INTERNATIONAL ACADEMY OF WOOD SCIENCE

BULLETIN 2013-I

www.iaws-web.org/

July 2013

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End of terms: 1 June

Please send correspondence to:

ROBERT EVANS
Silvi Scan Pty. Ltd.
8 Dobell Place
Dooncaster East, Victoria 3109
AUSTRALIA
Email: robert.evans@silviscan.com
http://www.iaws-web.org/

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MESSAGE FROM THE PRESIDENT

We are now well on the way in the planning of the 2013 IAWS annual meeting taking place in Nanjing October 17 to 21. The meeting will be hosted jointly by the Nanjing Forestry University, the InternationalCentre for Bamboo and Rattan (ICBR) and the Institute of Chemical Industry of Forest Products/Chinese Academy of Forestry (ICIFP/CAF). It will be organised together with the International Association of Wood Anatomists/IAWA and IUFRO, div.5. You are all invited to submit presentations for this meeting on the themes of

1. Wood science including wood properties, wood identification, wood structural diversity, wood anatomy, wood composites etc.
2. Wood processing technology including bio-refinery, biotechnology, bio-energy and bio-fuel, bio-materials etc.
3. Other topics related to wood and non-wood plants (bamboo, palm and rattan etc), cellulose nanofiber & its composites, and life cycle assessment of wood industry etc.

At the meeting we are very pleased to have Fellow Prof. Pieter Baas to present the Academy Lecture on the topic of "Adaptive Evolution of Wood Structure".

We will also have a presentation from the winner of the 2013 PhD award Dr. Sergio José Sanabria Martin who will give a presentation of his thesis on "Air-coupled ultrasound propagation and novel non-destructive bonding quality assessment of timber composites".
I look forward seeing as many as possible of you at this meeting. Please look at our website for more information http://www.iaws-web.org

The invitation for nominations for the PhD awards for 2014 has now been posted and I encourage all of you to submit suitable candidates. To qualify the student should have been awarded the degree during the last year in a country other than their native one. Please also inform your colleagues. You do not have to be an IAWS fellow to propose a candidate.
In the elections for 2013 we had 17 new fellows elected whom I especially congratulate on their achievement and welcome into the academy. Many thanks also to the nominators for providing an excellent list of candidates. I am very pleased with regard to our increased presence of female fellows to the academy. We will soon announce the nomination procedure for fellows for 2014 and I hope that you may be as active this year as the last and especially consider nominations from those non- or poorly-represented countries, scientists from emerging new fields of wood science as well as female scientists.

I congratulate Fellow Holger Militz on his election as new chair of the Academy Board to serve until 2016. Many thanks go to Fellow George Jeronimidis for his term as chair of the board during which he took on the new task of administrating the PhD awards.

The Academy has long been discussing a way of recognising fellows and scientists in general who have contributed substantially to the development in the wood science field in research, educational, or managerial areas without necessarily having a substantial publication record. In today's highly specialised society those administrative skills play an increasingly important role. Thus the Academy has this year instigated a Distinguished Service Award to be presented for the first time at the Nanjing meeting. We hope that this award will be viewed as a high honour in recognition of important achievements.

Lastly I would like to extend warmest congratulations to Fellow Derek Gray on being awarded the distinguished 2013 Marcus Wallenberg Prize.

Lennart Salmén, Stockholm

TREASURER'S REPORT FOR 2012

The details of the 2012 Treasury Report are below. The dues have been broken down into categories and the E is for "extra" year's payment. The net change for 2012 was $5,397. At the end of 2012, 132 of the 151 (87%) Active and Retired fellows and 21 of the 21 supporting members were current in their dues. Our CD's total $58,235 and interest rates have dropped to below 1% for two-year CD's, so we need to look for alternative secure investments. Many of our members are using PayPal to pay their dues; 79 of our fellows and 4 supporting members used this credit card method in 2012. We continue to purse creative avenues to continue the support from fellows and organizations. With expansion of the SWST Website, regular technical meetings, the PhD Thesis/Dissertation Award, the Distinguished Service Award, and inflation; continued revenue is essential to preserve our quality programs.

So far in 2013, we have received payments from 15 of 21 supporting members, 34 of 50 Retired fellows, and 57 of 101 Active fellows.

I feel IAWS continues to be in fiscally sound condition and a big thank you to all those who support our programs.

If you are able, please try PayPal—the process is simple and efficient.

Howard Rosen, USA
Treasurer
April 24, 2013

IAWS Expenses and Revenues - Calendar Year 2012

Revenues (E – extra years paid by a member)	
Retired dues (40 + 5E)	895.00
Active dues (73 + 10E)	4,150.00
Lifetime dues (12)	7,182.00
Supporting (21 + 3E)	4,730.00
Donations (2)	100.00
Total	***17,057.00***
Expenses	
Printing/mailing	214.00
Web Site Revision/Managing	5,611.79
Meetings	3,525.00
Academy Lectures	
1,400.00	
PhD Award	1,024.00
Foreign bank/wire fees Capital One	412.00
PayPal Fees	368.09
Total	***12,554.88***

Income = $**17,057** - $**12,555** = ***$4502***

Capital One Account	
Beginning balance January 1, 2012	
17,875.89	
Deposits by H. Rosen	3,365.00
Incoming bank wires	3,082.00
Transfer from PayPal	0,704.88
Withdrawal – Fees	-380.00
– Wires	-6,571.63
– Checks	1,250.00
– Cash	-1,933.00
End Balance December 31, 2012	***$24,893.14***

PayPal Account	
Beginning balance January 1, 2012	2,630.13
Deposits (50 active, 23 retired, 9 life, 5 Support)	9,360.00
Web expense	-817.16
Transfer to Capital One	-10,704.88
Fees	-368.09
End Balance December 31, 2012	***$ 100.00***

Total Assets

- CD Interest National Bank **$31,757.60**
  -renewed 10/16/11 at 1.14% for 2 years
  -interest is accumulated
- CD Discover **$26,476.93**
  -opened 4/07/10 at 2.1% for 3 years
  -interest is accumulated

Checking + PayPal Accounts = **$24,993** Total Assets = **$83,227**

Net change **2012 – 2011** **$5,397**

I have examined the books of the IAWS and have found all the details in satisfactory order.

Robert L.Youngs, FIAWS, Professor Emeritus, Virginia Tech. Date 1/19/2013

2012 NEW LIFETIME FELLOWS

Fuxiang. Chu
Paul Cooper
Pedro Fardim
Barry Goodell
Pascal Kamdem
Bo Kasal
Tetsuo Kondo
Jian Li
Yixing Liu
Victor Sanaev
Shigehiko Suzuki
Michael Wolcott

2012 VOLUNTARY CONTRIBUTIONS

Starting in 2001, we have provided an opportunity for Fellows to make voluntary contributions to IAWS. We thank each of these for helping to further the goals of IAWS. The following Fellow has made such a contribution over the past year:

Barry Goodell
Robert Ross

NEW CHAIR OF THE ACADEMY BOARD

Professor Holger Militz of the Institute of Wood Biology and Wood Technology Georg-August-Universität Göttingen/Germany, has been elected as the Chair of the Academy Board. He replaces Professor George Jeronimidis who steps down on completion of his term of office with the thanks of the Executive Committee.

NEWLY ELECTED FELLOWS

Following the recent elections, the following candidates were elected to Fellowship of the Academy. Congratulations to:

Vera E. Benkova

Born in Artemovsk, Russia, Dr Benkova is Senior Researcher at the Institute of Forest, Siberian Brunch, Russian Academy of Science. Graduated from Krasnoyarsk State University, Faculty of Physics, Ph.D. (a dissertation "Dielectric Relaxation of Bound Water in Wood" was defended in 1987, degree in Wood Science & Technology), Doctor of Science (a dissertation was defended in 2005, degree in Wood Anatomy). Author of the papers on wood sience, wood anatomy, dendroecology. Responsible for Creation of Russian version in Multilingual Glossary of Dendrochronology by Kaennel M. & Schweingruber F.H. (Compilers), 1995. Co-author of "Anatomy of Russian woods: an atlas for identification of trees, shrubs, dwarf shrubs and woody lianas from Russia" by Vera E. Benkova & Fritz H. Schweingruber. 2004.

