Bionic lightweight construction and functional morphology

# About this organisation

### **Machine translation**

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

# Overview of lightweighting expertise Machine translation This organisation has been machine-translated based on data provided in German. Manufacturing Research Development & Supply Offer Products Services & consulting

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

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Overview of lightweighting expertise					
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	Research	Nevelopment	Manufacturing & Supply		
Material					
Biogenic materials					
Cellular materials (foam materials)					
Composites					
Fibres					
Functional materials					
Metals					
Plastics					
Structural ceramics					
(Technical) textiles					

# **Contacts**

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Bionic lightweight construction and functional morphology

# Contacts Mr Dr. Christian Hamm Head of the Bionic Lightweight Construction and Functional Morphology unit chamm@awi.de

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