



Aeroacoustics of Propulsion and Ventilation Systems

Valpré conference center, Ecully, July 3-5 2017

(Sponsored by CeLyA, the school is free of charge)

Context and objectives

The aerodynamic noise from rotating-blade based and jet-powered technologies is a major concern in many engineering applications, not only dealing with high speeds as in aeronautical transport but also with low speeds as in ventilation and air conditioning, wind energy and so on. The same basic mechanisms are involved and just differently ranked depending on the characteristic Mach numbers of the flows and dimensional parameters. Facing the general need for noise reduction enforced by international or national authorities, researchers and engineers have to develop suitable strategies to meet the requirements. This implies a three-step approach that can be summarized as follows:

- **Understand** the physical mechanisms, that can be identified for instance using experimental characterization of the flow features responsible for the sound generation;
- **Model** them, either developing analytical and semi-empirical approximations for fast and approximate answers or resorting to accurate numerical simulations for a deeper investigation;
- **Reduce** the sound at source, by making use of the first two steps to propose low-noise designs or to develop control strategies.

The industrial chair ADOPSYS (*Aeroacoustics of Ducted and Open-air Propulsion SYStems*) co-funded by SAFRAN AeroEngines, Ecole Centrale de Lyon and the French National Agency for Research (ANR) is aimed at addressing these steps and capitalizes four years of coordinated research. Within that scope the summer school will cover many topics of interest from fundamentals in aeroacoustics to recent methodological advances, including modelling and simulation approaches as well as experimental techniques dedicated to modern aeronautical propulsion systems. The application to low-speed fans is also included.

Tentative Program (some lecturers are still to be confirmed)

Day 1	Day 2	Day 3
Fundamentals Sources in motion <i>M. Roger (ECL)</i>	In-duct propagation <i>M. Roger (ECL)</i>	Modal detection in ducts <i>L. Enghardt (DLR)</i>
Fundamentals Airfoil noise mechanisms <i>S. Moreau (Sherbrooke Univ.)</i>	Broadband airfoil-noise reduction techniques <i>To be confirmed</i>	Experimental multi-sensor and inverse methods <i>Q. Leclerc (INSA Lyon) & A. Pereira (ECL)</i>
Lunch break	Lunch break	Lunch break
Methods and needs Engine manufacturer <i>To be confirmed (SAFRAN AE)</i> + <i>Poster session</i>	Methods and needs Aircraft manufacturer <i>T. Node-Langlois (Airbus)</i> + <i>Poster session</i>	Beamforming and source localization in aeroacoustics <i>V. Fleury (Dassault)</i>
Fundamentals and numerical simulations of jet noise <i>C. Bogey (ECL) & N. Andersson (Chalmers Univ.)</i>	Modern turbofan engines & Installation effects on low-speed fans <i>C. Polacsek (ONERA) & S. Moreau (Univ.Sherbrooke)</i>	Aeroacoustics of supersonic jets - Experimental methods <i>T. Castelain (ECL)</i>
BBQ Party	Gala Diner	Closure

Coffee breaks will be provided each day between lectures.

Participants are encouraged to present their own work during the Poster sessions planned after the first afternoon talks on Day1 and Day2.

A technical tour of the aeroacoustics facilities at Ecole centrale de Lyon will also be organized.

Accommodation

All summer school events including the lectures given by internationally recognized experts will be hosted at Valpré conference center close to Ecole Centrale de Lyon in Ecully, and 20'-30' from downtown Lyon by public transportation. Courses, lunches, coffee breaks and dinners are **free of charge**, sponsored by Labex CeLyA Lyon University.

A **registration form** is attached to this mail.

Please send it as soon as possible and in any case before June 5th (the number of participants is limited) to carine.zambardi@ec-lyon.fr.

We recommend all participants to stay at the same place as the summer school at hotel Valpré. Reservation can be completed by email (reception@valpre.com) or phone (+33 (0)4 72 18 05 05); *do not make the reservation on Valpré website*. Please make sure to indicate that you will attend the CeLyA Summer School, in order to get preferential prices, and indicate also your days of arrival and departure. Preferential rates are available until June 2nd 2017.

- single room: 82 € breakfast included + 1.10 € local tax per night for one person
- twin room: 110 € breakfast included + 1.10 € local tax per night for 2 persons.

Only the first bookings will benefit from these special rates.

Public rates are respectively 110 € and 130 € for single and twin.