



# MEDICAL AMRC

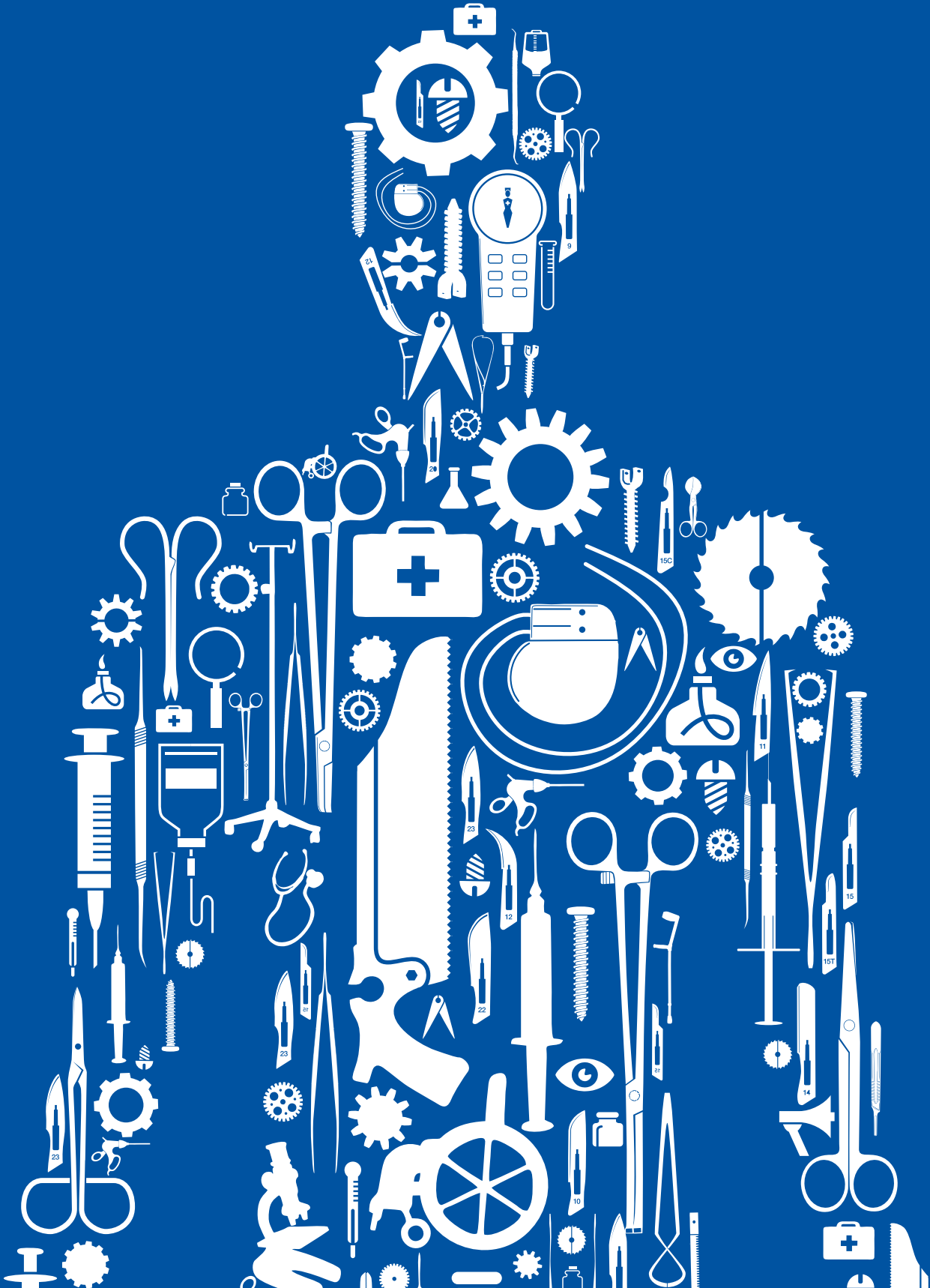


**Advanced Manufacturing  
Research Centre**



A state-of-the-art facility for  
developing new technologies, products  
and processes for the healthcare industry

# The Medical AMRC could help you develop better products and processes





The  
University  
Of  
Sheffield.

