

## Scientific Program

The Scientific Program of the conference will be daily arranged around two *Keynote Plenary Lectures* by distinguished scientists, and parallel sessions for oral paper presentations. Paper presentations in the form of Posters will also be possible, and facilities for that purpose will be available during the days of the **IRF'2013** conference.

## Social Program

In parallel with the Technical and Scientific Program, a full range of social activities will be offered to Delegates and Accompanying Persons during all days of the Conference. Most of these will be organised by a competent local travel agency to be associated with the **IRF'2013** conference.

## Registration

All attendees, including invited speakers, are strongly advised to register in advance of the Conference. The registration fees are as follows:

Registration Fee	Prior to 31 JAN 2013	After 31 JAN 2013
Full Delegate	650,00 Euro	850,00 Euro
Student Delegate	450,00 Euro	600,00 Euro
Accompanying Person	250,00 Euro	350,00 Euro

All registered delegates are entitled to one copy of the book of abstracts, CD-ROM with full-papers, attend all technical sessions, early-bird and welcome receptions, refreshments, lunches, conference banquet and privileged access to all initiatives of the social program. Accompanying Persons are entitled to early-bird and welcome receptions, banquet and privileged access to all initiatives of the social program.

## Further Information

For further information, please see the conference web site, or contact the Organising Committee at the following addresses:

**Prof. J.F. Silva Gomes**

FEUP/DEMec

E-mail: [sg@fe.up.pt](mailto:sg@fe.up.pt)

or

**Prof. Shaker A. Meguid**

AMDL/U.Toronto

E-mail: [meguid@mie.utoronto.ca](mailto:meguid@mie.utoronto.ca)

## Conference Venue

The conference will be held in the beautiful city of Funchal in Madeira (Portugal), at the Hotel **VIDAMAR Resorts Madeira\*\*\*\*\*** (Formerly **Hotel CS MADEIRA & SEA SPA\*\*\*\*\***), which is very convenient and well equipped for conferences in terms of facilities, transportation and proximity to other hotels.



The city itself is nestled in a great natural amphitheatre, facing the blue Atlantic with a backdrop of dramatic mountains. Located in the stunning south of Madeira, on its sunniest coast amidst banana plantations and wonderful gardens where flowers bloom all year round in the shelter of the verdant mountains, it is an extremely lush, green and relaxed city.



Funchal's history goes back over 5 centuries when early Portuguese settlers colonised the coast of a bright and sunny bay where fennel (funcho) grew in abundance, giving it's name to the new town of Funchal. Over the years the population grew, with international trade attracting the attention of all of Europe. Nowadays Funchal is a very modern city with over 104.000 inhabitants. It is one of the safest and cleanest cities in Europe and is a place that takes real pride in itself. The perfectly cobbled streets in the centre mixed with the modern shopping areas, cafes, bars, restaurants and of course tourists, make Funchal a city that is both interesting and exciting.

**IRF'2013**

Funchal/Portugall



4th International Conference on  
**INTEGRITY, RELIABILITY & FAILURE**

Funchal, 23-27 June 2013

## **2<sup>ND</sup> ANNOUNCEMENT AND CALL FOR PAPERS**

This is the First Announcement and Call-for-Papers for the **4<sup>th</sup> International Conference on Integrity, Reliability and Failure**, to take place in Funchal/Madeira (Portugal) from 23 to 27 June 2013. The deadline for Abstract Submission is 15 December 2012. Full information about the conference can be found in the IRF'2013 web site, at the following address:

<http://paginas.fe.up.pt/clme/IRF2013/>

## Organisation

*The conference is jointly organized by*

Faculty of Engineering, University of Porto  
MADL-University of Toronto  
CCEE-University of Madeira

## Relevant Dates

Submission of Abstracts	15 December, 2012
Notification of Acceptance	31 December, 2012
Deadline for Early Registration	31 January, 2013
Submission of Full Papers	15 March, 2013
Conference	23-27 June, 2013

## Conference Co-Chairs

**Prof. J.F. Silva Gomes**

Faculty of Engineering, University of Porto, Portugal

**Prof. Shaker A. Meguid**

MADL, University of Toronto, Canada

## Organising Committee

(Local Members)

Carlos C. António (FEUP); Clito F. Afonso (FEUP); José M. Cirne (U.Coimbra); Lino Maia (CCEE/UMA); Mário A.P. Vaz (FEUP); Paulo G. Piloto (I.P.Bragança); Pedro Moreira (FEUP/INEGI).

