Welcome

On behalf of the European Community on Computational Methods in Applied Sciences (ECCOMAS) we are pleased to welcome you to the Azores for the IV ECCOMAS Thematic Conference on the Mechanical Response of Composites (COMPOSITES2013), held at the University of the Azores, Ponta Delgada Campus, S. Miguel Island.

ECCOMAS is a scientific organization grouping together European associations with interests in the development and applications of computational methods in science and technology. The mission of ECCOMAS is to promote joint efforts of European universities, research institutes and industries which are active in the broader field of numerical methods and computer simulation in Engineering and Applied Sciences and to address critical societal and technological problems with particular emphasis on multidisciplinary applications.

Following the very successful conferences in Porto, London and Hannover, the IV ECCOMAS Thematic Conference on the Mechanical Response of Composites is now held in the Azores, Portugal. The scope of COMPOSITES2013 is to provide a forum for the exchange of knowledge and current research and development on Composite Materials and Structures. The conference focuses mainly on theoretical and numerical modelling and prediction of performance of composite structures, covering also experimental validation and challenging industrial applications.

COMPOSITES2013 has been supported by IDMEC - Instituto de Engenharia Mecânica, the City Hall of Ponta Delgada and the Government of the Azores through European Union programme Proconvergência Açores. This Book of Abstracts presents a collection of the papers presented at the conference, as well as the programme and other pertinent information related to the conference. Altogether, about 70 lectures will be presented, including 4 plenary lectures, and it reflects the current state of the art in research and advances in the mechanical response of composites.

We would like to take this opportunity to express our sincere appreciation to the authors and participants for their contributions, to all members of the organizing and scientific committees involved in the preparation of this conference and to all the support staff. The organizing committee is also grateful to the University of the Azores for hosting the conference and for all the logistic support provided.

Welcome to the Azores, enjoy the conference and the breathtaking islands of the Azores!

Afzal Suleman
Pedro Camanho
Conference Organization

Organizing Committee

Afzal Suleman (Co-Chairman) - IDMEC/IST, Portugal • U. Victoria, Canada
Pedro Camanho (Co-Chairman) - University of Porto, Portugal
Aurélio L. Araújo - IDMEC/IST, Portugal
Carlos A. Mota Soares - IDMEC/IST, Portugal
Cristóvão M. Mota Soares - IDMEC/IST, Portugal

Scientific Committee

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O. Allix, École Normale Supérieure de Cachan, France
A. Apicella, Alenia, Italy
L. Asp, Swerea SICOMP, Sweden
C. Bisagni, Politecnico di Milano, Italy
A. Corigliano, Politecnico di Milano, Italy
J. Costa, Universitat de Girona, Spain
C. G. Davila, NASA Langley Research Center, USA
R. de Borst, University of Glasgow, United Kingdom
M. de Freitas, Universidade Técnica de Lisboa, Portugal
A. Ferreira, Universidade do Porto, Portugal
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S. Hallett, University of Bristol, United Kingdom
L. Iannucci, Imperial College, United Kingdom
A. Kaddour, QinetiQ, United Kingdom
M. Kawai, University of Tsukuba, Japan
A. Kling, German Aerospace Center, Germany
J. Llorca, Universidad Politécnica de Madrid, Spain
S. Lomov, Katholieke Universiteit Leuven, Belgium
E. Lund, Aalborg Universitet, Denmark
A. T. Marques, Universidade do Porto, Portugal
N. McCartney, National Physical Labor, United Kingdom
P. Middendorf, Eurocopter Group, Germany
E. Morozov, University of New South Wales, Australia
E. Oñate, Universitat Politècnica de Catalunya, Spain
F. Paris, Universidad de Sevilla, Spain
S. T. Pinho, Imperial College, United Kingdom
J. N. Reddy, Texas A&M University, USA
J. J. C. Remmers, Technische Universiteit Eindhoven, Netherlands
H. C. Rodrigues, Universidade Técnica de Lisboa, Portugal
R. Rolfes, Leibniz Universität Hannover, Germany
K. Schulte, Technische Universität Hamburg-Harburg, Germany
R. R. Talreja, Texas A&M University, USA
A. Turon, Universitat de Girona, Spain
R. Vaziri, University of British Columbia, Canada
A. M. Waas, University of Michigan, USA
M. R. Wisnom, University of Bristol, United Kingdom

