



Hotel Rila  
Borovets Bulgaria  
3-5 October 2022

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UNIVERSITY OF  
FORESTRY  
Sofia, Bulgaria



BRANCH CHAMBER  
OF WOODWORKING  
AND FURNITURE INDUSTRY



UNIVERSITY  
OF ARCHITECTURE  
CIVIL ENGINEERING  
AND GEODESY

## CONFERENCE PROGRAMME

### Monday, October 3, 2022

**9:00** Organized transport from the parking lot of the University of Forestry in Sofia to Rila Hotel in Borovets resort

**11:00** Arrival at Rila Hotel in Borovets resort

**12:30 – 13:00** REGISTRATION OF PARTICIPANTS

**13:00** OPENING REMARKS, Rila 2 conference hall

Corresponding Member, Prof. DSc Ivan Iliev – Rector of the University of Forestry  
Prof. PhD Zhivko Gochev – Dean of Faculty of Forest Industry

**13:30 – 15:30** KEYNOTE PAPERS, Rila 2 conference hall  
Chairman: Chief Assist. Prof. Dr. Mariya Kokorska  
Technical Secretary: Chief Assist. Prof. Dr. Todor Petkov



#### MODELING OF METAMATERIALS FOR FURNITURE HONEYCOMB PANELS

Prof. Dr. Jerzy Smardzewski, Poznań University of Life Sciences, Faculty of Forestry and Wood Technology, Department of Furniture Design, Poznań, Poland



#### THE DEEP TECH: NEXT BIG THING IN INNOVATION ECOSYSTEM

Dr. Nadir Yildirim, Innovation Director Acting Executive Director for Strategic Planning and Partnerships Hamad Bin Khalifa University (HBKU), Education City, Doha, Qatar





## CHALLENGES AND OPPORTUNITIES FOR THE FURNITURE INDUSTRY IN BULGARIA AFTER THE COVID CRISIS, WAR AND RAW MATERIAL SHORTAGES

**Prof. Dr. Vassil Jivkov**, University of Forestry Sofia, Faculty of Forest Industry, Department of Interior and Furniture Design; Chairman of Branch Chamber of Woodworking and Furniture Industry, Sofia, Bulgaria

**15:30**

**GROUP PHOTO OF ALL CONFERENCE PARTICIPANTS**

**15:40 – 16:15**

**COFFEE BREAK**

**16:15 – 18:30**

**SESSION 1: RELATIONSHIP BETWEEN THE SCIENCE AND INDUSTRY, Rila 2 conference hall**

**Chairman:** Chief Assist. Prof. Dr. Mariya Kokorska

**THE BULGARIAN BRANCH CHAMBER OF WOODWORKING AND FURNITURE INDUSTRY A BRIDGE BETWEEN BUSINESS AND EDUCATION** - Daniela Petrova, Bulgarian Branch Chamber of Woodworking and Furniture Industry

**KASTAMONU-** Cagatay Piyadeci, Kastamonu Bulgaria

**S/4HANA READY-TO-RUN** - Elena Nikolova-Zhelyazkova, STEMO

**ONLINE SHOP FOR FURNITURE COMPONENTS – INSTRUMENTS FOR PLANNING AND OPTIMIZATION OF DETAILS** – Dipl. Eng. Alexander Sevdin, JAF Bulgaria

**FESTOOL – THE INNOVATIVE COMPANY** – Petar Yankov, Festool Bulgaria

**20:00**

**GALA DINNER, Restaurant Samokovi, Hotel Rila**



ELEVENTH INTERNATIONAL SCIENTIFIC AND TECHNICAL CONFERENCE  
INNOVATIONS IN FOREST INDUSTRY AND ENGINEERING DESIGN – INNO 2022

3 -5 October 2022, Hotel Rila, Borovets, Bulgaria

## CONFERENCE PROGRAMME

**Tuesday, October 4, 2022**

**9:00 – 10:45**    **SESSION 2, Zahari Zograf conference hall**  
**Chairman: Prof. PhD Petar Antov**

**BUILDING AN INNOVATION ENGINE IN WOOD-BASED PANEL INDUSTRY** – Dr. Huseyin Guler, Global Business Planning and Innovation Director, Kastamonu Integrated Wood Trade Inc.

