

Sustainable Biomaterials Newsletter

It's been a beautiful Spring in Blacksburg. . .

The redbud, dogwoods, and cherries are all out, and the daffodils have all but past. It's been warm and the students have been enjoying some nice sunny weather interspersed with some light showers and the occasional thunderstorm moving through the mountains. But the students have also been working hard and doing some amazing things both in and outside of classes.

In this issue of the Sustainable Biomaterials Newsletter you will learn more about some of our great students, and what they think of the department and their educational options. Our enrollments continue to increase due to the dedicated work of the faculty, and our students, in getting out the word about the value of the degree and the diversity of what we do in the field. You can see and hear even more about what our students have to say in video clips at: www.youtube.com/SustainableBiomtrls

Look inside this issue of the newsletter and you will also see more about the Wood Based Composite Center, some of our faculty-lead Spring break "Study Abroad" opportunities in Ireland and Costa Rica for our students, a student Jamboree for our Packaging Systems and Design students (where our students took First Place in one of the events), a great showing by the Department at the national meetings of the American Chemical Society, news from our Alumni about distinguished honors, visiting Scientists from Guadalajara, Mexico, and news of some excellent up-coming meetings in the Unit Load and Sustainable Business areas coordinated by our Faculty.

Graduation will be coming up before we know it, and another outstanding crop of graduates move on as Alumni to make their futures in the world. We thank all of the Businesses and Industry members that have come to campus in recent months with offers of career positions and internships for our students. One of these visits from Once again, we have more jobs than we have graduates, but that just points out the value of our graduates in the working world. The Department will continue to produce the highest quality educated student in the field and we are very proud of that reputation.

As always, we look forward to hearing from you, and if you have alumni news that would be valuable to have in the newsletter, we always welcome contributions. Thank you.

Sincerely,

Barry Goodell

Head, Department of Sustainable Biomaterials

Goodell@vt.edu

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.

Peter N. is a sophomore in the Biomaterials and Bioenergy area, and is currently in the Wood Materials Science option. “I can’t imagine any other department at Tech where everyone is as passionate about what they do. The level of dedication and enthusiasm of every student and professor here is something I never experienced before the Department of Sustainable Biomaterials. I’ve gotten a chance to work on a project with one of the Professors, and already I am doing ‘cutting-edge’ science. I love it!” exclaims Peter.



Paige M. is a sophomore in the Department. She is interested in the Residential Wood Structures. “I was originally interested in Architecture, but found out it was more ‘artsy’ than what I was looking for. I was always in love with the structural aspects of building rather than the art side. A lot of the classes that I take deal with the structural aspects of buildings.... Also, being in such a big school like Virginia Tech it can feel overwhelming sometimes, but you go out to the Brooks Center and... It feels like you’re in a different place...it’s really nice to be in a department that is so helpful.”



Watch Now ▶

See more of Paige and other students talk about their experiences in the department of Sustainable Biomaterials on YouTube.

Wood-Based Composites Center Supports Continuous Improvement Efforts

Published in PanelWorld, March 2012

Do you know what's going on inside your blending equipment at this very moment? Is it operating at peak performance? If not, do you know how to make it better? Of course, if it were easy to optimize your blending process, you would have done so already. Whether you apply adhesives using a blender, blow-line or roll-coater, optimization remains a mystery to most, and without dedicated effort and resources, plant technical folks must continue to do the best they can to optimize their resin application process.

Members of the Wood-Based Composites Center (WBC) have a different take on improving the manufacture and performance of composite wood products. They believe that sustainable, long-term improvement is rooted in fundamental research and effective networking. The National Science Foundation (NSF) agrees, and recently awarded the WBC the funds to establish an NSF Industry/University Cooperative Research Center (I/UCRC). Under the NSF model, the WBC has placed its industry members firmly at the center of industry advancement.

The WBC conducts industry-driven research, and it provides an exclusive technical forum for networking with competitors, customers and universities. Members are involved in developing research agendas; they make funding decisions, and they guide research projects that provide a path toward continuous improvement. And they do this at significantly reduced university overhead rates. Currently there are eight WBC-funded research projects under way at the Center's four partner universities—Oregon State, Virginia Tech, the University of Maine and the University of British Columbia. Topics range from understanding resin blending and resin distribution, to the micromechanics of bond performance, to documenting native formaldehyde emissions from wood, and how native emissions naturally vary.



