



# Newsletter

SOCIETY OF WOOD SCIENCE AND TECHNOLOGY  
July/August 2004

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## SWST Snapshot

SWST Membership	July 2004
Full members	291
Student members	62
Retired members	50
Affiliate members	3
Delinquent members	42
Fellows	2

Wood And Fiber Science Journal	July 2004
Subscribers	234
Delinquent Subscribers	32
Number of articles in 36(2)	18
<i>Currently in the pipeline</i>	
Ready for typesetting	19
Under revision by authors	32
Under review	28
Rejected	9



Rado Gazo, *Editor*  
Purdue University

Financial	July 2004
Cash & Bank Accounts	\$105,375.62
Investments	\$58,751
Liabilities	\$650

Web Page	July/Aug. 2004
Number of unique visitors	1,241
Number of new visitors	838
Gigabytes transferred	1.2
More data: <a href="http://www.swst.org/nettracker/reports/">http://www.swst.org/nettracker/reports/</a>	

## **NEWS**

**Dobbin McNatt** – hiked the entire length of the Appalachian trail!

### **GAO says YES to Lugar/Cochran study**

US Senators Cochran and Lugar requested General Accountability Office to prepare a report that will:

- Evaluate the current ability of the federal government to assist industry with wood utilization and product development
- Evaluate the programmatic and budgetary support and personnel capacity for basic wood and material sciences; and
- Evaluate the federal capability to develop emerging technologies and transfer them into products and manufacturing processes

Senator Lugar's Indiana state deputy director Lane Ralph visited Forest Products Laboratory and SWST executive director Vicki Herian during his fact finding tour when preparing the request for the GAO report. The results of GAO study may be useful in setting NRI funding priorities.

### **No reprints, only pdf files now available**

Beginning with Volume 36 (2004), we will no longer offer reprints. However, we will sell the pdf of your paper to you for \$100, which allows you to make limited copies and post it on your personal website. Simply check the appropriate box on the "Page Charge Authorization Form" when it is sent to you from the press.

### **Savings from e-newsletter, journal typesetting and ballot e-mailing**

We have saved a considerable amount of money this year in moving to e-mailing of various documents and also changing typesetters. An estimate is broken down as follows: e-newsletters: about \$400 per issue, for a total of \$2,400 per year; member handbook \$500 per year; membership directory \$1,000; ballots \$400 per year; annual meeting brochure \$1,000; journal typesetting about \$2,000 per issue, for a total of \$8,000. Total estimated savings: \$5,300 savings for printing, \$8,000 savings on typesetting.

### **Yearly accreditation reports**

New Accreditation Standards have been approved last year and a new handbook has been prepared. It can be seen at [http://www.swst.org/accred\\_handbook.pdf](http://www.swst.org/accred_handbook.pdf). In addition, there will now be an Annual Checklist form that will be sent out in the fall of each year. This is a 1-page report that you will fill out and return before February 1 of each year to the Executive Office. If a Substantive Change Report is deemed necessary, you will be notified and should follow the guidelines in Part III of the Accreditation Handbook.

### **Student Poster Competition results**

#1 - \$500 - Darren Riedlinger, Virginia Tech, “Improving the performance of thermosetting wood adhesives using multiphase emulsions”

#2 - \$250 - Jerome Alteyrac, Forintek Canada Corporation, “Influence of stand density on wood properties at different sampling heights in black spruce (*Picea mariana* (MILL.) B.S.P.)”

#3 - \$125 - Diogo Baptista, University of Maine, “Droplet dynamics applied to the assessment of water penetration resistance of coatings on wood”

### **George Marra donation in Balazses name \$1,000**

1st Place: Balazs G. Zombori, Frederick A. Kamke, and Layne T. Watson, “Simulation of the internal conditions during the hot-pressing process”, in 35(1).

The authors decided to donate the \$1000 to the Student Poster Competition Fund in Balazs’ name. Balazs’ plaque will be sent to his family in Hungary.

### **Distinguished Service Award**

DSA - This year's Distinguished Service Award winners were Helmuth Resch and Geza Ifju. This award is made by SWST in recognition of distinguished service to the profession as a whole. Such service may have been made in any educational, technological, scientific, or professional area directly related to the profession of Wood Science and Technology in furtherance of the objectives of the Society. They each received a plaque and made a presentation at the Annual Meeting. Their presentations will be printed in the October issue of Wood and Fiber Science.

### **Fellows**

The first Fellows Awards were presented to Jim Bowyer and Robert Youngs. This Award was established to "Recognize significant contributions to the wood science and technology profession and service to the Society by SWST members." A plaque was presented to each individual.

### **Constitutional amendment**

The following Constitutional Amendment was passed at the Annual Meeting. A ballot will be out to members soon.

Section 5. The nominee for each office receiving a plurality of votes cast for the office shall be elected. In the event of a tie in any office, the Executive Board will resolve the tie, by a majority vote. Elected officers shall assume the duties of their office at the close of business of the annual meeting following their election, except as stated in Section 8.

## **Highlights from SWST board meetings on June 26<sup>th</sup> and 28<sup>th</sup>, 2004**

- New logo for SWST is being developed
- Cost savings of \$2000 per issue of Wood and Fiber Science with change in typesetters
- Career brochure, “Career Opportunities in Applied Science and Engineering” is available for \$56 per hundred. Single copies are free. It is also available as a pdf file on the website.
- 1-page Yearly Accreditation report forms will be sent out from Executive Office each fall
- Survey of Past Presidents of SWST and FPS being conducted
- Work is continuing on the redesign of the cover of Wood and Fiber Science
- The Society is investigating the possibility of converting all past articles of Wood and Fiber Science to pdf documents
- RNRFC Conference is in Washington, DC, December 6-7, on “Congress on Building Capacity for Coastal Solutions
- Cellulosic Cell Wall Conference Proceedings will be available for purchase next year – more details later
- Meeting on “Wood Science and Education Research” will be held in Slovakia August 16-20, 2004
- Ad hoc Committee prepared “SWST Position on the Role and Opportunities of Wood Research in the USDA National Research Initiative”
- Cooperation with Woodlinks is being explored
- Visit to SWST from Lane Ralph of Senator Lugar’s office (brought about by the Position paper on National Needs and has since resulted in a study by GAO – see page 1 of Newsletter)
- Directory of Schools on the Web will be updated
- New membership survey is being initiated
- CORRIM II report will be published as a special issue of Wood and Fiber Science
- A 2004 Annual Meeting proceedings will be prepared and distributed to attendees. Extra copies will be available for purchase
- Changes in annual meeting format will be looked at for 2005

## **Colleges select first Excellence in Outreach award winners**

BLACKSBURG, date –Virginia Tech’s colleges have designated faculty as winners of the first annual College Awards for Outreach Excellence. The awards, made possible through funding from Virginia Tech’s Outreach and International Affairs, recognize the efforts of faculty who have made outstanding contributions in “putting knowledge to work” for the benefit of constituencies outside the university. One of the winners is Associate Professor Audrey Zink-Sharp for her efforts with “Wood Magic” science fair. Audrey has received numerous awards and recognition for her outreach including the Oak Ridge Associated Universities Junior Faculty Achievement Award, and the George G. Mara Award of Excellence from the Society of Wood Science and Technology. She was appointed as a U.S. delegate to the European Society for Wood Mechanics. Her current research, funded by the United States Department of Agriculture National Research Initiative Competitive Grants program is on re-engineering the wood cell

wall. She participates in the Wood-Based Composite Center and the Sustainable Engineered Materials Institute.

