

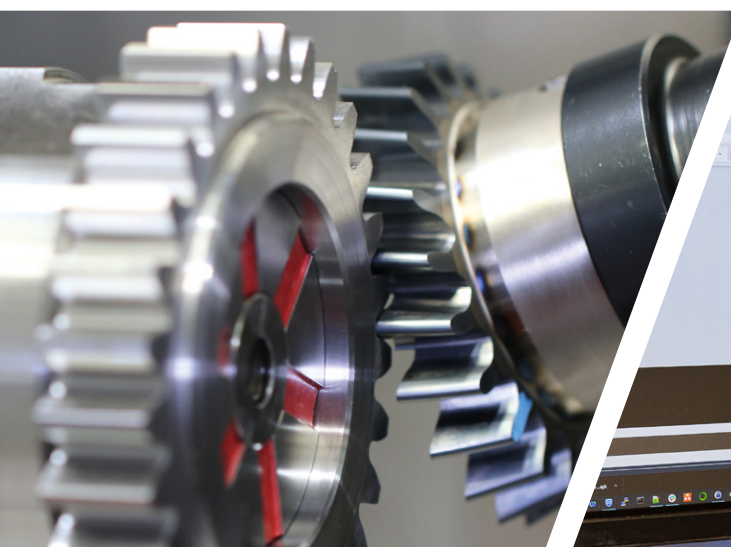


The University Of Sheffield.

# AMRC North West



## Making things better for Lancashire manufacturers





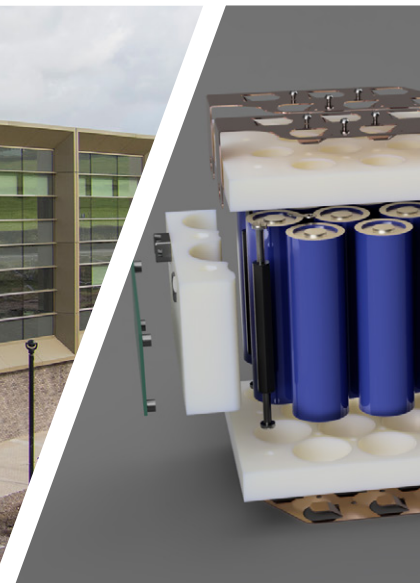
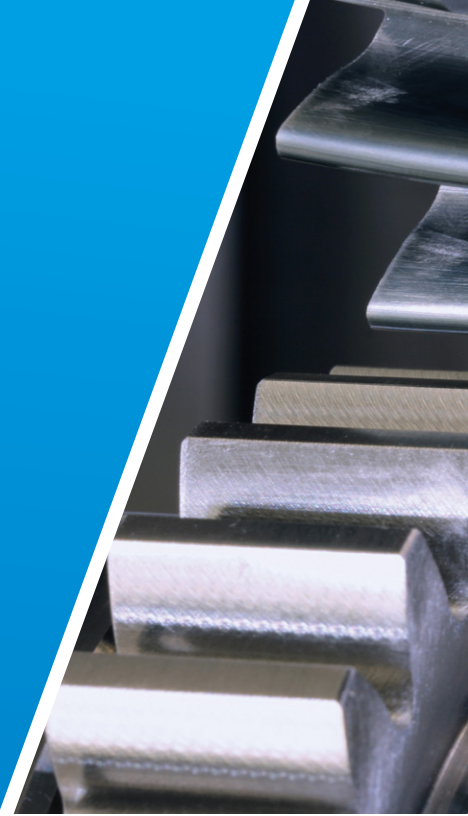
The  
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# AMRC North West

**AMRC North West, based in central Lancashire, is part of the University of Sheffield Advanced Manufacturing Research Centre (AMRC), a cluster of world-class centres for innovation and research into advanced manufacturing technologies used in the aerospace, automotive, medical and other high-value manufacturing sectors.**

Our research and development (R&D) at AMRC North West is accessible to all. Our goal is to drive innovation across the wider region, working closely with the extended small-to-medium enterprise (SME) supply chains that are the lifeblood of our economy.

Our dedicated applied research centre, built with a £20m grant from the Lancashire Enterprise Partnership (LEP) Growth Deal, sits at the heart of the Samesbury Enterprise Zone in Preston and is home to a high-performing team of experts operating at the cutting edge of R&D.



## Our mission is to:

- Demystify and de-risk R&D investment in innovation to drive step-change improvements in productivity, sustainability and quality;
- Accelerate the adoption of Industry 4.0 technologies including:
  - Additive manufacturing
  - Robotics and automation
  - 5G in manufacturing
  - Digital twins, simulation and modelling
  - Data capture and analytics
  - Machine monitoring
- Stimulate inward investment from high value-added manufacturers;
- Attract and inspire research expertise from across the North West and beyond.

