

How Guo's smart shirt can save your life.

The marriage of technology and fashion is nothing new. Creative minds such as Hussein Chalayan, Francesca Rosella and Ryan Genz, who have dressed stars like Lady Gaga and Katy Perry, have designed clothes using LED and lasers long before smart phones became commercial. Seen in art shows and concerts, interactive fashion has had an entertainment and aesthetic value. But researchers are now giving smart textile a deeper meaning. Li Guo, a doctoral researcher at the University of Borås in Sweden, has created a smart T-shirt—one that will save lives.

As with any T-shirt, comfort, design and ease of use are factored in the making of Guo's T-shirt, which at first glance doesn't appear noteworthy. Except it is. The T-shirt interacts with wearers and could ultimately save the lives of those suffering from chronic respiratory diseases such as sleep apnea and asthma.

Guo designed the T-shirt with fashion and medical utility in mind. The shirt had to be comfortable, wearable and washable. The fabric had to maintain its weight and elasticity. It also had to measure a person's breathing rate.

Back in the 1990s, some of Guo's senior colleagues at Borås created a T-shirt to monitor respiration rates. But the fabric in that case was used as "a base for conventional electronics," meaning the electrical monitors were glued on the fabric.

Guo's T-shirt doesn't contain a monitor. It is a monitor. Before the fabric is sewn, the fibers are coated with conductive ink in a process similar to silk-screening. A mesh-like screen is placed on top of the fabric and the conductive ink is then applied. The screen's tiny holes allow the ink to penetrate the fabric surface, and the fabric fibers adopt the conductive features of the ink. The now-conductive fibers expand and contract as the patient breathes, sending electrical signals that medical professionals can monitor and respond to.

This is how Guo hopes the T-shirt will enhance the lives of respiratory patients.

Hailing from China, a country with a strict one-child policy, Guo recognized the burden most Chinese children and parents carry. In a country that doesn't share the same social security most elderly people in Sweden enjoy, the child becomes obligated to care for ill parents. Guo says the responsibility becomes more time consuming and financially and emotionally draining for married couples who have to keep a close eye on aging parents.

People using the T-shirt will no longer have to depend on their children, Guo hopes, because the garment allows a doctor to monitor their health and detect life-threatening activities.

Associate Professor of Fiber Science at Cornell University, Juan Hineostroza says the purpose of smart textile is "to see what is happening with the human body." Something smart phones can't do because they don't operate on their own.

"It's like having a second skin that will be able to monitor your body."

Even westerners can benefit from the "second skin" that is Guo's shirt. Those who need constant monitoring can feel less bound to equipment needed to deal with their diseases. People like Anna Contreras Zepeda, a single mother of two in Sweden, are great candidates for the T-shirt.

Since she was 7, Zepeda has had chronic asthma. Often triggered by physical exhaustion, pollen and furry pets, the disease has made her dependent of three different medications; an inhaler, a Brincanyl Turbuhaler and cortisone. Without them Zepeda skirts death.

She remembers going for a walk to a secluded wood in Norrköping, Sweden, and suddenly gasping for air "I could feel my air pipes closing up and my chest felt heavier," she says. "I couldn't breathe. I reached for the Brincanyl in my jacket and realized that it was in my other jacket. I had to then just sit down for a while and try to calm myself down...My worst nightmare...is to choke (and die) from

lack of air,”

Zepeda believes Guo’s T-shirt can help those with respiratory issues by supplementing her medications and instilling a sense of safety whenever she’s out jogging. That said, Zepeda guesses the advanced T-shirt would be far more expensive than her medication. Her assessment isn’t too far off.

Although technology is advancing quickly, Guo says if the T-shirt is used commercially, the price range will be equivalent to luxury goods. Imagine a T-shirt with a price range from \$10,000 to \$150,000. That’s a Birkin bag!

Luckily, the rapid evolution of technology usually drives prices down and Guo would be a step closer to enhancing the lives of the generations after her. And regarding smart phones, she’s confident the technology will usurp the apps that measure things like heart rates.

“People forget their phones,” she says, “but they will not forget their clothes.”

By: Winta Matteous-Mebrahti

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