The Department of Wood Science & Forest Products at Virginia Tech
Volume 2 Issue 15 — Monday, April 16, 2007

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INSIDE VT WOOD

Reminder...

Remember to submit department news items by Friday 3 p.m. of each week to Will Pfeil at wpfeil@vt.edu for inclusion in Inside VT WOOD each Monday morning. All past issues of Inside VT Wood reside on our department website under the publications link.

News From Paul Winistorfer

- Today, Monday April 16 we are hosting visitors from Mead Westvaco Corporation. Mead is visiting campus to learn more about what we do, and capabilities on the VT campus to build cooperative relationships with them.
- Friday, April 20 a group from Southside will travel with me to Georgia Tech to visit the Advanced Wood Products Laboratory (http://www.coa.gatech.edu/awpl/) to learn of training and programming activities there as we move toward establishing programming for the wood industry in Southside.
- Our final faculty candidate for our manufacturing systems faculty position is on campus Wednesday and Thursday. Please review the interview schedule and plan to interact with our candidate. Don't miss the seminar on April 19th at 9:00 am in the Fralin Auditorium.
- Will Pfeil has added capability for web tracking and analysis tools to our department website. Using Google Analytics we are able to study our web traffic. For any day or period of time we can analyze volume, location, language, key word, content, page downloads, and much-much more information about our website and our content.
- Our department mailing to 100 WoodLINKS schools in 19 states is in the mail this week. We will continue annual mailings to WoodLINKS teachers, raising awareness of what our program offers to prospective students.
- We had a great reception last Monday for the new faculty hired in the bioprocessing/biomaterials cluster. See the attached photo(page 4) and brochure(page6) from the reception!

Visiting the University of Austral, Valdivia Chile

By Paul Winistorfer

April 1-6 I traveled to and visited at the University of Austral in Valdivia, Chile. Five Virginia Tech colleagues traveled to Chile to gain further momentum on a memorandum of understanding (MOU) between VT and Austral. This MOU has been in place for some time, but there is renewed interest in gaining traction with faculty and student exchanges.

Valdivia is located in the lake country in Southern Chile. Santiago, the capital is a 9 hour flight from Atlanta and Valdivia is a several hour flight South of Santiago. The area is rich in natural resources, including forestry, minerals, and a diverse fisheries industry. The rivers and Pacific Ocean are quite cold and limit the amount of swimming

and water activities. There are many snow-covered volcanoes in Chile, as well as the desert in the North and the agricultural central valley with prospering grape production.

VT representatives from the College of Vet Medicine, College of Agriculture and Life Science and College of Natural Resources met with Rector (President) Victor Cubillos and his staff, as well as individual Deans and faculty representing interests in Vet Med, Agriculture, Food Science, Natural Resources, Forestry, Wood Science.

I had the opportunity to present a seminar about our program at VT, to tour their facilities and to travel to see the only OSB plant in Chile. I spent the afternoon at the LP OSB plant about 80 km from Valdivia. The plant is merchandizing from native forests, and thinnings from pine plantations. Species used include radiata pine, eucalyptus, and native mixed hardwoods. The press line includes an 8 opening, batch press. They make both sheathing and siding at this facility.

There are opportunities for the College and specifically for our program with faculty and student exchange and we will pursue newly established connections and relationships that might be mutually beneficial to VT and the University of Austral.

We were hosted very well, and Rector Cubillos and his colleagues were most welcoming and pleasant to interact with!

An interesting wood pavilion in downtown Santiago, capital city of 6 million.

Dr. Gerhardt Schurig, Dean of the VT College of Vet Medicine and Austral University Rector Victor Cubillos discuss with the group the nature of the MOU between VT and Austral.

Wood Science classroom and mechanics test lab at the University of Austral.

Additional testing equipment in the mechanics lab at the University of Austral.

Laboratory hot press with two openings and electrically heated platens at the University of Austral.

The guest house at LP's Chile OSB manufacturing facility. Lunch was served at the guest house before touring the plant.

Paul Winistorfer, head of Wood Science and Forest Products, Dr. Susan Sumner, head of Food Science and Technology, and Dr. Roger Avery, Associate Dean of the College of Vet Medicine at a hosted lunch near the coast in Valdivia, Chile.

A bountiful fisheries industry provides daily fresh fish at the Valdivia market in downtown Valdivia, a city of 100,000.

The trip is nearly complete with a trip to the local market in Valdivia. The market included fresh fish, vegetables, flowers and other food items.

