

# Conference on the Mechanical Response of Composites Technical Programme

## Monday, 11/09/2023

Mon, 11/09/2023 17:00 - 18:00  
**Pre-registration**

Sun Club

Mon, 11/09/2023 18:00 - 20:30  
**Welcome Drink on the beach at sunset**

Sun Club

**Tuesday, 12/09/2023**

Tue, 12/09/2023 08:00 - 08:45  
**Registration and check in**

Conference Venue

Tue, 12/09/2023 08:45 - 09:00  
**Opening Ceremony**

Tue, 12/09/2023 09:00 - 10:40  
**Plenary Lectures - Prof. J.N. Reddy and Prof. Emilio Martinez-Pañeda**  
Chaired by: Prof. Giuseppe Catalanotti (Kore University Enna)

Aula Magna

Locking-free shell finite element, nonlocal approaches for architected structures, and fracture in solids  
**J. Reddy\***  
The phase field fracture method and its application for predicting the failure of composite materials  
**E. Martinez-Pañeda\***

Tue, 12/09/2023 10:40 - 11:00  
**Coffee Break**

Conference Venue

Tue, 12/09/2023 11:00 - 13:00  
**Virtual Testing and related themes I**

Chaired by: Prof. Kamran Nikbin (Imperial College London)

Aula Magna

Finite Element Modelling for Stress Identification in Microscale In-Situ Computed Tomography Tensile Specimens  
**C. Breite\***, L. Gorbatikh, S. Lomov, Y. Swolfs  
Low Cost Analysis of Industrially Representative Composite Defects for Propeller Design  
**J. Trevarthen\***, H. Baid  
Structural design and mechanical performance analysis of a full-scale 3D-printed bridge deck using GENOA 3DP Virtual Simulation Tool  
**L. Stepinac\***, A. Cantarutti, H. Baid, J. Galić  
A methodology to compute the knock down factors due to the presence of manufacturing defects using high fidelity models  
**A. Turon\***, O. Vallmajó, S. Abdel-Monsef, S. Medina, J. Ejarque, G. Guillaumet, A. Sasikumar  
Numerical simulation of thermoplastic composite materials: from raw material to structural performance  
**R. Tavares\***, J. Chevalier, B. Jovas, F. Lani  
Virtual manufacturing of thick composite beams, investigating cure cycle and shrinkage induced stress  
**J. Vroon\***, N. van Hoom

Tue, 12/09/2023 11:00 - 13:00  
**Delamination I**

Chaired by: Dr. Emilio V. González (Universitat de Girona), Dr. Laura Carreras (University of Girona)

Room A

Modelling of High-Velocity Impact-Driven Delamination in Large-Scale Tapered Laminates  
**J. Selvaraj\***, L. Kawashita, S. Hallett  
A mode I-II-III decomposed cohesive zone model for 3D simulation of delamination propagation in laminated composite materials  
**L. Carreras\***, D. Kandeel, O. Adesina, J. Renart, B. Bak, S. Jensen, E. Lindgaard, A. Turon  
Modelling of Delaminated Sandwich Structures Satisfying Every Dynamical Boundary and Continuity Condition  
**B. Hauck\***, A. Szekrényes  
Modelling Delamination Initiation and Propagation under Fatigue Loading through an ANSYS User-defined Cohesive Element  
**I. Urcelay Oca\***, B. Bak, E. Lindgaard, A. Strandbygaard, N. Rojo Saiz  
Numerical and Experimental Methods for the Identification of Interlaminar Properties in LSI Manufactured C/SiC Composite  
**M. Riva\***, A. Airolidi, A. Caporale, L. Cavalli, M. De Stefano Fumo  
Structural cohesive element for the modelling of delamination between thin shells without cohesive zone limit  
**X. Ai\***, B. Chen, C. Kassapoglou

Tue, 12/09/2023 11:00 - 13:00  
**Multi-scale Modelling I**

Chaired by: Dr. Martin Hirsekorn (ONERA), Prof. Heinz Pettermann (TU Wien)

