

Sustainable Biomaterials Newsletter

Greetings from Cheatham Hall,

Welcome to our first newsletter from the new Department of Sustainable Biomaterials. If you follow our newsletter, you know that over the past year the department has been working toward this change. With University governance approvals and State government approval required as well, the path to the new name was never certain until last month when final hurdles were cleared and approval was imminent. In the department we are all excited by the change, and the decision to make the name change by the faculty was unanimous. We believe that the new name better reflects the diversity of what we do, and teach, in the department now.

That is not to say that a change such as this does not come without some pain. Most of us have had a long history in the field of forest products, and we identify with the field and the industry in that area, even as the department grows and diversifies into new areas ranging from packaging for food and pharmaceuticals, to innovation-based manufacturing, to polymeric drug delivery systems. We are sensitive to the loss of the traditional nomenclature that we have used for more than 30 years and those of us that have been in the field that long feel the pangs that some of you may also experience. But we know already that the changes will be good for attracting new students into the field. We are also not abandoning the tradition areas and still have the Brooks Forest Products Center and the Center for Forest Products Business in the Department. The student Forest Products Club also continues (and with the increase in numbers of students entering the department, the club is also growing). Unfortunately, like most programs across the country our undergraduate program lacked adequate students to continue “business as usual” in the academic environment we live in today. The name change was needed for many reasons, but we believe strongly that this change is going to help build stronger industries, and both the traditional forest products industries as well as new bio-based industries will benefit as we continue to partner with them.

The public is demanding that businesses must be greener, and the products they buy must be from sustainable sources. The issue is not whether the public will pay more for these products, but whether they will continue to buy them at all when faced with competition from products from non-sustainable materials. We can address this issue head-on, by insuring that our products continue to be produced in a sustainable manner (with many **more** graduates that are well-educated with this background), and also by adopting the language that the public associates with renewable, sustainable materials. Virginia Tech is leading the way in making changes to help Society better understand the value and importance of sustainable biomaterials, including wood products. We also will continue to lead the way in the education of students with the highest level of teaching and training in the wood products area, as well as in the broad diverse area of sustainable biomaterials.

As always, please let us know your thoughts on the change and about any of the work that you see presented in this or past newsletters. Thank you for your continued support.

Sincerely,

Barry Goodell

Head, Department of Sustainable Biomaterials

Goodell@vt.edu

College of Natural Resources and Environment department renamed Sustainable Biomaterials to reflect wider scope

By Lynn Davis

The wood science and forest products department in Virginia Tech's College of Natural Resources and Environment has changed its name to the Department of Sustainable Biomaterials.

The decision was based on a desire to more accurately reflect the wide scope of education and research being done by the department and aligns with the college's broader transition in recent years toward an increased emphasis on sustainability and the environment. The State Council of Higher Education for Virginia approved the name change on Feb. 1.

The department, established in 1979 as an offshoot of the university's strong forestry program, has become a recognized North American leader in student education, research, and outreach. In recent years, faculty expertise has diversified to include education and research activities in nanomaterials, drug delivery, adhesion science, advanced composites, nontimber forest products, biofuels, aseptic packaging, and sustainable biomaterials.

"Sustainable biomaterials is a term that recognizes our broadening path for the future while maintaining our roots in natural materials, including forest products," said Department Head Barry Goodell.

"The forest industries of Virginia remain a \$25-billion contributor to the state's economy, and we will continue to serve this important sector," Goodell continued. "The new department name is broad enough to encompass newer aspects of the field, such as biofuels and renewable materials. We will continue to work with wood, the most widely used biomaterial, but we are expanding our focus to include other natural materials as well."

Paul Winistorfer, dean of the college and former head of the department, said, "We are working to put science behind the theme of sustainability, and the increased use of natural renewable materials must be a key part of our global sustainability commitment."

"The Department of Sustainable Biomaterials will have the opportunity to shift the materials-use paradigm among academics, the industry, and the public at large," Winistorfer said. "We are leveraging our traditional strengths to a larger, societal perspective."

Programs at other universities, such as North Carolina State University, Oregon State University, and the University of Minnesota, have changed their names to contain such terms as biomaterials, bioproducts, and renewable materials. These terms have also been adopted by leading international research programs, including Kyoto University's Division of Forest and Biomaterials Science in Japan, the Max Plank Institute of Colloids and Interfaces' Department of Biomaterials in Germany, and the Centre for Biocomposites and Biomaterials Processing in Canada.

"We are excited about the opportunity to continue serving the needs of our core industrial partners and society at large while reflecting our expanding research options," Goodell said. "In particular, we know that the term sustainable biomaterials positively reflects the activities of the department to our students and prospective students, which is helping to increase educational interest in this field."

