

Sustainable Biomaterials Newsletter

Greetings from Virginia Tech,

Once again, summer is upon us. We sent forth a fresh crop of graduates into the world earlier this month where they have taken career positions with companies ranging from Printpack and Johnson

Controls to Rex Lumber and Triunfo Amazonia in Brazil. Congratulations to all of our students as we know they will do well, and will represent the department well as new alumni. We continue to produce one of the finest graduates in the country and this is exemplified by the strength of our VT alumni across the nation and globally.

To make sure that our Alumni, Students, Faculty and Friends have a chance to connect, as usual, the department of Sustainable Biomaterials will sponsor a Reception at this year's annual Forest Products Society – International Convention. This year the Convention is in Washington,

DC. We invite all of you to attend the FPS meetings, but also to attend the Virginia Tech Reception at 5:00 p.m. at Murphy's of DC, just down the street from the Omni-Shoreham, the FPS Hotel venue this year.

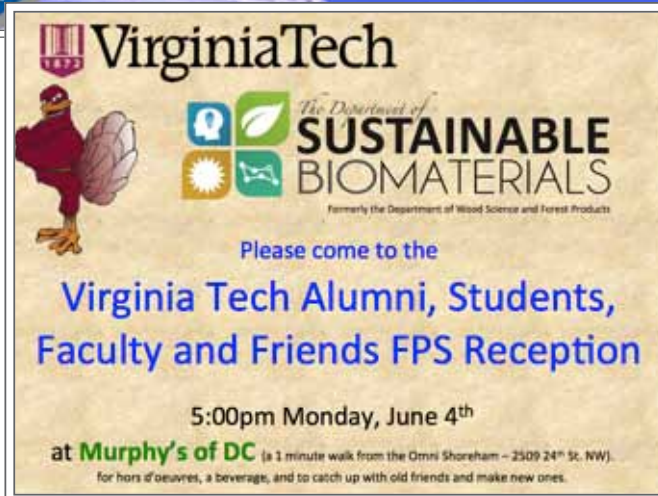
Meet and reconnect with old friends and Professors, and network with students from Virginia Tech that will be at the reception and of course at the meetings. Also, if you are interested in seeing some fun and lively student competition, we encourage you to attend the FPS "Wood Science Bowl" where schools around the country form teams and compete against each other to see who is most knowledgeable about wood and wood products! It's always a great rivalry between competing schools. We look forward to seeing you at these meetings as it will be our first Reception under the banner of the new department name.

Sincerely,

Barry Goodell

Head, Department of Sustainable Biomaterials

Goodell@vt.edu



STUDENT FACES IN THE DEPARTMENT

Meet Rosemary Masser

Rosemary is a Junior in the Department enrolled in the Option in Packaging Science (Packaging Systems and Design). She initially started at Virginia Tech in Engineering, but decided that she was more interested in the opportunities that the Packaging program in the department could offer her. This summer Rosemary is working as an intern in the Center for Packaging and Unit Load Design under the direction of Dr. Laszlo Horvath. She is looking forward to learning more about the Packaging industry and in helping the department out in a variety of ways including highlighting the value of education in Packaging to perspective students.



Watch Now ▶

See Rosemary talk about her experience at Virginia Tech on [YouTube](#). Learn about some of our student experiences as well on our [What Our Students Do](#) page.

Congratulation to all of our graduates this year from the Department of Sustainable Biomaterials – Major: Wood Science and Forest Products.

Khristopher Searl Michael Beagley

Zachary Michael Cogan

Nicholas Edward D'Amico
Cum Laude

Jonathan Michael Diamond

Jeffrey Alan Dolan
Magna Cum Laude

Robert John Falco

James Floyd Lassiter II

Jandir Santin Jr.
Leadership Institute and Cum Laude

Kyra Lempesis Schaeffer
CNRE College Ambassador



Graduation Ceremonies at Lane Stadium May 11, 2012

We wish all of you the very best, and know that you will represent Virginia Tech and the Department well in the world. As always, please keep in touch with us! We want to know how all of our Alumni are doing, and how we can help.

Keep in Touch

Graduating Students and Alums — Please stay in contact with us. We need to hear from you as you make your way into the world! And your classmates want to hear from you as well.

