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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](mailto: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.

## Red Alert

Inside VT Wood will resume publication the week of January 14, 2008. Happy Holidays to all!

## News From Paul Winistorfer

- Last Wednesday Eastman Chemical Company Cellulose Esters / Coatings Technology Group sponsored a graduate student symposium in our department. Eleven of our graduate students competed in an oral presentation competition. The winner was Fernando Navarro, PhD candidate working under the guidance of Dr. Maren Roman. Fernando is working on a project aimed at using ink jet printing technology for deposition of cellulose nanocrystal suspensions. Fernando was awarded a \$2,000 cash prize from Eastman. His complete abstract is included in this issue. Thanks to Drs. Brian Seiler, Kevin McCreight and Debra Tindall of Eastman for arranging this support, for traveling to spend the day with us, for lunch and for your interest in our graduate student research projects.



From L-R: Back Row – Dr. Scott Rennecker, Dr. Paul Winistorfer, Sudip Chowdhury, Dr. Kevin McCreight (Eastman), Dr. Brian Seiler (Eastman), Richard Johnson, Jacquelyn Evans, Hezhong Wang, Jung Ki Hong, Dr. Kevin Edgar, and Dr. Chip Frazier. Front Row – Tian Gao, Zhiyuan Lin, Dakai Ren, Yu 'Angela' Zhou, Shuping Dong, Dr. Debra Tindall (Eastman), Fernando Navarro, and Dr. Maren Roman.

Thanks to Dr. Kevin Edgar for arranging and moderating the symposium. Congratulations to all of our students for the very fine work you are doing and for delivery of very high quality presentations at the symposium. It was a great day! A link to all the abstracts can be found at: [http://www.woodscience.vt.edu/pdfs/Eastman\\_Abstracts.pdf](http://www.woodscience.vt.edu/pdfs/Eastman_Abstracts.pdf)

- Thanks to Mr. Harry Rogers, President of Big River Cypress and Hardwood, Inc of Blountstown, Florida and the Southern Cypress Manufacturers Association ([www.cypressinfo.org](http://www.cypressinfo.org)) for their donation of a cypress plaque memorializing the victims of April 16th. The plaque has been installed in the lobby of Cheatham Hall and the Association made a donation of \$3200 to the Hokie Spirit Memorial Fund. Harry is a 1973 alumnus of our program! Thank you Harry and the Southern Cypress Manufacturers Association.



From L-R: Rich Oderwald (Associate Dean for Academic Programs), Dr. Harold Burkhart (Forestry Dept. Head), Dr. Bob Smith (Associate Dean for Engagement), Dr. Eric Hallerman (Fisheries and Wildlife Dept. Head), President Charles Steger, Mr. Harry Rogers (Southern Cypress Manufacturers Association), Dr. Paul Winistorfer (Wood Science Dept. Head), and Dr. Bob Bush (Associate Dean for Research and Graduate Studies)



- Our Graduate Student Spotlight this week is on Tim Stieess, Ph.D. candidate working under the guidance of Dr. Earl Kline. Tim is studying supply chain concepts in the hardwood industry. All past Graduate Student Spotlights are now shown on our website under our Graduate Student link.
- The faculty will have a half work day on December 19 to address curriculum, space the Wood Enterprise Institute, and upcoming Spring issues. We will meet in the Brooks Classroom from 8:30 – 12 noon.



Tim Stuess, Ph.D. Candidate

## Happy Holidays to all!

My name is Tim Stuess. I am currently a Ph.D. student working with Dr. Earl Kline. My work involves the research of the hardwood supply chain. My concentration is how information is passed between members of the same supply chain and what degree that information filters through an organization. Other areas of interest have included Continuous Improvement, Performance Measurement, Discrete-event Simulation, Radio Frequency Identification, Rough Mill Analysis, Lumber Drying.

I was born in Wilkes Barre, Pennsylvania—the last of four children. At that time, my dad was a minister and my mom tried to keep us kids under control. By the time I was four we had moved to Cambridge, Massachusetts where my dad became a professor at a seminary and my mom started work in the public school system.

As a teenager, I was interested in furniture making. So, upon graduating from high school, I went to a two year hands-on wood technology program at Morrisville College, in central New York. I continued my wood

education in Syracuse, NY at the college of Environmental Science and Forestry while working at Stickley Furniture in the sub-assembly department.