Zhiyong Cai

Zhiyong Cai, Ph.D., P.E. is a Project Leader of Engineered Composites Unit at Forest Product Laboratory, USDA Forest Service. He is currently leading a group of research scientists developing new and improved composites from wood and other non-wood fiber sources using thermoset, thermoplastic, inorganic, and other naturally-derived binders. His researches focus on enhancing traditional wood-based composites and developing the next generation of cellulose nano composites, which will provide construction and building products that far exceed current expectations while opening new markets and reducing effects on the environment. Prior to the USDA Forest Service, he was a faculty member at Texas A&M University, teaching design of wood structures and forest products. He also worked as Product/Process Engineer at Temple-Inland Forest Products Company for three years in Texas.

Christine Chirat

Christine Chirat graduated from Grenoble Institute of Technology (Grenoble INP). She received her PhD degree in 1994. After a post doctoral period in one of the research center of the Westvaco company in Charleston, SC, USA, during which she worked on the optimization of the mills ' bleaching sequences, she joined Centre Technique du Papier in Grenoble in 1995, where she developed environmentally friendly bleaching sequences of pulps. Since 2001 she has been Associate Professor at Grenoble Institute of Technology in Pagora's department (International school for paper, printing media and biomaterials), where she teaches and conducts research in bleaching chemistry and technology, bioproducts from wood and biorefineries. In 2003 she received her habilitation to supervise PhD students.

Jorge Luiz Colodette

Jorge Colodette earned his Ph.D. in Paper Science and Engineering from the State University of New York in Syracuse, 1987. He was pulp and paper applications R&D manager for Praxair Inc., a visiting scientist at Abitibi-Price Inc. and a Visiting Professor at North Carolina State University. He is a member of several class associations including ABTCP-BR, TAPPI-USA, SPCI-SW, ATCP-CL, APPITA-AT, SWST-USA, PAPTAC-CN and PI-FI. Throughout his career he published about 18 scientific papers and registered 18 patents worldwide. He received the Tappi Fellow honorary title in 2007. He received 34 prizes for presenting

excellence papers at ABTCP - BR, PAPTAC - CN, ATCP - CL and UFV-BRA. As a professor he advised 28 MS and 13 DS thesis. He is currently a Full Professor at the University of Viçosa and head of the Pulp and Paper Laboratory, Brazil. His major research interests are in the areas of wood chemistry, pulping, bleaching and biorefinery.

Charles R. Frihart

Charles R. Frihart is Head of Wood Adhesives, Forest Products Laboratory, Madison, WI, USA he is engaged with building bridges between applied and fundamental research, industry and academics, nano-scale processes and macro-scale properties, and chemical structures and polymer properties involving both United States and foreign researchers. His main area of interest is in adhesives, with emphasis on the interactions of chemicals with wood. His involvement in the following FPL research teams includes:

- Working with outside organizations including standards committees to ensure test methods are consistent with fundamental understanding and doing studies to gain that knowledge
- Working with outside companies on new and improved biobased adhesives, some of which are being used commercially.
- Working with university professors on the use of advanced chemical and mechanical analysis to better understand effect of adhesive interaction with wood and particularly wood cell walls
- Assisting outside organizations, including the Department of Defense, on structure property relationships.

His research interests include the mechanisms of adhesive bonding and bond failure; bio-based adhesives, the interaction of chemicals with wood (including cellular and subcellular phenomena), the performance of wood adhesives, especially related to durability, analytical chemistry of wood adhesives, and wood adhesive chemistry and morphology and their relation to performance

Gunnar Hendrikson

Gunnar Hendrikson is Professor in Wood Chemistry at Royal Institute of Technology, KTH, Stoskholm, Sweden. His interests lie in wood biodegradation and the degradation of lignin and cellulose and in the role of lignin in the cell wall and how it links to other components. Such links are important for the properties of wood and for the pulping process. He has also been active in the development of processes and products for the industry, based on biotechnology, conventional technology or both.

S. Nami Kartal

Dr. S. Nami Kartal is a Professor at Forestry Faculty, Istanbul University, Turkey. His research areas diverse and include protection and preservation of solid wood and wood-based materials against degradation, environmental impact of treated wood usage, modification of wood by chemical and thermal treatments and application of nano-technologies in wood protection. He previously worked at USDA Forest Products Lab (FPL), Madison, WI and RISH, Kyoto University, Japan for two years at each institute and studied at various research laboratories worldwide as a visiting scientist. He has published 1 book, 2 book chapters and around 70 peer-reviewed papers along with a number of proceedings and other research papers. He developed a colorimetric microassay for determining boron- containing compounds in wood and leachates during his studies at FPL. His studies at Kyoto University were mostly based on consultative projects from various Japanese companies from the industry developing new wood-protecting chemicals and their biological lab and field tests.

Marie-Pierre Laborie

Marie-Pierre Laborie is currently a Chair holder in Forest Biomaterials in the Faculty of Environment and Natural Resources at the Albert-Ludwig University of Freiburg, Germany.

Over the past 15 years, her research has revolved around 3 major themes 1) the molecular scale characterization of the woody cell wall by means of viscoelastic and polymer physics approaches; 2) the design and characterization of the wood-adhesive interphase and of wood adhesives, and 3) the development of wood-derived biopolymers, bio-based composites and nanocomposites via interphase engineering. Her research group has received several

international awards including the Wood Award from the Forest Product Society for a former PhD student. In 2012, she received the German High Tech Champion Award in Green Buildings from the German Ministry of Education and Science and Fraunhofer Organization in collaboration with Prof. Pizzi (U Lorraine, France), for the development of bio-based foams from wood bark. She is very active in services within her professional field. After serving on various offices within the Executive Committee of the American Chemical Society- Division of Cellulose and Renewable Materials- since 2006, she is currently the Chair Elect of the division. She also served as the Chair of the Adhesive Technical Interest group of the Forest Product Society from 2004 to 2006.

Nili Liphschitz

Professor Liphschitz is Director of the Botanical Laboratories of the Institute of Archaeology at Tel Aviv University, Israel. She has interests in the areas of tree ecology, cambial activity, wood anatomy, wood formation, identification of wood in forest and cultivated trees. Her work is focused mainly on the trees of the Middle East. Her interest in dendroarchaeology led her to establish dendroarchaeological and dendrohistorical research in Israel, developing new chemical procedures and methods for charred and non-carbonized archaeological wood remains. She also established and led a comprehensive world-wide dendroachaeological research of shipwrecks off coasts of Israel, Sinai, Turkey, Cyprus, Croatia, Italy, Spain, Far East, Australia, Japan and other countries. She uses wood anatomy to identify the tree species of the hull construction-timbers of wrecks, which, together with their native growth habitats point to their construction site.

Armando G. McDonald

Dr. McDonald is a Professor of Renewable Materials in the Department of Forest, Rangeland, and Fire Sciences at the University of Idaho. He received his BSc (1983) and MSc (1985) in Chemistry from the University of Otago, New Zealand, and Ph.D. (1993) in Chemistry from York University, Canada. Armando came to the University of Idaho in December 2001 from Forest Research, New Zealand, where he was a Group Leader of the Materials Discovery group doing both fundamental research and product development projects. During his 16 years at Forest Research Armando's research focus was on understanding the influences of wood chemistry/biochemistry on wood and composite properties.
Currently, at the University of Idaho, he teaches courses in Lignocellulosic biomass chemistry, Biocomposites, Bioproduct and bioprocess development, and Introduction to Renewable Materials. His research focuses on biobased composite materials including fiber modification

and product prototype development; development of bio-based polymers from natural resources (carbohydrate and lignin) for use as plastics and resins; plant cell-wall development, conversion of biomass into value-added chemicals and fuels.

