

INSIDE VT WOOD

Virginia Tech Hokie Alumni, Students, Business Leaders and Friends:



Please join us, on the evening of June 20th at 7:00 p.m. for a Virginia Tech student, alumni and friend Departmental reception in Portland, Oregon. This reception will be held in conjunction with the Annual [Forest Products Society's International Convention](#) (IC), and it will be a friendly gathering to celebrate Virginia Tech's Department of Wood Science and Forest Product's activities, and the successes of our students, alumni and friends. Eleven of the Department's faculty and students will attend the FPS IC this year, so it will be a strong turn-out especially given the location on the west coast. Beyond our VT Hokie Student/Alum reception, the FPS Convention will have one of the highest turn-outs ever in recent years so it will be an excellent opportunity for technical exchange and interaction with old friends from the Society.

Location and Time for the Virginia Tech Reception: We will meet at [McMenamins Restaurant on Broadway](#) 1504 N.E. Broadway Portland, OR [[map](#)] for appetizers and mingling gathering, at 7:00 p.m. on June 20th, 2011. The location is just a few blocks walk from the FPS Convention site.

Barry Goodell

SPOTLIGHT ON UNDERGRADUATE RESEARCH

High Performance Microscopic Fibers from Paper and Biofuel Wastes

When wood is converted into paper or biofuels, up to a third of the biomass (i.e. lignin) is incinerated for fuel. There has been great effort to transform this material into useful chemicals and materials to enhance the economic sustainability of the developing biofuels industry. Two undergraduate researchers, Cole Burch (Sophomore, Wood Science and Forest Products) and Kyle Mirabile (Senior, Wood Science and Forest Products), are working in the lab of faculty member Scott Renneckar to convert isolated lignin into spider-web like filaments of fiber. The resulting sheet forms a non-woven tissue-like material that contains micro and sub-microscale fibers. The fibers can be carbonized making them well-suited for catalysis supports and energy storage devices. Kyle describes the fiber spinning process as relatively simple, “We use isolated lignins and mix these compounds with an array of solvents. We then load a syringe with a lignin solution and connect it to a high voltage device that helps to create and transfer a filament to the collector.” Dr. Renneckar enjoys the opportunity to facilitate undergraduate research, stating “Both Kyle and Cole were top-performers in my Wood Materials Science course this past spring. I was able to cherry-pick them to work in my lab this summer. With their energy and enthusiasm, they already have had success in electrospinning lignin.” Cole, a veteran of the Cheatham Hall labs indicates, “Summer undergraduate research has been very beneficial in helping me make decisions concerning graduate school and future career opportunities by allowing me to gain hands-on experience, in more detail than a class setting, of what a career in a particular field might involve.” The summer project is an important cornerstone in Dr. Renneckar’s research program to create membrane style reactors



Cole preparing lignin solution for electrospinning.

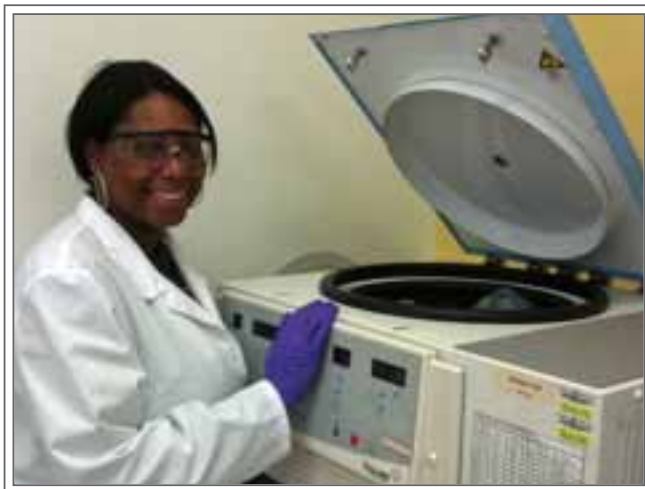


Kyle attaching high voltage supplier for electrospinning process.

More on Undergraduate Student Research in Wood Science and Forest Products...

