

## Research Profile



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**SUMMARY OF MY RELEVANT RESEARCH AREAS:**

Electrospinning of polymers with the incorporation of microfeatures. Additive manufacturing using polymer extruders, bioprinting and stereolithography. Creation of STL files and data handling of CT scans into printable objects. Highly porous microsphere production (polyHIPE) utilising microfluidics. Microfluidics manufacturing using direct laser write stereolithography. Vascularisation studies including chorioallantoic membrane (CAM) assays. Injectable materials and cell carriers. Mesenchymal stem cell (MSC) differentiation and characterisation.

**Brief summary of your research areas, in Chinese** we will translate this for non-Chinese speaking UK participants

**Primary Research interests:**

- 1) Influencing stem cell fate:** The manufacture of electrospun fibre membranes containing microfeature to influence cell behaviour. The investigation of musculoskeletal applications for these electrospun membranes is the main focus for this novel technology. In addition, work on neuronal, cartilage and skin tissues is also ongoing utilising this technology.
- 2) Bioprinting:** Additive manufacturing and bioprinting of tissue engineering scaffolds. Work on cleft pallet repair, the production of synthetic vasculature and the production of microfluidic devices.
- 3) Antimicrobial wound dressings:** The production of anti-microbial chronic ulcer dressings utilising electrospinning incorporating antimicrobial agents.

**Topics in which you would like to develop collaborative research:**

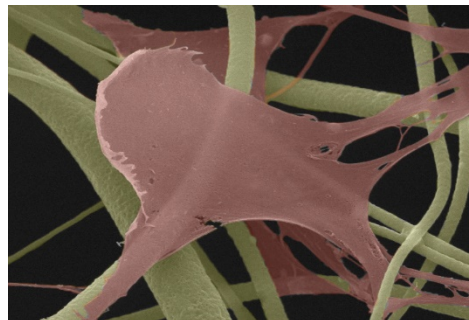
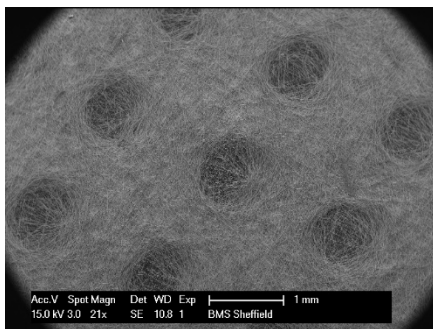
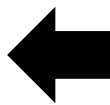
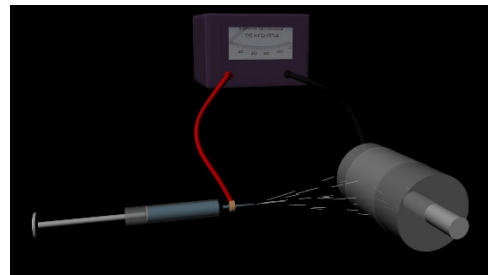
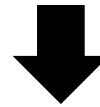
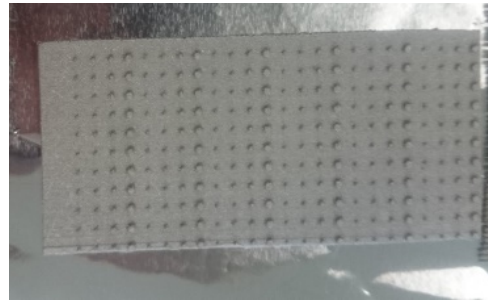
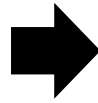
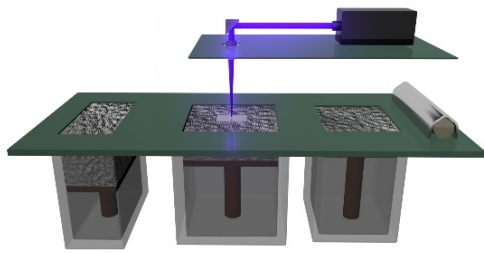
- 1) We are keen to find new collaborations with groups that would be interested in using the specialised electrospun membranes we produce for a new application/target tissue.
- 2) To find collaboration on new inks to use for our soft tissue bioprinting.

**Relevant existing collaborations (academic/clinical/commercial) inside or outside China.**

**China:** Collaboration with Dr AJ Wang (王爱娟) from Xi'an University of Technology.

**UK:** MeDe Innovation: Leeds, Newcastle, Nottingham and Bradford.

## Relevant graphics, figures, pictures:

**Publications and other outputs relevant to your interest in this programme**

“Osteosarcoma growth on trabecular bone mimicking structures manufactured via laser direct write”. A Malayeri, C Sherborne, T Paterson, S Mittar, I Ortega, P Hatton, F Claeysens. International journal of bioprinting. 2016.

“Photocurable high internal phase emulsions (HIPes) containing hydroxyapatite for additive manufacture of tissue engineering scaffolds with multi-scale porosity”. AJ Wang, T Paterson, R Owen, C Sherborne, J Dugan, JM Li, F Claeysens. Mater Sci Eng C Mater Biol Appl. 2016.

“Emulsion Templated Scaffolds with Tunable Mechanical Properties for Bone Tissue Engineering” Robert Owen, Colin Sherborne, Thomas Paterson, Nicola H Green, Gwendolen C Reilly, Frederik Claeysens, J Mech Behav Biomed Mater. 2015.

“Combination of Microstereolithography and Electrospinning to Produce Membranes Equipped with Niches for Corneal Regeneration” Í Ortega, F Sefat, P Deshpande, T Paterson, C Ramachandran, AJ Ryan, S MacNeil, F Claeysens. JoVE. 2014.