Xuejun Pan

Xuejun Pan is Associate Professor at the University of Wisconsin-Madison Dr. Pan's scientific interests lie in the areas of biorefining, forest products, and pulp & paper. In particular in the development of novel and effective pretreatment and fractionation technologies for bioconverting lignocellulose to fuels, chemicals and materials.

Krishna K. Pandey

Dr. Pandey is a Senior Scientist, Institute of Wood Science and Technology, Bangalore, India. His research work focuses on understanding photodegradation and weathering phenomenon and developing technologies for protection of wood from weathering. This consists of inducing dimensional stability and weathering resistance in wood through chemical modification of cell wall polymers, heat treatment and surface coatings. His research interests also include characterization and analysis of wood surfaces and wood polymers using spectroscopic techniques (FTIR, Raman, NMR and Fluorescence spectroscopy etc.).

Roy Pellerin

Roy F. Pellerin **is** Professor Emeritus, Civil & Environmental Engineering, Washington State University. He also served as Director of the Materials Science and Engineering Laboratory, Washington State University and served 15 years on the American Lumber Standards Committee. He has won numerous awards for his work culminating in a Wood Engineering Achievement Award for his lifetime achievements in the field of wood engineering, US Forest Products Society, 2007. His main professional goal was to make wood a true engineering material by developing nondestructive evaluation techniques that would enable individual structural wood members and panels to be identified by actual structural properties rather than by species averages and visual characteristics.

Alfred Teischinger

Alfred Teischinger is full professor at the University of Natural Resources and Life Sciences (BOKU) Vienna, Institute for Wood Science and Technology within the Department for Material Science and Process Engineering. Head of Department of "Material Science and Process Engineering". He is also scientific director of the Competence Centre for Wood Composites and Wood Chemistry (Wood K plus).

He studied wood science and technology at BOKU Vienna (University of Natural Resources and Life Sciences), obtaining a PhD in wood technology. He is editor in chief of „Holzforschung und Holzverwertung", journal of the Austrian Society of Forest Products Research (overlapping). He was a Fulbright Scholar at the University of Washington, Seattle USA. He is Professor of Wood Technology at the technical college for wood industries (Polytechnique) HTL Mödling and head of the accredited testing laboratory for Wood Industry (Versuchsanstalt für Holzindustrie).

Chung-Jui Tsai

C.-J. Tsai is the W.N. Haynes Professor and Georgia Research Alliance Eminent Scholar at the Warnell School of Forestry and Natural Resources, and Department of Genetics of the University of Georgia, USA.

She has dedicated most of her research to tree growth, stress responses and lignocellulosic wood properties. Her most recent investigative focus has been to understand the regulation of complex traits that integrate wood formation with leaf function. Examples include the cytoskeletal regulation of cell wall formation and leaf stomatal behavior, and the importance of sucrose transporters for long-distance transport of carbon into wood-forming tissues, a major carbon sink in long-lived trees. C.-J. Tsai has also made significant contributions to genomic resources development for Populus, the model species in tree genomics research.

Eugene I-Chen Wang

Dr Wang is Senior Researcher and Chief of the Division of Wood Cellulose and the Division of Forest Chemistry at the Taiwan Forestry Research Institute. He took his first degree at the National Chung-Hsing University of Taiwan and his Masters and PhD in Forestry at the University of British Columbia, Canada. He has been a post-doctoral fellow and research associate at the University of Alberta.In 2001 he won the 19th Forest Products Wood Chemistry Academic Award of the Forest Products Association of Taiwan and is Editor-in Chief of the Taiwan Journal of Forest Science.

Shiugan Yu

Dr. Shiyuan Yu has served as President of the Nanjing Forestry University from 1997 to 2010. Over the last 30 years he has been engaged in chemical and biochemical utilization of forest and agricultural lignocellulose. The project of bioconversion of xylan-rich lignocellulose to xylo-oligosaccharides has been commercialized with a dominant share in China's market. In the research into producing fuel ethanol from biomass, a pilot system has been developed. He won China National Award for Technical Invention in 2006.

IAWS PHD PRIZE

This year's first prize winner was Sergio José Sanabria Martin who carried out his work at ETH, Zurich. Second prize winner was Mingkai Peng at the University of New Brunswick, while the third prize went to Sebastian Clauß also working at ETH Zurich. The hearty congratulations of the Academy go to all three. The full abstract of the first prize winner's thesis is presented below together with abbreviated abstracts of the second and third prize winners' theses.

Air-coupled ultrasound propagation and novel non-destructive bonding quality assessment of timber composites. ***Sergio José Sanabria Martín***

Full-text available in: http://dx.doi.org/10.3929/ethza7335172

Several recent building collapses in glued laminated timber constructions were related to bonding failure, which should be prevented in the future with a timely defect detection.

Delamination is caused by both manufacturing errors and in-service climate variations simultaneously combined with long-sustained loads. The goal of the thesis was the development of novel non-destructive testing methodologies capable of imaging the position and geometry of delaminations within the bonding planes of glulam.

Air-coupled ultrasound (ACU) allows for a high sensitivity to debonding, on-site portability, excellent reproducibility and arbitrary scanning grids. However, the recorded signal levels are 50 dB lower than the ones obtained with the transducers pressed onto the sample, which has so far limited industrial applications to wood composite panel testing. In this work, an ACU system prototype capable of transmitting through up to 500 mm thick laminated softwoods *(Picea abies Karst.)* was developed. The bonding assessment is fundamentally based on the evaluation of the attenuation of the ultrasound beam, which significantly increases when transmitted through a material discontinuity (delamination) with respect to a defect-free glue line. Pulsed electronics filter out waves diffracted in air around the sample, the adjustment of the air gap between transducers and sample is not critical.

A full-wave finite-difference time-domain (FDTD) model was developed to simulate pulsed ACU wave propagation in heterogeneous anisotropic timber laminates. Ultrasonic waves transmitted through delaminations are attenuated by up to 50 dB, the amplitude contrast being reduced due to constructive wave interference to 20 dB for a 10 μm air gap. Well-glued bond lines are transparent to ultrasonic waves. Due to the anisotropy of wood, an ultrasound beam coupled with normal incidence into timber lamellas shifts up to 30° from the insonification axis along the energy flux direction, which is a local function of the ring and the grain angles, leading to signal fading at the receiver. Experimental wave paths as a function of the insonification position in a 65 mm thick laminate were predicted with 2 mm accuracy. The ultrasound beam diffracts in an elliptical shape elongated along the grain direction, along which the lateral resolution is lowest. The strong gradients of mechanical properties across the annual rings and wood knots lead to strong wave scattering. Overall, the complexity increases strongly with the number of insonified lamellas.

