TEXAS TECH UNIVERSITY
Fiber & Biopolymer Research Institute™

Newsletter—Edition
January-February-March 2019

FBRI Hosts Cotton Breeders from SLC Agrícola, Brazil

Special points of interest:

- Beltwide Cotton Conference in New Orleans, LA January 8-10, 2019.
- 2 Day Seminar held for SLC Agrícola Brazil January 22-23, 2019.
- Cotton Board & Producers tour FBRI Facility January 29, 2019.

SLC Agrícola is a Brazilian based company that produces agricultural commodities, focused on the production of cotton, soybean and corn. They sent 6 of their farm/gin managers and their logistics manager to FBRI to learn about cotton physiology and converting cotton into yarn and fabric. During the course of the 2 day seminar they toured the FBRI facility, were shown demonstrations, and received in-depth instruction from: Dr. Eric Hequet, Dr. Noureddine Abidi, Dr. Brendan Kelly, and Khawar Arain.

They were instructed on the following:

- Evolution of the Industry
- Micronaire, Maturity & Fineness
- Cotton Fiber Length and Tensile properties
- Relationships Fiber Properties-Yarn Quality
- Converting Cotton Fiber into Yarn
- Converting Yarn into Fabric
- Implication of Stickiness in Fiber Processing
- Chemical Processing of Cotton

Jorge Oliveira, SLC Agrícola, had this to say about the seminar "The course as a whole was very good, the theory was excellent, and certainly served to gain knowledge and a better understanding of the cotton culture." SLC agricola will be sending another group in fall 2019.

Dr. Kelly explains how HVI works

Helpful Links:

FBRI

Plant and Soil Science

CASNR

TTU

Biopolymer Research Group

The Cotton Board & Cotton Inc Producers Visit FBRI

On January 29, 2019 the Cotton Board hosted a regional (West Texas) meeting to update cotton producers on Cotton Incorporated-funded research in their area. The meeting was held at the Texas A&M AgriLife Research and Extension Auditorium where topics of Cotton Genetics/Production, Weed Science, Gin Improvement, Contamination Efforts and Plant and Soil Science were presented to the board and producers. In the afternoon the group of 60 individuals headed to FBRI to learn about Fiber Research and tour our facility. The Tour was facilitated by Dr. E. Hequet, Dr. B. Kelly and K. Arain. The members of the board and producers were impressed by our facility and the work and research happening here.

Dr. Eric Hequet receives Cotton Genetics Research

Dr. Eric Hequet

Congratulations to Dr. Eric Hequet! He received the Cotton Genetics Research Award while attending the Beltwide Cotton Improvement Conference in New Orleans, LA. Established in 1961 by the U.S. commercial cotton breeders to recognize and encourage basic research in cotton genetics, cytogenetics and breeding, the cotton genetics research award is administered by the Joint Cotton Breeding Committee consisting of representatives of the National Cotton Council and the USDA, along with state experiment stations, Cotton Incorporated and commercial breeders. Full story here.

Beltwide Cotton Conference 2019

The Beltwide Cotton Conferences speed the transfer of new technology to U.S. cotton producers and other industry members with the goal of strengthening U.S. cotton's competitive position in the world marketplace and enhancing industry members' profitability. The FBRI sent Dr. Noureddine Abidi, Dr. Eric Hequet, Dr. Brendan Kelly and 4 graduate students to present and participate in the 2019 Beltwide Cotton Conference held in New Orleans, LA on January 8-10. PhD student Zach Hinds won the 2nd place, out of 15, in the PhD Student Lightning Talk and Poster Competition at the Cotton Improvement Conference. Masters student Jacob James won the 1st place, out of 15, in the Masters Student Lightning Talk and Poster Competition at the Cotton Improvement Conference.

From left to right: Hinds, James, Sayeed, Morais

The Fiber and Biopolymer Research Institute receives the 2019 Headliner Award during the 35th Annual Celebrity Luncheon, April 9th 2019

The Lubbock Professional Chapter of the Association for Women in Communications presented this award to FBRI for its research and innovation in the Indigo process. The Headliner Award is presented to an individual or groups whose achievements or contributions have received widespread, positive recognition through the media and who have brought widespread positive attention to the Lubbock area. Dr. Abidi accepted this award on behalf of FBRI. Britta Tye, co-chair of the AWC Celebrity Luncheon said that "The innovative indigo dyeing process the TTU Biopolymer Institute has developed will undoubtedly have far-reaching effects".