### **Mike Barnes wins Outstanding Alumni Award at LSU**

The School of Renewable Natural Resources at Louisiana State University has recently announced that Dr. H. Michael Barnes, Professor, Forest Products Laboratory, Forest & Wildlife Research Center, Mississippi State University is the 2004 recipient of the LSU School of Renewable Natural Resources Alumnus of the Year Award. The award will be made to Mike at LSU's Homecoming on October 23, 2004. A native of Baytown, TX, Mike earned his BSF degree in 1965 from LSU with a major in Forestry and a minor in Forest Products. As an undergraduate, he was active in the Forestry Club and the Intra-fraternity Athletic Council and attended LSU on an athletic scholarship. He was awarded a National Science Foundation Undergraduate Research Program grant to study the ability of white-rot fungi to utilize lignin as a sole carbon source. In 1968, he earned a MS at LSU in Forest Products Technology with a minor in Experimental Statistics. His M.S. program was directed by the late Dr. Elvin Choong under a grant from Dr. Peter Koch at the USDA Forest Service Southern Forest Experiment Station in Pineville, LA. His thesis, *Effectiveness of stabilizing treatments on southern pine wood*, greatly added to the treatments being used to stabilize wood and had particular applications in the field of preservative-treated wood. His PhD is from the State University of New York College of Environmental Science & Forestry under the eminent educator and wood physicist, Dr. Chris Skaar.

Dr. Barnes was nominated for the award by fellow LSU alum, Dr. Todd Shupe. Dr. Barnes' nomination letter praised him for his numerous research credentials, which include over 167 technical articles, 2 patents, and countless presentations to academic colleagues, industry professionals, and high school students. Since 1971, Dr. Barnes has participated as principal investigator or co-investigator in extramural research grants and contracts valued in excess of \$5 million. His research program is international in scope and currently is addressing physical properties of treated wood and composites, preservative and fire retardant treatments to extend the durability of building components, biodeterioration of wood and wood-based materials, treatment variables affecting the uniformity of treatment of wood, terrestrial and marine tests on the biodegradability of treated wood, and new treatment technologies for wood preservation.

His research proliferation does not come at the expense of his teaching activities. He has advised and mentored 29 graduate students and has taught 18 courses. Moreover, Mike was part of the team that developed the Wood Magic program at Mississippi State. The Wood Magic Science Fair™ (WMSF) is an exciting and innovative program aimed specifically at elementary school students. It seeks to educate students about the tremendous importance of wood and wood products to each of us individually and to the economy of the nation. The WMSF is an attempt to change some of the common misconceptions concerning the depletion of trees and to improve the visibility of the forest products industries and emphasize their status as environmental conservators and was awarded the Group Honor Award for Excellence by the US Department of Agriculture in 2000.

During a sabbatical leave from MSU, he served as a Visiting Professor in the Department of

Biology, Imperial College of Science, Technology, & Medicine, London, UK. Mike has been very active in leadership positions in professional societies. He is a past president of the Society of Wood Science and Technology, Fellow of the Institute of Wood Science, and Regional Board Member of the Forest Products Society. He is a member of Sigma Xi, Xi Sigma Pi, and Gamma Sigma Delta honorary societies. He is a past chair/vice-chair of several committees of the American Wood Preservers' Association, the International Research Group on Wood Preservation, and the Railway Tie Association and serves on Committee O5 of ANSI and Committee D7 of ASTM. He is the 2002 recipient of the Gottschalk Award from the Forest Products Society, which recognizes and honors exceptional service to the Forest Products Society by an individual member. In 2004 he was recognized with the Award of Merit by the American Wood-Preservers' Association, that associations' highest award.

An avid Scouter, Mike has been recognized by the Boy Scouts of America several times including the Silver Beaver Award, the District Award of Merit, and the Scoutmaster Award of Merit. He and his wife, Martha, were awarded the Book of Golden Deeds Award by the Starkville Exchange Club and he was recognized by the city of Starkville with a key to the city for his work with community youth.

Congratulations Mike!!!

#### **New websites:**

##### **The Hardwood Forest Foundation:**

<http://www.hardwoodforest.org/index.asp>

##### **Forest Industries Technology – distance learning opportunity**

<http://distance.bangor.ac.uk>

##### **ForestryUSA Website**

Your Internet Gateway to Forestry and Forest Products in America - provides quick access to all the Internet sites of the federal and state governments, the forest industries, service and supply companies, associations and NGOs, consultants, education and research, forestry news, and much more. <http://www.forestryusa.com>

One of our most popular features is the "Forestry Careers and Employment" page where employers advertise their staff openings for many different positions in forest management, forest product manufacturing, research, and academics. <http://www.forestryusa.com/jobs.htm>

## CONFERENCES

### **XXII IUFRO World Congress in Brisbane, Australia, August 2005**

Don't be left behind, the IUFRO World Congress in Brisbane, Australia August 8-13, 2005 is approaching rapidly. If you have a poster or paper that you want to be considered, please contact the many people who are chairing sessions. For instructions, go to the Conference website: <http://www.iufro2005.com> or contact me directly:

Howard Rosen  
Phone: 703-605-4196  
E-Mail: [hrosen@fs.fed.us](mailto:hrosen@fs.fed.us)  
IUFRO Congress  
Conference Scientific Committee

### **14th International Symposium on Nondestructive Testing of Wood, May 2-4th, 2005, Hannover, Germany.**

<http://www.fh-eberswalde.de/ndt2005>

The NDT Symposium is a scientific conference addressing non destructive methods of evaluation and testing of wood and wood composites. It's goal is to promote the exchange of information among researchers, practitioners, and the wood processing industry on the application of NDT/NDE technologies for wood.

