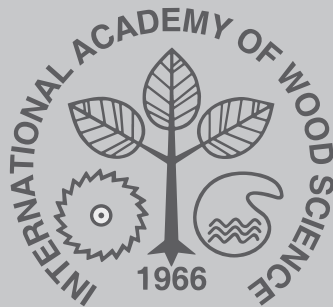


**INTERNATIONAL  
ACADEMY  
OF  
WOOD  
SCIENCE**

**BULLETIN  
2017-I**



[www.iaws-web.org/](http://www.iaws-web.org/)

**May 2017**

**Executive Committee**

**President: Uwe Schmitt, Hamburg**  
**Vice-President: Robert Evans, Melbourne**  
**Secretary: Yoon Soo Kim, Gwangju**  
**Treasurer: Howard Rosen, Silver Spring**  
**Past President: Lennart Salmén, Stockholm**  
**Bulletin Editor: Roberta Farrell, Hamilton**  
**Chair Academy Board: Pieter Baas**

## **ACADEMY BOARD**

**Chair: P. Baas (2018)**

R. Aloni (2020)

A. Ballerini (2020)

G. Daniel (2022)

R. Franich (2018)

A. Gutierrez (2022)

P. Niemz (2018)

A. Ragauskas (2018)

T. Shupe (2020)

K. Takabe (2020)

A. Teischinger (2022)

S. Wang (2022)

End of terms: 1 June

Please send correspondence by email to the new editor, Lloyd Donaldson:

[lloyd.donaldson@scionresearch.com](mailto:lloyd.donaldson@scionresearch.com)

<http://www.iaws-web.org/>

## TABLE OF CONTENTS

MESSAGE FROM THE PRESIDENT	1
TREASURER'S REPORT	3
IAWS MEMBERSHIP REPORT	5
OBITUARY AND IN MEMORIAM	8
- EMERITUS PROFESSOR TAKAYOSHI HIGUCHI	8
- JOHN DAVID BARRETT	10
NEWLY ELECTED FELLOWS 2017	11
HONOURS AWARDED TO FELLOWS	13
INTERVIEW WITH IAWS 2016 PhD AWARDEES:	14
- HATEM ABUSHAMMAL	14
- KAROL KULASIŃSKI	15
- WIM WILLEMS	16
PHD AWARDS – 2017	18
MEETINGS OF INTEREST	18
FORTHCOMING MEETINGS OF INTEREST TO FELLOWS	26
NEWS ITEMS FROM FELLOWS	30
HIGHLIGHTS	31
HIGHLIGHTS FROM IAWA	45
WOOD SCIENCE AND TECHNOLOGY – JOURNAL OF THE IAWS	50
AFFILIATE MEMBERS	51
GUIDELINE FOR HIGHLIGHTS	53
NOMINATION PROCEDURE FOR ELECTION OF FELLOWS	54
NOMINATION FORM	55



## MESSAGE FROM THE PRESIDENT

2017 is already the last year of my IAWS presidency and definitely a good time to look back to meetings and other activities of our Academy during the last three years.

In 2014, our annual meeting was held in Sopron/Hungary and Vienna/Austria, organized by Robert Nemeth from the West-Hungarian University of Sopron and Fellow Alfred Teischinger from BOKU University in Vienna. 'Eco-Efficient Resource Wood with Special Focus on Hardwoods' was the motto of this meeting, which highlighted recent trends and potentials of wood utilization, especially in European lesser-used hardwoods. Fellow Holger Militz gave his Academy Lecture on wood modification with interesting information on techniques and future applications. Quebec, Canada was the place of our 2015 meeting, which was organized by our colleagues from FP Innovations and Laval University. As it was a meeting in combination with the regularly held International Scientific Conference on Hardwood Processing, we expected a large number of participants. However, attendance was disappointing and only a few Fellows made their way to Quebec. Fellow Alain Cloutier gave an interesting Academy Lecture on 'Developments in Hardwood Utilization and Processing'. In 2016, we celebrated our 50th Anniversary Meeting in Paris, the place where our Academy was founded in 1966. Under the title 'Wood Science for the Future' we welcomed over 50 Fellows and additional colleagues in the historic rooms of the French Academy of Agriculture, in the heart of Paris. I have never met so many Fellows in one place, which was unique and a very good experience. Fellow Gerd Wegener excellently reviewed in his Academy Lecture the scientific developments of wood science from 1966 to 2016 as well as of our journal *Wood Science and Technology*. He also highlighted that wood science has changed from an exotic science to a rather complex and interdisciplinary research field. A big Thank You goes again to Past President Xavier Deglise who was the leading organizer for these days in Paris and also the post-conference tour through Champagne and Lorraine area, with very informative visits of wood and forestry research institutions in and around Nancy.

In 2014 and 2015, we had intensive discussions on Affiliate Members (in 2015 we renamed Supporting Members to Affiliate Members), especially on the election procedure and the benefits they might expect from IAWS. Past President Frank Beall as Chair of the Affiliate Member subcommittee and committee members De La Roche, Irle, Kasal, and Mc Lain did a great job and made a number of valuable recommendations to tighten the relationship of Affiliate Members with our Academy. We have followed these recommendations during the

last two years and four new Affiliate Members have joined and are promising for the future. A remarkable activity in this context was the joint workshop 'Co-operation for Development' between the Vietnam National Forestry University (VNFU) and IAWS, held in Hanoi in May 2015. This workshop ended in a signing ceremony of a MoU between IAWS and VNFU as well as a subsequently submitted application of VNFU for Affiliate Membership, which was approved by the Academy Board in late summer 2015. It is my sincere hope that the new Affiliate Member system might recruit more academic and research organizations for our Academy.

Last year we completely redesigned our webpage, which now appears fresh and modern. There is still the need to further improve the layout e.g. announcements of meetings and to also provide some space for Affiliate Members to distribute news via our webpage. I personally think that these developments were only the first steps in getting a lively Internet presence, which is not only valuable for IAWS Fellows but extend broadly. We achieve this ambitious goal only through a more active involvement of Fellows. To establish such a webpage system is one of the next steps on the way to an increased visibility. Our webpage is not a static system and can only be dynamic and attractive through inputs and modifications. Therefore, please support our Academy with comments, suggestions, and contributions. We are presently also discussing the use of other social media.

Finally, I wish to thank all Executive Committee and Board members as well as those who were supporting me in the various sub-committees during the past three years. I also wish to thank numerous unnamed Fellows for their very valuable comments that I received. It was a pleasure and an honour for me to serve the International Academy of Wood Science as its President. Now it is time to pass on the baton to Robert Evans as new President, Yoon Soo Kim as new Vice-President and to our newly appointed Secretary & Bulletin Editor, Lloyd Donaldson. I wish them all the best for the next years and for sure they will bring our Academy forward.

***Uwe Schmitt/Hamburg***

## **TREASURER'S REPORT**

Following is the audited Treasurer's Report for the calendar year 2016, dated April 18, 2017. The dues have been broken down into categories and the E is for "extra" year's payment. The net change for 2016 was \$7,205. At the end of 2016, 115 of the 126 (93%) Active and Retired fellows and all 24 of the Affiliate Members were current in their dues. Our CD's and mutual fund totals \$87,439 and have been invested in less secure and longer-term investments to obtain higher rates of return. The strength of the US dollar over many other currencies, especially the Euro, means our funds have increased in buying power in those countries.

We continue to pursue creative avenues to continue the financial support from Fellows and organizations. With revisions to a new more professional looking IAWS Website; regular technical meetings; a 50<sup>th</sup> Anniversary Meeting in Paris, France; the PhD Thesis/Dissertation Awards; the Distinguished Service Award; and inflation; continued revenue is essential to preserve our quality programs. The financial Report for the 50<sup>th</sup> Anniversary Meeting was in the last Bulletin and cost IAWS about \$4300.

So far in 2017, we have approximately \$29,600 in Capital One Bank and \$6,800 in our PayPal account. Added to our \$91,000 in savings, we have a total of approximately \$128,000 in assets. We need to contact delinquent members and actively encourage perspective Affiliate Members. All but 6 of our 24 Affiliate Members have paid 2017 dues and 70% of our Active and Retired members have paid this year. Our finances continue to be very sound.

***Howard Rosen, IAWS Treasurer***

## IAWS Expenses and Revenues--Calendar Year 2016

### Revenues (E – extra years paid by a member)

Retired dues (32 + 9E)	820.00
Active dues (72 +2E)	3,700.00
Lifetime dues (5)	3,000.00
Affiliate member dues (18)	3,595.00
50 <sup>th</sup> Anniversary Meeting	26,760.02
Donations (2)	900.00
<b>Total</b>	<b>\$38,775.02</b>

Date 10 Feb 2017

### Expenses

Printing/ mailing	12.20
Web Site Revision/Managing	5,481.59
Awards	1,017.32
Meetings	2,108.71
50 <sup>th</sup> Anniversary Meeting	27,980.22
Foreign bank/wire fees Capital One	363.00
PayPal Fees	1,094.38
<b>Total</b>	<b>\$38,057.42</b>

**Income = \$38,775 - \$38,057 = \$718**

### Capital One Account

Beginning balance January 1,2016	29,017.56
Deposits by H. Rosen	3005.00
Incoming bank wires	7070.22
Transfers from PayPal	27,400.00
Interest	30.27
Withdrawal – Fees	-363.00
– Wires	-25,045.92
– Checks	-9,150.58
– Cash	-1,298.38
<b>End Balance December 31, 2016</b>	<b>\$30,665.17</b>

### PayPal Account

Beginning balance January 1, 2016	2,869.87
Deposits (63 active, 27 retired, 6 life, 10 Affiliate)	8,690.00
50 <sup>th</sup> Anniversary registration	19,065.00
Donations	800.00
Transfers	-27,400.00
Payments	-682.14
Fees	- 1094.38
<b>End Balance December 31, 2016</b>	<b>\$2,248.35</b>

Total Assets

- CD Bank of the Ozarks **\$33,653.57**  
 -renewed 10/16/13 at 1.55% for 3 years  
 -interest is accumulated
- Vanguard Dividend Appreciations Index Fund **\$53,785.08**  
 -opened 5/23/13  
 -dividends are reinvested

Checking + PayPal Accounts = **\$32,913.52**      Total Assets = **\$120,352 (2016)**  
**\$113,147 (2016)**

Net change **2016 – 2015** **\$7,205**

*I have examined the books of the IAWS Treasury Account for 2015 and have found all the details in satisfactory order.*

**Frank C. Beall, UC Berkeley**

**IAWS MEMBERSHIP REPORT**

- The current membership status (March 2017)

**Distribution of Fellows by Country: 39 Countries, 382 Fellows.**

Australia	10	Greece	2	Russia	10
Austria	6	India	3	Slovakia	2
Bangladesh	1	Indonesia	1	Slovenia	1
Belgium	2	Israel	3	South Africa	2
Brazil	3	Italy	2	Spain	2
Canada	36	Japan	43	Sweden	16
Chile	3	Korea	5	Switzerland	6
China	21	Latvia	2	Turkey	1
Denmark	4	Netherlands	1	Taiwan	5
Egypt	1	New Zealand	10	United Kingdom	6
Finland	11	Philippines	1	USA	108
France	21	Poland	2		
Georgia	1	Portugal	1		
Germany	26	Romania	1	<b>Total</b>	<b>382</b>

## Distribution of Fellows by Continent

Continent	No. of Countries	No. of Fellows
Africa & Israel	3	6
Asia	9	81
Australia & New Zealand	2	20
Latin America	2	6
Europe	21	125
North America	2	144
Total	39	382

### Affiliated Members elected in 2016

Vietnam Forestry University, Hanoi, Vietnam  
 Seoul National University, Seoul, Korea  
 International Center for Bamboo & Rattan, Beijing, China  
 Göttingen University, Goettingen, Germany

### Fellows elected in 2017

Umesh Agarwal (USA)  
 Junyou Shi (China)  
 Alain Celzard (France)  
 Nicolas Brosse (France)  
 Youngcan Jin (China)  
 Yuzou Sano (Japan)  
 Andrey Pranovich (Finland)

### Fellows elected in 2016

Joris van Acker Belgium  
 Katarina Cufar Slovenia  
 Phillipe Gerardin France  
 Yonghao Ni Canada  
 Byung-Dae Park Korea, South  
 Xiping Wang USA  
 Cordt Zollfrank Germany

### Chair of Academic Board elected in 2016

Pieter Baas The Netherlands

### **New Board Members elected in 2016**

Geoffrey Daniel	Sweden
Ana Gutierrez	Spain
Alfred Teischinger	Austria
Siqun Wang	USA

### **Fellows deceased in 2017**

Takayoshi Higuchi	Japan
-------------------	-------

### **Fellows deceased in 2016**

Ants Teder	Sweden
Emmanuel Poppel	Romania
Josef Schurz	Austria
John David Barrett	Canada
Ramon Echenique-Manrique	Mexico
Kunio Hata	Japan

### **Deceased Fellows (2010 - 2015)**

John M. HARRIS (2010)	New Zealand
Shinji HIRAI (2010)	Japan
Tamio KONDO (2010)	Japan

Otto R. GOTTLIEB (2011)	Brazil
Huntly HIGGINS (2011)	Australia
Knut O. LUNDQUIST (2011)	Sweden
Hubert POLGE (2011)	France
Stanley K. SUDDARTH (2011)	USA
Jerzy WAZNY (2011)	Poland
Abraham FAHN (2012)	Israel
Wolfgang KNIGGE (2012)	Germany
Harold TARKOW (2012)	USA
Anne-Marie CATESSON (2012)	France
Eugene ZAVARIN (2012)	USA
B.J. ZOBEL (2012)	USA
Wilfred A. COTÉ (2012)	USA
Horst H. NIMZ (2013)	Germany
John D. BRAZIER (2013)	United Kingdom
Fernand BARNOUD (2013)	France
Gösta BRUNOW (2013)	Sweden
Shigeo ISHIDA (2013)	Japan
Thomas M. MALONEY (2014)	USA
Sandor MOLNAR (2014)	Hungary

Geza IFJU (2014)	USA
John ERICKSON (2014)	USA
Paul KIBBLEWHITE (2015)	New Zealand
Börje K. STEENBERG (2015)	Sweden
Boris N. UGOLEV (2015)	Russia
Rolf BIRKELAND (2015)	Norway

***Compiled by Yoon Soo Kim, IAWS Secretary, Gwangju***

## **OBITUARIES**



### **TAKAYOSHI HIGUCHI (1927-2017)**

Takayoshi Higuchi, Professor Emeritus of Kyoto University, Japan, passed away from a heart attack at his home at the age of 89 on February 23, 2017. The wood science community has lost a great teacher, scientist and true friend with his passing.