Bioprocessing/Biomaterials Cluster Reception

Back Row (L-R): Dean Richard Benson, Dean Mike Kelly, Provost Mark McNamee, Percival Zhang, Justin Barone, Scott Renneckar, and Kevin Edgar.

Front Row (L-R): Director of ICTAS Roop Mahajan, Dean Sharron Quisenberry, Zhiyou Wen, Abby Morgan, Maren Roman, and Julia Fan.

Dr. Ken Van Langenberg fill the Dennis M. Cullity Fellow Position

By Chip Frazier

Please welcome Dr. Ken Van Langenberg in his new position as the Dennis M. Cullity Fellow. Ken is a visiting scholar, here in Blacksburg through June 6. The Cullity Fellowship is supporting Ken's efforts to learn new techniques for wood adhesion research. While in Blacksburg, Ken will be learning and applying fracture test methods to study adhesive durability. Afterwards, he will visit the University of Tennessee to learn the latest in nanoindentation. Ken's office is in 311 Cheatham (Ken.VanLangenberg@ensisjv.com) but he'll also be working in the Brooks Center.

Dr. Ken Van Langenberg

Dr. Van Langenberg is a senior research scientist within Ensis Wood Processing and is the Team Leader of the Wood Adhesives and Composites group. Ensis is an unincorporated joint venture between Australia's CSIRO and New Zealand's Scion. It is a combination of Australasia's leading forestry research organizations pooling together its knowledge and expertise to provide science capability on a larger scale than ever (http://www.ensisjv.com/).

The Dennis M Cullity Fellowship was established by the Forest & Wood Products Research & Development Corporation (FWPRDC) in 2000 in honor of the Corporation's inaugural Chairman, Mr. Denis M Cullity CMG AO. The fellowship is intended to support the professional development of leading Australian forestry or forest products scientists and increase the value and benefits derived from research completed for the forest products industry.

Ken will be squeezing in some travel and sightseeing during his visit. Please offer your detailed recommendations!

The Department of Wood Science & Forest Products at Virginia Tech

Faculty Candidate Seminar
Manufacturing Systems Faculty Position
Department of Wood Science and Forest Products

April 19, 2007 – 9:00 AM
Fralin Auditorium

Secondary Wood Products Manufacturing: Opportunities for Training, Teaching and Research

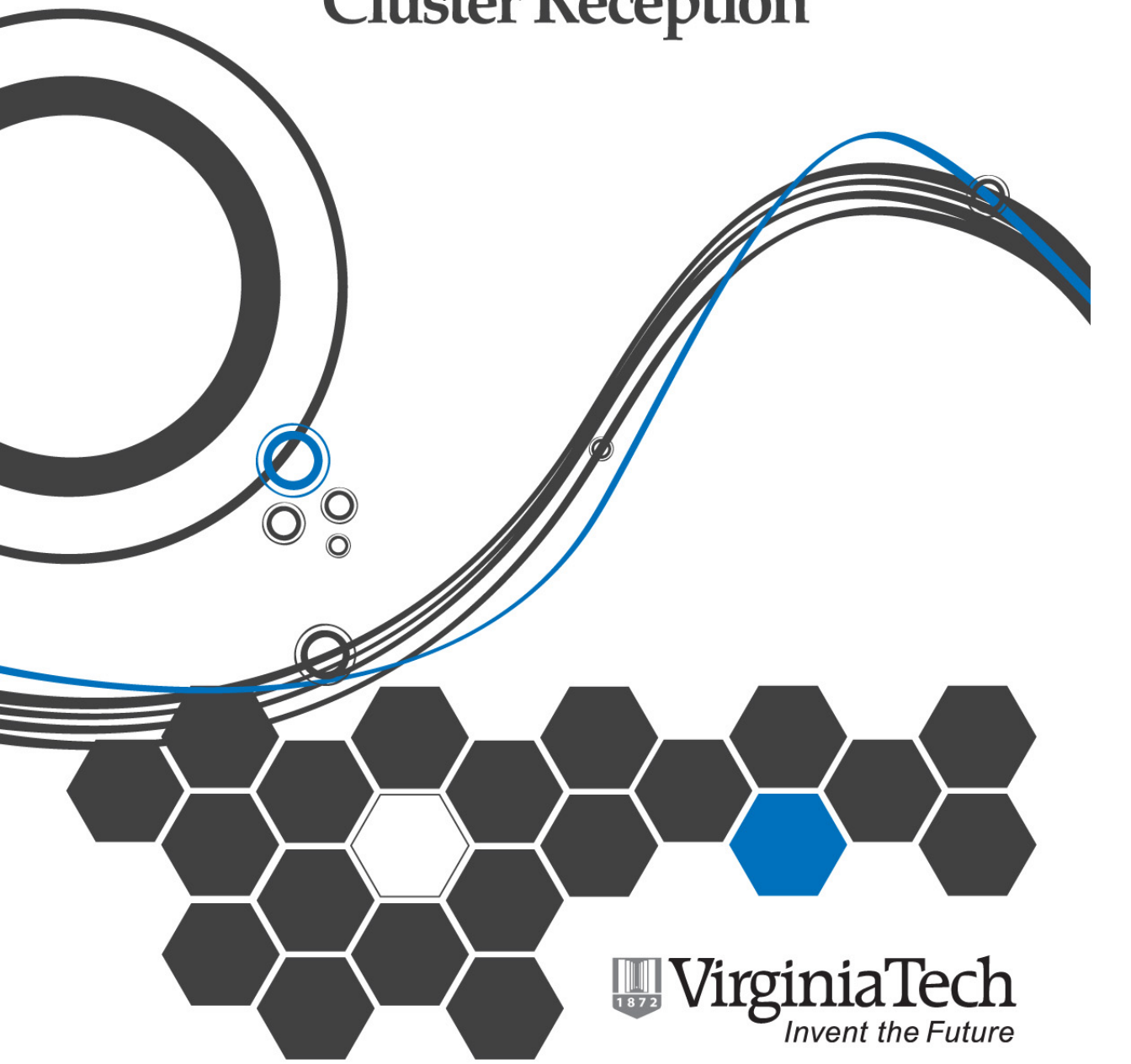
Dr. Urs Buehlmann
Project Manager
California Door Corporation

