8th World Conference on 3D Fabrics and Their Applications

Conference Programme

Venue: Sackville Street Building, North Campus, The University of Manchester, M1 3BB

Day 0: 27 March 2018

15:30 **Registration**, Entrance Hall, James Lighthill Building

Visit to the Northwest Composite Centre and the Textile Processing Labs

Day 1: 28 March 2018

08:00 **Registration**, Room C1, Sackville Street Building

Welcome Session, Room C53

08:25 Introduction to Conference – **Dr Xiaogang Chen**, Co-Chair of the Conference, TexEng Software Ltd, The University of Manchester, UK

08:30 Welcome Speech and Conference Opening – **Prof William Sampson**, Head of School of Materials, The University of Manchester, UK

08:40 Researches in 3D Textiles and Composites at Manchester – **Professor Constantinos Soutis**, Co-Chair of Conference, Director of NWCC, The University of Manchester, UK

Plenary Session – 1: Keynote Speeches (40 min each), Room C53

Session Chairman: Professor Constantinos Soutis, Co-Chair of Conference, Director of NWCC, The University of Manchester, UK

09:20 Philippe Boisse, INSA Lyon, France, **The need to use generalized continuum mechanics to model forming of 3D textile composite reinforcements**

10:00 Kadir Bilisik, Erciyes University, Turkey, Fracture Toughness (Mode-I) of Para-aramid/Phenolic Nano Preform Composites

10:40 Coffee Break

Parallel Session A: **Development of 3D Fabrics - 1**, Room C53
Session Chairman: Professor Kadir Bilisik, Erciyes University, Turkey

11:00 Alice Snape, AMRC, University of Sheffield, UK, **Stabilising and trimming 3D woven fabrics for composite preforming applications**
11:20 Kristina Simonis, RWTH Aachen University, Germany, **3D formed knitted fabrics by large circular knitting machines**
11:40 Hassan Saeed, Technical University of Dresden, Germany, **'Spacer stitching', an innovative sewing technology for improved thermal insulation and technical textile applications**
12:00 Jonathan Levesque, Groupe CTT, Canada, **Thickness prediction of 3D woven preform**

Parallel Session B: **3D Fabrics and Applications - 1**, Room C9
Session Chairman: Mr Brian McCarthy, TexEng Software Ltd and Knowledge Transfer Network, UK

11:00 Veerakumar Arumugam, Technical University of Liberec, Czech Republic, **Critical mechanical properties of 3D knitted spacer fabrics**
11:20 Helene Moustacas, MssMAt - Centrale Supelec, France, **Finite element simulation of carbon tows transverse compression: influence of disorder within the filament assembly**
11:40 Yanyan Chu, Zhongyuan University of Technology, China, **Numerical and experimental investigation of inter-yarn friction in UHMWPE fabrics subjected to ballistic impacts**
12:00 Jane Howarth, University of Bolton, UK, **Design characteristics for a sustainable, innovative exhaust media for the global automotive industry**

12:20 Lunch

Plenary Session – 2: Keynote Speeches (40 min each), Room C53
Session Chairman: Professor Philippe Boisse, INSA Lyon, France

14:00 François Boussu, ENSAIT, France, **Comparison of mechanical performance of 3D warp interlock fabrics**
14:40 Stepan Lomov, KU Leuven, Belgium, **Modelling damage in 3D woven composites based on µCT-captured geometry**
15:20 Tea Break

Parallel Session C: **Development of 3D Fabrics - 2**, Room C53

Session Chairmen: Dr. Özgür Demircan, Ondokuz Mayıs University, Turkey; Dr Anura Fernando, The University of Manchester, UK

15:40 Philipp Schegner, Technical University of Dresden, Germany, **Technology development for direct weaving of complex 3D nodal structures**
16:00 Carole Bessette, ENSISA, France, **Warp yarn damages prediction due to evolution of yarn tension during 3D weaving process**
16:20 Gerard Turk, Sigmatex (UK) Ltd, UK, **Developments in commercial analysis methods for 3D woven composites in the aerospace industry**
16:40 Shiyan Lu, Zhongyuan University of Technology, China, **Design and development of three-dimensional woven fabrics with stab resistance**
17:00 Jiawen Qiu, University of Manchester, UK, **Surface modification of carbon fibres for interface improvement in textile composites**