### **Woodframe' Housing Durability and Disaster Issues, Aladdin Resort & Casino, Las Vegas, Nevada, USA. October 4-6, 2004.**

The primary objective of this conference is to provide the latest information on problems and solutions related to woodframe housing durability and disaster issues. The conference will open with overviews of research and demonstration field test structures and facilities throughout North America that are designed to address the effects and mitigation of various environmental stresses (moisture, wind, earthquakes, fire, decay, and insect attack) on woodframe structures. This will be followed by sessions on the influence of construction and design practices; disaster mitigation; assessment and durability treatments; and biological degradation and moisture control. The conference will also include poster presentations on various subjects related to durability and disaster mitigation of woodframe housing.

(<http://www.forestprod.org/durability04bro.pdf>)

### **2004 RNRF Congress**

The 2004 RNRF Congress - December 6-7, 2004 in Washington, DC, on "Congress on Building Capacity for Coastal Solutions". This is by invitation only, so if anyone is interested in attending, please contact Vicki Herian at the Executive Office.



## **Structural Design with Wood--An Introductory Course**

This course is designed for individuals who never had the opportunity to learn wood design basics in a university-level course, but are involved in the design, construction, and inspection of wood buildings. The primary focus and objectives of this course are a mastery of wood design basics and understanding of the many factors routinely used and required by the 2001 National Design Specification for Wood Construction. The course notebook will contain the designs presented at the course relieving the participants of extensive note taking. It will also contain publications that relate to the construction of residential wood and plastic decks, preventing cracked ceramic tiles and grout, and I-joint repair. Participants will receive a certificate for 1.7 Continuing Education Units (CEUs) equivalent to 17 hours of instruction. For information, visit: <http://www.conted.vt.edu/sdww/>

## **Manufacturing Competitiveness of the Forest Products Industry: Competing in Today's Global Manufacturing and Consumer Marketplace.**

November 3-5, 2004, Omni Royal Orleans Hotel, New Orleans, Louisiana, USA  
Purpose

The North American forest products industry is facing many challenges in today's global marketplace, from resource procurement to environmental regulation to competition from off-shore manufacturers. The ability of the North American forest products industry to manufacture and compete in the global marketplace is being seriously challenged. Off-shore pressures from secondary manufacturers have begun to erode the manufacturing base of the secondary wood products industry. Primary producers face challenges in the commodity marketplace from off-shore producers and raw materials. Sustaining our manufacturing base is critical to the future of the forest industries in North America.

The complete program of this important conference is available in PDF format. If you would prefer to have a copy mailed to you, contact [conferences@forestprod.org](mailto:conferences@forestprod.org).

**Woodfiber-Plastic Composites**, May 23-25, 2005. Madison, WI, USA. For information, contact [conferences@forestprod.org](mailto:conferences@forestprod.org)

**3rd International Conference on Advanced Engineered Wood Composites**, July 11-15, 2005  
Bar Harbor, ME, USA. <http://www.aewc.umaine.edu>



## **EMPLOYMENT OPPORTUNITIES**

### **Head, Department of Forestry and Natural Resources, Purdue University**

Responsibilities: The Department of Forestry and Natural Resources, School of Agriculture, Purdue University, invites applications for the position of department Head. The Head will lead a diverse group of outstanding faculty and staff in the research, teaching, extension, development and international missions of a major land-grant university. The principal focus of the Head is to accomplish departmental objectives through continuing and expanding internal and external support, managing and augmenting financial and physical resources, and wise stewardship of human resources. The Head also is expected to serve as an advocate, liaison, and departmental representative within the university and with government agencies, lay and professional resource management groups, conservation organizations, related industries, and society at large. The Head will also be responsible for managing the departmental budget including considerable land holdings and endowments.

Qualifications: Candidates must have an earned doctorate, be eligible for tenure at the rank of Full Professor, and have had professional experience in forestry, wildlife, fisheries, forest products, or a closely related area. The department Head must have demonstrated strong leadership, communication, and administrative abilities and an appreciation for the diverse interests and missions of the department. Candidates will be considered from academia, industry, or government. The successful candidate will have demonstrated an outstanding record of scholarly achievement as well as the ability to successfully develop external financial support.

The Department: The department consists of 28 faculty members, 37 administrative and professional staff, 11 clerical staff, and 300 undergraduate and 70 graduate students. The annual budget exceeds \$7.7 million, with over 55% from sponsored research, gifts, and endowment funds. The department is one of 11 academic departments in the School of Agriculture. Interests of the faculty are diverse and encompass teaching, research and extension functions that advance knowledge of the natural resource sciences associated with the sustainable use of terrestrial and aquatic ecosystems. The department's expertise is diverse spanning forestry, wildlife, fisheries and aquatic sciences, wood products, human dimensions, spatial analysis, and natural resource management. The Hardwood Tree Improvement and Regeneration Center and the Illinois-Indiana Sea Grant Program, regional federal-state-industry-university collaborative efforts, also are located in the department. Five undergraduate curricula are offered: forestry, fisheries and aquatic sciences, natural resources, wildlife, and wood products. The department currently has an endowment exceeding \$90 million that provides substantial resources which are re-invested in departmental programs.

The Opportunity: The department is well positioned to remain one of the leaders in the natural resource sciences. It has a diverse, energetic faculty, greatly expanded facilities, nation-wide land holdings, and a large endowment. The successful candidate will have a vision to utilize these resources to fully develop the department's potential.

Salary: Commensurate with qualifications and experience.

Application Procedure: Qualified persons should submit the following: a letter of application; a statement of administrative philosophy emphasizing their ability to foster research, teaching, extension, development and international missions of the department; and, a complete curriculum vitae including the names, addresses, telephone and fax numbers, and e-mail addresses, if available, of five references. Nominations of outstanding potential candidates for the position are welcome. Applications will be accepted until December 15, 2004, or until the position is filled. Applications, nominations, and inquiries should be addressed to:

Ed Ashworth, Search Committee Chair  
Forestry and Natural Resources Head Search  
Purdue University  
Office of the Dean of Agriculture  
615 W. State Street  
West Lafayette, IN 47907-2053  
Contact Information: (765) 494-1306 (phone), (765) 494-7420 (fax), or [ashworth@purdue.edu](mailto:ashworth@purdue.edu)

Purdue University is an Affirmative Action/Equal Access/Equal Opportunity Employer.  
Women and minorities are encouraged to apply.

### **Associate in Research Position in Bio-Based Materials and Processing Research**

The Wood Materials and Engineering Laboratory at Washington State University announces a non-tenure track Associate in Research position with emphasis in natural fiber composites and polymers/adhesives beginning October 1, 2004.

Candidates for the position must have a B.S. degree (M.S. degree is preferred) in forest products, materials engineering, civil engineering, or similar field, or industrial work experience in a wood or polymer processing facility for 3-5 years. Good verbal and written communication skills are required.