Dr. Urs Buehlmann is currently a project manager for California Door Corporation leading continuous company improvement processes, new plant layout and process planning and implementation. Prior experience has involved research and extension efforts at the Department of Wood and Paper Science at North Carolina State University for the Secondary Forest Products Industry.

Globalization has taken a heavy toll on some sectors of the U.S. secondary wood products manufacturing industry. In the past, manufacturing systems research has rather narrowly focused on manufacturing systems without a holistic view of the entire wealth creation chain. Such approaches were successful in a national economy where all competitors faced similar conditions and markets were mainly sellers' markets. Today, with globalization a reality, consumers can choose from an oversupply of products and production can almost instantaneously move to the lowest cost location globally, while still using the latest manufacturing technologies. This leads to problems for manufacturers who do not adapt their manufacturing systems and business models, as has been demonstrated by certain sectors of the U.S. wood products industry. Therefore, a case can be made that manufacturing systems research should look at the entire value creation chain to ensure that any given manufacturing system addresses the constraints set by all aspects of a given competitive business environment. Dr. Buehlmann will present his vision of providing an industry-wide framework that facilitates training to all stakeholders and conducting applied research to answer specific opportunities for improvement.

Questions? Contact Dr. Earl Kline, Professor and Search Committee Chair
Department of Wood Science and Forest Products
231-8841 or email kline@vt.edu

Bioprocessing & Biomaterials Cluster Reception



VirginiaTech
Invent the Future

April 9, 2007

Bioprocessing & Biomaterials Cluster Reception

The Bioprocessing and Biomaterials faculty cluster represents a new interdisciplinary approach to the future of bioprocessing and biomaterials research and graduate education at Virginia Tech. Working cohesively from the onset, the supporters of the cluster have recruited a very talented group of faculty into the cluster who will be recognized at this reception.

This cluster initiative in bioprocessing and biomaterials was supported by

University Provost and Vice President for Academic Affairs
Dr. Mark McNamee

College of Agriculture and Life Sciences
Dr. Sharron Quisenberry, Dean

College of Engineering
Dr. Richard Benson, Dean

College of Natural Resources
Dr. J. Michael Kelly, Dean

Institute for Critical Technology and Applied Sciences (ICTAS)
Dr. Roop Mahajan, Director

And the departments of

Biological Systems Engineering
Chemical Engineering
Materials Science and Engineering
Wood Science and Forest Products

VirginiaTech
Invent the Future

Department of Biological Systems Engineering
College of Agriculture and Life Sciences

Dr. Justin Barone

Associate Professor - Biological Systems Engineering

jbarone@vt.edu

Academic Background

- PhD Macromolecular Science and Engineering from Case Western
- MS Engineering Science from New Jersey Institute of Technology
- BS Materials Science and Engineering from Lehigh University

Dr. Barone works in the areas of biomaterials and bioprocessing. His focus is on developing new biopolymeric systems derived from agricultural products. He has a special focus on modification of proteins for new value-added products.