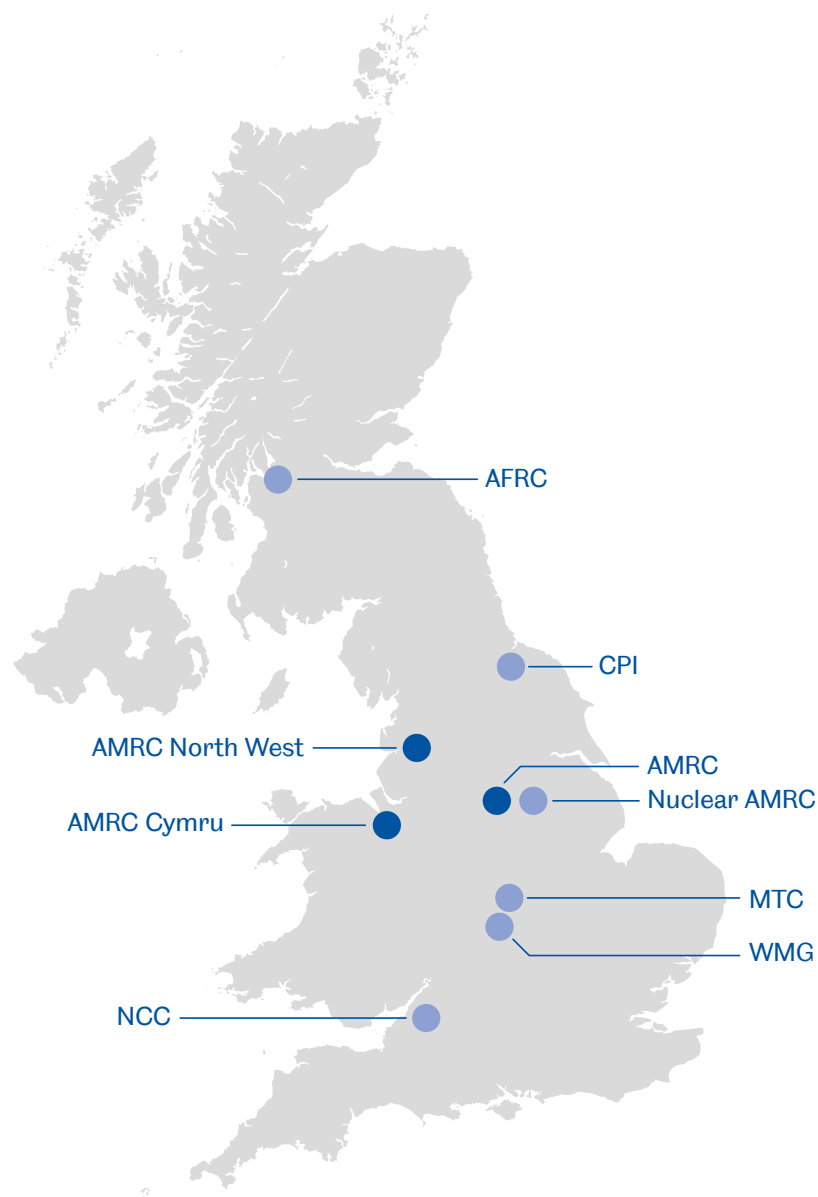
## AMRC North West is driven by industry, for industry - no matter what size your business.

Our R&D talents are available to any manufacturer that wants to reduce waste, raise productivity, improve quality and make the low-carbon transition while moving up the value chain.

We pride ourselves on using the knowledge and expertise gained from our R&D activity to meet the needs of SMEs in an affordable and beneficial way through our funded projects supported by the European Regional Development Fund (ERDF).



The AMRC has a global reputation for helping companies overcome manufacturing problems and is a model for collaborative research involving universities, academics and industry worldwide. We are also a member of the High Value Manufacturing (HVM) Catapult, a consortium of leading manufacturing and process research centres, backed by Innovate UK.



### High Value Manufacturing Catapult

**AFRC** – Strathclyde, **CPI** – Wilton, **AMRC** – Rotherham / Sheffield / Preston / Broughton, **Nuclear AMRC** – Rotherham, **MTC** – Ansty, **WMG** – Coventry, **NCC** – Bristol.



