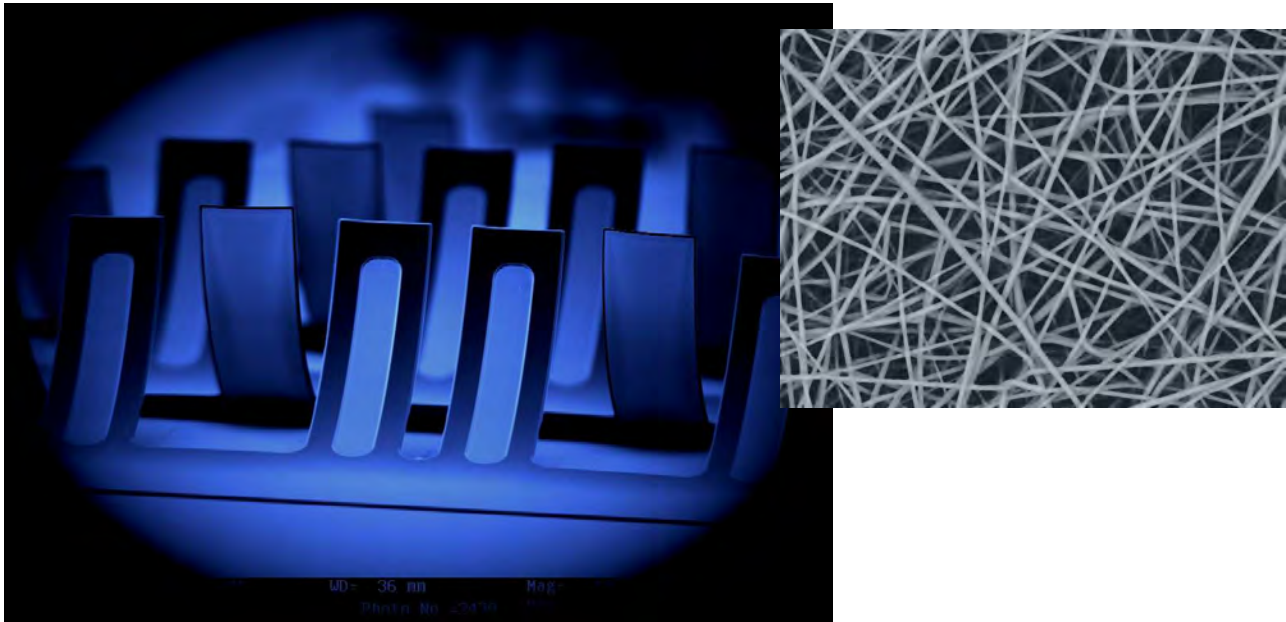




Small-scale science with large-scale impact



Micro and nanotechnology involves science and technology at an extremely small-scale – down to billionths of a metre – but its impact on society is huge.

The technology already produces improved hard disks, sunscreens, telecommunications and materials and can be applied further to healthcare, energy, security and transport - from biosensors and micro-needles to X-ray optics and laser targets.

STFC's Micro and Nanotechnology Centre (MNTC) is at the forefront of these technologies. Based at the Rutherford Appleton Laboratory (RAL) in Oxfordshire, the Centre offers facilities to universities and industries, produces spinout companies and attracts funding.

MNTC projects include:

- developing components for prototype medical probes with Imperial College London to investigate brain tissue and diagnose tumours
- producing electro-active polymers for 'smart skins' on aircraft to modify airflow and reduce fuel consumption

- creating nanofibres for treating wounds and use in high capacity batteries, fabrics and pharmaceuticals
- micro-thrusters for low thrust, long haul spacecraft propulsion
- microfluidics research for drug discovery trials
- building polymer microcantilevers that can measure blood fluids to help diagnose diseases and improve treatment

The MNTC is producing a number of successful spin-out companies. The Electrospinning Company Ltd, for example, uses an electrospinning process to create nanofibres from different materials. These nanofibres can then form materials with applications in healthcare, energy, the environment and security. The technology can improve air quality through more efficient filtration products and contributes to advanced battlefield clothing and respirators.

Nanofibres are particularly useful for making the scaffolds needed in cell and tissue engineering for regenerative medicine and drug delivery. Drugs can be impregnated in nanofibres and the concept of using controlled, drug release coatings and applying them to implants won Electrospinning

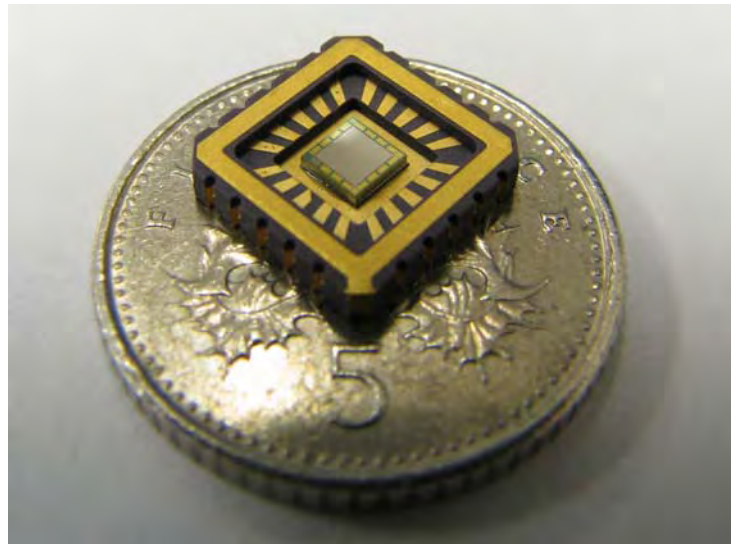
The Science and Technology Facilities Council

Company Ltd, the Medical Futures Translational Research Award in 2008.

Other spin-outs are equally successful. Technology at Oxsensis, developed in collaboration with MNTC, is producing fibre optic sensors for extreme environments, while the Qudos company is a designated National Prototype Facility.

Based at RAL since 1997, Qudos develops a wide range of processes for industries and government-generated projects. MNTC collaborated with Qudos, Ultra Electronics and Nottingham Trent University to create Sunlight Readable Emissive Display technology for the avionics industry.

Another spin-out company, Microvisk, is producing a handheld device for people at risk from blood clots after a heart attack or stroke. People can then monitor their blood viscosity at home to check if they are taking the right amounts of an anticoagulant such as Warfarin, for instance, without the need for repeat visits to a hospital. The device relies on the movement of a microcantilever and was first made and demonstrated at the MNTC.



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