A year after I graduated from ESF I decided that I did not have enough of the learning experience and came to Virginia Tech to get my Master's degree in the Wood Science department. My research at that time pertained to floor vibrations. During that time, I did some work with the Forest Service which got me a job as a consultant for the former Robert C. Byrd Hardwood Technology Center (currently Wood Education Resource Center) in Princeton, WV.

I have had a number of jobs between receiving my Master's degree and my return to school; the most interesting was the two years I spent in Brazil. While there, I was part of a small team of American contractors working for Aracruz Cellulose. We were assisting in the design, construction, and start-up of a sawmill, kilns and planer mill located north of Rio de Janeiro (and a 30 minute drive from the beach). The facility is still manufacturing lumber Eucalyptus. The lumber from that facility is currently marketed in the United States by Weyerhaeuser under the name of "Lytus."

Even when my jobs took me elsewhere, I have maintained a residence here. I have called Blacksburg home for over 15 years. Growing up in a city in the Northeast, I have grown to appreciate the small college town feel, the surrounding mountains and forests, and the moderate weather that Blacksburg offers. I regularly like to get out on the trails hiking, running, or biking with friends and my dog. When I am not out-and-about I enjoy working on and around my house.

# Eastman Chemical Company

Cellulose Esters / Coatings Technology Group

## Graduate Student Symposium

**WINNER!**



**Fernando Navarro**

## Ink-Jet Printing of Cellulose Nanocrystal Suspensions

**Fernando Navarro<sup>1</sup>, Ph.D. Candidate**

Major Professor: Maren Roman<sup>2</sup>

<sup>1</sup>Macromolecules and Interfaces Institute

<sup>2</sup>Department of Wood Science and Forest Products – (0323)

Virginia Tech

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### Abstract

Inkjet printing is a technique that allows precise deposition of fluids onto a variety of substrates with a high degree of controllability. Inkjet technology is rapidly gaining attention in areas such as nanoparticle and DNA micropatterning and printable electronics. To test if inkjet printing can be used to deposit cellulose nanocrystals (CNCs), aqueous suspensions of CNCs were prepared by acid hydrolysis (60% H<sub>2</sub>SO<sub>4</sub>) of dissolving grade softwood pulp and deposited onto glass substrates, in various grid patterns and microdot arrays, using a piezoelectric drop-on-demand ink jet printer. The surface energy of the glass slides was controlled by using soap, aqua regia, or a mixture of ethanol/chloroform (1:1) as a cleaning process.

#### Coffee drop effect

It was found that inkjet technology allowed the controlled deposition of CNCs onto glass substrates and due to limited wetting of the substrate, printing of grid patterns resulted in more or less regular patterns of droplets, depending on the grid spacing. The CNCs deposits were characterized using AFM, SEM and optical microscopy. It was found that at low CNC concentrations, the particles preferentially accumulated at the edges of dried droplets (coffee drop effect). At higher concentrations, a more uniform particle distribution across the droplet was achieved. Optical microscopy also revealed that the highest degree of regularity was obtained with a square grid as print pattern. The results of this study suggest that inkjet printing technology can be used for micro-patterning of controlled multilayer structures of cellulose and polymer or bioactive molecules.

**EASTMAN**

The Department of  
**Wood Science & Forest Products**  
at Virginia Tech

- We received a \$10,000 gift last week to help establish an endowed student scholarship in our department! The gift was from the Lora L. & Martin N. Kelley Family Foundation Trust. Special thanks to Dr. Stephen Kelley for enabling this gift, Mr. Bruce Kelley, and the Kelley Family Foundation for their decision to support our program. This gift will be matched with a larger gift from an anonymous donor to create a significant student scholarship endowment that will generate an annual award to a student(s) for which criteria have been established per the terms of the gift. This new endowment should grow to \$50-70,000 in the coming year. Thank you to the Kelley Family Foundation Trust for your support.
- Please see the attached faculty position announcement for our new faculty position in Forest Products Business Management. This position is based 75% in Virginia Cooperative Extension and we seek a successful candidate who will work with the industry in our state. Dr. Bond is chairing the search, aided by Drs. Buehlmann, Kline, Smith and Zink-Sharp. Please bring any candidates of interest to the attention of the committee. Note our February 1, 2008 screen date. We have established a web resource site for this search at:  
<http://www.woodscience.vt.edu/searchresources>
- Thanks to Angie Riegel and Linda Caudill for setting up our Christmas luncheon last week!
- As 2007 ends I thank the entire department for your collegiality, support, fine work, commitment and dedication to our program and students. Enjoy the holiday season! The moniker for 2008 – “Let’s Make 2008 Great”!

