



Live & Virtual Conference 20 Amsterdam

## The Future Composite Footprint

**Date** 30 September - 1 October 2020

**Location** Beurs van Berlage, Amsterdam

**Organization** SAMPE Benelux and SAMPE Europe



### WEDNESDAY 30 SEPTEMBER

8.00 - 9.00

**Registration & Coffee**

9.00 - 11.00

**Opening & Plenary Session**

- Welcome, by Bart Vangrimde, Huntsman, Chairman of SAMPE Benelux
- Opening, by Prof. Rinze Benedictus, TU Delft, President of SAMPE Europe

9.15 - 10.30

**3 Key-note Speakers**

- 'The Future Materials & Processing Footprint in Aerospace', by Bert Thuis, Royal NLR, Netherlands
- 'Sustainability in Aviation Materials and Manufacturing', by José Enrique Román, Boeing Research & Technology Europe, Spain
- 'The Future Composite Footprint in Automotive', by Prof. Frank Henning, ICT Fraunhofer, Germany

10.30 - 11.00

**Coffee Break**

11.00 - 13.00

**3 Parallel Sessions**

#### Room 1

##### THERMOPLASTIC COMPOSITES

**Session chair: Prof. Conchur O'Bradaigh, Edinburgh University, UK**

• *Study on Bending of Thermoplastic Tape-Braided CFRP Hollow Structures* by Simon Eckardt, Technische Universität Dresden, Germany

• *Direct stamp forming of flexible hybrid fibre preforms for thermoplastic composites* by Christoph, Schneeberger, ETH Zurich, CMASLab, Switzerland

• *Rilsan® Matrix tapes and an innovative manufacturing process for new applications* by Arthur Babeau, Arkema, France

• *Improved Impact Response of Carbon Fibre-Reinforced Polyether Ether Ketone (PEEK) Panels Toughened Using Polyether Imide (PEI) Film Layers* by John McLaughlin, University of Limerick, Ireland

• *TP-RTM Interfacial & Impact properties of Anionically Polymerised Polyamide 6 Composites* by James Murray, Edinburgh University, UK

#### Room 2

##### GENERAL MANUFACTURING & TOOLING

**Session chair: Prof. Peter Middendorf, Stuttgart University, Germany**

• *Metallization of thermoset and thermoplastic composite aeronautics structure through robotized deposition Cold Spray technologies* by Henri Perrin, Luxembourg Institute, Luxembourg

• *Image processing algorithm for error detection during the manufacture of carbon fibre reinforced plastics pressure tanks* by Nicolas, Rozo Lopez, Institute for Plastic Processing (IKV), Germany

• *Tooling of Tomorrow – Large Scale Additive Manufacturing (LSAM) tool production with 3D Printech Technology* by Phil Lunn, Airtech, Luxembourg

• *Compact Manufacturing Technology with Integrated Process Monitoring for Production of Near-Net-Shape Prepregs with Tailored Properties* by Björn T. Riecken, CompriseTec GmbH, Germany

• *Strategies for the manufacturing of wrinkle-free composite parts* by Michael Thor, University of Applied Sciences Upper Austria, Austria

• *Efficiency and Usability of Industrial Laser Assistance Systems in Composite Preforming – a Comparative User Study* by Hannah Dammers, Institut für Textiltechnik (ITA) of RWTH Aachen University, Germany

#### Room 3

##### AUTOMOTIVE COMPOSITES

**Session chair: Bert Rietman, SABIC, Netherlands**

• *Enhanced Characterisation and Simulation Methods for Thermoplastic Overmoulding (ENACT)* by Alisdair Ryder, Surface Generation, UK

• *Intelligent process monitoring of a Compression RTM reactive thermoplastic automotive door* by Nicolas Pantelelis, Synthesites, Greece

• *Structural thermoplastics composites using JM innovative in-situ polymerization technology with covalent resin to glass bonding* by Dany de Kock, Johns Manville, Belgium

• *Investigation of smc flame retardants for application in battery electric vehicles* by Patrick Griesbaum, Karlsruhe Institute of Technology, Germany

• *Introducing thermoplastics to serial production: thermoplastic resin transfer molding using caprolactam* by Thomas Stefani, DLR - German Aerospace Center, Germany

• *Laser-assisted thermoplastic tape placement: effects of consolidation roller geometry on wedge peel strength of CF/PA6* by Vincent Backmann, TU München, Germany