An experimental bonding quality assessment was first performed by perpendicularly insonifying the bonding planes. The transmitter and receiver transducers were scanned as a single unit along the width and length of the laminate. For each measured pixel a global assessment (defective/defect-free) of all bonding planes was obtained. Dedicated signal processing profited from the highlights of the ACU method to improve the lateral resolution, signal-to-noise ratio and contrast of the defect maps. Adhesive droplets with >12 mm diameter were detected in 10 mm thick laminates. The lateral resolution decreased with increasing number of laminations, with a 10 dB drop at 24 mm (cross-grain) and 110 mm (grain direction) from the defect boundary for 240 mm high glulam. A second experimental setup allowed detecting bonding defects in glulam beams of arbitrary height and length, that is, with an

unconstrained number of laminations. Moreover, the defects could be associated to each of the individual bonding planes. In this case, transmitter and receiver were scanned as a single unit along the height and length of the laminate, so that a slanted ultrasound beam was coupled at a defined refraction angle within the sample. The fields transmitted or reflected through a specific bonding plane were detected. This method became the subject of a patent application. Defect sizes of <50% of the beam width were successfully detected in commercial glulam beams lamellas of arbitrary annual ring orientations. Finally, the feasibility of aircoupled ultrasound tomography was demonstrated. The FDTD wave propagation model was excited by the difference of the timereversed slanted sound fields transmitted through a test and a reference (defect-free) glulam cross-section. Wave convergences then provided a map of bonding defects along the height and width of the inspected glulam cross-sections. An edge 40 mm wide gluing defect was successfully imaged in a 170 mm wide glulam beam. Further research is envisaged in this direction.

A separate investigation was performed to evaluate the applicability of X-ray computed tomography to the detection of gluing defects in timber laminates. A reconstruction method was proposed, which only required radiographies in a narrow angular range parallel to the glue line. This method filters out undesired wood heterogeneity, is applicable to laminated stacks of arbitrary height and length, and achieves reduced measurement and reconstruction times. The feasibility of the inspection was experimentally demonstrated with a microfocus laboratory system. 7 to 19 projection frames equispaced in an angular range from 0.6 to 1.8° were sufficient to segmentate glued and non-glued regions with a lateral resolution of 5 mm, air gaps down to 150 µm were detectable.

Second prize: Assessment of lumber distortion by modelling three dimensional shrinkage variations. ***Mingkai Peng***

This study was intended to develop a methodology to study how lumber distortion is affected by tree growth characteristics and lumber conversion pattern. *Pinus banksiana* and *Picea glauca* trees were harvested from a mixed-species spacing trial site. The digital image correlation (DIC) technique was used to measure wood shrinkage with high resolution at different heights of tree stems. Shrinkage models were developed as a function of growth rate and tree crown condition to predict shrinkage at each growth ring. A finite element lumber distortion model incorporating shrinkage variations was developed and validated by comparing the measured and simulated distortion in lumber pieces. The results indicate that wood shrinkage exhibits different radial variation patterns in the three anatomical directions. Wood shrinkage value and variation pattern are strongly influenced by tree crown characteristics and growth rate. Overall, the lumber distortion model is able to predict the trend of the distortion, although there are some discrepancies between predicted and measured distortion values in the test lumber pieces. The shrinkage models and lumber distortion model

developed can be used to study the influence of tree growth characteristics on distortion of resulting lumber after further validation.

Third prize: Structure-property relationships of one-component moisture-curing polyurethane adhesives under thermal load. ***Sebastian Clauß***

The thermal stability of adhesives for load-bearing construction has been one of their key parameters since engineered wood products were introduced in timber construction. In the case of one-component moisture-curing polyurethane (1CPUR) adhesives, knowledge about relationships between their chemical structure and the resulting bonding properties was limited, especially under high-temperature conditions. The objective of this research was to investigate the structure-property relationships of 1C PUR adhesives under thermal load. Therefore, the chemical composition of PUR prepolymers was systematically varied. Along with the cross-link density, the content of urea and urethane hard segments was specifically changed. Furthermore, the functionality of the prepolymers was adjusted by either the isocyanate (NCO) or the polyether component. The cured prepolymers were tested as both free films and in bonding, in combination with different wood species as a function of the temperature. In a second step, prepolymers with prospective properties were selected and formulated to adhesives. The properties of these were compared with the underlying prepolymers by the use of several investigation methods. To reach the goal of increased thermal stability, different types of organic and inorganic filler materials with the most promising set of properties were incorporated into the adhesives. The results clearly show that the structural composition of the prepolymers significantly influence the thermal stability of the bonds. In particular the urea hard segments always have a positive effect on thermal stability, whereas the urethane hard segments have a positive effect only at standard climatic conditions. The cross-link density plays a minor role in the normal temperature oscillation range, however, at high temperatures such as during a fire, cross-link density is of significant importance. The results of the prepolymers with varying functionality showed that the variations by the polyether or NCO components had no effect. The formulation showed no influence on the mechanical properties of the adhesives, neither in the macroscopic nor in the microscopic range. The increase of viscosity and reactivity, however, caused significant differences in the penetration behavior of the adhesive within the substrate. Thus, clearly better bonding results could be obtained with the formulated systems. Through the addition of filler materials, the thermal stability of the adhesives could be significantly increased. Therefore, the less cross-linked systems with low stiffness values offered particularly favorable potential. In summary, significant findings to the structure-property relationships of 1C PUR adhesives could be determined, which have been directly integrated in the development of new systems by the industrial partners Purbond and Bayer MaterialScience. As a result, marketable adhesives could be produced that comply with the high demands of ASTM D 7247 regarding thermal stability up to 230°C. Through the work presented, it could be shown that by optimized combinations of prepolymer and formulation in addition to filler materials, bonds can be realized that are fairly comparable to PRF adhesives.

HONOURS AWARDED TO FELLOWS

Peter Niemz The Wilhelm-Klauditz-Prize 2012

At the 8. European Wood Material Symposium in Hannover/Germany the Wilhelm-Klauditz-Prize 2012 was award to the ETH Zürich, Institute for Building Materials, wood physics group leader Prof. Peter Niemz, Fellow IAWS with their industrial cooperation partners, namely Dr. Sebastian Clauß, Dipl.-Holzwirt Oliver Kläusler, Prof. Dr. Peter Niemz, Dr. Mathias Matner, Dr. Dirk Dijkstra, Dr. Eduard Mayer (Bayer MaterialScience), Dr. Carlos Amen, Dr. Joseph Gabriel, Dr. Walter Meckel (Purbond AG) and Dr. Alexander Karbach (Currenta GmbH & Co. OHG). The prize is awarded in a three year cycle for outstanding scientific or application oriented works in the field of wood science and ecology by the "Internationaler Verein für Technische Holzfragen e.V".
The awarded project was initiated 2007 and completed 2011 in the framework of a dissertation entitled „Structure-property relationships of one-component moisture-curing polyurethane adhesives under thermal load". The investigation was concerned with the chemical improvement of 1C PUR adhesives for structural timber engineering. Within the study, significant findings to the structure-property relationships of 1C PUR adhesives could be determined which have been directly integrated in the development of new systems by the industrial partners. This adhesive type leads to particularly good adjustable formaldehyde free bondings of wooden lamellas. Continuative findings about the influence of filling materials and the adhesion of wood could be obtained as well. First product commercializations are cross laminated timber boards with increased thermal stability for building applications.
The work was awarded because of its technical relevance for timber engineering and the production of structural wood boards. In addition this project is a good example of successful cooperation between science and industrial practice.

REPORTS OF MEETINGS

World Wood Day Events in Dar es Salaam, Tanzania, March 19-22, 2013

Barry Goodell, Takao Itoh, Howard Rosen, and Pieter Baas represented IAWS at the first World Wood Day (WWD), March 21, 2013, which also included a 2-day technical symposium on wood culture with 22 speakers, a pan-African wood carving completion, an international wood carving and wood turning show, youth woodworking competition, and a children's drawing competition related to trees. March 21, 2013 was officially recognized as the first International Day of Forests by the United Nations General Assembly and WWD was celebrated on the same day to raise the awareness on how wood plays a key role in the sustainable future of our forests and society, adding meaning to the IWCS mantra that "Wood

is Good." WWD included entertainment, the presentation of prizes for the winners of the competitions, a ceremonial tree planting, and a final banquet. Pictured are two attendees looking over the wood carvings of the expert carvers from 25 African counties. Over 300 people from 45 countries attended this meeting. The International Wood Culture Society was the main organizer of this event and IAWS was one of the sponsors.