Parallel Session D: **3D Fabrics and Applications – 2**, Room C9

Session Chairperson: Dr Louise Brown, University of Nottingham, UK; Dr Matt Scott, National Composite Centre, Bristol, UK

15:40 Özgür Demircan, Ondokuz Mayıs University, Turkey, **Effect of integration of carbon nanotubes (CNTs) on the mechanical properties of thermoset composites reinforced with 3D biaxial warp-knitted fabrics**
16:00 Tim Bolle, RWTH Aachen University, Germany, **Biaxial mechanical evaluation of warp-knitted spacer fabrics as a component for myochardial patches**
16:20 Ghanshyam Neje, Indian Institute of Technology Delhi, India, **Compression properties of spacer fabric composites with different cell shapes**
16:40 Lila Maciel, Heriot-Watt University, UK, **Knitting with 3D effects as porous materials for sound absorption**
17:00 Gaye Kaya, Kahramanmaras Sutcu Imam University, Turkey, **Impact behaviour of Z-fibre reinforced carbon/epoxy composites**

17:20 End of Day 1 presentations

18:30 **Conference dinner** – Middle Kingdom Chinese Restaurant (86 Princess St, Manchester, M1 6NG), followed by music performance

Day 2: 29 March 2018

Plenary Session – 3: Keynote Speeches (40 min each), Room C53
Session Chairman: Professor François Boussu, ENSAIT, France

09:00 Bijoy Behera, Indian Institute of Technology Delhi, India, **Mechanics of 3D fabrics and composites**
09:40 Yordan Kyosev, Hochschule Niederrhein - University of Applied Sciences, Germany, **Numerical modelling of braiding process with paths changing of the yarn carriers**
10:20 Coffee Break and **Poster Session**

Parallel Session E: **3D Fabrics and Applications - 3**, Room C53
Session Chairman: Professor Stepan Lomov, KU Leuven, Belgium

11:00 Martin Kolloch, RWTH Aachen University, Germany, **Recent developments in the field of oxide ceramic fiber composites (OFC) with three-dimensional reinforcement structure**
11:20 Yanfei Yang, Zhongyuan University of Technology, China, **Ballistic responses of aramid fabrics and ultra high molecular weight polyethylene uni-directional laminates**
11:40 Özgür Demircan, Ondokuz Mayıs University, Turkey, **Effect of various matrix types on mechanical properties of thermoplastic composites reinforced with 3D biaxial warp-knitted fabrics**
12:00 Longxin Gu, Donghua University, China, **Finite element analysis of mechanical property of auxetic structures**

Parallel Session F: **Modelling of 3D Textiles – 1**, Room C9
Session Chairman: Professor Yordan Kyosev, Hochschule Niederrhein - University of Applied Sciences, Germany

11:00 Ying Wang, University of Manchester, UK, **A finite element and experimental analysis of composite T-joints used in wind turbine blades**
11:20 Raj Ramgulam, Albany Engineered Composites Inc., USA, **Weaving process simulation of 3D woven carbon fabrics**
11:40 Oliver Weeger**,** Singapore University of Technology of Design**,** Singapore, **Towards a digital workflow for design and fabrication of 3D knitted textiles: nonlinear multi-scale modelling, simulation and validation**

12:00 Haoxian Zeng, University of Manchester, UK, **Finite element analysis on the influence of structural parameters on the ballistic performance of 3D networked fabrics**

12:20 Lunch

Parallel Session G: **Smart Textiles**, Room C53

Session Chairmen: Professor Bijoy Behera, Indian Institute of Technology Delhi, India; Professor Henry Yi Li, The University of Manchester, UK