Specific responsibilities include the following: The operation and maintenance of composite manufacturing equipment for the processing of natural fiber composites (i.e., hot-pressing, extrusion, pultrusion, injection molding, etc.), mechanical testing and automated data acquisition, statistical analysis (e.g. ANOVA, DOE, regression), technical report writing, and materials inventory. The candidate will provide assistance and collaboration with faculty, staff, students, and industrial clients on a variety of research projects within the natural fiber composite field.

Additional information about the Department and Laboratory is available at <http://www.ce.wsu.edu> and at <http://www.wmel.wsu.edu>

Review of applications will begin August 16, 2004. Applicants are requested to send a cover letter, resume, graduate and undergraduate transcripts and names, addresses and phone numbers of five references to:

Dr. J. Daniel Dolan  
Chair, Search Committee  
Wood Materials and Engineering Laboratory  
Washington State University  
P.O. Box 641806  
Pullman, WA 99164-1806

Washington State University is an EO/AA educator and employer. Protected group members are encouraged to apply.

**The Wood Education and Resource Center** located in Princeton, West Virginia, a part of the Northeastern Area, State and Private Forestry, is announcing two vacancies for the positions of Director, GS-1301-14 (Physical Science Manager) and the other for Deputy Director, GS-0401/1301-13 (Interdisciplinary to Biological Scientist and Physical Scientist). Both announcements are open government-wide and via DEMO authority for outside applicants, with a closing date of August 10, 2004.

The Director vacancy is announced through AVUE and can be accessed at:  
<http://www.avuedigitalservices.com/usfs/applicant.html>.  
Also, it is posted on USAJOBS with a direct link to AVUE.

The Deputy Director position is Interdisciplinary and only announced through USAJOBS at <http://www.usajobs.opm.gov>. Please contact me if you have any questions regarding these announcements.

### **Five M.S. and PhD research assistantships at the Advanced Engineered Wood Composite Center**

AEWC is a 48,000 ft<sup>2</sup> world-class research facility at the University of Maine, is seeking highly qualified M.S. and PhD candidates. Five research assistantships are available in the following areas: Structural Composite Lumber, Extruded Wood Plastic Composites, Fiber Reinforced Polymer (FRP) Pre-stressed Timber, and Design Specification for FRP Glulams. Students are provided a stipend plus a waiver of tuition. Exceptional applicants will be flown out for an on-site tour and interview. Applicants must have a B.S. or M.S. in wood science or engineering.

Interested applicants should send a letter of intent, transcripts, and two letters of recommendation to: Habib Dagher, Director, Advanced Engineered Wood Composites Center, 5793 AEWB Bldg, University of Maine, Orono, ME 04473. (207) 581-2125.  
[hd@umit.maine.edu](mailto:hd@umit.maine.edu).

## STUDENT PROFILE

### Jerome Alteyrac, Laval University, Quebec City

I received an engineer diploma of Ecole Supérieure du Bois in Nantes (France). This is a 3 years long engineering course about wood processing.

Then I finished a one year DEA (Diplôme d'Étude Approfondie) (equivalent of Master degree) in Laboratoire de Rhéologie du Bois de Bordeaux (LRBB) in Bordeaux (France) under the supervision of Thierry Fourcaud (Scientist). The project was about trunk straightness of *Pinus pinaster*.



At the present, I am a PhD student in wood science at Laval University in Quebec City under the supervision of Alain Cloutier (professor at Laval university) and Tony Zhang (Senior Scientist at Forintek Canada Corp. in resource assessment). My project deals with wood quality of black spruce (*Picea mariana*) in relation to stand density. I plan to finish in December.

## DOUG'S AMMUSEMENTS CORNER

### Funny Flight Announcements

After every flight, pilots fill out a form called a gripe sheet, which conveys to the mechanics problems encountered with the aircraft during the flight that need repair or correction. The mechanics read and correct the problem, and then respond in writing on the lower half of the form what remedial action was taken, and the pilot reviews the gripe sheets before the next flight. Never let it be said that ground crew and engineers lack a sense of humor. Here are some actual logged maintenance complaints and problems as submitted by Quantas pilots and the solution recorded by maintenance engineers. By the way, Quantas is the only major airline that has never had an accident!

(P= The problem logged by the pilot.) (S= The solution and action taken by the engineers.)

P: Left inside main tire almost needs replacement.

S: Almost replaced left inside main tire.

P: Test flight OK, except auto-land very rough.

S: Auto-land not installed on this aircraft.

P: Something loose in cockpit

S: Something tightened in cockpit

P: Dead bugs on windshield.  
S: Live bugs on back-order.

P: Autopilot in altitude-hold mode produces a 200 feet per minute descent  
S: Cannot reproduce problem on ground.

P: Evidence of leak on right main landing gear  
S: Evidence removed.

P: DME volume unbelievable loud.  
S: DME volume set to more believable level.

P: Friction locks cause throttle levers to stick.  
S: That's what they're there for.

P: IFF inoperative.  
S: IFF always inoperative in OFF mode.

P: Suspected crack in windshield.  
S: Suspect you're right.

P: Number 3 engine missing.  
S: Engine found on right wing after brief search.

P: Aircraft handles funny.  
S: Aircraft warned to straighten up, fly right, and be serious.

P: Target radar hums.  
S: Reprogrammed target radar with lyrics.

P: Mouse in cockpit.  
S: Cat installed.

P: Noise coming from under instrument panel. Sounds like a midget pounding on something with a hammer.  
S: Took hammer away from midget.

## ABOUT SWST

The SWST Newsletter is published six times a year by the Society of Wood Science and Technology, One Gifford Pinchot Drive, Madison, WI 53705, USA.

Items for the Newsletter may be sent to Rado Gazo, at: [gazo@purdue.edu](mailto:gazo@purdue.edu)

The Society of Wood Science and Technology is a technical and professional organization for scientists and engineers working in academia, government, consulting and the forest-products industries and is dedicated to providing education and expertise regarding better ways to use and produce wood products.

Phone: (608) 231-9347

Fax: (608) 231-9592

E-mail: [vicki@swst.org](mailto:vicki@swst.org)

Web site: <http://www.swst.org>

### *Society of Wood Science and Technology*

President:	Audrey Zink-Sharp
Past President:	Douglas Stokke
President Elect:	Paul Smith
Vice President:	Doug Gradner
Executive Director:	Vicki L. Herian
Directors:	Dan Dolan (2005)
	Jeff Morrell (2005)
	Robert Beauregard (2006)
	Jerry Winandy (2006)

### *Wood and Fiber Science*

Editor:	Geza Ifju
Associate Editor:	D. Earl Kline
Editorial Assistant:	Carol B. Ovens

### *SWST Newsletter*

Editor:	Rado Gazo
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# Minutes

## 47th Annual Meeting

### Society of Wood Science and Technology

June 27, 2004

Amway Grand Plaza Hotel  
Pantlind Room  
Grand Rapids, Michigan

#### 2003 Annual Meeting Minutes

A motion was made, seconded and approved to accept the minutes as published in the July-August 2003 Newsletter.

