

Integrated Computational Materials Engineering (ICME) approach

How the 10xICME approach blends the boundaries between the digital world and the real world?





“ 10xICME is a key Hexagon solution initiated by our materials team and spread across the extended enterprise with building blocks from Hexagon and our eco-system partners.”

Guillaume Boisot,
Head of Materials & ICME Center
of Excellence at Hexagon

Developing a unique, integrated computational materials engineering solution

Integrated Computational Materials Engineering (i.e. ICME) offers engineers the ability to optimize the combination of materials and manufacturing processes. It helps innovate and maximize performance while reducing cost and lead time.



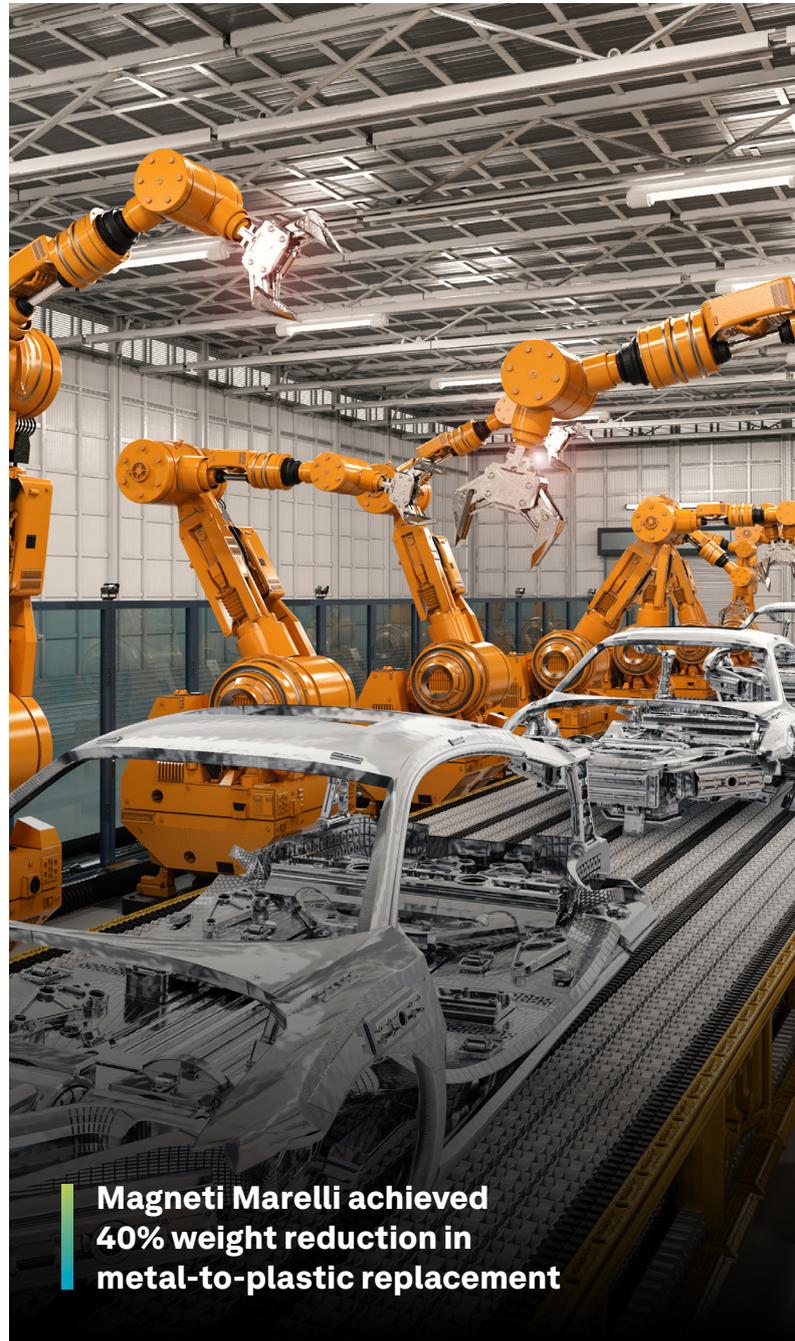
10xICME is setting the standard for ICME with the strongest solution ecosystem in the world

Combining a comprehensive suite of 10 established core technologies and services and developed over 19 years of extensive innovation, 10xICME is redefining the way in which ICME is delivered.

