

4th Aircraft Structural Design Conference 2014

Structures and Materials Group Conference

**Belfast, Northern Ireland
7-9 October 2014**

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PRE-REGISTRATION EVENT – MONDAY 6 OCTOBER 2014

18.00 **PRE-REGISTRATION NETWORKING EVENING**
The Crown Liquor Saloon, 46 Great Victoria Street, Belfast, BT2 7BA, UK

PROGRAMME – TUESDAY 7 OCTOBER 2014

08.00 **Registration & Refreshments**

09.00 ▶ **CHAIRMAN'S WELCOME**
Dr Malcolm Nash, Chairman, RAeS Structures and Materials Group, UK

09.05 **Welcome to Queen's University Belfast**
Professor Tom Millar, Dean of Engineering and Physical Sciences, Queen's University Belfast, UK

09.15 **Keynote: Title TBC**
Gavin Campbell, Director - Design Engineering and Technology Department, Bombardier Aerospace, UK

ROOM 1

▶ SESSION A – COMPOSITES (PART 1)

10.00 **(A.1) Practical Analysis of Composites Failures, Going Beyond First Ply Failure**
Andrew Main, Senior Consultant Engineer, MSC Software, UK

10.30 **(A.2) Development of a New Fuselage Concept**
Kristian Zimmermann, Researcher, Airbus Group Innovations, Germany

11.00 **Networking Refreshment Break**

▶ SESSION C – COMPOSITES (PART 2)

11.30 **(C.1) Manufacturing Process Simulation and Structural Evaluation of Grid Stiffened Composite Structures**
Wouter van den Brink, R&D Engineer, NLR, The Netherlands

12.00 **(C.2) Variable Stiffness Composites for Spinning Pre-Twisted Plates**
Matt Thomas, University of Bristol, UK

12.30 **(C.3) Multiphysics Simulation of Thermal Plasma Produced by Lightning Strike on Aircraft Structures**
Dr Adrian Murphy, Director of Research, Queen's University Belfast, UK

13.00 **Networking Lunch**

▶ SESSION E – OPTIMISATION & MDO (PART 1)

14.00 **(E.1) A Non-Intrusive Adaptive Strategy to Support Real-Time Structural Assessment**
Dr Laura Mainini, Postdoctoral Associate, Massachusetts Institute of Technology, USA

14.30 **(E.2) Novel Designs for Lightweight Aerospace Components**
Dr Stuart Nixon, Senior Technical Specialist, Dassault Systemes, UK

15.00 **(E.3) Identification of Dynamic Properties of Assembled Structures by Optimization of the Modal Assurance Criterion (MAC)**
Professor Santiago Hernandez, Professor of Structural Engineering, University of Coruña, Spain

15.30 **Networking Refreshment Break**

▶ SESSION G – OPTIMISATION & MDO (PART 2)

16.00 **(G.1) A Two-Step Optimisation Approach for the Optimal Design of Composite Structures, Including Geometric Non-Linear Behaviour, Design Rules and Manufacturing Constraints**
Dr Michael Bruyneel, R&D Team Manager, SAMTECH s.a., Belgium

16.30 **(G.2) Two-Level Multidisciplinary Design Investigations of High-Aspect-Ratio Wing with Swept-Wing Tip**
Vasily Chedrik, Head of Division on Multidisciplinary Design Optimisation, Central Aerohydrodynamic Institute, Russia

17.00 **(G.3) Optimisation of a Composite Lattice Fuselage Structure**
Professor Vassili Toropov, Professor of Aerospace Engineering, Queen Mary College, University of London, UK

ROOM 2

SESSION B – AIRCRAFT LOADING (PART 1)

(B.1) Loads Alleviation using Folding Wings Designs
Andrea Castrichini, Research Engineer, Siemens / University of Bristol, Belgium

(B.2) Uncertainty Quantification of Correlated Aircraft Loads
Irene Tartaruga, PhD Researcher, University of Bristol, UK

