

# SBIO Newsletter

Spring 2019

Featuring articles on  
study abroad in Ireland  
and Costa Rica

InsideTREES  
summer camp 2019

Alumni  
thoughts



COLLEGE OF NATURAL RESOURCES AND ENVIRONMENT  
**SUSTAINABLE BIOMATERIALS**  
VIRGINIA TECH.

## Message from the department head



I recently attended the National Wooden Pallet and Container Association (NWPCA) Annual Leadership Meeting and the Mass Timber Conference. Both events focused on the future of the industries in which many of our students work. The NWPCA has been a longtime supporter of our program, and their meeting highlighted the continued opportunities that exist in the pallet and packaging industry. The meeting program focused on innovation, leadership, and how the current political climate is impacting business. Most

of the nearly 600 participants were very optimistic about the wood packaging industry and its future. The Department of Sustainable Biomaterials has placed many of our students in this industry. I visited with a number of them, many of whom are now leaders in their companies. As I have mentioned before, once a student is successful in their job for a few years, they often end up in a management position. When we visit with industry representatives, they stress the importance of students having business management, finance, team building, and leadership skills as part of their education. We continue to work on our curriculum to make sure we are preparing our students for not only their initial position, but also their eventual leadership roles in their firms.

Probably the most important innovation to hit the building products industry in the past 40 years has been the development of cross-laminated timber (CLT) and mass timber construction. This technology has been used in Europe for nearly 20 years and started in the U.S. during the last decade. Buildings as high as 18 stories have been built with wood in North America. Our engineering faculty and many graduate students have been researching this area for a number of years. They have built and tested CLTs made out of Southern Yellow Pine and Yellow Poplar. At the Mass Timber Conference, it was reported that there are currently over 450 mass timber buildings in the design or construction stage in the U.S. Not only do CLTs offer a great opportunity to increase markets for wood, they are more environmentally friendly and have a much smaller carbon footprint than concrete and steel construction.

Building construction is the largest user of energy in the U.S., and building with wood can help reduce energy usage. Again, I visited with a number of former students who are working in this segment of the forest products industry and saw how their careers have developed.

In this issue of the SBIO Newsletter, we are highlighting past students and how their time in the department has helped them with their careers. In addition, we had some new graduate students join us in January, and there are updates on recent faculty activities. If you have any questions about the department or this newsletter, please feel to contact me at [rsmith4@vt.edu](mailto:rsmith4@vt.edu).

- Bob Smith -

## Study abroad program to Costa Rica provides a global perspective on the sustainable use of natural resources

### BY HENRY QUESADA

Associate Professor Henry Quesada and Professor Brian Bond recently conducted a study abroad program to Costa Rica. The program took 12 students there to study sustainable agriculture, forestry, water management, renewable energy, and wildlife management and to make a connection with local communities. The program has been running since 2010. Over the last four years, the program has been conjointly organized with EARTH University, a global leader in sustainable agriculture.



The program includes over 40 different activities, including lectures, tours, debates, and experiential learning. Besides learning about the sustainable use of natural resources, the students learned other co-curricular skills such as language, diversity and gender issues, and knowledge about local communities.

# Virginia Tech Sustainability and Culture Study abroad in Ireland, March 9-17, 2019

**BY NIAMH HAMILL, Director, Institute of Study Abroad Ireland**

We had a big “cead míle fáilte,” for the Virginia Tech students, under the guidance of Professor Bob Bush, who made Donegal their home for their program on sustainability and culture. This ran as a collaborative program with Tarrant County College geology and culture, so we spent a lot of time enjoying (and enduring) the wild Atlantic weather!

The students were delightful, full of enthusiasm and energy, and our field trips included a visit to the Cavan Burren, the Giant’s Causeway, Dunluce Castle, the Museum of Country Life, and Donegal Castle. The students also gave their services to the Bundoran Community Garden, a local operation run by Sr. Assumpta, dedicated to sustainable practices and community cooperation.

The craic was great, enhanced by our very own bog boys (Lucas and Liam), and thank you, Alex, for single-handedly stimulating the local craft economy! My girls (you know who you are) were proof that the next generation will be formidable and fierce. You were an awesome group of students, thank you!