He obtained his BSc degree at Nagoya University, Japan in 1950, majoring in biology and biochemistry, and ultimately obtained a DAgr from The University of Tokyo, Japan in 1959. Throughout his scientific career, he produced over 300 publications.

From 1950, he worked at Gifu University as a Research Associate with Professor Ichiji Kawamura. At the same university, he was promoted to Lecturer in 1953, to Associate Professor in 1960, and to Professor in 1967. His research focused on lignin biodegradation by wood-rotting fungi and lignin biosynthesis in bamboo. In recognition of his biochemical studies of lignin formation, he was invited to the 4<sup>th</sup> International Congress of Biochemistry held in Vienna in 1958. There he became acquainted with several eminent professors working on lignin chemistry and biochemistry, including Professor Karl Freudenberg from Universität Heiderberg and Professor Karl Kratzl from Universität Wien, which made a lasting impression on his science. At that time, in the early 1960s, he went to Saskatoon, Canada, to work with Professor Stewart Brown. Shortly after leaving Canada, he worked with Professor Fernand Barnoud in Grenoble, France. While posted in Canada and France, Higuchi made several important contributions to monolignol biosynthesis.

In 1968, Higuchi moved to Kyoto and was appointed Professor of Wood Research Institute, Kyoto University. He continued his biochemical and chemical studies of lignin biosynthesis, especially focusing on the role of *O*-methyltransferase in lignification, the characterization of *p*-hydroxyphenyl components of grass lignin, syringyl lignin formation, and preparation of a series of lignin model compounds that are indispensable in lignin reactivity studies. In the mid-1970s, Higuchi reinvigorated his lignin biodegradation studies, identifying some specific reactions in lignin biodegradation and characterizing the reaction mechanisms of the lignin side chain and aromatic ring cleavages.

From 1978 to 1984 and from 1988 to 1990, he was appointed Dean of the Wood Research Institute, Kyoto University. In 1970, he was elected as a Fellow of the International Academy of Wood Science (IAWS). He was eventually promoted to the Academy Board (1979–1983), Vice-president (1987–1990), and President (1990–1993) of IAWS. In 1991, he was also appointed Foreign Associate of National Academy of Sciences, USA.

Higuchi's eminence in lignin biochemistry and chemistry was recognized by several awards; the Japan Prize of Agricultural Science (1985), the Anselme Payen Award of the American Chemical Society (1987), Dr. h.c. from Grenoble University (1987), IAWS Academy Lecture (1988), the Medal with Purple Ribbon from the Government of Japan (1990), the Fujiwara Award (1992), the Order of the Sacred Treasure, Gold and Silver Star from the Government of Japan (2000), and the Japan Academy Prize (2001).

In private, Higuchi loved fishing. Especially, he enjoyed fishing sweetfish (*ayu* in Japanese) in rivers near Kyoto. In his last years, he enjoyed hot spring tours along with his fishing buddies.

Takayoshi Higuchi, the teacher and scientist, will be remembered for his supportive personality and gentlemanship. We express our deepest condolence to his bereaved family.

***Toshiaki Umezawa/Kyoto***



## **JOHN DAVID BARRETT (1940 - 2016)**

Dr. John David Barrett Feb 5, 1940 - Apr 5, 2016 David Barrett was born Feb 5, 1940 at St. Paul's hospital in Vancouver and his final days were also spent at St. Paul's before passing away peacefully Apr 5, 2016, and after a valiant fight against cancer.

David is survived by his brother Jim (Jimmy) Barrett as well as David's stepsons John Carl Wirtz and Gregory Scott Wirtz. In recent years, David developed a close and loving relationship with his friend Peggy Woodley

and her family.

David lived a remarkably full life and many people will remember him for his extraordinary intellect, his calm and quiet confidence, and his passion for life and the people in his life.

David graduated from the University of British Columbia (UBC) Faculty of Forestry in 1965, and went on to complete his PhD in Wood Science at the University of California, Berkeley in 1971. It was there at Berkeley that David met his wife of many years Lyndall Barrett and her three young sons, John, Alan (pre-deceased) and Gregory, with whom David remained close throughout his life. The family moved to Vancouver in 1971 where David began his career in wood science with the Western Forest Products Lab.

In his professional career, Dr. David Barrett was a leader in the field of Wood Mechanics and Timber Engineering. His work and talents were respected and recognized internationally as exemplified by many awards that he won including the Wood Award; L.J. Markwardt Wood Engineering Award; FRBC Forest Excellence Award; Dr. Hideo Sugiyama Award to name a few.

David joined UBC 1984 as the Head of the Harvesting and Wood Science Department and served as Head for a total of 15 years. He played a major role in developing the undergraduate Wood Products Processing program and in establishing the Centre for Advanced Wood Processing. Fellow Jack Saddler remarks, "Dave was an impressive, hard working person with a fierce intellect. At the same time as he championed the overall Wood Science discipline I think he did more to advance the field of timber mechanics than anyone. What is even more remarkable was that he was born and raised in a "floating logging camp", in northern Vancouver Island. Going from these origins to becoming a recognised and valued world expert and Professor at UBC. Incredible!"

***Adapted from The Province, Vancouver, British Columbia, Canada***

## NEWLY ELECTED FELLOWS 2017

### **AGARWAL, Umesh P.**

USDA Forest Service, Forest Products Laboratory, Madison/USA

Dr. Agarwal was born in 1953 in Agra, India. He received his bachelor's degree in Physics, Chemistry, and Mathematics and Master's degree in Chemistry from Agra University (India) in 1972 and 1974, respectively, and his Doctoral degree in Chemistry from the Indian Institute of Technology, Kanpur (India) in 1979. Subsequently, Dr. Agarwal worked as a post-doctoral fellow, in the University of Salford (UK) in 1979 and University of Durham (UK) in 1980. In 1981, he joined, as an Alexander von Humboldt Fellow, the Department of Chemistry, the University of Bielefeld (Germany) where he remained until mid of 1982. Towards the end of 1982, Dr. Agarwal joined, as a postdoctoral fellow, the Institute of Paper Chemistry, Appleton, Wisconsin, USA, finishing as Assistant Professor in 1985. In 1989, Dr. Agarwal joined, as a Research Chemist, the USDA Forest Service, Forest Products Laboratory in Madison, Wisconsin, USA, where he continues to be employed as a Senior Research Chemist and currently, serves as the Director of the Raman Laboratory.

### **BROSSE, Nicolas**

University of Lorraine, Nancy/France

Dr Brosse was born in 1966 in France. He received his master's degree in Chemistry in 1990 and his doctoral degree in organic chemistry from University H. Poincaré (Nancy) in 1993. From 1994 to 2006 he was assistant professor in organic chemistry with experience in multiple areas of organic synthesis, characterization of organic compounds and solid phase synthesis. His current interests include lignocellulosics pretreatment, polyphenolics characterizations and utilizations. He joined the Faculté des Sciences et Technologies (Wood Sciences Department) at University of Lorraine in 2006 when he became a full professor in the LERMAB laboratory (dedicated to wood material).

### **CELZARD, Alain**

University of Lorraine and Institut Jean Lamour, Nancy/France

Dr. Celzard was born in 1971 in Lunéville, France. He received his bachelor's and master's degrees in Chemical Physics in 1991 and in Materials Science in 1993, respectively, from Henri Poincaré – Nancy 1 University (France), and his doctoral degree (Honors) in Materials Science from the same University in 1995 after getting an Excellence scholarship. Dr. Celzard was hired as an assistant professor in 1996. In 2005 he became fulltime professor at ENSTIB (National School of Wood Science and Timber Engineering) in Epinal, France, where he developed an autonomous research team from 2007. In 2010 he was appointed Junior

member of the Institut Universitaire de France, and since 2012 he heads the “Biosourced Materials” team he created at Institut Jean Lamour (IJL), the largest laboratory of Materials Science in France. In 2015 he became distinguished professor, and he is in charge of the scientific priority “Materials and the Living” at IJL since 2013. He was elected head of department at IJL in 2016.

### **JIN, Yongcan**

Nanjing Forestry University, Nanjing/China

Dr. Jin was born in 1968 in Zhejiang, China. He received his bachelor’s and master’s degrees in Paper Science and Technology from Nanjing Forestry University, China in 1989 and 1992, respectively, and his doctoral degree in Wood Chemistry from Nanjing Forestry University in 1998. Dr. Jin studied as a special research student in Tokyo University of Agriculture and Technology from 1997 to 1998. He served as a process engineer and project engineer in Wulin Paper Co., Ltd. and Sunds Defiberator Beijing Office from 1989 to 1992 and 1998 to 1999, respectively. He joined, as an assistant professor, Laboratory of Wood Chemistry, Nanjing Forestry University in 1999, and was appointed as head of the laboratory in 2002. He was promoted to associate professor and professor in 2002 and 2007, respectively. He worked at North Carolina State University and the University of Tokyo as a visiting professor respectively from 2007 to 2008 and 2010 to 2011.

### **SANO, Yuzou**

Faculty of Agriculture, Hokkaido University, Sapporo/Japan

Dr Yuzou Sano was born in 1964 in Kumagaya city, Japan. He received his bachelor’s and master’s degrees in agriculture from Hokkaido University (Japan) in 1988 and 1990, respectively, and his doctoral degree in agriculture from Hokkaido University in 1995. Dr. Sano was appointed Instructor in the Department of Forest Products at Hokkaido University in 1990. He was subsequently appointed Assistant Professor, then Lecturer, and Professor of Research Faculty of Agriculture in 2013.

### **SHI, Junyou**

Beihua University (BHU), Jilin/China

#### Education

- 1983–1987 BSc (Polymer science and engineering), Changchun university of engineering, China
- 1989–1991 MSc (Physical and chemical), Beijing normal university, China
- 2000–2002 MSc. (Wood Science and Technology), Northeast forestry

university, China

- 2004–2007 Ph.D (Biological material engineering), Northeast forestry university, China

#### Experience

- 1987–1995: Teaching Assistant and Lecturer, Jilin forestry college, China
- 1995–2002: Associate Professor, Beihua university, China
- 2002–present: Professor, Beihua university, China
- 2007–2009: Chemical engineering poster-doctor mobile station, Tsing hua University, China
- 2010–present: Director, Wooden material science and technology Jilin province key laboratory, China

#### **PRANOVICH, Andrey**

Laboratory of Wood and Paper Chemistry, Åbo Akademi University, Turku/Finland

Dr. Pranovich was born in 1957 in Leningrad, USSR. He received his master's degree in wood chemistry and technology from Leningrad Forest Technical Academy (USSR) in 1979 and his doctoral degree in wood chemistry from Leningrad Forest Technical Academy (USSR) in 1988. Since 1979 till 1993 he worked as a researcher at St. Petersburg State Forest Technical University (Russia). Dr. Pranovich joined Åbo Akademi University as a research scientist in 1993.

#### **HONOURS AWARDED TO FELLOWS**

**Congratulations to Fellow Dr. Junyong (J.Y.) Zhu**, who was awarded the AIChE Andrew Chase Award for outstanding chemical engineering contributions to the forest products and related industries, by the American Institute of Chemical Engineers (AIChE) at the 2016 AIChE Annual Meeting. Fellow Zhu was also elected as a Fellow of AIChE in 2016.

