PRESS RELEASE

Paris, February 8th, 2024

JEC Composites Innovation Awards 2024: Here are the winners!

Annually, the JEC Composites Innovation Awards recognize successful initiatives and collaborative efforts within the composites industry. Over the past 26 years, the program has engaged over 2,000 companies globally, honoring 225 companies and 573 partners for their outstanding achievements in composites innovation and effective partnerships. Criteria for the awards include partner involvement in the value chain, project complexity, and commercial potential.

The competition is open to any company, university or R&D Center with a compelling collaborative innovation or concept to showcase. The success of participants is closely tied to partnerships and collective intelligence. Beyond being a ceremony, these awards serve as a platform to spotlight potentially undisclosed projects, offering inspiration and motivation to an expert audience eager to explore new frontiers.

After pre-selection of the 33 finalists, one winner has been named in each of the 11 categories by an international jury representing the entire composites value chain:

- Hüseyin ATES, CTO & Compounding BU Leader, Kordsa
- Pr. Alan BANKS, Innovation & Industrial Engagement Supervisor, Ford Motor Company
- Pr. Christophe BINETRUY, Professor, Centrale Nantes / Nantes Université
- Tamara BLANCO, Composite Materials & Processes Engineer & Expert, Airbus
- Dale BROSIUS, Executive VP/Chief Commercialization Officer, IACMI - The Composite Institute
- Michel COGNET, Chairman of the Board, JEC
- Dr. Karl-Heinz FÜLLER, Manager Future Exterior and Materials, Mercedes-Benz
- Dr. Sung HA, Professor, Hanyang University
- Guy LARNAC, Technical Domain Coordinator for Materials, Structures and Industrialization JTFR, Ariane Group
- Pr. Véronique MICHAUD, Head of Laboratory for Processing of Advanced Composites (LPAC), EPFL
- Pr. Kiyoshi UZAWA, Professor/Director, Innovative Composite Center, Kanazawa Institute of Technology.

The awards ceremony took place in Paris on February 8th, 2024. Discover here the winners!
ATG Europe has developed a one-shot manufacturing process for uninterrupted prepreg fibre-placed lattice structures that aim to replace current satellite central tube designs. These cylindrical lattice structures offer optimal structural functionality at a reduced mass.

This innovation included the design, development and manufacture of a fully representative CFRP lattice central tube based on requirements for ESA’s PLATO satellite, including all necessary interface zones. Thermoset pre-preg carbon fibre tows and patches were manually laid-up onto a mandrel, consolidated and cured in an autoclave in a single step to form one integral part. The primary interface to the launcher structure was provided by a one-piece aluminium interface ring, which was assembled to the lattice cylinder through a hybrid joint.

**Key Benefits**

- One-shot manufacturing process
- Structural efficiency and significant mass savings
- Uninterrupted pre-preg fibres leading to optimised structural performance
- High specific stiffness
- Reduced manufacturing time and cost
EmpowerAX – Additive Functionalisation
German Aerospace Center (DLR) (Germany)
dlr.de

Partners:
- 9T Labs AG (Switzerland)
- Airtech Europe (Luxembourg)
- Ansys Switzerland GmbH (Switzerland)
- CEAD B.V. (Netherlands)
- Ensinger GmbH (Germany)
- Fiberthree GmbH (Germany)
- FILL Gesellschaft m.b.H. (Austria)
- Hans Weber Maschinenfabrik GmbH / WEBER additive (Germany)
- PRIME aerostructures GmbH (Austria)
- Siemens AG (Germany)
- Suprem SA (Switzerland)
- SWMS Systemtechnik Ingenieurgesellschaft mbH (Germany)

The EmpowerAX Demo Part is a multi-curved thermoset shell additively functionalised with short and continuous fibre-reinforced elements realised by DLR and 12 EmpowerAX members. It demonstrates the industrially available process chain for Additive Functionalisation.

