Manufacturing & Design Research Theme

Ole Thomsen

Forming of fibre-steered preform

bristol.ac.uk/composites
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 focusses 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 areas:
- Process automation – automated fibre placement
- Supporting manufacturing via Virtual and Augmented Reality tools
- Robotics and cobotics
- Continuous tow shearing
- Graded multi-matrix composites
- Defects and features in composites manufacturing
- Understanding lay-up processes
- Design for manufacture
- Composites recycling
- Numerical modelling of manufacturing processes
- Manufacturing of functional composites
- Closed-loop process control
Selected highlights

• UoB spin-out company, iCOMAT - Innovation award in Advanced Engineering 2019 exhibition (E Kim, K Potter)

• Finalist - The Engineer Collaborate to Innovate in the Aerospace, Defence, and Security category for the Phoenix fully-autonomous uninhabited air system (no engines but propels itself forward by varying its buoyancy). Innovate UK consortium included 4 private companies, 3 of the UK government’s high-value manufacturing catapults, and 5 universities. UoB worked together with the NCC to design and build the wings and empennage for the Phoenix (J Kratz, K Potter)

• European Editor, Composites Part B: Engineering, Elsevier, IF=6.864 (O Thomsen)

• In close collaboration with NCC – awarded the 5th International Symposium on Automated Composites Manufacturing (ACM5) (Chair: K Potter, Co-chairs: E Garcia, NCC & O Thomsen), 14-15 April 2021, Venue: University of Bristol
Grants / Research (selected)

- **Advanced Continuous Tow Shearing in 3D (ACTS3D)** - EPSRC (PI: E Kim, Co-Is: K Potter, P Weaver, S Hallett)
- **Virtual un-manufacturing of fibre-steered preforms for complex geometry composites** - EPSRC Future Composites Manufacturing Hub feasibility study (PI: S Hallett, Co-Is: J Belnoue, E Kim)
- **High-rate forming process using sustainable fibre-steered preforms** - EPSRC Future Composites Manufacturing Hub feasibility study (PI: E Kim, Co-Is: S Hallett, J Belnoue, M Longana, I Hamerton)
- **Airborne UK, H2020 RAMSSES project**: Development of improved design and manufacturing techniques for thick composite marine structures (PI: P Harper, EngD O Parks)
- **EPSRC New Investigator Award**: Real-time Material Measurements and Process Control in Automated Fibre Placement Composites Manufacture (PI: J Kratz)
- **EPSRC Future Composites Manufacturing Hub – CIMComp** (PI: N Warrior /Nottingham) – increasing collaborative research with Hub partners
Grants (selected) – cont’d

- **EPSRC Programme Grant, Certification for Design – Reshaping the Testing Pyramid’ (CerTest)** (PI: O Thomsen, Co-Is: J Barton, S Hallett, J Kratz, R Smith, P Wilcox + Co-Is from Uni Bath, Uni Exeter, Uni Southampton)

  Value £6.9M / Duration 5 years

**Academic partners:**

**Partners:**
Outlook

• 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, marine, construction - expanding