# MEDICAL AMRC

The Medical AMRC is part of the world-leading University of Sheffield Advanced Manufacturing Research Centre and combines cutting-edge manufacturing technologies with world-class research, design and development.

The Medical AMRC has more than 40 multi-disciplined engineers from a wide range of industrial backgrounds who have extensive experience in solving problems through engineering design, product development and access to clinical expertise.

**Core capabilities include:** Medical device R&D, design for manufacture, mechanical, industrial & electrical design, materials development, 2D & 3D visualisation and prototyping.

The Medical AMRC works closely with a wide variety of clinical experts and academic connections through the University of Sheffield.

Medical AMRC projects have included innovative operating theatre instrumentation design, creation of intellectual property and orthopaedic implant design, using state of the art manufacturing.





# Working with us is easy

The Medical AMRC team will work with you to understand your needs, clinical requirements, manufacturing objectives or product vision. We work with individuals & organisations from start-ups to multinationals. If we can help your company, we want to hear from you.

We can work at any stage of the product development process, from exploratory research and proof-of-principle designs to pre-production prototyping and hand-over to industry.

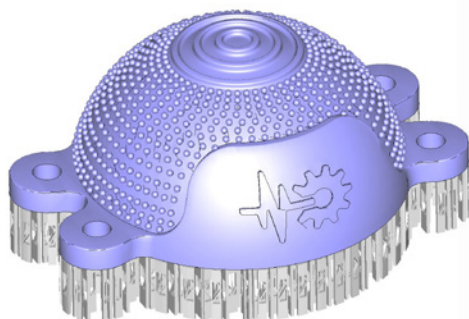
We can work on straightforward contract research, funded collaborations, either UK-based or European. We will provide you with a statement of work laying out the project deliverables, before any commitment is required.

A team can be selected to match the skill requirement of your project, from a pool of more than 40 specialist development staff. We can introduce our services at any stage, whether that is concept generation, design validation, prototyping or detail design.

The AMRC has an onsite, ISO 17025 UKAS accredited structural testing facility. The Facility provides services for the validation, verification and certification of demonstrators, prototypes, and complete projects that require independent, professional and impartial certification.

Throughout the projects we will consider the relevant medical device directives, and ISO 13485 & ISO 14971 standards, providing compliant documentation that is submittable in your technical dossier.

We achieved ISO 13485 certification in 2016.

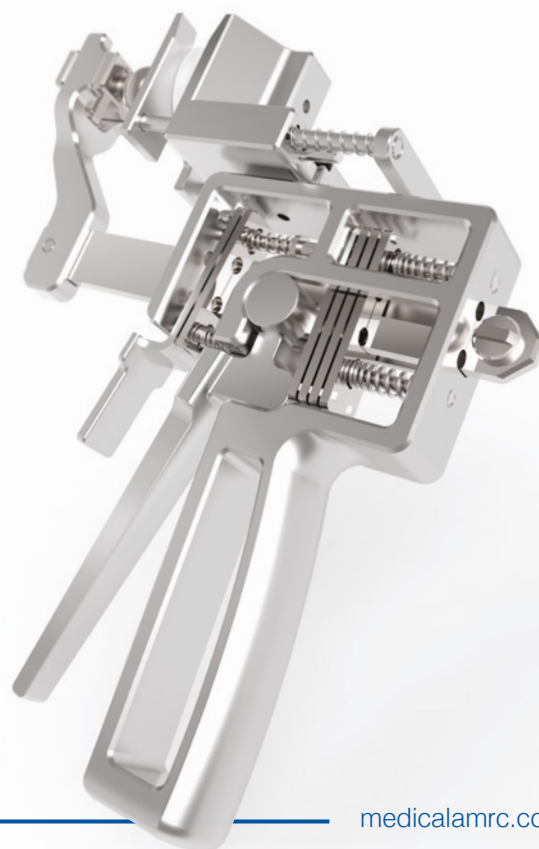


We value the need to protect your investment with the creation of intellectual property and have experienced staff to help you through the generation & application process.

Our extensive network of scientists, academics and clinicians can support your project requirements to ensure best practice and technical underpinning. We draw on this network to help convert primary research into industrial applications. We are also able to develop the supply chain through the extended industrial partnerships in place at the AMRC.