The day after WWD, many of the attendees traveled to the local Kisarawe Forest District and planted tree seedlings to emphasize the need for a sustainable source of trees to continue making wood products. A tour to a regional vocational training center and an ebony wood

carving market completed the day. More details on these meetings and tours can be found at the IWCS World Wood Day website "www.worldwoodday.org."

Howard Rosen
IAWS – Treasurer
IWCS – Vice President

FORTHCOMING MEETINGS OF INTEREST TO FELLOW

Annual Meeting of IAWS 17-21 October 2013, Nanjing/China

Announcement

The 2013 Annual IAWS Meeting will take place jointly with the PRWAC/IAWA meeting. It will cover the biological, chemical, and physical sciences of lignified natural materials and products derived therefrom, as well as the scientific base of the technology of converting such substances into useful products. You are kindly invited to submit your abstracts for inclusion in this great event.

Forests and Forest Products play an increasingly important role in the world, not in the least because of their significant share in carbon sequestration to mitigate global warming. The study of microscopic wood structure as an explanatory link between forest ecosystems, trees, timber properties and xylem hydraulics and as a basis for wood identification in wood culture, paleobotany, archeology and the timber trade is undergoing major advances throughout the world. The conference will provide a platform for presenting the most recent advances, especially made by wood anatomists and wood scientists from the Pacific region and Asia. Contributions from outside the region are also welcomed. Special attention will also be paid to the timber needs in China and the traditional use of dark-colored luxury woods like "hongmu" and its substitutes in furniture making.

Venue
The Conference will be held at the International Conference Hotel (Li-jing-lou Building) of Nanjing/China.

Nanjing International Conference Hotel

- Address: 2 Sifangcheng Zhongshanling,Nanjing
- Homepage: http://www.nic-hotel.com/index.html
- Tel: 86-25-84430888
- Fax: 86-25-84439255

Preliminary Programme
Oct.17
Morning Registration
Afternoon Opening Ceremony & Keynote Presentations (Group photo included)
Evening Welcome party
Oct.18
Presentations
Oct.19
Morning Afternoon Presentations
Evening Banquet
Oct.20
Presentations and Closing Ceremony
Oct.21
Conference tour

Meeting themes:

- **Wood science** including wood properties, wood identification, wood structural diversity, wood anatomy, wood composites etc.
- **Wood processing technology** including bio-refinery, biotechnology, bio-energy and bio-fuel, bio-materials etc.
- **Other topics** related with wood and non-wood plants (bamboo, palm and rattan etc), cellulose nano fiber & its composites, and life cycle assessment of wood industry etc.

Working language
The working language for the meeting is English (without interpretation).

Registration Fees
Early bird registration before 15 July 2013: US$ 400,- or RMB 2.500,-
Late registration after 15 July 2013: US$ 480,- or RMB 3.000,-
Accompanying persons: Before 15 July: US$ 240,-, after 15 July US$ 240,-
Student early bird registration before 15 July 2013: US$ 200,-
Student late registration after 15 July 2013: US$ 240,-

Important dates
Submission of abstracts: 15 July, 2013
Notification on acceptance of abstracts: 15 August, 2013
Final date for early-bird registration: 15 July, 2013

Accommodation

The International Conference Hotel in Nanjing is located in the famous Zhongshan Mausoleum scenery area It is close to numerous scenic spots and other places of interest. The hotel enjoys an exceptional location as well as a beautiful environment. The hotel has 400 spacious, comfortable guestrooms and suites, all furnished with modern facilities. The hotel restaurant offers great international and Chinese cuisine. The hotel also has a great recreational center in the basement. A sauna, bowling alley, squash and racquetball room, billiards room, dance hall, karaoke, gymnasium, beauty salon and clinic are all available here. And for a final touch, there is a mini golf course and four outdoor tennis courts.

For participants, the rate for each room type is cheaper than original, please contact the organizers as soon as possible.

Contact details
http://8th-prwac.njfu.edu.cn/
E-mail address: prwac8th@163.com

PRWAC 2013 Meeting in Nanjing

The 8th Pacific Regional Wood Anatomy Conference (PRWAC 2013) will take place from October 17 through 21 at the Nanjing Forestry University, China. The meeting will be co-organized by the Pacific Regional Group of IAWA and the Wood Science Branch of the Chinese Society of Forestry (14th WSC of CSF) and will be held jointly with the annual meeting of the International Academy of Wood Science (IAWS).

IDENTIFICATION OF TIMBER SPECIES AND ORIGINS

-REGIONAL WORKSHOP FOR ASIA-PACIFIC-

20-21 AUGUST 2013, BEIJING, CHINA

1. Background
Unsustainable and illegal logging, and trade in illegally harvested forest products causes many ecological, economic and social problems. It is estimated that up to 50% of wood exported from Amazon, Central Africa, Asia and Russia is illegally harvested.
Although instruments against such unsustainable and illegal practices have been established, there is a lack of practical control mechanisms to identify the origin of timber and wood

products. Existing timber tracking systems use paper-based documentation of timber origin and use at all stages of processing. However, paper-based tracking of products is open to tampering.

DNA fingerprints and stable isotopes use characteristics that are inherent to the timber instead of externally applied marks. This eliminates the possibility of falsifying accompanying chain-of-custody-documents and reduces possibility of laundering timber from illegal harvest.

The project, "Identification of Timber Species and Origins" led by Bioversity International, funded by Germany and guided by an international steering committee aims to facilitate the practical application of such innovative timber tracking tools (genetic and stable isotopes markers). At the project's Inception Workshop in Kuala Lumpur, Malaysia (24-25 April 2012), Bioversity international announced the creation of the Global Timber Tracking Network (GTTN).

GTTN will bring together scientists and all key stakeholders concerned about illegal logging, the associated trade and their impacts on environmental and social sustainability. Our goal in creating the network, is to ensure legal timber trade and curb illegal and unsustainable logging by facilitating and promoting the integrated use of genetic and stable isotope fingerprinting techniques with the existing timber tracking systems, certification standards, regulations and legislation.. The GTTN will develop and maintain a global online database with geo-referenced genetic and stable isotope data for priority commercial timber species. The database will facilitate accurate species identification for traded timber and provide tangible proof of the declared origin of wood and wood products.

2. Objectives of the workshop

The main objective of the Asia-Pacific Regional Workshop is to build the GTTN by bringing together scientists and other key stakeholders in the region with a view to gaining their support and active participation in the project.

The workshop aims to:

- Inform stakeholders about aims and progress in the timber tracking initiative and gain their support
- Provide an opportunity for information exchange about related projects and issues in the region
- Identify interested experts and institutes in the region, and initiate discussions on their involvement in the GTTN network
- Initiate discussions on the development and use of the GTTN database
- Decide on the list of priority species for the database

Outcomes of discussions at the workshop will inform the implementation of the project.

3. Participants

Scientific experts in the field; forest research institutions, forest administrations, representatives of relevant NGOs, international and regional organizations; and representatives of forest enterprises operating in the Asia-Pacific region will be invited.

4. Organizers

The workshop will be jointly organized by Bioversity International, the Chinese Academy of Forestry (CAF) and the Asia Pacific Association of Forestry Research Institutions (APAFRI), with International Academy of Wood Science (IAWS) and International Association of Wood Anatomists (IAWA) together.

5. Venue

The workshop will be held at the Chinese Academy of Forestry in Beijing, China. The whole day of August 19 will be arranged for registration

6. Contacts

For more information, please contact Dr. Marius R.M. Ekué (m.ekue@cgiar.org) at Bioversity International or Prof. Dr. Yin Yafang (yafang@caf.ac.cn) & Prof. Dr. Meng-Zhu Lu (lumz@caf.ac.cn) at CAF or Dr. Heok Choh Sim (simhc@frim.gov.my) at APAFRI.