**INFLUENCE OF COMPONENTS (UV + VIS) OF SOLAR RADIATION ON THE COLOUR CHANGE OF UNSTEAMED AND STEAMED BEECH WOOD** - Ladislav Dzurenda, Michal Dudiak, Adrián Banski

**IDENTIFICATION OF THE COLOR FALSE HEARDWOOD OF FAGUS SYLVATICA L. IN THE COLOR SPACE CIE L\*A\*B\*** - Ladislav Dzurenda, Michal Dudiak

**BEECH WOOD MODIFIED BY RADIO-FREQUENCY DISCHARGE PLASMA** - Peter Jurkovič, Ján Sedliačik, Igor Novák, Ivan Chodák, Angela Kleinová, Ján Matyašovský

**REDUCTION OF FORMALDEHYDE EMISSION FROM WOOD-BASED PANELS BY MODIFICATION OF UF ADHESIVES WITH NATURAL BIOPOLYMERS** - Ján Matyašovský, Ján Sedliačik, Peter Jurkovič, Peter Duchovič, Igor Novák

**MODIFICATION OF VARIOUS WOOD SPECIES BY BARRIER DISCHARGE PLASMA** - Ján Sedliačik, Igor Novák, Ivan Chodák, Angela Kleinová, Ján Matyašovský, Peter Jurkovič

**COMPARATIVE STUDY OF HEATING TECHNOLOGY AND INERT ATMOSPHERE AFFECTING LIGNOCELLULOSIC BIOMASS THERMOCHEMICAL MODIFICATION** - Anelie Petrissans, Priscila Rios Teixeira, Rafael L. Quirino, Larissa Richa, George Durrell, Allen Hulette, Baptiste Colin, Mathieu Petrissans

**EXPERIMENTAL STUDY AND MODELING OF THERMODEGRADATION DURING TORREFACTION OF ROW AND POTASSIUM IMPREGNATED BEECH WOOD** - Tram Nguyen, Larissa Richa, Anelie Petrissans, Rafael L. Quirino, Daniela Florez, Romain Remond, Baptiste Colin, Vanessa Fierro, Alain Celzard, Mathieu Petrissans

**10:45 – 11:00**    **COFFEE BREAK**

**11:00 – 12:30**    **SESSION 3, Zahari Zograf conference hall**  
**Chairman: Assoc. Prof. Dr. Victor Savov**

**INFLUENCE OF HYDROTHERMAL TREATMENT OF BEECH WOOD ON THE PROPORTION OF DUST PARTICLES FROM THE MILLING PROCESS** - Richard Kminiak, Martin Kučerka, Ľuboš Krišťák, Alena Očkajová

**DEVELOPMENT OF COMPOSITE TIMBER GIRDERS** - Meta Kržan, Tomaž Pazlar, Ivan Grašič, Boštjan Ber



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**THE INFLUENCE OF WOOD PELLET EXPOSURE TO DIFFERENT MICROCLIMATIC CONDITIONS ON THEIR MECHANICAL AND DIMENSIONAL PROPERTIES** - Marin Dujmović, Kristijan Radmanović, Matija Jug, Juraj Jovanović, Krešimir Balaško, Danijel Orlić, Branimir Šafran

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**IMPACT OF THE SAMPLE DIMENSIONS ON MEASURED WOOD COMPRESSIVE PROPERTIES ON THE LONGITUDINAL DIRECTION** - Krešimir Balaško, Marin Dujmović, Franko Lončar, Juraj Jovanović, Matija Jug, Branimir Šafran, Kristijan Radmanović

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**MODERN ENGINEERING TECHNIQUES FOR THE PRODUCTION OF MODIFIED POLYSACCHARIDES WITH BIOLOGICAL ACTIVITY** - Dragomir Vassilev, Nadezhda Petkova, Milka Atanasova, Panteley Denev

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**EFFECT OF THE HYDROLYSIS REGIME ON THE PROPERTIES OF RECYCLED FIBRES** - Viktor Savov, Petar Antov, Christian Panchev, Muhammad Adly Rahandi Lubis

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**SUNFLOWER STALKS AND LIGNOSULFONATE - ALTERNATIVE RAW MATERIALS FOR THE PRODUCTION OF ECO-FRIENDLY MEDIUM DENSITY FIBREBOARDS** - Julia Mihajlova, Viktor Savov

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**COMPUTING THE AVERAGE MOISTURE CONTENT OF WOOD MATERIALS SUBJECTED TO STEAMING IN AN AUTOCLAVE** - Nencho Deliiski, Natalia Tumbarkova, Dimitar Angelski, Pavlin Vitchev

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**CHANGE IN THE DURATION OF AUTOCLAVE STEAMING REGIMES OF NON-FROZEN PRISMS AT DISPATCHING INTERVENTIONS IN THE PRODUCTION OF VENEER** - Nencho Deliiski, Dimitar Angelski, Pavlin Vitchev, Natalia Tumbarkova

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12:30 – 13:30

LUNCH

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13:30 – 15:00

**SESSION 4, Zahari Zograf conference hall**

Chairman: Prof. DSc Ing. Nencho Deliiski

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**MECHANICAL RESPONSES OF THIN-WALLED HONEYCOMB PANELS WITH DISCREETLY PLACED REINFORCING ELEMENTS** - Jerzy Smardzewski, Maciej Tokarczyk