COMPOSITES2013 has been supported by

ECCOMAS - European Community on Computational Methods in Applied Sciences
IDMEC - Institute of Mechanical Engineering
UAç - University of the Azores
Azorean Regional Government
European Union programme Proconvergência Açores
CMPD - Câmara Municipal de Ponta Delgada
Organizing Institution

**IDMEC** - Institute of Mechanical Engineering

The Organizers are grateful to the University of the Azores for hosting the conference and for all the logistic support.

Conference Venue

**COMPOSITES2013, IV ECCOMAS Thematic Conference on the Mechanical Response of Composites** takes place in the campus of the University of the Azores at Ponta Delgada, S. Miguel Island, Azores, Portugal in its Amphitheaters B and C (see map next page for rooms B and C).

General Information

**Secretariat Open Hours**

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
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<tr>
<td>Wednesday, September 25</td>
<td>8:00-17:30</td>
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<tr>
<td>Thursday, September 26</td>
<td>8:30-18:00</td>
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<tr>
<td>Friday, September 25</td>
<td>8:00-17:30</td>
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</table>

**Secretariat**

Ms. Paula Jorge
Ms. Andrea Freitas
IDMEC - Instituto Superior Técnico
Av. Rovisco Pais 1 • 1049-001 Lisboa - Portugal

**Coffee-Breaks**

The coffee-breaks will take place in the hall next to the Room C and will be open to all participants. Kindly wear your badge at all time.

**Lunches**

The lunch tickets included in the registration package will be honored at the restaurant of the Vip Executive Hotel. Note that the Restaurant tickets have different colours for the different days of the event and are only valid for the lunch of the day printed in front.

**Registration**

On Tuesday, September 24, the Conference registration will take place at the VIP Executive Hotel, from 17:00 to 19:30. A Welcome Drink will be offered to participants, as a courtesy of the hotel manager. Registration Desk will be available also on Wednesday, September 25, from 08:00 to 08:30 at the Conference venue (University of the Azores, Ponta Delgada Campus), in the hall next to Room C.

**Presentations**

There will be a video projector and a laptop available in each room, as well as a laser pointer. You can bring your presentation either in MS Powerpoint or PDF. Regular presentations have the duration of 20 minutes, including discussion and Invited Lectures will have 45 minutes, also with discussion. We will have parallel sessions only on Thursday, September 26. We kindly ask delegates to upload their presentations in the available computers and to be at the assigned room before the session starts. We strongly discourage the use of personal laptops for presentations since this can cause perturbations to the programme schedule due to the technical problems that often arise.

**Internet**

There will be wireless access to the internet provided to all participants. Instructions on how to connect will be available on site. We will not have computers for public use of the participants. If you want to access the internet you should bring your own laptop or mobile device. Participants of the conference have free internet access in both recommended hotels: Vip Executive Hotel and Hotel do Colégio.
University of the Azores, Ponta Delgada Campus
Map of Ponta Delgada

- **COMPOSITES2013**
- **Hotel + Lunches**
- **Hotel**
- **Banquet**
- **Reception**
Social Programme

Important Note:
Your Reception, Banquet and Tour Vouchers, included in the Registration package, need to be presented when entering the respective event.

Reception
Wednesday, September 25, 18:30 - 19:30
The conference reception, offered by the Ponta Delgada City Hall on Wednesday, September 25, starting at 18:30, will take place at the Centro Municipal de Cultura. All participants and registered accompanying persons are invited. Centro Municipal de Cultura is located at Largo Mártires da Pátria (See also map on page 8) being either 20 or 10 minutes walk from VIP Executive Hotel or Hotel do Colégio, respectively, or a short Taxi ride.