21st International Wood Machining Seminar (IWMS-21), Tsukuba, 4-7 August, 2013

The 21st International Wood Machining Seminar (IWMS-21) will be held August 4-7, 2013 at EPOCHAL TSUKUBA, Tsukuba, Japan. This seminar is the 21stin a series that began in 1963 at Berkeley, California, USA to provide a forum for researchers and practicing engineers to present and discuss recent advances in wood machining.

The seminar will feature technical and scientific presentations and discussions on: Cutting process, Tool materials and tool wear, Advances in sawing technology, Planing, Molding, Routing, Sanding, and Novel wood products processing. An optional post-seminar tour will be organized. The conference language is English.

Tsukuba International Congress Center(EPOCHAL TSUKUBA)is an international conference center located in the heart of Tsukuba City, which is home to a large number of internationally renowned scientists.

Further information from: http://www.ffpri.go.jp/en/symposium/iwms21/

Woodchem 2013 –September 26th and 27th Nancy, France.

Covering a wide range of topics related to chemical and biochemical valorization of wood and the corresponding biomass, WOODCHEM® 2013 will provide an excellent opportunity for discussion and exchange of knowledge between scientists, engineers, industrials, and other specialists, as well as to policy makers and government officials to showcase leading-edge technology for future sustainable large scaled wood-based industries.
WOODCHEM® 2013 will take place in Nancy, France on September 26rd and 27th, 2013. The congress is organized every second year by the French Fibers Innovative Cluster ("Pôle de Compétitivité Fibres"). This 3rd edition is organized during the week of the 20th anniversary of the European Forest Institute.

Registration for the congress can be made only through the website: www.woodchem.fr

Functional Plant Anatomy, Moscow, September 2013

From September 16 through 21, 2013, on the occasion of the 90th birthday of Professor Gorn B. Kedrov, a conference on Functional Plant Anatomy will be organized by a consortium of Russian scientific organizations and societies, under the leadership of Dr. Alexander C. Timonin. Main topics to be addressed include functional anatomy of vegetative and reproductive plant organs, plant biomechanics, byproducts of morphogenesis, functional reconstructions in paleobotany, evolutionary implications, and theoretical concepts in functional biology. The deadline for registration and abstract submission is March 10, 2013.

www.anatomyconf.ru

First workshop of the NECLIME working group on fossil wood in Brno, Czech Republic, 2013

NECLIME is a project which tries to reconstruct the Neogene climate and vegetation of Eurasia and has several working groups. In September 2011 in Bucharest a special fossil wood working group was proposed. Its first workshop is planned for June 2013 at the Faculty of Forestry and Wood Technology of Mendel University in Brno (Czech Republic). The emphasis will be on Cenozoic fossil angiosperm wood with two main objectives: 1) to reconsider the nearest living relatives of fossil taxa, 2) to revise "taxon complexes" by adding fossil wood morphogenera and 3) to summarize the fossil wood localities suitable for Wiemann et al.'s statistical approach of paleoclimate reconstruction. A well equipped

room with a projector directly connected with a teaching microscope and 25 good-quality microscopes as well as numerous reference slides of modern Central European and some tropical wood will be at our disposal. The workshop is primarily for people who would be interested to become a NECLIME member and to cooperate with the fossil wood working group. However, IAWA members and others interested are also most welcome! The city of Brno where the workshop will take place is a nice and historical metropolis of Moravia, easily accessible by car or public transport. Moravian wine tasting and visits to historical sites and the beautiful Moravian Karst landscape are further incentives to come. We look forward to welcome you in Brno in 2013!

Vladimir Gryc (Mendel University in Brno) & Jakub Sakala (Charles University in Prague), organizers (e-mail contact: rade@natur.cuni.cz).

18th International Nondestructive Testing and Evaluation of Wood Symposium, Madison 2013

The 18th International Nondestructive Testing and Evaluation of Wood Symposium will be held from 24-27 September 2013. The symposium is a forum for those involved in nondestructive testing and evaluation of wood, wood-based materials and products. It will bring together the international nondestructive testing and evaluation research community, users of various nondestructive testing technologies, equipment development and manufacturing professionals, representatives from various government agencies and other groups to share research findings and new nondestructive testing products and technologies. For further information go to: http://www.forestprod.org/symposium2013

The COMPLAS XII Conference will be held in Barcelona, Spain on September 3-5, 2013 http://congress.cimne.com/complas2013/frontal/default.asp

At this congress, we are organizing a Mini-Symposium entitled with **"Multiscale Analysis of Wood and Wooden Structures" (Session Code 189).** We cordially invite you to submit an abstract to this mini-symposium.

This minisymposium is considered to be a forum for scientists and engineers working in the field of wood mechanics and wood technology. The submitted contributions should refer to recent developments and advances on analytical and numerical aspects of the mechanical and physical behavior of wood and timber structures. Also contributions dealing with developments in the fields of wood processing and innovative wood composites using numerical analysis are welcome.

Main topics of interest are

- macroscopic constitutive modeling,
- numerical analysis of timber structures and structural elements,
- modeling of timber joints and connections,
- fracture behavior of wood,
- moisture-induced deformations and moisture transport,
- wood drying and processing,
- engineered wood products,
- wood/glass wood/steel composites,

International Conference on Wood Adhesives 2013

A call for papers on wood adhesives and their performance in bonded products has been announced. This conference will be held on **October 9-11, 2013** at the Inter Continental Toronto Centre in Toronto, ON, Canada.

The conference brings together all the parties with an interest in wood adhesives: adhesive researchers, suppliers and users, and users of the bonded product who represent industry, academia, government, and other organizations. This conference provides an excellent opportunity to interact with leaders in the field from around the world (over 200 from 28 countries attended the 2009 meeting) and hear about the latest developments.

http://www.forestprod.org/woodadhesives/index.html

9th International Conference "Wood Science and Engineering in the Third Millennium" – ICWSE 2013,

The conference will be organized by the Transilvania University of Brasov - Faculty of Wood Engineering in Brasov, Romania, between **07 – 09 November 2013.**

All accepted papers will be published in a special edition of PRO LIGNO - scientific journal in the field of wood engineering, indexed by CABI, EBSCO and DOAJ (http://www.proligno.ro/en). Correspondence regarding the conference and submission of papers should be addressed to: icwse2013@unitbv.ro.

APCOM 2013 and ISCM2013 will be held in **Singapore in December 2013** (www.apcom2013.org).

At this congress, we are organizing a mini-symposium entitled **"Computational material modeling of wood and wood products" (MS 123).** We cordially invite you to submit an abstract to this mini-symposium.

This mini-symposium is considered to be a forum for scientists and engineers working in the field of wood mechanics and wood technology. The submitted contributions should refer to recent developments and advances on analytical and numerical aspects of the mechanical and physical behavior of wood, wood products, and timber structures. Also contributions dealing with developments in the fields of wood processing and innovative wood composites are welcome.

Main topics of interest include (but are not limited to):

- macroscopic constitutive modeling
- numerical analysis of timber structures and structural elements
- modeling of timber joints and connections
- fracture behavior of wood
- moisture-induced deformations and moisture transport
- wood drying and processing
- engineered wood products
- wood/glass and wood/steel composites

The joint 11th World Congress on Computational Mechanics (WCCM XI), the 5th European Conference on Computational Methods (ECCM V) and the 6th European Conference on Computational Fluid Dynamics (ECFD VI) (http://www.wccm-eccm-ecfd2014.org) will take place in Barcelona, Spain, on **July 20-25, 2014.**

At this congress, there will be a Mini-Symposium entitled "**Computational micromechanics of wood, engineered wood products, and cellulose-based materials" (MS 46)**.