President's Remarks – Doug Stokke thanked all the committee chairs, committee members, and the executive board, especially those going off the board or committees.

#### Executive Director's Report

##### Current Members as of June 1, 2004

Full members	287
Student members	58
Retired members	50
Affiliate Member	<u>3</u>
<b>TOTAL</b>	<b>398</b>

USA members	306
Canada members	41
Mexico members	3
Overseas members	48

##### Subscribers as of June 1, 2004

Subscribers	227
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##### Members as of June 1, 2003

Full Members	278
Student members	58
Retired members	56
Affiliate Member	<u>3</u>
	<b>395</b>

##### Subscribers as of June 1, 2003

Subscribers	222
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USA	99
Canada	14
Overseas	114

### **Delinquent Members**

Delinquent members as of 6/1/04 for 2004 dues – 42 total (21 full, 16 student, 5 retired)  
Delinquent subscribers for 2004 as of 6/1/04 – 35 total (18 US, 17 foreign)  
Compared to delinquent members as of June 1, 2003 – 76 total (43 full, 30 student, 3 retired)  
Compared to delinquent subscribers as of June 1, 2003 - 42 (24 US, 18 foreign)

### **Vanguard Accounts**

The Vanguard accounts were opened on February 3, 1998. The balance is \$47,551.77 on March 31, 2004 (the date of the last statement). The Student poster money was invested in November 1998 with an initial balance of \$4,750.00. The current balance (as of 3/31/04) in that account is \$11,198.96.

### **Checking Account**

The balance in the checking account as of June 1, 2004 is \$96,840.77.

### **Student Poster Competition Fund**

Contributors are: APA-The Engineered Wood Association, Asian Woods Inc., Balazs Zombori, California Cedar Products, Forintek Canada Corporation, Iowa State University, Louisiana State University, Mississippi State University, North Carolina State University, Oregon State University, Virginia Tech, University of British Columbia, University of Idaho, Washington State University, and Willamette Industries, Inc.

There are 17 participants in the 2004 Competition.

### **Miscellaneous**

All web pages have been updated as of June 2004.

A 2004 Membership Directory has been emailed to all members. Please inform the Executive Office of any corrections.

The Committee Handbook for 2003-2004 has been amended with new charges and other additions/corrections. This was emailed to all committee chairs and the board. It is also available on the web

Teaching Unit 1 and Unit 2 are available as powerpoint presentations. They can be viewed and used on the web or purchased on CD. There is also a set of 6 wood blocks and hand lens available for purchase. The cost is \$5 for the CD, and \$25 for the CD with wood blocks and hand lens. We have sold 32 teaching unit CD's and 4 unit packages, which includes the wood samples.

The Wood and Fiber Science searchable index has been put on the web on the main page. It is a searchable PDF file.

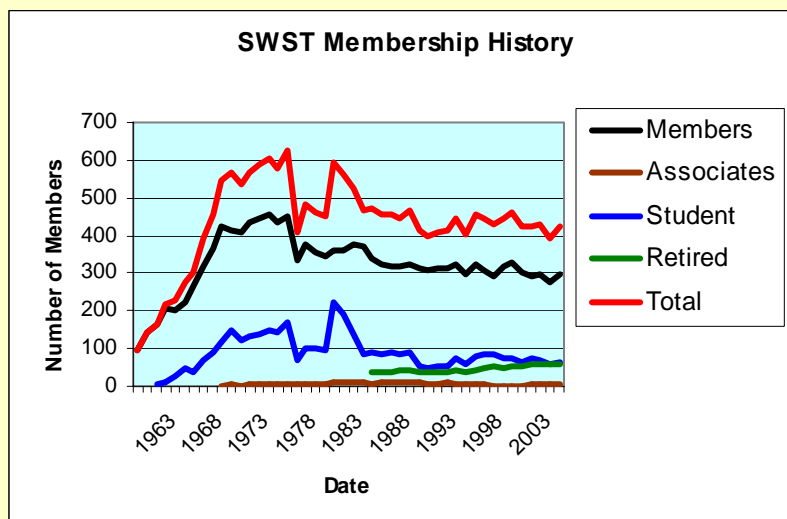
I have submitted an ad for Wood and Fiber Science with Ebsco Subscription Company, to be placed in their Librarian Handbook. The ad cost \$109 and goes to thousands of librarians. I have also participated in their Sample Issue Program for \$188 where our journal will be displayed at 2 librarian conferences.

The career brochure, "Career Opportunities in Applied Science and Engineering" is available for \$56 per hundred. Single copies are free. It is also available as a pdf file on the website.

The first electronic Newsletter went out in early February. We had 402 member's emails, and were missing 20. I received a few rejects back and have made corrections.

Beginning with Volume 36(1) of Wood and Fiber Science, we are no longer offering reprints. However, authors can purchase the pdf version of their paper for reprinting and posting on their website for \$100. Beginning with Volume 36(2), we changed typesetters from Allen Press to Impressions. This has been done in the hopes of reducing typesetting costs. The journal will still be printed at Allen Press.

I have prepared a membership trend plot, subscriber trend plot, and membership breakdown by category plot which are attached.



**Auditor's Report – Cheryl Hatfield**

At your request, I reviewed the SWST bank statements for the period June 1, 2003 through May 31, 2004. Checks, deposits, VISA and MasterCard charges, interest charges and bank charges were verified against the corresponding statements. No discrepancies were found between the statements and the books in any area. The May 31, 2004 checkbook balance of \$96,840.77 corresponds with the checking balance on the May 31, 2004 balance sheet. The \$58,750.67 total investment in the Vanguard accounts on the balance sheet also matches the totals on the most recent Vanguard statements (3/31/04).