## International Scientific Committee

Aben, H. (Estonia), Abreu, M.J. (Portugal), Adali, S. (S. Africa), Afonso, C.F. (Portugal), Aleksandrova, N. (Portugal), Alexopoulos, N. (Greece), Alves, A. (Portugal), António, C.C. (Portugal), Banks-Sills, L. (Israel), Baptista, J.S. (Portugal), Barros, R.C. (Portugal), Bathe, K.J. (USA), Botsis, J. (Switzerland), Bremand, F. (France), Caetano, E. (Portugal), Camanho, P. (Portugal), Campos, J.R. (Portugal), Castro, C.F. (Portugal), Castro, P.T.de (Portugal), Catarino, A. (Portugal), Cavalcante, M. (Brazil), Chen, T. (Taiwan), Chenot, J-L (France), Cirne, J. (Portugal), Correia, A. (Portugal), Costa, Luísa (Portugal), Crococolo, D. (Italy), Cunha, A. (Portugal), Datta, S. (USA), Degrieck, J. (Belgium), Dias, G. (Portugal), Dietrich, L. (Poland), Diogo, M.T. (Portugal), Dourado, N. (Portugal), Eberhardsteiner, J. (Austria), Esteves, J.L. (Portugal), Figueiro, R. (Portugal), Fernandes, A.A. (Portugal), Ferreira, D. (Portugal), Ferreira, J.G. (Portugal), Fiúza, A. (Portugal), Fonseca E. (Portugal), Gdoutos, E. (Greece), Geraldés, M.J. (Portugal), Guedes, R.M. (Portugal), Hejum, Du (Singapore), Igarua, A. (Spain), Ignaszak, Z. (Poland), Iliescu, N. (Romania), Jones, N. (UK), Jorge, R.N. (Portugal), Kahlen, F-J (S. Africa), Klein, W. (Germany), Kourkoulis, S. (Greece), Laermann, K. (Germany), Langseth, M. (Norway), Lima, G. (Brazil), Lino, J. (Portugal), Lopes, H. (Portugal), Lu, Jian (Hong Kong), Madureira, L. (Portugal), Maia, L. (Portugal), Mal, A. (USA), Marques, A.T. (Portugal), Masato, Y. (Japan), Meda, A. (Italy), Meguid, S.A. (Canada), Melo, F.Q. (Portugal), Michaelis, K. (Germany), Mileiko, S.T. (Russia), Miller, R.E. (Canada), Mines, R. (UK), Miranda, R. (Portugal), Miyano, Y. (Japan), Moreira, F. (Portugal), Moreira, P. (Portugal), Morimoto, Y. (Japan), Moura, M.F. (Portugal), Navarro, C. (Spain), Navas, H. (Portugal), Pappalettere, C. (Italy), Pieczyska, E. (Poland), Piloto, P. (Portugal), Pindera, M.J. (USA), Prime, M. (USA), Quelhas, O. (Brazil), Ramesh, K. (India), Reddy, J.N. (USA), Restivo, M.T. (Portugal), Ribeiro, J. (Portugal), Robinson, J. (Ireland), Rocha, A.B. (Portugal), Rodrigues, H. (Portugal), Ruiz, G. (Spain), Ruzicka, M. (Czech. Rep.), Sainov, V. (Bulgaria), Santos, J.M. (Portugal), Semenski, D. (Croatia), Silva, A.J. (Portugal), Silva, Lucas (Portugal), Silva Gomes, J.F. (Portugal), Sjödah, M. (Sweden), Soares, C.M. (Portugal), Sousa, Luísa (Portugal), Sousa, Rui (Portugal), Suleman, Afzal (Portugal), Takagi, T. (Japan), Talaia, M. (Portugal), Tamalsky, E. (Brazil), Tamuzs, V. (Latvia), Tavares, J.M. (Portugal), Tavares, P. (Portugal), Thomsen, O.T. (Denmark), Tooren, M.J. (Netherlands), Truman, C.E. (UK), VanHemelrijck, D. (Belgium), Varum, H. (Portugal), Vasques, C. (Portugal), Vaz, Mário P. (Portugal), Viana, J.C. (Portugal), Vilas-Boas, J. (Portugal), Wang, Wei-Chung (Taiwan), Weng, G. (USA), Yoneyama, Satoru (Japan), Yoon, Y.C. (Singapore), Zhang, Z. (China).