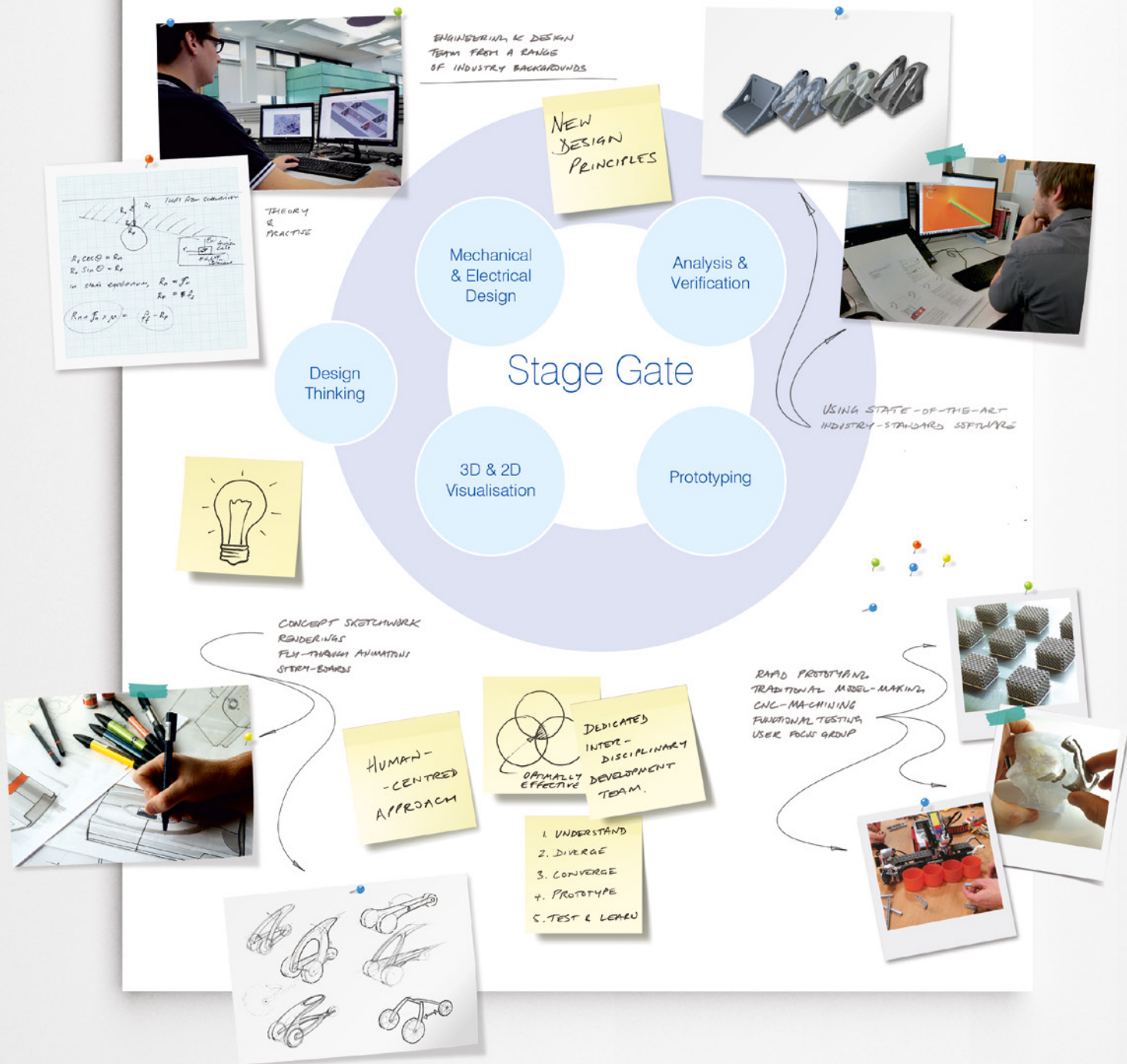
It could be an idea you need to develop, a solution that you think might revolutionise your business but you don't know where to start, or a process that needs to be refined.

**Let us help you push through technological boundaries to develop better products.**



# Our creative process

Everything we do is centred around the Stage Gate process for design and supported by 5 key capabilities.





# Cutting-edge manufacturing technologies

## Additive manufacturing - metal

Our research is helping our customers discover new ways to streamline the process of designing and manufacturing medical products and responding to significant interest from the healthcare industry in introducing metal additive technology to the production of implants and other devices.