Room B

Machine Learning Approaches For Multi-scale Modelling of Composites with Complex Architectures  
**B. El Said\***  
Machine Learning of Evolving Material Models for Multiscale Analysis of Fiber-reinforced Composites  
**I. Rocha\***, P. Kerfriden, F. van der Meer  
Multi-scale modeling of thermal expansion and chemical shrinkage in viscoelastic composites during the curing process  
**M. Hirsekorn\***, L. Marcin, T. Godon  
Molecular dynamics modeling of deformation and damage behaviour of main structural components of NiAl-Al<sub>2</sub>O<sub>3</sub> composite  
**M. Maździarz\***, S. Nosewicz  
Numerical Investigations of the Mechanical Behavior of GFRP Strut-Reinforced Foam Core Sandwich Panels  
**I. Skrna-Jakl\***  
Data-driven statistical method for the multiscale characterization and modelling of fibre-reinforced composites  
**A. Ciampaglia\***, G. Belingardi, D. Paolino

Tue, 12/09/2023 13:00 - 14:30  
**Lunch Break**

Sun Club

Tue, 12/09/2023 14:30 - 16:10

Aula Magna

### Virtual Testing and related themes II

Chaired by: Dr. Stephanie Miot (IRT Saint Exupery)

Comparison between Numerical Simulations and Experimental Observations of the Mechanical Effects of Out-of-Plane Waviness Defect Embedded in Composite Laminates under Compression

**C. Fougereuse\***, M. Hirsekorn, C. Fagiano, F. Laurin, M. Desailoud, M. Herman

Bearing/Pull-through Failure Envelope of Composite Joints: Novel Experimental Setup and Numerical Validation

**C. Furtado\***, R. Pinto, A. Volpi, F. Danzi, G. Catalanotti, F. Queirós de Melo, P. Camanho

Demonstrating the credibility of composite simulation

**S. Miot\***, L. Barriere, S. Guinard, J. Navarro, A. Chiappini

Maritime applications of fibre reinforced polymer composites

**Z. Ullah\***, M. Burhan, S. Millen, T. Scalici, L. Wan, G. Catalanotti, B. Falzon

Validation of Composite Pressure Vessels Modelling Methodology Using 2D-shell Elements at Coupon Level

**M. Bruyneel\***, A. Rajaneesh, T. Watanabe, Y. Urushiyama, Y. Tsuchiyama

Tue, 12/09/2023 14:30 - 16:10

Room A

### Delamination II

Chaired by: Dr. Albert Turon (Universitat de Girona)

Delamination Behavior of Impacted L-Shape Composite Laminates under Cyclic Loading

**K. Anam\***, M. Todt, H. Pettermann

Progressive Damage in thin 2D Woven CFRP Laminates due to Stress Concentrations at Free Edges and Notches

**L. Heinzlmeier\***, S. Sieberer, T. Wolfsgruber, C. Kralovec, M. Schagerl

On the numerical study of debonding in laminated composites through a homogenization theory

**A. Taherzadeh Fard\***, A. Cornejo, S. Jiménez, L. Barbu

Numerical Investigation of Delamination in Highly Tapered Laminates

**F. Ergin\***, A. Kayran

A three-dimensional Finite Fracture Mechanics model for predicting free edge delamination

**M. Burhan\***, T. Scalici, Z. Ullah, Z. Kazanci, B. Falzon, G. Catalanotti

Tue, 12/09/2023 14:30 - 16:10

Room B

### Multi-scale Modelling II

Chaired by: Prof. Xavier Oliver (International Center for Numerical Methods in Engineering (CIMNE)), Prof. Martin Fagerström (Chalmers University of Technology)

Multi-scale framework for shear-deformable shell elements - application to the delamination analysis of composites

**A. Hii\***, B. El Said, S. Hallett

Thermal aggression of a carbon fiber reinforced thermoplastic laminate: experiments-based thermomechanical modelling up to polymer decomposition

**D. Philippe\***, B. Vieille, F. Barbe

Modelling damage in composites using shell-based computational homogenisation and immersogeometric analysis

E. Börjesson, C. Verhoosel, J. Remmers, F. Larsson, **M. Fagerström\***

A novel multiscale approach for efficient 2D non-linear modelling of laminate composites

**X. Oliver\***, P. Wierna, D. Yago, O. Loberas, A. Huespe

Meso and macroscale thermomechanical modeling of 3D carbon/carbon composites

**A. Portal\***, G. Couégnat, F. Guillet

Tue, 12/09/2023 16:10 - 16:30

Conference Venue

### Coffee Break

Tue, 12/09/2023 16:30 - 18:30

Aula Magna

### Virtual Testing and related themes III

Chaired by: Prof. Yentl Swolfs (KU Leuven)

Towards fitting material parameters of fibre-reinforced polymers through image analysis and micro-mechanical simulations

**E. Rios\***, C. Breite, M. Mehdikhani, M. Diehl, Y. Swolfs

Adapting concrete experimental measurements in a FEM simulation for the development of a novel orthopaedic shoe.