**Our engineers use the latest advanced technologies and sustainable manufacturing techniques to help manufacturers on their journey toward net zero.**

**Our core capabilities are:**

- **Additive Manufacturing**
- **5G in Manufacturing**
- **Low Carbon Technologies**
- **Batteries and Automation**
- **Digital Manufacturing**
- **Machining**

Our ability to draw on the proven R&D talent of the University of Sheffield AMRC, the seven-member HVM Catapult and Lancashire's three universities provides immediate strength in depth to support the region in its ambition to make the North West a leader of innovation-driven, advanced manufacturing.



# Additive Manufacturing

**Additive Manufacturing (AM) has often been billed as a key component of the next industrial revolution. However, there are potential barriers that can prevent the uptake of this technology for some companies.**

**We can help your business answer the following questions:**

## **What are the capabilities of Additive Manufacturing and how does it work?**

- Information on additive manufacturing processes, capabilities, machines and materials;
- Avoid potential pitfalls associated with additive manufacturing.

## **Is Additive Manufacturing suitable for my company?**

- Bespoke report tailored to your company's needs and goals;
- Cost comparisons, feasibility studies, cost/benefit analyses;
- Insight into additive manufacturing, de-risking your transition towards digital manufacturing technologies.

## **What are the applications of Additive Manufacturing?**

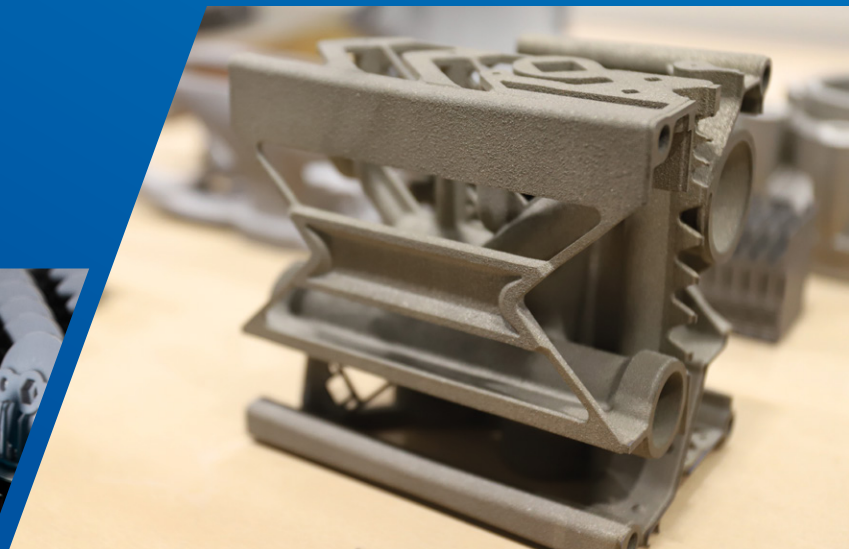
- Selection of AM processes suitable to your business needs;
- Business impact analysis – costs, lead times, purchase batch sizes, stocking requirements;
- Insight into agility, flexibility and diversity of additive manufacturing applications.

