

Biography:**Margaret W. Frey, Ph.D.,****Education:**

Cornell University	Chemical Engineering	B.S. 1985
Cornell University	Fiber Science	M.S. 1989
North Carolina State University	Fiber and Polymer Science	Ph.D.1995

Positions Held:

Associate Professor, Department of Fiber Science and Apparel Design, College of Human Ecology, Cornell University (July 2008-present)
Lois and Mel Tukman Assistant Professor of Human Ecology, College of Human Ecology, Cornell University (July 2005-June 2008).
Assistant Professor, Department of Textiles and Apparel, College of Human Ecology, Cornell University (July 2002-June 2008).
Manager of Material Development, Champlain Cable Corporation, (January 1998 – April 2002).

Research interests in formation of functional fibers and fabrics and utilization of rapidly renewable polymers in fibers and textiles

Title: Formation and functions of high surface area fabrics

Fibers with submicron diameters can be used to create fabrics with large specific surface area. By further controlling the surface chemistry of the fibers and the pore spacing between fibers, some unique functionality can be added to non-woven fabrics. Laboratory and greenhouse trials have confirmed that chemicals can be delivered via timed-release from fully biodegradable fabrics. Effective doses of pesticides were delivered over the course of plant growth cycles (months). Both diffusion of the chemical from the fiber and biodegradation of the fiber contributed to the sustained pesticide delivery. In a second application, similar fabrics have been activated with antibodies for selective capture of biological molecules. Incorporation of biotin into fibers as they were formed created attachment sites for streptavidin protein and biotinylated antibodies at the fiber surfaces. Thirdly, improved capture of particles and volatile organic compounds from air as compared to conventional materials has been demonstrated. Capture of sub-micron particles from air streams increased by a factor of 5 without an increase in pressure drop across the filter when nanofibers were added to a conventional filter media. Relationships between the fiber formation methods, fiber and fabric properties and effectiveness of the fabrics in all of these applications will be discussed.