



EUROPEAN COMMISSION



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MARIE CURIE ACTIONS

“FAGGIOLATI PUMPS Spa”



CONFINDUSTRIA Macerata

CFD

MODELLING / SIMULATIONS FOR INDUSTRIAL AND ENVIRONMENTAL ENGINEERING

Workshop / Industrial Short Course
18-19 October 2007, Macerata, Italy

CFD (Computational Fluid Dynamics) is considered today as indispensable tool in many industries, used daily for design, optimisation and prediction of equipment performances. It has contributed vastly to design improvement, to shortening the design cycles and marketing time of new products, and to make forecast in real-life situations which are inaccessible to measurements or any other solution method. Yet, “user-friendly” commercial CFD codes carry many snares and risks of misuse and abuse.

This workshop aims to provide the rationale and up-to-date developments in modelling and simulations for CFD of industrial and environmental flows. It also aims at providing guidance for knowledgeable use of CFD codes, proper choice of models and numerics for particular applications, and proper interpretation of CFD results.

The lectures will be illustrated by a range of CFD applications in various industries (turbo-machineries, IC engines, power equipment, electronic cooling, space heating and conditioning, material processing) as well as in environmental engineering (indoor climate, smoke and contaminant dispersion, atmospheric flows and pollutant dispersion, wind engineering) .

Topics

- CFD (Computational Fluid Dynamics): State-of-the-Art,
- Mathematical fundamentals
- Turbulence modelling for RANS CFD
- Large eddy- and Hybrid simulations for CFD
- Numerical discretisation and solution methods
- CFD demonstrations (FMG @ DMA “La Sapienza”)

Lecturers:

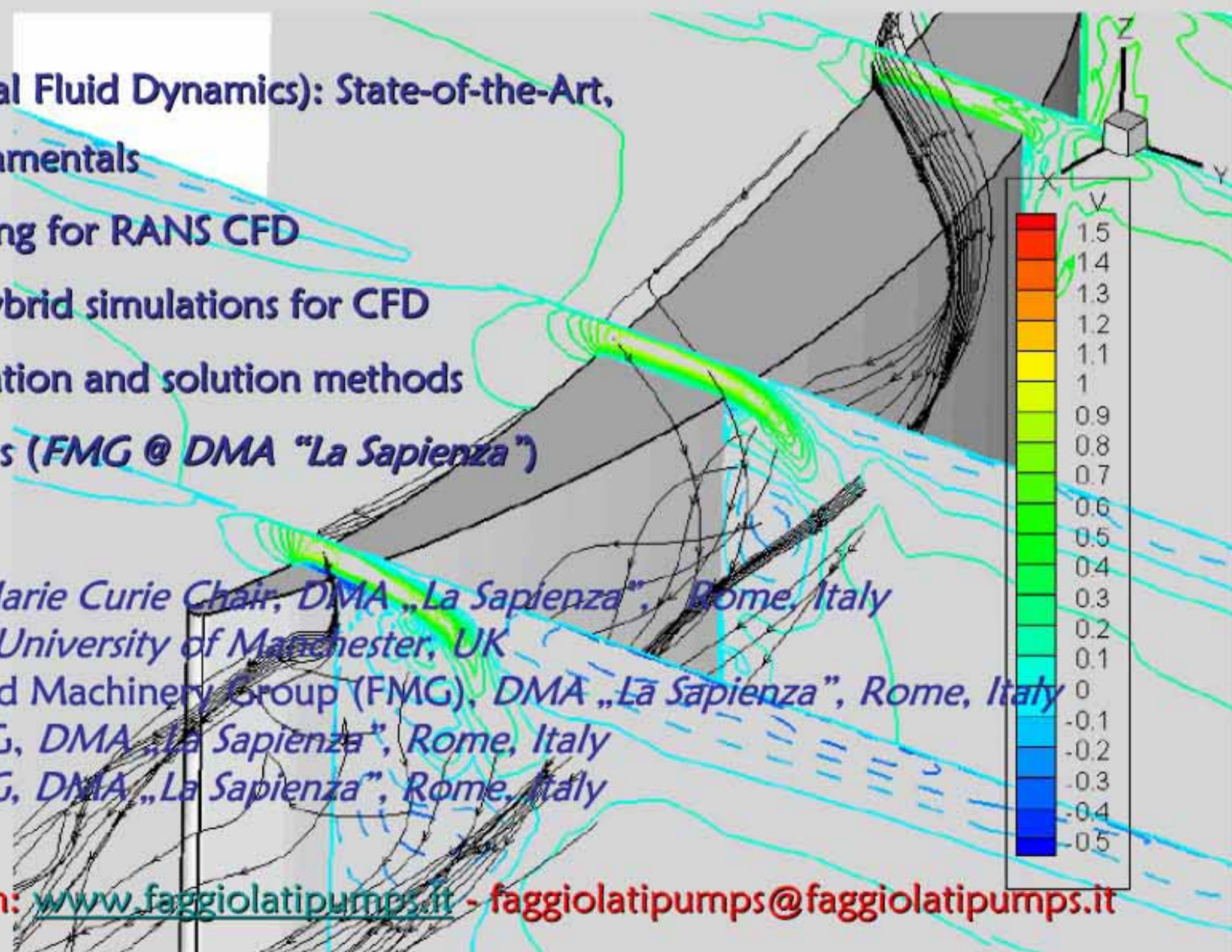
Prof. K. Hanjalic, *Marie Curie Chair, DMA “La Sapienza”, Rome, Italy*