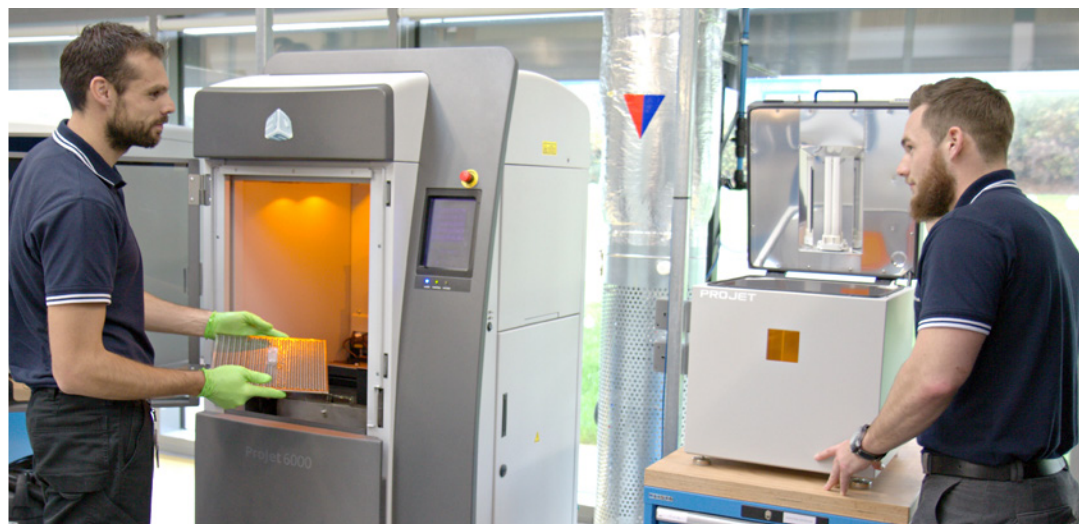
### Examples of related research include:

- Design for additive manufacturing
- Process optimisation
- Repeatability
- Dimensional accuracy
- Post processing
- Powder characterisation
- Surface finish
- Laser optimisation
- Machine development
- Simulation / lightweighting
- Lattice development for osseointegration
- Additive manufactured components using computerised tomography and topologically optimised CAD data



## Additive manufacturing - polymer

- Development of surgical guides and planning tools.
- Instrument prototyping using high-resolution SLA
- mUve 3D Dynamic Light Processing 3D printer
- 3D Systems ProJet 6000
- Fortus 900
- uPrint SE x 2

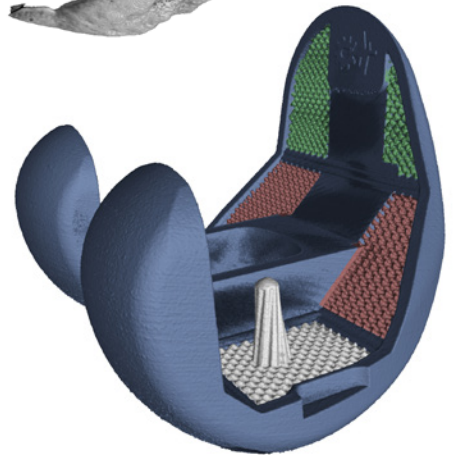
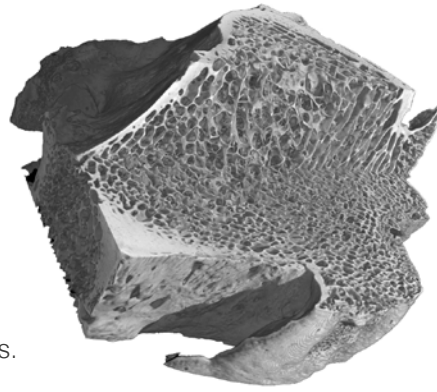


## CT

X-ray computational tomography is an essential capability for developing design and manufacturing processes for new technologies. Insight into organic structures provides vital information which aids design optimisation.