One of the easiest ways to do that is through our Departmental Alumni database. Please register here — (Angie and Debbie can help if needed). <http://sbio.vt.edu/alumnidatabase/alumniregister.asp>

The database has some gaps for the past couple of years, so if you know of alum from that period please ask them to sign up and update their information. It is really helpful to maintain communication with our alums so you can let us know of the latest trends in the field, and provide input on things we can do for current students.

Check out past alums in the database here: <http://sbio.vt.edu/alumnidatabase/> or just click on the pulldown menu for “Alumni” on our main sbio.vt.edu website.

Update from the Wood Enterprise Institute (WEI)

By Earl Kline

Congratulations to the WEI 2011-2012 student team for concluding a successful year at learning how to organize and run their business! This year, the team designed, manufactured and sold a wooden napkin holder to complement last year's drink coaster set. The design focus was to create a beautiful and sustainably produced wood product to be used and displayed as a home centerpiece. During the Fall Semester, the WEI team worked diligently to develop a business plan to outline how their product could sustain the business. This plan carefully described all of the market research, product design specifications, operations, cost assumptions, and various contingencies necessary to market and sell the product. Then, the challenge began in the Spring Semester when the student team learned that no matter how

carefully detailed their plan was, there were many “little” things that got in the way of delivering according to the plan. How the team responded and then adjusted to these challenges is where the true entrepreneurial learning occurs! The right answer is not found in a book or from a lecture; students must problem solve and learn from experience. In essence, the WEI business acts as a laboratory that provides many learning opportunities whereby students can practice a scientific problem-solving discipline to find and apply knowledge in ways to adapt and improve their business.

This year’s WEI team had to solve anticipated problems concerning maintaining the highest wood machining quality standards while creating a safe work environment that led to high worker productivity. But when unforeseen events happen like working out bugs in the product design, waiting for suppliers, dealing with personnel issues, and keeping the business up and running, the students gain “hands-on” experience on how to make proper adjustments. One considerable challenge for this year’s group was losing a key team member who was in charge of the business’ information technology (IT). The team had to adapt quickly to this loss during a critical time when the business depended on IT to market and sell products while collecting money. By keeping score in terms of the operational and financial health of the business, the students saw the impact of their actions and adjustments on the business’ bottom line.

The bottom line? Compared to previous WEI business cycles, this year’s team generated record earnings considering all operating costs such as materials, labor, facilities, and services. However, the business startup expenses still exceeded these record earnings. The unique challenge with the WEI business is that every year there is 100% turnover, and the business must start with a new team. To get the new team up to a level that matches the previous year’s performance has historically taken at least a full semester. WEI’s target is to be able to speed up the training cycle so that a new team is up and running sooner. The sooner the new team is up and running, the sooner business problem solving skills can be practiced to help drive the business toward a positive and sustainable cash flow.



The 2011-12 WEI Team: L-R Front – Edmund Murray, Kyle Simmons, Patrick Smith, Nate Slempe, Kyra Schaeffer. L-R Back – Earl Kline (advisor), Grant Vander Kolk, Jeff Dolan, Andrew Blevins, Josh Hertzler

The Wood Enterprise Institute is a student-run, faculty-supported organization at Virginia Tech that is recognized and respected as a leading learning environment for creativity, innovation, and entrepreneurship.

The learning goal of the WEI is to gain hands-on experience on how a business is run from the ground up; a “concept-to-market” principle. In meeting this goal, leadership opportunities are provided to coordinate the all business activities such as design, marketing, procurement, production, sales, and finance.

Many thanks go to our sponsors and donors who make the Wood Enterprise a premier learning experience. Please visit www.vtwei.com for more information.

The 2011-12 WEI product:
Napkin holder and coaster set.



New Editor for Wood Design Focus

Daniel P. Hindman, Ph.D., is the new editor of Wood Design Focus, the journal of contemporary wood engineering. Dan serves as associate professor in Wood Science and Forest Products at Virginia Tech where his research program focuses on the efficient use of wood materials for residential and commercial applications. His research philosophy revolves around structural design, safety during construction, and sustainability of wood buildings. Dan is a LEED Green Associate and is also affiliated with the Occupational Safety and Health Research Center (OSHRC) and the Myers-Lawson School of Construction at Virginia Tech.