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**COMPARATIVE ANALYSIS OF PHYSICAL AND MECHANICAL PROPERTIES OF SOME THIN AND ULTRA-THIN WOOD-BASED AND NON-WOOD-BASED FURNITURE PANELS** - Vassil Jivkov, Boryana Petrova, Nikolay Yavorov

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**POSSIBILITIES OF DETERMINING THE CHARACTERISTICS OF WOODCHIPS USING IMAGE ANALYSIS IN THE MATLAB PROGRAM** - Peter Koleda, Pavol Koleda

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**THE INFLUENCE OF THERMAL MODIFICATION OF OAK, SPRUCE AND MERANTI BLANKS ON SURFACE ROUGHNESS DURING SANDING** - Martin Kučerka, Richard Kminiak, Lubos Kristak, Tomasz Rogozinski, Marta Pedzik

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**ADHESION OF LACQUER COATINGS TO HDF SUBSTRATE IN UV ANALOQUE PRINTING SYSTEMS** - Tomasz Krystofiak, Maciej Tokarczyk, Barbara Lis

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**INVESTIGATIONS OF THE VISCOSITY OF LACQUER PRODUCTS FOR PRINTING UV TECHNOLOGIES** - Tomasz Krystofiak, Milena Henke, Barbara Lis

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**TECHNOLOGIES FOR UTILIZATION OF WASTE FROM CUTTING OF WOODEN MATERIALS** - Dimitar Angelski

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**SURFACE ROUGHNESS PARAMETERS FOR EVALUATION OF SANDING AND SANDPAPER GRIT SIZE IN PLYWOOD SURFACE PREPARATION FOR FILM FORMATION -**  
Krasimira Atanasova

**15:00 – 15:30**      **COFFEE BREAK**

**15:30 – 17:00**      **SESSION 5, Zahari Zograf conference hall**  
**Chairman: Prof. Dr. Dimitar Angelski**

**METHODS FOR DIGITALISING MATERIAL SURFACES AND THEIR USAGE IN THE DIGITAL ENVIRONMENT -** Atanas Hristozov

**NATURAL WOOD STAIN IN THE DESIGN FOR CHILDREN -** Ivanka Dobрева-Dragostinova

**WOODEN TOYS IN A CHILD'S WORLD -** Ivanka Dobрева-Dragostinova

**CHANGES IN THE BANKING SPACES' FUNCTIONAL SCHEMES IN BULGARIA: 1990 – 2020 -** Gergana Dikanska

**THE TRIPOD: A RARELY MENTIONED FURNITURE TYPE -** Regina Raycheva, Desislava Angelova

**SMALL SPORT ZONES IN HOME AND IN OFFICE: INTERIOR AND DESIGN -** Stela Tasheva, Desislava Angelova, Pavlina Vodenova

**DIGITAL EDUCATION IN THE FACULTY OF „FOREST INDUSTRY” IN THE CONTEXT OF INDUSTRY 4.0 -** Galin Milchev, Zhivko Gochev, Dimitar Angelski, Desislava Angelova, Nelly Staneva, Pavlin Vitchev

**SUCCESSFUL COLLABORATION BETWEEN DISCIPLINES THROUGH THE APPLICATION OF DESIGN THINKING IN THE CONTEXT OF TEACHING IN A VIRTUAL ENVIRONMENT -** Maya Ivanova, Samuil Botev, Desislava Angelova, Pavlina Vodenova

**17:00 – 18:00**      **SESSION 6, Zahari Zograf conference hall**  
**Chairman: Assoc. Prof. Dr. Galin Milchev**

**TECHNOLOGICAL RESEARCH OF PNEUMOSEPARATOR FOR FOREST SEED EXTRACTION -** Konstantin Marinov, Milen Ivanov, Dimitar Peev

**EXPLOITATION RESEARCHES ON FORESTRY MILLING MACHINES FOR SOIL PREPARATION AT THE TERRITORY OF SHUMEN NORTH-EAST STATE FORESTRY -** Konstantin Marinov, Konstantin Kostov

**EXPLOITATION RESEARCH OF A CABLE SKIDDER TAF 690 PE FOR TIMBER SKIDDING IN THE WESTERN STARA PLANINA -** Dimitar Peev, Dimitar Georgiev, Konstantin Marinov  
**SUITABLE OF LOCUST TREE WOOD FOR PRODUCE FURNITURE -** Panayot Panayotov

**18:00 – 19:00**      **SESSION 7, Zahari Zograf conference hall**  
**POSTER SESSION**

**EDGE WITHDRAWAL RESISTANCE OF SCREWS AND CONFIRMAT INTO DIFFERENT WOOD-BASED PANELS -** Vassil Jivkov; Borislav Kiuchukov; Ralitsa Simeonova; Assia Marinova