For many years department faculty members have been conducting research that doesn't fit easily under the banner of wood science and forest products. For example, Professor Kevin Edgar's research using polysaccharides from natural sources for improved delivery of anticancer compounds crosses disciplinary boundaries, as does Associate Professor Scott Rennecker's nanocellulose research focusing on converting biobased feedstocks into materials and composites.

Associate Professor Maren Roman's research targets cellulose drug delivery and nanoscale materials for bone repair scaffolds. Goodell himself has conducted research on the bioconversion of wood/cellulosic materials for biofuels, as well as on the development of nanoporous carbon and carbon nanotubes for energy storage applications.

All faculty in the department are contributing their expertise to expand and redefine the realm of teaching, research, and outreach activities, such as innovation-based manufacturing, lean business, sustainable building technologies, and packaging systems and design. The new department name encompasses the faculty expertise in a more accurate and forward-looking way and will help define new opportunities for students.

"Our undergraduate enrollment has almost doubled in the year since we began using the term sustainable biomaterials on our website and in our recruiting materials," Goodell said. "This is due to the efforts of our faculty and students in advancing the program in the new directions the name represents. We have several exciting degree programs under development that will continue to broaden the career opportunities for our students."

Recent analyses indicate the strength of this employment sector. An analysis published by Wired Magazine of 7 million LinkedIn users who switched industries in the past five years showed the strongest gains in the renewables and the environment category — almost double the growth of any other field. An IBISWorld report forecasts that the sustainable building material manufacturing industry will post the fastest growth in wages over the next five years.

"From the many employer requests we receive for our graduates, we anticipate strong demand from businesses in many different economic sectors," said Goodell. "In 2011, all of the department's graduates landed career-level positions."

STUDENT FACES IN THE DEPARTMENT

Below are two student members of our department that represent a bit of the spectra of student interest that we have represented by the field of Sustainable Biomaterials.

Zach Cogan is a senior in the Packaging Systems and Design option this year. Zach did an internship with Printpack Inc. over the winter break and had a very good experience with them. So good in fact, that Printpack put him through a 9-hour interview process, and in the end offered him a position as a Product Development Engineer. Zach says: “I was commended for my degree choice regarding this position because of the cookie cutter backgrounds of traditional chemical/material engineers that work in product development for packaging. They like the versatility of the degree and the fact I managed to cross-discipline in food science. I’ll keep you updated on my results, but everyone was eager to interview me and praised my work ethic and behavior.”



Christa Weaver is a new freshman in the Department having transferred majors from Biochemistry after her first semester. She is interested in the Biomaterials and Bioenergy area, and is currently in the Wood Materials Science option until that degree, working its way through University Government committees, becomes available at Tech in the department. Christa grew up outside of Richmond, VA and already knows what she will be doing this coming summer. She has accepted an offer from Dr. Chip Frazier to work in a National Science Foundation “Research Experience for Undergraduates” (REU) program on a project for the Wood-Based Composites Center. Christa sees this as a great opportunity and she is already enthused about her experience in the department. To prospective undergrad students she says: “I would recommend the department of Sustainable Biomaterials to any incoming student. Try it out and see — I have the feeling that you are going to love it, just like I have and everyone else that I have talked to. I feel like students will enjoy the small class sizes and just getting to know the people. You get a feeling of accomplishment and of helping the environment and helping the world that you live in.”

International Corrugated Packaging Foundation Conference

By Bob Bush

The *International Corrugated Packaging Foundation* has selected two outstanding VT packaging students, **Nick D'Amico** and **Tyler Matusevich**, to attend the Annual ICPF conference at Michigan State University and to have dinner with a group of industry leaders — all paid for by ICPF. A portion of the conference will be video broadcast to packaging programs around the country — including the VT program (Wednesday, February 22 at 2:00-4:00 in 315 JCH).

Electrically conductive nanocellulose materials

By Scott Rennekar



Peter Nixon, an undergraduate student in the Wood Materials Science option, is conducting research in Dr. Rennekar's lab this spring semester on the formation and properties of nanocellulose-graphite composite materials. Nanocellulose is a new form of cellulose that has a diameter of a millionth of a millimeter. An emerging material in the forest products industry, nanocellulose is amongst the cutting edge of new materials from our forests. Nanocellulose has already shown the ability to form high strength fibers and transparent nanopaper; Peter will be attempting to make these materials electroactive by the dispersion of conductive carbon materials. In so doing, Peter will be making textile-like fibers that have the feel of cotton, but could serve as lightweight wearable electronics.

Peter inspects a semi-transparent suspension of graphite and nanocellulose prior to film casting.

