

# Programme of The 8<sup>th</sup> International Conference on Flow Processes in Composite Materials (FPCM8) Douai, FRANCE - 11 – 13 July 2006

FPCM8 DAY 1 - Tuesday July 11, 2006	
7:30 - 8:00	Registration
8:00 - 8:15	Welcome
8:15 - 9:00	Keynote Address: <b>Challenges and applications of liquid resin injection and infusion at Airbus</b> B. Béral & G. Bazerque, Structures Research & Technology Dpt., AIRBUS, Toulouse, France <b>Chair : G. Ziegmann</b>
<b>Session 1 : Permeability Prediction – I</b> <b>Co-Chairs : S. Grove and A. Long</b>	
9:00 - 9:25	FPCM8#47 <b>Finite Pointset Method (FPM): A Meshfree Approach for Incompressible Flow Simulations Applied to Composite Materials</b> Alain Trameçon, Patrick de Luca, (ESI Group, France), Christophe Binetruy (Ecole des Mines de Douai, France), Jörg Kuhnert (Fraunhofer Institute for Industrial Mathematics, Germany)
9:25 - 9:50	FPCM8#11 <b>Permeability of the Woven Fabrics</b> Bertrand Laine, Fabrice Boust (ONERA, France), Gilles Hivet (ENSAM Polytech' Orleans, France), Philippe Boisse, Pierre Badel (INSA Lyon, France), Stepan V.Lomov (Katholieke Universiteit Leuven, Belgium)
9:50 - 10:15	FPCM8#2 <b>Modelling the Effects of Fabric Structure on the Variability of Permeability</b> Chee Chiew Wong, Andrew C Long, C.D. Rudd (University of Nottingham, UK)
10:15 - 10:45	<b>Coffee Break - Posters</b>
<b>Session 2 : Experimental Analysis</b> <b>Co-Chairs : V. Michaud and J. Summerscales</b>	
10:45 - 11:10	FPCM8#46 <b>Variability in Aerospace VARTM Processing</b> Pit Schulze, Dirk Heider (University of Delaware, USA)
11:10 - 11:35	FPCM8#45 <b>Liquid Composite Moulding: Influence of Flow Front Confluence Angle on Laminate Porosity</b> G. A. Barandun, P. Ermanni (ETH Zurich, Switzerland)
11:35 - 12:00	FPCM8#20 <b>Characterisation of Wood Fibre Mats as Reinforcement for the Resin Transfer Moulding Process</b> R. Umer, S. Bickerton (University of Auckland, New Zealand), and A. Fernyhough (Scion Research, Rotorua, New Zealand)
12:00 - 12h25	FPCM8#50 <b>Alkali Treatment of Jute Fabrics: Influence on the Processing Conditions and the Mechanical Properties of their Composites</b> Exequiel S. Rodríguez and Analía Vázquez (National University of Mar del Plata, Argentina)
12:30 - 1:45	<b>Lunch Break</b>

