

# THE HOT PRESS

Furniture Manufacturing and Management Center  
NC State University

Spring 2008

Volume XXIV

## In this issue:

- Curriculum possibilities
- Thoughts on research
- Comments from the Director, Russell King
- Extension: How to and for whom?

## The FMMC Staff:

Russell King - Director  
919-515-3335  
king@ncsu.edu

Tom Culbreth - Assoc. Dir.  
919-515-3335  
culbreth@ncsu.edu

Steve Walker - Asst. Dir. &  
Extension  
919-515-6419  
walker1@ncsu.edu

John Summey - Extension  
919-515-6418  
summey@ncsu.edu

Harvey West - Testing  
919-515-8527  
hawest@ncsu.edu

Jean Rollins - Admin. Asst.  
919-515-3335  
rollins@ncsu.edu

Ron Aman, Research Asst.  
919-515-5188  
ron\_aman@ncsu.edu



## We want to Hear from YOU!

In our last issue of the Hot Press, we gave you the lowdown on our move to Daniels Hall after years in Park Shops. We are well settled in and it is really nice. There is a lot more space available to us than we have ever had and with that space, we think we have the opportunity to provide more and better services to both our students and our industry partners. The challenge is figuring out the best way to do that in a world that is changing so fast that it is very hard to keep up!

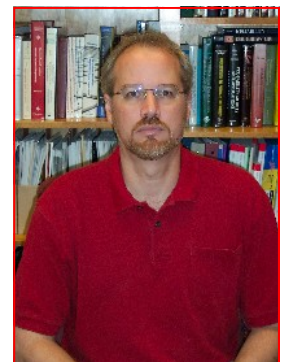
With this challenge of change in mind, we thought it would be good to tell our loyal Hot Press readers some of the things we are thinking about for our future. We have what we think are some good ideas on the direction our curriculum should take and some other good ideas that would relate our research activities more closely to the curriculum. As always, our research and curriculum would be tied closely to our extension activities. But it's important to note that these are our ideas of what we should do; it is critical for us to know what you think we should be focusing on to better prepare our students for the real world. It is equally important for us to know if the research activities we are considering are meaningful as they have been in the past. And finally, we are always looking for better ways to have our extension activities provide you with the services you need to compete effectively.

After you've taken the time to read this issue of the Hot Press, please take a little more time to give us some feedback. Tell us what you think. All our email addresses and phone numbers are listed on the left. We really want to know if you think what we think we should be doing is right. And we'll only know if you tell us *please do*.

## Comments from the Director, Russell King

We are getting nicely settled into our new home in Daniels Hall. As I mentioned in the last edition of The Hot Press, we have been looking at ways to increase our ability to serve our furniture manufacturing constituency as well as expand our ability to meet the needs of the broader home furnishings world. A plan is starting to come together.

The global economy has led to many changes in our industry, but one thing that hasn't changed is the fact that the ability to deliver new products to customers in a timely fashion will be a competitive advantage to those that can. Here at the FMMC, we have, for years, been encouraging the industry to make the investments in technology and people that can make that happen. We still think that is the right thing to do and in the future, want to be able to find ways to incorporate the concepts of rapid prototyping and mass customization more fully into our curriculum, our research activities, and our extension efforts. As always, we want and need your help.



(Continued on page 3)

## The BSIE, Furniture Manufacturing Track Program: Future Possibilities

Most of you who receive The Hot Press are graduates of either the FMM program or the BSIE, Furniture Manufacturing Track. You know that the main educational goal of the program has always been to provide well-trained industrial engineers for the furniture industry. That goal hasn't changed to be sure, but we all know that the furniture industry has changed dramatically. Accordingly, we are looking at how our educational mission needs to adapt to the world of today.

A quick refresher on the current Furniture Manufacturing Track specific curriculum:

- **ISE 330 Furniture Product Engineering.** Students examine the techniques of product engineering and its role in determining product quality and manufacturability. Students learn to translate a furniture design into a set of engineering specifications that supports efficient manufacturing of the product. The application of computer-aided design and engineering systems is emphasized in the computer-based product development, specification, and evaluation activities.
- **ISE 331 Furniture Manufacturing Processes I.** This course provides students with an understanding of the principles of wood machining processes and the capabilities of modern production woodworking equipment. Students learn to develop efficient process plans (machining sequences) based on product characteristics such as part geometry, material composition, and production volume. Students are introduced to computer-controlled machining and integrated manufacturing systems. These fundamentals are the foundation for the next two courses in the sequence.
- **ISE 430 Furniture Manufacturing Processes II.** Students undertake an intensive design project that involves the analysis and specification of the manufacturing systems required to operate a furniture manufacturing plant profitably. Based on a set of actual product drawings and estimated annual volume, a detailed quantitative analysis determines the proper floor space, machinery and manpower requirements, support systems, and operational policies for these systems. Machinery selection and specification issues are discussed in the context of product requirements, materials content, manufacturing lot sizes, and desired customer service levels.
- **ISE 431 Furniture Manufacturing Facilities Design.** Students complete the design of an integrated furniture manufacturing facility by developing a highly detailed plant layout using the quantitative specifications for the factory developed in ISE 430. They develop, via computer graphics, a physical arrangement of the production departments as well as manufacturing support and auxiliary systems. Equipment selection/arrangement, materials handling systems, storage systems, and space utilization techniques are discussed.