Networking Refreshment Break

SESSION D – AIRCRAFT LOADING (PART 2)

(D.1) Load Case Characterisation for Gradient Based Optimisation with an Aircraft Global Finite Element Model
Atipong Dharmasaroja, PhD Student, Queen's University Belfast, UK

(D.2) Loads Estimation for a Future of Derivative Aircraft
Anna Torkington, Loads Engineer, Airbus Operations Ltd, UK

(D.3) Analysis of In-Service Overload Incidents at Airbus
Thomas Wilson, Technical Competence Leader for Gust Loads and Aeroelastics, Airbus, UK

Networking Lunch

SESSION F – MORPHING (PART 1)

(F.1) Aerodynamic Modelling for a Morphing Rudder
Miguel A. Castillo Acero, VP Technology Development, Aernnova, Spain

(F.2) Camber and Span Morphing Wing Design for a Micro-UAV
Dr Rafic Ajaj, Lecturer in Aerospace Structures, University of Southampton, UK

(F.3) Aeroelastic Modelling of Morphing Wing Aircraft
Dr Senthil Murugan, Post Doctoral Research Assistant, Swansea University, UK

Networking Refreshment Break

SESSION H – MORPHING (PART 2)

(H.1) Range Performance Improvement with Morphing Wing Configurations
Dr Antonio Filippone, Senior Lecturer, University of Manchester, UK

(H.2) Design and Morphing of a Droop Nose Demonstrator with the Assistance of Shape Memory Alloys
Dr Dimitrios Stamatelos, Stress Engineer, AEROTRON Research, Greece

PROGRAMME - TUESDAY 7 OCTOBER 2014 (CONTINUED)

17.30 **(G.4) A Leading-Edge Engineering Delivery Model: Altair's Optimisation Centres**
Diana Teodoreanu, Project Engineer, Altair, UK

18.00 **End of day 1**

18.15 **DRINKS RECEPTION**
The Great Hall, Queen's University Belfast

PROGRAMME - WEDNESDAY 8 OCTOBER 2014

08.00 **Registration & Refreshments**

09.00 **Announcements**

09.15 **Keynote: Incorporation of Optimisation Tools in the Aircraft Structural Design Process at Saab Aeronautics**
Torsten Bråmån, Technology Leader Structural Dynamics and Technical Fellow, Saab Aeronautics, Sweden

ROOM 1

▶ SESSION I - STRUCTURAL STABILITY (PART 1)

10.00 **(I.1) Modelling and Characterisation of an Electro-Thermo-Mechanical De-Icing and Actuation System**
Christopher Brampton, Research Officer, University of Bath, UK

10.30 **(I.2) Postbuckling Optimisation of Composite Stiffened Fuselage Panels Using Steered Fibres**
Tanut Ungwattananit, Research Associate, Institute of Lightweight Structures, Technische Universität München, Germany

11.00 **Networking Refreshment Break**

▶ SESSION K - STRUCTURAL STABILITY (PART 2)

11.30 **(K.1) Postbuckling of Variable Thickness Composite Plates with Variable Angle Tows-Towards 'Buckle-Free' Concepts**
Dr Zhangming Wu, Research Assistant, University of Bristol, UK

12.00 **(K.2) Towards Imperfection Insensitive Buckling Response of Shell Structures - Shells with Plate-Like Postbuckled Responses**
Dr Paul Weaver, Reader in Lightweight Structures, University of Bristol, UK

12.30 **(K.3) Optimised Stiffened Composite Panels of Variable Fibre Tow**
Dr Wenli Liu, Lecturer in Aircraft Structural Integrity/ Stress Engineering, Cranfield University, UK

13.00 **Networking Lunch**

▶ SESSION M - ANALYSIS & ANALYSIS METHODS (PART 1)

14.00 **(M.1) Predicting Fatigue Life in Aerospace Structures**
Mike Coleman, Senior Technical Consultant, MSC Software, UK