**J. Finder\***, H. Möllers, C. Schmidt, S. Heimbs

Determination of a representative microstructure of a full composite pressure vessel using X-ray computed tomography

**S. Upadhyay\***, M. Mehdikhani, S. V. Lomov, D. Vandepitte, Y. Swolfs

Numerical and Experimental Study of a Butt-Joint Thermoplastic Composite Multi-Stringer Panel Under Compression

**A. Pereira\***, I. Lippers, J. Waleson, J. van Ingen, S. Turteltaub, C. Bisagni

Quantitative defects evaluation in composite materials by means of non-destructive Thermographic techniques supported by numerical simulations

**S. Riaz\***, G. Dell'Avvocato, D. Palumbo, M. Cinefra, U. Galietti

Application of the Phase Field and Cohesive Zone Model to simulate the unfolding failure in curved composite laminates

**S. Bushpalli\***, E. Graciani, B. López-Romano

Tue, 12/09/2023 16:30 - 18:30

Room A

### **Meshless and Novel Numerical Methods**

Chaired by: Prof. Endel Larve (University of Texas at Arlington), Prof. Francesco Parrinello (University of Palermo)

Adaptive Virtual Element Method for damage modelling in heterogeneous materials

**M. Lo Cascio\***, A. Milazzo, I. Benedetti

Extension of the Regularized Extended Finite Element Method to high density arbitrary interacting crack networks

**E. Larve\***, E. Zhou, D. Mollenhauer

On the Importance of Fibre Direction Mesh Alignment for Artificial Lightning Strike Simulations

**B. Nagavel\***, S. Millen, A. Murphy

Accurate Stress Fields in Composite Ply-Drops Using Variable Kinematics Wedge Element

**S. van den Broek\***, P. Greaves, P. Weaver, A. Pirrera

Cohesive crack propagation analysis by the hybrid equilibrium element formulation and element side rotation

**F. Parrinello\***, G. Borino

Tue, 12/09/2023 16:30 - 18:10

Room B

### **Multi-scale Modelling III**

Chaired by: Prof. Clara Schuecker (Montanuniversität Leoben)

Reliable Computation of Microscopic Solutions in Numerical Homogenization Context for Static Heat Conduction with Heterogeneous Heat Generation

**L. Belgrand\***, I. Ramière, R. Largeton, F. Lebon

Modelling anisotropic viscoelasticity of fibre-reinforced polymer laminates for general loading conditions

**C. Moser\***, M. Pletz, C. Schuecker

Multi-fidelity data-driven modelling of non-linear behaviour of woven composites

**E. Ghane\***, M. Fagerström, M. Mirkhalaf

Predictive Modelling of the Elastic Properties of 3D Printed Short Fibre Reinforced Polymers

**A. Canegrati\***, L. Martulli, Z. Mancassola, M. Kostovic, G. Rollo, A. Sorrentino, M. Carboni, A. Bernasconi

Micromechanical Homogenization Methods of Short Glass Fiber-reinforced Injection-molded Bio-based Composite Material

**O. Schwahofer\***, F. Otero, P. Camanho, K. Drechsler

AI prediction of the architecture of 3d textile fabrics

**A. Koptelov\***, B. El Said, A. Thompson, S. Hallett

Tue, 12/09/2023 19:00 - 20:30

### **Strolling around Old Trapani**

**Wednesday, 13/09/2023**

Wed, 13/09/2023 09:00 - 10:40

Aula Magna

**Plenary Lectures - Prof. Laura de Lorenzis and Prof. Frans P. van der Meer**

Chaired by: Prof. Heinz Pettermann (TU Wien), Prof. Pedro Camanho (FEUP/INEGI)

Automated discovery of material models: ideas, results, potential for composite materials.