Jesse Paris, Ph.D. candidate and WBC student at Oregon State University (Dept. of Wood Science and Engineering)



Sara Knowles, Ph.D. candidate and WBC student at the University of Maine (Chemistry Department)

At Virginia Tech, WBC Director and Professor Charles Frazier and Ph.D. candidate Xing Yang are studying the impact of filler particle size on adhesive penetration and performance in veneer bonding. They evaluate adhesion using fracture testing and they determine adhesive penetration using fluorescence microscopy. By combining these techniques they hope to provide new insights into the performance of plywood and laminated veneer lumber.

Across the continent, at the University of British Columbia in Vancouver, Professor Greg Smith and his team are working to help OSB producers optimize resin distribution and efficiency in the rotary drum blender. They are developing computer simulations of the blending process and studying the impact of various blender characteristics on blending performance. WBC Managing Director Linda Caudill comments, "The student working on this project, Ingrid Tsai, tells me that her regular interaction with WBC members has been invaluable to her, and to the success of

her project. I hear the same thing from our members; that they benefit greatly by working directly with our students. The system seems a win-win for everyone.”

No one can afford to ignore the recent and pending changes in formaldehyde emission regulations in the United States. But as emission limits are reduced, how are we going to account for the formaldehyde that naturally emits from wood, and how this native emission varies by species and processing history? WBC research at the University of Maine is looking at these issues, with a goal of first understanding how much native formaldehyde exists in wood, and how it is formed. Chemistry Professor Barbara Cole and Ph.D. candidate Sara Knowles continue to work on this topic with regular and direct input from center members.

How long will it be before the structural composites sector comes under a similar level of scrutiny as the non-structural industry? WBC members believe it is necessary to be prepared with solid scientific data and techniques to prepare for what lies ahead for formaldehyde emissions regulation. The NSF supports this approach, recently awarding Dr. Frazier a supplemental grant to complement the work already being conducted at Maine. “This is an intensive effort that we believe is critical to the long-term success of the industry,” Frazier says.

Consider the fact that every time you make a change to your adhesive or raw material, you are changing the way resin is distributed on your furnish. You are changing the way it penetrates into the wood. You may even be changing the way your product performs when it’s further processed and put into service. Think about the resin changes you’ve made in just the past 10 years, then ask yourself how you are preparing for the future; how you will maintain your market share and compete in a continuously changing industry. Consider visiting with a WBC member to learn how they are benefitting from their membership, and how the research they support is, in turn, supporting improvements in their businesses

Students Visit Costa Rica to Learn About Sustainability

Students registered in the class WOOD 3954 Global Issues in Sustainability visited Costa Rica from March 4 to March 12 to learn about sustainability in a developing country. The Spring course semester, under the leadership of Drs. Henry Quesada and Joe Loferski, has a goal to learn how natural resources are used for economic development in a sustainable manner. Before the field trip, students learn the theoretical concepts that



Students listen to a Florida Ice & Farm representative during the tour of the facility.

support the concept of sustainability and the field trip experience is the opportunity to learn how theory is put into practice. This time the field trip included visits to national parks, biological research stations, community-managed ecotourism projects, small and large industries, and lectures from Costa Rica Tech’s professors on various topics.

