



# FROM HARRY POTTER'S INVISIBILITY CLOAK TO ACTIVEWEAR THAT BREATHES ON ITS OWN...

## ...the Textile Industry Is Going Places We Never Imagined

What comes to mind when you consider the word "textile"? If you stopped at thread, fabric or yarn, it may be time to expand your textile horizon. The modern textile industry is going places we never expected or imagined. Through cutting-edge projects in disciplines like color chemistry, 3-D printing and microbiology, industry trailblazers hope to awaken the public to the audacious world of textile innovation.

"Due to the accelerating pace of change, opportunities abound for those currently in the industry, as well as those looking to join the textile field," said Marcia Weiss, associate textile design professor at Philadelphia University. "Among students, there is great interest in new technologies, sustainable textiles and artisanal textiles. Seeing how students mix these mediums is both captivating and inspiring."

Ally Leedy, a senior at North Carolina State University's College of Textiles, is one such student. As one of only 60 students in the world majoring in polymer and color chemistry with a concentration in science and operations, Leedy's niche educational experience makes her especially valuable to leading textile brands.

"I've observed and conducted a range of research experiments while in school. Recently, I created a goo using sound waves. With further processing, it can then be made into tiny micro-fibers that, when layered upon each other, can filter toxins from blood," said Leedy. "It's hard not to be optimistic about the future of the industry when I witness students exploring textiles through chemical experimentation and absorbing guest lectures from Nobel Prize-winning professors."

To introduce students to refractive index theory, Leedy's professor placed an oil-filled shot glass inside an upright pint glass. He proceeded to fill the pint glass with the same oil, and as he did, the shot glass disappeared. It sounds like a magic trick, but the professor applies this theory to his textile research, hoping to discover fabrics with negative indexes and in turn create fabrics that essentially appear to be invisible. Cue Harry Potter's cloak.

Brianna Brinkley, senior fashion design student at the Savannah College of Art and Design, echoed Leedy's sentiments: "I recently took a textile class that addressed the future of fabrics comprised of cotton, wool and silk, and it amazed me. It's hard to wrap your mind around just how many fabrics are out there and the thousands of ways they are created."

One microbiology case study highlighted by Brinkley's professor chronicles a Brooklyn-based biotech startup's efforts to grow ready-to-wear materials. The company, Modern Meadow, uses bovine cells to create a dense material similar to cowhide. By influencing cell cultures, scientists can customize a material's strength, texture, weight and elasticity. Modern Meadow scientists and creatives hope to ultimately fashion a type of leather that is lightweight, transparent, stretchy and responsive.

"Concepts of microbiology are being applied to a range of fashion products," Brinkley said. "I am particularly intrigued by athletic apparel. I was wowed by a New Balance project that used bacteria to create a synthetic 'second skin' that physically transforms when exposed to moisture. When a person's body temperature reaches a certain point, the second skin responsively opens up and allows sweat to evaporate."

Using Atomic Force Microscopes, a micron-resolution printer and other tools, researchers at MIT Media Lab's Tangible Media Group attached these bacteria to wearable fabric. The team developed many performance tests using a variety of patterns and shapes of cells; tests ranged from folding and bending exercises to raising a texture on a cloth. Designers then integrated the printed film composites into clothing using heat maps to determine where the body sweats most during exercise.

"These projects speak to why it is important for the industry to train future generations," said Bill Jasper, chief executive officer of Unifi Inc. "As the region and industry move into a more sophisticated era, it's becoming increasingly important to have prepared, passionate, innovative and thoughtful young talent. We've hired many young engineers and chemists over the last few years, and we've tasked them with developing what's next for our company and driving sustainability throughout the industry."

Unifi manufactures an array of textile products including multifilament POY (partially oriented yarn), draw textured yarn (DTY), polyester stable fiber, nylon textured yarns, recycled PET (polyethylene terephthalate) chip and premier value-added yarns with enhanced



performance characteristics. One such value-added yarn is Unifi's REPREEVE® product. REPREEVE is a family of recycled fibers made from recycled materials, including plastic bottles. REPREEVE turns the bottles into items worn and used every day, creating a "reprieve" for the planet.

"We continue to invest in research and development, especially from a functionality standpoint. We enjoy working with Ford, The North Face, the University of North Carolina at Chapel Hill and others to develop innovative projects and initiatives," Jasper said. "It's amazing where these types of partnerships take the industry. Right now, with REPREEVE, we're transforming bottle and polyester waste into yarn, which ultimately ends up in products like The North Face jackets and automobile interiors."

This industry is technical. It's savvy. It's sophisticated. According to SelectUSA, U.S. textile exports increased by 45 percent between 2009 and 2014 to \$18.3 billion. Textile and apparel manufacturing employment stands at a half-million; and because our industry requires inputs and other support services, a multiplier effect is generated. In major textile-producing states, government statistics show that each textile job supports an average of three additional jobs in sectors as diverse as banking, chemicals, shipping, rail, energy production and more.

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CEO, Unifi Inc.

"Since I entered college, textile careers have continued to shift and evolve, and that evolution excites me," Leedy said. "I'm hopeful as I enter the job hunt, because those I'm learning from and about are incredibly intelligent. These industry leaders are not only smart enough to dream up innovative ideas, but they are also bold enough to attempt them. That boldness captivates me."

Leedy's optimistic outlook resonates with Brinkley, Weiss and Jasper. Whether student, professor or CEO, there is a general consensus that the industry is heading in a progressive and innovative direction. Textile workers are becoming more skilled, while the industry as a whole is becoming more technologically advanced. Aspects of Harry Potter's world of wizardry may just be within our reach after all.