**L. De Lorenzis\***

Multiscale modeling of failure in composites

**F. van der Meer\***

Wed, 13/09/2023 10:40 - 11:00

Conference Venue

**Coffee Break**

Wed, 13/09/2023 11:00 - 13:00

Aula Magna

**Continuum Damage Mechanics**

Chaired by: Dr. Federico Danzi (INEGI)

Phase-field modeling of temperature, moisture and rate-dependent fracture behavior of polymer nanocomposites at finite deformation

**B. Arash\***, R. Rolfes

A finite strain approach to model intralaminar failure mechanisms in fibre-reinforced polymers

**I. Rodrigues Lopes\***, F. Danzi, A. Arteiro, F. Andrade Pires, P. Camanho

Damage and plasticity models for 3D printed materials

**E. Monaldo\***, D. Linardi, S. Marfia

Predicting material damage with support vector machines: a methodology and comparison of classically and quantum-computed kernels

**G. Tosti Balducci\***, B. Chen, M. Möller

An enhanced 3D elastoplastic-damage constitutive model for fibre-reinforced polymer composite materials

**I. R. Cózar\***, F. Otero, P. Maimí, E. V. González, A. Turon, P. P. Camanho

Impact damage modelling in composite laminates – numerical implementation of a strain rate dependent damage model

**D. Ivančević\***, J. Ratković

Wed, 13/09/2023 11:00 - 13:00

Room A

**Fatigue**

Chaired by: Prof. DANIELE FANTERIA (University of Pisa), Prof. Marino Quaresimin (University of Padova)

Full-Scale Fatigue Test of a Composite Tidal Blade

**S. Lopez Dubon\***, C. Vogel, D. Garcia Cava, C. O'Bradaigh, E. McCarthy

Static and Fatigue Testing for evaluating Damage Tolerance performance of an Out Of Autoclave – Liquid Resin Infused Carbon-Epoxy Curved Stiffened Panel

**D. Fanteria\***, L. Boni, F. Romano

Fatigue Crack Growth Rate Models for Variable Amplitude Loading: Novel Model Formulation, FE Implementation, and Benchmark Experiment

S. Jensen, L. Carreras, B. Bak, C. Lequesne, H. Xiong, **E. Lindgaard\***

Modelling crack-induced delamination in composite laminates subjected to fatigue loadings.

**L. Maragoni\***, P. Carraro, M. Simonetto, M. Quaresimin

Mode I Experimental and numerical analysis of the interlaminar fatigue behaviour of thermoplastic composites considering R-curve effects

**I. Leciñana\***, J. Renart, A. Turon, J. Zurbitu, J. Manterola, L. Carreras, B. Tijs

Innovative ultrasonic tests for the Very-High-Cycle Fatigue characterization of a carbon fiber woven fabric

**C. Boursier Niutta\***, A. Tridello, D. Paolino

Wed, 13/09/2023 11:00 - 13:00

Room B

**Micro-mechanics I**

Chaired by: Prof. Stepan Lomov (KU Leuven)

Causes and symptoms of the absence of the bundle size effect in the Fibre-Element-Imposed Impregnated Fibre Bundle Model

**S. Lomov\***, C. Breite, Y. Swolfs, S. Abaimov

Prediction of Non-linear Response of Multiphase Composite Microstructures through Deep Learning of Reduced Structure-Response Data

D. Biswas, **G. Ammasai Sengodan\***, S. A. Ponnusami

On the development of a simulation approach for modelling cellulosic foams as a core-material for lightweight bio-based sandwich panels

**M. Wagner\***, G. Baumann, Q. Jiang, N. Debabeche, T. Nypeló, S. Spirk, U. Hirn, W. Bauer, F. Feist

Experimental and Numerical Evaluation of the Behaviour Mechanical of Green Sandwich Panels

**F. Bongiorno\***, C. Militello, B. Zuccarello

Individual fibre segmentation from time-resolved computed tomography images of fibre-reinforced composites using deep learning

**R. Guo\***, C. Breite, J. Stubbe, Y. Zhang, C. Rojas Gomez, M. Mehdikhani, P. Villanueva-Perez, Y. Swolfs

Generating micromechanics-based data for elastic short fibre composites using generative adversarial networks

**M. Mirkhalaf\***, C. Verhoeven, E. Ghane

Wed, 13/09/2023 11:00 - 13:00

Room C

### Structural Health Monitoring

Chaired by: Prof. Umberto Galietti (Politecnico di Bari), Prof. Giuseppe Pitarresi (University of Palermo)

SHM system for bonding line monitoring of composite wing box skin-spar cap during manufacturing

**M. Ciminello\***, A. Concilio, U. Mercurio, G. Apuleo

On Planar Gradient Acoustic Impedance matching for Guided Ultrasonic Wave detection in SHM systems with Embedded Sensors

