### About this organisation

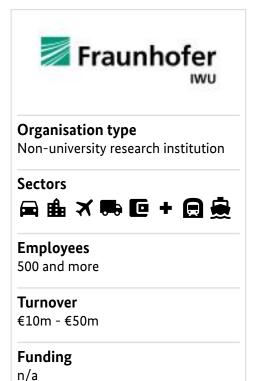
Fraunhofer Institute for Machine Tools and Forming Technology IWU is a driver for innovations in the field of production research and development. Lightweight structures are essential success factors in this context. The focus lies on metal foams, hybrid materials, pultruded and printed fiber-plastic composites.

We develop, design and manufacture entire assembly groups using these materials. If requested, we optimize the functions and properties of the assembly groups by simulation before their manufacturing and verify these characteristics after the completed production by conducting property analyses. Additive manufacturing processes open up new possibilities regarding component design, material utilization and individual number of pieces: laser beam melting is used for tool-free manufacturing of geometrically complex metal components. Such components include tools with integrated tempering channels and medical titanium implants with patientspecific geometry or internal functional structures for higher patient comfort. High functional integration is achieved by integrating sensors and actuators into the components. The research activities in additive manufacturing of plastic components focus on material development, increase in efficiency and resource efficiency.

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About this organisation		
Main areas covered	metal foam, fibre-reinforced plastics, metallic lightweighting, topology optimization, prototype construction	
Infrastructure		
Certifications	ISO 9001	
Keywords	E3 Research Factory, Metal Foam Center	
Memberships		

Overview of lightweighting expertise					
	Research	N Development	Manufacturing & Supply		
Offer					
Products Parts and components, Semi-finished parts, Machines and plants, Software & databases, Materials, Tools and moulds	<b>✓</b>	<b>✓</b>			
Services & consulting Consulting, Testing and trials, Funding, Engineering, Prototyping, Simulation, Technology transfer	<b>✓</b>	<b>~</b>			

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verview of lightweighting expertise				
	Research	N Development	/Janufacturing & Supply	
Field of technology				
Design & layout Lightweight manufacturing, Lightweight design, Hybrid structures, Lightweight construction concepts, Lightweight material construction	<b>~</b>	<b>✓</b>		
Functional integration Actuator technology, Sensor technology	<b>✓</b>	<b>✓</b>		
Measuring and testing technology Component and part analysis, Visual analysis (e.g. microscopy, metallography), Materials analysis, Destructive analysis, Non-destructive analysis	~	<b>✓</b>		
Modelling and simulation Loads & stress, Optimisation, Structural mechanics, Materials	<b>✓</b>	<b>✓</b>		
Plant construction & automation Plant construction, Automation technology, Handling technology, Robotics	<b>✓</b>	✓		
Recycling technologies				

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	Manufactu		
	Research	Development	& Supply
Manufacturing process			
Additive manufacturing 3D printing, Selective laser melting (SLM, LPBF,), Selective laser sintering (SLS)	<b>✓</b>	<b>✓</b>	
Coating (surface engineering)			
Fibre composite technology Resin infusion process, Resin transfer moulding, Pre-preg processing	<b>✓</b>	<b>~</b>	
Forming Impact extrusion, Compression moulding, Thermal converting, Deep-drawing, Fluid active media based forming, Rolling	<b>~</b>	<b>✓</b>	
Joining Clinching, Hybrid joining, Adhesive bonding, Sewing, Riveting	<b>✓</b>	<b>✓</b>	
Material property alteration			
Primary forming Pultrusion, Sintering, Injection moulding	<b>✓</b>	<b>✓</b>	
Processing and separating			
Textile technology Preforming	✓		

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	_	Manufactu	
	Research	Development	& Supply
Material			
Biogenic materials			
Cellular materials (foam materials) Closed-pore, Open-pore	<b>✓</b>	<b>✓</b>	
<b>Composites</b> Glass-fiber reinforced plastics (GFRP), Carbon-fiber reinforced plastics (CFRP)	<b>✓</b>	<b>✓</b>	
<b>Fibres</b> Aramid fibres, Glass fibres, Carbon fibres	<b>✓</b>	<b>✓</b>	
Functional materials Shape memory materials, Piezoelectric materials	<b>~</b>	<b>✓</b>	
<b>Metals</b> Aluminium, Magnesium, Steel, Titanium	<b>✓</b>	<b>✓</b>	
Plastics Thermoset plastics, Elastomers, Thermoplastics	<b>✓</b>	<b>✓</b>	
Structural ceramics			
(Technical) textiles  Meshes, Laid webs, Woven fabrics, Knitted fabrics, Nonwovens, mats	<b>✓</b>	<b>✓</b>	

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