## Objectives

**IRF'2013** is the fourth international gathering of scientists and engineers interested in the fields of energy harvesting, materials engineering, engineering mechanics and their effect on the environment. The first conference of this series was held in Porto in 1999, the second meeting was held in Singapore in 2004, and the third in Porto again, in 2009. The objective of this meeting is to provide a forum for the discussion and dissemination of recent advances in three related areas: **Integrity, Reliability and Failure** of engineering structures, components and systems. The goal is to enable mechanical, aeronautical, space, civil, automotive, biomedical, environmental, and nuclear engineers, researchers and scientists to exchange ideas on the following and derivative topics:

## Main Topics

- **Analytical and Numerical Tools:** FEM, BEM and Hybrid Methods , Analysis of Structural Components , Optimum Design Techniques , Metal Forming and Metal Cutting, Dynamics and Vibration , Computational Methods in, Failure Diagnostics , Dynamic Loading of Structures , Reliability Assessment.
- **Testing and Diagnostics:** Condition Monitoring, Destructive and Nondestructive Testing, Damage Mechanics and Assessment, Prototyping and Full-Scale Testing, Vibration Monitoring, Failure Diagnostics, Residual Stresses.
- **Surface and Interface Engineering:** Functionally Graded Materials, Smart Structures and Materials, Coatings Plating and Metal Finishing, Tribology and Failure of Interfaces, Surface Integrity, Surface Treatments and Shot-peening.
- **Civil Engineering Applications:** Structural Analysis, Structural Integrity, Experimental Tests & Structural Monitoring, Experimentation in Geoseismology, Concrete and Composite Structures, Metallic Structures, Structural Rehabilitation.
- **Sensors and Instrumentation:** Optical Techniques and Interferometry, Optical Fibres, Nondestructive Tools in Design, Advanced Mechanical Testing, Condition Monitoring, Self-sensing Materials, Self-healing Materials.
- **Tribology, Gears and Transmissions:** Gears and bearings, High speed wheel / rail systems, Clutches, Lubrication, Lubricants and additives, Surface coatings and heat treatments, micropitting, pitting, scuffing and wear.
- **Mechanical Design and Prototyping:** Mechanical Design, Product Development, Additive Manufacturing, Prototyping, Design for Manufacturing, Eco-design, Conversion Technologies.
- **Modes of Failure:** Fatigue, Corrosion-Fatigue, Stress Corrosion Cracking, Fatigue Creep Interaction, Environmentally Assisted Failures, Brittle Fracture, Buckling, Impact Failure.
- **Composite Materials:** Fibres, Matrices and Interfaces, Polymer, Ceramic, Carbon, and Metal Composites, Multifunctional Composites, Processing, Fabrication and Recycling, Durability, Damage and Fracture, Health Monitoring and Repairability, Applications: building, aerospace, medical, etc...
- **Nanotechnologies & Nanomaterials:** NEMS and MEMS Technologies, Nanocomposites, Nanodevices, Diagnostics and Control, Nanosensors, Molecular Devices.
- **Biomechanical Applications:** Mechanics and Design of Protheses, Biomaterials and Biocompatibility, Stress Monitoring, Dental and Orthopaedic Biomechanics, Sports and Rehabilitation Biomechanics, Biofluid Mechanics, Medical Devices.
- **Energy and Thermo-Fluid Systems:** Granular Flow, Thermal Barrier Coatings, Heat And Mass Transfer, Experimental Fluid Dynamics, Solid-Fluid Interactions, Interfacial Dynamics, Large Scale Eddy and Turbulence Analysis.
- **Impact and Crashworthiness:** Testing Techniques, Measure-ment in Dynamics, Earthquake Engineering, Crashworthiness, Ballistic Studies, Shock Loading, Energetic Materials, Impact Behaviour of Materials. .
- **Case Studies:** We would welcome real engineering applications, case histories and case studies that involve the use of experimental techniques in engineering applications to design, manufacturing and monitoring of structures, materials and processes.