This minisymposium will provide a forum to present and debate recent applications of computational micromechanics to wood and cellulose-based composites. It aims at bringing together researchers from various disciplines, such as wood and paper science, engineering, physics, and chemistry, working on the mechanical characterization and simulation of these composite materials. The symposium is intended to give an overview of our current understanding of the micromechanics of wood and cellulose-based materials from the molecular to the macroscopic scale and of the manifold approaches to link observations

at different length scales. Contributions on combined computational and experimental approaches, reflecting the need for comprehensive microstructural information in microscale/multiscale modelling, are also welcome.

Topics of interest include (but are not limited to)

- multiscale and multiphysics modelling of wood and cellulose-based materials;
- molecular dynamics simulations;
- structure-function relationships;
- wood fibres and fibre networks;
- fracture, damage and large deformations;
- transport phenomena involving vapour, fluids and solids;
- interactions between microscaled components;
- influence of moisture, temperature, and time on the mechanical performance;
- micromechanical aspects of wood modification and innovative cellulose fibre-based composites.

The 5th Nordic Wood Biorefinery Confernce

This will be held at the Stockholm Waterfront Congress centre, Stockholm, Sweden from 25-27 March 2014.

Topics

The conference will cover new research results and industrial experience related to biorefineries based on wood and/or on pulp mills:

- Biorefinery systems and processes.
- Biorefinery products: chemicals, materials and fuels.
- Apart from technical/scientific process/product subjects, economy and sustainability issues will also be addressed

Further information is available on http://www.innventia.com/nwbc2014

OBITUARY

Fernand Barnoud (1926 – 2013)

Fernand Barnoud passed away in Grenoble March 4th, 2013 at the age of 87.

After his thesis (Thèse de "Doctorat d'Etat") in 1962 and following a post-doctoral fellowship in North Carolina State University in Professor Ernest Ball's laboratory, he was one of the first in France to develop the model of plant tissue cultures in vitro to study the structure and development of the plant cell walls. In June 1964, he organized with great success the first International Symposium on the Chemistry and Biochemistry of Lignin, Cellulose and Hemicelluloses, with the help of Dr. Takayoshi Higuchi who was at the time Associate Professor at the University of Grenoble (1963 -1964). Soon after he was appointed as a Full Professor of Biology at the University of Grenoble and was also Professor at the school of engineers Ecole Française de Papeterie. His research group was the laboratory of Cellulose Biosynthesis. In 1966 he moved with his team to the newly created laboratory of CNRS (Centre National de la Recherche Scientifique), the "Centre de Recherche sur les Macromolécules Végétales" (CERMAV), a laboratory entirely devoted to Lignin and Polysaccharides, where he founded the group of research on Plant Cell Walls.

In 1975, he initiated the creation of the 'Groupe Français des Parois', promoting the study of the plant cell walls in France, later re-named the 'Réseau Français des Parois'.

His work as a professor of plant biology was duly respected by his students and by his Colleagues who held him in great esteem and voted for his election as Head of the Biology Department.

His dedication to his teaching was recognized with the award of "Chevalier, then promoted to "Officier des Palmes Académiques" in 1990. His contribution to wood science was recognized with his election as Fellow of the Academy of Wood Science in 1982. For his interest in agricultural science he awarded the distinction of "Mérite Agricole" in 1982. From the French Académie des Sciences he was awarded the Foulon prize in 1983.

I had the privilege to be one of his first students and to benefit from his advice and kind guidance. I was proud to be his successor in CERMAV and at the University. His passing represents a great personal loss.

To his wife, sons Christian, Philippe, Didier, and Patrick, their family and grand-children we offer our sincerest sympathy.

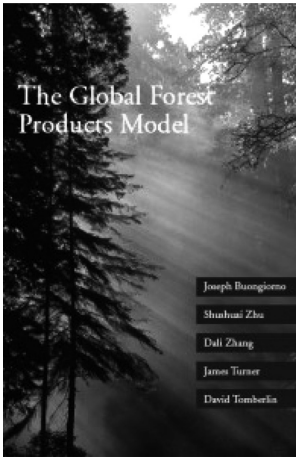
Jean-Paul Joseleau

BOOKS BY OR OF INTEREST TO FELLOWS

Cellular Aspects of Wood Formation. J. Fromm (ed.), Plant Cell Monographs 20, DOI 10.1007/978-3-642-36491-4_4, # Springer-Verlag Berlin Heidelberg 2013. This book includes a chapter by Fellow Roni Aloni entitled "The Role of Hormones in Controlling Vascular Differentiation" and several other chapters with Fellows Lloyd Donaldson, Dieter Eckstein, Gerald Koch, Uwe Schmitt, Adya Singh, and Björn Sundberg as authors or co-authors.

Handbook of Wood Chemistry and Wood Composites. Edited by Roger M. Rowell
CRC Press. ISBN: 978-1-4398-5380-1 $179.95 / £114.00
The degradable nature of high-performance, wood-based materials are an attractive option when considering environmental factors such as sustainability, recycling, and energy/resource conservation. This book is an excellent guide to the latest concepts and technologies in wood chemistry and bio-based composites. Leading researchers offer in-depth discussions of presently known mechanisms in chemical modifications. The second edition has been fully revised and updated throughout the text. This edition includes a new chapter on the latest chemistry of wood heat treatments and discusses the newest chemistry of wood heat treatment.

GFPM VERSION 2013



"The Global Forest Products Model"
Joseph Buongiorno, Shushuai Zhu, Dali Zhang, James Turner, David Tomberlin (Academic Press 2003, ISBN 0-12-141362-4)

The Global Forest Products Model (GFPM) is a dynamic and spatial economic equilibrium model of the world forest sector. It deals with 180 countries. For each country, the GFPM projects the forest area and stock, and the production, consumption, trade, and prices of fourteen commodity groups covering fuelwood, industrial roundwood, sawnwood, panels, and paper and paperboard. The model describes how world forests and their industries interact through international trade. The 2003 book, above, and the updated 2013 manuals available at the web site, below, document the methods, data, and computer software of the model. The GFPM has been applied widely to study issues of forest economics and policy, including the international impacts of trade agreements, illegal logging, phytosanitary measures, wood energy expansion, and forest carbon credits. The GFPM is made available free of charge for academic research.

The software, documentation, and one data set are available free of charge **for academic research only** at: http://labs.russell.wisc.edu/buongiorno/welcome/gfpm/

Polymeric Biomaterials Severian Dumitriu (founder editor) and Valentin Popa (editor), (2vols), Structure and function (vol I); Medicinal and Pharmaceutical Applications (vol II), CRC Press/Taylor& amp;Francis.: **January 16, 2013** | ISBN-10:**1420094726** | ISBN-13:**978-1420094725** | Edition: **3**

HIGHLIGHTS

Towards Thermoplastic Lignin Polymers; Progress in the Utilization of Kraft Lignin for the Synthesis of Heat Stable Polymer Melts

Dimitris S. Argyropoulos
Departments of Chemistry & Forest Biomaterials
North Carolina State University, Raleigh, NC, 27695-8005,

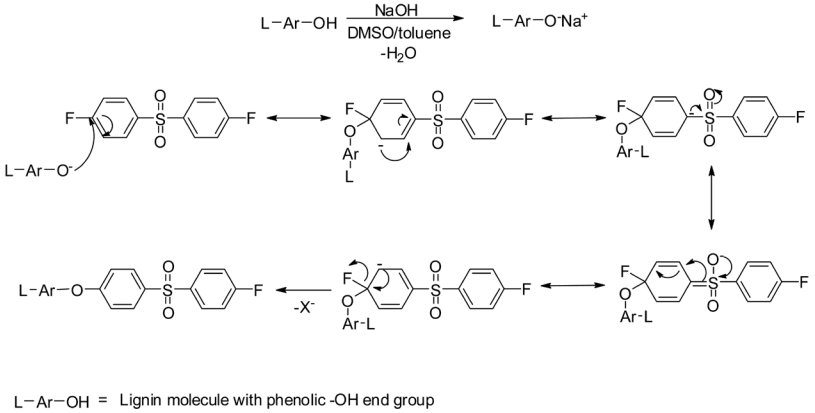
http://www4.ncsu.edu/~dsargyro /; email: dsargyro@ncsu.edu

