Structures
Research Theme

Stephen Hallett

bristol.ac.uk/composites
The Structures Academic Team

Our research into the mechanical performance of composites encompasses novel numerical methods, novel structural configurations, advanced analysis techniques, multi-functionality and data rich experimentation.

Alberto Pirrera  
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Paul Weaver  
Professor of Lightweight Structures

Luiz Kawashita  
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Matt O’Donnell  
Lecturer in Composite Structures

Giuliano Allegri  
Reader in Composite Structures

Stephen Hallett  
Professor in Composite Structures

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Giuliano Allegri  
Reader in Composite Structures
Selected PhDs completed in 2017/18

- Adam Thompson - Multi-Scale Modelling of Textile Composite Manufacture (Part of CIMComp DefGen project with many industrial partners)

- Matt Thomas - Structural Design of Variable Stiffness Composites Laminated on Doubly Curved Surfaces (Rolls-Royce supported CDT PhD)

- Camilla Osmiani - Multi-scale characterisation and modelling of tufted composites (Rolls-Royce supported CDT PhD)

- Ningbo Xie – NDT-based Performance Prediction for Wrinkled Composites under Compressive Load (collaboration with NDT group in Mech Eng)

- Bradley Cox - Development of well-behaved nonlinear structures (CDT PhD)
Some of our Awards

• **Bassam El Said** – awarded a Vice-Chancellor’s fellowship on “Hierarchical Multi-scale Modelling for Advanced Materials”

• **David Brigido** - reached the finals of The British Society for Strain Management (BSSM) Young Stress Analyst Competition 2018 for ‘Switchable-Stiffness Morphing Aerostructures using Granular Jamming’.

• **Andres Rivero** - won Best Oral Presentation at the 29th International Conference on Adaptive Structures and Technologies (ICAST) in Seoul, South Korea for his paper on "Aerodynamic Benefits of the Fish Bone Active Camber Morphing Device: Experimental Study”

• **Gaetano Arena** - awarded an EPSRC Doctoral Prize Fellowship on “Shape-adaptive structures: from academic research to industrial application”
New Projects Started

• **Ceramic Matrix Composite Technology Development (CEMTEC)** – Project with Rolls-Royce to investigate the use of numerical modelling previously developed for OMCs for use with CMCs: multi-scale structural analysis and textile preform deformation

• **Novel Lightweighting Approaches and Automated Manufacturing for Wind Turbine Blades** - application of a new winding-based manufacturing method for ultra-efficient truss structures from low cost feedstocks, supported by Vestas
Projects Completed

• **DynaPin** – Understanding Delamination Suppression at High Deformation Rates in Through-Thickness Reinforced Laminated Composites.
  • A £800K EPSRC funded collaboration between the Universities of Bristol, Oxford and Imperial College
  • Supported by industrial partners BAE, Rolls-Royce, Hexcel and the NCC.
  • More than 30 attendees at the project close-out meeting in October at the NCC

• **HiPerDuCT** – Recently completed Programme Grant
  • Strong collaboration established with Imperial
  • Shown that it is possible to create high performance composites that fail gradually with ductile or pseudo-ductile response, notch insensitivity and visible damage
  • More details at [www.hiperduct.ac.uk](http://www.hiperduct.ac.uk)
Summary and Outlook

• A significant number of projects ranging from blue-sky research to engineering applications
  • See quick-fire and posters for more technical details
• 30 PhD students and 20 Staff Researchers
• Working with many industrial partners
• Further opportunities for new projects and technology transfer