**M. Rottmann\***, W. Weber

Development of a self-sensing composite laminate based on PZT nanofibers for impact localization

**T. Brugo\***, G. Selleri, G. Selleri, F. Mongioli, E. Maccaferri, F. Zonzini, L. De Marchi, A. Zucchelli, M. Focarete, D. Fabiani

Structural Health Monitoring of Floating Offshore Wind Turbine

C. Garcia Pariente, **A. Alvarez de Castro\***

Tensile Testing of Pinned Hybrid CFRP/Titanium Joints and Damage Monitoring with Electrical Resistance Measurements

**A. Dengg\***, C. Kralovec, M. Schagerl

Novel approach to the crack density estimation: experimental measurements using IRT for validating analytical models

R. De Finis, D. Palumbo, **U. Galietti\***

Wed, 13/09/2023 13:00 - 14:30

Sun Club

### Lunch Break

Wed, 13/09/2023 14:30 - 16:10

Aula Magna

### Virtual Testing and related themes IV

Chaired by: Prof. Heinz Pettermann (TU Wien), Dr. Luiz Kawashita (University of Bristol)

On and Off-Axis Cyclic Behaviour of 3D-Woven Composites: Experimental Testing and Macroscale Modelling

**C. Oddy\***, M. Song, C. Stewart, B. El Said, M. Ekh, S. Hallett, M. Fagerström

A coupled experimental and numerical method to determine the fracture toughness

**D. Ma\***, P. Verleysen, M. Giglio, A. Manes

Damage Mechanism Analysis of QI Carbon/Glass Hybrid Laminates Subjected to Quasi-static Indentation Using Axisymmetric Model

**A. Chen\***, X. Wu, L. Kawashita, M. Wisnom

Computationally Efficient Postbuckling Analysis of Shear Deformable Laminates

**J. Schilling\***, C. Mittelstedt

Lévy-type buckling analysis of shear deformable unsymmetrically laminated plates with rotational restraints

**P. Schreiber\***, C. Mittelstedt

Wed, 13/09/2023 14:30 - 16:10

Room A

### Dynamics

Chaired by: Dr. Emilio V. González (Universitat de Girona)

Application of Model-based Design Approach on Dynamic Tensile Testing of Carbon/Epoxy Composites at Intermediate Strain Rates

**S. Yoo\***, E. Kim, N. Toso, H. Voggenreiter

Performance Evaluation of Triangular and Quadrilateral Flat Shell Elements based on Refined Zigzag Theory for Static and Modal

Analysis of Multi-layered and Curved Composite and Sandwich Structures

**D. Spinazzola\***, G. Credo, M. Gherlone

Methods for dynamic testing of polymer-based composite materials

**E. González\***, J. Artero-Guerrero, J. González, E. De Blanpré, V. Jacques

Finite Element Modal Analysis for Composite and Stiffened Beam Structures with Geometric Non-Linearities

**C. Patuelli\***, G. Frulla, E. Cestino

Strength Prediction for Multidirectional Open-Hole Composite Laminates under Dynamic Loading

**M. Toenjes\***, G. Catalanotti, H. Koerber, C. Pohl, K. Drechsler

Wed, 13/09/2023 14:30 - 16:10

Room B

### Micro-mechanics II

Chaired by: Dr. Joris Remmers (Eindhoven University of Technology)

A mean field homogenization model for fiber reinforced composite materials in large deformation

**A. Li\***, J. Remmers, H. van Dommelen, M. Geers, T. Massart

Stress Relaxation of a Unidirectional Composite: a Modelling Study

**C. Breite\***, V. Feyen, L. Gorbatiikh, S. V. Lomov, Y. Swolfs

Microscale Modeling of Creep Rupture in Unidirectional Composites under Off-axis Loading

**D. Kovačević\***, F. van der Meer

A numerical study into the rate-dependent failure behaviour of unidirectional carbon fiber reinforced polyvinylidene fluoride

**T. Lenders\***, J. Remmers, T. Pini, P. Veenstra, L. Govaert, M. Geers

Numerical Simulation of the Fatigue Damage Growth in Unidirectional Composites based on Fibre-Matrix Debonding

