

Newsletter

March 2022

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Welcome to the spring edition of the Hub Newsletter!

Hub Outreach Activities [1/3]

International Mission with the University of British Columbia- 8 February 2022

The Hub hosted a virtual international mission with the Composites Research Network (CRN) based at the University of British Columbia (UBC). CRN is a collaboration of academic and industry partners with a mission to translate research into practice for effective and low-risk knowledge-based composites manufacturing and design.

The virtual mission was attended by more than 100 delegates from academia and industry (including automotive, composite manufacture, and software development). Initial presentations by Hub director Professor Nick Warrior, and Professor Anoush Poursatip of the CRN, provided an engaging insight into the two organisations and their activities. Members of the CRN described the exciting work of the Knowledge in Practice Centre (KPC), whilst Hub members presented the innovative research currently being undertaken relating to curing, digitisation of deposition, and forming technology, with collaboration invitations being suggested in each. Convergent Manufacturing Technologies, a spin-off from the University of British Columbia Composites Group, discussed their role in solving the needs of industrial businesses through unique sophisticated simulation hardware and software. Early-career researchers from both the Hub and UBC, gave short presentations outlining current research in key areas including digitisation, thermoplastics, simulation, and the globally important field of sustainability.

The session proved a success in creating a dialogue between Hub researchers and our colleagues in Canada, and with scope for several international links already being discussed, the Hub look forward to exploring new relationships and potential collaborative projects.

A recording of the session can be viewed here:

youtu.be/BoTQiOKP95E



Hub Outreach Activities [2/3]

Synergy Workshop – 23 February 2022

The Hub organised a Synergy Promotion workshop, which officially launched the next Synergy call and provided Hub members with opportunities to discuss their research and ideas for future Hub projects and identify and build on current project synergies. To be eligible for the call, Expressions of Interest had to be submitted by 8 March and full proposals are due by 17:00 on 8 April. Research outcomes from the last round of Synergy Promotion projects were also presented:

- Connecting the work on microwave processing of composites with expertise in sensor development for temperature and stress management (Janice Barton, University of Bristol; Richard Day, Wrexham Glyndwr University; Adam Sobey, University of Southampton, Christopher Holmes, University of Bristol)
- Investigate the use of powder epoxy to co cure preforms (Colin Robert, University of Edinburgh; Edward Archer, Ulster University)
- Compile a database of raw micro CT scans from current and past projects (Stephen Hallett, University of Bristol; Mikhail Matveev, University of Nottingham)

This was our first in person event this year and we were pleased to see a number of familiar and new faces. The event was well attended with over 40 delegates.



Hub Outreach Activities [3/3]

Sustainability Seminar – The National Composites Centre – 30 March 2022

In conjunction with the National Composites Centre (NCC), the Hub participated in a Sustainability workshop at the NCC, Bristol & Bath Science Park, on Wednesday 30 March 2022.



A combination of presentations and interactive sessions gave delegates the opportunity to discuss Sustainability challenges and developments within the Composites Manufacturing sector. Sustainability is of key importance to the future of the composites industry. The high-specific properties and durability of composite materials offer well-known advantages in the use-phase via lightweighting, increase of life and reduction in maintenance. However, the high embodied energy of the constituent materials and lack of an established recycling route must be considered in any Life Cycle Analysis. The workshop aimed to highlight the sustainability activities within the NCC, strengthen links with the Hub and identify ongoing and future research challenges.

Upcoming Events

MACH 2022 – NEC Birmingham 4-8 April 2022



The Fifth International Symposium on Automated Composite Manufacturing (ACM5) – National Composites Centre, Bristol 5-7 April 2022



Hub Open Day and International Conference on Manufacturing of Advanced Composites (ICMAC 2022) – Advanced Manufacturing Research Centre (AMRC), University of Sheffield, 13-14 September 2022 – details to follow soon.



Staff News (1/3)

The Hub welcomes two new Business Development Managers, **James Whyman** (University of Nottingham) and **Dr Simon Quinn** (University of Bristol). They are responsible for coordinating and developing new external R&D funding applications to evolve the Hub's priority research areas, and mapping the needs of the Hub's industrial and academic partners. Together, they bring a level of dynamism to the team with different yet highly complementary background experience in high-grade academic research, grant funding, finance and innovation management.