**FISCAL STATUS DECEMBER 31, 2002**

**BALANCE SHEET**

Total Assets	\$73,915.06
Total Liabilities	\$ 628.36
Total Equity	\$73,286.70
Total Equity & Liabilities	\$73,915.06

**INCOME STATEMENT**

	<b><u>2003 Budget</u></b>	<b><u>Actual 2003</u></b>
Total Income	\$158,010.00	\$157,582.58
Total Expenses	<u>\$149,084.46</u>	<u>\$135,472.56</u>
	\$ 8,925.54	\$ 22,110.02

# 2005 SWST Budget

<u>Category</u>	<u>Income</u>	<u>Expenses</u>	<u>Net</u>
W&FS	\$108,480	\$ 69,020	\$39,460
Dues	\$ 21,925		\$21,925
Interest	\$ 100		\$ 100
Member			
Services	\$ 10,830	\$ 21,650	\$(10,820)
Admin			
Services		\$ 23,050	\$(23,050)
Salary &			
Taxes		\$ 26,153	\$(26,153)
TOTAL	\$141,335	\$139,873	\$ 1,462

## Wood and Fiber Science

Volume 36, 2004

	No. of Pages	
	Total	Technical
January issue	132	128
April issue	156	154
July issue	176	173
	-----	-----
Total Number of Pages	464	455

The annual budget calls for 600 pages of technical articles paying page charges. We fell behind that goal due primarily to the transition from Allen Press to Impressions for composition and type setting starting with the January, 2004 issue. If we want to maintain 600 technical pages per year, we should have 150 such pages per issue. In January, we fell behind by 22 pages while we were working out the logistics of the new arrangement of Impressions doing the type setting and Allen press doing the printing.

With the April and July issues, having 154 and 173 technical pages, respectively, we have caught up and the October issue will require to have a minimum of 145 technical pages only to meet the 600 goal. It will still be a squeeze because that issue has a lot of non-paying pages such as the index, the list of the winners of the various competitions, an editorial, the remarks by the

DSA recipients, etc. However, Carol and I feel, we can meet the budgetary goal.

#### Manuscript in the process as of June 10, 2004

Accepted and forwarded to Carol	19
Back to authors for revision	32
Out for review	28
Rejected	9
In Editor's office	3
	---
Total number of papers in the process	91

If the average number of papers in each issue is 15, we have more than enough accepted (19) to fill the October issue. This means that any manuscript accepted from now on can only be published in Volume 37, 2005.

During the last couple of months we had an unusual number of manuscripts which had to be rejected. The major reason for the rejections was English. However, there were a few with deficiencies in their technical contents.

In general, publication of *Wood and Fiber Science* has been going smoothly except for the January issue for which we had some minor problems with the transition from Allen Press to Impressions for composition and type setting. Carol still has to watch carefully the work of Impressions. For example, Carol discovered that for the July issue Impressions would have wasted a lot of space by printing some figures on single pages when those figures could easily fit on less than 1/2 pages. Carol Ovens is doing an excellent job, especially in editing for language and format and in overseeing the galleys.

Committee Reports – in Newsletter

#### **Publication Policy Committee**

Activity of the Publication Policy Committee this year has been mainly concerned with the design and format of *Wood and Fiber Science*. The objective is to replace the current 7x10 inch plain yellow journal with an 8 1/2 x 11 possibly multicolored journal. Three designs by Azzeddine Oudjehane were submitted to generate reaction to general layout, pictures, and contents on the cover. Reaction to these indicated a preference for pictures on the cover. The same designs were submitted to Allen Press for estimates of cost for printing. Their estimates indicated that we can print a journal 8 1/2 x 11 on white paper with pictures on the cover as shades of one color for essentially the same cost as the current journal. The 7 x 10 size and yellow cover of the current journal increase printing costs. Consideration of a logo for the new journal format is in progress. This will be submitted for Board and membership consideration when it is ready.

Submitted by Bob Youngs, Chair

Publication Policy – The committee is exploring electronic publishing possibilities.

### **Accreditation Committee Interim Report**

The Accreditation Committee has received the Interim Accreditation Report from West Virginia University. Committee Chair Jim Armstrong cannot participate in the review of the WVU program and has asked Vice Chair Audrey Zink-Sharp to chair the WVU review. The SWST Executive Board granted the programs at the University of Idaho and North Carolina State a one-year extension for re-accreditation to coincide with the date of their next SAF accreditation. Visits to these two institutions and to Virginia Tech are due to take place in 2005. The Committee was charged to "finalize and provide new accreditation handbook for the March Board Meeting. The Board approved the new handbook, which may be found on the SWST web page at [http://www1.fpl.fs.fed.us/swst/accred\\_handbook.pdf](http://www1.fpl.fs.fed.us/swst/accred_handbook.pdf). Members are urged to review the guidelines since they incorporate significant changes in the accreditation procedures for WST programs. The Committee is grateful to Tom McLain for his efforts in coordinating the revision of the Accreditation Standards.

Submitted by Jim Armstrong, Accreditation Committee Chair

Accreditation – We have switched to the new standards and also to a new yearly reporting system. The Executive Office will send out the forms in November, with a return due back in February. If there is a substantive change in the program, a more detailed report will be due.

### **Affiliate Member Report**

My name is Dr Reynolds Okai a Visiting Scientist from the Forestry Research Institute of Ghana now on sabbatical leave at Shimane University in Japan. I was very busy last year attending the All Division 5 IUFRO Congress in New Zealand, the 15<sup>th</sup> International Wood Machining Seminar in Japan, and the XII World Forestry Congress in Quebec, Canada. Since last year, I have been conducting research in Japan on the development of a new technology for band sawing using tip-inserted saws. Most companies in Japan have adopted this technology, which has helped to increase lumber yield and productivity.

### **Old Business**

This year we presented the first Fellow Awards. The procedure for nominating a person will be printed in the next Newsletter.

### **Past President's Plaque**

Audrey Zink-Sharp presented Doug Stokke with a plaque for his past year as president.

### **Teller's Report**

Ballots were emailed to all full members. Those who didn't have email addresses were mailed a hard copy. 129 ballots were returned, which compares to 136 from last year's prepaid ballot. The cost savings on this was \$200.

Vice President - Doug Gardner

Directors - Robert Beauregard and Jerry Winandy

Vote on Position Statement “National Need in Capacity for Forest Products Research and Development”

Yes 112 No 2

Total Ballots received – 129

Counted by Vicki Herian and Cherilyn Hatfield

### Constitutional Amendment Vote

A motion was made, seconded, and unanimously passed to accept the change in the constitution. Changes are noted in **BOLD**

#### Article VI – Elections

Current:

Section 5. The nominee for each office receiving a plurality of votes cast for the office shall be elected. Elected officers shall assume the duties of their office at the close of business of the annual meeting following their election, except as stated in Section 8.

Proposed:

Section 5. The nominee for each office receiving a plurality of votes cast for the office shall be elected. **In the event of a tie in any office, the Executive Board will resolve the tie, by a majority vote.** Elected officers shall assume the duties of their office at the close of business of the annual meeting following their election, except as stated in Section 8.

Meeting adjourned at 12:45.