#### Room 4

13.00 - 14.00

**Lunch**

14.00 - 15.20

**4 Parallel Sessions**

#### Room 1

##### 3D PRINTING

**Session chair: Bert Thuis, Royal NLR, Netherlands**

• *Seamless solution for industrial-grade continuous carbon fibre 3D-printed composites* by Yannick Willemin, 9T Labs AG, Switzerland

• *Fabrication of highly aligned discontinuous fibre thermoplastic filament feedstock for fused deposition modelling* by Narongkorn Krajangsawasdi, University of Bristol, UK

• *Optimization and monitoring of mechanical performance of 3D printed fiber reinforced products* by Tessa ten Cate, Brightlands Materials Center, Netherlands

• *Mechanical response of structural 3D printed polymers: an experimental and numerical study* by Robin Delbart, The University of Edinburgh, UK

#### Room 2

##### AUTOMATION

**Session chair: Tjark van Reden, MAI Carbon, Germany**

• *Creating tailored thermoplastic composite products using ATL* by Peter Boer, DTC - Dutch Thermoplastic Components, Netherlands

• *Process Simulation of the Automated Tape Laying Process for Thermoplastic Composites* by Daniel Fricke, DLR-German Aerospace Center, Germany

• *An integrated robotic work cell for highly automated ultrasonic inspection of complex CFRP parts* by Sebastian Zambal, PROFACTOR Austria

• *A post lay-up tack peel test for aerospace grade prepreg tapes* by Klaus Heller, Technical University of Munich, Germany

#### Room 3

##### SUSTAINABLE COMPOSITES

**Session chair: Prof. Aart van Vuure, KU Leuven, Belgium**

• *Thermo-mechanical recycling of continuous fiber reinforced thermoplastics into long fiber thermoplastics* by Amandine Codou, TNO-Brightlands Materials Center, Netherlands

• *Development of (interactive) facade elements on base of waste materials (waste) water companies* by Willem Böttger, NPSP, Netherlands

• *EcoGlide. Biodegradable autonomous cargo glider* by Clemens Dransfeld, TU Delft, Netherlands

• *Bamboo biobased fibers for high-performance composite applications* by Carlos Fuentes, KU Leuven, Belgium

#### Room 4

##### CIVIL ENGINEERING

**Session chair: Ronald Grefhorst, Siris, Belgium**

• *World's First Large Bridge Fully Relying on Carbon Fiber Reinforced Polymer Hangers* by Urs Meier, Empa, Switzerland

• *CEN Technical Specification – Design of Fibre-Polymer Composite Structures* by Thomas Keller, École Polytechnique Fédérale de Lausanne, Switzerland

• *Effects of High Temperature on Mechanical Performance of Carbon Fiber Reinforced Polymer Straps* by Danijela Stankovic, University of Edinburgh, UK

• *InfraCore® structures consist of Oblique Layered Materials, inspired by many examples found in nature* by Edwin Kanters, Infacore Company, Netherlands

15.20 - 15.50

**Tea Break**

15.50 - 17.10

**4 Parallel Sessions**

#### Room 1

##### INDUSTRIAL INNOVATION

**Session chair: Ron van Hoorn, Evonik, Germany**

• *Filament winding system Solution for Pressure Vessels* by Ralf Möller, Roth Composite Machinery GmbH, Germany

• *Requirements and performance of high precise functional coating technologies for the production of Prepregs for thermosetting and thermoplastic applications* by Andrea Glawe, Kroenert GmbH & Co KG, Germany

• *Metalized thermoplastic tapes for lightning protection solve common problems associated with automated manufacturing of composite aircraft structures* by Koen Hollevoet, Compolam, Belgium

• *From Non-Destructive Part Inspection to Numerical Simulation in Additive Manufacturing* by David Harman, Synopsys Northern Europe, UK

#### Room 2

##### AUTOMATION

**Session chair: Arnt Offringa, GKN/Fokker, Netherlands**

• *Temperature measurements in laser-assisted thermoplastic tape placement close to the nip-point* by Alexander Peitz, Aachen Center for integrative Lightweight Production, AZL, Germany

• *Effective emissivity characterisation and correction for accurate control of Automated Fibre Placement processes* by Phillip Druiff, National Composites Centre (UK), UK

• *Vacuum Bag Only Consolidation of Fiber Placed Thermoplastic Composite Structures* by Jagadeesh Swamy, ThermoPlastic composites Research Center (TPRC) / University of Twente (UT), Netherlands