**Congratulations to Fellow Barry Goodell**, who in January 2017 took a new



position at University of Massachusetts as a Professor in the Department of Microbiology. His teaching and research remain in the field of fungal deterioration and bioconversion of wood, and he periodically branches out

to other areas in research collaborations; as Barry says, “the fungal redox mechanisms seem to have many applications in diverse areas”.

Additionally, congratulations to Dr. Jody Jellison, plant biologist and pathologist and longtime leader of agricultural research and Extension programs, who is Director of the Center for Agriculture Food and the Environment at University of Massachusetts and Extension, as well as Director of the Center for Agriculture, Food and the Environment.



**INTERVIEW WITH IAWS 2016  
PHD AWARDEES:  
HATEM ABUSHAMMALA,  
KAROL KULASIŃSKI, WIM WILLEMS**

**Interview with Hatem Abushammala**

1. *What attracted you to work in wood science?*

When I started my master studies in 2009, there were more and more voices calling for a stronger dependence on sustainable resources to cover our energy and material demands. That triggered me to take my first steps into the area of wood and wood polymers and I was strongly fascinated by the wide range of applications where wood polymers can be advantageous.

When I started my master studies in 2009, there were more and more voices calling for a stronger dependence on sustainable resources to cover our energy and material demands. That triggered me to take my first steps into the area of wood and wood polymers and I was strongly fascinated by the wide range of applications where wood polymers can be advantageous.

2. *What do you enjoy most about your work?*

I do enjoy the fact that I am not only contributing in the scientific development of our race but also in the environmental wellness of our planet and the future of the coming generations. It does also feel great when my work, through the development of novel solutions and products, can improve the life quality of our communities.

3. *What are the major challenges for wood science research in the world?*

I believe the research in this area is progressing in the right direction and should keep so. A stronger collaboration and coordination between academia, industry, and decision-makers would accelerate the work towards our goals.



4. *Can you talk about some of the people who have been most influential in your career and life?*

For me, Prof. Wolfgang Glasser from Virginia Tech is a great inspiration. I always enjoyed discussing my work with him and listening to his talks during his multiple stays at our department at the University of Freiburg, Germany.

5. *What are your main hobbies and interests, outside of the laboratory?*

I have a strong interest in aviation. If not reading about it, you may find me spotting airplanes near some airport. Other than

that, I enjoy my workout time in the gym and watching soccer games.

### **Interview with Karol Kulasiński**

1. *What attracted you to work in wood science?*

What I find the most attractive in wood science is working with a material that keeps fascinating humanity since forever: renewable, flexible, environment-responsive, inexpensive, etc. Everybody can find in wood science something interesting! For a



chemical physicist, like me, the wood's hierarchical structure and complexity at every scale is remarkable and inspiring. I hope one day we will be fully able to understand and adapt the solutions that Nature "included" in wood composite-like tissue.

2. *What do you enjoy most about your work?*

I enjoy explaining to lay-people how complex and ingenious is the material they think they know so well...

3. *What are the major challenges for wood science research in the world?*

Those challenges depend strongly on the scientific field, but, overall, I think

we still can improve usability of wood and its processing efficiency.

4. *Can you talk about some of the people who have been most influential in your career and life?*

I must mention my Ph.D. advisor, Prof. Jan Carmeliet, who basically introduced me to the scientific community and taught me an integrity a researcher should have. I am also very thankful to Dr. Dominique Derome for her persistence in carrying on wood research and Prof. Robert Guyer for helping me link physical, molecular level, understanding with some real-world applicability.



5. *What are your main hobbies and interests, outside of the laboratory?*

I try to diversify my day, after work, with playing music and expanding my knowledge in macro economy. Weekends and holidays I enjoy mountain hiking.



## **Interview with Wim Willems**

1. *What attracted you to work in wood science?*

As a physicist, I have a lifetime commitment to science in general. The interest in wood material has roots in a family-owned enterprise in wood industry. My main attraction to wood science is to discover fundamental structure-property relations, especially in relation to wood moisture.

2. *What do you enjoy most about your work?*

My work is 50/50% wood science and wood product/process development for my thermal wood modification business. I enjoy both activities equally, because they are mutually inspiring each other. Within the science part, I most like analyzing experimental data and phenomena.

3. *What are the major challenges for wood science research in the world?*

In my perception, the gain of knowledge in wood science is too slow compared to many other natural/technical sciences. This renders investment into wood research less attractive for funding agencies and industry and does not help attracting top scientists. Two remedies that might catalyze the scientific output of wood science on the longer run, is to thoroughly check, update and expand the fundamentals of wood science, and, to develop a procedure to prepare wood test specimens in a well-defined state before conducting any experiment. It is a real challenge to make these efforts with the worldwide declining numbers of active wood scientists, narrowing research budgets and short-term research objectives.

4. *Can you talk about some of the people who have been most influential in your career and life?*

In life, my wife Lonneke was most influential. We are together over 30 years. She allowed - even stimulated - me to continuously spend a good part of my evening and weekend time to scientific study. During my bachelor studies, I developed a strong intuition for understanding natural phenomena by my teacher Peter Hammer. My master project supervisor prof. Hidde Brongersma inspired me to specialize in a subject where one can excel by gaining cumulative knowledge from multidisciplinary approaches. The master classes for innovative entrepreneurship by prof. Leo Verhoef stimulated me to start my thermal wood modification corporation. Prof. Holger Militz admitted me to the -studies in wood biology and wood products in Göttingen and introduced me into the world of wood science.

5. *What are your main hobbies and interests, outside of the laboratory?*

Outside the laboratory, I like to play the piano, to hike, to cook and play golf.



## **IAWS PhD AWARDS – 2017**

This year there were seven nominations for the IAWS PhD award for the best thesis on a subject in wood science defended in 2016. The Academy Board has selected a winner, and the second and third runners-up, to be announced at the forthcoming IAWS Annual Meeting in Bali, Indonesia.

Fellows are urged to already consider the nomination of their current PhD students, in case they defend their thesis in this calendar year 2017. The Board has noticed that only a few centers of wood science are active in nominating their students, while there must be many more worthy competitors from other universities as well.

Nominations for 2017 are due between 1 January and 31 March 2018, and should be sent to the chair of the Academy Board Pieter Baas ([pieter.baas@naturalis.nl](mailto:pieter.baas@naturalis.nl)).

For conditions and information on the PhD Award, please refer to the IAWS website, as follows:

- The purpose is to foster and recognize cross-national interaction.
- The submission shall be no more than 2 pages of an extended abstract (in English) of the thesis/dissertation and a one-page CV of the student.
- The submission can be by the student and/or the student's advisor.
- The thesis/dissertation must have been completed within one year prior to the yearly announcement.
- The documentation shall be sent by email to the Chair of the IAWS Board.

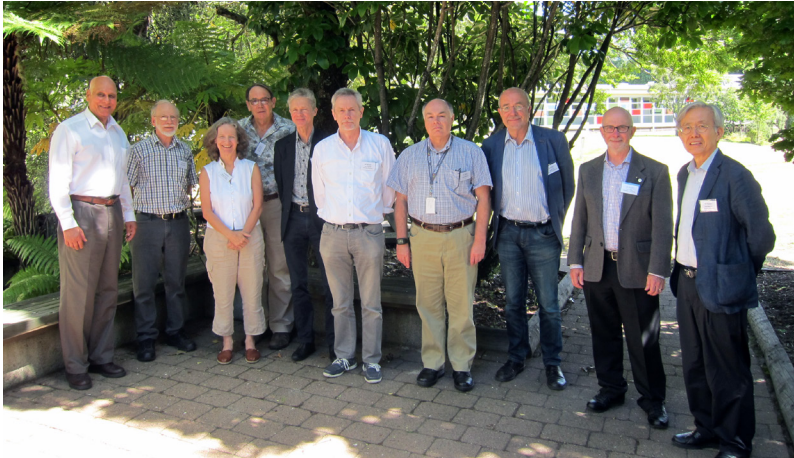
## **MEETINGS OF INTEREST**

### **Minutes of the IAWS Executive Committee Meeting 20<sup>th</sup> Feb, 2017 University of Waikato, Dean's Office, Hamilton/New Zealand**

Present: Uwe Schmitt, Lennart Salmén, Robert Evans, Pieter Baas, Roberta Farrell, Yoon Soo Kim

Apologies: Howard Rosen

1. The meeting was opened by President Uwe Schmitt at 9:50 a.m.



Roberta Farrell as local organizer welcomed EC members at the Dean's office of Waikato University in Hamilton. President Schmitt thanked Roberta Farrell for arranging the EC meeting at her university as well as participating in the next day's Plant Cell Wall Symposium at SCION in Rotorua, which was organized by Fellow Lloyd Donaldson.

## 2. Deceased Fellows

President Schmitt informed that John David Barrett from UBC in Vancouver passed away last year on April 5<sup>th</sup>. Unfortunately he got this sad news after the 2016 anniversary meeting in Paris so that it could not be announced there. All EC members held a minute of silence in memory of Fellow Barrett.

## 3. Minutes of the EC meeting in Paris, June 2016.

Pieter Baas asked for rewording the draft of the Paris minutes about the role of the Academy Board. He understands that the Board is supporting the EC in all the Academy's activities, which consequently aims at permanent information on EC activities by sending minutes of EC meetings also to the Board members. Uwe Schmitt underlined the importance of the Board especially in supporting the work of the EC, which is well described in the Constitution and Bylaws. All EC members agreed with the rewording of the Paris minutes and approved it.

President Schmitt informed that a special folder for EC members is available on our webpage after member login, which contains documents such as, minutes, letterhead etc.

#### 4. Officers

President Schmitt stated that Robert Evans is the incoming IAWS President and takes over this year on the founding day of the Academy, which is on 2 June. Yoon Soo Kim has been recently elected as new Vice-President and therefore also takes over as new Vice-President on the same day. Therefore, as Fellow Kim is currently the Academy's secretary, we have to appoint a new Secretary. Additionally, Roberta Farrell indicated to resign as Bulletin Editor. EC members were discussing whether the secretary should again be responsible also for the Bulletin. Considering that electronic data management (e.g. membership directory) saves a lot of time, the new secretary should in the future be responsible for updating and maintenance of our webpage. However, production of the Academy's biannual Bulletin was discussed as to rather to keep separate by appointing a new Bulletin Editor, or have the combined function of Secretary and Bulletin Editor.

EC members were discussing about well-suited candidates for IAWS secretary and Bulletin Editor. President Schmitt will contact these Fellows before June this year.

#### 5. Fellow Election process 2015/2016

President Schmitt reported that 106 Fellows voted. When compared to the relatively low number of 60-70 votes last year, it was a really good result. About 60% voted just after the first announcement. When sending out a reminder to vote, the increase in voting was not significant. Eleven candidates were nominated and all EC members scrutinized the results of voting and decided to finally elect seven candidates, as listed below:

Agarwal U	(USA)
Shi J	(China)
Celzard A	(France)
Brosse N	(France)
Jin Y	(China)
Sano Y	(Japan)
Pranovich A	(Finland)

Since only a few Fellows were regularly nominating candidates, EC members discussed how to increase the number of nominees. According to the last years, it became evident that only a handful of Fellows are sending documents for potential candidates. One option to improve the situation is that the President should send out a letter to those Fellows who were elected during the last ten years, encouraging them to think about potential candi-

dates and finally submit an official nomination.

President Schmitt informed EC about some technical problems during the recent voting process. Because the Chinese government does not allow connecting to Google, our webmaster had to send the ballot by regular e-mail to Chinese fellows. Ballots had then to be returned by mail. An electronic voting system has the advantage of easy and rapid handling. However, according to the blocked Google access in China, an alternative system should be used in future. The webmaster informed the President that some Fellows voted several times. In this case, it was decided to only count the last voting. EC members agreed with this procedure.

## 6. Bulletin

Roberta Farrell reported about her experiences as Bulletin Editor during the last years. Bulletin format has been standardized during past ten years. New Features such as the Interviews were highlighted by Roberta and she suggested more new features be added in the future. She recommended future space to be included for Affiliated Members, PhD students, Climate Change and topics of critical interest e.g. deforestation. President Uwe thanked for her excellent work during the last three years. Uwe informed that the Bulletin is being sent electronically but a few are still sent to Fellows who request a Bulletin as hard copy. Uwe informed also that Christina in Hamburg would be away from the work of design and layout of Bulletin due to her move to the President's Office of Thuenen Institute and therefore, with the new President, and new Editor, a new person for layout should be sought.

## 7. IAWS Finances

Treasurer Howard Rosen, unfortunately, could not attend the EC meeting due to private reasons. However, a detailed report was sent electronically which shows that finances of the Academy are very healthy. The EC members are very thankful for his excellent job and are happy that Howard Rosen agreed to continue as treasurer.