## **How to design for Additive Manufacturing?**

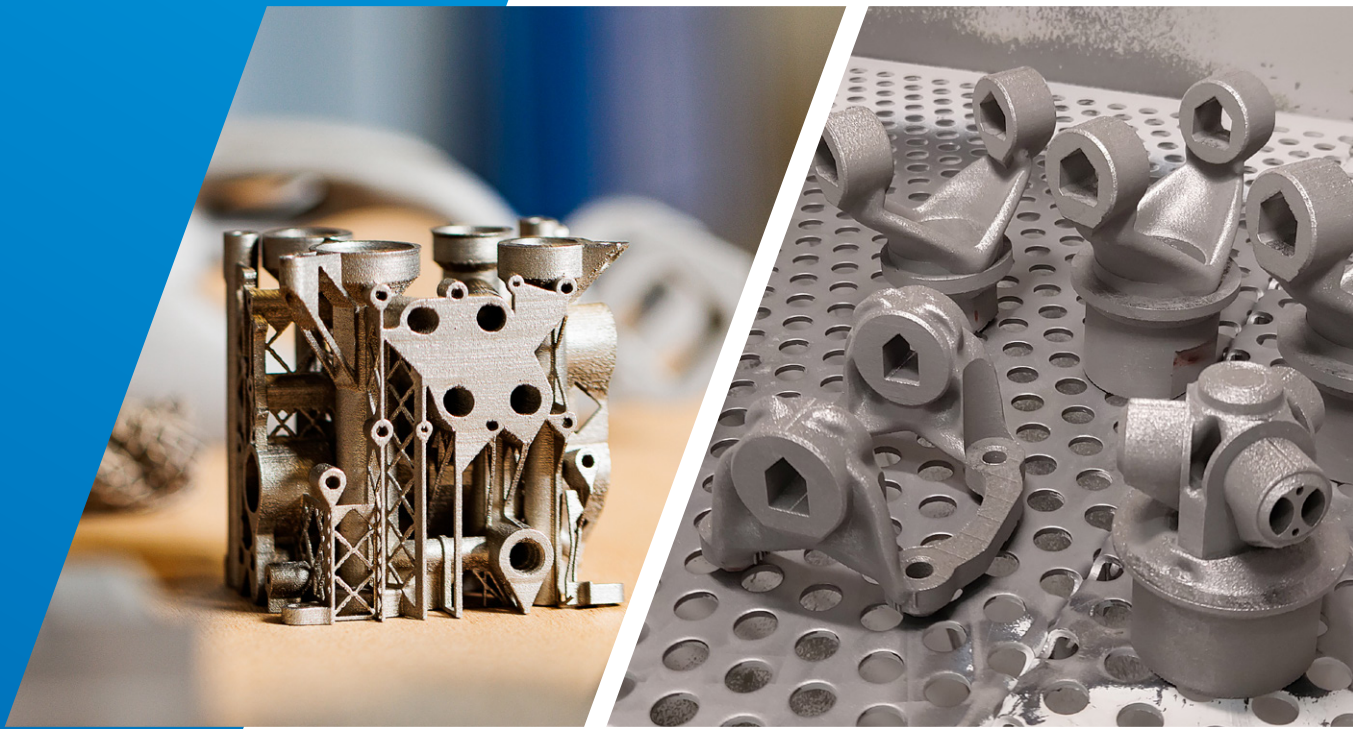
- Overview of design principles for additive manufacturing relevant to your application;
- Modification of component geometry to suit additive manufacturing process;
- Design for additive manufacturing knowledge to leverage the potential of polymer systems for your business.

## **What are the properties of additively manufactured parts?**

- Sample additively manufactured parts, with AMRC producing prototype components from CAD data via polymer and metal additive manufacturing;
- Comparison of prototype parts produced on various systems with a range of materials;
- Reduced time to market for new products, prototype testing or final part manufacture.



Our Additive Manufacturing team is here to help Lancashire-based SMEs who are considering implementing AM within their business, or who are interested in learning more about its applications.



# Digital Manufacturing

**Data is currently the most valuable asset a company can possess. However, not every company has the ability to collect, analyse and utilise data.**

Through our work with hundreds of SMEs across Lancashire, we have pinpointed common digital pain points and can work with you on these to help drive improvements in productivity, performance and quality.

**We can help your business in the following areas:**

## Job tracking

- Monitor jobs from start to finish;
- Pinpoint any bottlenecks in production, quickly and easily;
- Locate a job on the factory floor with ease.

## Asset management

- Reduce time searching for lost tools or parts; up to 15 minutes per person, per day is wasted;
- Radio frequency identification (RFID) allows for quick location of parts on the shop floor, within 1.5 metres;
- Restrict access to non-essential personnel (visitors, contractors).

## Machine monitoring

- Learn how machine monitoring can benefit your company;
- Gather data from machines and monitor overall equipment effectiveness (OEE);
- Make informed purchasing decisions.

## Embedded systems

- Retrofit legacy machines with sensors, creating a bespoke monitoring system for a fraction of the cost of a new machine;
- Replace old, outdated systems with smaller, single board computers as a cost effective method of upgrading a system.

## Data analytics

- How can data benefit my company;
- Can I gather data with the equipment I currently use;
- Isn't gathering and analysing data expensive?

