

Lorraine Vander Wielen: doctoral studies focus on fiber modification

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Reports by selected students on their research are a highlight of the annual Executives' Conference at the Institute of Paper Science (IPST) in Atlanta, Georgia, USA. Lorraine C. Vander Wielen, a doctoral candidate at the school, was one of the featured presenters at the September 23, 2002 meeting.

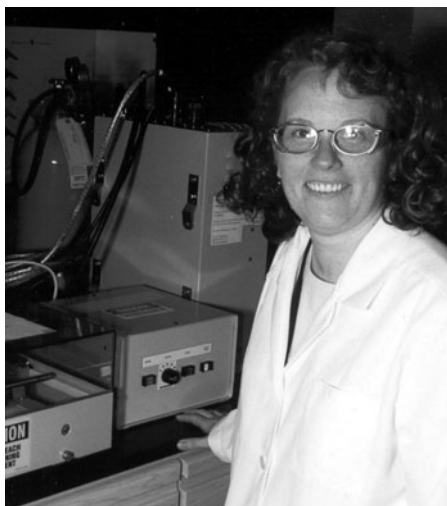
A native of Darboy, Wisconsin, near Appleton, Vander Wielen has been working on fiber modification through corona discharge. The technique applies a high voltage to a sample placed between two electrodes. The result is enhanced adhesion between flat surfaces, as already demonstrated elsewhere with cellulose films, ink to paper, laminates to wood, and so on.

"Corona discharge has the potential to oxidize and create radicals in materials," Vander Wielen noted. "The equipment is readily available, and can be operated in atmospheric conditions. Given its potential to cause chemical reactions to occur at the surface of the fiber and the availability of the equipment, it seemed like a natural direction to pursue," she said. Potential industry benefits include new methods to develop or improve products. The ideas for the research grew from discussions with Arthur J. Ragauskas, her advisory professor at IPST. The work is "based on the increasing need for fibers with new or improved surface chemistries which could be used for improving the properties of existing products as well as new product development," Vander Wielen explained. To develop the project, she had to pull together information and seek advice from experts in the areas of paper physics and wood chemistry.

"Although we've only been working on the project for a few months, we've seen some interesting preliminary results regarding the impact of fiber modification on the physical properties of pulp," she said. Initial results will be presented at an upcoming TAPPI conference. Her previous work with Joel Panek and Peter Pfromm on the effect of temperature and pH on the fracture of toner printed paper due to paper swelling was presented at

the 1997 TAPPI Recycling Symposium in Chicago, Illinois, and published in the *May 1999 TAPPI JOURNAL* (vol. 82, no. 5, pp. 115-121).

"The most satisfying aspect of working at IPST is the people," Vander Wielen



said. "The IPST faculty and my research committee are wonderful resources for advice. IPST also provides opportunities to develop contacts with widely respected researchers, executives, and managers throughout the pulp and paper community. These contacts have also been extremely helpful."

"Growing up near the Institute of Paper Chemistry (which later moved to Atlanta and became IPST) in Wisconsin's Fox Valley, I was aware of the unique opportunity for graduate research the institute provides," Vander Wielen said. "Pulp and paper was the dominant manufacturing industry, and the basis of the economy (in the Fox Valley), so I have always been aware of the importance of pulp and paper research."

Vander Wielen's interest in the industry also stems from her family's involvement. Her grandfather came from Holland to the United States to work in the pulp and paper industry. Her father retired from Asten/Johnson, her brother works for P.H. Glatfelter, and one of her three sisters worked for Kimberly Clark before taking on the challenge of helping

her husband run their farm and raise their children. Many of her uncles and cousins also work in the pulp and paper industry. (Her mother, however, worked as a grade school teacher before becoming a full-time wife and mother.)

Vander Wielen already has a master's degree in science from IPST. Before returning to IPST to pursue her doctorate, she worked four years at International Paper's mill in Camden, Arkansas. "That time in industry reinforced my interest in pulp and paper and further motivated my desire to pursue the Ph.D."

Like other students of today and of the past, Vander Wielen enjoys her studies, but is looking forward to the opportunity to both apply what she has learned, and to continue to learn and develop throughout her career.

"Many opportunities exist for researchers to make a difference," she said. "Although too numerous to list, these include the development of new and improved products, the development of new ways to modify papermaking fibers, the use biotechnology to improve trees, efforts to keep up with environmental regulation, and the development of innovative/cost effective process technologies." **TJ**



Vander Wielen is a member of the Pine Mountain Trail Association and a hiking and back-packing enthusiast.