Participation of undergraduate students in academic research greatly enriches their education and learning experience. Every year, the Department hosts several undergraduate researchers in its labs. Two of the students who will be spending their 2011 summer break in the lab are Destinii Smith and Chris Houser. Destinii, a rising sophomore and biology major at Shaw University, will work on the development of gold coated cellulose nanocrystals for biodistribution studies by micro computed tomography. Chris Houser, a rising junior and chemistry major at Bloomsburg University of Pennsylvania, will investigate methods for the surface deacetylation of chitin nanocrystals. They will both

be supervised by Associate Professor Maren Roman. In Professor Kevin Edgar's lab, Jennifer Carter is a rising senior biology major at St. Paul's college, and will be studying the use of polysaccharide blends in amorphous matrix drug delivery. Ben Cherniawski is a rising senior chemistry major at Virginia Tech, who will be synthesizing novel polysaccharide derivatives for enhancing the oral bioavailability of poorly soluble drug candidates. The funding for their summer research projects comes from the National Science Foundation.



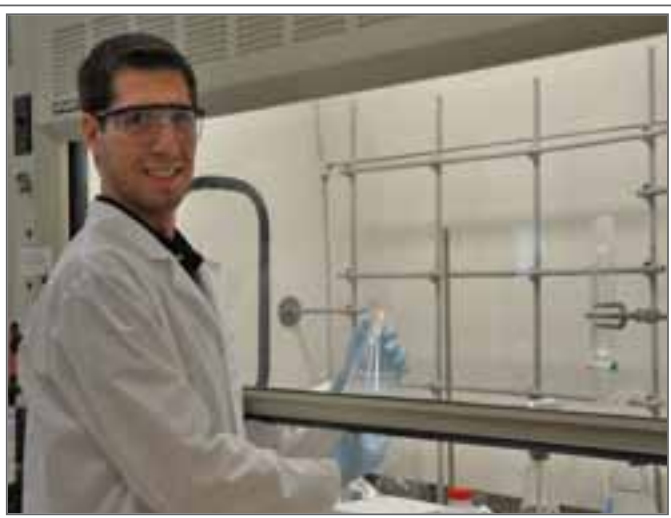
Destinii Smith centrifuges her cellulose nanocrystals.



Chris Houser dries his purified chitin samples.



Jennifer Carter analyzes drug-polymer complexes.



Ben Cherniawski synthesizes novel polysaccharides for drug delivery.

Class of 2011

Graduation Ceremonies were held on May 14th this year, with a tree planting and a reception for the students in addition to the awarding of the diplomas. Congratulations to our Wood Science and Forest Products 2011 graduates!

Pictured from left to right, front: Chris Rider, Kevin Roberts, Matt Mohr; back: Kyle Lawson, Will Rand, Sean Crawford, Scott McDonald, Justin Morris, Anthony Muscatello, Courtney Kepley. Not pictured: Ben Amoss, double major in Wood Science and Engineering



Also graduating this semester with their Masters of Science degrees are: Scott Lyon, Leslie Sanchez, Chao Wang and Lance Shields

2011 Wood Science and Forest Products graduate Anthony Muscatello with a bit of cellulose chemistry on his cap!



The First Apple iPad Aided Course in the College of Natural Resources and Environment

By Laszlo Horvath

The February edition of The Chronicles of Higher Education presented an article titled “Actually Going to Class, for a Specific Course? How 20th-Century.” The article elaborated on the idea of how new learning technologies prompt the rethinking of the traditional course structure. Gardner Campbell, Director of Professional Development and Innovative Initiatives at Virginia Tech indicated that the new digital technologies combined with modern teaching methodology could enrich the classroom experience for students.



Apple® iPad 2 for education (www.apple.com) Copyright © 2011 Apple Inc. All rights reserved.