James's background is in bid management, business strategy, contracts management and financial analysis. James graduated from Loughborough University with a PGDip in Advanced Physics and Anglia Ruskin University with a BSc Honours in Biomedical Science. He has over five years' experience in finance and managing projects for SMEs, LEs and Academia.



Simon has worked in the industry/academia interface for twenty years, developing collaborative projects, facilitating knowledge exchange and generating impact. This work has been funded directly from industry, and from UK Government and EU sources, >£10M as a PI/Co-I and several £M more as part of wider teams. His technical expertise is as an engineer (CEng, FIMechE), primarily focused on solving complex engineering problems involving materials and structures, including composites.

The Hub appointed **Dr Oriol Gavalda Diaz** for the role of Transitional fellow (University of Nottingham) in January 2022. Oriol obtained his PhD working within the Rolls Royce University Technology Centre (UTC) in manufacturing at the University of Nottingham, looking at the behaviour of ceramic composites after a material removal process. Before re-joining the University of Nottingham, Oriol spent over 3 years in the Centre of Advanced Structural Ceramics (CASC) at Imperial College London. Currently his main interests involve understanding the failure of materials via small scale testing and advanced characterisation techniques and the design of new ceramics and composites.



Dr Yang Chen commenced his role as Hub Innovation Fellow on 1 March 2022. Yang obtained his PhD from University of Paris-Est in 2017, for his work on damage mechanisms of ceramic matrix composites using X-ray computed tomography and large-scale simulations. His research focuses on computational mechanics and full-field imaging techniques for composite materials. Yang's Innovation Fellowship will focus on permeability variability of textile fabrics, for which large-scale simulations and data-driven techniques are being developed.



More information on Dr Chen's Innovation Fellowship can be found here:



cimcomp.ac.uk/research/permeability-variability-of-textile-fabrics-for-liquid-moulding-2



Dr Danijela Stankovic has recently commenced her role as a Post-Doctoral Research Assistant at the University of Edinburgh. Danijela holds a MEng from the University of Thessaly (Greece) and a PhD from the University of Edinburgh. Her research interests are FRPs for the construction sector, FRP performance at ambient and elevated (service) temperatures, FE modelling, fatigue testing of composites, and fire/elevated temperature testing.

Danijela is currently working on the Hub Feasibility Study "Manufacturing Value-Added Composites for the Construction Sector Using Mixed Waste Plastics and Waste Glass Fibres".



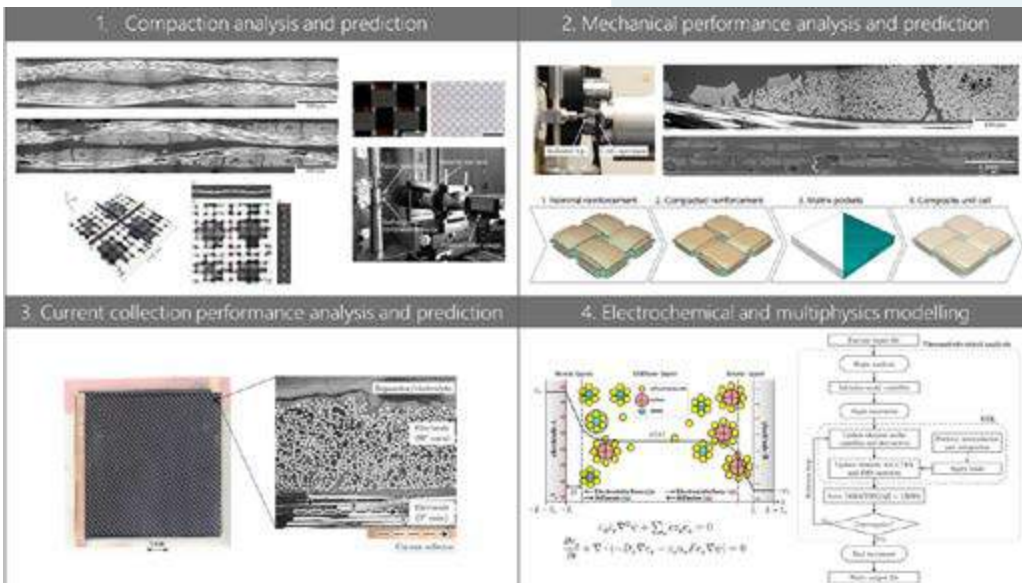
cimcomp.ac.uk/research/manufacturing-value-added-composites-for-the-construction-sector-using-mixed-waste-plastics-and-waste-glass-fibres/

