

## Manufacture of fully bioresorbable multiphase fixation devices to order

### Our aim

**Our aim** is to deliver design and manufacture for next generation multiphase bioresorbable spinal fixation devices, focusing on cost efficiency and validation of process chains.

The **academic partners** in this project are the University of Nottingham (Grant, Ahmed, Warrior, Lester); the University of Bradford (Coates) and the University of Leeds (Wilcox).

**Clinical collaborators** are Jaspan and Ellis (imaging) and Scammel and Boszczyk (orthopaedics) Nottingham University Hospitals.

This project has one key **research challenge**: The development and application of stratified design and manufacture processes for a new resorbable fracture fixation device. This achieved by combining modelling for stratified patient groups with specific new manufacturing processing routes to enhance capability in delivering devices to order to customers.

### Our approach

We will **develop**:

- > A manufacturing route for fully resorbable calcium phosphate based glass fibres (PGF) that can be integrated effectively to reinforce degradable polymers;
- > Coating technologies to enhance tooling and moulds;
- > Models to validate performance and safety.

We will **tailor**:

The degradation rates for PGFs by altering their chemical composition.

We will **evaluate**:

The manufacturing methodologies, for example, incorporation of these PGF fibres with micro-moulding and extrusion technologies to manufacture fixation components and related scale-up issues.

We will **investigate**:

New manufacturing methods to enhance composite mechanical and bioactive performance suitable for micro-processing methods.

We will **assess**:

In vitro performance of these novel structures, post processing and sterilisation.

We will **identify**:

Stratified patient groups and suitable fixation devices.

We will **enable**:

The rapid conversion of medical images into usable digital patient-customised device designs.

We will **create**:

High-fidelity 3D models of patient anatomy (both hard and soft tissue) in real time.

### What we want to achieve

1. Manufacturing methodologies for delivering resorbable fibre-reinforced composites through micro-moulding and extrusion.
2. Manufacturing processes for polymer encapsulation of calcium phosphate nanoparticles
3. Demonstration of proof of concept of the stratified approach to the design and manufacture of a resorbable fracture fixation device.



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## Join our community

The MeDe Innovation Network exists to provide support to the medical device sector, including academic, industry and clinical members. As a member of the Network, you will benefit from:

- > access to information about manufacturing research, from our Centre's research outputs, international partnerships, and clinical centres in medical device innovation throughout the UK
- > access to Technology Roadmapping techniques to help shape and inform future research needs
- > updates on sector news and events, through e-newsletters, network events and an annual conference
- > access to commercial opportunities arising from our work with the Medical Technologies Innovation and Knowledge Centre
- > being part of an influential contributor to the UK medical device landscape
- > marketing opportunities to highlight your organisation's news and events on the MeDe Innovation website

Dissemination of research and moving it along to adoption and commercialisation is central to our mission and we value input from those working across the medical device sector in the UK. The network aims to not only inform, but also to connect, enabling businesses, policy makers, academics and clinicians to share information, knowledge and ideas and debate the challenges and issues facing the community.

Membership is free and it's easy to join – contact us now.

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## Contact us

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