This project may be characterized as an innovation in foam dyeing technology. Foam dyeing is a water-saving, environmentally friendly technology that began to be commercialized in the 1980s and is increasingly used around the world. While traditional dyeing requires large amounts of water, current commercial foam dyeing consists mostly of air. As such, it cannot be used for dyeing with indigo because of its characteristic of insolubility in the presence of air. Indigo is insoluble until it undergoes a chemical change called *reduction* - the chemistry opposite of *oxidation*. Reduction imparts a negative charge to indigo, making it soluble in water and able to penetrate into cotton. After the indigo is absorbed by a fabric or yarn and removed from the dyebath, it instantaneously combines with oxygen in the air and reverts to the oxidized, insoluble, fixed, and intensely blue indigo

Indigo foam dyeing equipment

Foam indigo-dyed yarn

The next Session of the Texas International Cotton School (TICS) Session will be held August 5-15, 2019

The school is sponsored and managed by the Lubbock Cotton Exchange and the Fiber and Biopolymer Research Institute. The TICS session unites professionals from around the world to interact with top cotton experts. Students enrolled in PSS 5370 will understand U.S. cotton production, processing and marketing systems, see the latest machinery and equipment and make valuable business contacts. The hands-on course also covers all phases of production, harvesting, ginning, classing and testing. Approximately 30 guest experts from the United States and international organizations provide instruction and engage in discussion with students.

FBRI continues its tradition of hosting tours and demonstration

Several individuals and groups visited FBRI:

- Better Cotton Initiative Tour. The group consisted of 47 people. The group toured FBRI labs and explanation was given about the transformation of cotton from ginning, fiber testing, and transformation of fiber to yarn and fabric.
- South Plains Quilters' Guild (13 visitors).
- BASF E3 Brand Tour. Jon Mixson from BASF led this group composed of 12 individuals from various brands and mills
- Indigo Ag (10 people)
- Indian government delegation from Cotton Corporation of Indian and Ministry of Textiles
- Visitors from VICUNHA TEXTIL Brazil (Marcel Yoshimi Imaizumi and Luiz Eduardo Veloso Moura Da Silva) and Ralph Tharpe (from Indigo Mills Design)
- TAMU Borlaug Fellows
- Bayer Breeders
- Students from the TTU Department of Design
- Representatives from Textile mills from Pakistan, Turkey, Italy, and Brazil

BASF E3 group

Bayer Breeders

TAMU Borlaug Fellows

FBRI Publications - 2019

Peer Review Papers:

1. S. Liyanage[¥], N. Abidi. Molecular weight of cellulose and its organization at different stages of cotton fiber development. *Textile Research Journal*. 89(5) **(2019)**726-738.
2. R.S. Dassanayake[¥], E. Rajakaruna, N. Abidi. Borax-cross-linked guar gum-manganese dioxide composites for oxidative decolorization of methylene blue. J. Nanomaterials, **(2019)**, https://doi.org/10.1155/2019/7232715.
3. Y. Hu, S. Acharya[¥], N. Abidi. Cellulose porosity improves its dissolution by facilitating solvent diffusion. *International J. Biological Macromolecules.* 123(2019)1289-1296.
4. X. Wu, J. Wang, X. Zhou, H. Liu, N. Abidi, Y. Zhu, H. Pan. Surface engineering of spongy bacterial cellulose via constructing crossed groove/column micropattern by low-energy CO_2 laser photolithography toward scar-free wound healing. *Materials Science & Engineering C,* 99(**2019**)333-343.
5. A. Bouyanfif*, S. Liyanage[¥], E. Hequet, N. Moustaid-Moussa, N. Abidi. FTIR microspectroscopy reveals fatty acids-induced biochemical changes in *C. elegans. Vibrational Spectroscopy, **102(2019)8-15***.
6. McCormick*, K., Morais*, J., Hequet, E. F., Kelly, B. R. 2019. Development of the Calibration Procedure for High Volume Instrument (HVI) Elongation Measurement. *Textile Research Journal*. ***IN PRESS***
7. Hendon, B., Bechere, E., Witt, T., Kelly, B. R., Mishra, D., Auld, D. 2019. Genetic Improvement of Naked-Tufted Seed Mutants in Upland Cotton (Gossypium hirsutum L.). *Euphytica.*

Book chapters:

1. Y. Hu, R. Dassanayake[¥], S. Acharya[¥], N. Abidi. 2019. Cotton cellulose-derived hydrogels with tunable absorbability: Research advances and properties. In. Polymers and Polymeric Composites: A Reference Series. Cellulose-based Superabsorbent Hydrogels. Md. Ibrahim H. Mondal (Ed.) Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-76573-0_13-1. ISBN 978-3-319-76573-0. ***IN PRESS.***
2. R. Dassanayake[¥], S. Acharya[¥], N. Abidi. 2019. Biopolymer-based materials from polysaccharides: Properties, processing, characterization and sorption applications. In: Sorption ISBN: 978-953-51-6955-0 IntechOpen. ***IN PRESS.***

