Federal Cluster of Excellence MERGE

Central institution of the TU Chemnitz

About this organisation

Machine translation

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

The Federal Cluster of Excellence MERGE (Technology Fusion for Multifunctional Lightweight Structures) is Germany's first and only cluster funded by the German Research Foundation (DFG) in the field of lightweight construction research. Scientists from six interacting specialist disciplines are developing innovative manufacturing processes to reduce the weight of components and optimise value chains.

The focus is on the fusion of basic technologies suitable for large-scale production from the fields of plastics, metal, textiles and smart systems for the resource-efficient production of lightweight structures with high performance and functional density. Along process chains suitable for large-scale production, textile and metallic semi-finished reinforcement products are designed in in-line technologies to withstand loads and equipped with active components such as sensors and actuators using in-situ processes. The researchers are pursuing strategies for the recyclability of multi-material systems and the use of renewable raw materials as well as so-called bivalent resource efficiency (BRE for short) in order to tap into particularly high savings and innovation potential in the production and use of a component. The research areas involved are concentrated at one location, the Technology Campus, with Chemnitz University of Technology, the affiliated institutes and Fraunhofer Institutes, which promotes the transfer of knowledge over "short distances".

Reichenhainer Straße 31/33
09126 Chemnitz
Saxony
Germany
www.tu-chemnitz.de/MERGE

Organisation type
University or higher education institution

Sectors

Employees
50 up to 249

Turnover
n/a

Funding
n/a

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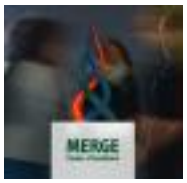




Main areas covered	Semi-finished and preform technologies, Plastics and metal processing, Textile engineering and technology, Modelling and simulation, Interface Engineering/ Design
Infrastructure	MERGE Technology Centre (MTC), Lightweight Manufacturing Complex
Certifications	DIN EN ISO 9001
Keywords	In-line and in-situ process chains, Multifunctional lightweight structure, Plastic/metal hybrid components, Smart Systems Integration, Bivalent resource efficiency
Memberships	

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Overview of lightweighting expertise

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	Research	Development	Manufacturing & Supply
Offer			
Products Parts and components, Semi-finished parts, Machines and plants, Software & databases, Systems and end products, Materials, Tools and moulds	✓	✓	
Services & consulting Training, Consulting, Testing and trials, Engineering, Prototyping, Validation, Simulation, Technology transfer	✓	✓	
Field of technology			
Design & layout Lightweight manufacturing, Lightweight design, Hybrid structures, Lightweight construction concepts, Lightweight material construction	✓	✓	
Functional integration Actuator technology, Sensor technology, Material functionalisation	✓	✓	
Measuring and testing technology Component and part analysis, Visual analysis (e.g. microscopy, metallography), Materials analysis, Destructive analysis, Non-destructive analysis	✓	✓	
Modelling and simulation Crash behaviour, Loads & stress, Life-cycle analysis, Multiphysics simulation, Optimisation, Processes, Structural mechanics, Materials	✓	✓	
Plant construction & automation Plant construction, Automation technology, Handling technology, Robotics	✓	✓	
Recycling technologies			

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	Research	Development	Manufacturing & Supply
Manufacturing process			
Additive manufacturing 3D printing, Deposition welding, Selective laser melting (SLM, LPBF, ...), Selective laser sintering (SLS)	✓	✓	
Coating (surface engineering) Galvanising, Plasma process, Sputtering	✓	✓	
Fibre composite technology Filament winding, Manual lamination, Resin infusion process, Resin transfer moulding, Pre-preg processing, Vacuum infusion	✓	✓	
Forming Bending, Impact extrusion, Compression moulding, Forging, Extrusion moulding, Stretch forming, Thermal converting, Deep-drawing, Fluid active media based forming, Rolling	✓	✓	
Joining Clinching, Hybrid joining, Adhesive bonding, Soldering, Sewing, Riveting, Screwing, Welding	✓	✓	
Material property alteration Mechanical treatment, Thermochemical treatment, Thermomechanical treatment, Heat treatment	✓	✓	
Primary forming Extrusion, Sintering, Injection moulding	✓	✓	
Processing and separating			
Textile technology Braiding, Preforming, Knitting, Textile surface treatment and finishing, Nonwoven & mats production, Weaving, Knitting, laid web production	✓	✓	

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	Research	Development	Manufacturing & Supply
Material			
Biogenic materials Bioplastics, Biocomposites, Wood	✓	✓	
Cellular materials (foam materials) Closed-pore, Open-pore	✓	✓	
Composites Basalt fibre-reinforced plastic, Glass-fiber reinforced plastics (GFRP), Ceramic matrix composite (CMC), Carbon-fiber reinforced plastics (CFRP), Natural fibre reinforced plastics (NFRP), Laminates	✓	✓	
Fibres Aramid fibres, Basalt fibres, Glass fibres, Ceramic fibres, Carbon fibres, Natural fibres	✓	✓	
Functional materials Electrostrictive / magnetostrictive materials, Shape memory materials, Piezoelectric materials	✓	✓	
Metals Aluminium, Intermetallic alloys, Magnesium, Steel, Titanium	✓	✓	
Plastics Thermoset plastics, Elastomers, Thermoplastics	✓	✓	
Structural ceramics Monolithic ceramics, Non-oxidic ceramics, Oxidic ceramics, Ultra-high-temperature ceramics	✓	✓	
(Technical) textiles Meshes, Laid webs, Crocheted fabrics, Woven fabrics, Knitted fabrics, Nonwovens, mats	✓	✓	

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