

Contributions from Composite Lightweight Engineering towards A Climate-Efficient Economy

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Abstract

Lightweight engineering is a key technology on the way to achieve the EU 2030 targets that aim at least 40% cuts in greenhouse gas emissions from 1990 levels, at least 32% share for renewable energy, at least 32.5% improvement in energy efficiency, and 80% reduction of greenhouse gas emissions by 2050. Therefore, an urgent need is present for a deep market transformation by deploying efficient materials and technologies for different sectors like the automotive industry, the aerospace industry, wind energy and the construction sector [1]. Composite materials play a major role within that transformation process since they unite extraordinary properties with a low weight. The award lecture gives an overview about recent developments in the field of composite lightweight engineering. Using examples of promising developments such as carbon concrete composites [2], multifunctional carbon fibre composites from renewable resources [2,3], and novel textile composites for automotive applications [4]. Beyond that, scientific and industrial efforts to increase the lifetime of composite products are discussed. This includes in particular the use of predictive modelling for a degradation forecast of the material properties [5-7], the development of novel experimental methods [8,9], and diagnostics technologies for structural monitoring [10].

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Biography of Presenting Author



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Scientific Career and Education

Since 2020	Professor for Composite Lightweight Engineering at HTWK Leipzig
2018-2020	Scientific coordinator of the “Research Center Carbon Fibers Saxony” (RCCF) at TU Dresden
11/2017	Dresden Excellence Award 2017 for outstanding research
2017-2020	Principal Investigator at the Institute for Lightweight Engineering and Polymer Technology (ILK) at TU Dresden
06/2017	Venia Legendi (Privatdozent) awarded by the Faculty of Mechanical Engineering at TU Dresden

03-04/2017	Research Professor at the Korea Institute of Science and Technology (KIST), Institute of Advanced Composite Materials, Jeonbuk (Korea)
02/2017	Habilitation in the field of “Lightweight Engineering” at TU Dresden
2015-2020	Freelancer at GWT-TUD GmbH Dresden
2014-2020	Head of the Research Group “Carbon Fibres”, Institute of Lightweight Engineering and Polymer Technology, TU Dresden
2008-2020	Head of the Research Group “Material Models”, Institute of Lightweight Engineering and Polymer Technology, TU Dresden
2008-2010	Several DAAD research visits at the University of Oxford (UK), Solid Mechanics & Materials Engineering Group
2008-2014	Lectureship within the ERASMUS Programme at TU Riga (Latvia)
2008	PhD Thesis, TU Dresden, summa cum laude
2004-2015	Freelancer at Leichtbau-Zentrum Sachsen GmbH Dresden
2002-2010	Research Associate at the Institute of Lightweight Engineering and Polymer Technology, TU Dresden
2001-2002	Research Associate at Institute of Mechanics and Computational Mechanics, Leibniz University Hanover (Germany)
2000	EU Intensive Programme “Monitoring, Protection and Strengthening of European Building Heritage”, University of Florence (Italy)
1996-2001	Study of Civil Engineering at TU Dresden (Germany), Field of Study: Structural Engineering - Mechanics

Publications and Presentations

Number of publications: 128

Number of invited presentations: 38 h-Index: 16 (Google Scholar)

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