**The scanning process will compile a series of x-ray scans of an object to re-create 3D data that can be analysed in numerous ways, including:**

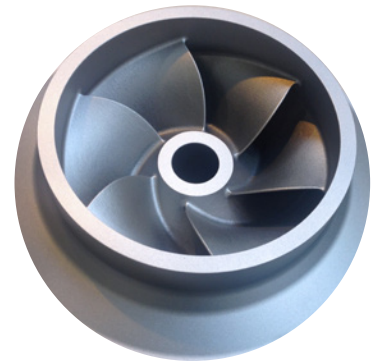
- Porosity / density
- Non-destructive inspection of complex internal structures
- Measure internal dimensions with high accuracy without sectioning part
- Inspect porosity and defects for developing new design processes for additive layer technologies. Inspect internal structures of a wide range of materials – composites, metals, polymers, ceramics, bone, foams.



## Castings

AMRC Castings provides advanced casting expertise and manufacturing capabilities:

- Computer process modelling
- Design for casting manufacture
- Rapid low-volume manufacture of precision castings
- Casting process and materials research

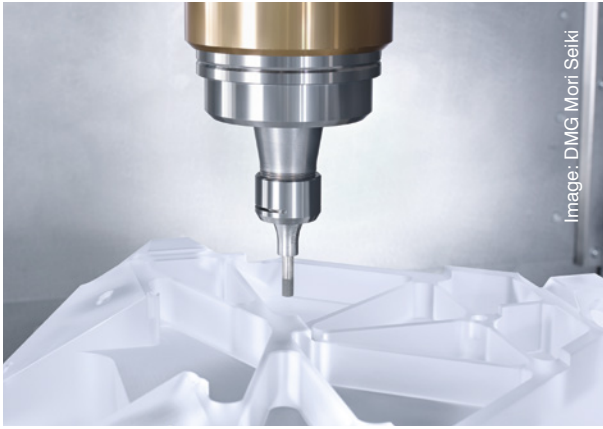


## Clean room

- Certified to ISO Class 7
- Dust-free precision environment  
6m x 3m working area
- Temperature and humidity monitoring

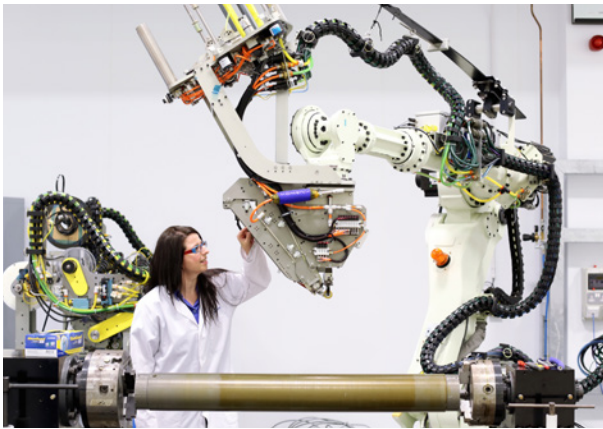






## Advanced Machining

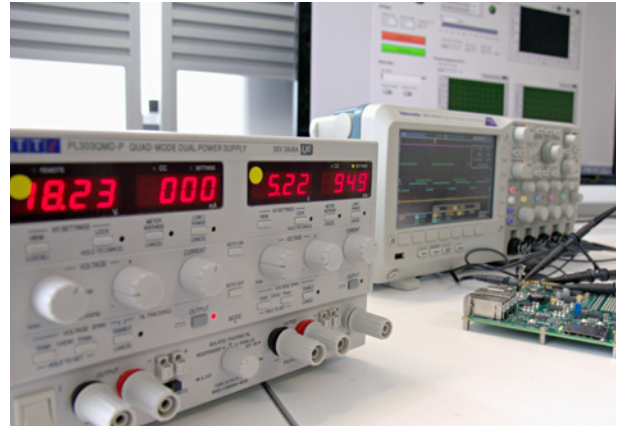
- 5-axis machining
- Ultrasonic machining
- Working with challenging materials
- Innovative fixturing and complex geometries increasing speed, precision, quality & economy
- Advanced grinding



## Composites

The AMRC Composites Centre is dedicated to the research of the new generation of carbon fibre materials.