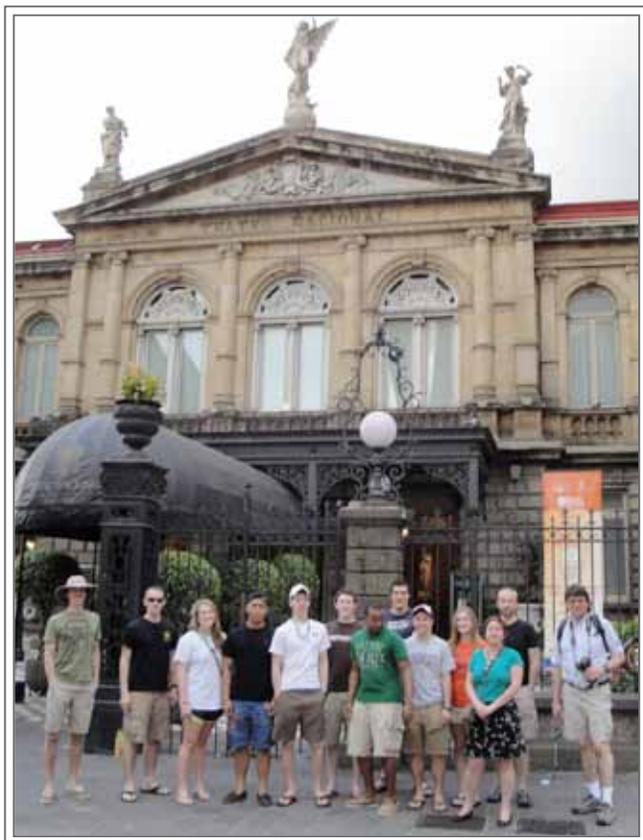
Sustainability should be a holistic approach that includes economic development, the environment, and the society. It was very rewarding for the students to learn how small and large businesses in different sectors such as hospitality, food, and wood products have embraced the so called “triple bottom line”. Business organizations that were visited understand that they can only be sustainable in the long term if their environmental and community goals are aligned with their business strategy. For instance, the students visited Florida Ice & Farm, a \$500 million dollar beverage private-owned company.

This local business has implemented sustainable program to become water neutral, carbon neutral and to recycle or reused all of its waste. This sustainability program has triggered an innovation process where the company has developed creative ways to measure its impact, implement best cleaner production practices, and to work very close with local communities to compensate for water and energy usage. The work with communities



Panamerican Woods' farm tree manager explains the tree cloning process.

and suppliers involves the transfer of cleaner production practices and education related to sustainability and it is critical to secure its supply of raw materials, educate the new generations, and to promote the company's sustainability efforts.



Students posing in front of the National Theater of Costa Rica.

Another example was Panamerican Woods, a vertically integrated wood products company located in the Northwest region of Costa Rica. Students learned during their visit on how tree farms are managed and how plantation trees are logged, processed, and marketed. Interesting for the students was to learn about the concept of vertical integration, meaning that the company manage and control the whole supply chain of operations from tree cloning to wood products commercialization. This company has been very successful in developing innovative techniques to decrease growing times, increase the quality of trees, increase raw material utilization, and develop engineering products that are mostly exported to Europe and United States. The company also works very close with the community and suppliers in order to educate and secure its supply of raw materials and promote their sustainability efforts.

Field trip and study abroad experiences are critical activities when learning about sustainability. An articulated learning process includes description of experiences, analysis and reflection on learned issues, and ultimately an engagement process where the students will put into practice what they have learned. This course is important for all students in the College of Natural Resources and Environment (CNRE) that are looking to understand theory and practice of sustainability and how they can use their learned experiences to engage in sustainability projects.



VT students get ready for zip lining, a thrilling experience to learn how to integrate the forest with economic activities such as ecotourism.

SBIO Students and Faculty Members Spend Spring Break Learning in Ireland

“Spend your spring break in a place where it is cold and rainy” was the call answered by 12 Virginia Tech students and two students from the Southern Virginia Higher Education Center (SVHEC) in March 2012. Virginia Tech faculty members Robert Bush and Tom Hammett lead the trip and were accompanied by CNRE Associate Dean Robert Smith and SVHEC faculty leader Clint Johnson. The nine days in Ireland were part of a course, *Culture, Natural Resources and Design in Ireland*, which sought to help students learn by experiencing how the three elements are interconnected.

Students in the course learned about Ireland during pre-trip videoconference meetings and were paired with *Galway-Mayo Institute of Technology-Letterfrack* (GMIT) students to complete a *design-build-market* project using wood as the primary material. Pairings and projects increased the level of cross-cultural engagement among the students. GMIT is a VT partner university and offers the premiere wood design and manufacturing program in Ireland.