### **Afternoon Program**

12:30–3:30 Joint SWST/Forest Products Society (FPS) Plenary Sessions

**Session 1:** Innovative Techniques for Measurements and Processes (Emerald A&B Room)

**Session 2:** Juvenile Wood: Its Biology and Impacts on Wood Utilization (Pearl Room)

**Session 3:** Research and Technologies to Provide the Future Fiber Supplies (Thornapple Room)

3:30–4:30 International Academy of Wood Science (IAWS) Lecture, “*A Compilation of Micrographs on Wood and Wood Products,*” by Norman P.

Vicki L. Herian  
Executive Director



# Abstracts

## “Better Ways to Connect: Going Beyond the Technical Report

June 27, 2004



John “Buddy” Showalter, P.E.  
Director  
Technical Media  
AF&PA/American Wood Council  
Washington, DC

### *Unlocking the Secrets of Successful Industry, Government, and University Partnerships*

Industry progress for wood products research has been sporadic and incremental. Research has increased at a slower rate than other major industry segments. To reverse this trend, efforts are currently underway to better define and coordinate high-impact research that will result in product and process “breakthroughs” for industry. Through AF&PA’s Agenda 2020 process, these goals will someday become reality.

Agenda 2020 creates partnerships between industry, government, and supporting laboratories and institutions to accelerate the research, development, and deployment of new technologies. These technologies are aimed at cutting energy use, minimizing environmental impacts, and improving productivity in industry. Industry drives the process by creating a strategic vision of the future and technology roadmaps that establish more detailed R&D priorities. Universities and government agencies like Department of Energy, USDA Forest Service, National Science Foundation, etc., serve as facilitators by encouraging industry to undertake long-term technology planning and by cost-sharing research.

Since its inception, Agenda 2020 has steadily increased the amount of support and resources provided for research – expanding from \$5 million to \$50 million per year. While funding for the pulp and paper side of the industry has overshadowed research on wood products, the 2002 formation of a new Agenda 2020 Wood and Wood Composites Task Group is a clear indication that the industry and DOE are serious about changing that inequity.



Dr. Chris Risbrudt  
Director  
USDA Forest Products Lab  
Madison, WI

***Experience in Building Partnerships to Accomplish Common Objectives***

Do you know of a great idea that fizzled because it just couldn't get off the ground? Perhaps a lack of funding, expertise, or exposure kept that plan from becoming reality. With declining budgets and staffs that are stretched thin, the resources necessary to take great ideas and turn them into successful projects aren't always available.

Partnerships could be the key to the success of such operations. Creating partnerships to accomplish goals is an effective way to share strengths and improve areas of weakness. Cooperation can improve the efficiency of complex projects and greatly extend their reach.

The Forest Products Laboratory's Advanced Housing Research Center (AHRC) is an example of a large and multifaceted partnership. AHRC was formed to improve our nation's housing by developing the durable, affordable, energy-efficient housing America needs. From the AHRC stems three partnership branches: the Federal Agency Housing Partnership, which facilitates interaction and coordination between Federal agencies for housing research and technology transfer; the Coalition for Advanced Housing and Forest Products Research, which brings together our nation's universities to focus on residential wood product and systems research; and the Residential Moisture Management Network, which consists of industry associations and government agencies who coordinate programs, disseminate information and recommended construction practices. The AHRC is guided by an Internal Coordinating Committee which facilitates internal team building and technical interaction with outside user groups, and an External Coordinating Committee which identifies and recommends research priorities and monitors the progress of the partnership.

The Woodfiber Initiative in Science and Engineering (WISE) is a new partnership between the Forest Products Laboratory and universities with programs in forest materials utilization. The WISE partners will collaborate to conduct research and demonstration programs to achieve valuable products based on renewable and recyclable materials from underutilized forest materials. The WISE looks to economically reduce fuel loads in forests by finding valuable uses for the materials that must be removed. In turn, this work will improve forest health and provide consumers with high-performance, environmentally sound products.

The Wisconsin Center for Sustainable Forestry Businesses consists of federal, state, university and industry partners and was formed in response to the uncertain future of Wisconsin's forest-based industry. The center was established to facilitate solving policy, business, and research and development issues that will allow for a sustainable forest-based industry in Wisconsin. The partnership aims to increase higher paying jobs, increase tax revenues, and sustain rural communities.

These partnerships have all set ambitious goals, and they must aim high to achieve them. But by tackling these large issues with partnerships, they have greatly increased their resources and, in turn, their chances for success.



Dr. A. William Bohner,  
Research Center Manager  
Trus-Joist – A Weyerhaeuser Business  
Boise, Idaho

### ***The Research Relationship between Industry and Academia***

Knowledge creation and knowledge transfer are critical to the mission of many colleges and universities. The involvement of customers is important to the success of this mission. These customers are many and include industry. The general expectation of continual improvement in the understanding and utilization of our wood resource will be enhanced when the relationship between industry and the universities is respectful and understanding of each other's needs and abilities.

There are many examples of the success of the relationship between industry and academia. Is it still working well? Are we still using each other's expertise to solve problems and advance our knowledge?

While it is important to encourage a close research relationship between industry and academic institutions it is, also, important that universities do not become the *de facto* research departments of industry. The university needs to be free to explore novel solutions to problems and to present new product concepts.

Finally, the link between industry and academia will work very well not only if the research is relevant and results effectively communicated. There must be people in industry who are interested in and able to see the value in the research results that are published in the professional journals. A lively exchange of ideas and opinions will ensure the transfer and use of knowledge.



Dr. David Brinberg  
Robert O. Goodykoontz Professor of  
Marketing and Professor of Psychology  
Department of Marketing  
Virginia Tech

***Translating Research into Action: Connecting the Business of Forest Industries to Research on Forest Industries***

A challenge facing many researchers at the interface between academic and applied research and between business faculty and industry experts is resolving the often conflicting values, demands, resource constraints, and research outcomes. These differences often result in sub-optimal collaborations when conducting cross-disciplinary research. I will present an overview of a research framework (Brinberg and McGrath 1985) that identifies structural reasons why these conflicts occur and suggest ways in which these research differences may be resolved. I will then describe a current project that is implicitly using this framework to integrate business school faculty with the faculty in forest-related departments as well as research activities between these faculty and industry experts.

# Improving the Performance of Thermosetting Wood Adhesives Using Multiphase Emulsions

Darren Riedlinger  
Wood-Based Composite Center Dynea Fellow  
Department of Macromolecular Engineering  
230 Cheatham Hall  
Virginia Tech  
Blacksburg, VA 24060

Dr. Charles Frazier  
Associate Professor  
Department of Wood Science and Forest Products  
Virginia Tech

**Abstract:** Despite intense competition and possible improved utilization efficiency, North American wood composite manufacturers are limited with only two commercially viable exterior grade thermosetting adhesives: alkaline phenol formaldehyde (PF) and polymeric methylenebis (phenylisocyanate) (pMDI). Recent studies have shown that a simple physical blend of the aqueous PF and the organic pMDI may offer several synergistic improvements over the two existing technologies. While this blend of “old” technologies may hardly seem novel, the dual-phase nature of this immiscible blend actually provides new areas for adhesive development through manipulation of the “oil-water” interface. However, many properties of this system remain poorly understood.