## 8. PhD Award 2017

Pieter Baas reported that seven nominations were submitted; possibly a few more will arrive before the deadline on March 31. Various strategies for increasing the number of nominations for the PhD Award were discussed. It was finally decided to send out invitation letters to Affiliate Members, leading universities and research institutions as well as to corresponding Fellows for a wider distribution of our PhD Award announcement. In addition, the editors-in-chief of *Holzforschung* (Fellow Oscar Faix), *Wood Science & Technology* (Fellow Klaus Richter) and *IAWA Journal* (Fellow Pieter Baas) should be asked for publication of this announcement.

*Meeting was stopped for lunch from 11:45 – 1:00pm and continued from 1:00 pm at the same place after lunch break.*

#### 9. Affiliate Members (AM)

During the last two years the four following institutions were elected as new AM of our Academy:

- Vietnam National Forestry University
- Göttingen University
- International Center for Bamboo and Rattan
- Seoul National University

EC members agreed to continue with our successful activities in recruiting more institutions. A few more institutions have already been contacted and we are hoping to welcome them soon in our Academy.

#### 10. IAWS Position Paper

President Schmitt proposed to regularly publish IAWS Position Papers about wood science topics. With the expertise of our worldwide renowned Fellows, it should be possible to write brief and clear statements, which should aim in a better visibility of the Academy. EC members welcomed this idea and agreed under the condition that it should be global, not too long, and not too technical. Such a paper should be published in a peer review journal with open access. Priority was given to the topics “education in wood science and technology” and “climate change and carbon mitigation based upon wood biomass”. Yoon Soo Kim was asked to take over responsibility for the first topic. At least one EC member should review the draft (maximum length 5~7 pages).

#### 11. Plenary Meeting of 2017 in Bali, Indonesia.

Fellows Schmitt and Baas informed that so far detailed information was not available from the local organizers in Indonesia. The Academy Lecture for the Bali conference was decided to be given by Prof. Arno Fruehwald from Hamburg University due to his intensive research activities on tropical hardwoods and the utilization of monocots during the last 30 years in collaboration especially with Malaysia and Indonesia. President Schmitt will contact Fellow Fruehwald. During the Paris EC Meeting it was proposed that Fellow Frank Beall should be honored with the Distinguished Service Award. Provided that the Board agrees with that proposal, the DSA could be delivered to Frank Beall during the Bali conference.

Regarding the IAWS PhD Award, the first prizewinner already indicated that

he would not be able to attend to Bali's conference. EC decided to now ask one of the two 2<sup>nd</sup> prizewinners to further promote this activity of the Academy.

## 12. New Webpage

President Schmitt reported about the recent modifications of the new webpage. It was decided to additionally give Affiliate Members some space for announcements. Any ideas for further improvements are highly welcomed. Fellow Schmitt also informed EC members that Christina Waitkus from Hamburg, who supported the webpage design and also did the final layout of the Bulletins during the last ten years, will not be available in the future because of organizational changes within the Thünen Institute.

## 13. AOB

The IUFRO All Division 5 Meeting will be held from 12-16 June 2017 in Vancouver. President Schmitt and Vice-President Evans are planning to attend as well as Treasurer Rosen. Fellow Ian de la Roche will hold the Academy Lecture entitled "Renaissance of Wood Building Design and Construction in North America".

The 20th International Nondestructive Testing and Evaluation of Wood Symposium will be held in Madison/USA from 12-15 September 2017. Fellow Bob Ross who is involved in the organization asked for a possible Academy Lecture. However, for 2017 we already have two ALs (Vancouver and Bali), therefore it was decided not to hold a third one.

The next EC meeting is in Bali during the annual meeting. Date and place will be announced soon. For 2018 there is not yet a decision about EC meeting and IAWS plenary meeting.



President Schmitt closed the EC meeting at 2:30pm. A dinner for EC members accompanied by some spouses was held that evening in Hamilton. In addition to attending the Plant Cell Wall Symposium, held at Scion on 21<sup>st</sup> February, a social and sightseeing tour of the area was enjoyed by all on the following day.

Editor's Note: A lively evening at the Tamaki Maori Village was enjoyed by the group, reminiscent of the *IAWS New Zealand Conference 2001: Productive Research, Globalisation and Forestry* held in New Zealand, when then President T. Kent Kirk participated in the Pōwhiri, which is the Maori traditional welcome ceremony, in Paihia.



2001: T. Kent Kirk receiving the wero (challenge) from a warrior from the tangata whenua (hosts).



2017: Rob Evans, Uwe Schmitt, Pieter Baas, Lloyd Donaldson learning the Haka.

## World Wood Day 2017 held in Long Beach, California USA, March 21-26, 2017



The 5<sup>th</sup> World Wood Day (WWD) was celebrated on March 21<sup>st</sup> and continued until March 26<sup>th</sup> in Long Beach California, USA to raise public awareness and understand the importance of wood in our society. The previous four celebrations were in Tanzania, China, Turkey, and Nepal. About 600 people from 85 countries attended this event at the Long Beach Convention

and Entertainment Center. IAWS has recognized the value of WWD to the advancement of wood science and contributed \$1000 to this important event. Howard Rosen (right), Treasurer of IAWS, presented the check to Mike Hou (center), Director of the International Wood Culture Society (IWCS) and Chung-Yun Hse (right), President of IWCS.

The overall theme of WWD 2017 was “Roots” to represent the use of wood in people’s lives, culture, and history. In keeping with the theme, WWD 2017 emphasized the wood culture of Native American people, who were the “roots” of civilization in the United States. The opening ceremony included Native American folk dancing with traditional musical instruments.

Shown here are a father and son dressed in traditional festive clothing. Many Native American wood carvers and boat makers provided their expertise to the Celebration.



Besides the tree planting, a 2½-day technical symposium, furniture making, wood carving



and turning demonstrations, a children’s program, a folk-art workshop, and a music festival; there were several special projects. One of these projects included work by US Artist David Best, who is known for stripping down vehicles and giving them sculptural makeovers with recycled and discarded materials. He created a 20-passenger wooden bus adorned with birch plywood fretwork and a removable spire for the Celebration.

Sixteen wooden blocks of basswood were carved by WWD artists and added to the exterior of the bus during the Celebration.

More details and pictures from these meetings and tours can be found at the World Wood Day 2017 websites <http://www.worldwoodday.org/2017/> and <https://www.facebook.com/worldwoodday>.

**Howard Rosen, Silver Spring**

## **FORTHCOMING MEETINGS OF INTEREST TO FELLOWS MEETINGS OF INTEREST TO FELLOWS**

### **IUFRO DIVISION 5 CONFERENCE** (adapted from the IUFRO website)

The 2017 IUFRO Division 5 (Forest Products) Conference will be held in Vancouver, BC from June 12th to 16th at the Pinnacle Hotel (downtown Vancouver). The Conference is jointly organized by IUFRO Division 5 and the Faculty of Forestry at the University of British Columbia, FPInnovations, and the Society of Wood Science and Technology. In recognition of the pressing global need for the forest sector to be a leader in sustainability, diversification, and innovation, the theme of the 2017 IUFRO Division 5 Conference is:

### **Forest Sector Innovations for a Greener Future**

The plenary topics include:

#### **Forest Sector Innovation**

How can innovative forest sector based environmental and social approaches assure a greener future for our global society?

#### **Innovations in Forest Products and Services**

How will fibre and forests be used in the near- and long-term (focus on bioenergy, biomaterials, biofuels, biochemicals, carbon and non-timber forest products)?

#### **Innovations in Wood Building and Design**

What will the next generation's needs for shelter and buildings be and how will they be met?

#### **Innovations in Forest Management, Policy and Markets**

Will there be enough biomass and sustainable products to support the growing global population?

#### **Innovations in Business Models and Management**

What will the businesses of forestry look like in the near-and long-term?

For more information, see [www.iufro2017.ca](http://www.iufro2017.ca)

## 9th Pacific Regional Wood Anatomy Meeting To Be Held Also With The IAWS Annual Meeting

The 9<sup>th</sup> PRWAC 2017 (Pacific Regional Wood Anatomy Conference) will be held 26-29 September 2017 at the HARRIS Hotel & Residences Sunset Road Kuta, in Bali – Indonesia. Adapted from the conference website, as follows:

“On behalf of the Pacific Regional Group of International Association of Wood Anatomist (IAWA), International Academy of Wood Science (IAWS), and the Indonesian Wood Research Society (IWoRS), we cordially invite researchers from all over the world to join us in the Joint Meetings for PRWAC 2017 (The 9th Pacific Regional Wood Anatomy Conference) and IAWS Meeting 2017 which are being organized at the same time with The 9th International Symposium of Indonesian Wood Research Society to be held at Harris Hotel and Residences, Kuta, Denpasar – Bali, INDONESIA, September 26 – 29, 2017.”

Universitas Gadjah Mada in the famous island of Bali – Indonesia, will host these important joint meetings. The venue of the conference will be at Kuta beach and also close to many other places of interest in Bali.

The conference is going to provide platform for researchers to present recent results, for discussions and the exchange of information in wide scopes of wood science and technology including.

- **PRWAC:** tree physiology and pathology, wood formation and cambial activity, dendrochronology (Tree ring analysis) & dendroclimatology, wood identification, wood quality, tropical hardwood and NWFP, paleobotany and archaeology, protection of endangered wood, wood utilization and environment, wood culture, general wood anatomy, cytochemistry: cellulose, hemicellulose, and lignin, tree ring analysis, wood anatomy and processing, and technique and technologies.
- **IAWS Meeting:** wood properties, wood processing technology, biomass energy.
- **Symposium of IWoRS:** wood basic properties, wood quality improvement, biocomposite, wood chemistry, pulp and papers, biomass conversion, renewable energy, non wood forest products, forest product processing, wood construction, and forest science.
- 

For more information, <http://woodconference.fkt.ugm.ac.id/9th-prwac/>  
**Still time to submit an abstract! Deadline extended until 15<sup>th</sup> May 2017.**

## International Conference “Renewable Resources: Chemistry, Technology, Medicine (RR2017)”

The conference RR 2017, will be held in Saint Petersburg State Forest Technical University, Institutsky per. 5, St Petersburg, Russia, from 18-22 September 2017, is devoted to fundamental and applied aspects associated with using renewable plant materials as a source of chemical compounds for new substances and materials with valuable practical properties. The main topics:

- biorefining – chemical processing of wood and other plant materials;
- novel chemical, biochemical and mechanical technologies in the field of renewable resources;
- novel polymers and nanomaterials based on wood and plant materials;
- organic synthesis based on renewable resources;
- biologically active substances from wood and different types of plants;
- pharmaceutical and medical preparations from chemical components of plant raw materials;
- new technologies in pulp and paper industry and in the production of wood composite materials;
- biofuels from renewable resources;
- environmental aspects of waste management in the chemical technology of wood;
- evaluation of the reserves and potential of renewable resources.

The conference is planned to conduct the following activities: Round Table Discussion: “Chemical and technological aspects of Biorefining”, Co-Moderators Prof. Eduard Akim and Prof. Bjarne Holmbom. Round Table Discussion: “Biofuels from wood and plant materials, and structured carbon Materials”, Co-Moderator Prof. Dmitriy A. Ponomarev, Prof. Nikolay I. Bogdanovich. The Conference program includes plenary lectures (30 min), oral presentations (20 min), and poster sessions. A book of abstracts will be published. The official language of the conference is English.

Abstracts should be submitted in English on one A4 page (margins everywhere 2 cm, indentation 0.5 cm), including title and author’s data (name, affiliation, address). Word processor Microsoft® Office Word for Windows, font Times New Roman (12 pt), single spacing. Abstracts should be submitted only on-line at the conference website. The deadline for submission of abstracts is **01.06.2017**.

The cultural program includes excursion to Petergoff, excursion to the Hermitage, visiting theaters and music events in Saint Petersburg. These excursions and other events will be paid separately.

Those wishing to participate in the conference must register at the website <http://onlinereg.ru/RR20117>

## The 9th European Conference on Wood Modification



**ECWM<sup>9</sup>**  
Ninth European Conference on Wood Modification

**The 9th European Conference on Wood Modification**

**Change of the date of ECWM9 to September 2018**

Due to the overloaded program of conferences, meetings and actions in and around September 2017 on related wood subjects, SHR as organizer and the ECWM scientific committee, have decided to postpone the 9th ECWM conference to September 2018 in the Netherlands.

Information about registration and important deadlines connected to this new date of the conference will follow the coming months. Check every now and then the ECWM9 website (<http://ecwm9.shr.nl/>) for further details. Special mailings will follow to inform you about the 9th ECWM 2018.

## 20<sup>th</sup> International Nondestructive Testing and Evaluation of Wood Symposium

The 20<sup>th</sup> International Nondestructive Testing and Evaluation of Wood Symposium will be held 12-15 September 2017 in Madison, Wisconsin USA at the USDA Forest Products Laboratory.

