Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research

Bionic lightweight construction and functional morphology

About this organisation

Machine translation

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

With its innovative research, excellent scientific infrastructure and many years of expertise, the Alfred Wegener Institute investigates practically all areas of the Earth system. This always goes hand in hand with the development of technical innovations. ELiSE lightweight construction is a patented bionic product development process based on the natural lightweight structures of plankton organisms such as diatoms and radiolarians.

With ELiSE Engineering, we offer a broad spectrum of engineering services. A strong link between design, calculation and optimisation provides an excellent basis for developing efficient and customer-specific lightweight construction solutions. For the automated transfer of biological construction methods to technical products, we rely on the use of specially developed algorithms. By skilfully combining FE analyses, topology optimisations and geometry generation, we optimise products with extremely efficient bionic stiffeners. We work in research projects for innovative lightweight construction. To this end, we have access to unique infrastructure and expertise such as scientific collections, micromechanical tests, microscopy processes and algorithms for generating and optimising lightweight construction solutions.

Am Handelshafen 12
27580 Bremerhaven
Bremen
Germany
awi.de

Organisation type
Non-university research institution

Sectors
No specific sector

Employees
500 and more

Turnover
More than €50m

Funding

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Main areas covered	Structural optimisation
Infrastructure	CAD, FEM, algorithms, optimisation
Certifications	
Keywords	Bionic lightweight construction, algorithms
Memberships	

Overview of lightweighting expertise

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	Research	Development	Manufacturing & Supply
Offer			
Products			
Services & consulting			

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Overview of lightweighting expertise

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	Research	Development	Manufacturing & Supply
Field of technology			
Design & layout Lightweight design, Lightweight construction concepts	✓	✓	
Functional integration			
Measuring and testing technology			
Modelling and simulation Loads & stress, Optimisation, Structural mechanics	✓	✓	
Plant construction & automation			
Recycling technologies			
Manufacturing process			
Additive manufacturing 3D printing, Selective laser melting (SLM, LPBF, ...), Selective laser sintering (SLS), Stereolithography	✓	✓	
Coating (surface engineering)			
Fibre composite technology			
Forming			
Joining			
Material property alteration			
Primary forming			
Processing and separating			
Textile technology			

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	Research	Development	Manufacturing & Supply
Material			
Biogenic materials			
Cellular materials (foam materials)			
Composites			
Fibres			
Functional materials			
Metals			
Plastics			
Structural ceramics			
(Technical) textiles			

Contacts

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Contacts

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