Dr. Barone's research program will focus on thermal, chemical, and enzymatic modification of proteins, polysaccharides, and fats and the properties of the modified materials. The anticipated end-uses of the bio-based materials will be as replacements for fossil fuel-derived materials.

Areas of Expertise

- Structure and properties of proteins, polysaccharides, and fats
- Modification and processing of proteins, polysaccharides, and fats
- Development of new products from bio-based materials

Dr. Julia Fan

Assistant Professor - Biological Systems Engineering

zlfan@vt.edu

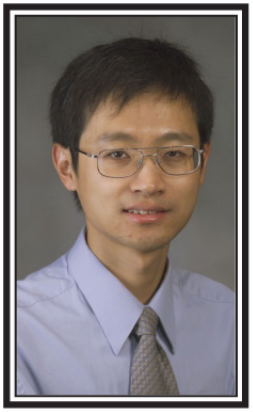
Academic Background

- PhD Chemical and Biochemical Engineering from Dartmouth College
- MS Engineering Management from Dartmouth College
- MS Chemical Engineering from Iowa State University
- BS Biochemical Engineering from Zhejiang University of China

Dr. Fan's primary research interests are in advancing technologies for production of bio-based fuels and chemicals from cellulosic biomass or other renewable resources, including metabolic engineering and biocatalyst development; fermentation process development and modeling; biological and chemical process design and economic evaluation.

Areas of Expertise

- Protein and metabolic engineering
- Fermentation process development
- Process modeling and process design
- Economic evaluation



Dr. Zhiyou Wen

Assistant Professor - Biological Systems Engineering

wenz@vt.edu

Academic Background

- PhD University of Hong Kong
- MS Chemical Engineering from East China University of Science and Technology
- BS Chemical Engineering from East China University of Science and Technology

Dr. Wen's work encompasses research on: development of omega-3 fatty acids from biodiesel waste for use as an animal feed supplement; pretreatment of lignocellulosic agricultural waste for enhanced anaerobic digestion; biodiesel production from microalgae; and analysis of microbial community of mixed culture systems.

Dr. Wen spent three years as a postdoctoral research associate with Washington State University's Department of Biological Systems Engineering. His research and extension expertise include bioprocessing, bio-resource utilization and bioproducts development. He is also familiar with a variety of fermentation technology including fungal and algal fermentation, plant and animal cell culture. Dr. Wen has two invention disclosures and shares in the application for a patent.

Dr. Wen's research program focuses on developing value-added products from agricultural byproducts.

Areas of Expertise

- Fermentation and cell culture
- Animal manure management
- Mass culture of microalgae

Dr. Percival Zhang

Assistant Professor - Biological Systems Engineering

biofuels@vt.edu

Academic Background

- PhD biochemical and chemical engineering from Dartmouth College
- MS Biochemical Engineering from East China University of Science and Technology
- BS Biochemical Engineering from East China University of Science and Technology

Dr. Zhang's research interests are focused on breaking biological barriers to biofuels (cellulosic ethanol and hydrogen) production. They include (i) the development of a novel lignocellulose fractionation using cellulose solvent and organic solvent at modest conditions plus solvent recovery; (ii) the investigation of heterogeneous cellulose hydrolysis mediated by fungal and bacterial cellulases; (iii) the development of a novel hydrogen production method from carbohydrates with a theoretical high-yield (12 H2/glucose) via cell-free synthetic metabolic engineering; (iv)

cellulase engineering via biomolecular engineering – directed enzyme evolution and rational design; and (v) the development of lignin- and hemicellulose-derived products.

Dr. Zhang spent three years as a research scientist and a post-doctoral researcher at the Thayer School of Engineering at Dartmouth College. Among his awards, Dr. Zhang received the 2004 National Natural Science Award of P. R. China (the first class). At the 2003 Gordon Research Conference, he received a Poster of Excellence Award. His paper ranked as the second most downloaded paper in Biotechnology and Bioengineering (2005). At Virginia Tech, he has received the Ralph E. Powe Junior Faculty Enhancement Award (2006) and one of Best and Brightest People by Esquire Magazine (2006). He holds one US patent and has submitted another patent application. Dr. Zhang is a member of the American Chemistry Society, the American Association for the Advancement of Science, the American Society of Agricultural and Biological Engineers, the American Institute of Chemical Engineering, and the American Society of Microbiology.

Dr. Zhang's research program focuses on production of biofuels and renewable materials based on biomass.