Banquet
Thursday, September 26, 20:00 - 23:00
The Conference Banquet will take place at the Restaurant Solar da Graça on Thursday, September 26, starting at 20:00. The restaurant, located at Rua do Mercado 26, 9500-326 Ponta Delgada (See also map the on page 8), is a short walk from the VIP Executive Hotel and Hotel do Colégio.

Conference Tour
Saturday, September 28, 9:00 - 18:00
The buses for the Tour will start at 9:00 from the Vip Executive Hotel and will proceed to Lagoa do Fogo, Lagoa das Furnas, Terra Nostra Park and return to Ponta Delgada. Lunch, included in the Tour, will take place at the Terra Nostra Hotel and will include the famous Cozido das Furnas (a mix of vegetables and meats slowly cooked in the hoot volcanic soil of the geyser region of Furnas). The Hot Springs and Natural Swimming Pools of Hot Water at the Terra Nostra Park and Hotel are an invitation for you to have a swim.

So, you are welcome to take your swimming suit and towel and enjoy these Hot Waters.

For those that have flights leaving Ponta Delgada in the end of the day, bring your luggage to the Tour and you will be dropped at the airport by the end of the Tour, well in time for your scheduled flight.
General Tourist Information

Transportation from the Airport to Hotel

The most convenient transportation between the airport and the hotels is by Taxi. The ride, including the supplement for luggage, should be about 10€. The Taxi ride should take about 15 min.

Moving Around

All sites of interest in Ponta Delgada are at walking distance from the hotels. For instance, the Historical City Center is about 15 - 20 min walking from the VIP Executive Hotel, while Hotel do Colégio if located in the Historical City Center. The sea front (Portas do Mar) is 15 min walking. The city of Ponta Delgada is generally calm and safe. A Taxi ride inside the city should not be more than 5€ to get around between the hotels and University campus. Other public transportation (buses) is also available. If you plan to drive around the island of S. Miguel you can rent a car at the many locations in town (take notice of the places that will be visited in the Conference Tour). The best way is to get the car reservation through the desk of your hotel.

Places of Interest in Ponta Delgada

All places of interest in Ponta Delgada are around the Historical City Center and along the sea front. You will find The City Gates; City Hall; Fortress of S. Bras; The Regional Government Palace (Palácio de Santana); Church of S. Peter; Church of S. Sebastian; Convent; Church of Christ; Portas do Mar.

Other Places of Touristic Interest in the Island of S. Miguel

To drive all around the island may take more than one day. During the Conference tour the area Northeast and East of Ponta Delgada will be visited (except for the most Eastern part of the island). West of Ponta Delgada seats one of the ex-libris of Azores, Lagoa das Sete Cidades which has beautiful views not only from the top but also driving down into the actual village of the Sete Cidades. The drive of the Western and Northern shores of the island also present some amazing views. At least half a day is required for exploring this part of the island.

Other General Information

Time zone: one hour less than GMT. Electricity: 220V, 50 Hz with standard European plugs. Currency: Euro (€). Emergency Phone number: 112. Temperature in late September: Average high about 22C; Average low about 17C. Other: Expect Rain, Expect Sun, Expect 4 seasons in a single day!
### Scientific Programme