Through its unique combination of solutions, the ten pillars of 10xICME provide an extensive, robust, and value rich ICME solution. It assists users through the entire materials development, design, engineering and manufacturing processes.

10xICME is developed alongside academia and industry experts and was released for use following further input from partners across our eco-system which led to the 'fine tuning' of the unique ten pillar methodology.

This end to end solution utilizes a comprehensive suite of products which help you 'predict the future'. Inspect data, visualise and simulate anything including; material development to testing, insight management, compliance and digital continuity.



**Magneti Marelli achieved
40% weight reduction in
metal-to-plastic replacement**

The ten big benefits of 10xICME



Reduces development time



Less environmental impact



Accelerates innovation



Optimizes performance



Manages data & processes



Enhances productivity



Compliance & sustainability



Saves you money



Reduces waste



Improves quality

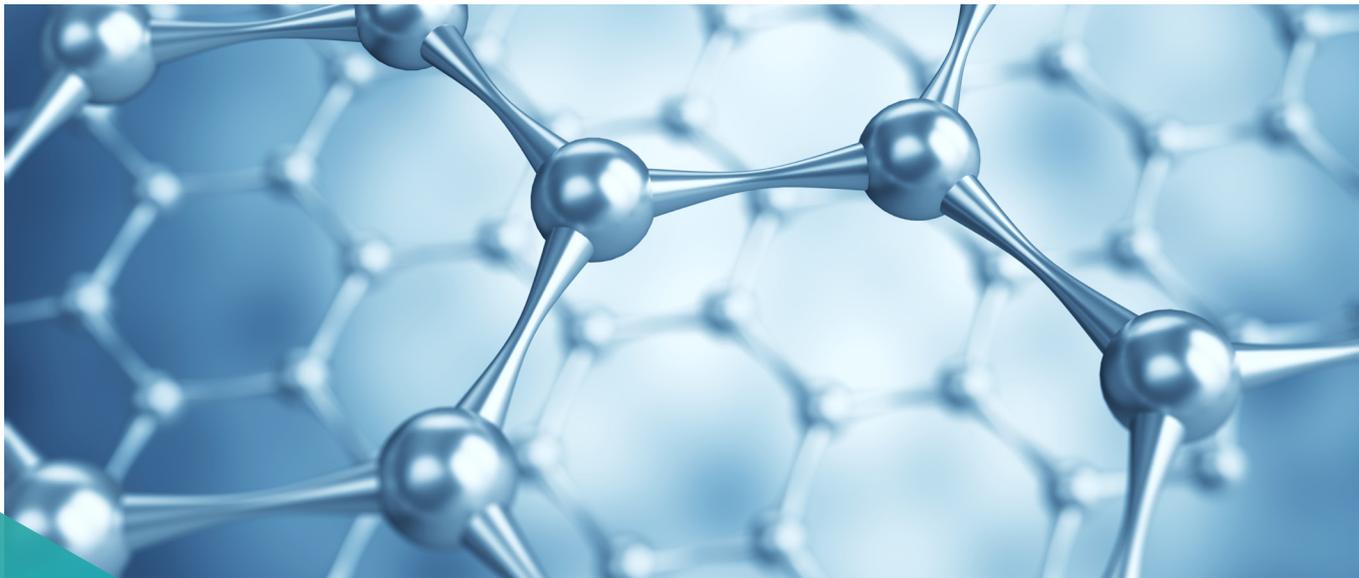
Digitally merge every stage of your materials development process, speed up delivery and drive innovation

10xICME integrates computational materials science tools into a holistic system that accelerates material development, transforms the engineering design optimization process and unifies design and manufacturing.