Here are some quotes from participants:

“I fell in love, not just with the natural beauty of the scenery but with the people, the culture, and the depth of history and traditions. I am and will be grateful for this priceless opportunity and experience.” Michaela Miller, student

“The ISAI has been one of the greatest things I have been involved with. Niamh and John clearly have such big hearts for students and sharing their world with us. I learned so much, enjoyed myself, and got some of the greatest experiences of my lifetime. I’ll be back.” Kayla McMurray, student

“The personalized and knowledgeable staff at ISAI combined with the fascinating history, culture, and beauty of Ireland made this the best trip ever.” Maureen Deisinger, faculty

“It is not possible to sum up how incredible this experience has been in a few sentences. It’s a great way to experience a lot of Ireland in a short amount of time without feeling rushed. You feel like you get the full experience.” Emily Vollmer, student

“I had no idea that Ireland’s culture is so rich, its history so complex, and its landscape so ruggedly beautiful. I felt very welcome everywhere we went and especially at the Atlantic Hotel. Our every need was addressed, and the quality of the educational experience cannot be overstated. I wish I could stay longer!” Alex Mazarr, student



Students who participated in the 2019 study abroad trip to Ireland.



Dr. Robert Bush at Dunluce Castle, Ireland

## Wood Enterprise Institute **BY EARL KLINE**

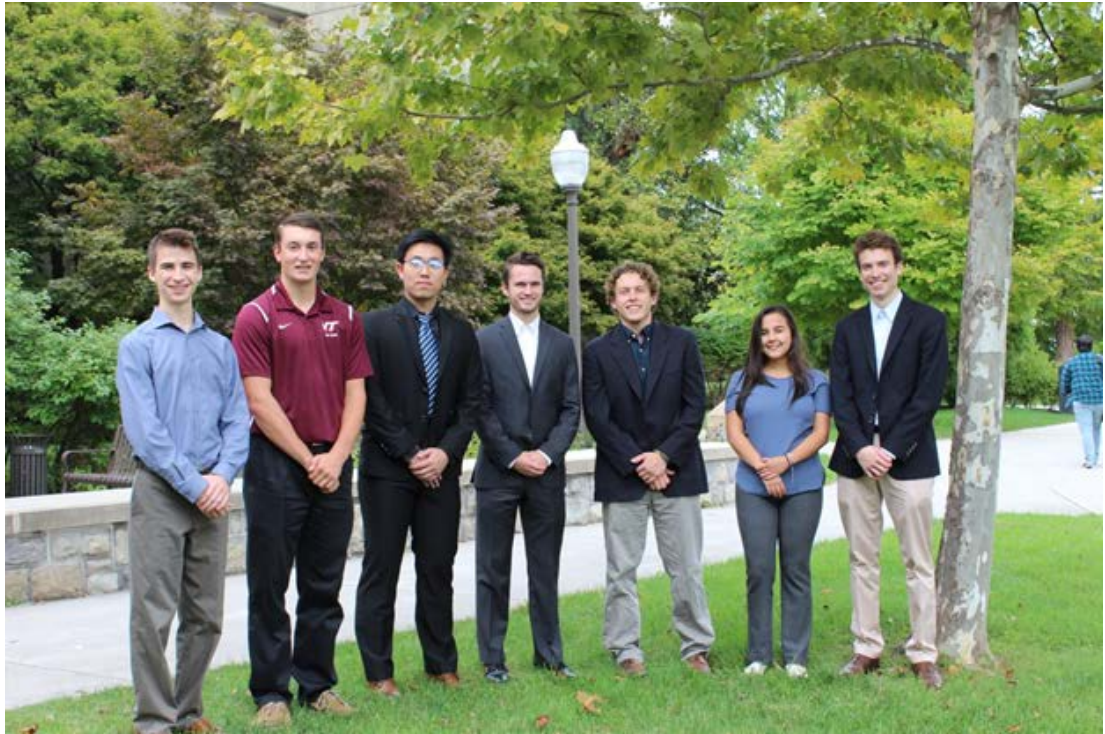
Greetings from the Wood Enterprise Institute! WEI is about a month away from completing its 12th business cycle. Nearly 150 Virginia Tech alumni have participated in this enterprise since 2007. Student teams have started and managed businesses making many innovative products over the years, solving real customer needs and generating over \$47,000 in revenue! This revenue provides each new student team the start-up funds they need to launch their business venture to design, test, make, and sell their own product ideas. The funds also help to keep the department's Innovation Lab up to date with the latest technologies and lean business organization methods, which help sustain a great place to learn and experience what student entrepreneurial capability is possible.