## Keynote Speakers

The conference program includes a number of Keynote Plenary Lectures by distinguished scientists, to provide thematic presentations of their most recent findings:

- Professor E.A. Elsayed (Rutgers University, USA)
- Professor Noritsugu Umehara (Nagoya University, Japan)
- Professor Shaker A. Meguid (University of Toronto, Canada)
- Professor Xiong Zhang (Tsinghua University, China)

## Thematic Symposia

Thematic symposia will be organized under the auspices of the **IRF2013** conference. The list of thematic Symposia is still opened and those that have been proposed so far are as follows:

- SMART STRUCTURES AND MATERIALS
- BIOMECHANICS OF SOFT TISSUES
- IMAGING AND VISUALIZATION
- OPTICAL TECHNIQUES OF EXPERIMENTAL MECHANICS IN DESIGN
- BLOOD FLOW MECHANICAL BEHAVIOUR
- INTEGRITY, RELIABILITY AND FAILURE IN DENTAL MATERIALS AND PROSTHODONTIC APPLIANCES
- MECHANICAL CHARACTERIZATION OF BONE BEHAVIOR
- CERAMIC MATERIALS
- DESIGN OF STRUCTURES SUBJECT TO LOAD AND/OR MATERIAL UNCERTAINTY
- STRUCTURAL AND MULTIDISCIPLINARY OPTIMIZATION
- INNOVATIVE JOINING PROCESSES
- VIBRATION AND STRUCTURAL ACOUSTICS ANALYSIS
- DYNAMICS, STABILITY AND CONTROL IN ENGINEERING STRUCTURES
- ASSESSMENT, MONITORING AND CONTROL OF CIVIL ENGINEERING STRUCTURES
- BEHAVIOUR CHARACTERIZATION AND STRENGTHNING OF CONSTRUCTIONS FOR EARTHQUAKE DEMANDS
- EXPERIMENTAL TESTING IN BUILDING REHABILITATION
- CONCRETE MATERIAL PERFORMANCE
- SAFETY OF WOODEN STRUCTURES
- OCCUPATIONAL SAFETY AND HEALTH
- THERMODYNAMICS AND THERMO-FLUID SYSTEMS
- LEAN & GREEN MANUFACTURING
- TEACHING MECHANICS AND MATERIALS IN DESIGN
- ADVANCES IN NANOENGINEERING
- ENVIRONMENTAL APPLICATIONS OF NANOMATERIALS
- STRUCTURAL INTEGRITY OF ADVANCED POLYMER COMPOSITES
- ADVANCES IN FIBROUS AND COMPOSITE MATERIALS FOR CIVIL ENGINEERING
- STRUCTURAL HEALTH MONITORING OF ADVANCED STRUCTURES
- FIRE AND STRUCTURAL ENGINEERING
- METROLOGY, QUALITY CONTROL AND RELIABILITY
- MEDICAL DEVICES AND HEALTHCARE MATERIALS
- MICROMECHANICS AND HOMOGENIZATION OF HETEROGENEOUS MATERIALS

## Technical Exhibition

**IRF'2013** will provide facilities for a technical exhibition on equipments, software and services related to *Integrity, Reliability and Failure* during the whole period of the conference. Companies and individuals interested in displaying software, apparatus or any other kind of material at the technical exhibition should inform the conference chairs of their intention as soon as possible.