



# MATERIAL WHIRL

Solar-powered jackets, anti-spill silk, intelligent pants and see-through walls – Clare Dowdy looks

Until now, picking a new shirt has come down to colour, style and peer pressure, perhaps. But the decision-making process could get trickier if tops whose pattern changes according to the heat of the wearer's body start hitting the shelves. Or imagine – if you dare – special fibres in underpants which register bodily secretions that signal unwelcome changes in cervical cells and fertility, and medicate the wearer through their skin. These are just two manifestations of materials science. In laboratories across the world, scientists are coming up with novelties that could change not only how we dress but also how we live.

In this brave new world, the boundaries are being blurred between old-school, natural fibres such as cotton and wool and manmade fibres. What is more, the idea of natural being best is being put to the test.

In these environmentally aware times, the consensus is that being green means eschewing synthetic materials. Surely, the received wisdom goes, unbleached organic calico is better than a manmade alternative. But many researchers and scientists are now questioning the sustainability of natural materials, and believe that manmade fibres

may actually come out on top, for the planet as well as for the user.

One reason for this is that it turns out that green materials may not be all they are cracked up to be. Even organic cotton takes up a lot of field space that could be given over to edible crops, and is just as labour-intensive to process as its chemically treated cousin. Also, recycling natural fibres usually involves what is called 'down-cycling' – as in the lowering of quality of the materials, which have been degraded as a result of recycling.

Rachel Wingfield, the director of the design and research company Loop PH, explains, 'People see synthetics as the epitome of over-consumption and waste, but it depends on how these are applied and used, and how many are going to be produced.' Furthermore, they can be not just recycled but 'up-cycled' – the word for materials that have a greater quality value and are more useable than their previous incarnation.

The question of what constitutes a manmade

**BECAUSE THE WALLS CURVE,  
THIS HOUSE CAN'T BE  
FULLY SEEN FROM ANY ONE  
VANTAGE POINT**

fibre is less straightforward than you might think. Manmade fibres fall into two categories. First there are the cellulosic fibres (such as viscose, acetate and cupro), which are regenerated from chemically treated cellulose, itself derived from pulp in nature. Then there are the non-cellulosic fibres (acrylic, nylon, polyester and carbon fibres), which tend to go by the name of synthetics and are derived from polymers produced from petrochemicals.

There is no doubt that producing all types of manmade fibres is energy-intensive. So scientists are trying to come up with bioplastic alternatives made out of renewable materials, giving us manmade fibres whose origins are in nature, such as Tencel, which is made from wood, and the maize-derived Ingeo.

One reason for this is that it seems that solutions to our environmental crisis are likely to be based on technological changes rather than on the return to a more primitive lifestyle traditionally advocated by radical environmentalists. In future, we are likely to be using stronger and longer-lasting materials, and fewer of them.

Certainly a lot of effort is going in this direction, as the trend research company Worth Global

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## THE DESIGNER YEOHLEE TENG HAS BUILT SPILL- RESISTANT TECHNOLOGY INTO HER SILK AND LINEN GARMENTS

Left the architect  
Patrick Keane's  
Invisible House.

Right Yeohlee Teng's  
spill-resistant clothes  
on the catwalk

Style Network (WGSN) has spotted. It claims that more new products and materials have been developed in the past 20 years than in the history of materials science.

And the fruits of these labours could well end up in fashion boutiques. Hussein Chalayan is one such pioneer in the fashion world. He employs high-tech materials to create pieces that change shape according to temperature. 'The technical textiles sector is one of the fastest-growing and changing areas of the global textile and apparel industry,' says Brian McCarthy, the director of TechniTex, which researches, designs and develops new technologies and applications for the textile industry.

Andrew Dent backs this up, adding that the construction industry as well as boutiques could be affected. He directs research into innovative materials and processes at the materials research centre Material Connexion, and is a co-author of the book *Ultra Materials: How Materials Innovation is Changing the World*. 'High-performance fabrics are being reconceived... Their ability to interface with technology is changing how the human body is experienced and how the urban environment is built,' he writes. 'Today, textiles reveal their capacity to transform our world more than any other material.'

The sort of things that we are likely to see in the future range from the intriguing to the mind-boggling, if the aforementioned underpants are anything to go by. Also in the pipeline are fabrics that adapt their density according to the surrounding temperature and woven-in solar panels.

There are two approaches to material innovations: you can embed electronics in a fabric, in the way that some sportswear companies such as Neill Europe are doing. Hence its H4 Campack, a rucksack with inbuilt media player and camera. Another example of this experimentation is Interactive-Wear's solar technology integrated into the Italian manufacturer Ermenegildo Zegna's jacket, which recharges mobile phones – solar modules are mounted on its neoprene collar, and the electricity generated from solar energy is transmitted through conducting textile leads and stored temporarily in a battery or fed directly to a connected phone.

Another approach is treatments or coatings for fabrics. That treatment may be dirt-repellent or able to control temperature or get rid of sweat. The designer Yeohlee Teng has incorporated spill-resistant technology into her silk and linen garments, meaning that if something spills on the material, it will slide off it and not stain it.

Wingfield foresees a fruitful future for chemically enhanced materials – 'that could involve nanotechnology or polymers responding to heat and light and capable of changing their shape'. This again lends itself to synthetics as it is easier to treat or coat them than is the case with natural fibres. ■

'Today, textiles reveal their capacity to transform our world more than any other material.'

at the fashion and building fabrics of the future

### The Invisible House

The Australian architect Patrick Keane is fascinated by new materials. Why go for boring old brick, he says, when there are lighter, more 'intelligent' alternatives? Keane now has a chance to practise what he preaches with his residential project Invisible House.

His Sydney client was after a house that 'disappeared', so Keane's firm Enter Architecture turned to carbon fibre, the stuff that Formula 1 cars are made of. Keane says, 'Essentially it is made from Corecell T-Foam, a composite fibre material woven out of some of the strongest materials on earth using technologies from aviation, marine and auto F1.' The material is not only strong but also waterproof, and has thermal properties providing good insulation. The walls can be paper thin because the material is so light.

One of the advantages of the material is what Keane calls the 'strength through form' concept, by which he means that the building – which should be ready next February – doesn't need columns. 'It's totally open-plan as there's no necessity for independent reinforcement.' (None

of those nasty columns or walls that would block the views through the house.) Yet the house has intriguing perspectives none the less: because the walls curve, this first-of-its-kind house can't be fully seen from any one vantage point.

To get the carbon fibre right, Keane teamed up with the engineering company Gurit. 'We believe this will change the face of construction because the materials are being custom-made for the project rather than a builder buying ready-made materials like bricks and concrete,' Keane adds. **Clare Dowdy**