2007 Inaugural WEI Team (L-R): D. Earl Kline, Thomas Blount, John Foster, Wes Saunders, Adam Birkett, Jesse Paris, Kevin Eberling, Mike Elebash, Becky Dawson, Josh Hosen, Kevin Knight, Rob Hart, Daniel Roethle

Fast forward to the current academic year. Ten student WEI members are testing their abilities to own and operate the business. They are executing their business plan to make and sell dog bowl stands to address the needs of “Hokie Nation” pet owners by providing craftsmanship, functionality, and aesthetics for their customers. The market in the past has always been providing unique novelty items to Virginia Tech alumni, family, and friends. This year's opportunity is to tap into a rather extensive market base of pet owners, offering unique

feeding experiences for their dogs. Please check out what they have been up to at [www.vtwei.com](http://www.vtwei.com) and [www.facebook.com/wei.vt/](https://www.facebook.com/wei.vt/).



2018-19 WEI team (L-R): Max Reynolds, Jimmy Atkinson, Junhao Li, Daniel Grizzard, Christian Muckerman, Aileen De La Ree, Andre Sobert. Not pictured: Gillian Cubbage, Stephanie Renberg, Dylan Willard.



The 2018-19 Wood Enterprise Institute dog bowl stand and one satisfied customer.

## InsideTREES summer camp BY AUDREY ZINK-SHARP

InsideTREES is the first summer camp offered for high school students by the Department of Sustainable Biomaterials on Virginia Tech's campus. It will be held Sunday, June 9, 2019, through Thursday, June 13, 2019.

The program presents a unique opportunity for high school students to experience college life and learn about an interdisciplinary environmental



field. The goal of the program is to increase awareness of educational and career opportunities in natural resources and sustainable biomaterials, especially for women and underrepresented students. Our target audience is first generation, women, and minority students from rural areas.

Aspects of wood science, green chemistry, dendrochronology, and engineering are included in the learning modules that promote a sustainable future. Hands-on activities include What's in a Tree daily charting, Reading the Rings, Writing with Wood, Looking Really Close, Making a Chia Paper Plant, Wood Sandwiches, Life Cycle Assessments, a Day in the Life student panel, career and college preparation discussions, and a field trip to a local cross-laminated timber installation. As a grand finale, participants will complete a comprehensive project based on what they have learned about what's inside a tree.

All expenses, except transportation to and from Virginia Tech and personal items, will be covered. Participants will be provided a dorm room in a residence hall on the Blacksburg campus of Virginia Tech and breakfast, lunch, and dinner at one of Virginia Tech's award-winning dining facilities. InsideTREES is supported by funds received from the U.S. Department of Agriculture NIFA Women and Minorities in Science, Technology, Engineering, and Mathematics Fields Program (WAMS), Award No. 2017-38503-27170.

We have maximum participation of 10 high school students already and are looking forward to providing a great experience for them.

More information about InsideTREES can be found at [sbio.vt.edu/SummerCamp.html](http://sbio.vt.edu/SummerCamp.html). For additional information, contact Professor Audrey Zink-Sharp [agzink@vt.edu](mailto:agzink@vt.edu) or (540) 231-8820.



## Welcome to our new graduate students



**Joseph Pomponi**

“I graduated from Penn State with a degree in biorenewable systems: bioproducts, which is essentially the wood science/products program. In my free time away from class and research, I like to watch TV, play video games, and work out. I'm huge into college football, college basketball, and baseball. I bleed blue and white, but I hope to catch a couple of Hokie games while I am here.”