#### Room 3

##### TEIJIN SESSION INFRA & ARCHITECTURE

**Session chair: to be announced**

• To be announced

• To be announced

• To be announced

• To be announced

#### Room 4

##### JOINING & BONDING

**Session chair: Henrik Schmutzler, Lufthansa, Germany**

• *New 3R Bonding Technology for Repairable, Recyclable and Reprocessable Aerospace Composite Materials* by Alaitz Ruiz de Luzuriaga, Cidetec, Spain

• *Method to characterize electrical conductivity of woven thermoplastic composites* by Sebastiaan van den Berg, TPRC/GKNFokker/UTwente, Netherlands

• *Process control of susceptorless induction welding of thermoplastic composites* by Kenneth Frogner, Corebon, Sweden

17.10 - 18.00

**Student Seminar**

18.00 - 21.00

**Cocktail & Dinner**



09.00 - 10.40

4 Parallel Sessions

Room 1

AEROSPACE

Session chair: Martin Nagelsmit, Royal NLR, Netherlands

- *Shear and compression buckling of PPS matrix composite panels stiffened by induction welded stringers* by Alfonso Maffezzoli, University of Salento, Italy
- *Eco friendly production method for composite grid stiffened panels* by Peter Nijhuis, Royal NLR, Netherlands
- *Automated Kitting implementation: A case study from the aerospace industry* by Marcus Kremers, Airborne, Netherlands
- *Generative Structural Design and Optimization of a composite wing section of a Modern Electric Aircraft* by Gaëtan Van den Bergh, 4RealSim, Netherlands

Room 2

GENERAL MANUFACTURING & TOOLING

Session chair: Oliver Bottler, Airtech, Luxembourg

- *Examination of learning models and inference of manufacturing methods of CFRP by deep learning using their ultrasonic images* by Kaori Miura, Teijin Composites Innovation Center, Japan
- *Estimation of mechanical properties of CFRP and detection of CFRP with defective fracture strengths by deep learning using its ultrasonic images* by Chihiro Imanaka, Teijin Composites Innovation Center, Japan
- *Effect of process routing (direct vs. preformed) on part infiltration during Wet Compression Molding (WCM) of a complex demonstrator* by Fabian Albrecht, Karlsruhe Institute of Technology, Germany
- *Novel Process for the Wet Filament Winding* by Benedikt Bergmann, Institut für Verbundwerkstoffe GmbH, Germany
- *Functional integration in FRP Parts via Hybrid-matrix-injection* by Kalle Kind, Technical University of Munich, Germany

Room 3

HYBRID & SANDWICH

Session chair: Prof. Clemens Dransfeld, TU Delft Netherlands

- *Novel Core Material for automated high-volume Sandwich Composite Aerostructures* by Alexander Roth, Evonik Resource Efficiency, Germany
- *Impact Behavior of Epoxy-Polyamide Hybrid Laminates* by Diana Heflin, Purdue University, United States
- *Experimental Parameter Study on the Manufacturing of Sandwich Structures Based on Sheet Moulding Compounds* by Jesper Buck, Helmut Schmidt University Hamburg, Germany
- *Robust development, validation and manufacturing processes for hybrid metal-composite lightweight structures* by Daniel Haider, TU Dresden, Germany
- *Net-shape wet compression moulding* by Felix Nusser, Technical University of Munich, Germany

Room 4

JOINING & BONDING

Session chair: Irene Fernandez Villegas, TU Delft, Netherlands

- *A dynamic induction welding development for fuselage panel* by Pierre Couaraze, Jules Verne Institute, France
- *Modified Epoxy Matrix Resins for Reduced Dependence on Redundant Fasteners in Secondary-Bonded Composite Structures* by Frank Palmieri, NASA Langley Research Center, United States
- *A comparative study of Adhesive bonding and Ultrasonic Welding for repair of CF/PEKK* by Vedant Modi, University of Limerick, Ireland
- *Tailored repair procedure for (impact-damaged) thermoset CFRP components by UV-initialized (radically-oxidic) matrix removal* by David Hoffmann, ITM-TU Dresden, Germany
- *Towards Continuous Resistance Welding for Full-Scale Aerospace Components* by Manuel Endrass, DLR-German Aerospace Center, Germany