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<thead>
<tr>
<th>Time</th>
<th>Tuesday September 24</th>
<th>Wednesday September 25</th>
<th>Thursday September 26</th>
<th>Friday September 27</th>
<th>Saturday September 28</th>
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<tbody>
<tr>
<td>08:00</td>
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<td>VIP Executive Hotel</td>
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<td>08:30</td>
<td>Session 1 Micromechanics ID41 ID60 ID119</td>
<td>Session 5A Structural Health Monitoring ID57 ID65 ID66</td>
<td>Session 5B Testing and Virtual Testing ID21 ID22 ID23</td>
<td>Session 9 Mechanics of Composite and Sandwich Structures ID108 ID121 ID120</td>
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<td>Tour to S. Miguel island</td>
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<td>09:10</td>
<td>Session 2 Dynamics and Stability ID24 ID43 ID95 ID77 ID52</td>
<td>Session 6A Damage Mechanics ID34 ID107 ID38 ID30</td>
<td>Session 6B Testing and Virtual Testing ID25 ID42 ID44 ID50</td>
<td>Session 10 Mechanics of Composite and Sandwich Structures ID75 ID76 ID87 ID103</td>
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<td>10:00</td>
<td>Session 3 Nanocomposites ID39 ID51 ID94</td>
<td>Session 7A Damage Mechanics ID47 ID55 ID61 ID63</td>
<td>Session 7B Testing and Virtual Testing ID54 ID92 ID113 ID84</td>
<td>Session 11 Failure Analysis ID20 ID35 ID72 ID127</td>
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<td>Registration &amp; Welcome Drink</td>
<td>Session 4 Novel Numerical Methods ID49 ID37 ID53 ID124</td>
<td>Session 8A Damage Mechanics ID32 ID114 ID117 ID29</td>
<td>Session 8B Optimization ID83 ID70 ID28 ID111</td>
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<td>20:00</td>
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## Tuesday, September 24

17:00 - 19:30  
**Registration & Welcome Drink (VIP Executive)**

## Wednesday, September 25

08:00 - 08:30  
**Registration**

Room C  
08:30 - 09:00  
**Opening Ceremony**

Room C  
09:00 - 09:45  
**Invited Lecture**  
(Chaired by C.A. Mota Soares)  
09:00 - 09:45  
**IL01 Pierre Ladeveze, L.M.T. Cachan, France**  
*Virtual Testing of Laminated Composites: State-of-the-art and Challenges*

Room C  
09:50 - 10:10  
**Session 1 - Micromechanics**  
(Chaired by M. Yildiz)  
09:50 - 10:10  
**ID41 B. Sabuncuoglu, S. Orlova, L. Gorbatikh, S.V. Lomov, I. Verpoest**  
*Analysis of Stress Distributions in Steel Fibre Reinforced Composites in Micro-Scale Including Large Deformations*

09:50 - 10:10  
**ID60 Yasmine Abdin, S. V. Lomov, Atul Jain, I. Verpoest**  
*Micro-Mechanical Modelling of Short Wavy Steel Fiber Reinforced Composites*

10:10 - 10:30  
**ID119 A. Arteiro, A.R. Melro, P.P. Camanho**  
*Mechanics of thin-ply laminates*

10:50 - 11:10  
**Coffee Break**

Room C  
11:10 - 11:30  
**Session 2 - Dynamics and Stability**  
(Chaired by S.T. Pinho)  
11:10 - 11:30  
**ID24 Maria Neto, Jorge Ambrósio, Ana Amaro, Luis Roseiro**  
*Active Control of Structural Elements made of Composite Materials Exhibiting Large Rotations*

11:30 - 11:50  
**ID43 Riccardo Vescovini, Chiara Bisagni**  
*A Numerical/Experimental Procedure for the Transient Dynamic Analysis of Composite Laminated Structures*

11:50 - 12:10  
**ID95 Ylyas Kacar, Vebil Yildirim**  
*Free Vibration Analysis of Non-Cylindrical Helical Composite Springs Under Compression*

12:10 - 12:30  
**ID77 Alexander Kling**  
*Validation Approach for Robust Primary CFRP Structures - Buckling and Post-Buckling of Stiffened Panels*

12:30 - 12:50  
**ID52 V.S. Fedotovskii, T.N. Vereschagina, S.V. Lunina, E.A. Pilshchikova**  
*Dynamic density of disperse composite*
12:50 - 14:20  Lunch (VIP Executive)

**Room C**  Invited Lecture  (Chaired by C.M. Mota Soares)
14:20 - 15:05  **IL04**  Yuris Dzenis, University of Nebraska-Lincoln, USA  
Ultrahigh-Performance Continuous Nanofibers as Next Generation Reinforcement in Composites