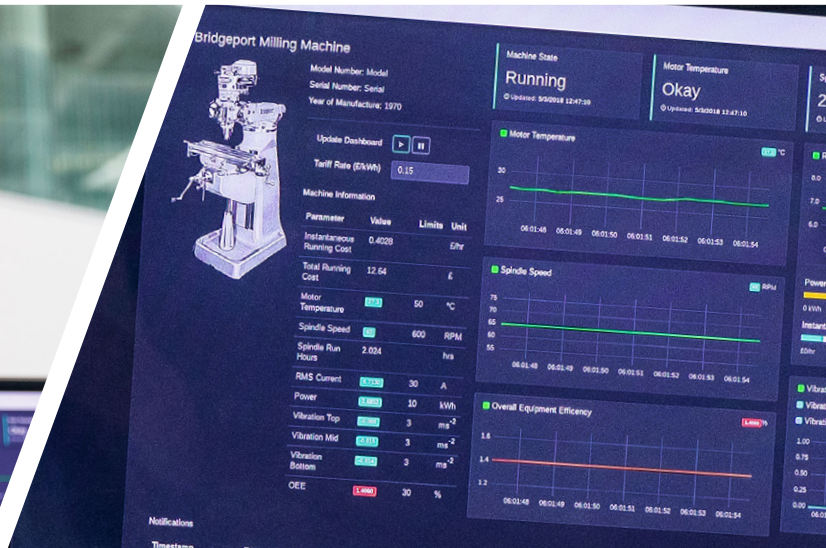
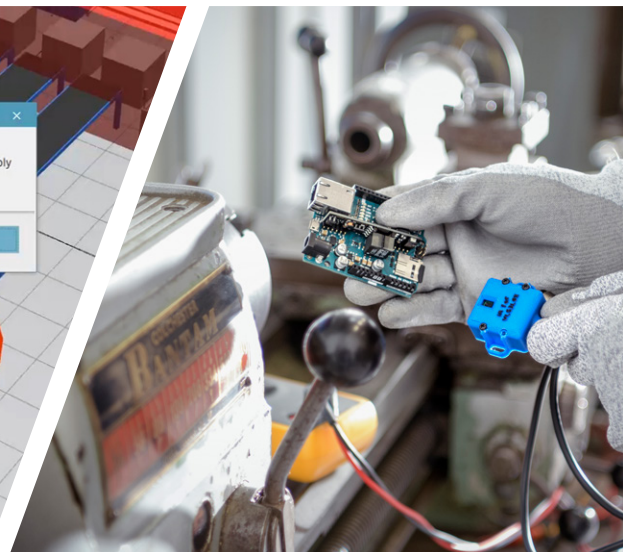
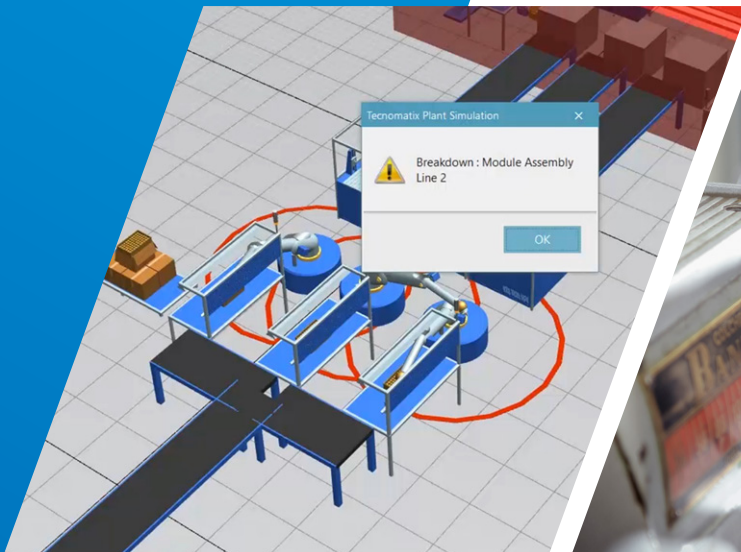
## SME Benefits

This platform provides SMEs with an easy introduction into data and how it can benefit the company, what costs are to be expected, what method of approach is best and understand barriers to implementation.





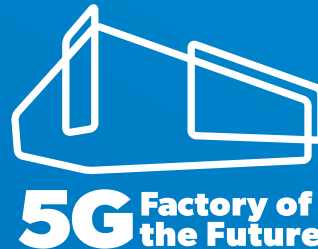
Our digital team can help companies considering the move to a more data-driven manufacturing process.



# 5G for Manufacturing

## The future is now with 5G in manufacturing.

We are leading the 5G Factory of the Future project, an open-access industrial testbed that aims to find new and more efficient ways of manufacturing to help lead industry towards a smarter, safer and more sustainable future.



Our programme has major global partners in BAE Systems and IBM, along with communications provider aql, specialist Lancashire-based SMEs, Machine Tool Technologies and Miralis, and the Digital Catapult. Together, we aim to demystify 5G for the manufacturing sector and work towards developing the smart factory of the future, today.

**This ground-breaking project is unlocking the potential of 5G technology by:**

- Improving productivity and efficiency;
- Connecting workers, machinery supply chain and product;
- Using agile, connected digital infrastructure to improve production processes, worker safety, quality control and much more.



