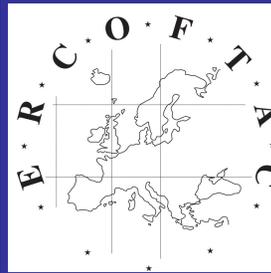


Registration

www.ercoftac.org



Uncertainty Management and Quantification in Industrial Analysis and Design

www.ercoftac.org

Location

GE Global Research Centre
Freisinger Landstrasse 50
D-85748 Garching b. Munich
Germany

The GE Global Research centre is located on the outskirts of Munich with excellent access to the centre and Munich Airport by the autobahn, ring road and train networks.



Course fees

€490 ERCOFTAC members
€610 Non-ERCOFTAC members

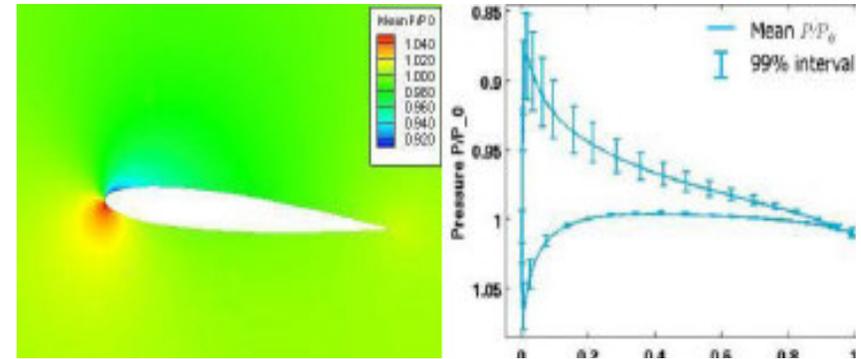
This fee includes: course registration, course material, lunch, refreshments and course dinner. Please note that accommodation is not included in this fee.

Registration

Please contact Dr. Richard Seoud at the earliest opportunity to reserve a place:

Dr. Richard E. SEOUD
ERCOFTAC Industry Engagement Officer
Tel: +44 (0)208 543 9343
Email: richard.seoud-ieo@ercoftac.org

For further information : www.ercoftac.org



Course Coordinator: Prof. Charles Hirsch

3 - 4 March 2011

GE Global Research Centre,
Munich, Germany

Information

ERCOFTAC, a leader in applied fluid mechanics, is proud to announce a two day awareness course on 'Uncertainty Management and Quantification in Industrial Analysis and Design'.

Uncertainty quantification is a new paradigm in industrial analysis and design as it aims at taking into account the presence of numerous uncertainties affecting the behavior of physical systems. Dominating uncertainties can be either be operational (such as boundary conditions) and/or geometrical resulting from unknown properties, such as tip clearances of rotating compressor blades or from manufacturing tolerances.

Whether bringing a new product from conception into production or operating complex plant and production processes, commercial success rests on careful management and control of risk in the face of many interacting uncertainties. For example a new aircraft or aero-engine must be designed and engineered within a given time frame and budget to meet a given set of performance requirements, and then manufactured at unit cost and rates that meet an overall business plan. Today's fiercely competitive market and increasingly stringent regulatory environment is such that there is very little margin of error. Failure to appreciate, understand and appropriately manage risks inevitably results in severe financial penalties, and even irrevocable damage to reputation.

Historically, chief engineers and project managers have estimated and managed risk using mostly human judgment founded upon years of experience and heritage. As the 21st century begins to unfold, the design and engineering of products as well as the control of plant and process are increasingly relying on computer models and simulation. This era of virtual design and engineering opens the opportunity to deal with uncertainty in a systematic formal way by which sensitivities to various uncertainties can be quantified and understood, and designs and processes optimized so as to be robust against such uncertainties. Human judgment will always play an important role, but leading companies in many fields of engineering are increasingly aware of these possibilities and uncertainty quantification is beginning to feature strongly in their strategic aspirations. Thus this is a very opportune moment to introduce a two- day awareness course on this emerging topic. The aim is to share the aspirations and requirements of leading companies in the fields of aerospace, energy, transport and chemical process; review emerging methods and techniques and how these are being deployed; and define the current state-of-the-art and map out-near term future possibilities.

Speakers

- Prof. Charles Hirsch
Numeca International, Belgium
- Prof. Anthony Hutton
ERCOFTAC, UK
- Ms. Anne Dutfoy
EDF, France
- Dr. Alain Dervieux
INRIA, France
- Dr. Vincent Couaillier
Onera, France
- Dr. Bernard Eisfeld
DLR, Germany
- Dr. Gilbert Roge
Dassault, France
- Dr. Alberto Pasanisi
EDF, France
- Dr. Alexander Karl
Rolls-Royce, USA

Programme

Thursday 3 March 2011

Industry Requirements and Objectives for Uncertainty Quantification (UQ) and Risk Reduction by Robust Design

- | | | |
|-------|--|--------------------------|
| 9:00 | Requirements for UQ from Aircraft Industry | <i>Dr. G. Roge</i> |
| 9:45 | Requirements for Uncertainty Quantification and Risk Reduction for Effective Application to Robust Design of Engines | <i>Dr. A. Karl</i> |
| 10:30 | Refreshments | |
| 10:45 | UQ at ONERA | <i>Dr. V. Couaillier</i> |
| | Methodologies for UQ and for Robust Design Under Uncertainties | |
| 11:30 | Sensitivity Analysis by Adjoint; Automatic Differentiation and Application | <i>Dr. A. Dervieux</i> |
| 12:15 | Lunch | |
| 13:15 | Numerical Uncertainties and Error Control: The MUNA project | <i>Dr. B. Eisfeld</i> |
| 14:00 | Polynomial Chaos Methods-Intrusive and non-Intrusive Methods | <i>Prof. C. Hirsch</i> |
| 14:45 | Quantitative Uncertainty Management at EDF: Stakes, Methods and Tools | <i>Ms. A. Dutfoy</i> |
| 15:30 | Refreshments | |
| 15:45 | Key Tools and Processes for the Application of Robust Design in Gas Turbine Development | <i>Dr. A. Karl</i> |
| 16:30 | Q & A | |

Friday 4 March 2011

Examples of Applications and Test Cases with Prescribed Uncertainties

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|-------|---|------------------------|
| 9:15 | The RAE 2822 Test Case with Prescribed Uncertainties: Comparison of UQ Methods | <i>Dr. G. Roge</i> |
| 10:00 | Lessons Learned from the NODESIM Project | <i>Prof. C. Hirsch</i> |
| 10:45 | Refreshments | |
| 11:00 | Some Examples of Applied Uncertainty Management Studies at EDF | <i>Dr. A. Pasanisi</i> |
| 11:45 | Present State of the Art and Outlook for The Next Technology Readiness (TR) , Including an Introduction to a Best Practice Guide for UQ | <i>Prof. A. Hutton</i> |
| 12:00 | Lunch | |
| 13:00 | Q & A | |
| 14:00 | Close | |