**Room C**  Session 3 - Nanocomposites  (Chaired by P. Camanho)
15:10 - 15:30  **ID39**  Ihab Salama, Amal Esawi  
Fracture Toughness of Aluminium-Carbon Nanotube composites
15:30 - 15:50  **ID51**  Gabriella Josefsson, Fredrik Berthold, E. Kristofer Gamstedt  
Estimation of the elastic properties of cellulose nanofibrils from the elastic properties of biobased nanocomposites
15:50 - 16:10  **ID94**  F. F. Melemez, M. Yildiz, Y.Z. Menceloglu  
Strategies for Manufacturing Nano Phase Incorporated Fiber Reinforced Composites

16:10 - 16:30  Coffee Break

**Room C**  Session 4 - Novel Numerical Methods  (Chaired by J. Ambrósio)
16:30 - 16:50  **ID49**  Georg C. Ganzenmueller, Michael May  
Modelling of Delamination and Failure in a Carbon Composite T-Joint Construction Element using the mesh-free Peridynamic Method
16:50 - 17:10  **ID37**  Joris J.C. Remmers, Thomas I.F. Haartsen and Clemens V. Verhoosel  
Isogeometric Kirchhoff-Love shell elements for the simulation of buckling of thin-walled composite panels
17:10 - 17:30  **ID53**  Saman Hosseini, Joris J. C. Remmers, Clemens V. Verhoosel, René de Borst  
Modeling of delamination in composite laminates using an isogeometric solid-like shell element
17:30 - 17:50  **ID124**  S. T. Pinho, B. Y. Chen, P. M. Baiz, N. V. De Carvalho T. E. Tay  
A floating node method for modeling multiple discontinuities within an element

18:30 - 19:30  Reception at City Hall

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**Thursday, September 26**

**Room C**  Invited Lecture  (Chaired by A. Suleman)
09:00 - 09:45  **IL02**  Anoush Poursartip, University of British Columbia, Canada  
Transitioning Composites Knowledge and Models into Industrial Practice: Challenges and Opportunities
**Room C**  
**Session 5A - Structural Health Monitoring**  
(Chaired by A. Araujo)  

09:50 - 10:10  
**ID57**  
**Sergey G. Ivanov, Larissa Gorbatikh, Stepan V. Lomov, Ignaas Verpoest**  
*Comparison of Damage Development in Woven Composites under Tension in Fibre and Bias (Off-axis) Directions*  

10:10 - 10:30  
**ID65**  
**Casey J. Keulen, Fatih F. Melemezy, Talha Bozy, Pandian Chelliah, Halit S. Turkmen, Mehmet Yildiz, Afzal Suleman**  
*Monitoring the strain energy release rate of composite materials with embedded fiber Bragg gratings*  

10:30 - 10:50  
**ID66**  
**Casey J. Keulen, Mehmet Yildiz, Afzal Suleman**  
*Lamb wave tomography with a hexagonal network for damage detection in composite plates*  

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**Room B**  
**Session 5B - Testing and Virtual Testing I**  
(Chaired by J.R.R.A. Martins)  

09:50 - 10:10  
**ID21**  
**G. Catalanotti, J. Xavier, P.P. Camanho**  
*Fracture toughness and crack resistance curves in the longitudinal compressive failure of polymer composites*  

10:10 - 10:30  
**ID22**  
**P. Badalló, D. Trias, L. Marin, J.A. Mayugo**  
*Analysis of composite stringer run-outs under tensile load*  

10:30 - 10:50  
**ID23**  
**Supratik Mukhopadhyay, Mike I. Jones, Stephen R. Hallett**  
*Modelling of out-of-plane fibre waviness; tension and compression tests*  

10:50 - 11:10  
**Coffee Break**  

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**Room C**  
**Session 6A - Damage Mechanics I**  
(Chaired by L.M.P. Durão)  

11:10 - 11:30  
**ID34**  
**Sina Berg, Eelco Jansen, José Reinoso, Raimund Rolfes**  
*Two-way loose coupling procedure for the analysis of local composite material damage*  