14.30 **(M.2) Non-Finite Element Approach to Screening Stiffened Composite Panels for Test Programme Planning**
Martin Gillen, Research Engineer - Strategic Technology, Bombardier Aerospace, UK

15.00 **(M.3) Automatic Thick Thin Decomposition of Complex Body for Hex Dominant Meshing**
Liang Sun, PhD Student, Queen's University Belfast, UK

15.30 **Networking Refreshment Break**

▶ SESSION O - ANALYSIS & ANALYSIS METHODS (PART 2)

16.00 **(O.1) SCART - Structural Calculation and Reporting Tool**
Lasse Saaby Georgsen, Lead Stress Engineer, Terma A/S, Denmark

16.30 **(O.2) Rapid Sizing of a Composite Wing Structure**
Bosco Raju, PhD Candidate, Queen's University Belfast, UK

17.00 **(O.3) Rapid Analysis of Variable Stiffness Plates**
Matthew O'Donnell, PhD Researcher/Teaching Associate, University of Bristol, UK

ROOM 2

▶ SESSION J - AEROELASTICITY & ADAPTIVE STRUCTURES (PART 1)

(J.1) Refined Mass Modelling in FEM for Aeroelastics Purposes: An Industry Approach
Oscar Castro Alvarez, Loads and Aeroelastics Engineer, Airbus, Spain

(J.2) Deployment and Optimisation of Adaptive Aircraft Structures
Dr Oliver Rhodes, Technical Specialist, Simulia, UK

Networking Refreshment Break

▶ SESSION L - AEROELASTICITY & ADAPTIVE STRUCTURES (PART 2)

(L.1) Store Separation: Theoretical Investigation of Wing Aeroelastic Response
Giovanni Paolo Reina, Engineer, University of Naples Federico II, Italy

(L.2) Automatically Generated Aeroelastic Analysis Models Including Physics Based Control Surface Representation
Reinhold Maierl, PhD Student, Airbus DS, Germany

(L.3) Aeroelastic Tailoring of Composite Wings using Internal Structural Members Shape and Stacking Sequence
Guillaume Francois, PhD Research Student, University of Bristol, UK

Networking Lunch

▶ SESSION N - AEROELASTICITY & ADAPTIVE STRUCTURES (PART 3)

(N.1) A New Methodology in Reliability-Based Design Optimisation for Aeronautical Structures
Marco Menegozzo, PhD Student, University of Padua, Italy

(N.2) Analysis of Transonic Limit Cycle Oscillations Under Uncertainty
Richard Hayes, PhD Student, Queen's University Belfast, UK

(N.3) Prediction of Limit Cycle Oscillations Using an Implicit Aeroelastic-Harmonic Balance Method
Dr Simão Pinheiro Marques, Lecturer in Aerospace Engineering, Queens University Belfast, UK

Networking Refreshment Break

▶ SESSION P - STRUCTURAL DESIGN (PART 1)

(P.1) Structural Design Challenges of the OHS Configuration
George R. Seyfang, Retired - Formerly Principal Concepts Engineer, BAE Warton, UK

(P.2) Constructing a New Form of Safe VTOL Fixed Wing Aircraft
David John Wills, CEO, RAW-air, Austria

(P.3) A Three-Dimensional Finite Element-Based Damage Model for Composite Structures Under Crush Loading
Professor Brian Falzon, Royal Academy of Engineering - Bombardier Chair in Aerospace Composites, Queen's University Belfast, UK

PROGRAMME – WEDNESDAY 8 OCTOBER (CONTINUED)