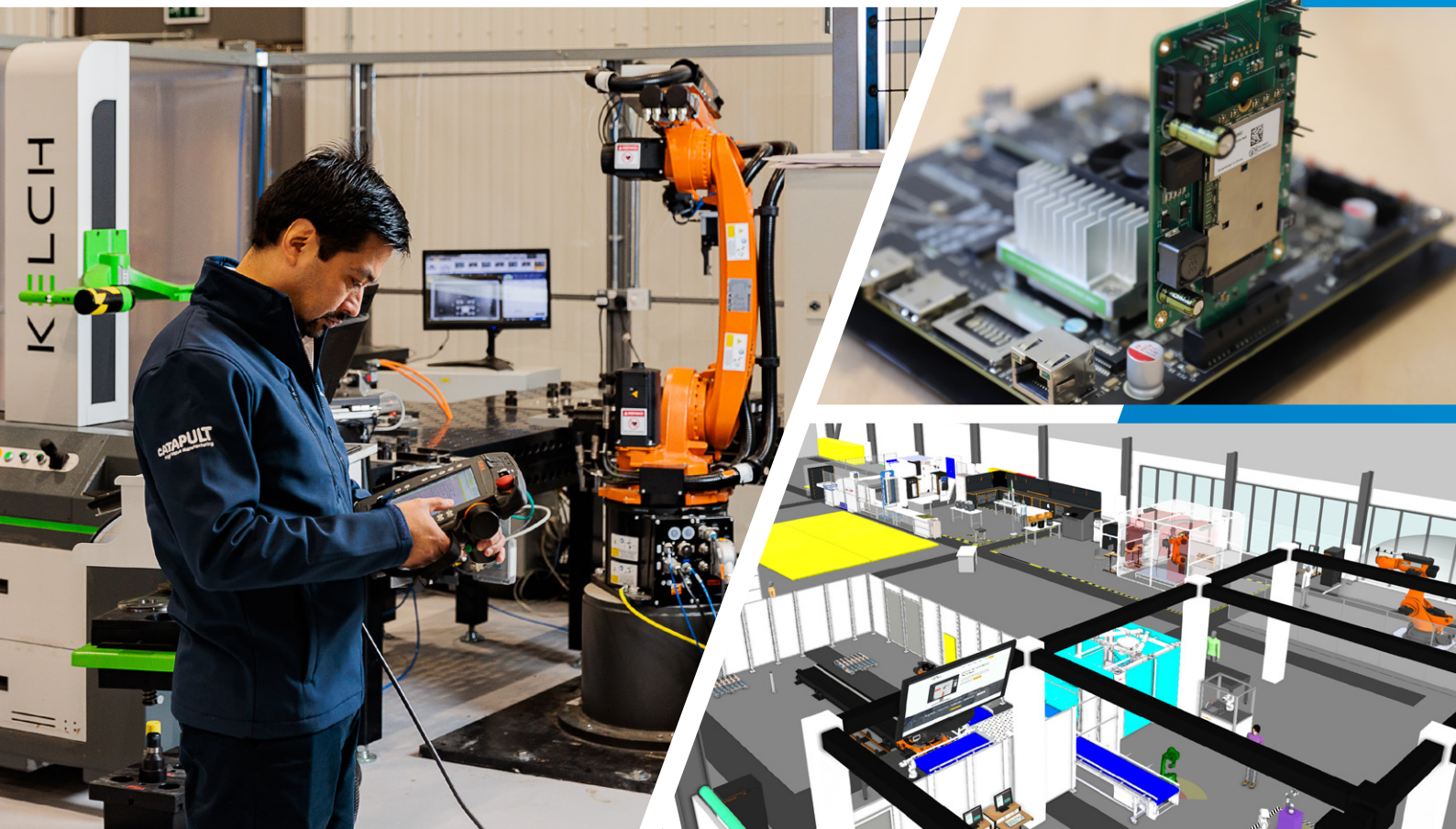
**With 5G, we finally have a way to make digital manufacturing a realistic prospect. By accelerating adoption of Industry 4.0 technologies – using 5G to move manufacturers into the digital fast lane – Lancashire businesses have an opportunity to not just survive, but thrive.**

Until now, digital connectivity simply hasn't been able to deliver this sort of impact for the manufacturing industry. Wi-Fi, 4G and wired solutions each lack at least one of the fundamental capabilities of mobility, bandwidth, latency or the security needed to be truly useful on an industrial scale.

5G has opened the door to a whole host of possibilities for manufacturing — closed loop control, tool automation, troubleshooting using augmented reality, remote asset monitoring, digital twins, fully wireless factories and much more.