11:30 - 11:50  
**ID107**  
**Atul Jain, Stepan V. Lomov, Yasmine Abdin, Stefan Straesser, Wim Van Paepgem, Ignace Verpoest**  
*Scaling of SN curves of short fiber composites - a hybrid multiscale approach*  

11:50 - 12:10  
**ID38**  
**Stephen R. Hallett, Xiaodong Xu, Xiangqian Li, Michael R Wisnom**  
*Numerical modelling of the effect of ply block thickness in Overheight Compact Tension (OCT) Tests*  

12:10 - 12:30  
**ID30**  
**X.C. Sun, S.R. Hallett**  
*Investigation of Key Damage Mechanisms in Compression After Impact/Indentation Loading*  

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**Room B**  
**Session 6B - Testing and Virtual Testing II**  
(Chaired by A.R. Melro)  

11:10 - 11:30  
**ID25**  
**Y. Swolfs, L. Gorbatikh, I. Verpoest**  
*Stress concentrations around multiple fibre breakages: the validity of linear superposition*  

11:30 - 11:50  
**ID42**  
**E. Obert, F. Daghia, P. Ladevèze, A. Bergerot**  
*A micro-meso bridge for the mesoscale modelling of woven composites*
<table>
<thead>
<tr>
<th>Time</th>
<th>ID</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>11:50 - 12:10</td>
<td>ID44</td>
<td>In-plane shear behaviour of non-crimp fabric laminates by means of 3D finite element analysis</td>
<td>Luis Miguel Marques Ferreira, Enrique Graciani Díaz, Federico Paris Carballo</td>
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<tr>
<td>12:10 - 12:30</td>
<td>ID50</td>
<td>X-ray micro-computed tomography investigation of agglomeration and fibre length degradation through the processing chain of wood fibre composite</td>
<td>Thomas Joffre, Arttu Miettinen, Fredrik Berthold, Markku Kataja, E. Kristofer Gamstedt</td>
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<tr>
<td>12:30 - 14:00</td>
<td></td>
<td>Lunch (VIP Executive)</td>
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<tr>
<td>Room C</td>
<td></td>
<td>Session 7A - Damage Mechanics II</td>
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<tr>
<td>14:00 - 14:20</td>
<td>ID47</td>
<td>Validation of continuum damage approach in open-hole carbon-epoxy laminates</td>
<td>N. Otaño, U. Segurajauregi, H. Usabiaga, X. Sagartzazu</td>
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<tr>
<td>14:20 - 14:40</td>
<td>ID55</td>
<td>Numerical modelling of damage modes in UD thin carbon/glass hybrid laminates</td>
<td>Meisam Jalalvand, Gergely Czél, Michael R. Wisnom</td>
</tr>
<tr>
<td>14:40 - 15:00</td>
<td>ID56</td>
<td>Damage in fabric-reinforced composites under impact bending</td>
<td>Himayat Ullah, Andy R. Harland, Vadim V. Silberschmidt</td>
</tr>
<tr>
<td>15:00 - 15:20</td>
<td>ID61</td>
<td>Drilling damage in composite material</td>
<td>Luís Miguel P. Durão, João Manuel R. S. Tavares, Victor Hugo C. de Albuquerque, Jorge Filipe S. Marques, Óscar N.G. Andrade</td>
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<tr>
<td>Room B</td>
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<td>Session 7B - Testing and Virtual Testing III</td>
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<tr>
<td>14:00 - 14:20</td>
<td>ID54</td>
<td>Measurements of the mechanical properties of honeycomb panels focusing on the influence of the relationship of used adhesive to the cell size</td>
<td>Jarmil Vlach, Radek Zboncáč</td>
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<tr>
<td>14:20 - 14:40</td>
<td>ID92</td>
<td>A new design rule for pultruded frp members under combined shear and bending loading</td>
<td>F. Möller, M. Feldmann</td>
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<tr>
<td>14:40 - 15:00</td>
<td>ID101</td>
<td>A new method for measuring cohesive lengths and mixed-mode cohesive laws using digital image correlation</td>
<td>Carlos Sarrado, Albert Turon, Adrià Quintanas, Josep Costa</td>
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<tr>
<td>15:00 - 15:20</td>
<td>ID113</td>
<td>CFRP Cables Tensile Behavior</td>
<td>Felipe F. Luz, Lais V. Silva, Sandro C. Amico, Carlos A. Cimini Jr.</td>
</tr>
<tr>
<td>15:20 - 15:40</td>
<td>ID84</td>
<td>A Natural Fiber-Concrete Experimental-Computational Design Through Dynamical Timoshenko Theory</td>
<td>Flávio Pietrobon Costa, Ricardo de Carvalho Alvim, Rosana de Albuquerque Arleo, Alvim, Lucas Pereira da Silveira</td>
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<tr>
<td>15:40 - 16:00</td>
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<td>Coffee Break</td>
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</tbody>
</table>
| Room C | Session 8A - Damage Mechanics III  
(Chaired by A. Turon) |
|-------|-----------------|
| 16:00 - 16:20 | **ID32**  
Navid Zobeiry, Alireza Forghani, Anoush Poursartip, Reza Vaziri  
**A Combined Experimental and Numerical Approach to Characterize and Simulate the Damage Behaviour of Laminated Composites** |
| 16:20 - 16:40 | **ID114**  
**T. Ferreira**, M. Freitas, L. Reis, L. Simões  
**Damage tolerance analysis of composite laminates regarding different production conditions** |
| 16:40 - 17:00 | **ID117**  
J. Díaz-Alvarez, C. Santiuste, N. Feito, **X. Soldani**, M.H. Miguélez  
**Damage prediction in composite milling** |
| 17:00 - 17:20 | **ID125**  
Luiz F. Kawashita, M. Francesca Pernice, Stephen R. Hallett  
**Mesh-independent cohesive crack model for the analysis of in-plane compression and shear failure in laminated composites** |
| 17:20 - 17:40 | **ID29**  
Waleed K. Ahmed, A-H.I. Mourad  
**LEFM Based Approach to Evaluate the Impact of Debonding Problems in Rehabilitated Steel Members Using FRP Composites** |