The trip coincided with National Tree Week in Ireland the students participated in events throughout the week. Highlights included the Irish opening of *Taking Root: The Vision of Wangari Maathai* — a film about the Nobel peace prize recipient and founder of the Green Belt Movement in Kenya; a lecture and demonstration of fine woodworking; activities for primary school children; and tree planting on the GMIT-Letterfrack campus. Virginia Tech students presented the GMIT students with a plaque they made in commemoration of the visit and the ongoing partnership. Also presented, as a letter from CNRE Dean Paul Winistorfer and a plaque from the Virginia Department of Forestry which recognized National Tree Week and the three-way collaboration of GMIT, SVHEC and Virginia Tech.



Culture, Natural Resources and Design in Ireland: 2012 students and faculty members at the “Spanish Arch” (part of the old city wall dating to 1584) during a walking tour of Galway lead by GMIT faculty member Dr. Patrick Tobin (photo by P. Tobin)



In addition to the design-build-market projects and Tree Week activities, the group visited the museums, hiked in Connemara National Park, visited the Cliffs of Moher and the Sky Road, explored the town of Ennis, enjoyed a walking historical tour of Galway City, and visited the Kylemore Abby estate.

Local countryside guide Inez Streefkerk discusses ancient “bog oak” with VT students (left to right) Lori Koch, De’Ashley Spain and Rosemary Masser during a mountain and bog hike in the Connemara National Park. (photo by R. Bush)

Traveling to the 2012 ICPF Teleconference

By Nick D’Amico, Tyler Matusevich and Packaging faculty

Two packaging students (Nick D’Amico and Tyler Matusevich) were selected by ICPF to participate at the broadcast site in East Lansing during the 13th annual ICPF Careers in Corrugated Packaging & Display Teleconference that was held February 22, 2012. The ICPF award included the student’s participation as guest speakers in the ICPF reception party, dinner and they also attended several meetings with Teleconference industry speakers. This exceptional opportunity was offered to the VT-Packaging program in the Department by the ICPF because of the long-term close relationship between the department of sustainable biomaterials (SBIO) and ICPF. Previously, ICPF donated several pieces of equipment to the VT-Packaging program housed in the SBIO. That equipment includes a CAD table for corrugated board and other analytical testing tools. The following letters written by these students demonstrates what they learned from this trip:

Letter from Nick D’Amico (Senior in Packaging, Williamsburg, VA);



Last month I took a flight to Lansing Michigan to attend a teleconference. It only sounds silly when I phrase it like that, I promise.

Tyler Matusevich and I were selected to represent Virginia Tech at the ICPF Teleconference this February. ICPF stands for the International Corrugated Packaging Federation, an organization that exists to connect students and employers in the corrugated packaging industry. This was a tremendous opportunity for the both of us.

In order to be selected, Tyler and I wrote letters to ICPF expressing how we felt the conference would benefit us. With recommendations from Dr. Young Teck Kim, we were selected to fly out to the broadcast site at Michigan State University. ICPF would cover the airfare and hotel accommodations.

On the first night, we met with representatives from the participating companies and students from other packaging schools around the country. ICPF provided a dinner where students could talk to the industry professionals. I spoke with an HR representative who gave me interviewing tips and with a small business owner who designs end-aisle displays and movie poster stand-ups. I even talked with an MSU professor about our program. I may have collected enough business cards to fill one of my old Pokémon binders. After the dinner we went downtown to network with the other packaging students.

The next day we had breakfast with ICPF and toured the MSU facilities. I was happy to see so many familiar pieces of equipment. Although our packaging program is fairly new, we have access to a lot of the same resources that the MSU students are using.

The conference was very informative, though the students who watched it from Virginia Tech can vouch for that. I'd like to mention how impressive the broadcast room in Cheatham Hall looked on the big screen at MSU. Our school was well represented.

The biggest part was not so much the conference itself, but the networking opportunities provided by attending in person. Richard Flaherty, president of ICPF, took us to dinner where we discussed our careers. He suggested that we create accounts on ICPF's career portal, careersincorrugated.com. Since the conference, Richard has informed me that he will be using my résumé as an example of what employers can find on the site. His involvement in my career search has been invaluable, as was the entire experience.