White & Co. Donates Best Load® Software to Packaging Program at Virginia Tech

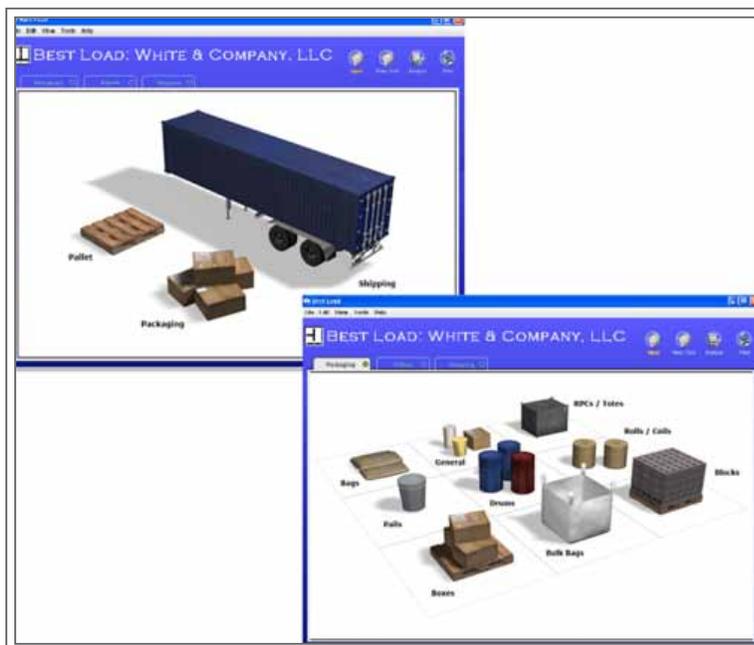
By Laszlo Horvath

Packaging science students at Virginia Tech have a competitive advantage as they approach a tight labor market, thanks to a major in-kind software donation from [White & Company](#).

“We are pleased to offer Virginia Tech packaging science students Best Load®, our packaging optimization software, as it will help to prepare the future leaders in the packaging design, logistics, and manufacturing industries for the opportunities ahead with best-in-class technology,” said Dr. Marshall White, president of the company and Professor Emeritus at Virginia Tech.

The students received the latest version of Best Load®, which leverages packaging data more effectively and allows users to design a pallet, package and unit load. Students can then use Best Load® to manipulate the component designs for optimal performance of the unit load while minimizing raw material used in the design of the package and pallet.

Using the software to predict the compression strength, weight, and optimum dimensions of the distribution packaging to pallets, students can also effectively resolve real-world warehouse safety and product damage issues experienced in the supply chain while developing a strong understanding of how the unit load components



interact. Working with Best Load® also allows students to focus on managing packaging mass, volume, and cost data for sustainability goals during the packaging design process.

“So much of the science used to calculate the interactions managed by Best Load® are not available in any software program. Students would spend whole semesters in the packaging lab to experience what Best Load® generates in just seconds. It’s truly revolutionary and I’m thrilled to be able to expose the students to these concepts at such an advanced level. VT packaging students will have the knowledge and experience to correct product damage and warehouse safety issues before they ever experience them in the workplace,” says White.

Faculty member Dr. Young Teck Kim believes the gift will give students an edge in their future careers. “Best Load® is professional, industry-level software, delivering results sought after by most all Fortune 500 companies. Job interviewers will be impressed with our students’ ability to use professional-grade analytical tools to resolve complex logistics issues,” Dr. Kim said.

I feel that such gifts greatly enhance the opportunities for students – both today and in the future. We are constantly seeking to provide state-of-the-art technology solutions in classrooms and labs, and such tools also help us to recruit future students and can even help positively affect our rankings. The software will be incorporated into our continuing education and professional outreach course offerings to packaging and logistics professionals.

Based in the Department of Sustainable Biomaterials, the [Center for Unit Load Design](#) tests and develops technologies to optimize material handling efficiency, and focuses on packaging, palletization, material handling and unit load design.

Glasser Receives Guest Professorship at University of Freiburg, Germany.

The *Deutsche Forschungsgemeinschaft* (equivalent to the National Science Foundation in the US) has awarded Wolfgang G. Glasser, Professor Emeritus of Wood Science at Virginia Tech, a **Mercator Guest Professorship** at the University of Freiburg, Germany. Glasser is to assist Professor Marie-Pierre Laborie (PhD-Wood Science, Virginia Tech), Professor at the Institute of Forest Utilization and Work Science of the University of Freiburg, with teaching and research assignments. The University of Freiburg is offering two undergraduate (semester)-courses in *Renewable Resources – Biopolymers and Biocomposites* (in the German language) and is currently introducing an MS-degree in *Umweltnaturwissenschaft* (Environmental Science). Glasser has been active in this field at Virginia Tech from 1972-2006. He taught Wood Chemistry and related courses on the undergraduate and graduate-level; he introduced a 6000-level graduate course in Biopolymers and Biocomposites in 1984; and he directed the first Biobased Materials Center (funded by the Center of Innovative Technology of Virginia) at VT from 1985-1992. Glasser is the recipient of the George Olmsted Award of the American Paper Institute (1974); the Scientific Achievement Award of IUFRO (1986); and the Anselme Payen Award of the Cellulose and Renewable Materials Division of the American Chemical Society (2000). Glasser currently (and since 2000) serves as Editor-in-Chief of *CELLULOSE* [Springer], which is the leading periodical in the field of industrial polysaccharides, including pulp and paper and textiles (with an impact factor of 2.83).