**Kerrigan Strong**

Kerrigan Strong, a first semester master's student, graduated cum laude from Virginia Tech in December 2018 with a bachelor's in sustainable biomaterials. Her research endeavors will consist of experimentally measuring, and later predicting, the shrinkage and swelling of wood panels and their resulting shape geometries in order to control warpage caused by moisture content changes. In

her free time, Kerrigan enjoys music and is currently a member of the Virginia Tech Chamber Singers, something she's been a part of since her time as an undergraduate. She also likes spending time outdoors with her goldendoodle, Finn.



## Paula Fallas successfully defends her M.S. thesis

BY HENRY QUESADA

Paula Fallas from Costa Rica has successfully defended her master's thesis. Paula worked on the application of lean thinking tools to the wood fiber supply. Her research was funded through a competitive grant from the Wood Research Supply Institute (WSRI) and the Department of Sustainable Biomaterials. Paula worked under the mentorship of Henry Quesada, Brian Bond, and Earl Kline. Her work has been presented at the Society of Wood Science and Technology convention in Nagoya, Japan, and at the WSRI annual meeting in New Orleans. In addition, she has published one peer-reviewed paper and is currently working on two other peer-reviewed papers.



## Wood-Based Composites Center featured in the Engineered Wood Journal

BY LINDA CAUDILL

The Wood-Based Composites Center is an industry/university research consortium with a mission to advance the science and technology of wood-based composite materials. Since its founding in 1999, industry service has been the center's motivation, inspired by its industry members, who provide guidance and oversight on all matters, including research, student training, and fiscal decisions. Besides strong industry support, the durability of the center is due to a stable leadership triad composed of center directors Linda Caudill, Fred Kamke, and Chip Frazier. As the center's 20th anniversary approaches, this [Engineered Wood Journal article](#) features the story of a member-driven research center with long-lasting partnerships and a reputation as a leader in research and education in wood composites.

## BIM class visits Shelter Alternatives BY DAN HINDMAN

On February 27, the SBIO 2984: Building Information Modeling in Residential Structures class visited Shelter Alternatives, a Blacksburg design/build firm specializing in new home construction and home renovation. Shelter's lead designer, Joe Bassett, talked to students about how he uses the Autocad Revit computer program in design and construction.

Revit is used to create the design, communicate construction documents, and present renderings to the customer. Shelter has constructed three net-zero homes in the past year. One project the group examined earned a home energy rating system (HERS) value of -3, meaning that the home produces more energy than it uses throughout the year!

Unlike a computer aided drafting (CAD) program, Autocad Revit creates 3D objects that include data on the physical properties and dimensions. This allows the designer to create a full building – structural elements, finish elements, interior design, plumbing, electrical, lighting, etc. – in the structure. Revit models are shared throughout the range of construction professionals (architect, structure, mechanical, and electrical professionals). The ultimate goal of Revit is to eliminate conflicts and problems during construction.

If you are interested in learning more about Revit or building information modeling, contact Dan Hindman at [dhindman@vt.edu](mailto:dhindman@vt.edu).



## Henry Quesada invited to speak on the potential use of hardwood lumber at industry meetings

The National Hardwood Lumber Association (NHLA) invited Associate Professor Henry Quesada to speak at its annual convention, held in Toronto in October 2018. Henry is part the Virginia Tech group working to overcome the main drivers and challenges to using hardwood lumber for the manufacturing of cross-laminated timber (CLT). This group also includes faculty members Brian Bond, Dan Hindman, and Joe Loferski from the Department of Sustainable Biomaterials and architects Kay Edge and Edward Becker from the College of Architecture and Urban Studies at Virginia Tech.

Henry has also been invited to participate in roundtable discussions with other hardwood lumber associations to try to develop a strategy to open the door for hardwood lumber as raw material for CLT. These associations include the Canadian Hardwood Lumber Association, the Indiana Hardwood Lumbermen Association, the American Hardwood Export Council, and the Appalachian Hardwood Manufacturers Inc.