- Automated production
- Machining
- Advanced curing
- Novel materials and processing



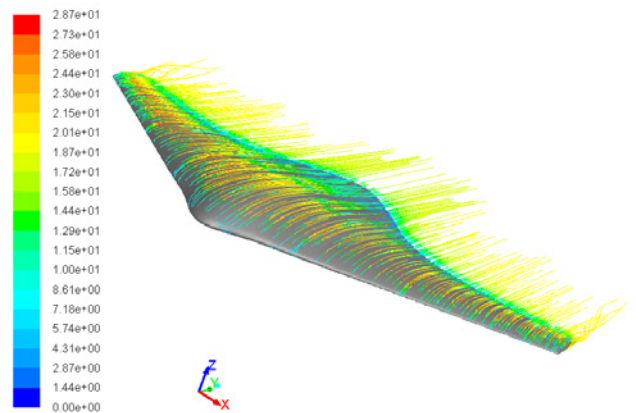
## Electronics engineering

### Proof of Concept

- COTS hardware + LabView
- Use Model / User Interface development

### Custom Hardware Design

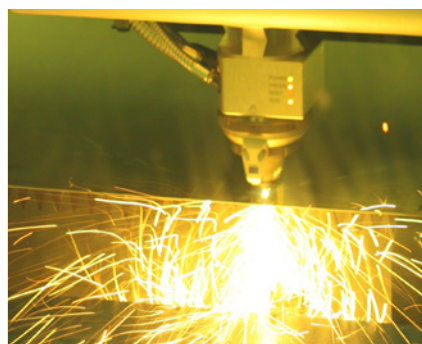
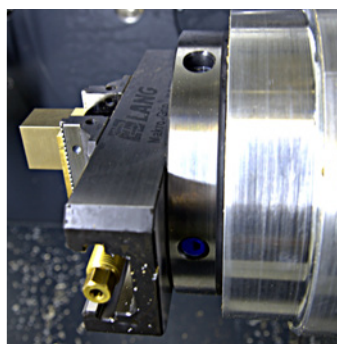
- Design capture & High speed PCB design
- Embedded Real Time software design
- Design for Manufacturability & Test
- Functional Verification



## Advanced Simulation

Analysis of parts and systems without the need for repeated physical tests in a lab.

- Computational fluid dynamics
- Finite Element Analysis (FEA)
- Design optimisation
- Kinematic analysis





