From bridal gowns to wearable technology

While best known for her bridalwear designs that have sold in Harrods, Browns, Browns Bride and Liberty as well as her own shop, Rebecca Street's career has also seen her work with leading fashion houses such as Alexander McQueen, Mulberry and Mary Katranzou. Rebecca is now also using her skills as a design technician to develop wearable technology, which has implications for both fashion and medical science. A winner in InnovateUK's first ever Women in Innovation Competition, Rebecca is now also working with scientists at leading UK universities and research institutes.

"Inspired by McQueen, I have always been interested in the engineering side of fashion, looking at how to make new shapes, working with fabrics in an innovative way, breaking new ground in design," says Rebecca.

"I realised that sketches of complex, showpiece garments were appearing in 3D in my mind, which gave me a greater understanding of how to go about creating them."

One particular piece comes to mind: McQueen was one of several designers commissioned by Vogue to create a contemporary gown for Marie-Antoinette. He designed a billowing pink and grey silk taffeta gown. The taffeta was to be cut into stripes, which increased 0.5cm in width each stripe. These striped panels were cut into chevrons, which in turn dovetailed up into the embroidered, corseted bodice.

"Bringing this design to reality required true engineering," explains Rebecca.

At Mary Katrantzou she managed Mary's first commissioned bridal gown, which took 120m of mostly multi layer satin chiffon circles, whipped into a stunning confection. While it looked light and effortless, it was extremely heavy and in principle was suspended from a halter neck; another feat of structural engineering.

Rebecca's initial venture into wearable technology came about when she was invited to be part of a team commissioned by House of Fraser to design and develop a groundbreaking piece to be showcased at the BAFTAs. The result was a dress that featured LED lights, which were sculpted into a cocoon-shaped bodice and also secreted into the flow of a chiffon skirt. Each ran on a separate circuit which were sequenced to react to movement. The team also created a soft pastel palette of colours rather than the harsh primary tones usually generated by LED lights. The dress was worn by Donna Air on the red carpet and featured next morning on the Lorraine TV show.

Rebecca Street, a winner in the first InnovateUK Women in Innovation competition is pictured with one of her own dresses, outside Imperial College London's physics lab. Photographer Amelia Troubridge. Getty Images.

A few years ago, when she was looking to further push the boundaries of her engineering and innovative abilities, Rebecca asked herself: "What's the most luxurious material a garment can be made from, which doesn't involve killing animals?" The answer: gold.

While gold has been used to decorate the robes of nobility in the form of embroidery and braiding through the ages, Rebecca set about developing a process to apply the precious metal onto fabric which would make it commercially accessible to a contemporary market. It has been a long and complex journey but eventually, Rebecca succeeded in developing T-shirts with designs in 22ct gold, pure silver and copper, which are machine washable. Research proved that the fabrics are conductive, showing potential within medical science.

A chance meeting with a nano physicist at Imperial College London led to a conversation about heart monitors and how the university was looking for a fabric with conductive gold on it, to wrap around printed circuit boards and act as an aerial. Rebecca responded immediately with samples and Imperial confirmed that the metal fabrics were indeed conductive.

A subsequent meeting with a research fellow at Southampton University illustrated that printing circuit boards directly onto fabrics to make 'wearables' was the next step. However, the university's own developments disintegrated after washing, which made Rebecca's process of interest.

Primarily due to this new direction for the gold process, Rebecca was encouraged to apply for InnovateUK's first Women in Innovation Competition. She was successful and Material Alchemy has been established to exploit her technology, with patent pending.

The Centre for Process Innovation has made comparative tests, applying gold by the various methods currently available to both woven and knitted fabrics. The results indicate Rebecca's process is the only one that remains conductive after 10 washes, which is key to the development of medical wearables.

In Rebecca's more familiar markets of luxury fashion and interiors, she's evolving the use of precious metals, away from T-shirts towards more luxury and couture products by placing finely detailed feathers onto silk organza, for example, and accenting Hermes and Versace printed scarves with gold, silver and moon gold.

The first 22ct gold, pure silver and copper developments, in the form of slogan T-shirts at www.stateoftheheart.london Photographer Nick Dolding

Rebecca also developed a sustainable luxury collection, which was awarded 'One to Watch' by the Ethical Fashion Forum. It comprised ethical fabrics and clever construction, a highlight of which was a hand cut vegetable-tanned leather 'Tree' dress. Photographer Marcelo Benfield