## WoodLINKS USA December Newsletter Available

WoodLINKS USA has released its December newsletter. The newsletter can be found online at:

<http://www.woodscience.vt.edu/publications/woodlinks/pdfs/WoodLINKS-20071213-0206.pdf>

### **Assistant/Associate Professor – Business Management DEPARTMENT OF WOOD SCIENCE AND FOREST PRODUCTS**

The Department of Wood Science and Forest Products at Virginia Tech is seeking applications for the position of assistant/associate professor in the area of forest products business management. We seek a candidate who would develop and apply business management strategies to support domestically competitive and sustainable wood products businesses.

**Position Description:** The tenure-track position will be at the Assistant/Associate Professor level and will be a 12 month appointment. The position will have responsibilities in engagement/extension programming and industry outreach (75%) and teaching/research (25%).

- The successful candidate is expected to work with the Virginia forest products industry and deliver programming focused on competitiveness of the industry.
- The successful candidate will develop a state, regional and nationally recognized engagement/extension program in forest products business management.
- The successful candidate will develop and deliver Continuing Education ‘short-courses’
- Teaching responsibilities will initially include one undergraduate course in forest products business management.
- The successful candidate will be expected to work directly with the Virginia forest products sector, obtain extramural funding, publish in refereed journals, participate in local, regional and national meetings of professional societies, serve as major professor for graduate students, and serve on graduate committees.
- The position reports administratively to the Head of the department.

**Qualifications:**

- Candidates must have a Ph.D. in forest products, wood science, marketing, business management, operations management, or closely related field.

- Candidates must be able to communicate effectively with people at all levels in university, industry, associations and private sectors.
- Candidates must demonstrate the ability to build a successful program that is engaged with the industry in their area of expertise as it relates to business management and competitiveness of the industry.
- Candidates at the Associate Professor level must have a demonstrated track record of success in extension or research, including the ability to articulate a coherent extension or research agenda and to identify potential funding sources to support such activities.

**Preferred Qualifications:** Candidates should have a history of collaboration with colleagues on and off campus, experience reaching out to business, industry and government agencies. Candidates must demonstrate collegiality and the ability to be a good departmental, college, and university citizen.

**Application:** Application materials should include a current vitae, official transcripts for all degrees at all institutions, the names, addresses, phone numbers and email addresses of three professional references. The applicant should address his or her interest in the position by preparing a written statement of interest that addresses the matching of personal skills and education with the position description. All materials must be submitted electronically with exception of official transcripts, which must be mailed. Submit on-line at [www.jobs.vt.edu](http://www.jobs.vt.edu), referring to posting No. 071303. Review of candidate files will begin February 1, 2008 and continue until a suitable candidate is identified.

#### **Inquiries:**

Dr. Brian Bond, Associate Professor and Search Committee Chair  
 Department of Wood Science and Forest Products  
 College of Natural Resources, Virginia Tech  
 Brooks Forest Products Center (0503)  
 Blacksburg, VA 2406  
 Phone 540-231-8752 or email [bbond@vt.edu](mailto:bbond@vt.edu)

Virginia Tech is an Equal Opportunity/Affirmative Action Employer and has a strong commitment to the principle of diversity and, in that spirit, seeks a broad spectrum of candidates including women, minorities, veterans, and people with disabilities. Virginia Tech is the recipient of the National Science Foundation ADVANCE Institutional Transformation Award to increase the participation of women in academic science and engineering careers. Individuals with disabilities desiring accommodations in the application process or needing this material in an alternate format should notify Debbie Garnand, Department of Wood Science and Forest Products at 540-231-8853 or email at [garnandd@vt.edu](mailto:garnandd@vt.edu).