Presentations:

1. A. Bouyanfif*, S. Liyanage[¥], E. Hequet, N. Moustaid-Moussa, N. Abidi. Fourier Transform Infrared microspectroscopy imaging to study *C. elegans*. 257th American Chemical Society National Meeting and Exposition, March 30-April 4th, 2019, Orlando, FL.
2. N. Dissanayake*, V.D. Thalangamaarachchige[¥], S. Troxell, E. Quitevis, **N. Abidi.** Cellulose dissolution in imidazolium-based ionic liquids: Effect of size and shape of cations. 257th American Chemical Society National Meeting and Exposition, March 30-April 4th, 2019, Orlando, FL

*: Graduate student, [¥]: Post-doc

Changing the way the world talks about fiber quality

The Fiber and Biopolymer Research Institute of the Department of Plant and Soil Science at Texas Tech University is committed to serving the research needs of manufacturers, cotton breeders, and public agencies. In addition, our academic programs, in conjunction with other colleges at Tech, are continually in progress. Research done at the FBRI is changing the way the world talks about Fiber Quality.

FBRI Laboratories

Provide valuable research and evaluation services to cotton breeders, researchers, seed companies, and producers. They provide excellent opportunities for undergraduate and graduate students to perform research on cotton.

Ginning (contact: noureddine.abidi@ttu.edu)

- Micro-gin: 24-saw fully-equipped Lummus Imperial III gin stand fed by a Lummus 700 Feeder. The gin is equipped with a super -jet lint cleaner behind the gin stand and a single Sentinel II saw lint cleaner (18" in width) for lint cleaning
- Tabletop 10-saw gin (minimum 50 g)
- Tabletop roller gin (for small sample 10 g or less)

Fiber Testing (contact: khawar.arain@ttu.edu)

- High Volume Instrument (HVI) Testing: HVI testing using Uster Technologies 1000 systems, providing the average of micronaire, length, uniformity, strength, elongation, color, and trash
- Advanced Fiber Information System (AFIS) Testing: AFIS provides measurements for length, maturity ratio, fineness, neps, and trash
- FAVIMAT single fiber testing to determine tenacity, elongation, work-to-break, and linear density
- Yarn testing

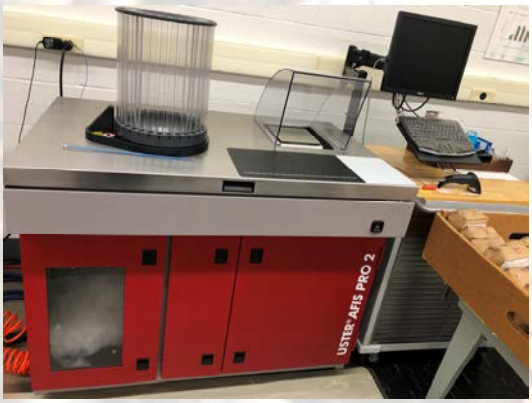
Yarn Spinning (contact: khawar.arain@ttu.edu)

- Yarn spinning (carded and combed)
- Rotor spinning

Other testing (contact: noureddine.abidi@ttu.edu)

- Fiber cross-section.
- X-Ray diffraction, FTIR analysis, Thermogravimetric analysis, High Performance Liquid Chromatography.

HVI



AFIS

Statimat yarn testing

The Fiber and Biopolymer Research Institute is committed to providing a safe working environment for its students and staff. Students and staff participated in safety training related to fire extinguisher and laboratory safety.

Fire Extinguisher training

FBRI students and staff took part in group fire extinguisher training. Fire marshal Mike Kennon and fire inspector Clint Morris led the class. They shared the acronym to help students and research staff to remember the steps taken when using a fire extinguisher, PASS: **P**ull the pin on the extinguisher, **A**im the hose nozzle, **S**queeze the handle to release the extinguishing agent, **S**weep the nozzle form side to side at the base of flames until extinguished. Learning how to properly extinguish a fire is an invaluable lesson since our primary research material is highly flammable cotton.

Clint Morris and Mike Kennon share fire safety tips with FBRI personnel

Lydia Cruz puts out the test fire while Clint Morris coaches on technique

Equipment for training included a fire simulation "stove," propane tank, and an air compressor used to recharge fire extinguishers between uses.

Laboratory Safety Seminar

Heather Coats, Senior Lab Safety Specialist with Texas Tech University Environmental Health & Safety, presented a seminar and demonstration to students and staff on various laboratory safety issues. For example, students practiced how to deal with chemical spills.

Heather Coats explains the use of different PPE

Students practicing how to deal with chemical spills

Visit us on the web!

http://www.depts.ttu.edu/pss/FBRI.php

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