Goodell travels to Malaysia for IRG-WP meetings

Barry Goodell, head of the department traveled to Kuala Lumpur in Malaysia for the 43rd Annual meetings of the International Research Group on Wood Protection. The IRG is the leading group in the world focused on wood protection, wood preservation and degradation of wood. Goodell presented a Plenary session paper on Bordered Pit Imaging that focused on the use of a new imaging technique (4Pi microscopy) providing high resolution of undried wood materials in the nano-scale range. This permitted imaging of unspirated bordered pits in wood to reveal new features about bordered pits that had not previously been described. The talk was co-authored by colleagues Daniela Maschek and Dr. Holger Miltz from Georg-August University in Göttingen, Germany, by Dr. Jody Jellison in VAES at Virginia Tech, and by Mark Lessard at the Jackson Laboratory.

Goodell also promoted the Sustainable Biomaterials department at Virginia Tech to the IRG organization to help spread the good work about the department and Virginia Tech's outstanding education, research and outreach efforts internationally.



IRG-WP participants at a Plenary session in Malaysia focused on Advanced Imaging Techniques Chaired by Dr. Phillip Evans from Canada and Dr. Gri Alfredsen of Norway. The IRG focuses on new methods to protect wood from deterioration by decay, insects, marine borers and other environmental hazards, and in the development of new protection systems.

Inset: Professor Goodell with Dr. Andrew Zahora, Senior Research Scientist at Viance, LLC in the Forest Research Institute of Malaysia's Bukit Lagong Forest Reserve.

Positioning the College of Natural Resources and Environment for the Future

The Department of Sustainable Biomaterials is one of four Departments within the College of Natural Resources and Environment (CNRE). As part of our College's evolution the leadership under Dean Paul Winistorfer have developed the following statements to define the College and where we head in the future. The vision for the future of the College is broad, and the Department of Sustainable Biomaterials fits well into this vision.

Advancing the Science of Sustainability

The College of Natural Resources and Environment prepares the future generation of leaders to address the complex natural resources issues facing our planet. World-class faculty lead transformational research that complements the student learning experience and impacts citizens and communities across the state and around the world on issues of sustainability, natural resources management, and the environment.

Learning – Students Inventing a Sustainable Future

The College of Natural Resources and Environment is nationally and internationally recognized for its undergraduate and graduate education. Programs focus on managing natural resources and preserving the diversity of Earth's physical and cultural environments. The college's world-class faculty is dedicated to mentoring students through experiential learning toward the development of sustainable solutions to society's natural resources-related problems.

Discovery – Research for Environmental Sustainability

The College of Natural Resources and Environment is a global leader in transformational research impacting environmental sustainability. World-class faculty lead interdisciplinary teams that utilize the latest technologies to explore, investigate, and create solutions for the natural resources and environmental problems facing the world. This research creates the knowledge that future generations can build upon to help develop solutions to the world's complex environmental issues.

Engagement –Partnering for Sustainable Solutions

The College of Natural Resources and Environment's engagement program partners with landowners and communities to provide science-based solutions to natural resources and environmental issues facing the world. Its goal is to improve the lives of the citizens of Virginia and beyond by providing information to make better decisions to sustainably manage and utilize natural resources.

Bio-based Materials Center holds 2nd Annual Graduate Research Symposium

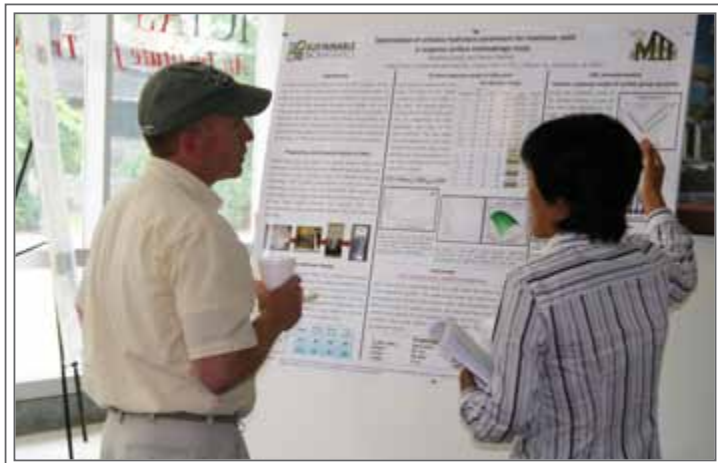
Founded in 2008, the Bio-based Materials Center (BBMC) is a multidisciplinary academic center at Virginia Tech under the directorship of Professor Kevin Edgar of the Department of Sustainable Biomaterials. The faculty members of the BBMC also include Professors Chip Frazier, Scott Rennecker, and Maren Roman. The BBMC is a research and education center under the Institute for Critical Technology and Applied Science (ICTAS) with funding from the USDA National Institute of Food and Agriculture and from ICTAS.