**A. Seidel\***, B. Sørensen, K. Drechsler

Wed, 13/09/2023 16:10 - 16:30

Conference Venue

### Coffee Break

Wed, 13/09/2023 16:30 - 18:30

Aula Magna

## Laminated and Textile Composites

Chaired by: Dr. Pietro Russo

Thermo-mechanical FE analysis of a composite liquid hydrogen storage system for aerospace applications

S. Valvano, **A. Maligno\***

Free Vibration Analysis of Thermally Prestressed Constant and Variable Stiffness Laminated Beams using Strong Unified Formulation

**S. Ojo\***, G. Zucco, P. Weaver

Manufacturing and characterization of Polyamide 11/Basalt twill fibre fabric laminates

I. Papa, F. Napolitano, V. Lopresto, T. Valente, **P. Russo\***

Evaluation of Bend-Twist Coupling in Shape Memory Alloy Integrated Fiber Rubber Composites

**A. Annadata\***, A. Endesfelder, M. Koenigsdorf, J. Mersch, T. Gereke, M. Zimmermann, C. Cherif

Investigating the energy absorption capabilities of novel composite materials

**P. Campos\***, D. Dall'i, A. Arteiro, F. Danzi, D. Moreira, V. Lobão, L. Vigna, A. Calzolari, I. Lopes

Numerical and Experimental Assessment of Non-Adiabatic Effects in Thermoelastic Stress Analysis of Composite Laminates

**R. Cappello\***, J. Dulieu-Barton, R. Ruiz-Iglesias, G. Pitarresi, G. Catalanotti

Wed, 13/09/2023 16:30 - 18:10

Room A

## Optimisation and Probabilistic Methods

Chaired by: Prof. Heinz Pettermann (TU Wien)

Robust design of very large composite structures

**R. Costa\***, S. Pinho

On the Analytical Modelling, Global Optimization and Experimental Investigation of the Free-Edge Effect in Composite Laminated Shells

**A. Kappel\***, C. Mittelstedt

Quantum Optimization of Composite Laminates for Stacking Sequence Retrieval

**A. Wulff\***, B. Chen, M. Steinberg, Y. Tang, M. Möller, S. Feld

Assessing the Effect of Material Inter- and Autocorrelation on Composite Structure Reliability

**B. Van Bavel\***, D. Vandepitte, D. Moens

Analysis of Cure Behaviour Uncertainties in Thermoset Composite Parts using Particle Filter

**A. Balaji\***, C. Sbarufatti, D. Dumas, O. Pierard, F. Cadini

Wed, 13/09/2023 16:30 - 18:10

Room B

## Micro-mechanics III

Chaired by: Dr. Federico Danzi (INEGI), Dr. Fermin Otero (CIMNE)

Thermoelastic Micromechanical Analysis of CFRP with Voids

**M. Trombini\***, R. Masia, A. Pagani, M. Petrolo, E. Carrera

Data-driven microstructure-generator for high-fidelity analyses of unidirectional composite laminates

**F. Danzi\***, R. Silva, C. Furtado, I. Rodrigues Lopes, R. Tavares, D. Fanteria, P. Camanho

Effect of the matrix softening behaviour on local stress concentration factors in unidirectional fibre-reinforced composites: a numerical analysis

**C. Rojas\***, S. Lomov, Y. Swolfs

Transverse crack patterns in cross-ply laminates from micromechanical analysis using Phase-Field fracture.

**J. Macias\***, A. Arteiro, F. Otero, P. Camanho, I. Garcia, J. Reinoso

Wed, 13/09/2023 19:00 - 20:30

## Travel to the Gala Dinner & Photo Stop at the Salt Lakes

Wed, 13/09/2023 20:30 - 23:00

Villa Favorita

## Gala Dinner at Villa Favorita

Thursday, 14/09/2023

Thu, 14/09/2023 09:00 - 10:40

Room A

### Progressive Failure Analysis

Chaired by: Dr. Frans van der Meer (Delft University of Technology), Mr. Andrea Cantarutti (AlphaSTAR)

Novel Design of Experiments to Simulate Impact Damage in Glass Fibre Pipe Under Internal Pressure

**H. Alhashmy\***, M. Abadi, A. Hijles, F. Waluyo

Computational Modeling of Progressive Failure in Composite Laminates Under High-Cycle Fatigue Loading

**P. Hofman\***, F. van der Meer, L. Sluys

An assessment on the effect of draping of 3D woven composites utilising a numerical and empirical material characterisation approach

**I. Topalidis\***, B. El Said, A. Thompson, J. Keulen, S. Hallett

Development of a Progressive Fracture Method to Predict Crack Arrest in Large Scale Composite Thermoplastic Fuselage Panels.

