Grants Support Textile Research

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Undergraduate and graduate students conducting textile-related research projects are eligible to apply for grants from the AATCC Foundation. Interested students may visit the Foundation website, www.aatcc.org/foundation/research.htm, and click "Guidelines" for a list of suggested topics and application information.

The Foundation awarded four grants in 2007. An abstract of the first winner's work was published in the February issue of *AATCC Review* (Vol. 8, No. 2, p21.) Here, the second article in our two-part series, we abstract the work of the three remaining grant recipients.

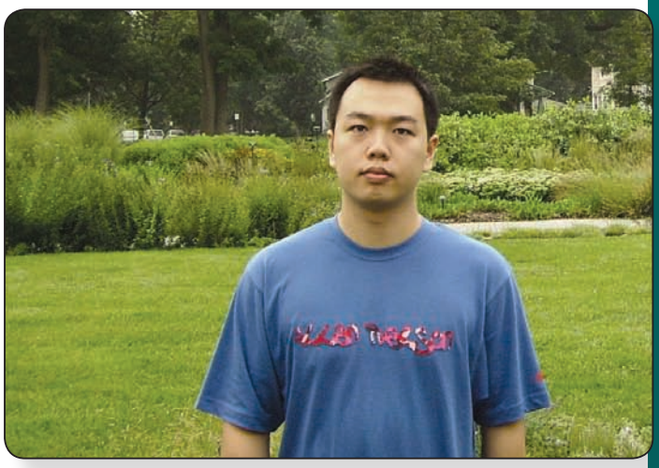
Ashley Jacobs, Louisiana State University; School of Human Ecology; Baton Rouge, La., USA

Advisor: Ioan Negulescu

Monitoring Molecular Mass During Processing of Poly(Lactic Acid) for Making Fibers and Coloration

Poly(lactic acid), or PLA, is prone to thermal degradation during the spinning of fibers and processing, particularly during coloration, both in the wet and dry states. The present investigation will be focused on the variation of the molecular mass of PLA during melt spinning of fibers from pellets, as well as during coloration of fibers in the wet state. Colored fibers will be also obtained by adding dyes during the spinning process. The molecular mass of the PLA polymer will be monitored rheologically by the variation of the

melt viscosity at the same temperature as that of the spinning processing. Absolute molecular mass of all PLA samples (i.e., before and after spinning and dry coloration of fibers, as well as before and after wet dyeing) will be determined by a novel size exclusion chromatography/light scattering method developed at Louisiana State University using chloroform solutions of respective PLA species.



Soak Wai Wong,
Virginia Polytechnic Institute & State University; Apparel, Housing, and Resource Management; Blacksburg, Va., USA

Advisor: Jessie Chen-Yu

Effects of Climate Conditions, Washing Action, Fabric Softeners, and Repeated Laundering on the Ultraviolet Radiation Protection of Woven Cotton Fabric

The purpose of this research is to examine the effects of climate conditions, washing action, household fabric softeners, and repeated laundering on the ultraviolet radiation (UVR) protection of woven cotton fabric. A Q-Sun Xenon Test Chamber will be used to simulate three weather conditions (e.g., a semi-tropical climate as is found in South Florida; a semi-arid climate as in Phoenix, Arizona; and a temperate climate as in Columbus, Ohio). Three types of washing action will be included in the study (e.g., top-load, vertical-axis washing machine with an agitator; front-load, horizontal-axis washing machine with tumble action; and water-saving, top-load machine with toss action). Two types of softeners (e.g., rinse cycle softener and dryer sheet softener) will be used in the study. After the specimen has been exposed to a selected climate condition according to the AATCC Test Method 169, the specimen will be washed with a selected washing action, using a selected type of fabric softener. This process will be repeated 20 times. The ultraviolet protection factor of specimens will be measured before washing and after 1, 5, 10, 15, and 20 washing cycles. Shrinkage will also be measured as a control variable. Based on the design above, a four (three climate conditions, plus a control group) by three (types of washing action) by three (two types of fabric softener, plus a control group) by six (before washing, and after five levels of washing cycles) experimental design is developed, which results in a total of 216 (4 ×3 × 3 × 6 = 216) experimental cells. For each cell, five repeats will be conducted.

Yi Zou,
University of Nebraska-Lincoln; Department of Textiles, Clothing, and Design; Lincoln, Neb., USA

Advisor: Yiqi Yang

Biodegradable Protein-based Composites for Automotive Headliner and Other Applications

This project will develop 100% biodegradable protein-based composites using byproducts of agricultural processing. Specifically, chicken feathers and wheat gluten will be used to develop composites specifically targeted for the automobile industry. About four billion pounds of chicken feathers and about 200 million pounds of wheat gluten are available in the US every year. Both chicken feathers and wheat gluten are sold commercially at less than US$1 per pound. Using wheat gluten and chicken feathers will not only provide cheap, abundant, and indigenously-available renewable resources for composites, but will also add value to the agricultural products.

In the proposed research, we will blend chicken feather fibers and wheat gluten in various proportions and study the effect of various processing conditions such as density, temperature, time, and thickness on the properties of the composites. The composites developed will be characterized for their tensile, flexural, and acoustic properties using standard test methods. The compatibility of wheat gluten and chicken feathers will be analyzed using scanning electron microscopes (SEMs), X-ray diffraction, and other equipment.