Combined with the rest of the Industrial and Systems Engineering curriculum and our outstanding faculty, the Furniture Manufacturing Track has served our students well. But it does have the traditional case goods focus that has been our bread and butter. Should we change?

Things we are considering include:

- Ways to have more focus on upholstery.
- Opportunities to make supply chain management and logistics a greater point of emphasis.
- Rapid prototyping and mass customization techniques for furniture manufacturing.



Perhaps our greatest challenge is in finding ways to attract students. The world of manufacturing does not have the appeal that it once did and that's not just limited to furniture. Will more of an emphasis on the skills needed to compete in a global economy (supply chain management, mass customization, etc.) make a difference?

Quite frankly, we don't know. But we are going to do our best to find out and then do our best to provide an excellent education to the students who have the good sense to take advantage of it. Let us know what you think we should be doing. We want your input — you are the end users of our education product. Help us to make it the best it can be.

Contact Dr. Rusty King at 919-515-3335 or Steve Walker at 919-515-6419 and give us your feedback.

## Future Research Efforts: What we're thinking about...

As Dr. King mentioned in his comments, we will be working on a research strategy over the next several years that would give our efforts a unified theme focusing on rapid prototyping/mass customization technology implementation. Here's an overview of what we have in mind:

1. Phase One of the effort would focus on the visual evaluation of customized furniture. In other words, how do we turn that customer's photo from their living room into data we can use to price the product, make the product, and deliver the product, all with an easy-to-use interface allowing for rapid modifications.
2. Phase Two would focus on the manufacturing challenges that Phase One success would create — Computer integrated manufacturing with dynamic bills of materials, dynamic cut bills, dynamic machine tool path planning, dynamic part routing; all based on customer dimensional and feature input.
3. Phase Three would tie in the supply chain, both upstream and downstream from the manufacturing process. This would involve the integration of purchased materials to support the system and also effective tracking tools using barcode and RFID technology. Phase Three would be adapted as the project evolves in Phases One and Two.



We're excited about the possibilities that these research activities represent. All the above would build on past research activities the FMMC has sponsored. We have faculty and graduate students with an excellent set of skills to help us move forward quickly, especially in the areas of product development and supply chain management. If over time we are able to identify and acquire the right manufacturing equipment, we think we'll be able to demonstrate some outstanding process possibilities. These will benefit the entire home furnishings industry while strengthening our education and extension missions. That's applied research at its best!



*Note that the images in this section were created in Solidworks.*



### Comments from the Director, Russell King, continued from page 1

As this issue of The Hot Press is being produced, we are preparing a research proposal for the AHFA Furniture Foundation to support a multi-year research effort that would ultimately result in our being able to demonstrate a rapid prototype/mass customization process. Initially, our efforts would focus on developing the software capability needed to turn a product concept into the data needed to make that product. Overtime and with the ongoing support of the industry (hopefully), we could develop the ability to show you, effectively and with available technology, how such a process could work.

None of this would have been possible in our old home; we simply didn't have the space to do such things. Now, however, with our Daniels Hall facilities, we have the room to give effective demonstrations. The potential to utilize substantial manufacturing equipment and more closely duplicate the real world is possible. We feel there exists a terrific opportunity to provide the industry with more support than ever before.

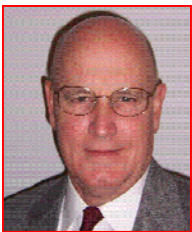
We think this is a good direction for our future. Please let us know if you think we are right.

## FMMC Extension: What We Can Do For You!

The FMMC extension staff has been working to help the Furniture Industry for as long as there has been a furniture program at NC State University. Some of the things we have done in the past include:

- Facility Design and Layout support for numerous manufacturers as they have looked for better ways to utilize existing space and to adopt Lean Manufacturing strategies.
- Classes in furniture construction and manufacturing techniques aimed at the non-manufacturing sector of the industry, specifically the retailers of the world.
- Workshops ranging from Rapid Response Manufacturing strategies to setup time reduction techniques to product development process improvement methods
- Furniture Testing — Our ongoing and highly regarded testing lab under the leadership of Dr. Harvey West with more capability to meet your needs than ever in our new facilities in Daniels Hall.

All the above have been and can be done in a totally customized way to meet the needs of a specific company. Because of our university and industry support, all the services can be offered in an extremely cost effective manner. And if we can't meet your needs ourselves, we'll do everything we can to help you find somebody who can. Please feel free to call us anytime to schedule us for a visit to your company.



John Summey  
919-515-6418



Steve Walker  
919-515-6419

Dr. Harvey West  
919-515-8527



## THE HOT PRESS

**Furniture Manufacturing and Management Center**  
**NC State University**  
**Campus Box 7906**  
**Raleigh, NC 27695**  
**[www.fmmcenter.ncsu.edu](http://www.fmmcenter.ncsu.edu)**

---

Non Profit Organization  
 U.S. Postage  
 PAID  
 Raleigh, NC  
 Permit No. 2353

---