Prof. B.E. Launder, *University of Manchester, UK*

Prof. F. Rispoli, *Fluid Machinery Group (FMG), DMA “La Sapienza”, Rome, Italy*

Dr. A. Corsini, *FMG, DMA “La Sapienza”, Rome, Italy*

Dr. D. Borello, *FMG, DMA “La Sapienza”, Rome, Italy*



Information and Registration: www.faggiolatipumps.it - faggiolatipumps@faggiolatipumps.it

PROGRAMME

Thursday, 18.10.2007

8.00-9.00 Registration

9.00-9.30 Opening, *Giovanni Faggiolati and Franco Rispoli*

9.30 -10.00 **CFD (Computational Fluid Dynamics):**

State-of-the-Art, Impact on industrial design and development, Prospect for SME, In-house CFD versus Commercial, *Kemo Hanjalic and Brian Launder*

10.00-10.30 **Mathematical fundamentals:**

Equations for CFD, Solution approaches, (RANS, LES, DNS) *Kemo Hanjalic*

10.30-11.00 **Coffee Break**

11.00-12.15 **Turbulence modelling for RANS CFD :**

Linear and nonlinear EVMs, Algebraic and differential SMC, Wall treatment, *Brian Launder*

12.15-13.00 **Turbulence simulations:** Large-eddy and hybrid simulations (LES, HLR), *Kemo Hanjalic*

13.00-14.00 **Lunch Break**

14.00-15.00 **Numerical discretisation and solution methods:**

Finite Volume, Finite Elements, *Franco Rispoli*

15.00-17.30 **Demonstrations of CFD: solving industrial problems, forecast, optimization**

D.Borello, A.Corsini, K.Hanjalic, B.E.Launder, F.Rispoli

- Turbomachinery flows: blade cascades, tip-leakage, internal/external cooling
- Combustion: industrial combustors, deposit formation
- Electronics cooling: jets and cross-flow convection, conjugate heat transfer
- Indoor climate, environmental flows, contaminant/pollutant dispersion

16.00-16.30 **Coffee Break**

Friday, 19.10.2007

9.30 -13.00 **Round Table : CFD in Industrial and Environmental Engineering –**

- application of CFD in product development, design and optimization
- potential of CFD for SME – interest, prerequisites, cooperation

Moderator: Franco Rispoli

Participants, especially from small and medium enterprises (SME), are invited to send to the organizer questions on actual problems in industrial practice, to be discussed with a view to possible solutions using CFD.

Venue : Faggiolati Pumps Spa - Via Papa Giovanni XXIII, 31 62100 Macerata

Accommodation: Forestry-Hotel

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