



Capability Statement

Carbon Fibre and Composites

About us

The carbon fibre and composites group at IFM combines world leading research in advanced carbon fibre development and synthesis, manufacture of composite materials, development of novel monomers and resin systems, and control of fibre-matrix interfaces through functionalisation.

Our overarching strategy is to create innovative composite materials with extraordinary properties. We have a strong focus on developing novel composite materials with prolonged lifetimes that are more sustainable, energy efficient and light weight, with optimised performance and value.

Our multi-disciplinary team contains polymer chemists, material scientists and mechanical engineers, combining knowledge and skills to enable innovative solutions to industry problems.

Core Competencies

Carbon fibre development

We aim to develop the next generation of carbon fibre that is sustainable, low cost, high performance and multifunctional. Our research includes the use of bio-based materials, such as lignin and cellulose, as low-cost, sustainable precursors and the use of rapid oxidation methods for low-cost carbon fibre. As well as traditional techniques, our research includes 3D printing of carbon fibre and self-healing materials, rapid composite manufacturing and the use of life cycle analysis to develop more sustainable manufacture of carbon fibre.

Surface treatment of carbon fibre

We are developing innovative, tailored interface solutions between carbon fibre and matrix and enhancing the bonding strength in hybrid composite materials with novel surface functionalisation. This work is a critical pathway to developing value-added solutions for recycled carbon fibre.

Resin development

The main focus of this research is development and synthesis of novel resins from bio-derived sustainable resources, processable high-temperature and fire-resistant resins, re-processable thermoplastics and re-workable (self-healing) thermosets.

Advanced composite manufacturing

Our research into rapid composite manufacturing processes for high-volume production is targeted to the automotive industry.

Another focus is on the recycling of carbon fibre derived from end-of-life products and production wastes and identifying avenues to develop value-added applications for recycled composites.

Differentiators

Breadth of scale

Carbon Nexus is a globally unique, open-access carbon fibre facility with advanced fibre processing technologies, such as a precursor wet-spinning line, a research carbon fibre line and an industrial relevant scale pilot line.

Our state of the art infrastructure allows us to perform research along the entire composite manufacturing chain, from polymer molecules to precursor spinning, carbon fibre manufacture to the final product. This includes development and demonstration of innovative manufacturing concepts, technology feasibility studies and delivery of production-ready technology and operations.

Research Leader

Professor Russell Varley,
Professor Composite Materials