-Nick D'Amico

Letter from Tyler Matusevich (Junior in Packaging, Blacksburg, VA):



Going to the ICPF Teleconference held on Michigan State's campus was a wonderful experience. The first night I arrived in East Lansing, a group dinner was held with speakers of the teleconference. This included a lot of "big wig" industry leaders such as presidents, vice presidents, CEO's, and more of a wide spectrum of the corrugated packaging industry.

Getting to talk to these leaders about job opportunities and salaries was a fulfilling experience and it helped me decide what I want to do for a career. The next day the teleconference was held and I thought it went very well. There was a lot to be learned about the corrugated industry. I definitely recommend sending students from other packaging schools to attend the teleconference in person.

-Tyler Matusevich

IoPP Student Jamboree XVIII

By Laszlo Horvath and Young Teck Kim

The IoPP Student Jamboree is a nationwide annual event where packaging students meet, share ideas, and build lifelong connections. Every year, the jamboree is organized by a different packaging school and this year's XVIII Packaging Jamboree was organized by the Rochester Institute of Technology (RIT) located in Rochester, NY. Virginia Tech was represented by twelve students and two faculty members (Dr. Kim and Dr. Horvath). The packaging students started to organize the trip months before the event. **Nick D'Amico, Senior from Williamsburg, VA**, treasurer of IoPP Virginia Tech Chapter led the team's fundraising efforts for the Jamboree which resulted in a sponsorship from Virginia Tech and significant resources from the Department of Sustainable Biomaterials. In addition to participating on the Jamboree, the group also planned a visit to the Niagara Falls waterfall on the way to Rochester which provided a great opportunity to all the students to see one of the national treasures of the United States. After months of planning the excited group began the travel at 4am on March 29th. The long travel provided a great opportunity for the students and the faculty to get to know each other and to share common experiences. The majority of the trip was without any major excitement; although, one cross section before the Niagara Falls one the cars took the wrong turn



Students and faculty of the Packaging Science program at Virginia Tech in front of Niagara Falls.

and ended up at the US-Canadian border. After long hours of travel and an extensive discussion with the US border guards, the group arrived to Niagara Falls around 4pm where everybody had a chance to observe the majestic waterfall.

The exhausted group arrived to RIT where a social dinner provided a great opportunity for the students to build friendships with other packaging school students. There was a great turnout in this year's Jamboree. More than 120 students participated from all over the country.

Friday, April 30, 2012: The first day of the Jamboree started with presentations from major packaging companies related to the topic of the Jamboree which was Customer Connections and How to Communicate with the Customers. Heinz, HAVI Global Solutions, and L'Oreal presented examples of innovative packaging designs which were used to improve the consumer experience.



Participating students from the Packaging Science Program at Virginia Tech. attend the days presentations on consumer connections and packaging design during the XVIII loPP Packaging Student Jamboree at Rochester Institute of Technology.



The testing of the Pringles Chip Packaging Design Drop Competition.

John Marshall, Senior Packaging Technologist at Heinz emphasized the importance of the "total emersion" with the customer during the packaging design process. "This year's presentations were great. They were much more exciting than the ones last year" said **Russell Carr, Junior from Suffolk, VA**, president of loPP Virginia Tech Chapter.

Followed by numerous presentations, the awaited part of the Jamboree — the egg drop competition began at 1pm. Packaging students at RIT successfully spiced up the traditional egg drop competition by building in new elements. The most interesting changes were when they exchanged the egg with a Pringles chip. In addition to this swap, they also included several preliminary challenges where the winning team received the best materials for the competition. This year the grand prize of the competition was an Amazon Kindle given to every member of the winning team.

really close which resulted in two of the teams receiving Amazon Kindles not just the winning team. From Virginia Tech Patrick McCampbell (Sophomore, Newmarket, VA) and Michael Clifton (Junior, Gloucester, VA) are the happy owners of two of the Kindles.

The group safely arrived back to Blacksburg at 10pm on April 31st (Saturday). Students of the loPP Virginia Tech Chapter are really grateful for the sponsorship of the Department of Sustainable Biomaterials and Virginia Tech and already started to plan the visit to next year's Packaging Jamboree which will be organized by Michigan State University.