# Engineering for the healthcare industry of tomorrow

Research

Concepts

Manufacturing

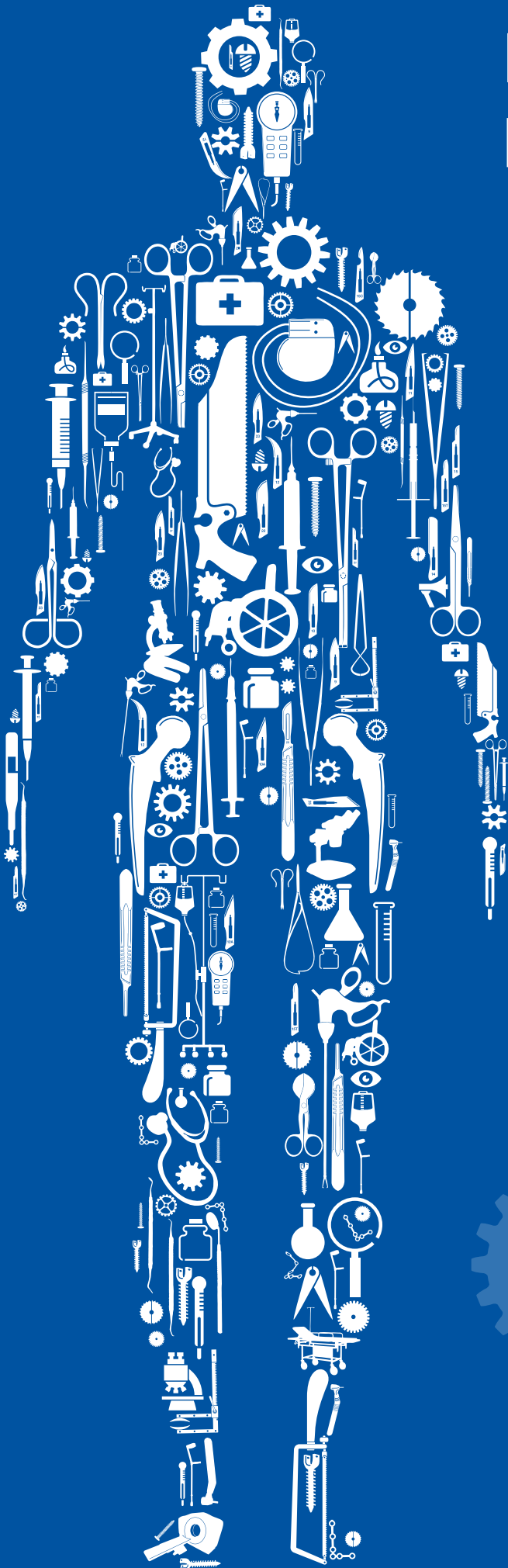
Design

Engineering

Prototyping

Materials

Validation





The Advanced Manufacturing Park

## AMRC Group

The AMRC with Boeing is part of the AMRC Group, a cluster of world-class centres for industry-focused research and development of technologies used in high-value manufacturing sectors.

The group has specialist expertise in machining, casting, welding, additive manufacturing, composites, designing for manufacturing, testing and training.

It has a global reputation for helping companies overcome manufacturing problems and has become a

model for collaborative research involving universities, academics and industry, worldwide.

Sub-centres of the AMRC with Boeing include AMRC Castings, the Medical AMRC and the National Metals Technology Centre (NAMTEC).

Also located on the Advanced Manufacturing Park is the Nuclear AMRC, which helps UK companies win work in the civil nuclear sector in new build, operations and decommissioning, the AMRC Training Centre and the Knowledge Transfer Centre (KTC).

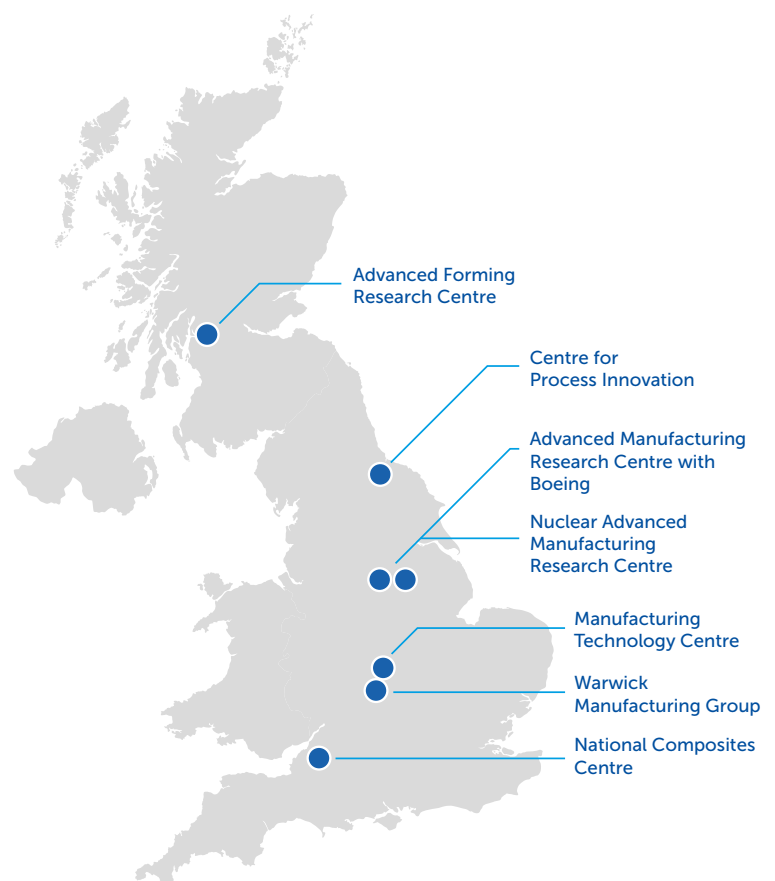
## High Value Manufacturing Catapult

The AMRC with Boeing is a core part of the High Value Manufacturing Catapult, an alliance of seven leading manufacturing research centres backed by the UK's innovation agency, Innovate UK.

Being part of the Catapult ensures that we play a core role in the revival of the national manufacturing sector. It also allows companies working with us to tap into a national network of manufacturing research excellence.

If any aspects of a particular challenge fall outside any Catapult member's areas of expertise, each can call on the other centres' knowledge and resources.

The High Value Manufacturing Catapult is just one of a new generation of Catapults targeting the most vital technologies for the UK's future.





To find out more about how  
we can help your business,  
contact Craig Roberts, Head of Medical AMRC:  
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