17.30	(O.4) Modelling and Simulation for Advanced Materials Systems Design Robert Harwood, Aerospace and Defence Industry Director, Ansys, USA	(P.4) Next Generation Methods for Aerospace Structures Delphine Zinck, A&D Test to Performance Industry Solution Experience Senior Manager, Dassault Systemes, France
18.00	End of day 2	
	▶ CONFERENCE BANQUET Titanic Belfast Museum	
18.15	Coaches to leave conference venue for Titanic Belfast Museum	
18.30	Drinks reception & tours of the museum	
20.00	Dinner	
	After dinner talk: Aspects of Aircraft and Aerospace Manufacturing in Northern Ireland Guy Warner, Author, UK	
22.00	Coach 1 to depart for Queen's University Belfast	
22.30	Coach 2 to depart for Queen's University Belfast	

PROGRAMME – THURSDAY 9 OCTOBER 2014

08.30	Registration & Refreshments	
09.00	Announcements	
09.15	Keynote: Composites in Aerospace: A Multi-Physics Modelling Approach Professor Constantinos Soutis, Director of the Aerospace Research Institute, The University of Manchester, UK	
	ROOM 1	ROOM 2
	▶ SESSION Q – MANUFACTURING (PART 1)	SESSION R – FAILURE & REPAIR (PART 1)
10.00	(Q.1) Design and Flight Tests of a Civil Unmanned Aerial Vehicle for Maritime Patrol: The Use of 3D-Printed Structural Components Mario Ferraro, UAV Designer, University of Southampton, UK	(R.1) Composite Scarf Repairs using Vacuum Infusion and Bondline Veils Dr Paul Merton Wales, Post Doctoral Research Fellow, University of Limerick, Republic of Ireland
10.30	(Q.2) Automated Methods for Aircraft Design Integrated with Manufacturing Roisin McConnell, PhD Student, Queen's University Belfast, UK	(R.2) Optimised Design of Damage Tolerant Tow Steered Composite Laminates Dr Andrew Rhead, Lecturer in Composites, University of Bath, UK
11.00	Networking Refreshment Break	Networking Refreshment Break
	▶ SESSION S – MANUFACTURING (PART 2)	SESSION T – NON-DESTRUCTIVE TESTING
11.30	(S.1) Investigation of Production Process Variations on Occurrence of Delamination During Hole Drilling in Composite Laminates Jacob Thorup Filipowicz, Stress Engineer, Terma A/S, Denmark	(T.1) Composite Rotorcraft Structures Monitoring with Acoustic Emission Method Dmitry Soloviov, Lead Engineer, Test and Simulation, Russian Helicopters, JSC, Russia
12.00	(S.2) Investigation of Aircraft Panel Deformations during Riveting Process Dr Adrian Murphy, Director of Research, Queen's University Belfast, UK	(T.2) Micromechanical Nanoindentation Simulation of Aircraft Coatings using FE Simulation Peter Foster, Research Assistant, Queen's University Belfast, UK
12.30	(S.3) Achieving Desired Thermomechanical Coupled Field in Functionally Graded Hollow Cylinders by Material Tailoring Dr Guojun Nie, Professor, Tongji University, China	
13.00	Closing Comments	
13.10	Networking Lunch	
13.40	▶ TECHNICAL TOURS	

All tours are free to attend and open to all conference delegates. Coaches will be provided to transport you to the site of the visit and back to Queen's University Belfast afterwards. Places are limited and will be given out on a **first come first serve basis**, so make sure you book your place when registering for the conference. Please note that **booking is essential** and delegates can only attend one technical tour.

	Northern Ireland Advanced Composites and Engineering Centre (NIACE)	Thales Land and Air Systems	Bombardier Aerospace
	15 places available	10 places available - open to European Nationals only	15 places available
13.40	Coaches to depart from conference venue for NIACE site	Coaches to depart from conference venue for Thales site	Coaches to depart from conference venue for Bombardier Aerospace site
14.00	Tour to begin	Tour to begin	Tour to begin
15.00	Coach to depart for Queen's University Belfast	Coach to depart for Queen's University Belfast	Coach to depart for Queen's University Belfast
15.20	Arrive back at University	Arrive back at University	Arrive back at University