The Department of Wood Science and Forest Product in collaboration with the Office of Learning Technologies will be among the pioneer programs utilizing modern digital technologies to enhance the classroom experience for the new generation of students by starting the first Apple® iPad-Aided Course in the Fall of 2011. Packaging Dynamics for Distribution (WOOD 4042) was selected as the pilot program. Dr. Laszlo Horvath, instructor of the course will work closely with Jennifer Sparrow (Director of Emerging Technologies), Gardner Campbell, and the digital innovation team to develop innovative course content that meets the requirements of the students of the 21st Century. Participants in the course will have the opportunity to check out the newest Apple® iPad 2 for the whole semester.

Utilizing iPad 2's during the course will eliminate the continuous distraction by the social media and provide full digital freedom for the students in the classroom by giving them the ability to search, collaborate, and work online. There are a great number of applications which encourage online teamwork and collaboration which let students share files with each other. The course will also utilize various note taking programs to encourage students for digital note taking and online sharing. The portability of the iPad 2 will give students the freedom to move outside and work on class projects or just prepare for the next course. Online evaluations will be a vital part of the education. Students will take random online quizzes in the classroom and outside of the classroom which will provide immediate feedback on their understanding of the topic to the instructor.

Second Annual Graduate Research Symposium

By Laszlo Horvath

Following the tradition started by Dr. Maren Roman in 2010, the Department of Wood Science and Forest Product organized the second Graduate Research Symposium on April 29, 2011 in the Fralin Auditorium. Outstanding presentations were made by eight graduate students and a postdoc covering topics from Lean accounting, continuous improvement factors, U.S. wood pallet supply chain, Fall Arrest System in residential construction, fracture cleavage testing in adhesively-bonded wood, lean thinking in furniture engineering process, compressive stress distributions across pallet surfaces, effect of stretch wrap patterns on containment force for unit load, degradation of wood particles and particle orientation in wood polymer composites. The wide range of topics represented well the diverse range of research conducted by the department. The students made an excellent job preparing for the presentation, advertising and organizing the event. The symposium was sponsored by the Department of Wood Science and Forest Products and the College of Natural Resources.

Pictured from left to right: (first row) Scarlett Sanchez, Adrienn Andersch, Johanna Madrigal, (second row) Chao Wang, Dr. Laszlo Horvath, and Jim Bisha.



WSFP Faculty Discuss Sustainable Biomaterials for Regenerative Medicine

In early May three WSFP faculty members were among a group of five VT professors, all members of the ICTAS Bio-based Materials Center (BBMC), who visited the Wake Forest Institute of Regenerative Medicine (WFIRM) in Winston-Salem, NC for a series of presentations and discussions about novel biomaterials for regenerative medicine. The workshop, organized in collaboration with WFIRM Director Anthony Atala, included WSFP faculty members Kevin Edgar (BBMC Director), Chip Frazier and Scott Renneckar, as well as BBMC members Alan Esker from Chemistry and Dan Dudek from Engineering Science and Mechanics. Together the Wake Forest and Virginia Tech scientists identified a wide range of projects for collaborative work that could lead to superior materials, designed and synthesized from sustainable biomaterials, that could form the basis for replacement tissues and organs.

Forest Products Club: Service Project at Brooks Center

On April 30th, students from the Forest Products Club at Virginia Tech participated in a service project to clean up the water garden area at Brooks. The garden is dedicated to the memory of J. W. Akers, a former Wood Science employee. The students rearranged the stepping stones and benches and trimmed back trees and hedges. Dan Hindman and Wendy Silverman donated perennial flowers. Please feel free to stop by and enjoy the garden!



Introducing Magnus

As part of a special study class entitled “Furniture Design and Aesthetics” this semester, Scott McDonald examined the elements of furniture and the origins of aesthetics. “Aesthetics is a difficult quality to describe,” McDonald says. “With the differences in style and available choices, I wanted to look at what different people think are good aesthetic choices.” He continues, “I’ve always seen how some people can’t stand dark wood, or how they hate round tables, or how they hate a certain table height. I wanted to investigate it, and apply it to my own designs.”