**AUTOMATED ELECTRO-PNEUMATIC MECHATRONIC COMPLEX FOR TREATMENT OF SMALL ROTARY DETAILS OF SOLID WOOD -** Izabela Radkova, Reneta Dimitrova, Slav Dimitrov





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**OPTIMIZATION OF WAREHOUSE AREAS FOR FINISHED PRODUCTS IN FURNITURE INDUSTRY ENTERPRISES** - Petar Nikolov, Stanislav Dimitrov

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**IMPROVEMENT OF THE TECHNICAL-ECONOMICAL AND ECOLOGICAL INDICATORS OF WOODWORKING AND FURNITURE ENTERPRISES THROUGH AIR RECUPERATION IN THEIR VENTILATION INSTALLATIONS** - Petar Nikolov, Raiko Stanev

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**APPLICATION AND TRENDS IN CNC MACHINES IN THE FURNITURE INDUSTRY IN BULGARIA** - Aleksandar Doichinov, Pavlin Vitchev

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**INVESTIGATION OF ATMOSPHERE SUSTAINABILITY OF PROTECTIVE-DECORATIVE COATINGS – PART I** - Vladimir Mihailov, Todor Petkov, Verjina Lozanova-Aleksieva

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**COMPARATIVE INDICATORS OF LIGHTWEIGHT STRUCTURAL ELEMENTS OF WOODEN PREFABRICATED BUILDINGS** - Vasil Merdzhanov, Vladimir Mihailov, Todor Petkov

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**STUDENTS' WORK DIARIES: VISUAL IMPRESSIONS OF A DESIGN PROJECT STUDY MODULE** - Angelova, D., Raycheva, R., Vodenova, P., Tasheva S.

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**ASSESSMENT OF NATURAL DISTURBANCES IN FOREST AREAS BY REMOTE METHODS** - Svetoslav Anev, Sonya Damyanova, Adriana Marinova, Ina Ivanova, Daniela Tsoneva

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**COMPOSITION IN THE 21ST CENTURY: GESTALT AND INTUITIVE DESIGN** - Stela Tasheva

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**INVESTIGATION OF THE INFLUENCE OF SOME FACTORS ON THE STRENGTH AND STIFFNESS OF JOINTS WITH STAPLES AND GUSSET PLATES** - Desislava Hristodorova, Nelly Staneva

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**SELECTION OF MODES FOR CO2 LASER HEAT TREATMENT WHEN ENGRAVING COMPLEX GRAPHIC IMAGES ON PLYWOOD** - Zhivko Gochev, Pavlin Vitchev, Yuzlem Aziz, Tihomir Stanev

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**EVALUATION OF THE QUALITY OF SURFACES PROCESSED WITH HAND-GUIDED CNC MILLING MACHINE** - Pavlin Vitchev, Zhivko Gochev, Engindzhan Halim

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**OPPORTUNITIES FOR OPTIMIZATION OF PRODUCTION ACTIVITIES AND COST OF PRODUCTION IN THE FURNITURE INDUSTRY** - Elena Nikolova, Desislava Hristodorova

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**RESTORATION OF BEECH FORESTS AFTER NATURAL DISTURBANCES** - Sonya Damyanova, Svetoslav Anev, Adriana Marinova, Ina Ivanova, Daniela Tsoneva

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**DATA ENVELOPMENT ANALYSIS OF FACTORS FOR FOREST INDUSTRY WAGES AND SALARIES LEVELS IN NUTS 2 REGIONS OF BULGARIA** - Nikolay Neykov, Radostina-Popova-Terziyska, Emil Kitchoukov

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**Technical Secretary:** Chief Assist. Prof. Todor Petkov



**Wednesday, October 5, 2022**

**10:30 Departure from Rila Hotel**

**10:45 – 12:15 CULTURAL PROGRAM- TOURIST TOUR IN SAMOKOV CITY** (In the past, Samokov was a centre of handicrafts and art, with notable figures like Zahari Zograf, Hristo Dimitrov and Nikola Obrazopisov. The town's name is a compound word of "samo" and "kov", respectively meaning "self" and the root of the verb "forge, hammer", and comes from the *samokov*, a mechanical forge powered by water, since the town of Samokov was a major iron-producing centre during the Middle Ages.)

**12:30 Departure from Samokov City**

**14:00 Arrival in the parking lot of the University of Forestry in Sofia**

### Dear Participants,

For ensuring well-organized sessions and sufficient time for discussions, the following recommendations are made for paper presentations:

- Presentations should be 7 minutes long and should include topic introduction, statement of objectives, methods used, main results, conclusions and recommendations for future research;
- Discussions involving questions and answers should be 3 minutes long immediately after the paper presentation;
- Each presenter should upload his presentation (prepared in English according to the requirements provided on the conference website: [ino.ltu.bg](http://ino.ltu.bg)) on the computer before the relevant session.