10.40 - 11.10

Coffee Break

11.10 - 12.30

4 Parallel Sessions

Room 1

3D PRINTING

Session chair: Christian Weimer, Airbus, Germany

- *Production of Continuous Carbon Fiber Reinforced Polyamide Filaments for Microwave Additive Manufacturing* by Nanya Li, Karlsruhe Institute of Technology, Germany
- *Developing localised inkjet printing of resin additives for selective property and formability enhancement* by Kirk Willicombe, University of Bristol, UK
- *Modeling thermal behavior of cooling channels in big area additive manufactured structures* by Matthias Feuchtgruber, Technical University of Munich, Germany
- *To be announced*

Room 2

SPACE APPLICATIONS

Session chair: Javad Fatemi, Airbus Defence and Space, Netherlands

- *Development of a lean production process for a Thermoplastic Composite Upper Stage propellant tank* by Lars Brandt, DLR-German Aerospace Center, Germany
- *Development of fibre-placed pre-preg lattice structures for satellite central cylinder applications* by Bart Smeets, ATG Innovation Ltd., NL / Ireland
- *Impact damage behavior of light organic thermal protection for CFRP launcher* by Carlos Mangas, Airbus Defence and Space, Spain
- *Technology Development for Composite Rocket-engine Frames* by Gerard Poort, Airbus Defence and Space, Netherlands

Room 3

FIBRES, RESINS & INTERFACES

Session chair: Prof Aart van Vuure, KU Leuven, Belgium

- *Recent Advances in LIBS for Real-Time Detection of Silicone Contaminants on CFRP Surfaces* by Rodolfo Ledesma, National Institute of Aerospace, United States
- *Creation of Creep-less Composites Using Multi-functional Tg-less Epoxy* by Hirofumi Nishida, Kanazawa Institute of Technology, Japan
- *Investigation of the bonding behavior of melt blended or adhesion promoter modified polypropylene to a concrete matrix by single fiber pull out tests* by Michael Sigrüner, Rosenheim Technical University of Applied Sciences, Germany
- *Extended pot life resins for out-of-autoclave processing for large and complex part* by Malgorzata Holynska, ESA, Netherlands

Room 4

TESTING AND CHARACTERISATION

Session chair: Prof. Mathias Kersemans, Ghent University, Belgium

- *Failure characterisation of carbon/epoxy sub-components with the aid of Digital Image Correlation and Acoustic Emission* by Kalliopi-Artemi Kalteremidou, Vrije Universiteit Brussel, Belgium
- *Efficient detection of production defects in a CFRP aircraft component by means of flash infrared thermography* by Gaëtan Poelman, Ghent University, Belgium
- *Robust and Baseline-free defect detection in aircraft CFRP components using full-field guided wave analysis* by Joost Segers, Ghent University, Belgium
- *Replacing strain measurements by vibration measurements for the identification of orthotropic engineering constants of composite sheets* by Hugo Sol, Bytec BVBA, Belgium

12.30 - 13.30

Lunch

13.30 - 15.30

4 Parallel Sessions

Room 1

INDUSTRIAL INNOVATION

Session chair: Guy Larnac, Ariane Group, France

- *Advanced Fiber Placement AFP - Agility for Production* by Markus Feiler, Coriolis Composites GmbH, Germany
- *To be announced* by André Bertin, Coexpair, Belgium
- *Pushing the automation envelope for multi-material aerostructures* by Thorsten Groene, Cevotec, Germany
- *To be announced* by Axel Seifert, Plastic Omnium, Belgium
- *Composite structures manufactured without the waste from tooling using 3D Composite Kits* by François Geuskens, Curve Works, Netherlands

Room 2

AUTOMATION

Session chair: Tjark van Reden, MAI Carbon, Germany

- *Processing Technology for the fully automated Production of tailored thermoplastic Composite Blanks* by Norbert Müller, ENGEL AUSTRIA, Austria
- *An automated and digital approach to manufacture complex, one-off composite structures* by Anders Brødsgj, Airborne, Netherlands
- *The Influence of Thermal Contact Resistance on the Thermal History in Laser Assisted Fiber Placement* by Ozan Çelik, Delft University of Technology, Netherlands
- *CoRe Heat – Continuous Resistance Heating Technology for high-speed carbon fibre placement processes* by Yannis Grohmann, DLR - German Aerospace Center, Germany