In an effort to provide a forum for researchers, the international nondestructive testing and evaluation research community sponsors a series of technical symposia for exchange of technical information. These symposia are scheduled on a biannual basis at locations throughout the world. The most recent symposium was held in Rio de Janeiro, Brazil in 2015.

Washington State University and the USDA Forest Products Laboratory (FPL) initiated the International Nondestructive Testing and Evaluation of Wood Sym-

posium Series. The first symposium was held at FPL in the fall of 1963, with proceedings produced and distributed in 1964. At the meeting, nearly 100 scientists, engineers, and industry leaders discussed possibilities of a wide range of scientific means for testing wood nondestructively.

This symposium series has two goals: 1. to provide a technical and scientific forum for scientists to present and exchange results from their research endeavors; 2. to bring researchers and industry together in an attempt to bridge the gap between the results of research efforts and the use of those results by the wood industry.

Early symposia focused on basic nondestructive evaluation principles and lumber assessment procedures in North America; the symposium now attracts researchers and industry representatives from throughout the world and represents the full spectrum of technical interests, from basic and applied science to the use of various methods in industrial and field applications.

Research scientists from twenty three countries will be presenting papers on a wide range of topics, including the assessment of; 1. Seedlings and saplings; 2. Archeological materials and historic structures; 3. And historic and urban trees. Technical sessions that focus on condition assessment of structures and evaluation of timber are also scheduled. All papers will be compiled in a proceedings, which will be published by the USDA Forest Service Forest Products Laboratory. Scheduled social events include a banquet on the campus of the University of Wisconsin-Madison, tours of the FPL, and a post-symposium dinner cruise on Lake Mendota.

## **NEWS ITEMS FROM FELLOWS**

A significant achievement was the world's first cellulosic biojet commercial flight, successfully demonstrated by a coast-to-coast Flight No. AS04 of Alaska Airlines on Nov. 14, 2016 from Seattle to Washington D.C. The biojet used for this flight was produced from sugars derived from harvest softwood residue preprocessed by the SPORL process developed by Fellows Zhu (US Forest Service, Forest Products Laboratory) and Xuejun Pan (University of Wisconsin-Madison) and colleagues at the Forest Products Laboratory. See <https://newsroom.alaskaair.com/2016-11-14-Forest-powered-flight-heads-to-Washington-D-C>

## HIGHLIGHTS

### 2016 ANNUAL REPORT FROM VALENTIN I. POPA, emeritus prof.

PhD in Chemical engineering

Corresponding member of Romanian Academy for Technical Sciences, International Academy of Wood Science, International Lignin Institute, American Chemical Society

### 12 Published papers, and 3 Communications, including

- E. Ungureanu, A. E. Trofin, A. M. Ariton, D. C. Jitareanu, O. Ungureanu, V. Gilca, S. I. Bors, and **V. I. Popa**. Applications of epoxidated lignins for bioprotection of lignocellulosic materials. *Cellulose Chem. Technol.*, **50** (1), 77-85 (2016), IF 0.833
- L. Lazar, A.I. Talmaciu, I.Volf and **V.I.Popa**. Kinetic modeling of ultrasound assisted extraction of polyphenols from *Picea abies* bark. *Ultrasonic Sonochemistry*, **32**, September, 191–197(2016) <http://dx.doi.org/10.1016/j.ultrasonch.2016.003.009>, IF 4.556

### Editor in chief Cellulose Chemistry and Technology

**Reviewer:** Bioresource Technology, Journal of Natural Fibres (2), Food Chemistry,

Carbohydrate Polymers (2), Industrial Crops and Products (2), Journal ACS Sustainable Chemistry & Engineering, Journal of Hydrogel, International Journal of Polymer Science

### PhD Supervisor: Thesis defended:

Oana Crina Bujor, Extraction, identification and antioxidant activity of the phenolic secondary metabolites isolated from the leaves, stems and fruits of two shrubs of the Ericaceae family), thesis joint supervision with University of Avignon-National Institute for Agricultural Research, Avignon, France Dr.Claire Dufour.

Project: Biorefining and biological properties of polyphenols isolated from biomass

## Observations on starch grains in heartwood of ancient and modern oak



**T. Nilsson<sup>\*1</sup> and C.G. Björdal<sup>2</sup>**

<sup>1</sup> Tomtebov.5, SE-741 42 Knivsta, Sweden

<sup>2</sup> Department of Marine Sciences, University of Gothenburg, Gothenburg, Sweden \*  
Corresponding author E-mail: nilssonbielke@gmail.com

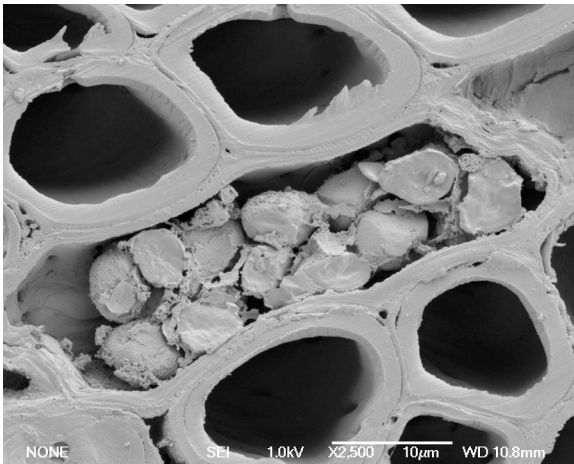
In a project on the microbial and chemical degradation of archaeological wood ('Save the VASA'), we made numerous microscopical studies of waterlogged oak samples taken from the warship 'Vasa'. Starch grains were frequently observed in the radial and axial parenchyma cells of the heartwood.

Starch is a reserve compound, formed and stored in parenchyma cells of most tree species. It functions as a reserve compound that is used during spring and formed during the autumn (Essiamah and Eschrich 1985). It is generally depleted when the sapwood is transformed to heartwood (Kozłowski and Pallardy 1997). We have been able to find only three earlier reports on starch found in heartwood. Price (1916) observed abundant starch grains in the rays and wood parenchyma of several annual rings the heartwood of a living apple tree. Dietrichs (1964) reported on starch in beech heartwood. Nilsson and Daniel (1990) observed starch grains in the thick-walled tyloses in vessel elements of the heartwood of an archaeological *Pistacia* wood sample, ca. 2000 years old.

Wood samples of oak for analysis were obtained from the warship 'Vasa', which is on display at the Vasa Museum in Stockholm. The ship sank in 1628 and was

salvaged in 1961, after 333 years. After recovery, the ship's timbers were kept wet, first by spraying with water and then with polyethylene glycol solutions containing a boric acid-borax mixture (Håfors 2001). The spray treatment ended in 1979 and the timbers were allowed to dry out slowly. Outbreaks of acid sulphate salts on wood surfaces during the rainy summer of 2000 led to a concern that chemical degradation of the wood could threaten the preservation of the ship. We became involved in a new project, aimed at discovering whether chemical degradation of the 'Vasa' timbers had occurred since the salvage. Samples to be investigated were taken from three types of oak timber: wood with significant salt deposits, wood with iron corrosion products and wood without salts and iron. [Methods can be obtained from Fellow Nilsson.]

Starch grains, colourless, more or less globular or an irregular shape, were found in 8 of the 26 oak heartwood samples from the 'Vasa'. Starch was found in both inner and outer samples. The outer samples were degraded by soft-rot fungi and erosion bacteria to a depth that varied from a few millimetres to 10-20mm. Granular material, similar in size and shape to the starch grains observed further in, was occasionally observed in parenchyma cells adjacent to wood cells that had been degraded by soft-rot and erosion bacteria.



Scanning Electron Micrograph of starch grains in ancient oak heartwood

The grains stained blue with iodine and they disappeared when the sections were boiled in water, proving that the grains consist of starch. Starch grains were rare or absent in several samples. However, where they did occur, they usually filled the individual parenchyma cells.

The occurrence of starch in the heartwood is surprising. Starch is formed in the parenchyma cells of the sapwood and is consumed during the early parts of the growing season. Starch is

also depleted during heartwood formation for the synthesis of extractives and may therefore be temporarily present only in transition zones. Occurrence of starch in heartwood may therefore be regarded as an anomalous. Price (1916)

observed that the occurrence of starch varied between individual annual rings. He suggested that an explanation could be that “excess storage” of starch could occur in years favourable for the production of starch. This could lead to starch accumulation, if the following season was fruitless or partly fruitless. Formation of heartwood from sapwood containing starch would then permanently trap the starch. Dietrichs (1964) observed starch granules in the ray parenchyma cells of beech (*Fagus sylvatica*) heartwood in 3 out of 11 examined trees. Starch was present in the inner and outer heartwood.

Essiamah and Eschrich (1985) reported on annual changes of starch content in six European deciduous tree species, including oak (*Quercus robur*). Ebermann and Stich (1985) studied the seasonal variation of wood peroxidase activity within oak trees (*Quercus robur*). They observed an increased peroxidase activity in winter and concluded that heartwood formation in oaks takes part mainly during the winter. It is possible that the dissolution of starch in the transition wood partly is prevented by extremely cold weather or enzymatic activities during the heartwood formation or a combination of the two. These factors may be similar to events induced by severe frosts or injuries, which are known to result in included sapwood, also called “moon-rings”, as discussed by Dufsiefken et al. 1984. They reported that starch occurred in the included sapwood and that tylose rarely were developed. Our results suggest that the process of heartwood formation in oak trees could be quite sensitive to external factors.

Starch is known to be very susceptible to degradation by micro-organisms. It is therefore surprising that the starch survived for over 300 years in a seawater and more than 2,200 years in a wetland, both of which are environments in which fungi and bacteria are abundant. No signs of degradation of wood cells were observed in samples taken from a greater depth in the oak timbers and it was not possible to see any evidence of fungi or bacteria. It seems unlikely, however, that the inner parts of the timbers remained free from micro-organisms over centuries. Dark-coloured grains of the same size and shape as the starch grains could often be seen in parenchyma cells close to the surface of the wood, where attack on the wood itself was obvious. This attack was caused by soft-rot and erosion bacteria. It is most unlikely that the micro-organisms present were unable to degrade starch. Therefore, the preservation of starch requires an alternative explanation. The dark colour of the grains in the outer parts of the wreck samples could be due to the presence of tannins, iron or both. It is possible that the tannins protect the starch from degradation, since it is known that tannins can form complexes with starch, which may resist microbial degradation (Lewis and Starkey 1968, Porter 1989). Tannins are also known to inhibit amylases (McDougall et al. 2005).

A possible correlation between starch and mast years should be investigated. If climate plays a part by influencing an annual variation in the starch content in the heartwood, this would be of interest to dendrochronologists.

This work was performed within the National Maritime Museums of Sweden research project "Save the VASA" sponsored by The Bank of Sweden Tercentenary Foundation, The Swedish National Heritage Board, The Swedish Foundation for Strategic Research (SSF), The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS), and The Swedish Agency for Innovation Systems (VINNOVA).

## References

1. Dietrichs, H.H. 1964. Das Verhalten von Kohlenhydraten bei Holzverkerung. *Holzforschung* 18, 14-24.
2. Dujesiefken, D., Liese, W. and Bauch, J. 1984. Discolouration in the heartwood of oak-trees. *IAWA Bulletin n.s.*, 5, 128-132.
3. Ebermann, R. and Stich, K. 1985. Distribution and seasonal variation of wood peroxidase activity in oak (*QUERCUS ROBUR*). *Wood and Fiber Science*, 17, 391-396.
4. Essiamah, S. and Eschrich, W. 1985. Changes of starch content in the storage tissues of deciduous trees during winter and spring. *IAWA Bulletin, n.s.*, 6, 97-106.
5. Håfors, B. Conservation of the Swedish warship Vasa from 1628. *Vasa Studies* 18, The Vasa Museum, Stockholm, Sweden.
6. Kozlowski, T.T. and Pallardy, S.G. 1997. *Physiology of woody plants*. 2nd edition. Academic Press.
7. Lewis, J.A. and Starkey, R.L. 1968. Vegetable tannins, their decomposition and effects on decomposition of some organic compounds. *Soil Science*, 106, 241-247.
8. McDougall, G.J., Shapiro, F., Dobson, P., Smith, P., Blake, A. and Stewart, D. 2005. Different polyphenolic components of soft fruits inhibit  $\alpha$ -amylase and  $\alpha$ -glucosidase. *Journal of Agricultural and Food Chemistry*, 53, 2760-2766.
9. Nilsson, T. and Daniel, G. 1990. Structure and the aging process of dry archaeological wood. In: *Archaeological Wood. Properties, Chemistry*

and Preservation (Rowell, R.M. and Barbour, R.J. (Eds.), Advances in Chemistry Series, 225, pp. 67-86, Washington DC, 1990.

10. Porter, L.J. 1989. Condensed tannins. In: Natural products of woody plants. Chemicals extraneous to the lignocellulosic cell wall (Rowe, J.W., Ed.), Vol. 1., pp. 651-690, Springer Verlag, Berlin.
11. Price, W.A. (1916). Starch in apple trees. The Ohio Journal of Science, 16, 356-359.