In this study the hybrid’s liquid morphology is examined along with its impact on the solid-state adhesive properties following cure. A polymeric membrane is found to rapidly encase the dispersed pMDI phase upon resin blending. This rationalizes several unusual thermal transitions reported in literature, but challenges their methods used in determining the hybrid’s residual isocyanate content. PF adhesives of varying alkali and methylol contents are synthesized to further probe this interface. Their effect on the hybrid morphology is studied using optical microscopy, flow rheology and oscillation cure rheology. The literature reported residual isocyanate contents are also reexamined using alternative methods. Dynamic mechanical analysis is then used to examine the thermal transitions and degree of PF-pMDI molecular interaction occurring in cured test specimen prepared from the liquid hybrids. A low temperature glass transition is identified near that of neat pMDI, suggesting that the polymeric membrane may be inhibiting cure. Solid-state  $^{13}\text{C}$  nuclear magnetic resonance and Fourier transform infrared spectroscopy are then used in conjunction with the sample dynamic mechanical analysis to better explore this low temperature transition as well as several other observed thermal transitions. Finally, imaging of the solid state morphology is performed using transmission electron microscopy.

## **Influence of stand density on wood properties at different sampling heights in black spruce (*Picea mariana* (MILL.) B.S.P.)**

Jerome Alteyrac, PhD student, Université Laval, Pavillon Abitibi-Price, Sciences du bois, G1K 7P4, Quebec, QC, Canada

Alain Cloutier, Professor, Université Laval, Pavillon Abitibi-Price, Sciences du bois, G1K 7P4, Quebec, QC, Canada

Tony Zhang, Senior Scientist, Forintek Canada Corp., 319 rue Franquet, G1P 4R4, Quebec, QC, Canada

The study, involving Forintek Canada Corp. and Laval University Wood Sciences Department, deals with the impact of stand density on wood properties of black spruce at different sampling heights. Stand density management is becoming an important forest management regime in Eastern Canada. The effect of growth rate on wood quality has been a subject of great interest for decades, and numerous studies have investigated the relationship between growth rate and wood quality in several commercial species, including black spruce. The objective of this study was to better understand the relationship between growth conditions and selected wood quality features in black spruce. More specifically, this study was designed to investigate the impact of stand density and sampling height on the radial variation of selected wood quality features. Thirty-six black spruce trees were harvested from an 80-year-old stand, naturally regenerated from fire, and located in Chibougamau, northwestern Québec, Canada. Each sample tree was assigned a local stand density, evaluated by the number of neighboring trees, and all trees were grouped into the three following stand density categories, 1790 t/ha, 2700 t/ha and 3400 t/ha. An X-ray densitometry analysis was run on 1.57mm thick strips collected at 2.4m, 4.8m and 7.2m sampling heights. Thus, several ring features were measured for each growth ring from the pith to bark. Ring area, was used to complement ring width which is most often used as growth rate indicator, and was computed from ring width assuming a circular shape. Earlywood proportion and intra-ring density variation were calculated from width and density of earlywood and latewood.

All the radial profiles showed that the variation due to sampling height was larger than that due to stand density. And it was notably observed that stand density has more influence on growth features than on density features. The non significant influence of stand density on wood density was mainly explained by the high stand density value. A very weak interaction of sampling height / stand density was observed, implying that the influence of stand density on wood traits does not depend on the sampling height. However, some longitudinal variations were dependent upon the type of wood (juvenile or mature). Indeed, ring density showed a large variation with sampling height only in juvenile wood. Finally, the variation of ring width and ring density among sampling height, stand density, and cambial age highlighted the link between these two variables.

It was also noticed that the radial patterns of maximum ring density and ring area could be useful to identify the age of juvenile wood boundary. Actually, in the upper part of the stem, the transition age occurs earlier and the juvenile wood gets some mature wood characteristics.

# **DROPLET DYNAMICS APPLIED TO THE ASSESSMENT OF WATER PENETRATION RESISTANCE OF COATINGS ON WOOD**

**Diogo Baptista**

**Advanced Engineered Wood Composites – University of Maine, Orono**

## **ABSTRACT**

Surface free energy is usually determined by measuring the contact angle of a probe liquid deposited on a surface, at a moment in time. When dynamic image analysis (DIA) is used, it becomes possible to track the behavior of an evaporating droplet. The geometry of a spherical sessile droplet on a surface can be characterized by a number of parameters, including volume, contact angle, height, cap radius, base radius, cap and base areas. The conducted study shown that at any moment in time, if only two droplet parameters out of these listed above are known, all other parameters were able to be determined, using simple geometrical formulas. In a general case, the two parameters given were the droplet volume and the contact angle. A simple model was then developed to predict the dynamic behavior of spherical sessile droplets on impermeable surfaces. With a known evaporation rate, it became possible to characterize and predict the droplet shape dynamics. With further knowledge on the receding contact angle, a more complex droplet behavior can be simulated. The model was then used to simulate experiments reported by other researchers, showing that simple geometrical relations account for many features of the dynamic sessile droplet behavior reported in the literature. It is also demonstrated that the often reported bulk evaporation rate, without being adjusted to the droplet cap area, should not be used as a meaningful indicator of droplet dynamics. In addition, other studies have shown that the intensity of the evaporation over the cap area is not uniform. The present work also studied the effect of droplet geometry on the average intensity of evaporation in non-saturated environments. The evaporation flux is shown to be related to the contact angle and to the droplet shape factor. An experiment was conducted by polymerizing glass slides with octadecyltrichlorosilane (OTS) in order to obtain different hydrophobicity surfaces, thus resulting in different contact angles and droplet cap and base areas. The results show a linear correlation between the evaporation flux and a range of the droplet shape factor, defined as the cap area over the base area. By correlating the droplet geometry with the average evaporation flux, it is possible to determine the volume of liquid that diffuses into a permeable surface. This is accomplished by developing a model that subtracts evaporated volume from total droplet volume. The difference will then correspond to the amount of water that diffused into the permeable surface. The fact that one can quantify this diffused water allows a further application of the concept to the field of wood surface science. Particularly, it becomes possible to apply the DIA, as a low cost and reliable method, to assess the resistance of water penetration of coatings on wood, by quantifying and comparing the diffused water among different samples.

**Sponsors:** this research is supported by NRI Competitive Grant Program/USDA award No. 2003-35103-12890: Program 73.0

**Faculty advisors:** Lech Muszyński & Douglas Gardner