This sustainable design and manufacturing solution focuses on delivering benefits that are highly valued and prized by manufacturers the world over.

Explore the 10xICME pillars to improve materials use

The ten building blocks, deliver a complete suite of solutions to simulate everything from development to testing, management to modelling and beyond



1/10

Virtual Material Development

Virtual Material Development is aimed at accelerating the development of advanced material systems such as engineering plastics, composites, metals, ceramics and bridges the gap between the digital model and the manufactured product in a faster and more affordable way.

Our extensive tool, based on the Digimat product solution, allows our customers to predict the mechanical, thermal and electrical behaviour of materials, based on their underlying microstructure.

This microstructure can be built completely into our software, or it can come from CT scanning or molecular dynamics delivered by specialist partners.

2/10

Virtual Material Testing

Following Virtual Material Development, our Virtual Material Testing solution uses simulation to complement, optimize and accelerate material characterization which enables you to test your material extensively, to understand how it behaves before advancing to the design phase.

We have developed virtual testing software, enabling hybrid material testing with virtual and physical tests. This cuts the time of testing in half and can reduce cost by a factor of three.



3/10 **Material Lifecycle Management**

A solution designed to support companies in organizing, protecting and using their materials IP and more generally to digitize material workflows. In short it is a unique and world-leading system to manage your materials data.

MaterialCenter is the central hub we use to manage physical and virtual material's data which shares information, while protecting intellectual property. Overlooking material's information can have a significant impact on your product quality, cost and development time. Industry leaders in the digital era are starting to embark on a material's digitalization strategy to mitigate materials risk.

4/10 **Material eXchange**

Supporting the industry as a whole, as well as individual users, the Material Exchange platform is a platform that has been developed to support the effective and efficient use of materials, thanks to an easy & secure exchange of advanced material data and models between material suppliers and end-users.

Suppliers can develop very accurate material models for their customers to use and they can provide the material model through our exchange platform where they can encrypt and protect the models.

Material suppliers, who are sharing material models with Digimat end users, are enhancing overall material education, and usage benefits of their products.

5/10 **Compliance and Sustainability**

To ensure that your product meets compliance and sustainability requirements and industry regulations. It is made accessible to the designers and analysts as early as possible in the product development cycle to support compliant and sustainable use of materials.

6/10 **Virtual Manufacturing**

Aimed at accelerating and optimizing the manufacturing of composites and metals using traditional or the latest additive technologies.

7/10

Accurate Material Modelling

This is where we take part simulation to the next level of accuracy and/or predictability thanks to a combination of accurate data, material models and high fidelity modeling of the part geometry, microstructure (e.g. defects) and other influencing factors.

Applying extensive knowledge of materials, we can help you to find the right material model and feed it with the right data to make sure your end simulation is accurate, based on accurate material models and accurate material data.

8/10

Effect of Manufacturing

Effect of manufacturing on part performance is important to model and understand the behavior of the product as actually manufactured and not only as designed. The effect of manufacturing can either be simulated or measured then used in part performance simulation.

9/10

Material Intelligence (MI)

Material intelligence applies artificial intelligence to materials. Both physical testing and virtual testing leads to an invaluable dataset. With artificial intelligence, both can be combined to create more value.

The large size of data can make decision making challenging. Artificial intelligence methods embedded in 10xICME improve the material development, select and utilization process.

10/10

Digital Twin

Used to model the entire process of transforming the raw material into products for a more effective and efficient use of materials.

This material centric digital twin connects each element together with the right data flow to model the manufacturing line in its entirety. From the initial stage of getting the materials in, to the final stage of getting the product out.