## **Towards Sustainable and Integrated Production of Carboxylated Cellulose Nanocrystals and Nanofibrils Using Fully Recyclable Di-carboxylic Acids**

**Liheng Chen**<sup>a,b</sup> and **J.Y. Zhu**<sup>b\*</sup>

<sup>a</sup> Key Laboratory of Biomaterials of Guangdong Higher Education Institutes, Department of Biomedical Engineering, Jinan University, Guangzhou 510632, China

<sup>b</sup> Forest Products Laboratory, Forest Service, U.S. Department of Agriculture, Madison, WI 53726, United States

Cellulose nanomaterials, such as cellulose nanocrystals (CNC) and fibrils (CNF), have attracted renewed interest for a variety of applications<sup>1-4</sup>. Economic and environmentally sustainable production, however, is the key to achieving their potentials. Currently, CNC are mainly produced by acid hydrolysis using concentrated mineral acids<sup>5-10</sup> developed in the 1940s and 1950s<sup>11-13</sup>. Several pilot-scale facilities are in operation and a commercial-scale facility has been developed in North America, however, using concentrated mineral acid hydrolysis still raises several concerns: (1) difficulties in economic acid recovery (approximately 9 kg H<sub>2</sub>SO<sub>4</sub>/kg CNC using sulfuric acid) and disposal of a large amount of salt (approximately 13 kg Na<sub>2</sub>SO<sub>4</sub>/kg CNC) from acid neutralization; (2) low thermal-stability of the resultant CNC, especially when sulfuric acid is used<sup>14</sup> (although sodium exchange can increase thermal stability), which limits CNC application from a very large market of nanocomposites processed at relatively high temperatures; (3) difficulties in functionalization of CNC due to the presence of sulfate groups; and (4) low CNC yield of approximately 30% to 50% under the so-called standard hydrolysis conditions (64wt% acid concentration at 45–50 °C for approximately 60 min). Our recent studies addressed the low yield issue and resulted in yield of approximately 90% based on cellulose<sup>6,15</sup>.

CNF are often produced through mechanical fibrillation with the assistance of chemical or enzymatic pretreatment to save energy in fibrillation<sup>16-22</sup>. These

pretreatment processes are not compatible with concentrated mineral acid hydrolysis for CNC production. Separate production lines for CNF are therefore required, in addition to difficulties in economic recovery of chemicals.

Overall, existing processes for production of CNC and CNF remained environmentally unsustainable, very expensive, and economically out of reach for most product development applications. Despite a large amount of reported research, few studies showed promising prospects for achieving low cost and sustainable production of cellulose nanomaterials with tailored properties and functionality, all of which are critical to many promising commercial applications.

Knowledge of cell wall ultrastructure is still limited, but current understanding on the subject suggests that hydrolysis is effective in deconstructing cell walls into nano-sized building blocks by hydrolyzing hemicelluloses that link cellulose fibrils<sup>23</sup> and depolymerizing disordered cellulose<sup>22</sup>. Here we report using concentrated di-carboxylic acids to realize tailored and integrated production of carboxylated CNC with CNF<sup>24, 25</sup>. Advantages of the proposed approach are two-fold: (1) when using di-carboxylic acids with low solubility, such as oxalic and maleic acid, efficient and low-cost acid recovery can be achieved through crystallization; and (2) one carboxyl group of di-carboxylic acids can esterify cellulose through Fisher–Speier esterification<sup>26</sup> to produce carboxylated CNC and CNF, beneficial for aqueous dispersion and further functionalization. These acids have low strength (pKa) and cannot hydrolyze all cellulose materials into CNC; however, cellulose loss to sugars is also minimal. Most of the feeding cellulosic material ends up as partially hydrolyzed fibrous cellulosic solids residue (FCSR) that can be easily fibrillated into CNF with low energy input<sup>5, 27, 28</sup>. By tuning the hydrolysis severity, tailored production of CNC and CNF with desired morphology and surface properties can be achieved<sup>28</sup>. Lignin containing carboxylated CNC (LCNC) and CNF (LCNF) can also be produced when using unbleached chemical pulps as feeding material<sup>29</sup>.

*Typical CNC and CNF yields:* Di-carboxylic acid hydrolysis of bleached Eucalyptus kraft pulp (BEP) fibers resulted in low CNC yield below 25% due to its low strength (Table 1). Samples were abbreviated as (O or M or Sxx, yy, zz), with xx as acid concentration in wt%, yy as temperature in degrees C, and zz as time in minutes. The resultant FCSR was used to produce CNF through subsequent mechanical fibrillation in a microfluidizer. Total loss of carbohydrates to soluble sugars was low, based on the total yield of FCSR and CNC (Table 1) for the BEP of cellulose content of 78% with xylan content of 15%. Most of the solubilized sugars were from xylan, as evidenced from measured xylose in the hydrolysates<sup>25, 28</sup>.

Table 1. List of CNC and FCSR (=CNF) yield, crystallinity, and surface properties.

CNC Sample <sup>1</sup>	FCSR(CNF) yield (%)	CNC yield (%)	CNC Charge (mV)	COOH (mmol/g CNC)	CrI (%)
Feed BEP				ND	76.0 ± 0.4
(O50, 100, 45)	91.4±0.2	8.3±0.0	-38.0 ± 0.3	0.11	82.8
(O60, 100, 45)	89.1±0.3	9.0±0.2	-41.9 ± 0.7	0.15	82.4
(O70, 100, 45)	80.8±0.7	11.4±0.2	-43.3 ± 0.9	0.19	81.2
(O60, 100, 90)	87.3±0.5	11.0±0.3	-45.0 ± 0.3	0.39	80.0
(O70, 100, 60)	73.5±0.3	24.7±0.2	-42.5 ± 0.5	0.23	80.4
(M50, 100, 45)	95.9±0.3	1.1±0.0	-30.1 ± 0.4	~0.14	
(M70, 100, 45)	83.9±0.4	12.0±0.0	-33.3 ± 0.7	~0.22	
(S64, 45, 45)	0	31.6±0.6	-59.4 ± 0.8		77.9 ± 0.2

<sup>1</sup> O, M, S stand for oxalic, maleic, and sulfuric acid, respectively.

*Tailoring CNC and CNF morphology:* A combined hydrolysis factor (CHF) was developed as a hydrolysis reaction severity that can control xylan (CHF<sub>x</sub>) dissolution and cellulose (CHF<sub>c</sub>) depolymerization (DP) based on first-order reaction kinetics <sup>28</sup>. The morphology of CNC and CNF can be tailored by controlling CHF<sub>c</sub>. The CNF morphology can also be controlled by the extent of mechanical fibrillation, e.g., number of passes (P) in microfluidizer.

*Surface properties:* Conductometric titration and zeta-potential measurements indicated that di-carboxylic acids produced CNC are carboxylated with surface charge (Table 1), which can facilitate dispersion in aqueous processing. Maleic acid has a slightly lower strength (high pKa) than oxalic acid and resulted in CNC with slightly lower surface charge. CNF are also carboxylated.

*Crystallinity and thermal stability:* Sulfuric acid hydrolysis can damage cellulose crystals due to its strength at high concentrations. Di-carboxylic acid, however, produced CNC with higher crystallinity index (CrI) than sulfuric acid (Table 1), which can improve CNC thermal stability. This can be seen from TGA analyses as well as from the color of the sulfuric-CNC (see below on the left) and the oxalic-CNC (see below, on the right) after 24 h in the oven at 105 °C.

*Conclusions:* We believe that concentrated di-carboxylic acid hydrolysis has significant advantages over existing processes for producing cellulose nanomaterials, such as easy acid recovery, high cellulosic nanomaterial yield, esterification

of cellulose to resulted carboxylated and charged cellulose nanomaterials. It therefore has potential to achieve low cost and sustainable production of functional cellulose nanomaterials.



## References

1. J. A. Kelly, A. M. Shukaliak, C. C. Y. Cheung, K. E. Shopsowitz, W. Y. Hamad and M. J. MacLachlan, *Angewandte Chemie - International Edition*, 2013, **52**, 8912-8916.
2. M. Giese, L. K. Blusch, M. K. Khan and M. J. MacLachlan, *Angew. Chem. Int. Edit.*, 2015, **54**, 2888-2910.
3. H. Zhu, W. Luo, P. N. Ciesielski, Z. Fang, J. Y. Zhu, G. Henriksson, M. E. Himmel and L. Hu, *Chem. Rev.*, 2016, **116**, 9305–9374.
4. R. J. Moon, A. Martini, J. Nairn, J. Simonsen and J. Youngblood, *Chem. Soc. Rev.*, 2011, **40**, 3941-3994.
5. Q. Q. Wang, J. Y. Zhu, R. S. Reiner, S. P. Verrill, U. Baxa and S. E. McNeil, *Cellulose*, 2012, **19**, 2033-2047.
6. L. Chen, Q. Wang, K. Hirth, C. Baez, U. P. Agarwal and J. Y. Zhu, *Cellulose*, 2015, **22**, 1753-1762.
7. D. Bondeson, M. A. and K. Oksman, *Cellulose*, 2006, **13**, 171-180.
8. W. Y. Hamad and T. Q. Hu, *Can. J. Chem. Eng.*, 2010, **88**, 392-402.
9. H. Yu, Z. Qin, B. Liang, N. Liu, Z. Zhou and L. Chen, *Journal of Materials Chemistry A*, 2013, **1**, 3938-3944.
10. S. Camarero Espinosa, T. Kuhnt, E. J. Foster and C. Weder, *Biomacromolecules*, 2013, **14**, 1223-1230.
11. O. A. Battista, *Industry and Engineering Chemistry*, 1950, **42**, 502-507.
12. B. G. Rånby, *Discussions Faraday Soc.*, 1951, **11**, 158-164.

13. R. F. Nickerson and J. A. Habrle, *Ind. Eng. Chem.*, 1947, **39**, 1507-1512.
14. M. Roman and W. T. Winter, *Biomacromolecules*, 2004, **5**, 1671-1677.
15. Q. Wang, X. Zhao and J. Y. Zhu, *Ind. Eng. Chem. Res.*, 2014, **53**, 11007-11014.
16. T. Saito, Y. Nishiyama, J. L. Putaux, M. Vignon and A. Isogai, *Biomacromolecules*, 2006, **7**, 1687-1691.
17. M. Pääkko, M. Ankerfors, H. Kosonen, A. Nykänen, S. Ahola, M. Österberg, J. Ruokolainen, J. Laine, P. T. Larsson, O. Ikkala and T. Lindström, *Biomacromolecules*, 2007, **8**, 1934-1941.
18. H. Liimatainen, M. Visanko, J. A. Sirviö, O. E. O. Hormi and J. Niinimäki, *Biomacromolecules*, 2012, **13**, 1592-1597.
19. T. Zimmermann, E. Pöhler and T. Geiger, *Advanced Engineering Materials*, 2004, **6**, 754-761.
20. W. Wang, M. D. Mozuch, R. C. Sabo, P. Kersten, J. Y. Zhu and Y. Jin, *Cellulose*, 2015, **22**, 351-361.
21. M. Henriksson, G. Henriksson, L. A. Berglund and T. Lindström, *European Polymer Journal*, 2007, **43**, 3434-3441.
22. Y. Qin, X. Qiu and J. Y. Zhu, *Sci. Rep.*, 2016, **6**, 35602.
23. M. Busse-Wicher, T. C. F. Gomes, T. Tryfona, N. Nikolovski, K. Stott, N. J. Grantham, D. N. Bolam, M. S. Skaf and P. Dupree, *Plant Journal*, 2014, **79**, 492-506.
24. H. Bian, L. Chen, R. Wang and J. Y. Zhu, *J. Visualized Exp.*, 2017, **55079**, DOI:10.3791/55079.
25. L. Chen, J. Y. Zhu, C. Baez, P. Kitin and T. Elder, *Green Chem.*, 2016, **18**, 3835-3843.
26. E. Fischer and A. Speier, *Chemische Berichte*, 1895, **28**, 3252-3258.
27. Q. Q. Wang, J. Y. Zhu and J. M. Considine, *ACS Appl. Mater. Interfaces*, 2013, **5**, 2527-2534.
28. R. Wang, L. Chen, J. Y. Zhu and R. Yang, *ChemNanoMat*, 2017, **3**, DOI: 10.1002/cnma.201700015.
29. Bian, H., L. Chen, H. Dai and J. Y. Zhu, *Carbohydrate Polymers*, 2017, **167**, 167-176.

