

# Sustainable Biomaterials Newsletter

## **Hello from the Department of Sustainable Biomaterials:**

It is hard to believe that we are in the middle of the semester and students will soon be packing for their spring break activities. With the winter we have had, I imagine many of them will be headed to warmer climates. This semester saw our undergraduate enrollment grow to 80 students and we continue to receive numerous applications for our graduate program. Our packaging science program continues to increase with more than 20 students. Many of them will be headed to the 28th annual Student Packaging Jamboree at Michigan State University in March. The Wood Enterprise students are manufacturing 3 different products this year in their “design to market” experiential learning experience. Companies are starting to set schedules for interviews for full-time employees and summer internships. We will have about 25 students graduating this spring, so please contact the department if you are looking for new employees.

Our faculty are working in numerous research areas. These include energy savings in mills, international marketing efforts, materials use in the pallet industry, secondary manufacturing competitiveness issues, and a variety of topics dealing with cellulosic chemistry. It always amazes me the breadth of our research in the department. But, they all have a common theme: Training the next generation of leaders and scientists to assist the forest products industry in the sustainable development and use of our forest resources.

In this issue of the newsletter you will see where two of our students traveled to the ICPF's annual career in Corrugated Packaging Conference at Michigan State University, where faculty presented their research in different parts of Asia, one of our Ph.D. students was bestowed one of the highest Graduate Student Awards given by the American Chemical Society's Cellulose and Renewable Materials Division and the Eastman Symposium on Sustainable Biomaterials Chemistry was held in November on campus. Please contact me if you have any questions regarding the newsletter or anything else with the department at 540-231-7679 or [rsmith@vt.edu](mailto:rsmith@vt.edu).

Sincerely,  
*Bob Smith*  
Interim Department Head  
[rsmith@vt.edu](mailto:rsmith@vt.edu)

## Sustainable Idea was Awarded to Develop Value Added-Bioproducts from Biomass

A collaborative research project, "Strengthening Feedstocks, Production and Products in Western North Carolina," prepared by Drs. Young T. Kim and Scott Rennekar (faculty of Sustainable Biomaterials) was recently awarded the full funding level (\$145K) they proposed from the Biofuels Center of North Carolina through collaboration with Bent Creek Institute, Inc. housed in the North Carolina Arboretum. They are planning to isolate and add extra values on the fraction using modern extrusion and chemical modification technologies for production of "value-added bioproducts." Their research goal is "to generate Zero waste from production." It will officially launch in the middle of March 2013 and could be extended into a multiple year project. A variety of impacts on local business and society for the long term will be anticipated from their research.

## Eastman Symposium on Sustainable Biomaterials Chemistry

On November 29, 2012, Eastman Chemical Company representatives Rachel Potter, Wes McConnell, and Elizabeth Guzman-Morales visited campus for the 4<sup>th</sup> annual Eastman Symposium on Sustainable Biomaterials Chemistry. At this symposium graduate students and postdoctoral fellows from the Sustainable Biomaterials Department, and some of our collaborating groups in other departments, presented their recent research on the chemistry of natural polysaccharides and other sustainable biomaterials. This year we had a record number of presentations, 10 oral and 6 poster presentations. Eastman generously provided cash awards for the best oral and poster presentations. The winners this year were:

**Haoyu Liu** (first place Oral, Edgar Lab)

**Chao Wang** (second place Oral (tie), Esker lab)

**Xueyan Zheng** (second place Oral (tie), Edgar lab)

**Jeff Dolan** (first place poster, Rennekar lab).

We greatly appreciate the support for our students from Eastman Chemical Company.



