

# Fraunhofer Institute for High-Speed Dynamics, Ernst Mach Institute, EMI

## About this organisation

### Machine translation

This profile has been machine-translated based on data provided in German.

Fraunhofer EMI specialises in the investigation of physical-technical processes in materials, structures and components, such as those that occur in crashes or impacts. With our research at our three locations in Freiburg, Efringen-Kirchen and Kandern, we contribute to increased safety, reliability, resilience and sustainability in our society.

The competence portfolio in the field of lightweight construction ranges from the non-destructive and mechanical characterisation of materials, fabrics and components to the development and implementation of material models for all lightweight construction materials and material structures for requirements in both the quasi-static and highly dynamic strain rate range.

Ernst-Zermelo-Straße 4  
79104 Freiburg  
Baden-Württemberg  
Germany

[www.emi.fraunhofer.de](http://www.emi.fraunhofer.de)



**Organisation type**  
Non-university research institution

**Sectors**  
Four small black icons representing different sectors: a car, a building, an airplane, and a person.

**Employees**  
250 up to 499

**Turnover**  
€10m - €50m

**Funding**  
n/a

**Main areas covered**      Material characterisation, Modelling, numerical simulation, Dynamic component analysis, Multi-material systems, Additive manufacturing

**Infrastructure**      Research crash facilities, Rapid tearing systems, Split Hopkinson Bar (push+pull), Accelerator systems 100-10000 m/s, Drop weights

**Certifications**

**Keywords**

**Memberships**

## Overview of lightweighting expertise

### Machine translation

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	Research	Development	Manufacturing & Supply
<b>Offer</b>			
<b>Products</b> Parts and components, Systems and end products, Materials	✓	✓	
<b>Services &amp; consulting</b> Training, Consulting, Testing and trials, Prototyping, Validation, Simulation, Technology transfer	✓	✓	
<b>Field of technology</b>			
<b>Design &amp; layout</b> Hybrid structures, Lightweight construction concepts, Lightweight material construction	✓	✓	
<i>Functional integration</i>			
<b>Measuring and testing technology</b> Component and part analysis, Visual analysis (e.g. microscopy, metallography), System analysis, Materials analysis, Destructive analysis, Non-destructive analysis	✓	✓	✓
<b>Modelling and simulation</b> Crash behaviour, Loads & stress, Multiphysics simulation, Optimisation, Processes, Structural mechanics, Materials, Reliability validation	✓	✓	
<i>Plant construction &amp; factory automation</i>			
<i>Recycling technologies</i>			

Overview of lightweighting expertise

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	Research	Development	Manufacturing & Supply
Manufacturing process			
<b>Additive manufacturing</b> 3D printing, Selective laser sintering (SLS)	✓	✓	✓
Coating (surface engineering)			
Fibre composite technology			
Forming			
<b>Joining</b> Hybrid joining, Adhesive bonding, Riveting	✓		
Material property alteration			
Primary forming			
Processing and separating			
Textile technology			

## Overview of lightweighting expertise

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	Research	Development	Manufacturing & Supply
<b>Material</b>			
<b>Biogenic materials</b> Bioplastics, Biocomposites	✓	✓	
<b>Cellular materials (foam materials)</b> Closed-pore, Open-pore	✓	✓	
<b>Composites</b> Aramid fibre composites, Glass-fiber reinforced plastics (GFRP), Carbon-fiber reinforced plastics (CFRP), Short fibre-reinforced concrete, Nanocomposites, Natural fibre reinforced plastics (NFRP), Laminates, Textile-reinforced concrete	✓	✓	
<b>Fibres</b> Aramid fibres, Glass fibres, Carbon fibres, Metal fibres, Natural fibres	✓	✓	
<i>Functional materials</i>			
<b>Metals</b> Aluminium, Intermetallic alloys, Magnesium, Steel, Titanium	✓	✓	
<b>Plastics</b> Thermoset plastics, Elastomers, Thermoplastics	✓	✓	
<b>Structural ceramics</b> Monolithic ceramics	✓	✓	
<b>(Technical) textiles</b> Meshes, Laid webs, Woven fabrics, Knitted fabrics	✓	✓	

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## Contacts

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Mr Dr. Jens Fritsch  
*Business Unit Manager Automotive*

[Jens.Fritsch@emi.fraunhofer.de](mailto:Jens.Fritsch@emi.fraunhofer.de)

Mr Dr. Michael May  
*Head of Aviation Division*

[Michael.May@emi.fraunhofer.de](mailto:Michael.May@emi.fraunhofer.de)