Saturday, April 31, 2012: The highlight of the second day was the final step of the Pringles Chip Packaging Design Challenge the "Big Drop". All the packaging designs were scored based on the idea and the aesthetic appearance then they protective function was evaluated by dropping them from 18 feet. The competition was



Winners of the Pringles Chip Packaging Design Competitions from Virginia Tech. **Patrick McCampbell, Sophomore, Newmarket, VA**, left and **Michael Clifton, Junior, Gloucester, VA**.

Industry Speakers Enhance Learning in *Introduction to Forest Products Marketing*

A series of speakers from several segments of the wood products industry have helped to enhance student learning in Dr. Bush's course, *Introduction to Forest Products Marketing*. Speakers have included Mr. Hal Mitchell and Mr. Dan Caldwell of Atlanta Hardwood Corporation; Mr. Lance Johnson of ISK Biocides; and Mr. James Schwille of Universal Forest Products Atlantic Division, LLC. The most recent speaker was Mr. Casey Mickelson, President of Richmond International Forest Products in Glenn Allen, Virginia.

Mr. Mickelson spoke with the students in the course about the trading business and how it differed from sales. He described the process and parameters of a trade and the need for integrity and trust in the lumber business. Later Mr. Mickelson met with CNRE Dean Paul Winistorfer and interviewed students for internship positions.



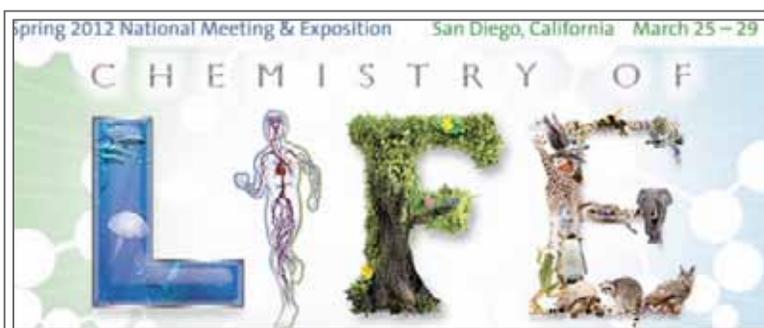
Mr. Casey Mickelson, President, Richmond International Forest Products, describes the "parameters of a trade" to students in *Introduction to Forest Products Marketing* March 2012 (photo by R. Bush)



Mr. Casey Mickelson, President, Richmond International Forest Products (center back row), *Introduction to Forest Products Marketing* students, and Instructor Robert Bush (right front row) March 2012 (photo by Yu Zhou)

SBIO at the 243rd National Meeting of the American Chemical Society

During the last week of March, the American Chemical Society held its 243rd National Meeting in San Diego, CA. The Virginia Tech Department of Sustainable Biomaterials was represented at this meeting by Prof. Scott Rennekar, Prof. Emeritus Wolfgang Glasser, Prof. Kevin Edgar and his students Haoyu Liu, Junia Pereira, Daiqiang Xu, Siddhesh Pawar, Prof. Maren Roman's postdoc Hezhong Wang and her students Shuping Dong, Chen Qian, Feng Jiang, and Christopher Houser (undergraduate), and Prof. Chip Frazier's student Sudip Chowdhury. The delegation delivered thirteen oral and two poster presentations (presenter in bold):



Oral presentations:

