connect young researchers in his department with colleagues at the Research Institute of Wood Industry, Chinese Academy of Forestry in Beijing.

## **International recognition**

His career was not focused only in Zvolen and, for his active collaboration with them, the University of Sopron awarded Professor Babiak an honorary doctorate in 2003.

He was a member of the Society of Wood Science and Technology and was elected a member of the International Academy of Wood Science in 2011. His global recognition in the world of wood science led to him organise and co-chair two Wood Science conferences in Zvolen: the IAWS Annual Meeting in 2012 and the International Convention of SWST in 2014, the latter being the largest international Wood Science conference in the history of the Zvolen TU.

Professor Babiak registered over 127 publications, cited in 897 sources. He is co-author of three patents and developed two methods of measuring heat transfer characteristics and gas transfer characteristics in wood.

## **Conclusion**

Dr.h.c. prof. RNDr. Marián Babiak, PhD. was an integral part of the Wood Science community. He was hugely influential in the teaching and development of science at the TU in Zvolen, the CULS in Prague and the University of Sopron, Hungary, throughout a career spanning over 40 years, and lasting until the last moments of his life. He created many Wood Science specialists, and shaped the development and direction of still more graduate students and colleagues. He is well-known among students for his saying: 'An averagely intelligent dolphin could handle this!' Another of his sayings was, 'Deadlines are meant to be postponed.' Unfortunately, he could not postpone his destiny.

Although he is no longer among us, his memory remains. He was an expert, a scientist, a teacher, a reviewer, an editor, a supervisor and much more besides. He was a loving and beloved husband, father and grandfather. We remember him as a person with a big heart: a heart for family, a heart for students, a heart for colleagues and a heart for wood and wood science. We remember a mentor, a friend, a colleague with a gentle smile and a natural sense of humour. A person who is carved into our memories and whom we will not forget.

Thank you and farewell, Professor.

Dr. Rastislav Lagana  
Head of Department of Wood Science  
Technical University in Zvolen  
T. G. Masaryka 24  
96001 Zvolen, Slovakia