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# TIMBER FRAME BUILDING 101:

## MSU Students Learn a New Craft

By Karen Brasher

Mississippi State University students are learning a time-honored craft and making use of new tools in the process. Saws, mallets and squares were coupled with books, laptops and flash drives for students who added technology to a craft that dates back to early civilization.

The Wood in Design and Engineering course offered in the spring 2008 semester was a hands-on laboratory in the art of building a timber frame house.

Once a popular construction method, timber frame structures date back to 6220 B.C. In the early 1900s, Sears and similar companies made a mint by selling thousands of timber frame homes through mail order catalogs.

"Timber frame homes were replaced over the years with the stud and platform building style," said Laurie Grace, forestry professor. "However, the durability, utility, building and function

of wood as a material have led to resurgence in this method of construction, especially in upscale residential and commercial markets."

With that in mind, it was decided that students in the Wood in Design and Engineering course would construct a timber frame house, Grace added.

"Working a piece of rough cut wood to finished product allows students to see firsthand how man-made and natural forces, both positive and negative, affect the lumber produced from a tree," Grace said. "That is, in fact, what we want forestry students to understand, not just in principle but in actual application."

Sweet gum trees from the university's John W. Starr Memorial Forest were cut and sawn into 4-by-4 and 8-by-9 timbers.

"The plans were to build a 16-foot by 32-foot building in two sections; however, shortage of longer lumber lengths forced a design change to a 16-foot by 48-foot building in three sections," Grace said.

Sweet gum lumber is not typically used in home construction, which provided a learning opportunity in itself.

"The actual working of wood brings to light the many theoretical practices discussed in books but seldom seen or experienced," Grace said.

Species differences, growth rates, grain patterns, fire damage, storm damage, insect damage, how the log was sawn, and even knots impact the usability of the lumber in ways that previously were not fully realized, Grace added.

Students with previous construction experience even found the project challenging.

"Timber frame structures are designed so that each member interlocks with other members of the frame with each joint individually carved and fitted," said Lance Stewart, a doctoral candidate enrolled in the course. "We could not use nails or staples as fasteners, and since the parts are fabricated to fit, there is little room for error."

Also, since the parts are not interchangeable, simple defects in a piece of lumber can cause problems. This requires thinking several steps ahead, Stewart added.

Nine undergraduate and graduate students and their friends worked on the pieces during nights and weekends in forestry professor Bill Stuart's shop. The final assembly included 275 finished pieces and was erected in 3 days.

The structure was used for the first time in June at the Mid-South Forestry Equipment Show, where continuing education courses were held for loggers and professional foresters.

It will remain as a permanent structure on the John W. Starr Memorial Forest for demonstration and to determine how sweet gum lumber performs in this application.

"The structure will also allow scientists to determine the durability of timber frame construction in the modern environment," Grace said.

This type of project has potential for development in Southern markets, creating business opportunities for small firms in rural communities that would require low initial capitalization and add value by using semiskilled labor and low-value timber, Grace added.