Under the guidance of Dr. Dan Hindman, Scott performed two major tasks for this special study—a survey of aesthetics and a creation of an original furniture piece for entry into the FreshWood competition sponsored by the Association of Woodworking and Furniture Suppliers (AWFS). Scott authored an online survey with several questions about aesthetic qualities of wood materials, design elements such as height, shape, modern or traditional design, and pricing. The survey received 202 respondents from a variety of ages, backgrounds, and parts of the



country. Preliminary results show that people prefer function over form, as well as darker woods, and prefer the most expensive pieces of furniture to be in their living room. The survey will be presented as a poster at the 2011 Forest Product Society's International Convention in Portland, Oregon in June.

Scott also produced an original piece of furniture using a very original concept—magnets. Dubbed “Magnus,” the elliptical coffee table can be rotated to form a rosette shape. The magnets are embedded under the laminate surface and allow the tops to ‘click’ into preset positions. Design advice was gratefully provided by David Kenealy of the South Boston Higher Education Center, who had used magnets in a furniture project before to make a ready to assemble end table. Another instrumental person in the creation of the table was David Jones, shop manager of the Brooks Forest Products Center.

“Scott was able to show creativity and experienced the design process. He was able to take his concept to completion and produce a finished product. I hope this class can serve as a model for encouraging future students to participate in design.” says Dr. Hindman. Scott and Dr. Hindman wish to thank David Jones and David Kenealy for their ideas and time on this project.

Hindman Becomes Member of School of Construction

Recently, Dr. Daniel Hindman, associate professor in Wood Science and Forest Products, became a principal member of the Myers-Lawson School of Construction. Dr. Hindman is the first faculty member from the College of Natural Resources and Environment to be added to the School as a principal member. Both Dr. Hindman and Dr. Joseph Loferski have been Affiliate Members of the School of Construction since 2006 when the School was formed.

Bush and Young explore opportunities for students in the glass packaging industry

By Robert Bush

Dr. Young Teck Kim and I traveled to North Carolina on May 25th to develop opportunities for students to learn about the glass packaging industry. During the trip, we followed glass packaging from raw materials to finished product ready for sale to the consumer. We first visited Owens-Brockway Container, Inc. in Lexington, North Carolina and toured the glass bottle manufacturing facilities. The plant produces glass from a combination of raw materials and recovered post-consumer glass (cullet) and forms it into bottles for beer and spirits. Many of these bottles are shipped to MillerCoors in Eden, North Carolina—the next stop for the day.

According to the [MillerCoors website](#), “The Eden facility was the first brewery to produce Miller Genuine Draft, back in 1986. Today, it’s a state-of-the-art operation with more than 600 employees and a production capacity of 9 million barrels of great beer annually.” Nine million barrels is some 387 million US gallons – a lot of beer by any standard. In addition to learning about the use of the primary packaging (glass bottles) we observed their use of secondary and tertiary packaging, automated and robotic packaging machines, and state-of-the-art distribution systems.

We met with Mr. Lloyd Taylor (Plant Manager) and Mr. Wayne Brinkley (Area Packaging Quality Engineer) at Owens-Brockway Glass Container, Inc. At MillerCoors, we spoke with Mr. Dave Fistner (Senior Quality Assurance Engineer) and others. In both cases we explored opportunities for future student field trips to the facilities and internships for packaging students. The reception we received and enthusiasm for the growing VT packaging program was exceptional. We plan to pursue both field trip and internship opportunities during fall semester.

Our thanks to Mr. Rick Bayer of the Glass Packaging Institute for making the trip arrangements and for introducing us to his colleagues at Owens-Brockway and MillerCoors. Without Mr. Bayer’s assistance the visits may not have been possible.

Hindman Recognized As Outstanding Teaching Faculty

During the 2011 College of Natural Resources and Environment Banquet, Dr. Daniel Hindman received the Curriculum Club Award from the Department of Wood Science. Dr. Hindman is an associate professor in Wood Science and Forest Products after joining the department in 2003. Currently, Dr. Hindman teaches the Wood Mechanics, Green

Building Systems courses and co-teaches Design of Wood Structures with Dr. Loferski. The students particularly enjoyed the bridge project in Wood Mechanics, as well as numerous field trips to construction sites and the Catawba Sustainability Center. “I am very honored to receive this. I try to have fun and pass on practical knowledge in every class I teach.”