Glasser plans to begin the Guest Professorship in the summer semester 2012, which starts in April. He is currently deeply involved in acquiring the necessary language skills.

Daiqiang Xu Awarded CELL Graduate Student Award

Daiqiang Xu is the recipient of the 2012 CELL division graduate student award. The award was given to Mr. Xu by Marie-Pierre Laborie, the chair of the [American Chemical Society’s CELL division](#). As the award recipient of The Graduate Student Award for Excellence in Cellulose or Renewable Materials Research Mr. Xu will receive a check for \$2,000, travel expenses to the upcoming ACS meeting during the Anselme Payen Banquet where he will present his work, and an individual plaque honoring the recipient’s accomplishment.



The Forest Products Club Spring Activities

The Forest Products Club has a lot of activities coming up for the spring semester. One of our community projects includes the design and creation of a solid wood bench made from the recently cut down Sycamore tree that was planted on the Henderson lawn during the founding years of Virginia Tech. This project is a great experience for the group by developing new woodworking techniques and learning about safe wood preservatives. Moreover the Forest Product Club has a chance to make a unique, even sentimental, sitting area for the community.

The club is also participating in the annual Big Event to help local underprivileged families rebuild and repair their homes. Faculty and students alike are welcome to join our team and participate in this great volunteer opportunity. Our club has also decided to create a library at the Brooks Center for the students in Sustainable Biomaterials and will be collecting textbooks and setting up a reading area throughout the semester. The Forest Products Club is a social organization so we have decided to conduct weekly meetings devoted to fun activities. From undergraduates to professors anyone is welcome to join any of our events. Find the Forest Products Club on Facebook or email Jeff Dolan at jadolan4@vt.edu for more information.

Packaging Science Program Receives \$882,000 Donation from Esko

By Laszlo Horvath

The faculty members of the Packaging Science program in the Department of Sustainable Biomaterials at Virginia Tech are continuously working on the academic curriculum to provide the most advanced knowledge of packaging systems to our students. One aspect of this work is the development of new packaging courses. In Fall 2011, Dr. Young Teck Kim started a Packaging Polymers and Production class where the students received state-of-the-art information on the production of plastic packaging materials, including recyclable and compostable plastics, and the plastic packaging industry in general.

Beginning with the Spring 2012 semester this January, Dr. Laszlo Horvath began to teach the Computer Aided Design in Packaging class. The class focuses on the design of packaging solutions using various computer programs and already the course has become very popular with the students. We have great classes focusing on packaging distribution but we were always lacking design related classes; therefore, this is a great opportunity for us to be able to provide relevant structural design knowledge to our students.



Binoculars packaging product design produced using the new ArtiosCAD

The class will use Siemens Unigraphics NX7 for primary package and product design, ArtiosCAD for secondary packaging design, Studio for store visualization, and CAPE to analyze the efficiency of packaging solutions in the distribution chain. The combination of software packages provides a unique opportunity for our packaging students to design packaging solutions which meets not just functional and marketing requirements, but also permits the optimization of distribution solutions.

Esco which is one of the largest packaging software developer companies in the world, recently provided significant support for development of the design class by donating 20 licenses of its brand new version of the ArtiosCAD and Studio "All-in Bundle" This donation has a total value of \$882,000. We also received several licenses from CAPE Systems for their CAPE PACK — Pallet Pattern and Packaging Design Software.

The software donation is allowing us to teach using a systems-based structural packaging design approach with our students.



Pasta sauce packaging product design produced using the new ArtiosCAD

Bush Attends Workshop to Improve Education Abroad Courses

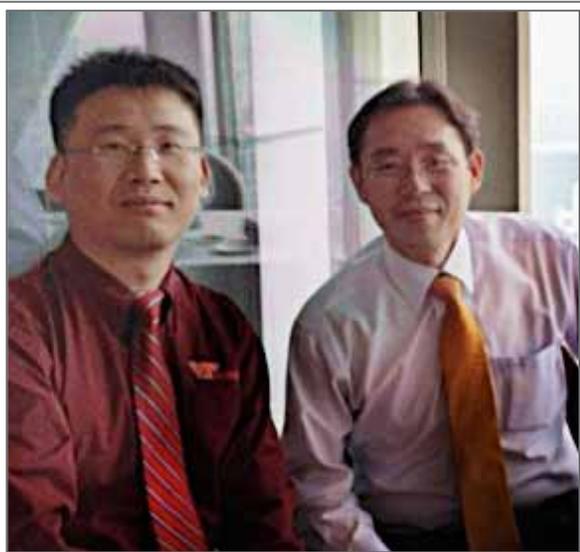
Professor Robert Bush attended the *Workshop on Intercultural Skills Enhancement (WISE)* presented by Wake Forest University on February 10th and 11th, 2012. The event offered strategies for better preparing student for cross –

cultural engagement and for assessing the impact education abroad courses have on students. Also discussed were strategies for maximizing student learning while minimizing risk. Bush plans to implement strategies learned at the workshop in the Education Abroad course he will lead, along with Dr. A. L. (Tom) Hammett, to Ireland during Spring Break 2012. His participation in the workshop was supported by the CNRE Office of the Associate Dean for Engagement and the Virginia Tech Office of International Research, Education and Development.