The EmpowerAX Demo Part showcases the concept of Additive Functionalisation and its industrially available process chain. It is a collaborative project within DLR Innovation Lab EmpowerAX where DLR and twelve industrial players – from design and simulation experts over CAD-CAM specialists to printing and material suppliers – joined forces to demonstrate the capability of overprinting a multi-curved thermoset shell with high-performance, short- and continuous fibre-reinforced thermoplastic material. Cost-efficient composite manufacturing is combined with the high agility and design freedom of additive manufacturing.

Key benefits:
- Cost-efficient composite manufacturing
- Overprinting of a multi-curved shell
- Combining thermosetting and thermoplastic polymers
- Short & continuous fibre-reinforced materials
- Industrially available process chain
Automotive & Road Transportation - Parts

Monolithic CFRP-Aluminum Monocoque: A Novel Approach for Carbon Neutrality
Toyota Motor Corporation (Japan) tytlabs.co.jp

Partners:
- Toyota Central R&D Labs., Inc (Japan)
- Toyota Customizing & Development Co., Ltd. (Japan)
- TISM Co., Ltd (Japan)

A full-scale variable axial CFRP-aluminum semi-monocoque was designed, fabricated, and evaluated. It showed a 15% weight reduction with minimal fiber waste (4%) and assembly cost.

This technology aims to improve carbon neutrality through the effective use of carbon fiber reinforced polymers (CFRPs).
The technology creates 3D monolithic CFRP-aluminum structures by integrating anisotropic topology optimization, Turing pattern fiber path generation, tailored fiber placement and nano uneven anodization bonding, to optimize fiber function and material utilization.
A semi-monocoque prototype demonstrates the potential for weight reduction in large 3D structures with complex topology using large fiber tow (50K) placed on 5 km of design paths with only 4% fiber waste.

Key benefits:
- Full-Lifecycle Carbon Neutrality
- Weight Reduction
- Minimized Fiber Waste and Assembly Cost
- Optimized Material Usage
- Advanced Manufacturing Process
Automotive & Road Transportation – Process

Reactive PA6 Pultrusion: Boost for TP Composites

Röchling Automotive SE (Germany)
roechling.com/automotive

Partners:
- Fraunhofer Institute for Chemical Technology ICT (Germany)
- Röchling Industrial SE & Co. KG – Haren (Germany)

Reactive thermoplastic pultrusion enables the production of cost-effective and highly resilient automotive components. The profiles are integrated in the final part by injection or compression molding. The PA6-based composites allows simple recycling in without dismantling.

The innovation is the use of in-situ pultruded PA6GF profiles for cost-efficient composite parts in the automotive industry. The combination of a highly efficient production for the reinforcement elements by using continuous pultrusion with state-of-the-art injection molding allows a production at low cycle time and costs. The achievable fiber content of the pultruded profiles is higher than for alternative reinforcements and due to the same plastic material for injection molding and the pultruded profiles, the whole part can be recycled without any dismantling operations.

Key benefits:
- Cheap Processes and Raw Materials
- Sustainable – Just a Single Polymer
- Strong by Design and Reinforcements
- Light due to Material Savings
- Flexible use in Diverse Applications
Building & Civil Engineering

RENSCO MCFR (Mineral Composite Fiber Reinforced)
RENSCO USA (USA)
RENSCO-usa.com

Partners:
- Arquitectonica (USA)
- Catalyst Communications (USA)
- Coastal Construction (USA)
- DeSimone Consulting Engineers (USA)
- DeVit Consulting. Inc. (USA)

RENSCO MCFR is a state-of-the-art structural building system comprised of interlocking composite building units of various types and sizes of blocks, columns, beams, joists, headers, decking, connectors, etc. These products are all adhesively joined (chemically bonded) to form monolithic structures.

RENSCO products are manufactured with naturally occurring raw materials and newly composed materials from recycled products in an environmentally friendly manufacturing process. Yet it is economical, easy to work with, fast to construct, has superior strength and requires no maintenance after construction, EVER! The American Society for Testing and Materials (ASTM) has verified and listed our Environmental Product Declarations (EPD).