Rachel Potter (Eastman Chemical Company) and Haoyu Liu



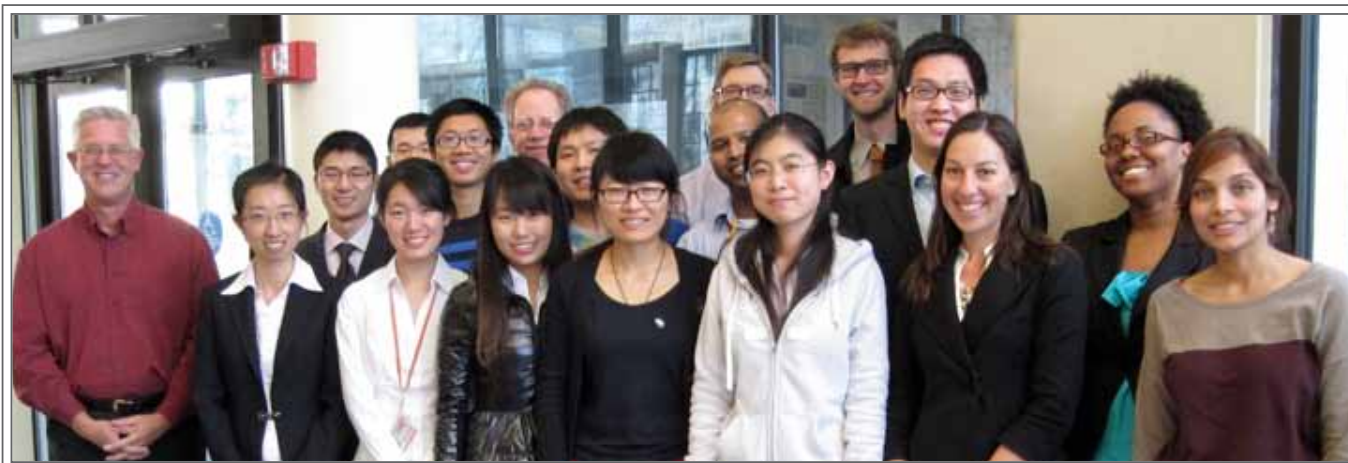
Rachel Potter and Jeff Dolan



Xueyan Zheng and Rachel Potter

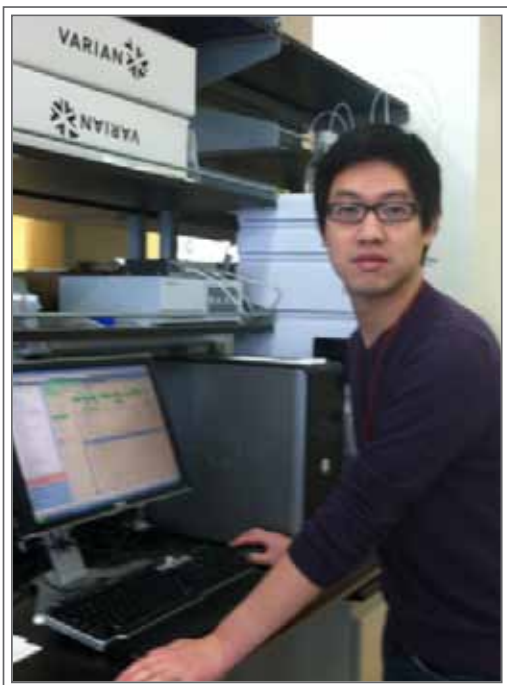


Chao Wang and Rachel Potter



2012 Eastman Symposium Participants

## Haoyu Liu is 2012 Graduate Student Award Recipient



Haoyu Liu, a 4th year Ph.D. student in the Macromolecular Science and Engineering (MACR) degree program under the supervision of Prof. Kevin Edgar, has been selected to receive the American Chemical Society's Cellulose and Renewable Materials Division (CELL) Graduate Student Award for 2012. This award is a prestigious international award, given to only one student each year, and recognizing "excellence in cellulose or renewable materials research". Liu is already an author of seven published papers and is a co-inventor on a patent application, as well as having presented papers at several international scientific meetings. His research, in collaboration with the group of Prof. Lynne Taylor at Purdue University, has uncovered a superior family of cellulose  $\omega$ -carboxyalkanoate polymers for enhancing oral bioavailability of poorly soluble drugs, which can lead to lower doses, fewer patient side effects, lower drug costs, and can help to rejuvenate new drug pipelines.

This is the second consecutive year that a student from the Edgar Lab has won this prestigious award; Dr. Daiqiang Xu (Ph.D. Chemistry 2012, now a research scientist at Ashland Chemical) won the 2011 CELL Graduate Student Award.

Haoyu Liu analyzing drug delivery systems

## White Teaches Packaging Science Course at Inner Mongolia Agriculture University

Dr. Marshall White, Professor Emeritus of the department of Sustainable Biomaterials, spent most of October 2012 in Hohhot, China teaching a course, Packaging and Global Supply Chain Operations. Hohhot is a city of 2 million people and student enrollment at Inner Mongolia Agriculture University (IMAU) is 30,000, about the size of Virginia Tech. The class included 27 third year students in the College of Materials Science and Art Design. The course was taught in English without translation. Dr. White found the students to be enthusiastic and bright. They understand and write English well. The course included 40 hours of classroom contact hours. To help teach the design principles he was able to use examples of trade between the US and China. This seemed to help the students understand how to use these concepts to solve supply chain operational problems. In the end this was a learning experience for both Dr. White and the students. He enjoyed the interactions with both students and faculty at IMAU. Dr. White feels that one can learn so much more about a foreign culture through experiences such as this, than one could visiting as a tourist or on business. He greatly encourages faculty to take advantage of such opportunities.

