Forming of fibre-steered preform
Our research centres around Design for Manufacture, from novel material forms that facilitate forming, through detailed process understanding and novel machines to factory operations.
Core activity

The Manufacturing and Design theme group focuses on developing the means to turn ideas into hardware through efficient design and manufacturing practices. We build an in-depth understanding of current processes and develop novel and innovative manufacturing approaches, to deliver improvements in cost, quality and functionality across a range of industries.

Research focus areas:
- Process automation – automated fibre placement
- Continuous tow shearing
- Defects and features in composites manufacturing
- Understanding lay-up processes
- Design for manufacture
- Composites recycling
- Manufacturing of functional composites
- Numerical modelling of manufacturing processes
- Robotics and cobotics
- …
Selected highlights

• James Kratz:
  • Started EPSRC New Investigator Award: Real Time-AFP
  • Appointed to EPSRC Early Career Forum in Manufacturing Research

• Eric Kim:
  • iCOMAT: Start-Up business of the year award from Composites UK
  • IAA with Owens Corning (Jan 2021~) - Delamination suppression technique for composite wind turbine blades

• Carwyn Ward:
  • Young Engineer and Student (YES) Sub-Committee of SAMPE UK + EIRE

• New EngD projects: AirborneUK (2), iCOMAT, NCC (2)
EPSRC Future Composites Manufacturing Hub

cimcomp.co.uk

- Total EPSRC total investment of £10.4M led by the University of Nottingham
- Kick-off January 2017 – duration of 7 years
- Initially 5 partner universities – Nottingham, Bristol, Manchester, Imperial College with spokes Cranfied and Southampton
- Now 16 partner universities
- Bristol Composites Institute the largest partner/beneficiary in addition to UoN, with a duration of 7 year and kickoff in January 2017
Ongoing BCI Hub core project activity

Fibre Steered Forming Technology (Hub Core project – lead BCI): 01/09/2019 to 31/08/2021

- **Industry partners:** ESI, BAE, NCC, Coriolis, GKN Aerospace, AMRC, MTC, WMG, Airbus, Rolls-Royce, Hexcel, Composites Integration, Solvay, Airborne, Heraeus Noblelight, Pentaxia, Sigmatex, Spirit Aerosystems

- **Focus:** Modify the Continuous Tow Steering (CTS) process to feed highly-aligned discontinuous fibre tapes, produced from reclaimed/recycled fibres (HiPerDiF process), to further optimise the drapeability of preforms and enable a step-change in material cost.

Images showing the process and material samples.
Manufacturing for Multifunctional Composites (Hub Core project – Lead ICL): 01/09/2017 to 31/08/2021

- **Industry partners:** BAE Systems, Airbus, NCC, Hexcel, Qinetiq, Chomarat, Oxeon, GKN Aerospace

- **Focus:** Structural power from supercapacitors developed through embedding structural carbon fibres in a carbon aerogel (CAG) – BCI focus on manufacturing process development and validation
Inductive curing of functionalised composite architectures

Making structural supercapacitors formable
Status & Outlook

• 2020 – difficult year (COVID-19)

• Significant and growing activity – in close collaboration with UoB colleagues from ‘Structures’ and ‘Materials’ research themes, WBRH and NCC

• Focus on fundamental/applied research & technology transfer – in close collaboration with our industrial partners

• Areas: aerospace, automotive, wind energy, construction, marine - expanding
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