Key benefits
- Less costly than a comparable wood, concrete, or steel structure.
- Stronger-passed ASTM and TAS Standards; able to withstand Cat 5 hurricane winds.
- Faster - No shoring, formwork, bracing or waiting for related inspectors
- Lighter - Similar in weight to a wood structure and 1/4 the weight of concrete.
- Fire, water, and pest resistant. Easy to build with.
Circularity & Recycling

Emphasizing to Enhance Material Property by Sizing

B&M Longworth (Edgworth) Ltd (UK)
bmlongworth.com

Partners:
- Autotech Engineering (Gestamp) (UK)
- Brunel University London (UK)
- EMS-Grivory (UK)
- Ford Motor Company (UK)
- Gen2Plank Ltd (UK)
- TWI Ltd (UK)

The creation of ‘glassene’ a brand new, advanced material with price-point close to glass and performance to rival some carbon fibre, with impressively low LCA. Promotes structural reuse of composites on a mass scale.

EMPHASIZING aims to create a new advanced material with price close to glass fibre, performance to rival some carbon fibre and impressive LCA.

GRP from a range of sources (wind, marine, fibre production) reclaimed as 100% clean glass by DEECOM® pressolysis.

The fibres are chopped into 6mm lengths before a range of sizing chemistries are considered, assessed, and tested; then compounded with polyamide thermoset and injection moulded; creating a mass production, structural component, tested against the steel counterpart and with a characterisation data card.

Key benefits:
- Global GRP waste solution
- Enables wind/marine/glass fibre industries to have ‘zero waste from composites’
- Creates a new, green, low cost advanced material to directly displace virgin
- Recyclate can go back into industries looking to decarbonise = circularity
- Addresses the current advanced materials imbalance of demand vs supply
Digital, AI & Data

Wind Turbine Blade Executable Digital Twin
ReliaBlade (Denmark)
reliablade.com

Partners:
- CEKO Sensors (Denmark)
- FORCE Technology (Denmark)
- Siemens Industry Software (SISW) (Belgium)
- Technical University of Denmark (Denmark)
- Zebicon (Denmark)

The wind turbine blade executable Digital Twin combines a reduced-order model with live sensor signal to assess structural performance in real-time. Physical and virtual sensors combined is key to perform Structural Health Monitoring.

The 12.6m wind turbine blade is manufactured using a conventional vacuum infusion process at DTU BladeLab. Non-crimp UD and BIAx fiberglass fabrics, sandwich core material and root inserts are placed as dry layup in the molds. Subsequently, vacuum infusion processes are conducted for each of the parts using an epoxy resin system. After the shells and webs have been infused and fully cured, the two airfoil shells and shear webs are bonded together using epoxy adhesive before the blade is trimmed.

Key benefits:
- Live monitoring of blade deformations
- Live monitoring of loads and remaining life
- Predictive maintenance assessment
- Remote monitoring and health assessment
- Model error reduction
A new modular cutting tool for woodworking machine is developed exploiting the mechanical advantages of CFRP. More than 50 % weight reduction and an increase in working speed of over 50 % is achieved.

Instead of replacing the metallic tool body with CFRP, new design principles were analyzed using numerical simulation. Following the principle of optimal load sharing, the virtual development resulted in a modular tool design, with triangular components that absorb the centrifugal forces and an outer shell that accommodates the bending and torsional loads. Load optimized orientation of carbon fibers leads to maximum stiffness and strength of the tool body. The final result features maximum weight reduction and increased productivity without compromising product quality.

Key benefits:
- Modular lightweight design with CFRP parts can replace standard cutting tools.
- New design exploits fiber strength and stiffness leading to rigid tools.
- Over 50% mass reduction and 50% higher speed and productivity possible.
- Scalability of design leads to a high application range.
- Usage with standard adapter and cutting knives, high processing accuracy.
OceanWings®
AYRO (France)
ayro.fr
Partners:
• Alizés (France)
• Jifmar Offshore Services (France)
• Zéphyr et Borée (France)
• Neptune Marine (Pays-Bas)
• VPLP Design (France)
• ArianeGroup (France)

OceanWings® is a patented, automated, self-raising and lowering vertical wingsail system that enables newbuild or existing ships to reduce their fuel consumption and resulting carbon footprint by up to 50%.