| Room B | Session 8B - Optimization  
(Chaired by A.J.M. Ferreira) |
|-------|-----------------|
| 16:00 - 16:20 | **ID83**  
M. Bruyneel, G. Craveur, C. Beghin  
**Optimal design of composite structures with design rules and manufacturing constraints, based on continuous design variables** |
| 16:20 - 16:40 | **ID70**  
Rafael T.L. Ferreira, **Helder C. Rodrigues**, José M. Guedes, José A. Hernandes  
**Hierarchical optimization of laminated structures for stiffness and natural frequencies** |
| 16:40 - 17:00 | **ID28**  
Andrzej Katunin  
**Recent research on damage identification in composite elements using wavelet transform with optimally selected wavelets** |
| 17:00 - 17:20 | **ID111**  
Pierre Duysinx, Maria Guillermo, Tong Gao, Alain Remouchamps, Michael Bruyneel  
**Comparison of parameterization schemes for solving the discrete material optimization problem of composite structures** |
| 17:20 - 17:40 | **ID118**  
Graeme J. Kennedy, Joaquim R. R. A. Martins  
**Optimal Aeroelastic Tailoring of Composite Wings** |

| 20:00 - 23:00 | **Banquet**  
(Bar & Restaurant Solar da Graça)** |
Friday, September 27

Room C  Invited Lecture  
(Chaired by P. Camanho)
09:00 - 09:45  IL03  Ignas Verpoest, Katholieke Universiteit Leuven, Belgium  
Innovative Toughening Concepts for Composites: Nano-engineering, Metal Fibres, Natural Fibres, Hybridisation