#### **Lunch and Learn program**

Lunch and Learn program to begin in January. Beginning in January the department will host a once-a-month 'Lunch and Learn' informal brown-bag lunch program. This is not a formal seminar program – but an opportunity to put topics on the table for anyone in the department to participate in. Volunteers are needed to lead a discussion on a topic of your interest for each month during the spring.

#### **Professor and Department Head, Department of Forestry – Position Available**

The position of Professor and Department Head of the Virginia Tech Department of Forestry is available and the search has begun. Please see the web resource site established for this important leadership search in our college:

<http://www.forestry.vt.edu/searchresources>

#### **Endowment Releases “Mapping a Course of Action”**

The U.S. Endowment today released “Mapping a Course of Action: Results of a Survey and Workshop Designed to Assist the U.S. Endowment for Forestry and Communities.” “We’re pleased to be able to provide this document to those with interest in the Endowment,” said Carlton Owen, President of the U.S. Endowment. “We believe that

this report will serve at least two purposes. First, it provides further evidence of our commitment to openness and transparency in all of our affairs; second, it sheds valuable insights on a number of issues of importance to those interested in sustainable forestry and forest-reliant communities.” Full copies of the report are available as a pdf for viewing online or download at this website at the Focal Initiatives tab — Background Report.

[http://usendowment.org/images/Mapping\\_a\\_Course.pdf](http://usendowment.org/images/Mapping_a_Course.pdf)

## **US DOE to Invest up to \$7.7 Million for Four Biomass-to-Liquids Projects; More than \$1B in Funding for Biofuel Development Announced This Year**

The US Department of Energy (DOE) has selected four biofuels projects in which it plans invest up to \$7.7 million. These projects will demonstrate the thermochemical conversion process of turning grasses, stover, the non-edible portion of crops and other materials into biofuel. Combined with today’s announcement, DOE has announced more than \$1 billion in funding for biofuels research and development (multi-year funding) projects this year.

These new projects are focused on more efficiently eliminating contaminants generated during the thermochemical production of biofuels. Combined with the industry cost share, more than \$15.7 million is slated for investment in these four projects.

Negotiations between the selected companies and DOE will begin immediately to determine final project plans and precise funding levels. Funding will begin in Fiscal Year 2008 and will run through FY 2010, subject to Congressional appropriations.

The following four projects were competitively selected for negotiation of awards:

Emery Energy Company of Salt Lake City, Utah. Emery Energy Company has partnered with Ceramatec, Inc. and the Western Research Institute to demonstrate a new, low-cost, novel way to mitigate tars and oils in biomass synthesis gas while also managing other impurities. This project will also verify the technical viability of using the resulting clean synthesis gas in a downstream liquid fuel catalysis process. EEC intends to use a ‘high impact’ biomass such as corn stover as the high impact biomass for their project. DOE will provide up to \$1.7 million for the \$2.9 million project.

Iowa State University of Ames, Iowa. Iowa State, in partnership with ConocoPhillips Company, will test an integrated biomass to liquids system that uses gas cooling through oil scrubbing rather than water scrubbing in order to minimize waste water treatment. Switchgrass will be the biomass feedstock fed into the gasifier. The gas-oil scrubbing liquid will then be sent to a coker in existing petroleum refining operations to be used as a feedstock. ConocoPhillips’ proprietary sulfur removal technology will also be incorporated into the gas cleanup. Non-proprietary methods will be used to remove ammonia, chloride and other alkali materials. DOE will provide up to \$2 million for the \$5.2 million project.

Research Triangle Institute of Research Triangle Park, North Carolina. Research Triangle Institute, in partnership with North Carolina State University and the University of Utah, will generate syngas derived from woody biomass. A dual fluidized bed reactor will allow continuous regeneration of a catalyst that can simultaneously reform, crack, and remove tar, NH<sub>3</sub> and H<sub>2</sub>S down to ppm levels. During Phase 2, RTI will design and build a slurry bubble column reactor system to convert the clean syngas into a liquid transportation fuel. DOE will provide up to \$2 million for the \$3.1 million project.