- CELL 2: Some reflections on the regeneration of cellulose and chitosan (**Glasser**)
- CELL 6: Cellulose morphology and surface charge effects on xyloglucan adsorption (**Qian, Roman**)
- CELL 35: Electrospun fibers of regenerated cellulose for biomedical applications: Formation, characterization, and in vitro biocompatibility of scaffolds (**Renneckar**)
- CELL 38: Synthesis of new pullulan derivatives for drug delivery (**Pereira, Edgar**)
- CELL 141: Regioselective synthesis of bioactive cellulose derivatives (**Edgar**)
- POLY 151: Derivatization strategies for the polysaccharide alginate (**Pawar, Edgar**)
- CELL 160: Effects of the non-ionic surfactant Tween 80 on the adsorption of cellulases onto lignin substrates (**Jiang, Roman**)
- CELL 170: Optimization of cellulose hydrolysis parameters for maximum nanocrystal yield: A response surface methodology study (**Dong, Roman**)
- CELL 193: Probing orientation and phase behavior of in-situ lignocelluloses using 2H NMR spectroscopy (**Chowdhury, Frazier**)
- CELL 236: Regioselective synthesis of cellulose esters (**Xu, Edgar**)
- CELL 247: Synthesis of organo-soluble alginate esters via carboxyl group modification (**Pawar, Edgar**)
- CELL 276: Gene cloning and expression of fungal chitin deacetylase for the surface deacetylation of chitin nanocrystals (**Wang, Roman**)
- CELL 288: Effects of the non-ionic surfactant Tween 80 on the enzymatic hydrolysis of model cellulose and lignocellulosic substrates (**Jiang, Roman**)

Poster presentations:

- CELL 73: Synthesis of carboxyl-containing long chain cellulose esters (**Liu, Edgar**)
- CELL 113: Enzymatic surface deacetylation of chitin nanocrystals (**Houser, Roman**)

Department Hosts Visiting Scientists from Mexico

From February 25 to March 31, the department hosted three visiting scientists from the Wood Science and Paper Research Department of the University of Guadalajara. During their stay, the three scientists, Dr. Fernando Navarro Arzate, Dr. Rogelio Ramirez Casillas, and J. Jesus Vargas Radillo, MSc., worked in Prof. Maren Roman's lab on a joint project funded by the Mexican government, titled "Preparation of high-value polysaccharides from wild species of the state of Jalisco". After a seminar by Dr. Navarro about current research efforts at the Wood Science and Paper Research Department, Profs. Goodell, Roman, Hammett, and Frazier met with the visiting scientists to talk about future joint activities of the two universities.



Navarro



Ramirez



Vargas

Department Alumni News — NSF Early Career Award: Yadama Works to Develop Better Building Materials

By Tina Hilding, College of Engineering and Architecture

Vikram Yadama, Assistant Professor and Extension Specialist in the Department of Civil and Environmental Engineering, recently received a prestigious National Science Foundation CAREER award for his work to develop unique, sustainable building materials from wood strands.

With the five-year, \$400,000 grant, Yadama and his colleagues aim to develop better sustainable building materials made from lignocellulosic fibers. In particular, they are working to expand knowledge on the design and manufacturing of wood-based composite products for use in net zero energy construction, particularly for the outer shell of buildings, which is called a building's envelope.

Buildings account for approximately 40 percent of all U.S. energy use, of which homes are 54 percent and commercial buildings use 46 percent. The U.S. government aims to increase the development of net-zero energy commercial buildings by 2015 and residential buildings by 2030, says Yadama.

A key to increasing energy efficiency in buildings is to reduce heating and cooling requirements. Maintaining a consistent and moderate temperature inside the building is determined by the properties of a building envelope. "If the interior temperature changes gradually, it is less burdensome on heating and cooling systems," he says.

Yadama's project will assess new design concepts that use panelized systems for residential construction to meet the structural and energy requirements of the building codes. In particular, Yadama is working on the development of lightweight, three-dimensional, lignocellulosic sandwich panels with complex geometries that will be more efficient than the oriented strand board or plywood that are currently used in the outer shell of buildings.

The work will include computer modeling to carefully analyze how different geometries affect energy efficiency and the material's behavior. While the materials will need to have optimal energy efficiency, they also will have to maintain the strength and stiffness needed to meet building codes, he says.

The materials will be designed and then eventually tested at WSU's natural exposure testing facility in Puyallup, assessing factors such as how moisture and temperature vary through walls exposed to the natural elements.

Yadama also will be training engineering students to work with and gain better understanding of bio-based materials, so that they will bring this familiarity with the materials into their future careers in the building industry. He also hopes that the new type of materials will provide a way to use low-value wood feedstock to make a value-added product and thereby help the forest products industry.

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.

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



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	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