

The GSS2011 is aimed at engineers and other professionals in all sort of fields who wish to learn more about the current state-of-the-art of Fracture and Damage Mechanics, and their computational application in solving complex engineering problems. The initiative is also tailored not only for researchers and developers in the field but particularly for engineering students with some background on continuum mechanics and numerical simulation techniques.

University of Aveiro  
Dept. Mechanical Engineering  
<http://grids.web.ua.pt> | [gss2011@ua.pt](mailto:gss2011@ua.pt)



In general, the typical audience for a course in Fracture and Damage Mechanics comes from several disciplines such as mechanical, civil, aerospace and materials backgrounds. Furthermore, over the years, Meshless Methods, Natural Element Methods (NEM) and the eXtended Finite Element Method (XFEM), along with the Generalized Finite Element Method (GFEM), have emerged as novel numerical methods to solve various problems in different areas of engineering and sciences such as solid mechanics.

## Topics

1. Fundamental aspects of the formulations and applications of Fracture and Damage Mechanics to engineering problems.
2. Numerical modelling issues and experimental validation on Fracture Mechanics, and fatigue crack growth and closure phenomena.
3. Fracture and damage models and their applications in aerospace structures and design.
4. Discontinuity finite elements and their software implementation for fracture modelling of composite materials.
5. Fracture and Damage Mechanics applications in plastic metal forming.
6. XFEM, Meshless Methods and Natural Element Methods on the numerical simulation on fracture, damage and discontinuities.
7. Fracture/damage and its interaction with fatigue in industrial applications.
8. New trends and applications of damage formulations in metal forming.

The GSS2011 aims to introduce both the basic theoretical principles and the emerging numerical methods to students, scientists and engineers so that they can be equipped to solve various problems in engineering, sciences and industries. The GSS2011 also aims to provide a practical understanding of both calculation and simulation of fracture and damage phenomena. Specific emphasis will be given to the theoretical coverage of both Fracture and Damage Mechanics, and their computational application, as well as their practical application, to the analysis of structures in the context of Solid Mechanics. The sessions will be headed by top researchers in the field, and it is the purpose of this initiative to provide an open forum of discussion among the participants.

**Accommodation** Block reservations at preferential rates can be arranged, by the Organisation, in the student residences of the University of Aveiro and upon request during registration. Additionally, the city of Aveiro has several 3 and 4 stars Hotels, in the city centre, suitable for a nice stay at a walking distance to the GSS2011 venue. Detailed information on this can be accessed, for instance, via the GSS2011 webpage ([http://grids.web.ua.pt/grids\\_ev\\_GSS2011.html](http://grids.web.ua.pt/grids_ev_GSS2011.html)).

## Lecturers

**Alfredo Balacó de Moraes**

*University of Aveiro, Portugal*

**Anne-Marie Habraken**

*University of Liège, Belgium*

**Elias Cueto**

*University of Zaragoza, Spain*

**Fernando Antunes**

*University of Coimbra, Portugal*

**Francisco Novo**

*Structures Section, TEC-MSS, ESA, AOES Group BV, Noordwijk, The Netherlands*

**Francisco Pires**

*University of Porto, Portugal*

**Joaquim Alexandre Pinho da Cruz**

*University of Aveiro, Portugal*

**Luís Filipe Borrego**

*Coimbra Institute of Engineering, Portugal*

**Luís Galvão dos Reis**

*Technical University Lisbon, Portugal*

**Nicolas Moës**

*Ecole Centrale de Nantes, France*

**Rui Fernando Martins**

*New University of Lisbon, Portugal*

## Registration fees and important dates

800 € (without accommodation)

900 € (including accommodation in student residence halls)

**Registration deadline: July 15th, 2011**

Registration fees include all the course documentation, participation in all sessions, lunches and coffee breaks, welcome reception, social programme and banquet.

## GRIDS Summer School 2011

### Fracture and Damage Mechanics in Engineering Applications

1<sup>st</sup> Announcement

Aveiro, Portugal  
Aug 29 - Sep 2



The campus of the University of Aveiro is located very close (at walking distance) to the centre of Aveiro, at a convenient distance from hotels, restaurants and a variety of cultural sites. Aveiro is located on the shore of the Atlantic Ocean, near white sand beaches, and it is well-known for its channels, seafood and traditional "egg sweets". It is often called "The Portuguese Venice" because of its channels and boats, as well as for similar problems when it tried to conquer the water from the sea.  
Coordinates: 40°37'46.73"N, 8°39'28.51"W

The city dates back at least to the 10th century, when it was known by its first Latin name of "Alavarium", literally, "a place with a watercourse". The Moors invaded and held it until the 11th century, after which it became popular with Portuguese royalty. In the winter of 1575 a terrible storm closed the entrance to its port, ending a thriving trade in metals and tiles. Aveiro is also famous for its production of salt and for its seaweed harvest, which is used for fertiliser in the area.



The GSS2011 is organised by the GRIDS Research Group, a group dedicated to the study and development of numerical methods and simulation techniques in engineering, integrated in the Department of Mechanical Engineering, TEMA Research Unit, University of Aveiro ([www.ua.pt](http://www.ua.pt)), Portugal. The GSS2011 initiative is driven by the Division of Fracture and Advanced Computational Techniques (DiFrACT) of GRIDS.

**Chairpersons**  
J. Pinho da Cruz, Assistant Professor  
R. de-Carvalho, Research Assistant

University of Aveiro