International Outreach within the Virginia Tech Packaging Program

By Young Teck Kim

Upon the invitation of Samsung Fine Chemicals Co., LTD (SFC) of Seoul, Korea, a subsidiary of the global company Samsung group, Dr. Young T. Kim who is a faculty member in the VT packaging program housed in the Department of Sustainable Biomaterials traveled to South Korea during 2011-2012 winter-break. He toured the facility of the R&D Center of SFC which is located in the middle of Korea, Daejeon, and made a presentation about potential collaboration opportunities in research and education. At the end of the meeting, SFC and Dr. Kim explored various directions that would be mutually beneficial for both VT-Packaging and SFC. After the meeting, Vice President, Dr. Yunil Hwang who is a director of the advanced materials research institute of SFC, confirmed SFC's participation in the 2012 Packaging Summit which will be held at Virginia Tech mid-year. Dr. Kim is currently writing a research proposal to SFC for development of a sustainable packaging system using bioplastic technology.



Dr. Kim (left) had a lunch meeting with Vice President, Dr. Cho, Jinhun who is a director of Cosmetic R&D Center at Woongjin Coway, Co. LTD of Seoul, Korea and discussed potential collaboration in research and education. Right after this meeting, Dr. Kim made a presentation at their R&D center about VT-Packaging and a new technology for biosensors in packaging using a chemiluminescence assay which was developed by Dr. Kim's research group.



Mr. Kim, KB (left) Vice-President of E. Saeng Technopack and Young T. Kim. Dr. Kim visited and toured E. Saeng Technopack, Co. and introduced the VT-Packaging Summit, which will be held at Virginia Tech in the middle of this year.

Taking advantage of this international trip, Dr. Kim also visited other global leading packaging companies (E. Saeng Technopack Co., LTD of Seoul, Korea and Woongjin Coway Co., LTD of Seoul, Korea) and a packaging academic institute (Yonsei University of Wonju, Korea) to introduce the VT-Packaging program's new era in the field, and to build up a global packaging network. At Yonsei University which is one of top-ranked universities in Korea and offers a sole 4 years packaging academic program, Dr. Kim had a chance to meet with many students who are pursuing packaging degrees and discussed both trends in packaging technology and the VT-Packaging program.

Dr. Kim returned to Blacksburg, the hometown of VT-Packaging, on January 12, 2012 with great hope for the future potential of these international collaboration opportunities.



Dr. Kim visited the headquarters building of SFC and discussed potential collaboration between VT-Packaging and SFC in research and education.

Vacuum/steam Phytosanitation Seminar at WERC: Personnel Highlights Important New Treatment System



Easily transportable Vacuum/Steam system in operation treating pallets.

Thirteen people attended a Phytosanitation seminar put on by Dr. Zhanjing Chen and Dr. Marshall White from the Department of Sustainable Biomaterials, VT Packaging Group. The seminar was held at the [Wood Education and Research Center \(WERC\)](#) on Jan. 18, 2012. Many other attendees from all over US listened to the seminar on line. The attendees came from wide range of fields that included the [USDA's Animal and Plant Health Inspection Service \(APHIS\)](#) and Forest Service, Universities, Association and private business sectors. Our VT seminar focused on global interests. Although there were many inquiries from countries about the seminar from Germany, South African, Indian, Netherland, Greece, Turkey, Mexico and Canada, the US Forest Service guidelines restricted participants to those from the USA.

Dr Zhangjing Chen, research scientist, presented the findings from his research project with Dr. Marshall White on vacuum/steam treatment of pallets and stringers. Their overall goal is to develop a