**N. van Hoorn\***, W. van den Brink, B. Tijs, J. Waleson, J. Docter, J. van Ingen

Numerical Analysis using GENOA software to obtain Composite Allowables for an aeronautical composite material

R. Conte, S. Russo, B. Gambino

Thu, 14/09/2023 09:00 - 10:40

Aula Magna

### Fracture Mechanics I

Chaired by: Mr. Bas Tijs (Fokker/GKN Aerospace), Mr. Andrea Cantarutti (AlphaSTAR)

Measuring Cracks in Welded Thermoplastic Composite Single-lap Shear Joints with Digital Image Correlation

**A. Schiller\***, C. Bisagni

Controlling Failure of Carbon-fibre Reinforced Polymer (CFRP) Structures via Structural Fuses

**E. Kazemi\***, V. Medeau, E. Greenhalgh, S. Pimenta, J. Finlayson, S. Pinho

Conduction Welding the Next-Generation Thermoplastic Composite Fuselage: Fracture Toughness Characterization and Numerical Analysis

**B. Tijs\***, A. Turon, S. Esteban, C. Bisagni

Size Scale Effects in Fiber-Reinforced composites using phase field

**P. Asur Vijaya Kumar\***, A. Dean, H. Pettermann

Phase Field Fracture Modelling of 3D Printed Materials: an Anisotropic Analysis

**S. Sangaletti\***, A. Mitrou, I. Garcia Garcia, A. Arteiro

Thu, 14/09/2023 09:00 - 10:40

Room B

### Reduced Order Models

Chaired by: Dr. Fermin Otero (CIMNE)

Multiscale modeling of structures via a localized hyperreduced-order method

**J. HERNÁNDEZ\***, A. Giuliadori, E. Soudah

Approaches for Modelling the Mechanical Behaviour of Lithium-Ion Cells and the Application of Machine Learning Techniques within Numerical Simulation

**A. Schmid\***, A. Pasquale, C. Ellersdorfer, F. Chinesta, M. Ziane, M. Raffler, F. Feist

Efficient Nonlinear Multiscale Spectral GFEM Applied to Composite Aerospace Structures

**J. BÉNEZECH\***, L. Seelinger, A. Reinartz, T. Dodwell, R. Butler, R. Scheichl

Physically recurrent neural networks for microscale analysis of rate-dependent off-axis unidirectional laminates

**M. Maia\***, I. Rocha, F. van der Meer

Definition of Shell Reduced Order Models for the analysis of large reinforced composite structures

**F. Turon\***, F. Otero, X. Martinez

Thu, 14/09/2023 10:40 - 11:00

Conference Venue

### Coffee Break

Thu, 14/09/2023 11:00 - 13:00

Aula Magna

### Fracture Mechanics II

Chaired by: Prof. Yentl Swolfs (KU Leuven)

Segmentation Tools for Delineating the Profiles of Pulled-out Fibre Bundles in In-Situ Tomograms of Translaminar Fracture of Thin-Ply Composites

**S. AhmadvashAghbash\***, C. Rojas Gomez, G. Broggi, A. Aydemir, A. Argyropoulos, J. Cugnoni, V. Michaud, M. Mehdikhani, Y. Swolfs

A 3D Damage Model for Simulating Damage Modes in Fibre Metal Laminates

**I. Abuzayed\***, N. Wirawan, C. Zhang, J. Curiel Sosa

Characterising and Predicting Failure of Injection-moulded Short-fibre Composite Subcomponents

**Y. Fujita\***, S. Noda, J. Takahashi, E. Greenhalgh, S. Pimenta

Short glass fiber reinforced polymers: a phase-field model for the multiscale analysis of fracture

**A. Fajardo Lacave\***, F. Welschinger, L. De Lorenzis

Electro-Mechanical Modelling of Fracture in Carbon Nanotube Based Composites

**L. Quinteros\***, E. Garcia-Macias, E. Martinez-Pañeda

Off-axis Strength Predictions for Multidirectional Thin-ply Laminates

**A. Mitrou\***, A. Arteiro, J. Reinoso, P. Camanho



Thu, 14/09/2023 11:00 - 13:20

Room A

## Multifunctional Materials

Chaired by: Prof. Flavia Libonati (University of Genoa)

Thermal Residual Stresses Effect in Functionally Graded Metal Matrix Composite – Experiment and Simulation

**W. Węglewski\***, M. Basista, K. Bochenek, J. Capek

Development and modeling of a self-sensing composite laminate interleaved with piezoelectric nanofibers and CFRP electrodes.