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<b>Session 3 : Modelling</b> Co-Chairs : J. Bréard and P. Ermanni	
1:45 - 2:10	FPCM8#3 <b>A New Formulation for the Infusion of a Thermo-Reactive Resin into a Composite Deformable Medium</b> P. Celle, S. Drapier , J.M. Bergheau (Ecole Nationale Supérieure des Mines de Saint-Étienne, France)
2:10 - 2:35	FPCM8#15 <b>Unsaturated Modelling of Dual Scale Flow in Liquid Composite Moulding Processes</b> Y. Wang and S.M. Grove (University of Plymouth, UK)
2:35 - 3:00	FPCM8#36 <b>Deviation from Darcy's Law: an Implication of Unsaturated Flow in Dual-Scale Fiber Mats in LCM</b> Murthy S. Munagavalasa (S.C. Johnson & Son, Inc., USA), Krishna. M. Pillai (University of Wisconsin - Milwaukee, USA)
3:00 - 3:25	FPCM8#31 <b>Flow Modeling of the Compression Resin Transfer Molding Process</b> Jeffrey M. Lawrence, Pavel Simacek, Susanna Laurenzi, Suresh G. Advani ( University of Delaware, USA)
3:25 - 3:50	FPCM8#26 <b>Heat Transfer Modelling During Liquid Composite Molding Manufacturing Processes : Comparison Between Two Models</b> Mylène Deléglise, Christophe Binetruy, Patricia Krawczak ( Ecole des Mines de Douai, France), P. Castaing (CETIM Nantes, France)
<b>3:50 - 4:20</b>	<b>Coffee Break - Posters</b>
<b>Session 4 : Forming</b> Co-Chairs : P. Boisse and S. Lomov	
4:20 - 4:45	FPCM8#40 <b>Processing of Low-Viscosity CBT Thermoplastic Composites: Heat Transfer Analysis</b> Adrian Murtagh, Siora Coll, Conchúr Ó Brádaigh ( National University of Ireland, Ireland)
4:45 - 5:10	FPCM8#13 <b>Film Stacking Impregnation Model for Thermoplastic Composites Applied to a Novel Net-shape Preforming Process</b> S.T. Jespersen, M.D. Wakeman, V. Michaud, J-A. E. Månson (Ecole Polytechnique Fédérale de Lausanne, Switzerland ), D. Cramer (Fiberforge, Inc., USA)
5:10 - 5:35	FPCM8#41 <b>Shear Deformation Behaviour of Fibre-Reinforced Composites Using a Model Composite System</b> Walter F. Stanley, Patrick J. Mallon (University of Limerick, Ireland)
5:35 - 6:00	FPCM8#28 <b>A Consistent Woven Fabric Unit Cell and Preprocessor for Meso Analyses of Deformation and Permeability</b> Gilles Hivet (ENSAM-Polytech'Orleans, France), Bertrand Laine (Office National d'Etudes et de Recherches Aérospatiales, France), Philippe Boisse (INSA Lyon, France)
6:15 - 7:15	<b>Informal meeting on Permeability Measurement</b>
<b>7:30</b>	<b>Dinner</b>

FPCM8 DAY 2 - Wednesday July 12, 2006	
8:00 - 8:45	<p>Keynote Address : <b>Multi-Scale Modeling in Liquid Composite Molding</b> Suresh G. Advani, George W. Laird Professor of Mechanical Engineering, Associate Director, Center for Composite Materials, University of Delaware, USA <b>Chair : C. Rudd</b></p>
<p><b>Session 5 : Materials characterisation – I</b> <b>Co-Chairs : S. Bickerton and A. Saouab</b></p>	
8:45 - 9:10	<p>FPCM8#30 <b>Statistical Correlations in the Permeability Tensor</b> Laura M. McGrath, Qiang Liu and Richard S. Parnas (University of Connecticut, USA)</p>
9:10 - 9:35	<p>FPCM8#14 <b>Measurement of Permeability of Continuous Filament Mat Glass-Fibre Reinforcements by Saturated Radial Airflow</b> R. Pomeroy, S. Grove, J. Summerscales, Y. Wang, A. Harper (University of Plymouth, UK)</p>
9:35-10:00	<p>FPCM8#25 <b>Mechanical Properties and Permeability Measurements of Fibre Reinforcements: A Continuous Method</b> S. Comas-Cardona, C. Binetruy and P. Krawczak (Ecole des Mines de Douai, France)</p>
10:00 - 10:30	<b>Coffee Break - Posters</b>
<p><b>Session 6 : Simulation – I</b> <b>Co-Chairs : P. Kelly and K. Pillai</b></p>	
10h30 - 10:55	<p>FPCM8#38 <b>A Fast Numerical Approach to Reduce Void Formation in Liquid Composite Molding</b> E. Ruiz, V. Achim , F. Trochu (École Polytechnique Montréal, Canada), J. Bréard (Université du Havre, France) S. Chatel (European Aeronautic Defense and Space Company, Corporate Research Centre, France)</p>
10:55 - 11:20	<p>FPCM8#51 <b>Simulation of Process Induced Defects in Resin Transfer Moulded Woven Carbon Fibre Laminates and their effect on Mechanical Behaviour</b> Bijoy Sri Khan, Kevin D Potter, and Michael R. Wisnom ( University of Bristol, UK)</p>
11:20 - 11:45	<p>FPCM8#44 <b>Simulation of Entrapments in LCM Processes</b> R. Arbter, P. Ermanni (Swiss Federal Institute of Technology (ETH Zurich), Switzerland)</p>
11:45 - 12:10	<p>FPCM8#54 <b>Isothermal Flow Analysis in Liquid Composite Molding Processes</b> M. Hattabi &amp; J. Echaabi (Université Hassan II Aïn Chok, Maroc), A. Saouab (Université du Havre, France)</p>
12:10 - 12:35	<p>FPCM8#16 <b>Simple Models for Mold Filling Stage in Liquid Composite Molding and Their Applications to Structure-Process Coupled Optimization</b> Chung Hae Park, Abdelghani Saouab, Joel Bréard, (Université du Havre, France) Rodolphe Le Riche (Ecole des Mines de Saint-Etienne, France)</p>
12:40 - 1:55	<b>Lunch Break</b>