Most efforts to utilize lignin have been limited by various factors that impart in it characteristics that define it as an unreliable precursor to polymer production. This is because lignin (and more specifically technical lignin) offers relatively unpredictable polymerization characteristics, depending upon its source and the degree of delignification to which the plant materials were subjected. More specifically, the highly functional character of lignin (i.e., rich in phenolic and aliphatic OH groups, as well as reactive benzylic carbons) induces a variety of potential polymerization sites and heat instability in such materials. Both factors promote gelation processes under polymerization conditions or when the temperature increases close to and/or above the glass transition temperature (Tg). In addition, the relatively low molecular weight (a few thousands) for lignin derived from commercial pulping and biorefinery operations makes lignin unsuitable for higher end applications, such as, high performance, heat stable engineering thermoplastic applications.

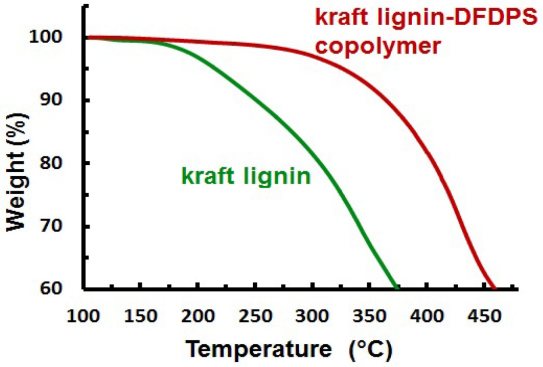
The work of our group at NCSU has focused at providing a detailed molecular understanding of the way the polymeric properties of kraft lignin and its derivatives are affected by their thermal treatments. This information was then correlated with the polymeric properties of the materials (glass transition temperature (Tg), molecular weight characteristics, and thermal stability) for a series of selectively and progressively derivatized softwood kraft lignin samples[1]. Softwood kraft lignin was shown to be highly susceptible to thermally induced reactions that cause its molecular characteristics to be severely altered with the concomitant formation of irreversible crosslinking with no thermoplastic processing possibilities. However, by fully methylating the phenolic OH groups[2] from within the structure of softwood kraft lignin, the thermal stability of these materials was seen to be

dramatically enhanced and their Tg's reduced[1]. Optimum thermal stability and melt cycling was observed with the fully methylated derivatives. The accumulated data is aimed at providing the foundations for a rational design of single or multi-component lignin-based thermoplastic materials with reproducible polymeric properties when thermally processed in a number of manufacturing cycles[1, 2, 3].

Furthermore, we have been able to create polyarylene (ether sulfone)-kraft lignin copolymers synthesized by a base catalyzed stepwise copolymerization of suitably functionalized, fractionated kraft lignin with 4,4'-diflourodiphenyl sulfone(DFDPS) in an aprotic solvent at elevated temperatures (Scheme 1)[3].



Scheme 1. Copolymerization of kraft lignin with difluorodiphenyl sulfone (DFDPS).



The benefits of incorporating DFDPS within kraft lignin are apparent in the TGA thermograms of the copolymer shown in Figure 1 below. Thermally stable polymer melts exceeding 300 ^{0}C are apparently attainable[3].

Figure 1. TGA of kraft lignin and its DFDPS copolymer.

Conclusions & Overall Outlook

This effort offers novel avenues at creating reactive lignin materials that are stabilized and rendered better suited for industrial applications. It provides methods for creating lignins of controlled and modulated characteristics exhibiting thermal and polymerization stabilities. Such thermal properties and stable molecular weight distributions of lignins and copolymers produced from commercial lignins provides a means for beneficially modulating the properties of an otherwise intractable bio-polymer.

REFERENCES

1. Cui, C., Sadeghifar, H., Sen, S., and Argyropoulos, D. S.. "**Toward Thermoplastic Lignin Polymers; Part II: Thermal and Polymer Characteristics of Kraft Lignin and Derivatives,"** *BioResources* 8(1), 864-886, (2013).

2. Hasan Sadeghifar, Chengzhong Cui, and Dimitris S. Argyropoulos, "Toward Thermoplastic Lignin Polymers. Part I. Selective Masking of Phenolic Hydroxyl Groups in Kraft Lignins via Methylation and Oxypropylation Chemistries; Ind. Eng. Chem. Res., 2012, *51* (51), pp 16713–16720 Publication Date (Web): December 4, 2012 (Article) DOI: 10.1021/ie301848j

3. Dimitris S. Argyropoulos, "High Value Lignin Derivatievs, Polymers, & Copolymers & Use Thereof in Thermoplastic, Thermoset and Composite Applications. ",US Patent Application No,61/601,181, Filed Feb 21 2012,

GUIDELINE FOR HIGHLIGHTS

The purpose of the Highlights, published in the Bulletin, is to promote the integration of the
fields of wood science. Fellows are encouraged to submit Highlights to any of the Officers!

Highlights should:

- be free of jargon and highly technical language and (unexplained) acronyms, and be readily understood by wood scientists in other fields
- be no more than 1000 words (roughly 4 pages in the Bulletin)
- begin by providing a brief background or framework to put the report in perspective
- give due credit to the work of others in the field, not just summarize the author's work
- contain important references to the literature for further reading
- finish with a statement of future directions in the area

NOMINATION PROCEDURE FOR ELECTION OF FELLOWS

The nomination process is relatively simple; all you need to do is fill in the Nomination form and send it to me. For those to be considered in the next election, the deadline for receipt of nominations is **30 September**.

I then contact the nominee, confirm their willingness to stand for election, and then have them complete the more detailed application form. The Executive Committee reviews the nominees to determine if their applications are complete, and then, in early November, submits the completed applications to the membership for ballot.

Typically, scientists who are nominated are either mid-career, showing great promise and accomplishments, or near the end of their career, when their peers feel that they have made major continuing contributions over their professional life.

There are two areas of Fellowship that are under-represented in IAWS. One is Fellows from developing countries, where the number of refereed scientific contributions, as viewed by the developing world, may be somewhat lacking because of the past or current inability to publish in the leading journals, and/or difficulty with the English language. The other area relates to the few numbers in certain scientific disciplines; if you are in one of those, you are aware of that. The Executive Committee is also interested in election of wood science managers who have had a major impact through their oversight of research activities, without necessarily having the expected number of refereed publications.

Please spend some time thinking about potential nominees, perhaps looking through the Directory and the listing of Fellows by countries. Since we do not "promote" ourselves to gain members, it is up to the Fellows in the Academy to provide the basis for this recognition.

Lennart Salmén

Nomination for Fellowship of the International Academy of Wood Science

Name of Candidate:
Position of Candidate:
Candidate Mailing Address:

Candidate email address (required!):

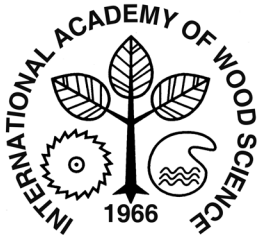
Candidate's Background (maximum 100 words):

Reasons for the candidate's nomination (outstanding in his/her field; substantial contributions to wood science; major results in management of research; etc):

Date:
Nominator name:
Email address:
Telephone:

Please return to: lennart.salmen@innventia.com

IAWS



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