## Welcome to our new lab technician, Shannon Lenahan

Shannon Lenahan joined the Department of Sustainable Biomaterials in January 2019. After graduating from Virginia Tech in chemical engineering, she worked for a number of years in chemical scale-up and process development for the U.S. Navy, ATK at the Radford Arsenal, and Nalas Engineering. In addition to her responsibilities in the sustainable biomaterials department, she also has her fingers in theatrical production work, house renovation, and fundraising and project support work for a nonprofit called Economic Development Greater East. A few of her other interests include travel, languages, gardening, permaculture, and rugby.



## Alumni thoughts

We asked some of our alumni what they learned while at Virginia Tech that most prepared them for their career. Following are some of the responses we received.

**Designing a solution that works for the entire system.** Andrew Corbin, B.S. 2014, Packaging Engineer II, Spectrum Brands

**I learned many things that I now apply. Probably most importantly, how to conduct research. I learned about wood science and technology, and forest products marketing. During my coursework I saw great instructors and how they cared for their students and their learning, which I now try to apply in my teaching.** Omar Espinoza, M.S. 2006 and Ph.D. 2009, Associate Professor, University of Minnesota



**I learned how to work with professionals in the forest products field. In addition, how to conduct market research and communicate the results to stakeholder groups.** Scott Lyon, M.S. 2011, Forest Products Specialist, Wisconsin Department of Natural Resources



**At VT I obtained an in-depth understanding of wood as a material. I also learned how to investigate things with an analytical mindset.** Kyle Mirabile, M.S. 2015, Technical Sales Representative, Hexion Inc.

Collaboration with people from different degrees and backgrounds. I had the opportunity to take classes and work with people with a variety of experience and personalities, and thus learned a great deal about communication, collaboration, and being flexible. I can't stress this enough – collaboration will be a huge part of your career! Scott Renneckar, B.S. 1997 and Ph.D. 2004, Associate Professor, University of British Columbia



Other than packaging classes, the industry exposure we got through guest speakers in class or at Packaging Club, as well as feedback we got from career services on resume and cover letter writing. Group project organization and presentation creation and giving. Erica Roesel, B.S. 2016



It was the “drive” by superstar faculty that helped me the most. VT is special because the department is loaded with an all-star team. While I was there, they challenged me to learn. They taught me to hold high standards and ethics in my career. I learned to set impossible dreams and goals, but then work to surprise myself through achievement. I learned that if you are not shooting for the stars, then you are not challenging yourself. Brian Via, B.S. 1996 and M.S. 1998, Director, Forest Products Development Center, Auburn University



Laboratory technician time provided me with a comprehensive understanding of packaging, pallet, and unit load design and performance. Braden White, M.S. 2008, Executive Director, White & Company LLC

*Look for more comments from our alumni in a future issue.*

# SBIO Extension



## Specialists

### Brian Bond

Wood Processing  
[bbond@vt.edu](mailto:bbond@vt.edu)

### Urs Buehlmann

Secondary  
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### Henry Quesada

Continuous  
Improvement  
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## Extension highlights

The wood products industry in Virginia is a critical contributor to the economy of the state – represented by more than 1,000 primary and secondary industries and over \$25 billion in economic impact.

The Department of Sustainable Biomaterials (SBIO) at Virginia Tech is one of the leading U.S. academic programs in the field of renewable materials with a focus on cellulosic materials such as wood products.

Besides research and teaching efforts, SBIO has an important role in the dissemination of new knowledge in the area of renewable materials through SBIO's three extension specialists.



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Cooperative  
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[www.ext.vt.edu](http://www.ext.vt.edu)

## A look at Virginia's wood products industries

In 2016, the U.S. Census reported figures for the number of establishments, the number of employees, and the value of shipments in Virginia's three wood products industry sectors under the North American Industry Classification System (NAICS code) (Table 1).

