

# TEXTILE TOPICS

International Textile Center

Texas Tech University Lubbock, Texas USA

## Final Phases of Construction Begin for Advanced Natural Fiber Structural Analysis Laboratory

Following the removal of some large equipment in the South wing of the International Textile Center (ITC), preparations are being made to begin renovations to complete the construction of the new Advanced Natural Fiber Structural Analysis Laboratory.

The objective of the laboratory hopes to “enable new knowledge about micro-structures and molecular characteristics,” says Dr. M. Dean Ethridge, the Center’s Managing Director. “Implications for the use-value in textile processing will also be clarified. In collaboration with plant breeders and biotechnologists, genetic sources for these structural properties will be sought, in order to either select or genetically engineer cotton fibers with improved properties.”

The major part of the renovation of the 5,500 square-foot space involves enhancements for exacting control of ambient conditions and the installation of electrical and compressed air services. Then the area will be finished out and the instruments installed. The new lab is slated to be complete and operational before the end of 2006.



A moving crew removes equipment in preparation for the renovation of the new Advanced Natural Fiber Structural Analysis Laboratory

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current research  
information  
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industries.*

International  
Textile Center  
Texas Tech University  
Lubbock, Texas  
79409 - 5019  
phone 806.747. 3790  
fax 806.747. 3796  
itc@ttu.edu  
<http://www.itc.ttu.edu>

## Next Session of Texas International Cotton School to Begin in August

During the two-week period of August 21 - September 1, 2006, students from countries as diverse as Bangladesh, Korea and Australia are expected to attend the 25th session of the Texas International Cotton School. They will receive hands-on instruction in all phases of cotton production, harvesting, ginning, classing, testing, preparation, processing marketing and trading of cotton.

The Cotton School is a cooperative effort of the Lubbock Cotton Exchange and the International Textile Center, Texas Tech University. Since its inception, the mission has been to provide students with an integrated understanding of the U.S. cotton industry and how it interacts with the global cotton/textile complex. Classroom instruction is combined with use of the International Textile Center’s comprehensive laboratory facilities and with tours of cotton industry facilities located in and around Lubbock. These include, among others, cotton farming and ginning operations, a company specialized in controlling moisture content of cotton during ginning, cotton marketing and warehousing facilities, a U.S. Department of Agriculture cotton classing facility, and a textile mill.

# The International Textile Center in the 21<sup>st</sup> Century- A Brief Overview

**M. Dean Ethridge**

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In the early 21st century, both the geographical shifts in global textile production and the rapid technological changes affecting the global fiber/textile complex require that adjustments in the cotton production sector occur at a very fast pace. The dominant and emerging textile manufacturing sectors in the Orient, which are driving forces in this wave of change, need new levels and combinations of fiber properties to accompany new spinning, fabric forming, and finishing technologies. The new, hyper-competitive global textile industry must strive for greater efficiency at all stages of processing. Admittedly, this brave new world would be utterly unrecognizable to the Texas cotton producers of 80 years ago. Nevertheless, their vision to create a center for fiber and textile research that could help meet the demands of their customers into the 21st century is a testament to the insight of those pioneers.

Situated in Lubbock, Texas, among the millions of bales that stretch across the seemingly limitless horizon of the Plains of West Texas, is Texas Tech University's International Textile Center (ITC). Fulfilling a charge in the University's 1923 charter, the mission statement of the ITC is "to be a world leader in providing research, education, and technology transfer related to fiber properties and textile manufacturing, in order to increase the market value and use of natural fibers."

In order to fulfill its mission, the ITC must understand and work closely with every segment of the cotton industry, from the plant breeders and biotechnologists, through the cotton farmers, ginners, warehousemen, and merchants, and on to the textile and product manufacturers. An outstanding example of partnership in education is provided by the Texas International Cotton School, presented by the Lubbock Cotton Exchange, with Texas cotton merchants heavily involved in both teaching and hosting activities. Held in August

of each year, this intensive, two-week course has instructed 400 students from 53 countries in technical, economic, policy and marketing aspects of the global cotton industry

Within the walls of the ITC's 110,000 square foot facility one may discover a variety of studies, including: analysis of the microstructure of cotton fibers; the measurement of diverse fiber and fabric properties; the relationships of fiber properties to spinning performance and to yarn and fabric quality; the spinning performance of new cotton varieties; the development of new measurement technologies pertinent to fibers, yarns and fabrics; etc. Success in these research efforts requires that the ITC be highly collaborative with other, complementary research disciplines that are also striving to improve cotton's competitiveness.

The ITC exists within the College of Agricultural Sciences and Natural Resources and benefits from the continuous collaboration of its research faculty. Other vital collaborators include: (1) Texas Tech University's College of Engineering and College of Human Sciences; (2) Texas A&M University's Texas Agricultural Experiment Station and Texas Extension Service, especially the personnel at the Texas A&M University Research and Extension Center at





Lubbock; and (3) U.S. Department of Agriculture's Cropping Systems Research Laboratory, which includes the Cotton Production and Processing Unit (Ginning Laboratory) and the Plant Stress and Water Conservation Laboratory.