5G Factory of the Future is a live test bed environment where this technology is being put through its paces, showing businesses how they can use 5G to innovate and sharpen their competitive edge.

The 5G Factory of the Future programme was awarded £9.5m by the Department for Digital, Culture, Media and Sport (DCMS), which includes match funding from industry. It is part of the government's £200m investment in 5G testbed facilities across the country.



# Low Carbon Technologies

## Can digital technologies drive low-carbon manufacturing?

**We are developing a Low Carbon Smart Building Demonstrator, supported by the Lancashire Enterprise Partnership, to create the road map for manufacturers of all sizes - small to large - on how they can achieve net zero by 2050 and halve carbon footprints by 2030.**

We recognise the important role small and medium-sized enterprises (SMEs) have in the low-carbon transition, that's why our demonstrator is specifically developed to be accessible to all manufacturers.

### So how will we drive change?

- Provide a foundational level of understanding on the impact of carbon dioxide and why net zero is of critical importance;
- Support the education and embedding of Lean practices within your facility. We see Lean as being the facilitator to provide you with the headroom to implement net zero into your culture;
- Practical assists to support you in defining and integrating your solution through knowledge transfer partnerships;
- Demonstrations on a range of Industrial Internet of Things (IoT) technologies such as:
  - **Digital dashboards:** visualising data sources to support educated decision making;
  - **Building Management Systems (BMS) integration:** allowing complete visualisation and control of all elements of your building's infrastructure;
  - **Occupancy and asset management:** understanding how your space is used and where opportunities for improved efficiency and repurposing of space is applicable;
  - **Equipment monitoring and proactive maintenance:** limiting and preventing machine down time and unnecessary up time;
  - **Renewable energy, including generation and storage:** allowing you to become more self-sufficient and cost effective;
  - **Environmental monitoring and adaptation:** driving a healthy workspace and reducing non-quality in controlled processes;
  - **Digital Twin and metaverse-style working:** providing an immersive solution to understand all KPI's within your facility from anywhere with an internet connection;
  - **Manufacturing execution systems:** a solution to remove waste in processing, supply chain and improve traceability without the use of paper and its subsequent storage.





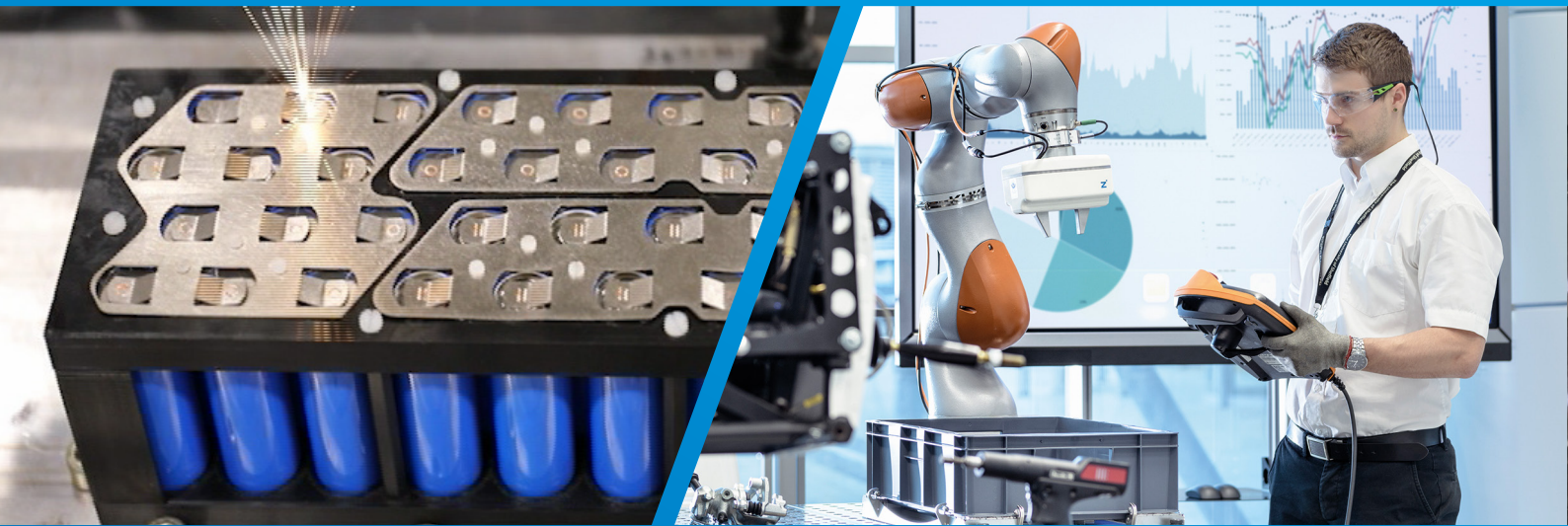
In his message to the COP26 United Nations climate change conference, Sir David Attenborough said:

**“A new industrial revolution powered by millions of sustainable innovations is essential and is indeed beginning. If working apart we are a force powerful enough to destabilise our planet, surely working together we are powerful enough to save it.”**

With this project, AMRC North West, and any interested partners, have the opportunity to take these powerful words and convert them into revolutionary actions. **Get in touch if you want to be part of that future.**



# Batteries and Automation



**Batteries and automation could save your business money by eliminating costly errors and streamlining your processes to help employees complete them more efficiently.**

We're offering support to Lancashire-based SMEs who are considering implementing these technologies within their business, or are interested in learning more about its applications.

**We can help your business in the following areas:**

## **Collaborative robots (Cobots)**

- Cobot selection;
- Tooling selection;
- Health and safety;
- Automation concept, for example machine tending concept design.

## **Battery and energy storage**

- Electrical system requirement capture;
- Use case modelling;
- Pack configuration optimisation;
- Electrical energy storage options;
- Battery chemistry selection.

## **Continuous improvement**

- Value stream mapping;
- Factory layout and cell design;
- Process mapping;
- KPI investigation;
- Funding opportunities.

## **Digital and design**

- Getting started with computer aided design (CAD);
- Viewing computer aided design in virtual reality;
- Discrete event simulation suitability check.



# Machining



## We help companies to develop techniques which deliver significant improvements in machining performance and span.

Our research team is here to support Lancashire-based SMEs that want to improve machining performance within their business.

### We can help your business in the following areas:

#### Machining dynamics assessment

- Chatter suppression and process optimisation using tap testing techniques to achieve maximum material removal rates for your machining processes.

#### Optimised machining tooling

- Assistance with geometry, tooling material and parameters for your application. Help identifying tool wear, considering optimal tool holding solutions, and presenting best tooling options in the marketplace.

#### Digital Integration in machining

- Development of machine tool condition monitoring and signal processing solutions. Advice on productivity monitoring software.

#### Machining CAM strategy

- Advice on down selecting suitable CAD/CAM software. Development or optimisation of CAD/CAM models. Optimal machining strategy development.

#### Cutting fluid selection

- Help choosing the optimal fluid for your process through the AMRC's extensive partnership, and advice for managing coolant and health and safety considerations.





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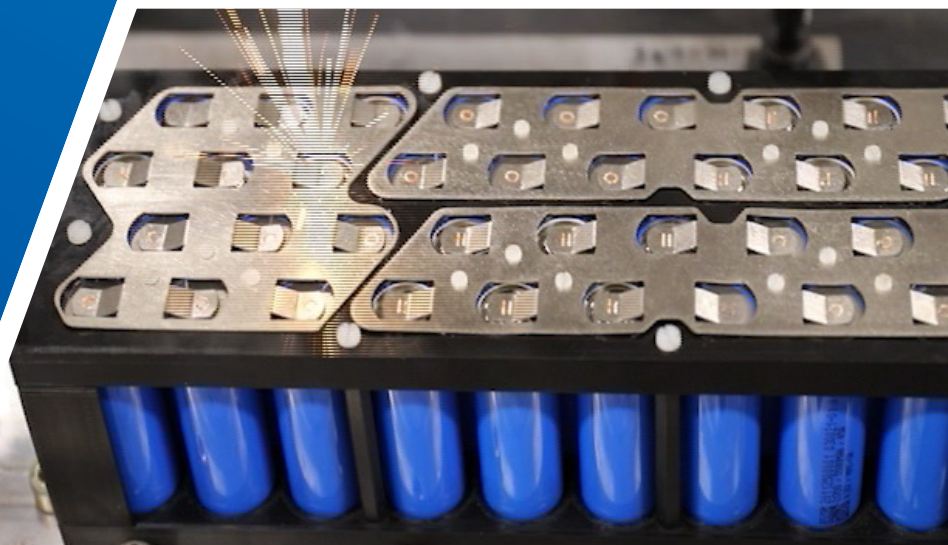
**For more information** on our fully-funded support and how we can help your business become smarter and more sustainable, please contact:

e: [northwest-enquiries@amrc.co.uk](mailto:northwest-enquiries@amrc.co.uk)

t: 01254 947 100



[amrc.co.uk/northwest](http://amrc.co.uk/northwest)



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