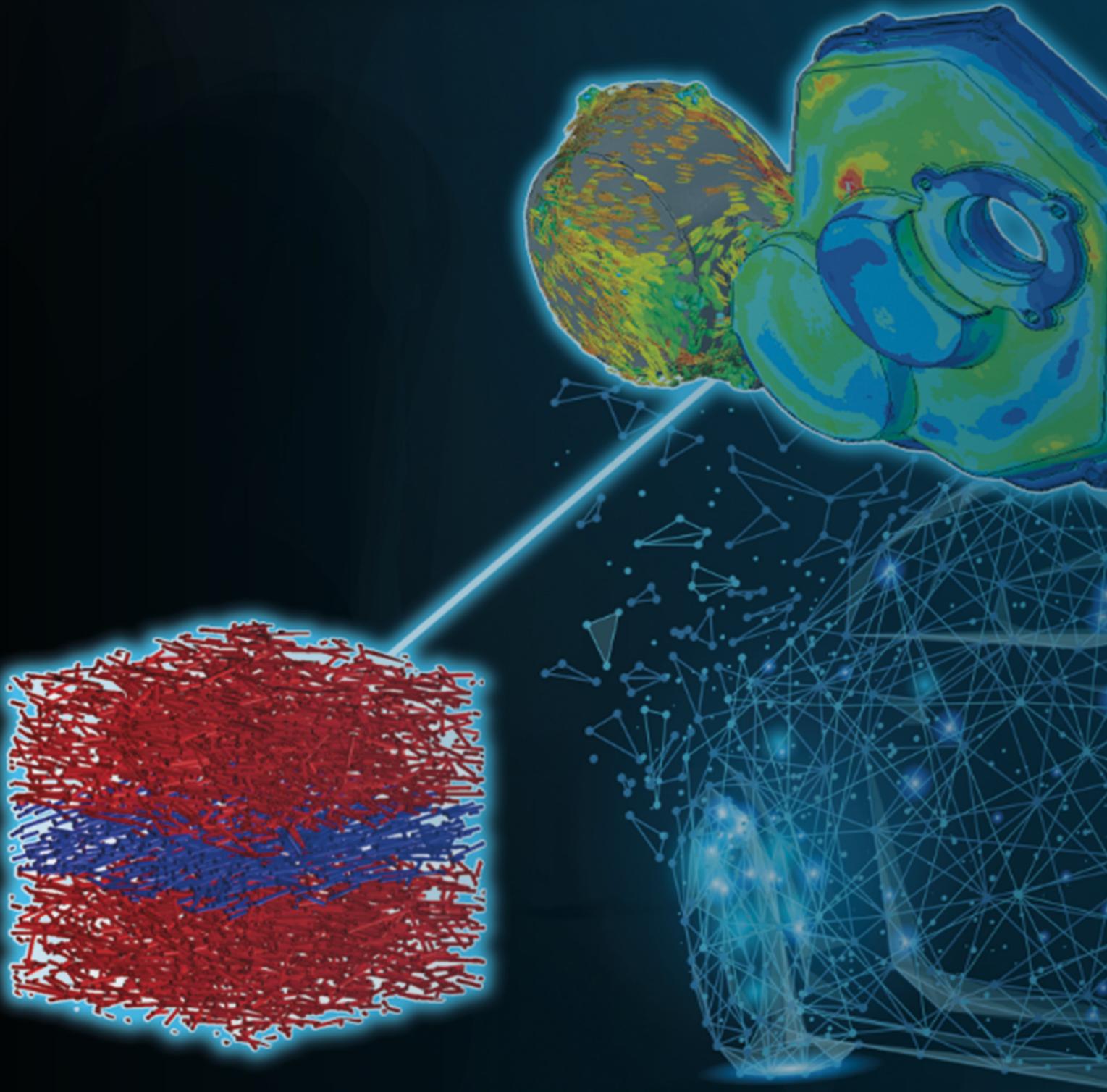


ICME is key to manufacturing transformation

10xICME is setting the standard for ICME with the strongest solution ecosystem in the world

It's unique methodology blends academic research, cutting edge software and physics to help engineers tackle today's challenges and create new opportunities for tomorrow.







Continue your journey with 10xICME...

The best way to understand the transformational capability 10xICME offers is to book a conversation with the team.

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Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that use data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit hexagonmi.com.

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