On Friday, May 18, the BBMC held its 2nd annual Graduate Research Symposium. Twenty-four graduate students of BBMC faculty members presented their research projects in 13 oral and 11 poster presentations. The keynote speaker of this year's symposium was Dr.



Keynote presentation by Dr. Jennifer Kelly

Jennifer Kelly of the Food and Drug Administration, giving a talk on "Promoting Medical Device Innovation and Safety". The all-day symposium, including extensive oral presentations as well as a late-afternoon poster session, was organized by a committee of four BBMC graduate students (Siddhesh Pawar, Betsy Claunch, Xiao Zhang, and Jung Ki Hong) with leadership from Professor Roman and support from Dr. Hezhong Wang. The symposium was well attended and showcased the diverse nature of the BBMC's research activities. The symposium program and presentation abstracts are posted under Events on the BBMC's Web site at www.bbmc.ictas.vt.edu.



Chip Frazier and Shuping Dong

President Yoon Soo Kim from Chonnam National University visits Virginia Tech

Dr. Yoon Soo Kim, a wood scientist by training but currently President of Chonnam National University in South Korea visited Virginia Tech in late April. Attending with Dr. Kim were Dr. Gyonggu Shin, Vice President of International Programs and Dr. Hyeun-Jong Bae, Center Director for Bioenergy Research at Chonnam National University. Dr. Bae also presented a seminar on Bioenergy in Asia during the visit.

In meeting with administrators and scientists at Virginia Tech, the Chonnam National delegation signed a Memorandum of Understanding between the two Universities and an exchange program for students was discussed. There are many commonalities in the academic offerings of Virginia Tech and Chonnam National. Chonnam National University is ranked as one of the top 100 Universities in all of Asia and we look forward to future collaboration particularly in the area of Sustainable Biomaterials.



Delegates from Chonnam National University meet with Administrators at Virginia Tech to discuss collaborative opportunities between the two Universities. From left: Dr. Bae, Chonnam National University, S. Korea; Dr. Patrick Miller, Associate Dean for Graduate Studies and Outreach, College of Architecture + Design; Paul Winistorfer, Dean, College of Natural Resources and Environment; Dr. Susan Ott Rowlands, Dean, College of Liberal Arts and Human Sciences; Dr. Daniel Wubah, Vice President and Dean for Undergraduate Education, Dr. Barry Goodell, Head, Department of Sustainable Biomaterials; President Yoon Soo Kim, Chonnam National University, S. Korea; Miriam Rich, Communications Coordinator for the Office of International Research Education and Development; Dr. Gyonggu Shin, Vice President of International Programs, Chonnam National University, and Dr. Jerome Niles, Interim Vice President for Outreach and International Affairs

Hindman and Hammett Presented at the International Conference for Higher Education Pedagogy

Dr. Dan Hindman and Dr. Tom Hammett were invited to present a paper about their sustainability teaching methodology (focused on immersing students in sustainability) at the Virginia Tech organized and hosted international Conference for Higher Education Pedagogy held in February. Over 1000 faculty attended the conference, representing over 35 countries. As a result of this presentation Dan and Tom were invited to speak to the Virginia Tech Career Services staff during their all day retreat on May 14t in the Smith Career Center. Both these presentations provided good opportunities to broaden the exposure of our two (now) linked courses (Green Building Systems and Green Business) and our new curriculum focused on sustainability.

Green Business – Why Isn't it on Every One's Mind?

Tom Hammett was an invited speaker during a symposium held during "Green Week" at the GMIT campus in Letterfrack, Ireland. He was invited to talk about the green business course here at VT for the students and faculty at this GMIT campus. His talk coincided with the Department lead education aboard course held at GMIT during Spring Break in March.