Room C  Session 9 - Mechanics of Composite and Sandwich Structures I  
(Chaired by H.C. Rodrigues)
09:50 - 10:15  ID108  Alastair F. Johnson, Sebastian Kilchert  
Modeling Impact Damage in Sandwich Panels with Structural Composite Cores
10:10 - 10:30  ID121  António R. Melro, Cláudio S. Lopes, Pedro P. Camanho  
Impact simulations in variable-stiffness panels
10:30 - 10:50  ID120  Joana Rocha  
The difference between noise radiation of aluminium and composite aircraft panels excited by flow and by random noise: a novel model for prediction

10:50 - 11:10  Coffee Break

Room C  Session 10 - Mechanics of Composite and Sandwich Structures II  
(Chaired by J. Rocha)
11:10 - 11:30  ID75  Carlos S. Sousa, Pedro P. Camanho, Francisco M.A. Pires, Afzal Suleman  
Variable Stiffness Flexible Matrix Laminates with Prescribed Finite Elastic Deformation
11:30 - 11:50  ID76  Hannes Koerber, Jose Xavier, Pedro P. Camanho, Jose R. Sainz de Aja, Yasser Essa  
High strain rate behaviour of textile composites under compression and combined compression-shear loading
11:50 - 12:10  ID87  Lukasz Smakosz, Jacek Tejchman  
Experimental and numerical investigations of composite structural insulated panels CSIPs
12:10 - 12:30  ID103  Jukka Aalto, Risto Syrjä  
On Shear Stiffnesses of Beams

12:30 - 14:00  Lunch (VIP Executive)

Room C  Session 11 - Failure Analysis  
(Chaired by P. Nordlund)
14:00 - 14:20  ID20  S. Heimbs, A. Mierzwa, T. Duwensee, C. Breu, A.C. Nogueira, M. May, C. Less, J. Wolfrum  
Investigation of Static and Dynamic Failure Behaviour of Composite T-Joints
14:20 - 14:40  ID35  M.G. Callens, P. De Cuyper, L. Gorbatin, I. Verpoest  
Ductile steel fibre/polypropylene composites: Influence of fibre architecture on the tensile behaviour
14:40 - 15:00  **ID72**  **M. Vogler, P.P. Camanho, H. Koerber, R. Rolfes**  
New material modeling approaches for endless fiber composites and organic sheets

15:00 - 15:20  **ID80**  **Mircea Calomfirescu, Anton Maier, Thomas Körwien**  
Adhesively bonded joints in composite aerostructures: Analysis, Design and Certification aspects

15:20 - 15:40  **ID127**  **P.S. Shivakumar Gouda, John Williams, Vijay chatterjii, Sameer Rahatekar, M.R. Wisnom, Dayananda Jawali**  
Effect of Graphene and Rubber on Mode-I Fracture Behaviour of Glass Epoxy Unidirectional Laminated Composites

15:40 - 16:00  **Coffee Break**

**Room C**  
**Session 12 - Delamination**  
(Chaired by M. Vogler)

16:00 - 16:20  **ID31**  **Heinz E. Pettermann, Eloy Rama Lista, Andreas Reisinger, Jakob Gager**  
Delamination Induced Ply Damage — Nonlinear Simulations Accounting for Degradation of Layer and Interfaces Properties Simultaneously

16:20 - 16:40  **ID97**  **Marco Borotto, John Botsis**  
Bridging effects on carbon/epoxy composite materials

16:40 - 17:00  **ID98**  **L. Zubillaga, N. Carrere, A. Turon, G. Guillamet**  
Experimental validation of stress/energy models to predict the onset of delamination from free-edges

17:00 - 17:20  **ID126**  **P. Nordlund**  
Delamination Modeling by Automatic Insertion of Interface Elements and Cracks

17:20 - 17:40  **ID128**  **A. Riccio, A. Raimondo, F. Scaramuzzino**  
Mechanical Behaviour of Composite Stiffened Panels: A Novel Numerical Approach for Skin-Stringer Debonding Evolution

**Saturday, September 28**

9:00 - 18:00  **Tour to S. Miguel island**