## Applications of Quantum Chemistry Methods in Exploration of Wood Adhesive Chemistry



**Guanben Du and Taohong Li, Southwest Forestry University, Kunming, China**



Although the commonly used wood adhesive resins, like urea-formaldehyde (UF) and phenol-formaldehyde (PF) resin et al., have a history over one century, many details regarding the mechanisms of the synthetic reactions remain unrevealed and

many experimental results have not been well rationalized. Take UF resin as an example. It has been known that the chemical structures of the UF polymers and performance of this resin are closely related to the synthetic conditions, like F/U molar ratio, pH, reaction time and temperature, as well as reactants adding procedure<sup>[1,2]</sup>. To understand how the conditions influence the structures and components of UF resin, scientists tried to use analytical technologies, like nuclear magnetic resonance (NMR) and mass spectroscopy (MS), to characterize the polymer structures<sup>[3-8]</sup>. Many useful results were obtained indeed. Namely, the relative contents of hydroxymethyl groups, methylene and methylene ether bridges, urons, unreacted formaldehyde, can be obtained from quantitative <sup>13</sup>C-NMR analysis, as well as the molecular weights can be known from MS spectra. However, the NMR and can tell us what the polymers are but they cannot tell us how they are formed and why they are changed with the conditions. To look insight into the competitive relationships of the involved reactions, the mechanisms must be investigated in detail. The difficulties of exploring reaction mechanisms using experimental methods mainly lie in the complexity of the resin chemistry. Specifically, a number of competitive reactions are involved and the short-lived intermediates cannot be captured with experimental strategies. The lack of the knowledge on the reaction mechanisms has been obviously a barrier for improving the synthetic technologies.

Fortunately, with the development of the quantum chemistry theories and computer technologies, investigation of any individual target reaction on computer has become feasible. In this context, our team began to apply quantum chemistry methods to resin chemistry since 2010. During the past several years, the main base- and acid-catalyzed reactions involved in synthesis of UF and PF resins have been studied<sup>[9-12]</sup>. The details that were obtained from theoretical

calculations include geometrical and electronic structures of the reactants, intermediates, transition states and products, in addition to the kinetic energy barrier and thermodynamic properties of each elementary reaction. Based on the identified mechanisms and calculated energetics, the competitive relationships of different reactions have been elucidated. Further, the influences of reaction conditions on the structures and components of the resins were also rationalized.

The much more complicated co-condensation reaction systems, like melamine-urea-formaldehyde (MUF) and phenol-urea-formaldehyde (PUF) reactions, are undoubtedly more challenging for traditional experimental methods to show details. Our recent experiments showed that the co-condensations are very sensitive to pH<sup>[13,14]</sup>. According to our theoretical calculations, the relative reactivity of the intermediates produced under alkaline or acidic condition toward different monomers determines the competitive relationship between the self- and co-condensations. We are going to share these results with all readers in future publications and demonstrate further how theoretical methods helped us understand the resin chemistry, hoping more scholars will attend in similar research.

It is sure that the chemicals used in synthesis of wood adhesives will be more diversified and the reaction systems will be more complex. We believe theoretical chemistry methods can make important contributions to the improvement and innovation of the synthetic technologies.

## References

1. Dunky M. Adhesives based on formaldehyde condensation resins. *Macromolecular Symposia*, 2004, 217, 417-429.
2. Dunky M. Urea-formaldehyde (UF) adhesive resin for wood. *International Journal of Adhesion Adhesives*, 1998, 18, 95-107.
3. Kim MG. Examination of selected synthesis parameters for typical wood adhesive-type urea-formaldehyde resins by <sup>13</sup>C NMR Spectroscopy. I. *Journal of Polymer Science Part A: Polymer Chemistry*, 1999, 37, 995-1007.
4. Siimer K, Pehk T, Christjanson P. Study of the structural changes in urea-formaldehyde condensates during synthesis. *Macromolecular Symposia*, 1999, 148, 149-156.
5. Kim MG. Examination of selected synthesis parameters for typical wood adhesive-type urea-formaldehyde resins by <sup>13</sup>C NMR Spectroscopy. II. *Journal of Applied Polymer Science*, 2000, 75, 1243-1254.

6. Kim MG. Examination of selected synthesis parameters for typical wood adhesive-type urea–formaldehyde resins by  $^{13}\text{C}$  NMR Spectroscopy. III. *Journal of Applied Polymer Science*, 2001, 80: 2800-2814.
7. Christjanson P, Pehk T, Siimer K. Hydroxymethylation and polycondensation reactions in urea–formaldehyde resin synthesis. *J Journal of Applied Polymer Science*, 2006, 100, 1673-1680.
8. Despres A, Pizzi A, Pasch H, Kandelbauer A. Comparative  $^{13}\text{C}$ -NMR and matrix-assisted laser desorption/ionization time-of-flight analyses of species variation and structure maintenance during melamine–urea–formaldehyde resin preparation. *Journal of Applied Polymer Science*, 2007, 106, 1106-1128.
9. Li T, Cao M, Liang J, Xie X, Du G. Theoretical Confirmation of the Quinone Methide Hypothesis for the Condensation Reactions in Phenol-Formaldehyde Resin Synthesis, *Polymers*, 2017, 9, 45.
10. Li T, Liang J, Cao M, Guo X, Xie X, Du G. Re-elucidation of the acid-catalyzed urea–formaldehyde reactions: A theoretical and  $^{13}\text{C}$ -NMR study *Journal of Applied Polymer Science*, 2016, 133, 44339-44356.
11. Li T, Du G, Guo X, Liang J, Wang H, Xie X Competitive Formation of the Methylene and Methylene ether Bridges in the Urea-formaldehyde Reaction in Alkaline Solution: A Combined Experimental and Theoretical Study, *Wood Science and Technology*, 2015, 49(3): 475-493.
12. Li T, Xie X, Du G. A theoretical study on the water-mediated asynchronous addition between urea and formaldehyde, *Chinese chemical Letters*, 2013, 24(1): 85-88.
13. Cao M, Li T, Liang J, Du G. The influence of pH on the melamine-dimethylurea-formaldehyde co-condensations: A quantitative  $^{13}\text{C}$ -NMR study, *Polymers*, 2017, 9(3), 109.
14. Cao M, Li T, Liang J, Wu Z, Zhou X, Du G. A  $^{13}\text{C}$ -NMR Study on the 1,3-Dimethylolurea-Phenol Co-Condensation Reaction: A Model for Amino-Phenolic Co-Condensed Resin Synthesis, *Polymers*, 2016, 8, 391-405.

## **HIGHLIGHTS FROM THE DEPARTMENT OF SUSTAINABLE MATERIALS, VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY, SPRING 2017**

Quoting from the Virginia Tech Spring 2017 newsletter:

- The Wood Enterprise Institute (WEI) has had another very successful year with their VT wine rack and the Center for Packaging and Unit Load Design (CPULD) continues to give students first hand experiences working with the packaging industry with a variety of different projects.
- The Society of Renewable Resources (SRR) at Virginia Tech is a club for students interested in sustainability through the use of natural and renewable resources. The club's mission is to provide service to the Department of Sustainable Biomaterials and the Virginia Tech community and to foster professional development to better enable tomorrow's work force. Through service and professional development activities, students are able to make better professional and career connections related to the application of sustainable biomaterials, renewable resources and technologies studied in their courses.
- Virginia Tech Packaging Student club has been established since 2010. The club is a member of two different national organizations: a Student Chapter of the Institute of Packaging Professionals (IoPP) and a student chapter of Technical Association of the Pulp and Paper Industry (TAPPI). More than 60 active students are doing collaborative projects every semester such as participation in packaging design competitions, the annual PackExpo and the Packaging Jamboree. Developing a deep and advanced career in packaging is a main goal of the club.
- National Wooden Pallet and Container Association (NWPCA) and Virginia Tech are working together to move the pallet industry into the 21st Century. NWPCA became one of the Gold level members of the Center for Packaging and Unit Load Design (CPULD) in 2015 and established the NWPCA Research Fellowship program in which graduate students are supported to investigate the interaction between packages and pallets and to conduct research that helps the pallet industry be more sustainable.
- The Sustainable Packaging Designer Trainee program was established in 2012 by the Center for Packaging and Unit Load Design (CPULD). Since then, the program has become a great success. Students graduating from the program receive job offers as early as a year before graduation at companies such as Niagara Bottling, Rehrig Pacific, Newell RubberMaid, Sam's Club, Manhattan Associates, and Grupo Phoenix.

The internship/training program is one of the most extensive extracurricular training programs offered at Virginia Tech.

## HIGHLIGHTS FROM IAWA

IAWA Newsletter - May 2017

Edited by Yafang Yin ([yafang@caf.ac.cn](mailto:yafang@caf.ac.cn)) and Pieter Baas

### Call for IW Bailey Award 2017 nominations

IAWA Members are encouraged to nominate manuscripts for the prestigious IW Bailey award, written by themselves or by their students, and submitted to or published in the IAWA Journal in 2017. The award, amounting to 1000 € and sponsored by Brill Publishers is for the best manuscript submitted by an early career researcher, who has completed her/his PhD in 2011 or later. Please send your nominations to [Pieter.Baas@naturalis.nl](mailto:Pieter.Baas@naturalis.nl). Deadline for submission is 15 September 2017. In 2016 two awards were presented: one to Dr. Carla Harper for her paper on *Fungal decay in Permian Glossopteridalean stem and root wood from Antarctica* in IAWA J. 38: 29-48, and one to Dr. Shan Li for her paper on *Intervessel pit membrane thickness as a key determinant of embolism resistance in angiosperm xylem* in IAWA J. 37: 152-171.

### IAWA-WRAITH participated in GTTN II meeting in Germany

The GTTN [Global Timber Tracking Network] phase II kick-off meeting was held in Bonn on 15-16 February, hosted at the premises of the German Federal Ministry of Food and Agriculture. In total 32 people participated from 21 organizations, from 12 countries. 11 participants represented the supply side of timber tracking services, and 10 participants represented the actual and potential customer base for such services. IAWA and IAWA-WRAITH (wood anatomy) was represented by Dr. Peter Gasson and Dr. Gerald Koch.

The first part of the meeting started with a review of GTTN phase I activities, followed by presentations on the progress with the development of the available wood identification methodologies, and presentations on the actual and potential application in real-life business and law enforcement. The second part of the meeting introduced GTTN phase II objectives, activities, modes of interaction and organisational setup. Breakout discussions focused on the key GTTN activities: standardisation of methods, development of an expert and service portfolio, development of a reference database and promotion of timber tracking tools.

GTTN is now also identifying experts interested in cooperation in phase II. Through the 'GTTN Expert Identification Survey' you can help shape the GTTN working groups in terms of working group membership and thematic. The survey can be accessed via: <https://www.surveymonkey.com/r/GTTN-2>.

***Jo Van Brusselen and Gerald Koch, Germany***

### **Wood identification workshop 2017 in Seattle, Washington**

A workshop on the Development and Scaling of Innovative Technologies for Wood Identification was held from February 28 to March 1, 2017, in the University of Washington, Seattle, U.S.A. This meeting was co-organized by the USDA Forest Service-International Programs (USFS-IP), World Resources Institute (WRI) and World Wildlife Fund (WWF). The topic of this workshop was developing methods to identify the species and origin of timber and wood-based products for combating illegal logging.

Over 70 participants from more than 30 academic, governmental and enforcement sector entities met in the workshop, discussed current challenges in wood identification, and set up collaborations to improve technologies on wood identification in fighting against illegal logging. Different methods on identifying species and origin of timber were evaluated and promoted to enforcement officials as well as the private sector in the workshop. On behalf of IAWA and IAWA-WRAITH, Prof. Yafang Yin was invited to provide a presentation regarding methods for wood identification: wood anatomy, DNA barcodes and chemistry.

***Shan Li, Beijing***

### **IAWA New website is being built in Beijing, China**

Multiple attempts to transfer the IAWA domain name (iawa-website.org) from the Naturalis Biodiversity Centre, Netherlands to the Chinese Academy of Forestry, China failed. In order to manage the IAWA website, a new IAWA domain name (iawa-website1.org) has been established and a new IAWA website is being built at CAF, Beijing, China. During the transition period information on the IAWA website will not be updated. Please refer to our regular Newsletter for the latest IAWA Association affairs and Wood Anatomy news.

***Juan Guo, Beijing***

### **InsideWood asks for your help**

As of April 20, 2017, InsideWood (IW, <http://insidewood.lib.ncsu.edu>) has 9,050 descriptions in IAWA hardwood codes and 46,796 images. Although IW has a wide coverage, there are thousands more woody species needing descriptions and illustrations. IW asks your help with expanding and improving its content. If you have pdfs of publications with descriptions of fossil or present-day woods that aren't in IW or that have details that aren't yet included, please send them to Prof. Elisabeth Wheeler (elisabeth\_wheeler@ncsu.edu), so that information can be added to the IW database. If you use IW and have noticed errors, please let her know so she can correct those errors. Also, if you have photographs of vouchered wood samples that you would be willing to share that would be deeply appreciated. Images of species that have descriptions in IW but no or

few images are especially welcome. Of course, any images contributed will have the name of the contributor and institution associated with them.