Hammett to Present US Agency for Development Project

Tom Hammett has been selected by Higher Education for Development (HED) to present a review of his US Agency for Development (USAID) funded project at the 2012 NAFSA: Association of International Educators Conference in Houston. This annual event gathers over 14,000 education specialists for workshops, displays and demonstrations by vendors, and academic discourse on international education. His presentation will be part of a session entitled: Deepening Campus Internationalization: International Higher Education Partnerships. Tom will review his 5-year MemCoE program at the Institute of Forestry in Nepal designed to improve teaching and learning skills, improve mentoring of students and training of faculty, and develop a collaborative research portfolio.

Memorial Center of Excellence at the Institute of Forestry in Nepal

In 2006 twenty-five natural resource conservation professionals lost their lives in a tragic helicopter crash. In recognition of their contributions to Nepal and the region, and to help educate the next generation of natural resource professionals, in 2007 the US government funded the establishment a Memorial Center of Excellence (MemCoE) at the Institute of Forestry (IOF) in Nepal. Tom and the Virginia Tech team that he leads won the competition to develop the program. To date Tom has involved over 25 organizations at the IOF, and facilitated over 25 visits by faculty members from outside the IOF and Nepal (many from Virginia Tech) to work with the faculty and students at the IOF. As the MemCoE Program Director he mentors five collaborative research groups based at the IOF – each includes faculty members and representatives organizations from outside the IOF. Tom travels to work at the IOF campus twice a year, the most recent trip was in April when he presented workshops on teaching and green business, mentored faculty research teams in report writing and grant writing, developed a strategic plan for the campus, and planned a large international conference focused on incorporating research into teaching and learning to be held in September 2012.

Richmond Expo 2012

The Department of Sustainable Biomaterials was well represented at the “Richmond Expo 2012” in May; billed as America’s leading trade show for the forest products industry. Representatives from the Center for Forest Products Business and from the Center for Packaging and Unit Load Design joined with the Department and the College to spread the word about our programs at Virginia Tech. The Expo was well attended (double the 2010 attendance) and VT students and faculty had some great discussion with attendees and other vendors as part of the event.

Bond, Quesada, Earl Kline and Urs Buehlmann and Adrienn Andersch from the department also presented an Educational Session: “Maintaining a Sustainable Business in Today’s Market” ahead of the Expo to help participants focus on how to maintain a sustainable business in today’s challenging markets.



Drs. Brian Bond, Barry Goodell, Laszlo Horvath, Henry Quesada Pineda (on left, behind table) and Bob Smith (in center, behind table) attended the expo with students Jason Hoepker (on right, behind table), Rosemary Masser, Zach Shiner who did a great job of representing the Department and the Center for Packaging and Unit Load Design as well.

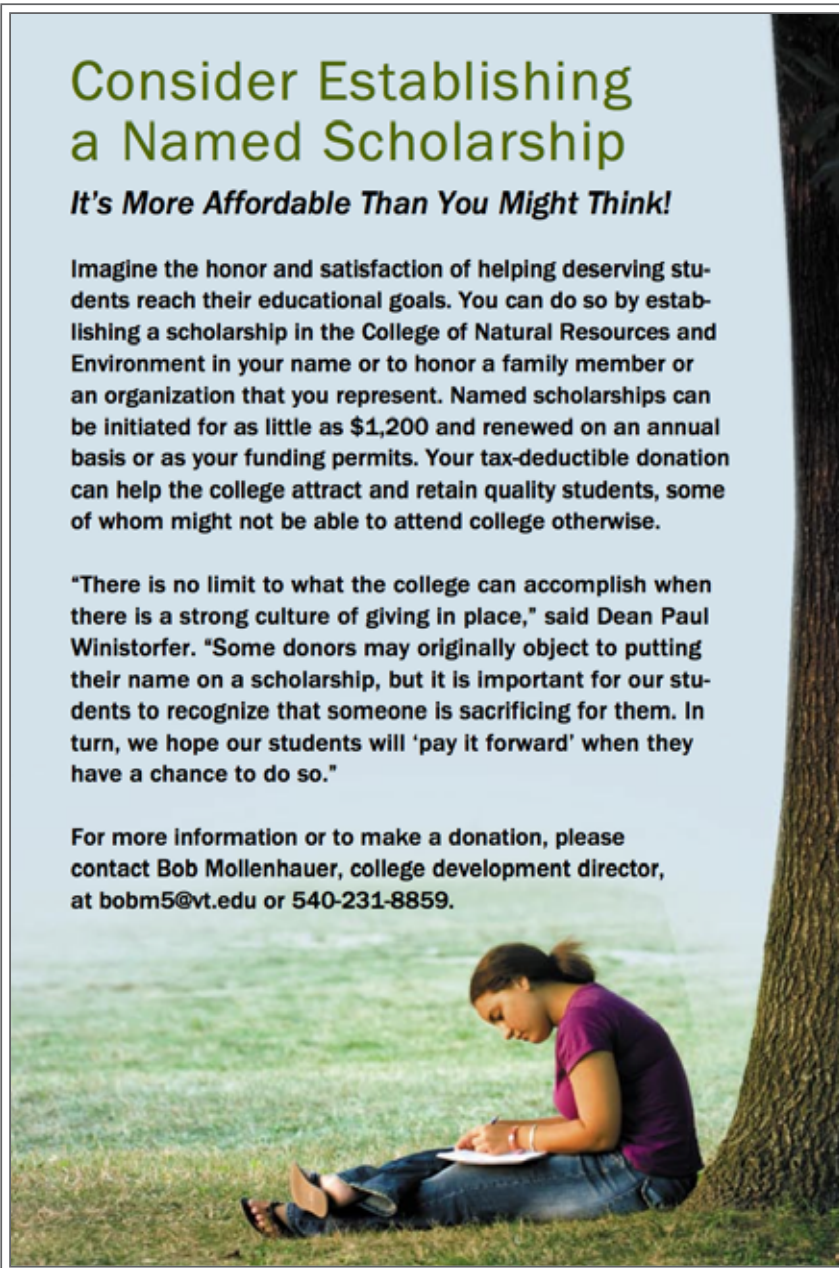
Consider Establishing a Named Scholarship