Southern Research Institute of Birmingham, Alabama. In collaboration with Pall Corporation, Thermochem Recovery International, and Rentech, Southern Research Institute will use a 1 megawatt thermal biomass gasifier to generate syngas. The proposed ceramic filter technology and proven gas cleanup sorbent and catalyst system is expected to exceed the required contaminant removal levels specified by Rentech. The unique cleanup technology will be coupled with a conventional scrubber and polishing filter downstream. DOE will provide up to \$2 million for the \$4.5 million project.

Other biofuels research and development projects announced this year include: \$385 million for commercial-scale biorefineries (6 projects being pursued); \$200 million for pilot-scale (10%) biorefineries to test novel refining processes; more than \$400 million for three bioenergy centers—funding originally include \$375 million, but an early

surge of funds allowed for an additional \$30+ million; and \$23 million for “ethanologen” to develop more efficient microbes for ethanol refining.

<http://www.discoverhybridcars.com/environmental-news/us-doe-to-invest-up-to-77-million-for-four-biomass-to-liquids-projects-more-than-1b-in-funding-for-biofuel-development-announced-this-year>

## **U.S. Agency Objects To Proposed Power Plant Forest Service Says Pollutants Will Spoil N.C. Wilderness Area**

Tuesday, Dec 11, 2007 - 12:08 AM

By REX BOWMAN

TIMES-DISPATCH STAFF WRITER

The U.S. Forest Service is warning Virginia environmental officials that pollution from a \$1.6 billion coal-fired power plant proposed for Wise County would violate federal clean-air laws. In a letter to the Virginia Department of Environmental Quality, the supervisor of the Pisgah National Forest in North Carolina said the plant proposed by Dominion Virginia Power would pump enough sulfur dioxide into the air to possibly damage plant life and visibility in the 12,000-acre Linville Gorge Wilderness.

The anticipated 3,300 tons per year in sulfur dioxide emissions from the plant would violate the federal Clean Air Act, which affords special protection to the pristine area, according to Forest Supervisor Marisue Hilliard. Hilliard recommended that the company find ways to reduce emissions.

The Linville Gorge Wilderness, sometimes called the Grand Canyon of the East because of its 2,000-foot gorge, is southeast of the proposed plant.

Dominion Virginia Power officials said they would not comment on the Forest Service’s analysis. However, spokesman Karl Neddenien said the company will work with the Forest Service “to resolve any issues they may have.”

The plant, called the Virginia City Hybrid Energy Center, would potentially emit 25 million pounds of pollutants into the air each year, including those that cause smog and acid rain, along with 5.3 million tons of carbon dioxide, a greenhouse gas. It would be one of the biggest polluters in the state, though Dominion refers to it as a “clean coal” plant.

Dominion officials say the 585-megawatt plant is necessary to help it meet an anticipated 4,000-megawatt jump in demand from its customers by 2017.

Hilliard’s letter comes less than two weeks after the Virginia Air Pollution Control Board asked Dominion to propose a less-polluting version of the plant. The DEQ has already issued a draft air permit to the company, but the company still needs a final permit and the approval of the State Corporation Commission.

Yesterday, the Southern Environmental Law Center in Charlottesville, which has been fighting the plant, urged Dominion to heed the Forest Service’s call for a cleaner operation.

“The Forest Service’s finding should be a wake-up call to Dominion that the old-style, polluting power plant it wants to build is a bad fit for the Southern Appalachian mountains and communities,” said Cale Jaffe, staff attorney for the center.

Jaffe said Dominion needs to make a greater effort to get its customers to conserve energy.

Contact Rex Bowman at (540) 344-3612 or [rbowman@timesdispatch.com](mailto:rbowman@timesdispatch.com).

<http://www.inrich.com/cva/ric/news/business.apx.-content-articles-RTD-2007-12-11-0038.html>

## **Study Abroad Checklist**

For several years, Virginia Tech has required all faculty and staff who are planning an international trip or program for Virginia Tech students to follow certain procedures to ensure the safety of students and the successful implementation of programs. The policy that spells out faculty and staff responsibilities in this area is Presidential

Policy Memorandum #225. This policy statement is available on the president's website, at <http://www.policies.vt.edu/policymemos/ppm225.pdf>, and is also linked from the Faculty and Staff page of the Education Abroad website, <http://www.educationabroad.vt.edu>.