Vital guidance, as well as funding for many research projects, comes through three entities that are firmly rooted in the cotton industry. One is the Food and Fibers Research Grant Program within the Texas Department of Agriculture, which is funded by the Texas Legislature. Another is the Plains Cotton Improvement Program, which is funded with check-off funds from Texas Plains Cotton producers and is administered through their Plains Cotton Growers Association. The third entity, international in scope, is Cotton Incorporated, which is funded with check-off funds from U.S. cotton producers and importers, with the mission "to increase the demand for and profitability of cotton through research and promotion." Substantial additional funding for research projects come from the U.S. Department of Agriculture and from an array of private sector entities.

The cumulative impact of all these forces for cotton improvement have resulted in a large part of the Texas Plains crop having fiber properties that are rank among the best upland cottons produced in the U.S. Current efforts are focused on further improvements in fiber fineness and maturity, in order to further the strategic objective of reducing the neps and short fiber content of the cottons.

The nexus for achieving further improvement in cotton fiber quality will be at the genetic/biotech level; therefore, the ITC is in a close partnership with the newly established Cotton Genomics Center within the College of Agricultural Sciences and Natural Resources, Texas Tech University. Ultimate realization of these improvements will require systemic adjustments in crop management and termination, harvesting, and ginning. Therefore, the ITC is also in close partnership with those entities engaged in research and extension services that are focused on these aspects.

The most dynamic dimension of the ITC is its Materials Evaluation Laboratory and a newly developing Advanced Natural Fibers Structural Analysis Laboratory. Everything else done at the ITC eventually comes to these laboratories for measurement and evaluation. The work done here is serving much more than Texas cotton interests. For example, breeding and biotechnology entities from across the U.S. and around the world send fibers for testing and evaluation in these laboratories.

Just as the ITC was involved with the development of the high-volume instrument (HVI) and open-end rotor spinning, it is now involved with the development of technologies and methods for more in-depth fiber quality evaluation and more efficient utilization of existing fibers. The result will be to continue to change both the understanding of the fiber itself and the language used to describe fiber quality and processing performance. Eventually, fiber properties like fineness, maturity and elongation may be spoken about as naturally as length and strength are today.

"The technological changes both in cotton fibers and in processing have increased the demand of manufacturers in the Middle and Far East for further improvements in their efficiencies," says Dr. M. Dean Ethridge, Managing Director of the ITC. "Through our research, we strive both to reduce the variability of cotton fiber properties and to better manage this variability throughout the manufacturing process." Increasingly, U.S. cotton merchants are involving the ITC in dialogues with international textile manufacturers, in order to help decide what steps need to be taken to



improve the performance of fibers shipped to these manufacturers.

Global cotton spinners need measurement technology that is both fast and repeatable for properties like fineness, maturity, length distribution (short fibers), and neps. Both the development and the validation of such technology has been retarded by the lack of ‘reference standards’ that allow measurement of results obtained and progress made. The research led by Dr. Eric Hequet, Associate Director of the ITC, with essential funding by Cotton Incorporated and the Food and Fibers Research Grant Program, Texas Department of Agriculture, has already provided the necessary reference standards for maturity and fineness. Measurement technology is also being developed in the arena of yarns and fabrics. The most recent example comes from research led by Dr. Eric Hequet, in collaboration with the Department of Electrical and Computer Engineering at Texas Tech University. This team developed an instrument that accurately and precisely measures the degree of wrinkling of fabrics. This research, funded and patented by Cotton Incorporated, resulted in the licensing of the technology to a instrument manufacturing and marketing firm in the U.K., Roaches International, which displayed a commercial version of the instrument at the ITMA Asia exposition in October, 2005.

Research on processing technologies and the

relationships among fiber properties and processing performance continue to be a major thrust at the ITC. Dr. Mourad Krifa, Head of Processing Research, is evaluating compact spinning technology, with a focus on its potential to bring medium-stapled cottons into the production of finer yarns. Dr. Krifa is also exploring relationships between fiber properties and spinning performance, as well as the interaction effects among fiber properties on spinning performance

Research on issues involving chemistry and nanotechnology is led by Dr. Nouredine Abidi, Head of Chemical/Finishes Research. This work spans from raw fibers to finished fabrics; it encompasses molecular/structural issues and specialty finishes. Issues such as maturity, fineness, and the identification and quantification of sugars have dominated recent research on fibers. Recent research on fabrics has dealt with color fastness, anti-bacterial and anti-microbial finishes, ultraviolet radiation protection, hydrophobic and hydrophilic finishes, and permanent press finishes.

The Texas cotton farmers who settled the “old west” had a vision that anticipated great and continuous changes in the future. The journey through that future has now led to a new era of close cooperation with the “New East.” The ITC, like those farmers, is dedicated to continuing this mutually beneficial relationship throughout the 21st century.