It's More Affordable Than You Might Think!

Imagine the honor and satisfaction of helping deserving students reach their educational goals. You can do so by establishing a scholarship in the College of Natural Resources and Environment in your name or to honor a family member or an organization that you represent. Named scholarships can be initiated for as little as \$1,200 and renewed on an annual basis or as your funding permits. Your tax-deductible donation can help the college attract and retain quality students, some of whom might not be able to attend college otherwise.

"There is no limit to what the college can accomplish when there is a strong culture of giving in place," said Dean Paul Winistorfer. "Some donors may originally object to putting their name on a scholarship, but it is important for our students to recognize that someone is sacrificing for them. In turn, we hope our students will 'pay it forward' when they have a chance to do so."

For more information or to make a donation, please contact Bob Mollenhauer, college development director, at bobm5@vt.edu or 540-231-8859.



Short Courses and Continuing Education

Energy Savings Through Lean Thinking

September 27, 2012 from 8:30 a.m. to 2:00 p.m.
Virginia Tech Roanoke Center, Roanoke, VA.

Agenda

- Energy update
- Best practices for energy savings
- Energy savings through lean thinking
- Case study I: Specific industry update

- Energy Management Systems
- Case study 2: Saving energy consumption through Kaizen events
- Adjourn

Registration fee: \$50. Includes coffee break and boxed lunch.

For details contact For details contact Henry Quesada at quesada@vt.edu or (540) 231-0978

Quantitative Methods for Management

October 18-19, 2012 from 8:30 a.m. to 5:00 p.m.
Virginia Tech Roanoke Center. Roanoke, VA.

Agenda

- Basics of decision making
- Spreadsheet basics
- Basic statistical concepts
- Data generation using Montecarlo methods
- Forecasting
- Inventory control models
- Design of experiments
- Linear programming
- Queue Analysis
- Markov Analysis
- Simulation

Registration fee is \$400. Includes all coffee breaks, lunches, materials, and certificate.

For details contact For details contact Henry Quesada at quesada@vt.edu or (540) 231-0978

Third Innovation-based Manufacturing Workshop

November 15, 2012 from 8:00 a.m. to 3:00 p.m.
The Inn at Virginia Tech. Blacksburg, VA

Agenda

- Innovation update in the manufacturing sector
- The manufacturing report
- Case study 1
- Key note speaker. TBA
- Entrepreneurship and Innovation
- Case study 2
- Role of Innovation in Economic Development
- Student innovation-based manufacturing competition

Registration fee is \$50. Includes coffee break and boxed-lunch.

For details contact For details contact Henry Quesada at quesada@vt.edu or (540) 231-0978

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 |