Virginia Tech and Purdue University Partnership Delivered a Workshop in Supply Chain Management

Drs. Earl Kline, Omar Espinoza, and Henry Quesada from the Department of Wood Science and Forest Products at Virginia Tech teamed up with Dr. Eva Haviarova from the Department of Forestry at Purdue University to teach the workshop “Supply Chain Management: Challenges and Opportunities”. The event was held at the Vincennes University in Jasper, IN. A total of 24 participants attended the workshop, mostly from the local furniture industry. The workshop was a good change for participants to learn about current trends in Supply Chain Management (SCM), applications of Lean Thinking in SCM, and SCM performance based management. Also Don Dugan from General Electric (GE) participated as a speaker by introducing and providing examples and applications of how third party logistics (3PL) works. The workshop ended up with the participation of Dr. Haviarova who delivered an updated on the platform “Indiana Forest Products Web Community”. Feedback from participants indicated that the workshop met and exceeded expectations in terms the depth and amount of information provided, and the quality of the speakers and the facilities.

The workshop was sponsored by the Department of Wood Science and Forest Products at Virginia Tech, the Manufacturing Extension Partnership at Purdue University, the Dubois County Area Development Corporation (DCADC), Virginia Cooperative Extension (VCE), and Vincennes University.

For more information on similar training opportunities, please contact Dr. Henry Quesada at quesada@vt.edu

2011 Solar Lumber Drying Course a Success!

By Brian Bond

This year’s Drying Lumber with a Solar Kiln course drew a national audience of hobby woodworkers and small business owners. Participants came from as far away at Michigan and Connecticut to learn about how to build and operate the solar kiln designed at Virginia Tech



Left image: Front view of the Virginia Tech solar kiln. Right image: Rear view, small load of oak with plastic baffle up.

for drying lumber. Participants indicated not only a significant improvement of how solar drying of lumber works but also an improvement of their basic understanding of wood properties. One participant wrote that “This was an excellent course. I believe woodworkers who have no particular interest in building a kiln would also benefit from this course. Besides learning to build the kiln, I gained useful knowledge about principles of drying, the reasons for warping, checking, staining, etc.” While the concept of drying wood using only solar energy appeals to many attending the workshop, the greatest interest is in learning how to dry wood to a moisture content required for interior woodwork with minimal expertise and cost.

The Department of Wood Science at Virginia Tech has a long history of involvement in the design and operation of solar kilns both nationally and internationally. There have been two publications on this work, [Design and Operation of a Solar-Heated Dry Kiln, Extension Publication 420-030](#) and [Design and Operation of a Solar-Heated Dry Kiln for Tropical Latitudes, USDA Southern Research Station General Technical Report SRS-134](#). Dr. Brian Bond also maintains information on the VT solar kiln on the departments website: http://woodscience.vt.edu/about/extension/vtsolar_kiln/

Renneckar Travels to Oak Ridge for the Core University Bioenergy Workshop



Oak Ridge National Laboratory

On May 11th, Scott Renneckar travelled with a delegation from Virginia Tech to participate in the Oak Ridge National Laboratory “Core University Bioenergy Workshop”. Along with Dr. Renneckar, John Fike (CSES), Ryan Senger (BSE), Bingyu Zhao (HORT), Saied Mostaghimi (Director, VAES), and Kevin Davey (OVPR) attended the workshop. Presentations from Oak Ridge National Laboratory Scientists were complemented with presentations from the participating universities. Scott Renneckar presented his work in the realm of bioenergy, along with content provided from his colleagues within the Department. The talk was titled “Defining lignocellulosic structure, assessing saccharification, and developing value-added co-products.” Dr. Charles Frazier, Dr. Maren Roman, and Dr. Barry Goodell provided content for the talk.

UPCOMING Workshops



Why Lean Safety?

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Fighting symptoms rather than solving the root cause?
Increases in injuries and illnesses?



Huge amounts of physical and chemical hazards?
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No visualization?

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