Room 3

TEXTILE COMPOSITES

Session chair: Stepan Lomov, KU Leuven, Belgium

- *Forming Characterisation of Non-Crimp Fabrics using Textile-applied printed Strain Sensors* by Prof. Peter Middendorf, Institute of Aircraft Design, University of Stuttgart, Germany
- *Mesoscale modelling of woven composite materials with manufacturing defects* by Christian Fagiano, ONERA, France
- *Development of Drap Forming Process for Composite Structure Using Forming Simulation* by Yusei Kondo, Mitsubishi HeavyIndustries, Japan
- *Development of Web Based Composites – a highly moldable material for semi structural applications* by Felix Teichmann, Institut für Textiltechnik (ITA) Augsburg, Germany
- *Virtual Fiber Modelling: a Viable Multi-Scale Approach for Mechanical Modelling of Textile Materials* by Lode Daelemans, Universiteit Gent, Belgium
- *To be announced*

Room 4

STRUCTURE & PROCESS SIMULATION

Session chair: Ruben Sevenois, Ghent University, Belgium

- *Improved compression after impact strength in thin composite laminates through virtual simulation based optimization and novel laminate designs* by Aravind Sasikumar, AMADE, University of Girona, Spain
- *A digital twin for compression moulded sheet moulding compound* by Connie Qian, The University of Warwick, UK
- *Integrated process simulation as key for the efficient product and process development of thermoplastic composites and hybrids* by Dominik Dörr, SIMUTENCE GmbH, Germany
- *Process Modelling of Diaphragm Forming with UD Semi-Finished Prepregs* by Franz Maier, University of Applied Sciences Upper Austria, Austria
- *Validation of a Rheological Model for the Simulation of the Sheet Molding Compound Manufacturing Process* by Anna Julia Imbsweiler, Technical University Munich, Germany
- *To be announced*

15.30 - 16.00

Tea Break

16.00 - 17.00

3 Parallel Sessions

Room 1

INDUSTRIAL INNOVATION

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Room 2

TESTING AND CHARACTERISATION

Session chair: Prof. Mathias Kersemans, Ghent University, Belgium

- *Measurement of Permanent Deformation, Stiffness Degradation and Strength of Open Hole Glass/PA6 UD Thermoplastic Composite in Tension and Compression* by Ruben Sevenois, Ghent University, Belgium
- *Low velocity impact response of interlaced composites* by Rutger Kok, University of Edinburgh, UK
- *Machine learning approach for damage detection in lightweight structures* by André Tavares, Siemens Digital Industries Software, Belgium

Room 3

ENERGY

Session chair: Marcus Kremers, Airborne, Netherlands

- *Testing of a 6m Hybrid Glass/Carbon Fibre Powder Epoxy Composite Wind Blade Demonstrator* by Christophe Floreani, The University of Edinburgh, UK
- *Composite production methods for a cost-effective airborne wind energy system* by Edward Fagan, National University of Ireland Galway, Ireland
- *The Impact of Viscoelasticity on Wind Turbine Blade Leading Edge Protection* by Imad Ouachan, University of Bristol, UK

Room 4

POSTER PRESENTATIONS

- *Production automation of secondary and co-bonded composite patches* by Maaik Borst, Hogeschool van Amsterdam, Netherlands
- *Predicting the damage development in epoxy resins in FRPs using an anisotropic damage model and cohesive-zone-elements* by Jonas Müller, Institute for Plastics Processing at RWTH Aachen University, Germany
- *Comparison of dynamix mechanical analyses and free oscillation test on glass fibre reinforced plastics* by Torsten Heydt, Institute for Composite Materials, Germany
- *CF/PEEK 3D printed materials microstructure characterisation by X-ray computed tomography* by Silvano Sommacal, The Australian National University, Australia
- *Design and manufacturing of a carbon fiber wheel rim for a formula student car* by Samy Mahmoud, Ainshams University, Egypt
- *Investigating the Resin Flow Through an Intricate Manifold System for Large Scale Vacuum Resin Infusions* by Petar Zivkovic, National Composites Centre, UK
- *Material model for distortional hardening of Unidirectional CFRTP considered from the results of virtual material testing* by Koji Yamamoto, Cybernet Systems, Japan

17.00 - 18.00

Fare well drink

POST-CONFERENCE - FRIDAY 2 OCTOBER

Composite related Plant visits to DTC, GKN Fokker, NLR, SAMIXL/TU Delft, TCY

08.30 Departure Bus station Amsterdam Central Station

14.30 Back in Amsterdam - Amsterdam Central Station

DTC - Almere

GKN Fokker - Hoogeveen

NLR - Marknesse

SAMIXL / TU Delft - Delft

TCY - Ypenburg