Since 2003, there has been a checklist for ensuring compliance with Policy Memo 225. I am writing to inform you that the Administrative Checklist for complying with Policy Memo 225 has been revised. The University Council on International Affairs (UCIA) approved the changes to the Administrative Checklist at its monthly meeting on December 6.

I have attached a copy of the revised checklist. It is also available on the Education Abroad website, [www.educationabroad.vt.edu](http://www.educationabroad.vt.edu), under Faculty and Staff > Forms and Policies. The old checklist has been removed and should no longer be used.

Please note that the revised checklist also specifies that faculty and staff leading student programs abroad should submit a signed copy of the checklist and related information to Education Abroad/OIRED at least one month prior to the starting date of the international program. I appreciate your assistance of faculty, staff, department heads and college deans in gathering the required information and submitting it in a timely manner.

One final note: Education Abroad/OIRED has implemented a new website that includes an online database called StudioAbroad. All Tech students studying abroad will be entered into this new data system. Faculty and staff who are coordinating programs abroad and who are interested in being training in using the system should contact me to schedule a training session.

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## **Undergraduate Research & Prospective Graduate Student Conference, April 8, 2008**

Virginia Tech undergraduates are invited to participate in the 6th Annual Virginia Tech Undergraduate Research and Prospective Graduate Student Conference on Tuesday, April 1, 2008 at the Squires Student Center. Sponsored by the Center for Academic Enrichment and Excellence and the Graduate School, the conference offers a professional forum for undergraduates to showcase the results of their involvement in scholarly research and gain essential information relevant to their pursuit of graduate study.

Please ask your undergraduate researchers to hold the date and to look for additional information early in the spring 2008 semester.

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## **New Biofuels Workforce Training Program in North Carolina: CCCC Selected to Offer Biofuels Degree Program**

In North Carolina, biofuels education has a simple formula: CCCC. That stands for Central Carolina Community College, a state leader in training workers for the burgeoning biofuels industry. At its September 2007 meeting, the North Carolina Community College Systems Board of Trustees acknowledged this leadership by granting the college the distinction of becoming the first in the state to offer a biofuels associate degree program.

The two-year program, Alternative Energy Technology: Biofuels, and related certificate programs will provide the biofuels industry with workforce development and training. The degree program starts in fall 2008.

The N.C. Strategic Plan for Biofuels Leadership has identified workforce development as a key factor in growing the industry. To accomplish this, the college has worked closely with industry and will work closely with the newly formed North Carolina Biofuels Center to determine workforce-training needs.

New courses have been created for the Alternative Energy Technology: Biofuels degree curriculum, including biofuels analytics, biofuels waste management, and renewable energy technology. As part of the interdisciplinary approach, students will also take courses in chemistry, electrical control systems, welding, bioprocessing practices, and small business development.

Biofuels degree graduates will qualify for numerous positions within the industry. Employment opportunities include, but are not limited to, plant technician, plant manager, lab technician, sales manager, process coordinator, or business owner.

The college's Chatham County Campus in Pittsboro has been offering biofuels classes since 2002. The program has grown each year with strong support from numerous state agencies and industry. Since 2004, the college has received more than \$300,000 in grants to expand its biofuels curriculum.

Most recently, the Community College System's BioNetwork awarded CCCC two grants totaling more than \$140,000. These grants will help fund the expansion of biofuels courses for the degree program as well as non-curricular biofuels education for the public.

Biofuels will be housed in a new \$3.8 million, 18,000-square-foot Sustainable Technologies Classroom and Lab Building on the Chatham Campus. Ground has been broken, and the facility is scheduled for completion by fall 2009.

The new biofuels lab will facilitate training of students with analytical and production methods and equipment used in both biodiesel and ethanol production, including a seed crusher, small-scale biodiesel reactor, and ethanol production facility.

The building itself will be green, built to the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) silver standards. Included in the design, by Cherry Huffman Associates, is the utilization of fuel production byproducts for heat.

To learn more about CCCC's biofuels degree program, contact Andrew McMahan, the college's biofuels coordinator, at (919) 542-6495, ext. 214, or by email at [amcmahan@cccc.edu](mailto:amcmahan@cccc.edu), or visit the college's website at <http://www.cccc.edu/biofuels/>.