

## ERCOFTAC – SIG 39

### Computational Aeroacoustics – 9 & 10 October 2014

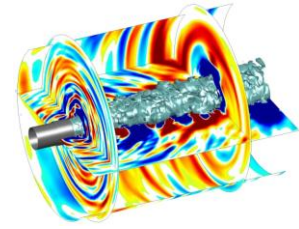
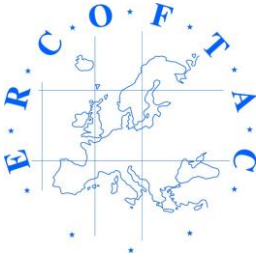
Course coordinator: Prof. Christophe Bailly

Venue: GE Global Research Center, Munich, Germany

#### Lecturers

- Prof. Christophe Bailly, Ecole Centrale de Lyon, France.
- Dr. Christophe Bogey, Ecole Centrale de Lyon, France.
- Dr. Gwenael Gabard, University of Southampton, England.
- Prof Christopher Schram, Institute von Karman, Belgium.
- Prof. Wolfgang Schröder, Institute of Aerodynamics, Aachen, Germany.

This course is intended for researchers in industry and in academia including Ph.D. Students with a good knowledge in fluid mechanics, who would like to build up or widen their knowledge in the field of aeroacoustics (modeling, computational tools and industrial applications). It will first provide a comprehensive overview of recent insights of aeroacoustics theories (Lighthill's analogy and vortex sound theory, extensive hybrid approaches and wave extrapolation methods, duct acoustics). A number of practical problems involving the coupling between CFD's results and CAA will be also thoroughly discussed (*e.g.* how design a mesh size for aeroacoustics applications using large eddy simulation, inclusion of mean flow effects via hybrid formulations such as the acoustic perturbation equations, presence of surfaces, aeroacoustic couplings, ...) and realistic applications performed by the instructors (aeronautics, car industry, propulsion, energy,...) will be discussed. Advanced computational aeroacoustics methods will be also presented as well as what we can learn from the direct computation of aerodynamic noise. Finally, specific topics reflecting participant interests will be discussed in a final round table session.



**Thursday 9 October 2014**

**09:00** – An overview of the numerical simulation of turbulent flows (C. Bailly)

*10:00 – 10h30 Refreshments*

**10:00** – Simple sources and Lighthill's analogy (G. Gabard)

**11:30** – Vortex sound theory (C. Schram)

*12h30 – 13h30 Lunch*

**13:30** – Solid surfaces in acoustical analogies (C. Schram)

**14:30** – Review of some classical configurations: cavity, cylinder & airfoil (C. Bailly)

*15:30 – 16h00 Refreshments*

**16h00** – Aeroacoustics approaches in the framework of unstructured grids (G. Gabard)

Course Dinner

**Friday 10 October 2014**

**09:00** – Hybrid APE/LES Analysis: Part I Theory (W. Schöder)

**10:00** – Hybrid APE/LES Analysis: Part II Airframe, Jet, and Combustion Noise (W. Schöder)

*11:00 – 11h30 Refreshments*

**11h30** – Duct acoustics (G. Gabard)

*12h30 – 13h30 Lunch*

**13:30** – Computational aeroacoustics and Direct Noise Computation (C. Bogey)

**14:30** – Guidelines for accurate simulations and practical applications to turbulent round jets (C. Bogey)

*15:30 – 16h00 Refreshments*

**16h30** – Q & A Session

Registration of interest: [richard.seoud-ieo@ercoftac.org](mailto:richard.seoud-ieo@ercoftac.org)

Fees: Members €640, Non-Members €995.

Course fees cover course material, refreshment, lunch, course dinner, however, accommodation not included.