Areas of Expertise

- Lignocellulose pretreatment and fractionation
- Protein engineering and high-throughput screening and selection

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Departments of Chemical Engineering / Materials Science and Engineering
College of Engineering

Dr. Abby Morgan

Assistant Professor - Chemical Engineering, Materials Science and Engineering (this is a joint appointment)
awmorgan@vt.edu

Academic Background

- PhD Materials Science and Engineering from University of Illinois at Urbana-Champaign
- BS Textile Chemistry from Auburn University

Dr. Morgan's research program will focus on the design, synthesis, characterization and evaluation of degradable polymeric biomaterials for their use in tissue engineering and drug delivery applications. The goal is not only to improve current treatments for limb salvage and tissue regeneration but also to understand the correlation between scaffold properties and cellular response. Her work will be multidisciplinary, drawing upon areas such as chemistry, materials science, chemical engineering, bioengineering, medicine, and pharmaceutical science.

Currently, she is a National Research Council Post-doctoral Fellow with the National Institute of Standards and Technology in Gaithersburg, Maryland.

Areas of Expertise

- Biomaterials
- Polymer Chemistry
- Tissue Engineering

Dr. Paul Gatenholm

Professor - Materials Science and Engineering

pgatenho@vt.edu

Academic Background

- PhD Polymer Technology from Chlamers, Goteborg, Sweden

Areas of Expertise

- Chemical and enzymatic modification of polysaccharides
- Characterization of Molecular Structures
- Tissue Engineering.

Department of Wood Science and Forest Products
College of Natural Resources

Dr. Kevin Edgar

Professor - Wood Science and Forest Products

kjedgar@vt.edu

Academic Background

- PhD Duke University
- BS Bucknell University

Dr. Edgar works in the area of biomaterials and bioprocessing. His primary interest is in novel polysaccharide and carbohydrate derivatives, and the development of efficient synthetic processes for these materials. He has a special interest in the development of effective drug delivery systems based on polysaccharide chemistry.

Dr. Edgar has a background in organic chemistry, polymer chemistry, and the chemistry of cellulose and other polysaccharides. He received his BS degree in Chemistry from Bucknell University, and then his PhD degree in Organic Chemistry from Duke University. Prior to joining the department, he was a Technology Fellow with Eastman Chemical Company in Kingsport, Tennessee.

Dr. Edgar's research program focuses on the synthesis of novel polysaccharide biomaterials, the development of novel and efficient synthetic methods for their synthesis, and the unraveling of structure-property-performance relationships for these novel materials, as they relate to important end uses such as drug delivery systems.

Areas of Expertise

- Cellulose esterification
- Polysaccharide modification
- Structure-property relationships in polysaccharides
- Biomedical applications of polysaccharides
- Development of drug delivery systems based on novel polymers
- Carbohydrate chemistry

Dr. Scott Renneckar

Assistant Professor - Wood Science and Forest Products

srenneck@vt.edu

Academic Background

- PhD Virginia Tech
- MS UC Berkeley
- BS Virginia Tech

Dr. Renneckar's discovery program is focused on research to determine the interactions of nanoparticles and polyelectrolytes with plant-based macromolecules in order to create functionalized plant-based composites. From this broad theme, Dr. Renneckar's interests are two-fold: 1) combining nanotechnology into contemporary wood-based composites and 2) creating biobased composites from the bottom-up (controlled placement of nanoscale building blocks).

Dr. Renneckar's long term research goal is to create a wood-like material from any source of biomass with prescribed functionality by placement of the appropriate nanoscale materials. Components of this research involve the elucidation of the fundamental behavior of polymers and nanoscale materials at the solid-liquid interface (interactions with the polymers within the cell wall or model plant-based polymer surfaces), facile methods to process biomass into the constitutive polymer components such as steam explosion processing, and using layer-by-layer nanoassembly to create highly structured materials.

Dr. Maren Roman

Assistant Professor - Wood Science and Forest Products

maren.roman@vt.edu

Academic Background

- PhD Polymer Chemistry from SUNY College of Environmental Science and Forestry
- MS Chemistry from Clausthal University of Technology

Dr. Roman works in the area of natural and bio-based polymers and composites. Her research program focuses on novel applications of cellulose nanocrystals and spans both fundamental and applied projects in various disciplines, including surface science, food science, and biomedical science.

Dr. Roman joined Virginia Tech as an assistant professor in the summer of 2004. Prior to that, she held a postdoctoral position at the Pulp and Paper Research Centre at McGill University.

Areas of Expertise

- Chiral and self-assembly properties of cellulose
- Molecular organization and interactions of polymers in wood
- Interactions of natural and synthetic polymers with native cellulose surfaces
- Cellulose reinforced polymer composites and nanocomposites
- Isolation and utilization of wood components