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*The 15th*  
**Wood Adhesion Short Course**  
**July 11-12, 2018**

*A Wood-Based Composites I/UCRC Short Course*

**Location:** Inn at Virginia Tech and Skelton Conference Center  
901 Prices Fork Road  
Blacksburg, VA 24061

**What you will learn:**

Why does glue stick? What makes wood unique when it comes to gluing it together? The adhesive bonding of wood is becoming increasingly important as large timber becomes more and more scarce. Industries are adopting new technologies to bond wood pieces into larger elements such as flat panels, structural beams, finger-jointed lumber, furniture parts, etc. Industry professionals need to learn more about wood material science and the science of wood adhesion to effectively troubleshoot wood bonding problems and adopt new technologies.

During the course, you will learn about the:

- Basic structure of hardwoods and softwoods,
- Theories of adhesion,
- Material properties of wood,
- Impact of wood's microstructure on adhesion,
- Common wood adhesives in use today,
- Influence of moisture on adhesion,
- Penetration and distribution of adhesives,
- Fracture and testing of bonded wood, and
- Surface properties and bonding of wood.

This short course will introduce the basic concepts of adhesion, and then build on these concepts with specific attention to wood. Upon completion of the course, participants will better understand the unique bonding characteristics of wood. They will be better prepared to analyze existing problems and performance, and evaluate new applications.

**Who Should Attend:**

- Persons involved with the research and development of wood adhesive and wood composite technologies.
- Individuals who manage adhesive or composite-manufacturing processes, and who wish to sharpen their knowledge of wood and wood adhesion.
- Persons seeking an introduction to wood within the context of adhesion and composite technologies.
- Adhesive suppliers who wish to improve their ability to communicate with the forest products industry.
- Persons who have had some college level chemistry, and who are comfortable with basic chemical principles.



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## Agenda:

### DAY ONE:

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| 7:45 a.m.  | Registration and refreshments  |
| 8:00 a.m.  | Welcome and Introductions (Frazier, Kamke, Nairn)                          |
| 8:10 a.m.  | Overview to Adhesion Science (Frazier)                                     |
| 8:20 a.m.  | Participant Introductions  |
| 8:30 a.m.  | Basic Structure of Hardwoods and Softwoods/Micro-Structure of Wood (Kamke) |
| 10:00 a.m. | Break  |
| 10:20 a.m. | Material Properties of Wood and Bonded Wood (Nairn)                        |
| 11:30 p.m. | Lunch  |
| 12:20 p.m. | Surfaces: Solids and Liquids (Frazier)                                     |
| 1:20 p.m.  | Adhesive Stress State and Adhesive Testing (Nairn)                         |
| 2:05 p.m.  | Break  |
| 2:25 p.m.  | Introduction to Polymer Science (Frazier)                                  |
| 3:30 p.m.  | Wood and Water Relationships (Kamke)                                       |
| 4:55 p.m.  | Questions and Discussion<br>Day One Wrap-up                                |
| Optional   | Group Dinner @ a local restaurant  |



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## **DAY TWO:**

- 7:45 a.m. Refreshments
- 8:00 a.m. Introduction to Wood Adhesives (Frazier)
- 8:50 a.m. Adhesive Distribution and Penetration (Kamke)
- 10:00 a.m. Break
- 10:20 a.m. Introduction to Wood Adhesives, continued (Frazier)
- 11:05 a.m. Simple Design and Fracture of Bonded Wood (Nairn)
- 11:50 a.m. Lunch
- 1:00 p.m. Adhesive Viscometry (Frazier)
- 1:30 p.m. Group Photo  
Travel to Cheatham Hall
- 2:15 p.m. Lab Exercises:  
Group A: Resin Penetration and Distribution (Kamke)  
Group B: Wood Anatomy and Structure (Zink-Sharp w/Nairn)  
Group C: Laboratory Tour and Demo (Frazier)
- 4:00 p.m. Questions and Discussion
- 4:30 p.m. Course Evaluation and Wrap-up, Adjourn

### **About the Instructors:**

Dr. Chip Frazier is the Thomas M. Brooks Professor in the Department of Sustainable Biomaterials at Virginia Tech and is the Co-Director of the Wood-Based Composites Center. He specializes in adhesives and adhesion.

Dr. Fred Kamke is Professor and JELD-WEN Chair of Wood-based Composites Science in the Department of Wood Science and Engineering at Oregon State University. He is the Co-Director of the Wood-Based Composites Center. Dr. Kamke specializes in composite manufacture, resin penetration and distribution, and wood and water relationships.

Dr. John Nairn is Professor and Richardson Chair in the Department of Wood Science and Engineering at Oregon State University. He specializes in mechanics and fracture of wood and wood-based composites. Before coming to Oregon, he specialized in deformation and fracture of polymers and polymer-based composites.

Dr. Audrey Zink-Sharp is Professor and Associate Department Head in the Department of Sustainable Biomaterials at Virginia Tech. She specializes in quantitative wood anatomy, micro-mechanics, and video microscopy.



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**Cost:**

The cost for the two-day short course is \$795.00 per person. Members of the Wood-Based Composites I/UCRC are eligible for a reduced fee of \$675.00. The registration fee includes workshop materials as well as lunch and refreshments during the class.

**Travel Information and Lodging:**

You are responsible for making your own lodging reservations. A block of rooms has been reserved for participants at the Inn at Virginia Tech, 901 Prices Fork Road, Blacksburg, Virginia at a discounted rate of \$149.00, single or double occupancy. Reservations can be made by calling 540-231-8000 or toll-free at 877-200-3360. Be sure to ask for the “The 15th Wood Adhesion Short Course” room block.

Reservations must be made **on or before Monday, June 11, 2018**. Rooms will be released to the public at this time and the special rate will no longer be offered.

Use the Roanoke-Blacksburg Regional Airport (ROA) if air travel is required. You can download driving directions to the Inn at Virginia Tech from their website ([www.innatvirginiatech.com](http://www.innatvirginiatech.com)). A good alternative to renting a car is the Smart Way Commuter Bus ([www.smartwaybus.com](http://www.smartwaybus.com)). The fare is only \$4.00 each way (exact change required), and the bus will bring you directly to campus. The bus stops at the Squires Student Center, but if you contact The Inn before you arrive (540-231-8000), they will send the hotel van to pick you up. To facilitate networking, an optional (non-hosted) group-dinner is planned for July 11<sup>th</sup>.

**For More Information:**

Contact Linda Caudill, Managing Director, Wood-Based Composites Center, at 540-231-7092 or by email at [lcaudill@vt.edu](mailto:lcaudill@vt.edu)

**To Register:**

Registration is available until space is sold out or until Wednesday, June 20, 2018. Register on-line, beginning in February, [on the VT Continuing Ed website](#). You can also contact the Virginia Tech Division of Continuing Education directly at:

Conference Registrar: Lauren Henson  
702 University City Blvd.  
Blacksburg, VA 24061  
Phone: 540-231-5182

or visit our website at <http://www.wbc.vt.edu>

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