The challenges of our technology include the wing's ability to withstand winds of up to 100 knots, while ensuring the proper functioning of its operations: automatic orientation in relation to the wind, adjustable camber, reefable and furlable. Structure is therefore essential to meet these challenges. At AYRO, we have chosen to use composite materials to a large extent in the construction of our wingsails, for their high mechanical strength and lightweight.

Key benefits
• Up to 50% of fuel savings
• Automated and passive system
• Dimensioned for harsh sea environmental conditions
• Reefable and furlable system
• Adapted to new-build and retrofitted ships
Renewable Energies

Blade Circularity Solution
CETEC Project (Denmark)
www.project-cetec.dk/

Partners:
• Vestas (Denmark)
• Olin (Germany)
• Aarhus University (Denmark)
• Danish Technological Institute (Denmark)
• Stena Recycling (Denmark and Sweden)

CETEC's Blade Circularity Solution renders epoxy-based turbine blades circular without altering the material's design or composition. It employs a chemical process breaking down epoxy resin into virgin-grade materials, establishing a circular economy for blade manufacturing.

Our innovation redefines circularity for epoxy-based turbine blades. It precisely separates glass, carbon fibers, core material, metal components, and resin for dedicated recycling, optimizing reuse and enhancing circular value chains. Featuring cutting-edge chemcycling, it breaks down epoxy resin into chemical monomers, ensuring recycled materials achieve virgin-grade properties. Emphasizing sustainability, it operates efficiently using non-toxic, standardized chemicals with minimal energy input. Tailored for conventional epoxy-based turbine blades, it addresses an industry gap, supported by waste handlers' interest and ongoing industrial scaling, promising swift lab-to-large-scale implementation.

Key benefits:
• Circularity for epoxy-based composite material
• Recyclability without modifying design
• New sustainable raw material source
• Strengthening the wind industry’s sustainability proposition
• Immediate scalability and mature recycling value streams
Green Snowboard with A.L.D.-tech.®
silbaerg GmbH (Germany)
silbaerg.com

Partners:
- Sächsisches Textilforschungsinstitut e.V. (STFI) (Germany)
- bto-epoxy GmbH (Austria)
- Circular MTC e.V. (Germany)
- SachsenLeinen GmbH (Germany)

Snowboard with patented anisotropic coupling effect (A.L.D.-tech.®) made out of hemp and recycled carbon fibers with bio-based epoxy resin.

The innovation is the application of the Dry-Fiber-Placement (DFP) for the production of hybrid hemp and recycled carbon fiber (rCF) snowboard preforms. The process was currently only used to process continuous virgin carbon fibers. Thanks to the excellent material properties of the hemp tape and the directional rCF nonwovens, both materials can be processed automatically using DFP. This saves 75% of cutting waste of the hemp fibers and uses the cutting waste of our carbon fiber snowboards to save costs and reduces the CO2 footprint.

Key benefits:
- Green snowboard based on hemp fibers and recycled carbon nonwoven
- Using of Dry-Fiber-Placement for waste-reduced production
- Unidirectional or high-orientated semi-finished textiles for perfect properties
- Circular economy for high-performance snowboards made of virgin carbon fiber
- Green economy for the green snowboard by using bio-based epoxy
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www.jec-world.events/fr/
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About JEC
JEC Group is a non-profit organization entirely dedicated to promoting composite materials and fostering their applications globally.
Publisher of the JEC Composites Magazine, the industry's reference magazine, JEC organizes several events around the world, including JEC World, the leading international exhibition dedicated to composites and their applications, which takes place annually in Paris. JEC media, events and digital channels connect a global community of professionals from the composites industry and beyond, to enable knowledge transfer, create networking opportunities, and highlight innovation.
JEC: Connecting the World with Composites
www.jeccomposites.com