

Nanotech advances nanew fabric

By Kevin Maney, USA TODAY

By this summer, you'll be able to have nanotechnology in your pants. Oh, baby.

Really — you'll walk into a store and see pants tagged with the brand name Nano-Dry or Nano-Care, each made with nanotechnology created by Nano-Tex, a 14-person company that's 51% owned by fabric giant Burlington Industries. This might be the first time that nanotech shows up in a mass-market consumer product — a landmark of sorts. You could even say these will be the first true smarty-pants.

Of course, the vast majority of shoppers will have the same reaction as Burlington CEO George Henderson when he was first presented with the idea for nanotech textiles. "I had no idea what nanotech was," he says. "The only thing I remember thinking was *Mork & Mindy* — you know, 'Nano-nano!' That and 'nanosecond.' But otherwise, I had no idea."

Nanotechnology is supposed to be a technology of the future — as in, like, when we have cars that fly and biotech Brussels sprouts that taste like chocolate. Nanotech literally refers to any technology done on a nanometer scale. A nanometer is one-billionth of a meter, which is three to five atoms across. Scientists at places such as Bell Labs and IBM Research are only beginning to be able to build minuscule mechanical and information devices on that scale.

The Nano-Tex products are extremely simple nano devices. Actually, they're more like nano hairs. This is nanotech on training wheels. Still, it's nanotech, it works, and it's going into an everyday product, which is pretty amazing.

The driver behind this is David Soane, a doctor of chemical engineering who had already founded two molecular technology companies, ZMS and Alnis. A few years ago, he became fascinated with nanotechnology and tried to think of practical applications.

"I did a little tinkering in the lab with a couple of guys," Soane says.

They came up with a way to use nanotech to add properties to different kinds of natural and man-made textiles without changing the look or feel of the fabric. In 1998, he launched a company based on the technology and called the start-up AvantGarb, a name more clever by half than most of what Silicon Valley comes up with.

The technology behind the first product, as explained by Soane, works like this:

A cotton fiber is a round cylinder. On a nano scale, it's the size of a tree trunk. Now imagine grafting lots of little hairs onto the tree trunk until it creates a peach fuzz effect. Soane is doing that to the fibers, using what he calls nano-whiskers, which are built atom-by-atom. This is all pretty tricky. The whiskers have to be the right shape. They have to be able to be suspended in water so fabric can be dipped into a nano-whisker solution. And, once applied to the fabric, the whiskers have to land on the surface and stick with the blades pointing up.

The fuzz on the fibers is permanent — it changes the fabric itself so it can't wash or wear off like other coatings used to make cotton resist wrinkles and stains. It is also undetectable, except when seen under a high-power microscope.

The fuzz creates a cushion of air around the fibers, Soane says. When water hits the fabric, it beads up on the cushion and rolls off. It can't get through. But if force is applied to the water, it passes through the fabric but doesn't get absorbed by the fibers — so sweat, for instance, can

still be wicked away from your body. Apply this to a pair of khakis, and you get pants that resist wrinkles, stay dry in the rain and wipe clean when, for instance, air turbulence shimmies your coffee cup off the airline tray table and onto your lap.

After nailing the technology, Soane went to see Henderson, bringing along an eyedropper, a tiny swatch of treated fabric and an explanation of nanotechnology. Henderson, once he got past images of Robin Williams in an alien suit, jumped on the opportunity.

He invested and got a 35% stake, later increasing the stake to 51%. Burlington renamed the company Nano-Tex. The heart of Nano-Tex has stayed with Soane in Emeryville, Calif., but the company now has some of its staff at Burlington's Greensboro, N.C., headquarters.

It should be mentioned that Burlington desperately needs something like this. Its financial performance and stock price have been sinking for years. The stock is now at \$1.75. Analysts usually rate stocks as buy, hold or sell. Burlington's is rated more like "run the other way." Henderson believes Nano-Tex could not only give Burlington new, premium products, but also buff its image.

Anyway, Nano-Tex perfected the nano-whiskers for cotton to create Nano-Care. Then it created nano-arches, which can be attached to nylon or other man-made fabrics to give them a cotton-like wicking ability. That's the Nano-Dry product.

Burlington is making fabric with the processes. It also plans to license the processes to other mills. So far, it has signed up Gayley & Lord, the biggest maker of fabric for khaki pants. (Makes you realize there's a biggest maker of everything. Hey, we're the biggest maker of khaki pants fabric! Or, like, we're the biggest maker of those tiny screws that go in eyeglasses! Or pencil lead! Or xanthan gum!)

By summer, khaki pants made using Gayley & Lord fabric and Nano-Tex technology should be on the market. The cost? About \$5 more for a pair of nano-pants.

What's next? "There are many other geometries we can explore," Soane says. Nanotechnology might be able to give fabric all kinds of properties. "The nanotech world creates unimaginable promise for the future," he says.

How about self-cleaning textiles that are covered in nano-machines that eject dirt? Or self-repairing pants: If it tears, nano-devices in the cloth seamlessly close it up.

"We don't have the luxury of tinkering with things that are years down the line," Soane says, good-naturedly. "We want to create a business."

But you can tell he's thinking about it.

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