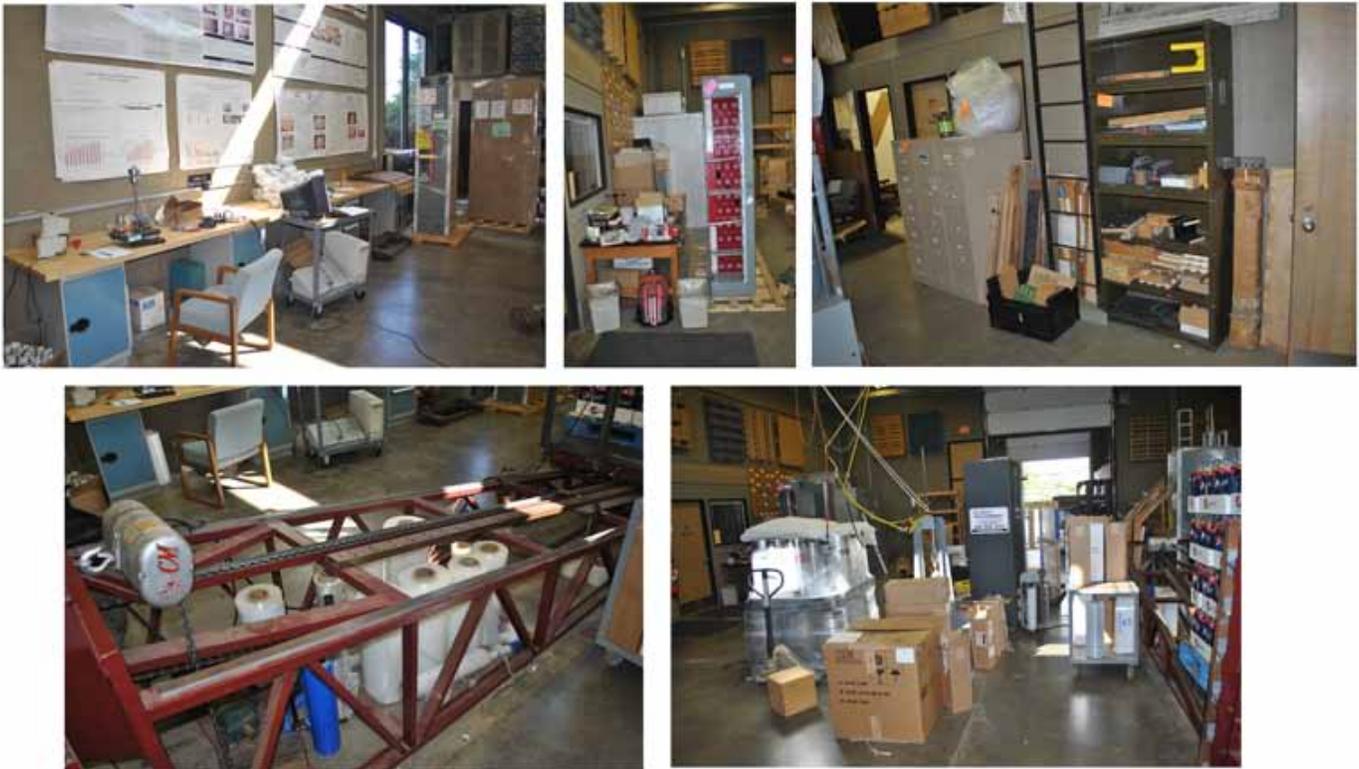
commercially viable vacuum/steam phytosanitation system that will be an alternative to methyl bromide fumigation or conventional heat kiln-drying treatments. This system will reduce treatment time, and save energy while helping the environment. Dr. Chen discussed the theoretical principles of treatment and his findings that pallets can be treated in less than one hour. This is compared to a treatment regime of three hours when using current heat kiln methods and schedules. Dr. Hennessey from APHIS encouraged the VT team to explore vacuum/steam treatment processes for export hardwood logs. Jeff Slahor from WVU who has worked on wood treatment research for many years, offered the VT Team the use of a pressure treatment cylinder for future research needs. Bob Wright, a project engineer from [Enviva](#) biomass company, said that Methyl bromide, currently a widely used fumigant in sanitation treatments, is an ozone depleting material. However, even after combustion of methyl bromide, it produces more green house gas. So alternate treatment methods are desirable. If you are interested in the vacuum steam treatment methodology, please contact Dr. Chen Zhangjing at chencho@vt.edu or 540-231-4404.

Center for Unit Load Design Begins the Lean Journey

By Laszlo Horvath

The Center for Unit Load Design has been serving the Commonwealth and United States as a whole for more than 30 years. The Center takes a systems approach in analyzing pallets, packaging, and material handling equipment to optimize material handling efficiencies through the study of the packaging materials, the material handling equipment, and the interactions of these with pallets. In recent years, the Center went through many changes related to its staffing and its leadership. Under new leadership, we are now working hard to increase the quality of the services already provided by the center and developing new services requested by the clients. Professor Mark White continues his strong support of the Center, and we are thankful for his continued insights.

As part of the process to grow and expand quality services, the Center began to adopt the philosophy of Lean manufacturing and management which originated from the Toyota Production System. The goal of Lean philosophy is to eliminate waste while provide value to the customer.



Laboratory of the Center for Unit Load Design **before** the Lean transformation.

