

Advanced technology creates new range of multi-functional textiles

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Research by two Victoria University PhD graduates has advanced cutting edge technology that combines wool with gold and silver to create a new range of multi-functional textiles.

Dr. Fern Kelly and Dr. Kerstin Burridge have completed parallel research projects that have pioneered a way of embedding tiny nanoparticles of gold and [silver](#) in New Zealand wool, resulting in colorful textiles that have functional and aesthetic benefits. Dr. Kelly has worked with silver and Dr. Burridge with gold.

When the [precious metals](#) are reduced to the [nanoscale](#) (a nanoparticle is one billionth of a metre in diameter) they scatter light in different colours with silver appearing as yellow, peach, pink and purple and gold producing a range of brilliant hues.

That means textiles in many colors can be created without using traditional—and mostly synthetic—dyes, adding to the sustainability of the innovation.

Repeated testing by Drs. Kelly and Burridge has shown that the gold and silver are bound to the wool with an ultra strong bond making the textiles totally colourfast and ensuring they do not fade in light or with repeated washing.

In addition, the textile products incorporating silver [nanoparticles](#) have strong anti-microbial properties meaning they resist bacteria and pests,

like moth larvae, that live in carpets. They also reduce the build-up of static electricity.

Dr. Kelly says there is exciting potential to use the silver wools in a range of commercial applications.

"We're looking at the benefits of including the fiber in carpets and also in upholstery on airplanes and public transport—places where textiles get a lot of use but it isn't practical to clean them all the time."

Other possibilities include bandages and clothing such as socks and sportswear, where the anti-microbial properties would reduce odor.

The initial target market for the golden wools is high end fashion accessories, fabrics and floor coverings. While it is around 100 times more expensive than wool colored with organic dyes, there is interest for niche applications such as scarves, exclusive apparel and luxury carpet for residences, hotels or super yachts.

Dr. Burridge says capacity is being scaled up and two 10 kilogram batches of golden wool are currently being produced. Another initiative has seen students from Massey University take part in a competition to design women's fashion garments that feature the golden wool.

"It's been fantastic getting creative minds on to exploring the possibilities," says Dr. Burridge.

Professor Jim Johnston from Victoria's School of Physical and Chemical Sciences supervised both Fern and Kerstin's research and is leading commercialization of what he calls 'world first' technology.

"It's had enormous market acceptance from the start. 'Wow' is what people from across the wool industry say what they see what we are

doing to add significant value to the New Zealand wool clip."

The inventors—Professor Johnston, Dr. Kelly, Dr Burridge and Dr. Aaron Small—are partnering with Wools of New Zealand to develop the technology and are working with New Zealand Trade and Enterprise in London and Milan to gain entry into the high fashion knitted apparel market.

Both Dr. Kelly and Dr. Burridge, who graduated from Victoria in December last year will continue to be involved in developing and commercializing their research.

The team has been working with final-year fashion students from Massey University on designs using the gold merino and these will be displayed in a free fashion show open to the general public.

The Merino [Gold](#) Fashion Show fashion show will be held in the Michael Fowler Center to mark the launch of the 2011 Year of Chemistry 'The Big Picture'. The fashion show will be followed by a talk by Cambridge University's Sir Richard Friend speaking on 'Exploring the creative tensions between science and technology'.

Provided by Victoria University

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