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<b>Session 7 : Applications</b> Co-Chairs : S. Advani and P. Krawczak	
1:55 - 2:20	FPCM8#35 <b>Composites in High-End Industrial Applications</b> Maarten Labordus, Willem Souren (Lightweight Structures BV, The Netherlands)
2:20 - 2:45	FPCM8#8 <b>Novel Fabrication Methods for (Low Temperature) Thermoformable Composites Intended for Medical Applications</b> R.R. Habeb, R.A. Khan, S. Cozien-Cazuc, Y. Jing, A.J. Parsons, G.S. Walker, I.A. Jones, C.A. Scotchford, C.D. Rudd (University of Nottingham, UK)
2:45 - 3:10	FPCM8#32 <b>Low Pressure Processing of High Fiber Content Composites</b> V. Michaud, S. Sequeira Tavares, A. Sigg, S.Lavanchy and J.-A.E. Månson ( Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland)
3:10 - 3:35	FPCM8#33 <b>Processing-Dependent Microstructure of Long Glass Fibre Reinforced Polyamide 6-6 Injection Mouldings and Related Mechanical Properties</b> Eric Lafranche, Arnaud Coulon, Patricia Krawczak (Ecole des Mines de Douai, France), Jean-Pierre CIOLCZYK, Jérôme MAUGEY (Hutchinson SA, France)
3:35 - 4:00	FPCM8#34 <b>Effect of Packing Pressure and Mold Temperature on Fiber Orientation in Injection Molding of Reinforced Plastics</b> Parvin Shokri, Naresh Bhatnagar (Indian Institute of Technology, India )
4:00 - 4:30	<b>Coffee Break - Posters</b>
<b>Session 8 : Monitoring &amp; Control</b> Co-Chairs : P. Ermanni and D. Heider	
4:30 - 4:55	FPCM8#27 <b>Investigation of Capillary Flow Across a Bank of Aligned Fibers</b> Valentin Neacsu, Suresh G. Advani (University of Delaware, USA), Johannes Leisen (Georgia Institute of Technology, USA)
4:55 - 5:20	FPCM8#21 <b>Active Control of the Vacuum Infusion Process</b> D.K. Modi, M.S. Johnson, A.C. Long , C.D. Rudd (University of Nottingham, UK)
5:20 - 5:45	FPCM8#37 <b>Variations in the Unsaturated Flow with Flow Direction in Liquid Composite Molding</b> Tonmoy Roy, Krishna M. Pillai (University of Wisconsin - Milwaukee (USA)
5:45 - 6:10	FPCM8#23 <b>Monitoring and Control for Liquid Composite Moulding</b> Nikos Pantelelis (National Technical University of Athens, Greece) and George Maistros (Inasco Hellas, Greece)
8:00	<b>Banquet</b>