## Change of Leadership at CELLULOSE

CELLULOSE, the international periodical dealing with the science of industrial polysaccharides by Springer, is currently experiencing a change in leadership. Wolfgang G. Glasser, Professor emeritus of Wood Science at Virginia Tech, is stepping down from his position as Editor-in-Chief after leading the journal for the past 12 years. Dr. Alfred French of the Southern Regional Research Center (SRRC) of the Agricultural Research Service (ARS) of the US Department of Agriculture (USDA) in New Orleans, LA, has taken over the role of successor effective with issue 20(1). In 2000, when Glasser accepted the position as Editor-in-Chief of CELLULOSE, the journal was in its 9th year of publication. It published 4 issues per year with a page-volume of about 300 pages per year. Under Glasser's direction, the journal grew to 6 issues per year with a page-volume of more than 2200 pages. At the same time, the journal's impact factor rose from 0.7 to 3.6 (2012-data). It is currently experiencing a volume of manuscript downloads in excess of 80,000 papers per year.

For the past 3 years, CELLULOSE has operated with a 3-member Board of Associate Editors that includes Professor Kevin J. Edgar of the Sustainable Biomaterials Department of the College of Natural Resources and Environment of Virginia Tech. The other two Associate Editors are from Germany and Japan. The journal's Editorial Board represents 30 leading scientists in the fields of materials science of polysaccharides, wood, paper and textiles. The journal has a promising future, indeed!

## Visiting Scientists in the Department



Dr. Gry Alfredsen from the Norwegian Forest and Landscape Institute in Ås, Norway is visiting Professor Barry Goodell in the department of Sustainable Biomaterials for a three-month stay. Gry is conducting research in the wood protection area and is focused on service life

issues. Her work on the molecular biology of fungi that decay wood is well known and she gave a talk on this topic for the Virginia Tech campus in February in addition to acquainting the audience with a short history of Norway.



Dr. Fangli Sun is a Professor of Wood Science and Technology at Zhejiang Agriculture & Forestry University in China, and she is on sabbatical for one year, at Virginia Tech working with Dr. Chip Frazier on a wide variety of topics ranging from wood cell wall microfibril angle to bamboo chemistry sabbatical for one year. Fangli has also taken on a side-project with

Barry on the protection of bamboo with an iodine complex that chemically fixes to the wood. She has already seen much of Virginia and has also visited Eastman Chemical Company to give a lecture there.

We are pleased and honored to have Gry and Fangli join us in the department.

## Keynote Presentations by Barry Goodell in Georgia, Japan, and Korea

Professor Barry Goodell gave a keynote talk at the 2nd Biennial International Conference on Processing Technologies for the Biobased Products Industries at St. Simons, Georgia in early November 2012. His talk was given in cooperation with the Society of Wood Science and Technology on the topic: The Redesign of Wood Science & Technology Academic Programs in America: The Changing Landscape of Forest Products- Sustainable Biomaterials-Renewable Materials Education. The PPT slides from that talk can be viewed here: [http://www.ptfbpi.org/Presentations/Goodell\\_Education\\_Presentation.pdf](http://www.ptfbpi.org/Presentations/Goodell_Education_Presentation.pdf)

He also chaired a session on “Industrial Processes” at the “Frontiers in Biorefining - Chemicals and Products from Renewable Carbon” meetings also held in St. Simons, Georgia.

Additionally, Goodell travelled to 4 sites, two in Japan (Shizuoka and Tokyo) and two in Korea (Gwangju and Seoul) at the end of November and early December 2012. In Japan, Dr. Goodell gave a Keynote talk at the BioCOMP 2012 meetings and he also participated in ceremonial meetings including meetings with the Governor of the Shizuoka Prefecture and the Opening of the Ceremonial Sake Cask as part of the reception and dinner. There was much interest in the changes that were occurring in wood science to sustainable/renewable materials emphases in programs across the US and Canada. Goodell renewed contacts with long-time colleagues and was introduced to several young scientists who have interest in collaborating with Virginia Tech researchers. Several potential graduate students also met with Goodell.



Opening Session Speakers and Organizers of the BioCOMP 2012 Meetings. Shizuoka, Japan. November 28, 2012. Ceremonial Opening of the Sake Cask. (Goodell second from right.)

In Korea, Goodell also renewed relationships with colleagues and met with faculty and students with an interest in collaboration on research. After one presentation on the ultrastructure of bordered pit membranes in wood, he received valuable guidance that may be useful for future research collaboration. Meetings with President Yoon Soo Kim and Vice President Gyonggu Shin were fruitful and solidified arrangements where Chonnam National University (CNU) will fund two faculty members from the College of Natural Resource and Environment and from the College of Liberal Arts and Human Sciences to travel to Korea this next summer for teaching. In addition, an arrangement to support two Virginia Tech students on a CNU scholarship for a summer session in Korea was also solidified. In Seoul, Dr. Goodell also discussed arrangements for further collaboration with colleagues in VT's, Sustainable Biomaterials Department with two Vice Presidents of SK Chemicals in their Biopolymers and Research Development areas.