A technical program titled *Performance Enhancement of Textile Fabrics using Functional Finishes* was sponsored by the re-organized Piedmont Section of AATCC on March 1st. The program was conducted at the Speedway Club at Lowe’s Motor Speedway in Concord, NC. A total of 128 associates registered for the one day program that included topics related to imparting specific functional properties to textile fabrics for specific end-use applications.

Functional properties discussed included anti-microbial treatments and flame retardant finishes and coatings for textiles. Anti-microbial technology for the war fighter was a specific application area discussed by one of the speakers. New technologies for improved or enhanced performance of cotton apparel products were presented. The topic of textile fluorochemical applications was designed to educate the audience and to challenge some of the myth and misunderstanding concerning fluorochemistry. One of the presentations discussed market research data showing the trend in performance apparel and consumer preferences for various product categories. One topic reviewed the plan and commitment of a specific company in sustainability efforts to become a ‘mission zero’ company by 2020.

The following is an overview of highlights of the program.

**State-of-the-art at the university**

Dr. Blan Godfrey, Dean of the College of Textiles at North Carolina State University, gave a review of the various research project areas at the university related to performance textiles. The textile school has seventy four industry or funding participants for the various ongoing programs. Two thirds of the graduates from the College of Textiles accept employment in North Carolina and two thirds of those positions are in a textile related industry. The university is actively engaged with other universities in the National Textile Center. This consortium of universities includes NCSU, Clemson, Georgia Tech, UMass-Dartmouth, Auburn and Philadelphia University.

One of the fastest growing areas of the textile school has been the Nonwovens Cooperative Research Center. Nonwovens textile applications are used in automobiles, military end uses as well as hospital and laboratory gowns.
The university is involved in a cooperative project to redesign the standard hospital gown with Johnson & Johnson. The ordinary hospital gown has not been redesigned for decades. The university received a $2 million dollar grant from the federal government to develop and test protective wear for biological and chemical resistance. Federal funding has also been received to develop a new generation of turn out gear for firefighters.

The university has expanded efforts to include cooperation with home care equipment companies that manufacture washers and dryers. Companies such as Whirlpool and GE have looked to the university to provide guidance in the future design of these appliances.

Other areas include bio-medical textiles research and fiber based medical devices. Self cleaning fabrics and anti-viral textiles may be possibilities for selection in future apparel choices. The university is evaluating new fibers research to provide ‘smart fiber’ technology that responds to various environmental factors.

The Textile Protection and Comfort Center, established some fourteen years ago, provides a state-of-the-art testing facility to conduct controlled experiments and testing of new product and apparel developments. This laboratory also is the home of ‘Pyro-man’.

A general overview of antimicrobial treatments for textiles was given by Bill Hanrahan of Microban Products Company. The overview included requirements for EPA registration, requirements for testing to comply with regulations and the various chemistries that can be applied to give antimicrobial properties. Other information discussed included test methods to determine efficacy and variables affecting laundering durability.

Ron Dombrowski of Tech Tex Solutions reviewed flame retardant finishes and coatings. His presentation covered phosphorus based and halogen based chemistries. Regulations and environmental concerns were reviewed.

New technologies for improved cotton fabric performance properties were presented by Michele Wallace of Cotton Incorporated. Three topics covering new finishing applications for cotton included Tough Cotton™, Storm Denim™ and Wicking Windows™. Tough Cotton™ is a finishing treatment that improves tear strength and abrasion resistance properties of wrinkle resistant cotton fabrics. Storm Denim™ is a garment treatment process for denim apparel that imparts a water repellent finish while maintaining the breatheability of the garment. Wicking Windows™ is a finish application that increases the water wicking ability of cotton and introduces moisture control of cotton fabrics.

Antimicrobial technologies for apparel for the warfighter were discussed by Amy Johnson of the U.S. Army Natick Soldier RD&E Center. Several keys issues were mentioned related to the fact that treatments on warfighter fabrics must be safe for extended wearing applications. Durability of technologies must be durable and effective in odor control for field applications. A description of the complexities of conducting field trials was enlightening.

Bob Buck from the DuPont Company addressed a number of essential facts that the consumer and general public needs to know about fluorochemicals. Mr. Buck emphasized
that the statement PFOA-free is a misnomer. He discussed the limitations of analytical testing procedures and the differences between limits of quantitation and limits of detectability. There is a lack of sufficient information to indicate that fluorochemicals are dangerous. More information must be gathered and testing performed to assess the risk(s), if any, associated with the use of fluorochemicals.

Megan Huffman of Cotton Incorporated gave a presentation on performance apparel and the cotton consumer. Market share of performance apparel products was discussed. Other information presented included sport apparel market share for men and women as it relates to age group and spending patterns of these groups.

A presentation about sustainability and green manufacturing was given by Eric Harrington of Interface. This presentation was a case history account of what Interface is doing to become a ‘mission zero’ company. A mission zero philosophy includes priorities for sustainability that encompass elimination of waste, elimination of benign emissions, using renewable energy sources, incorporating resource-efficient transportation and redesign of business models to use a green supply chain approach to produce green products.

A highlight of the day was the guest speaker for the luncheon. Jason Keller of the Busch Series discussed the protective apparel used by race car drivers. This included every piece of clothing worn by a driver as well as other equipment including seat belt material. He has become more interested in performance fabrics and the supply chain to produce these products after he learned that his father supplied various chemical products for the textile industry.