FPCM8 DAY 3 - Thursday July 13, 2006	
8:00 - 8:45	Keynote Address : <b>Composite Material Parts in Renault Cars : the Past , the Present and the Future</b> Alain GIOCOSA, Général Manager of Polymers Engineering Department, RENAULT, France <b>Chair : F. Trochu</b>
<b>Session 9 : Materials characterisation – II</b> <b>Co-Chairs : S. Comas-Cardona and J. Summerscales</b>	
8:45 - 9:10	FPCM8#18 <b>Modeling of Resin Cure Kinetics for Molding Cycle Optimization</b> Edu Ruiz, F. Waffo, C. Billotte, F. Trochu (École Polytechnique de l'Université de Montréal, Canada), J. Owens (GM Research and Development Center, Materials and Process Lab)
9:10 - 9:35	FPCM8#19 <b>A Stereo Photography System for Monitoring Full Field Thickness Variation During Resin Infusion</b> Q. Govignon, S. Bickerton, J. Morris, J. Lin (University of Auckland, New Zealand )
9:35-10:00	FPCM8#29 <b>Experimental Investigation of the Compressibility and Permeability of Fabric Reinforcements</b> E.C. van de Ven, R. Loendersloot, R. Akkerman (University of Twente, Netherlands)
10:00 - 10:30	<b>Coffee Break - Posters</b>
<b>Session 10 : Simulation – II</b> <b>Co-Chairs : S. Advani and F. Boust</b>	
10h30 - 10:55	FPCM8#4 <b>Numerical Simulation of the Infusion Processes Validation &amp; Parametric Study</b> Tariq Ouahbi, Abdelghani Saouab, Joel Bréard, Pierre Ouagne (Université du Havre, France), Sylvain Chatel (European Aeronautic Defence and Space - Corporate Research Center, France)
10:55 - 11:20	FPCM8#6 <b>A Fast Solution Method for Modeling the RTM-Process Using Simplified Geometries</b> F. Klunker, G.Ziegmann (Clausthal University of Technology, Germany)
11:20 - 11:45	FPCM8#22 <b>Nonconforming Elements for Liquid Composite Molding Process Simulations</b> Piaras Kelly, Sam Jennings (University of Auckland, New Zealand)
11:45 - 12:10	FPCM8#48 <b>Simulation of Articulated Compression Resin Transfer Molding</b> V. Achim, S. Soukane, R. Gauvin, F. Trochu (École Polytechnique de l'Université de Montréal, Canada)
12:10 - 12:35	FPCM8#39 <b>A Simplified Numerical Approach to Simulate Resin Transfer Molding with a Dispersion Medium</b> Edu Ruiz, F. Trochu (École Polytechnique de l'Université de Montréal, Canada), S. Chatel (European Aeronautic Defense and Space Company, France)
12:40 - 1:55	<b>Lunch Break</b>

**Session 11 : Permeability Prediction – II**  
**Co-Chairs : R. Akkerman and P. Krawczak**

1:55 - 2:20	FPCM8#5 <b>Wisetex-Based Models of Permeability of Textiles</b> Stepan V.Lomov, Ignaas Verpoest, Bart Verleye, Bertrand Laine, Fabrice Boust (Katholieke Universiteit Leuven, Belgium)
2:20 - 2:45	FPCM8#10 <b>Predicting the Permeability of Textile Reinforcements via a Hybrid Navier-Stokes-Brinkman Solver</b> B. Verleye, D. Roose, S.V. Lomov, I. Verpoest, M. Griebel (Katholieke Universiteit Leuven, Belgium), M. Klitz, R. Croce (Institute for Numerical Simulation, Bonn, Germany)
2:45 - 3:10	FPCM8#17 <b>A Permeability Prediction for Non-Crimp Fabrics</b> R. Loendersloot, R. Akkerman (University of Twente, Netherlands)
3:10	<b>Adjourn</b>

**POSTERS**

FPCM8#1 <b>Prediction and characterisation of the shear behaviour of viscous woven textile composites</b> Philip Harrison (University of Glasgow, U.K.), Jinhua Wang, Andrew C. Long and Michael J. Clifford (University of Nottingham, U.K.)
FPCM8#12 <b>Correlated permeability distribution: mould filling simulations versus experimental results</b> F. Desplentere, S.V. Lomov, and I. Verpoest (Katholieke Universiteit Leuven, Belgium)
FPCM8#24 <b>Nano Adhesive Bonding of High Performance Polymer for Aerospace Applications</b> S. Bhowmik, H. W. Bonin, V. T. Bui (Royal Military College of Canada, Kingston, Canada) and R. Benedictus (Faculty of Aerospace Engineering, Delft University of Technology, The Netherlands)
FPCM8#42 <b>An Electrostatic Powder Spray Process for Manufacturing Polyphthalamide High Performance Composite</b> Chiara Zaniboni, Paolo Ermanni (ETH Zurich, Switzerland)
FPCM8#53 <b>Structure and Properties of PP-Based Sandwich Injection Moldings</b> Yuji Fujita (Japan Polypropylene Corporation, Mie, Japan), Tsutomu Nagaoka (Kobe Steel, Ltd., Tokyo, Japan), Masaya Kotaki, Hiroyuki Hamada (Kyoto Institute of Technology, Japan)