



# Capability Statement

## Fibres and Textiles

### About us

The Institute for Frontier Materials (IFM) is home to a world leading fibre and textile research group. The group has broad expertise and capability with a strong focus on improving the sustainability of the textile industry across the supply chain, including pathways for adding value to textile waste.

We have a multi-disciplinary team consisting of textile engineers, fibre technologists, materials scientists, physicists, chemists, engineers, biologists and polymer scientists focused on driving innovation toward new circular materials and technologies.

### Core Competencies

#### Fibre, yarn and textile design

Our research includes construction of novel melt and wet spun filaments, conductive fibres and textiles, nanofibres and short polymer fibres, filtration media as well as medical and safety applications.

#### Textile treatment and colouration

Polymer science and textile engineering combine to design advanced fibre and textile treatment methods and chemistries to improve the environmental footprint of textile production processes.

#### Adding value to textile waste

Physical and chemical engineering come together to provide novel upcycling avenues for waste derived from the textile supply chain. This research includes blend separation technologies, advanced fibre regeneration, use of agricultural waste in packaging, and repurposing used textiles for a broad spectrum of applications.

### Differentiators

The textiles team incorporates an equal depth of materials and textile science and engineering coupled with knowledge of textile processing capabilities to truly accelerate the transition to more sustainable and circular fibres and textiles.

As well as traditional techniques, we also use cutting-edge technologies such as artificial intelligence and machine learning to rapidly predict and optimise the extremely complex and multi-faceted systems that are fibre science, polymer science and textile design.

### Our Infrastructure

This unique combination of science and textile processing capabilities is complemented by state-of-the-art characterisation, testing, prototyping and scale up facilities on the one site. Our infrastructure capability, in partnership with CSIRO, at Deakin Waurn Ponds campus integrates industrial and pilot-scale equipment across the entire textile supply chain for short staple fibres (eg. cotton) and includes carding, combing, roving, spinning, knitting, weaving, fabric dyeing and finishing. Other equipment includes wet spinning, melt spinning, and nonwoven processing.

### Circular economy focus


- > Develop materials with extraordinary functionality, following circular economy principles
- > Develop new materials and processes to prolong the useful life of textiles, and lower the textile industry environmental footprint
- > Develop novel ways to repurpose and recycle textile waste.

### Research Leader

Alfred Deakin Professor Xungai Wang,  
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