### **Digitalization of IAWA Bulletins (1957-1979) is completed**

Dr. Tomo Fujii, Fellow of the Forestry and Forest Products Research Institute (FFPRI) in Tsukuba, Japan, has completed the digitization of old IAWA Bulletins issued from 1957-1979. These IAWA Bulletins contain some important “classical” papers, and will be posted on the new IAWA website soon.

### **Multilingual Glossary of Terms Used in Wood Anatomy (1964) is available on the web**

Prof. Yuzou Sano of the Hokkaido University and Dr. Ryogo Nakada of FFPRI, Japan made a pdf file of IAWA glossary in Japanese, which is available at [http://www.jwrs.org/kenkyu/wa\\_wp/glossary/glossary.html](http://www.jwrs.org/kenkyu/wa_wp/glossary/glossary.html) together with the other glossaries for wood anatomy published by the Japan Wood Research Society. For the English version, please refer to [http://www.jwrs.org/kenkyu/wa\\_wp/glossary/IAWA\\_glossary.pdf](http://www.jwrs.org/kenkyu/wa_wp/glossary/IAWA_glossary.pdf). IAWA will post this scan-pdf on the IAWA new website or to provide a link later.

Some years ago, Guillermo Angeles, Instituto de Ecologia, Veracruz, Mexico, prepared a pdf of the Glossary’s index, with the English terms in alphabetical order, along with the equivalent terms in French, German, Italian, Portuguese, Spanish, and Serbo-Croatian, the pdf of the index is available at <http://inside-wood.lib.ncsu.edu/links#general>.

### **Elisabeth Robert is a new Associate Editor of the IAWA Journal**

We welcome Elisabeth Robert as a new associate editor of the IAWA Journal. Elisabeth’s expertise is in functional and ecological tree biology and wood anatomy. She currently holds a position at the Centre for Ecological and Forestry Applications (CREAF), Barcelona, Spain (e.robert@creaf.uab.cat).

## Obituary



### **Yance Ikwartus Mandang (1943-2017)**

The legendary Indonesian Wood Anatomist, Yance Ikwartus Mandang, has passed away on 24 February 2017 (at the age of 74) after undergoing colon cancer surgery.

He worked for the Forest Product Research and Development Center in Bogor, Java, from 1977 as a curator of the Xylarium Bogoriense until he retired in 2008. In 1985 he joined an on-the-job training in computerized wood identification systems at the Forest Product Laboratory, USDA, Madison, USA, and later applied his experience to build a wood identification system for South-East Asian timbers.

He was one of the authors of the 2nd and the 3rd Indonesian Wood Atlas, and helped in the translation of the IAWA Hardwood List into Bahasa Indonesia. During his career, he explored the anatomical properties of major and minor timber species from many regions in Indonesia, and introduced the term of ‘the least known wood species’ in 2007. He regenerated research on fossil woods in Indonesia in 1996, when accidentally he found many petrified woods being sold in an area in West Java. He also published research on anatomical properties of medicinal wood and studied alternative wood species suitable for making pencils. His major contribution in digitalising the Xylarium database and constructing a computerised wood identification system for South East Asian timbers will help future generations of researchers, students and customs officers.

Until the end of his life, he assisted wood researchers in Xylarium Bogoriense to evaluate all commercial timbers from Indonesia. In hospital, he was very happy when the final draft for publication was shown to him, and now ‘The Classification of Indonesian Commercial Timbers’ book is in press.

***Listya Mustika Dewi and Ratih Damayanti, Indonesia***

### **Selected Future meetings from IAWA newsletter**

#### **Agenda of XIX IBC 2017 in Shenzhen, China**

The XIX International Botanical Congress (XIX IBC) will be held at Shenzhen, China on 23- 29 July 2017 by Botanical Society of China and Shenzhen Government, at the Shenzhen Convention & Exhibition Center; parts of the symposia will be held at the Sheraton Shenzhen Futian Hotel. IAWA proposed a symposium co-organized by Dr. Frederic Lens and Prof. Biao Pan on a wide array of modern

wood research, which will be T4-39 part on 16:00-18:00, July 28, 2017(Friday). The Social Hour of IAWA will be arranged on the evening of July 27, 2017 (Tuesday). IAWA-China Group will be co-organizer for this event. Detailed information will be announced after fixing the place and time. Check the website: <http://www.abc2017.cn/Symposia/>.

**Shengcheng Zhai, Nanjing**

### **EuroDendro Conference in Tartu, Estonia**

The EuroDendro conference will be held in Tartu, Estonia on 6–10 September 2017, organized by the University of Tartu and the Estonian University of Life Sciences. It is a regular international conference on dendrochronology and tree-ring studies. Topics of the sessions cover dendroarchaeology, dendroclimatology, dendroecology, forest health, wood anatomy and technical advances in dendrochronology. The deadline for registration and abstract submission is June 30th and April 30th, 2017, respectively. Check the website for detailed information <http://eurodendro2017.ut.ee/avalet>.

**Shan Li, Beijing**

### **International summer school in Naples, Italy: from xylogenesis to dendroecology**

An International summer school from xylogenesis to dendroecology: dendrochronology, quantitative wood anatomy and stable isotopes will be held in Naples, Italy on 25-29 September 2017, organized by Prof. Veronica De Micco, the University of Naples Federico II - I. This summer school will provide knowledge and tools to study and interpret environmental “signals stored” in wood, based on a multidisciplinary approach: from xylogenesis to quantitative wood anatomy, tree-ring measurements, and tree-ring stable isotopes. It will show how understanding the dynamics of wood formation in response to environmental factors is pivotal to forecasting forest response to on-going climate changes. The course will include theory, fieldwork, and hands-on laboratory sessions. Students will be involved in all aspects of sample preparation and analysis as well as in data interpretation. Please send expression of interest or inquiries to [giovanna.batipaglia@unicampania.it](mailto:giovanna.batipaglia@unicampania.it) or [demicco@unina.it](mailto:demicco@unina.it) to get more information.

### **The third xylem international meeting in Bordeaux, France 2017**

The third xylem international meeting is going to be held in Bordeaux, France on September 27th – September 29th, 2017. Keynote lectures mainly focus on leaf hydraulics, iso/anisohydric concepts as well as *Vitis* hydraulics. Other sections include topics on plant hydraulics, xylem anatomy and plant physiology. The deadline for registration and abstract submission is May 31st. Check the website for detailed information <http://jplanthydro.org/announcement/view/8>.

**Shan Li, Beijing**

#### **4th IAWA-China Group annual meeting in Zhang-Jia-Gang, China**

The fourth IAWA China Group Annual Meeting will be held at Zhang-Jia-Gang city, China, 25 and 26 November 2017 by the Entry-Exit Inspection and Quarantine Bureau of Zhang-Jia-Gang. The theme of this meeting will be 'Innovating the research on wood anatomy and promoting sustainable development and utilization of forest resources'. Topics will be addressed as follows: development of wood anatomy, identification of endangered species and new species, multiple techniques for wood identification, protection of archaeological wood, sustainable utilization of wood resources, wood formation and dendrochronology.

***Shengcheng Zhai, Nanjing***

#### **WOOD SCIENCE AND TECHNOLOGY – JOURNAL OF THE IAWA**

ISSN: 0043-7719 (Print) 1432-5225 (Online)

#### **Description**

*Wood Science and Technology* publishes original scientific research results and review papers covering the entire field of wood material science, wood components and wood based products. Subjects are wood biology and wood quality, wood physics and physical technologies, wood chemistry and chemical technologies. Latest advances in areas such as cell wall and wood formation; structural and chemical composition of wood and wood composites and their property relations; physical, mechanical and chemical characterization and relevant methodological developments, and microbiological degradation of wood and wood based products are reported. Topics related to wood technology include machining, gluing, and finishing, composite technology, wood modification, wood mechanics, creep and rheology, and the conversion of wood into pulp and biorefinery products.

See <http://link.springer.com/journal/226>

The Editor-in-Chief is Klaus Richter, Holzforschung München, Technische Universität München, Germany; The Co-Editor-in-Chief is Robert Evans, Silvi Scan Pty. Ltd., Australia

## AFFILIATE MEMBERS

Affiliate Members shall be educational, research, industrial, or governmental organizations and individuals, who are actively engaged in carrying out or promoting research in wood science or the enhanced utilization of wood on the basis of scientific or technological principles and practices. The importance of Affiliate to the Academy is two-fold:

- The Academy derives direct contact with organizations and individuals actively engaged in the utilization of wood and wood products
- The Academy receives financial support for its activities from these members.

Contact Details are available on the IAWS website.

## AFFILIATE MEMBERS LIST

Contact Details are available on the IAWS website.

CHINESE ACADEMY of FORESTRY (CAF)	<a href="http://www.caf.ac.cn">www.caf.ac.cn</a>
CIRAD FORETS (French Agricultural Research Center for International Development)	<a href="http://ur-bois-tropicaux.cirad.fr">ur-bois-tropicaux.cirad.fr</a>
ESB- ECOLE SUPÉRIEURE DU BOIS, France	<a href="http://www.ecoledubois.com">www.ecoledubois.com</a>
FORESTRY & FOREST PRODUCTS RESEARCH INSTITUTE, Japan	<a href="http://www.ffpri.affrc.go.jp">www.ffpri.affrc.go.jp</a>
FP INNOVATIONS, Canada	<a href="http://www.fpinnovations.ca">www.fpinnovations.ca</a>
FRAUNHOFER-INSTITUTE OF WOOD RESEARCH, Germany	<a href="http://www.wki.fraunhofer.de">www.wki.fraunhofer.de</a>
HOLZFORSCHUNG MÜNCHEN, Germany	<a href="http://www.holz.wzw.tum.de">www.holz.wzw.tum.de</a>
INNVENTIA AB, Sweden	<a href="http://www.innventia.com">www.innventia.com</a>
INTERNATIONAL CENTRE OF BAMBOO AND RATTAN,China	<a href="http://www.icbr.ac.cn/en">www.icbr.ac.cn/en</a>
KYOTO UNIVERSITY, Japan	<a href="http://www.rish.kyoto-u.ac.jp">www.rish.kyoto-u.ac.jp</a>
MISSISSIPPI STATE UNIVERSITY, USA	<a href="http://www.cfr.msstate.edu/forestp">www.cfr.msstate.edu/forestp</a>
MOSCOW STATE FOREST UNIVERSITY, Russia	<a href="http://www.mgul.ac.ru/en">www.mgul.ac.ru/en</a>
OREGON STATE UNIVERSITY, USA	<a href="http://www.woodscience.oregonstate.edu">www.woodscience.oregonstate.edu</a>
SCION, New Zealand	<a href="http://www.scionresearch.com">www.scionresearch.com</a>
SEOUL NATIONAL UNIVERSITY, Republic of Korea	<a href="http://www.adhesion.org">www.adhesion.org</a>
STATE UNIVERSITY OF NEW YORK, USA	<a href="http://www.fla.esf.edu">www.fla.esf.edu</a>

TECHNICAL UNIVERSITY in ZVOLEN, Slovakia	<a href="http://www.tuzvo.sk/en">www.tuzvo.sk/en</a>
THÜNEN INSTITUTE, Germany	<a href="http://www.ti.bund.de">www.ti.bund.de</a>
UNIVERSITE LAVAL, Canada	<a href="http://www.xylo.sbf.ulaval.ca">www.xylo.sbf.ulaval.ca</a>
UNIVERSITY OF GÖTTINGEN, Germany	<a href="http://www.holz.uni-goettingen.de">www.holz.uni-goettingen.de</a>
UNIVERSITY OF MINNESOTA, USA	<a href="http://www.bbe.umn.edu">www.bbe.umn.edu</a>
US FOREST PRODUCTS LABORATORY, USA	<a href="http://www.fpl.fs.fed.us">www.fpl.fs.fed.us</a>
VIETNAM NATIONAL UNIVERSITY OF FORESTRY	<a href="http://www.vfu.edu.vn">www.vfu.edu.vn</a>
WOOD TECHNOLOGY INSTITUTE, Poland	<a href="http://www.itd.poznan.pl">www.itd.poznan.pl</a>

## GUIDELINES 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 scientist 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 summarise the author's work
- Contain important references to the literature for further reading

Finish with a statement of future direction in the area

## **NOMINATION PROCEDURE FOR ELECTION OF FELLOWS**

he 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.

***Robert Evans***

## **NOMINATION FORM**

### **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: Robert Evans [robertxevans@gmail.com](mailto:robertxevans@gmail.com)**

## **NOMINATION FORM**

### **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: Robert Evans [robertxevans@gmail.com](mailto:robertxevans@gmail.com)**



## **Imprint**

### **Editorial**

International Academy of Wood Science  
c/o Thünen Institute  
Leuschnerstr. 91  
21031 Hamburg  
Germany

### **Responsible for contents**

Dr. Uwe Schmitt/President  
Dr. Robert Evans/Vice President

**Layout:** Christina Waitkus/Thünen Institute



**IAWS**

[www.iaws-web.org](http://www.iaws-web.org)