14:00 Louise Brown, University of Nottingham, UK, **Fabric Sensors – modelling deformation in knitted fabrics**

14:20 Lei Zeng, University of Manchester, UK, **Fibre surface modification with graphene oxide for improvement of interface in ballistic composites**

14:40 Jianxin He, Zhongyuan University of Technology, China, **A biomimetic multilayer nanofiber 3D fabric from polylactic acid and Tussah silk fibroin as a scaffold for bone tissue engineering**

15:00 Kathrin Pietsch, Technical University of Dresden, Germany, **Simulation of the outer-plane elastic and permeability properties of warp knitted spacer fabrics**

15:20 Yasir Nawab, National Textile University, Pakistan, **Development & characterization of green composites using novel 3D woven preforms**

15:40 R.N. Manjunath, Indian Institute of Technology Delhi, India, **Mechanical performance of high energy absorbent 3D woven hollow structures**

Parallel Session H: **Development of 3D Fabrics – 3**, Room C9

Session Chairmen: Professor Prasad Potluri, The University of Manchester, UK; Dr Martin Kolloch, Institute for Textile Technology, RWTH Aachen University, Germany

14:00 Matt Scott, National Composite Centre, Bristol, UK, **Effect of process parameters on the geometry of composite parts reinforced through-the-thickness by tufting**

14:20 Elif Ozden Yenigun, Royal College of Art, London, UK, **Growth of high-yield aligned CNTs onto 3D woven preforms for multifunctional structural composites**

14:40 Meire Oliveira Santos, University of Minho, Portugal, **3D modular textile structures: a new approach to mechanical performance of nonwoven materials**

15:00 Weitao Zhou, Zhongyuan University of Technology, China, **Facile fabrication of polyester filament fabric with highly and durable hydrophilic surface by microwave-assisted glycolysis**

15:20 Lila Maciel, Heriot-Watt University, UK, **A classification for three-dimensional textiles in surface design**

15:40 Robert Kuempers, Technical University Dresden, Germany, **Advances in multi-layer weft knitting technology for the one-step manufacturing of customized net-shaped 3D preforms for composite applications**

16:00 Tea Break

Farewell, Room C53

16:20 End of conference remarks and farewell - **Dr Xiaogang Chen**, Co-Chair of the Conference, TexEng Software Ltd, The University of Manchester, UK

Poster Presentations

- Sai Liu, College of Textiles, Donghua University, China, **A finite element analysis of auxetic behavior of complex yarns with negative Poisson's ratios**
- Diansen Li, Beijing University of Aeronautics and Astronautics, China, **Compression properties and failure mechanism of three-dimensional multi-axial warp knitted glass/epoxy composites**
- Oscar Bareiro, Institute for Textile Technology, RWTH Aachen University, Germany, **Computational optimization of a FEM simulation model of the braiding process**
- Martin Kolloch, Institute for Textile Technology, RWTH Aachen University, Germany, **FEM process simulation of a 3D rotary braiding machine using LS-DYNA**
- Martin Kolloch, Institute for Textile Technology, RWTH Aachen University, Germany, **Development of a cost efficient 3D rotational braiding machine**
- Martin Kolloch, Institute for Textile Technology, RWTH Aachen University, Germany, **Bionically optimized 3D braided reinforcement structure**

- Zishun Yuan, School of Materials, The University of Manchester, UK, **A numerical study of ballistic mechanism of quasi-isotropic panel made from Dyneema® woven fabrics**
- Monali Dahale, Ulster University, UK, **Effect of pick density on the tensile, compressive and shear properties of 3D layer-to-layer woven composites**
- Jianxin He, Zhongyuan University of Technology, China, **Highly sensitive, self-powered and wearable electronic skin based on pressure-sensitive nanofiber woven fabric sensor**

The golden sponsorship from **Yangyu Machinery Manufacturing Ltd**, China, a 3D weaving machine manufacturer and 3D fabric innovator, is fully acknowledged. The support from the **School of Materials, University of Manchester** is much appreciated.