Jack Holyoak has recently commenced an Engineering Doctorate (EngD) in Composites Manufacture with the University of Nottingham. The EngD project investigates high volume manufacturing processes utilising sustainable prepreg materials, including natural fibres and bio-based resins. Jack is also a Research & Development Engineer at SHD Composite Materials. The SHD Group manufactures and develops a wide range of advanced composite tooling and component prepreg materials, in the UK, Europe and USA for international supply.



Jack joined SHD as a school leaver in 2015 and graduated from part-time study; BEng (Hons) in Mechanical Engineering in 2019, with the research focus of his dissertation being on characterising Polyfurfuryl alcohol bioresin within advanced composite prepreg.

Congratulations to **Maria Valkova** (Imperial College London) who passed her PhD Viva at the end of November 2021 with minor corrections. Below is an image from Maria's presentation to the examiners which details the content of her thesis. Her thesis title was 'Predicting the performance of structural power composites'.



2022 Q1 Publications

Zhang, H., Li, A., Wu, J., Sun, B., Wang, C., Yang, D., (2022).
Effectiveness of Fibre Placement in 3D Printed Open-Hole Composites Under Uniaxial Tension

Composites Science and Technology, Vol 220, 109269.

<https://doi.org/10.1016/j.compscitech.2022.109269>

Parsons, A.J., Gonciaruk, A., Zeng, X., Thomann, F.S., Schubel, P.J., Lorrillard, J., Johnson, M.S. (2022).

Controlling Mass Loss from RTM6 Epoxy Resin Under Simulated Vacuum Infusion Conditions.

Polymer Testing, vol. 107, 107473.

<https://doi.org/10.1016/j.polymertesting.2022.107473>

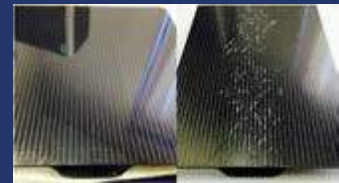


Fig. 1. Two carbon fibre/RTM6 panels produced with an omega beam stiffening element. The panel on the left was infused at 180 °C, while the panel on the right was infused at 120 °C. A reduction in print through was observed using a higher temperature infusion..

Struzziero, G., Barbezat, M., Skordos, A.A. (2022).

Assessment of the Benefits of 3D Printing of Advanced Thermosetting Composites using Process Simulation and Numerical Optimisation.

Additive Manufacturing, vol 54, 102719.

<https://doi.org/10.1016/j.addma.2022.102719>

Other News

Structural Power Aircraft Fuselage Beam Demonstrator

The Core project Manufacturing for Structural Applications of Multifunctional Composites has recently completed their demonstrator and are pleased to share videos of the tool Demo 170122 & Structural Power Aircraft Fuselage Beam Demonstrator.

 [Demo Tool](#)

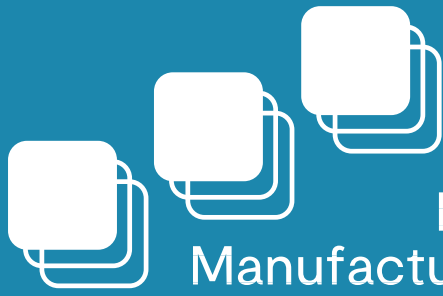
 [Structural Power Aircraft Fuselage Beam Demonstrator](#)

Active RTM

The Core project Active RTM will host an online industrial event on Monday 11th April 2022, 13:00 – 16:00. The main topics will be defect detection and associated sensing strategies and innovative approach to process control.

All industrial partners are very welcomed to attend. For further information, please contact Michael Tretyakov:

 Michael.Tretyakov@nottingham.ac.uk



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If you would like to contribute to our quarterly newsletters,
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