**F. Mongioi\***, T. Brugo, G. Sella, E. Maccaferri, A. Zucchelli, D. Fabiani, L. Mazzocchetti

Hierarchical toughening of epoxy using thermoplastic multilayers

**U. Farooq\***, J. Teuwen, C. Dransfeld

Investigation into the Manufacture of Hybrid Wear Resistant Forging Tools using Tailored Forming Technology

**M. Till\***

Advanced fiber composites: towards recyclable bio-inspired composites

**F. Libonati\***, A. Stagni

Embedded FBG Sensors in Additively Manufactured Polylactide Composites Reinforced with Continuous Fibers

**P. Pawlowski\***, A. Orłowska-Galezia, C. Graczykowski, M. Mieloszyk

Thu, 14/09/2023 11:00 - 13:20

Room B

## Novel Materials

Chaired by: Prof. Enrico Cestino (Politecnico di Torino)

Non-Destructive Evaluation of Surface Coating on Ceramic Matrix Composites using Thermographic Techniques

F. Di Carolo, G. Santonicola, **F. Ancona\***, D. Palumbo, U. Galletti, C. Toscano, M. De Stefano Fumo, M. De Cesare

Multiscale investigation of mechanical properties of spark plasma sintered Ni-SiC composites

**M. Chmielewski\***, A. Strojny-Nędza, K. Kaszyca, K. Kowiorski, P. Jenczyk, D. Jarzabek, P. Bazarnik, Z. Pakiel, B. Romelczyk-Baishya, S. Nosewicz

Synthesis and characterization of the spark plasma sintered copper-diamond composites

**A. Strojny-Nędza\***, M. Chmielewski, R. Zybala, K. Kaszyca, A. Gajewska-Midziałek, B. Romelczyk-Baishya, S. Nosewicz

A novel nacre-inspired cfrp microstructure for improved strain to failure under in-plane compression

**T. Garulli\***, T. Katafiasz, E. Greenhalgh, S. Pinho

Curing Dependent Piezoresistivity in CNT/epoxy Nanocomposites: from Experimental Observation to Numerical Analysis

**T. Wong\***, T. Yu, F. Zou

Evaluating the Flexural Performance of Basalt Composite Sandwich Structures for Marine Applications

**M. Chairi\***, J. El Bahaoui, I. Hanafi, F. Favaloro, C. Borsellino, F. Galantini, G. Di Bella

Effectiveness of nanotechnology treatments in composite aircraft applications

**E. Cestino\***, J. Catapano, F. Galvano, A. Felis, S. Zuccalà, V. Martilla, V. Sapienza, L. Chesta

Thu, 14/09/2023 11:00 - 13:20

Room C

## Impact

Chaired by: Dr. Denis Dallì (Faculty of Engineering, University of Porto)

Low-velocity impact behavior of a hybrid PEEK-PEI multilayer thermoplastic matrix reinforced with carbon fiber

**S. Toro\***, A. Ridruejo, C. González, J. Fernández-Blázquez

Investigation of Several Impact Angles for Predicting Bird-Strike Damage in a Riveted eVTOL Composite Wing

**E. Kayar\***, G. Abdelal, B. Falzon, Z. Kazanci

Incorporating the effects of curvature and inclination on composite energy absorption in macroscale crash structure models

**D. Dallì\***, A. Arteiro

Modelling and Optimization of Natural Fiber Tubular Structures subjected to axial crushing

**M. Capretti\***, G. Del Bianco, V. Giammaria, S. Boria, A. Scattina, G. Bellingardi, V. Castorani

Mechanical Behaviour of Sustainable Sandwich Structures

**D. Rizzo\***, G. Epasto, P. Russo

Dynamic Damage Progression in Cross-ply CFRP Composite Beams Under Low-velocity Impact and Quasi-static Indentation Loading

**O. Batmaz\***, D. Coker

Thu, 14/09/2023 13:20 - 15:00

Sun Club

## Farewell Lunch

Thu, 14/09/2023 18:00 - 20:30

## Visit at the old medieval town at the top of Mount Erice