In the past, when the center experienced high testing volume, organizational limitations resulted in clutter with associated unaccounted project delays. To tackle this problem, a Lean taskforce was assembled which contained Lean manufacturing experts from the Department of Sustainable Biomaterials (formerly the Department of Wood Science and Forest Products), Dr. Earl Kline and Dr. Henry Quesada. As one of the first steps in the transformation, the task force organized a weeklong continuous improvement event to sort out and eliminate unnecessary materials and waste, set the equipment and tools in order to speed up the production, and set up standardized equipment and laboratory maintenance procedures.

In a second step, Dr. Laszlo Horvath developed standardized test setup and reporting protocols for the most commonly used ISTA, ASTM, and ISO procedures. Currently, the Center is working on standardized training protocols to accelerate student training and to develop a safer workplace. "The safety of the students is the first priority for us." said Laszlo Horvath.

Despite past challenges, the Center is moving forward now to maintain and continue the strong reputation it is known for, and with the entire Packaging Systems and Design team in the Department backing its further, we expect to enhance our reputation as the best and most experienced pallet and unit load testing facility in the US.



Laboratory of the Center for Unit Load Design *after* the first phase of the Lean transformation is completed.

NAMED SCHOLARSHIPS - Can you help?

Are you interested in providing a Scholarship to help our students in your name? Perhaps instead you would like to honor someone else; a family member, or even an organization that you represent and provide support for a scholarship with that name? Associating your name with Virginia Tech and with our department and College helps us attract and retain quality students, and of course it also provides a tax deduction credit. Most importantly though, it helps students who would need support to attend Virginia Tech, and by donating to the department you can make the gift specific to targeted areas of interest. All scholarship donors, and the names of the scholarships, are listed on our Department and College's promotional materials and website, and all donors as well as the recipients are recognized at the College's Award's Banquet each year — to which all donors are invited.

For those that are able, please consider making a donation of \$1,000/year for a named scholarship. Named Scholarships can be renewed on a yearly basis if desired, or they can be supported as your funding permits in future years. Smaller donations are of course also welcome to support our students and go into the scholarship fund for departmental and College use.

To make a donation, please feel free to contact Mr. Bob Mollenhauer, Director of Development. Phone: (540) 231-8859; Email: bobm5@vt.edu or you can contact Dr. Barry Goodell directly via email, Goodell@vt.edu or phone, (540) 231-8853. Specific questions about how the scholarships are applied can also be directed to Dr. Goodell. We thank you kindly for your support.



Department of Sustainable Biomaterials
III. Graduate Students Symposium
March 27, 2012



Short Courses and Continuing Education



CENTER FOR
UNIT LOAD
DESIGN

FEB
2012

SHORT COURSES 2012



Taught by
Marshall S. White
Professor Emeritus and CEO of White and Company

Wood Pallet Design and Performance

April 17-18

Effect of pallet design and selection on materials handling costs; fundamentals of new and remanufactured stringer class pallet design; designing block class pallets; designing stringer class pallets using Best Load®

[Register Online Now](#)

Unit Load Design

May 15-17

Principles of unit load design; Unit load material handling audit; Packaging design; Pallet design; Material handling systems; Interactions between material handling equipment, packaging, and pallets; Diagnosing and solving material handling problems; stringer class pallet design using Best Load®; Laboratory Tour.

[Register Online Now](#)

Cost

- \$500 members of Center for Unit Load Design
- \$800 members of ISTA/MHIA/Pallet Profile Subscribers
- \$900 Non-members

Registration Deadline: April 5 (Wood Pallet Design) + May 5 (Unit Load Design)

(Late registration +\$50) Registration fee includes all course materials, CEU certificate, daily continental breakfasts, lunch, and refreshment breaks.

For more information on the short course please contact Angela Riegel at (540) 231-7107 or Laszlo Horvath at (540) 231-7673.

**EDUCATIONAL SESSION
 EXPO RICHMOND 2012**

Maintaining a Sustainable Business in Today's Market

Date

May 17, 2012

Time:

8:00 am-4:00 pm

Location:

 Expo Richmond 2012
 Richmond Raceway Complex
 Richmond VA

Registration:

Investment is \$60. Includes materials and coffee break. Please go to <http://www.cpe.vt.edu/reg/msbtm/> to get you registered. For questions please contact Mrs. Angela Riegel at ariegel@vt.edu

You can also visit the web page <http://www.cfpb.vt.edu/?p=351> for more details and updated information

Sponsors:

VIRGINIA TECH

 Brooks Center (503)
 Blacksburg, VA

 Phone: 540-231-7107
 Fax: 540 231-8868
 E-mail: ariegel@vt.edu

Program description

Today's wood products business environment is more challenging than ever before. The markets have changed, changes to business occur faster, and competition is fierce. This program will focus on how to maintain a sustainable business in today's market by providing a brief insight into future conditions, providing strategies to increase effectiveness and competitiveness, and reduce costs. This course is designed for anyone involved with the operation and management of a wood products business.