Table 1. Establishments, employees, and shipment values in Virginia wood products industry, 2016

NAICS code	Number of establishments	Number of employees	Value of shipments
Wood products manufacturing 321	433	13,134	\$3.98 billion
Furniture and related products manufacturing 337	350	6,506	\$3.8 billion
Paper manufacturing 322	79	7,105	\$1.865 billion
<b>TOTAL</b>	<b>862</b>	<b>26,745</b>	<b>\$9.645 billion</b>

Source: usatrade.census.gov

In 2018, Virginia exported \$347.7 million in wood products, as defined by the Harmonized System (HS) code 44 (wood and articles of wood). The top five products represent 96% of total exports within HS code 44 for 2018 (Table 2).

Table 2. Top wood product commodities exported from Virginia, 2018

Commodities within HS code 44 (wood and articles of wood)	Total value	Percentage
4407 Wood sawn or chipped lengthwise, sliced, etc.	\$201,533,775	58%
4403 Wood in the rough, stripped or not of sapwood, etc.	63,795,724	18%
4401 Fuel wood in logs, etc.; wood in chips, etc.	45,773,074	13%
4408 Veneer sheets, etc., not over 6 mm thick	19,871,414	6%
4411 Fiberboard of wood or other ligneous materials	5,142,250	1%
Other	11,585,333	3%
<b>Total HS code 44</b>	<b>\$347,701,570</b>	

Source: usatrade.census.gov



The following Virginia wood products and furniture industry statistics and rankings among U.S. states by total value of shipments were generated using data from the U.S. Census Bureau (4-digit NAICS codes last reported in 2016 and 6-digit NAICS codes last reported in 2012):

◆ **6th in NAICS 3211 (sawmills and wood preservation)**

- 1st in NAICS 321114 (wood preservation) with \$536.8 million, 20 establishments, and 863 employees
- 10th in NAICS 321113 (sawmills) with \$502.1 million, 126 establishments, and 2,160 employees

◆ **9th in NAICS 3212 (veneer, plywood, and engineered wood product manufacturing) with \$859.7 million**

- 9th in NAICS 321219 (reconstituted wood product manufacturing) with \$262.2 million

◆ **14th in NAICS 3219 (other wood product manufacturing)**

- 4th in NAICS 321918 (other millwork [including flooring]) with \$326.4 million and 43 establishments
- 7th in NAICS 321911 (wood window and door manufacturing) with \$326.3 million and 20 establishments
- 8th in NAICS 321912 (cut stock, resawing lumber, and planing) with \$251.1 million and 40 establishments
- 18th in NAICS 321920 (wood container and pallet manufacturing) with \$119.6 million and 56 establishments
- 12th in NAICS 321999 (all other miscellaneous wood product manufacturing) with \$144.8 million and 43 establishments

◆ **11th in NAICS 3371 (household and institutional furniture and kitchen cabinet manufacturing) with \$1.1 billion**

- 3rd in NAICS 337122 (nonupholstered wood household furniture manufacturing) with \$386.9 million and 68 establishments
- 11th in NAICS 337110 (wood kitchen cabinet and countertop manufacturing) with

\$368.5 million and 211 establishments

- 10th in NAICS 337212 (custom architectural woodwork and millwork manufacturing) with \$134.0 million and 44 establishments

◇ 7th in NAICS 3379 (other furniture related product manufacturing) with \$530.3 million

## Upcoming courses

### Wood Basics (May 20-24, 2019)

**History:** The North American Wholesale Lumber Association Wood Basics course was started in 1981 to educate and develop a skilled workforce for the forest products industry. More than 1,500 professionals have graduated from the course since its inception, representing a broad cross section of the industry. Since that time, the curriculum has evolved with the industry, in areas such as technology and global trade. Today, the Wood Basics course provides companies the best value and option to ensure their employees have the tools and knowledge to help them succeed.

**Curriculum:** Wood Basics is a four-day immersion class that includes both classroom training and field operations. The curriculum encompasses the entire spectrum of the forest products industry: from seed to tree, from production to sales. Classes are taught by industry experts and cover all the topics relevant to success, such as:

- Sales training
- Product segmentation
- Price and cost trends
- Logistics and transportation

**Instructors:** The instructors are recognized experts in their respective fields, including corporate executives and industry consultants. The Department of Wood Science & Engineering, College of Forestry at Oregon State University and the Department of Sustainable Biomaterials, College of Natural Resources and Environment at Virginia Tech provide many of the facilities, while their professors also act as instructors.

**Where:** Blacksburg, Virginia.

**Registration and more details:** [www.nawla.org/page/Wood-Basics](http://www.nawla.org/page/Wood-Basics)

### **Vacuum-Steam Treatment of Logs to Meet Export Requirements (June 5, 2019)**

This program is composed of both a workshop and field demonstration of vacuum-steam phytosanitation for logs. The goal of the workshop is to introduce all those associated with the movement and export of logs to a commercially viable nonfumigation method of treatment. The vacuum-steam system greatly improves the turnaround time of the current USDA T-314 heat treatment schedule for hardwood logs. Research has confirmed the efficacy of this method for a number of important pests and pathogens of hardwood logs, including oak wilt, thousand canker disease complex, and cerambycid borers. The workshop and field demonstration will be held at the Brooks Forest Products Center at Virginia Tech on June 5, 2019. For more information or to register, please go to [vacuum-steam](#). This course will be taught by Dr. Brian Bond, who has extensive experience in working closely with the wood industry as an extension specialist in the areas of lumber drying, wood and moisture relations, and sawmill efficiency. The course is sponsored by Virginia Cooperative Extension.



### **Basic Hardwood Lumber Drying (Aug. 5-7, 2019)**

Operating a lumber drying facility requires special skills. A significant amount of lumber can be damaged during drying when proper techniques are not used. Knowledge also allows one to better satisfy customer demands. This course is designed for beginning operators and supervisors drying hardwood lumber in steam or dehumidification dry kilns. The program will cover practical techniques for the efficient and effective operation for air drying and kiln drying lumber. The program will include measuring moisture and the use of sample board kiln and predryer operational techniques, drying schedules, causes and cures for drying defects, and quality control procedures. The course includes a visit to a commercial hardwood lumber drying operation. The course will be held in Roanoke, Virginia, Aug. 5-7, 2019. This course will be taught by Brian Bond, Dan Hindman, and Joe Loferski and is hosted by the Flooring Educational Guild.

### **Unit Load Design and Performance (Aug. 13-15, 2019)**

Learn unit load design: a systems based optimization procedure that will improve customer service and increase your competitiveness.

**Who should attend:** Packaging, pallet, and material handling equipment suppliers, as well as the users of these components.

**Where:** Brooks Forest Product Center, 1650 Research Center Drive, Blacksburg, Virginia

**Registration fee:** \$700 for ISTA/MHIA/NWPCA members, \$400 for members of the Center for Packaging and Unit Load Design, and \$800 for non-member, early registration.

**Registration and information:** [Unit Load Design and Performance](#)

## Introduction to Thermally Modified Wood (Oct. 17, 2019)

This short course will introduce attendees the basic concepts of thermally modified (TM) wood. The program includes the processes, markets, performance aspects, and disadvantages of TM wood.

**Who should attend:** Architects, civil engineers, wholesale lumber distributors, retailers, building contractors, and the general public. CPE credits are available.

**Where:** Virginia Department of Forestry, Charlottesville, Virginia

**Registration fee:** \$100. Includes CPE credits, course materials, coffee break, and boxed lunch.

### Tentative agenda:

- 8:30 a.m. Welcome and introductions (Charlie Becker)
- 8:45 a.m. Wood modification techniques (Brian Bond)
- 9:30 a.m. Coffee break and networking
- 9:45 a.m. Thermally modified wood basics (Scott Seyler, Northland Forest Products)
- 10:30 a.m. Markets for thermally modified wood (Omar Espinoza, University of Minnesota)
- 11:15 a.m. Applications of thermally modified wood: An architect's perspective (TBD)
- 12:00 p.m. Lunch and networking
- 1:00 p.m. Work at Virginia Tech on thermally modified wood (Brian Bond and Henry Quesada)
- 1:30 p.m. Tour of Northland thermally modified wood facility
- 2:30 p.m. Final questions, opportunities, and threats
- 3:00 p.m. Adjourn

For more details, contact Henry Quesada at [quesada@vt.edu](mailto:quesada@vt.edu).



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