Tentative Agenda

- A glimpse of the Future
- Product Costing for Wood Products Firms
- Supply Chain Management Update
- Lean Supply Chain
- Energy Savings
- Energy Consumption in the Hardwood Industry
- Sustainability: A threat or an Opportunity?
- Buying into Sustainability


**Department of Wood
 Science and Forest Products**

Equipment “Wishlist” in the Department to Enhance the Undergraduate Student Experience

CAN YOU HELP US?

With advances in technology and limited budgets, it is often difficult for Universities to keep up and provide students with hands-on experience using the latest equipment. Often, it is not even necessary to have the very latest equipment as the “base model” can provide a good educational experience in our classes and labs.

With that in mind, the Department has put together an Equipment Wishlist to send out to our Alumni and Friends. The hope is that those of you in a position to provide either new or used equipment, or funding to purchase such equipment, might help us out in the Department. Many of these are “big ticket” items, but some are more modest. Depending on your sub-field, some of the equipment may not even have recognizable names! We thought we would try this approach though and see what it might net. Some folks in Industry may be aware of equipment that is being changed out, and the older system may be just perfect for our needs.

Please note that we have limited space in our Brooks Lab facility, so we do need to be selective. The faculty have discussed the list and developed the list based on what they think is most needed, and that will be maximally used.

Thank you for any help, and if you have ideas for other ways to help us bring in important equipment pieces to grow the educational experience for our students, please let us know. Thank you.

Equipment needs for Teaching and Student Learning in Packaging, Mechanics, and Innovation and Design activities at Virginia Tech

Vision: To create a world-class undergraduate student workspace that is recognized and respected as a leading student learning environment for creativity, innovation, and entrepreneurship.

Innovation and Design	Teaching Purpose	Short/Long Term Need
CNC Machine	Rapid prototyping, proof-of-concept testing	Short
CIM Cell (robot/PLC/conveyor/bar code/RFID)	Automation, materials management	Long
Dust collection system	Minimize/eliminate dust–sustain cleanliness	Short
Finishing/spray booth	Finish technologies and “green” finishes	Long
CAD/CAM studio (hardware & software – Pro E, SolidWorks, etc.)	Product concept, design, and modeling	Short*
3-D scanner	Rapid prototyping, product modeling	Short*
Video conferencing system	Meetings, distance teaching/learning	Short
Electric lift	Facility maintenance	Long
Flexible electrical/air service	Flexible manufacturing and work cells	Short
Saw-stop safety table saw (2)	Safety for students	Short
Mobile end-feed table	Materials management	Short

*Similar to Packaging System & Design request

Mechanics/Sustainable Structures	Teaching Purpose	Short/Long Term Need
MTS controller and data acquisition system	Current system no longer supported by MTS; WOOD 3314, WOOD 2554, WOOD 1234, other classes conducting testing	Short
12 Stereo Microscopes	WOOD 1234, special study; provide more student access to microscopes	Short
Dual Axis Force Plate (2)	WOOD 3314, WOOD 5324; physical demonstrations, biomechanics,	Short
V20 Nail Kicker by Reconnix (2)	WOOD 3324, Deconstruction; disassembly of wooden structures, preparing bioenergy sources	Short
High End (Ergonomic) Safety Harnesses (2-4, possibly different brands, quality)	WOOD 3314,WOOD 4984 (DWS), safety training; demonstrate use/quality of different safety harness	Short
Vermeer HG200 Portable Grinder	WOOD 3324, Deconstruction, Bioenergy generation source	Short
Packaging Systems & Design		
Packaging Systems & Design	Teaching Purpose	Short/Long Term Need
3D Scanner	Accelerate the primary package and product design	Short
Texture analyzer and/or MTS 250 lbs load cell	Testing various mechanical properties of packaging products and contents	Short
Rapid Prototype maker	Rapid prototyping and primary packaging design concepts	Short
Gas Permeability Tester (O₂, H₂O, CO₂)	Studying the interaction between packaging materials and products	Short
Digital printer	Package design concepts, printing and labeling studies	Short
Bench top Extruders (single/ twin screw type for casting or blown film)	Primary units for Packaging polymers and production areas	Short
Digital Micrometer	Measuring the thickness	Short
Vacuum sealer	Producing Vacuum packaging system	Short
SolidWorks CAD program	Accelerate the product design	Long

Controller for the vibration table	The current controller barely works	Long
Hot seal maker	Study of sealing effect of packaging materials	Long
UV/Visible/Fluorescent/Chemiluminescent spectrometers	Designing smart packaging sensor for Food packaging	Long
Melt Index/Rheometer	Understanding of viscosity of plastic polymers	Long
Colorimeter	Measuring the optical transparency	Long
Bench top Injection /Blow molding machines	Understanding of rigid plastic packaging productions	Long
Newer HPLC/ GC-MASS spectrometer	Analyzing various physical properties of packaging materials and system	Long
DSC/DMA/TGA/TMA	Understanding of thermal properties of packaging materials	Long