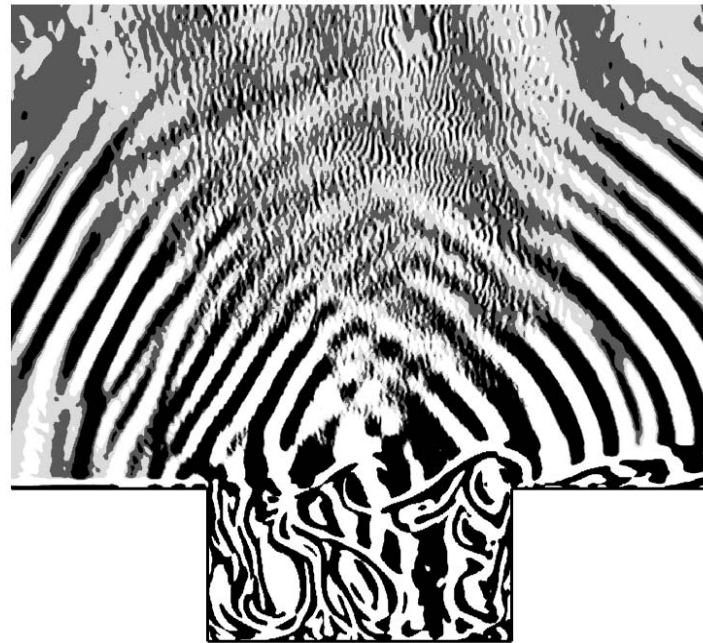


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**von KARMAN INSTITUTE
FOR FLUID DYNAMICS**

AERODYNAMIC NOISE FROM WALL-BOUNDED FLOWS



March 9-13, 2009

von Karman Institute for Fluid Dynamics
72, Chaussée de Waterloo
1640 Rhode-Saint-Genèse, Belgium

Phone: +32(0)2 359 96 04 - Fax: +32(0)2 359 96 00
E-mail: secretariat@vki.ac.be, TVA BE 0407 185 709
Website: <http://www.vki.ac.be>

INTRODUCTION

An accurate understanding of the mechanisms of aerodynamic noise from wall-bounded flows is required to predict that noise and subsequently reduce its environmental impact.

The aim of this Lecture Series is to present the state-of-the-art review of on-going activities in noise prediction and to indicate current research directions, in a way accessible to attendees coming from both academic and industrial areas. The course should appeal not only to experts already working in the domain, but also to newcomers to the field.

Introductory lectures on the fundamentals of aeroacoustics will be followed by up-to-date reviews on the different numerical / theoretical approaches: DNS, LES and other hybrid RANS-LES, SAS and aeroacoustical analogies. Applications to the aerodynamic noise from boundary layers, airfoils, airframe devices, cavities, automotive components and internal flows will illustrate the capabilities of the different approaches, allowing an evaluation of their performances and a quick application in various fields of research. A synthesis, including a discussion on topics of interest to the attendees, is planned on the last day.

The Lecture Series directors are Dr. J. Anthoine and Ir. J. Christophe of the von Karman Institute for Fluid Dynamics, Belgium.

TIMETABLE

MONDAY MARCH 9

- 08:45 Registration
- 09:15 Welcome and introduction
- 09:30 Fundamentals of aeroacoustics
Prof. M. Roger, Ecole Centrale de Lyon, France
- 11:15 Fundamentals of aeroacoustics (Continued)
Prof. M. Roger
- 14:00 Overview of predictive tools
Prof. M. Wang, University of Notre Dame, USA
- 15:45 Numerical methods: DNS
Dr. R.D. Sandberg, University of Southampton, UK

17:00 Reception

TUESDAY MARCH 10

- 09:00 Numerical methods: LES and hybrid RANS-LES (DES and zonal methods)
Dr. M. Terracol, ONERA, France
- 10:45 The scale-adaptive simulation (SAS) method for unsteady flow predictions
Dr.-Ing. F. Menter, ANSYS, Germany

- 14:00 Analytical / empirical techniques
Prof. M. Roger
- 15:45 Boundary layer noise
Prof. M. Wang

WEDNESDAY MARCH 11

- 09:00 Airfoil noise: experimental database and hybrid approaches
Dr. S. Moreau, Valeo Thermal Systems, France
- 10:45 Airfoil noise: hybrid approaches (Continued)
Ir. J. Christophe, VKI, Belgium
- 14:00 Airfoil noise: direct simulation approaches
Dr. R.D. Sandberg
- 15:45 Visit of the VKI laboratories

THURSDAY MARCH 12

- 09:00 Airframe noise
Dr. Y. Guo, Boeing Company, USA
- 10:45 Airframe noise (Continued)
Dr. Y. Guo
- 14:00 Cavity noise
Prof. X. Gloerfelt, Ecole Nationale Supérieure d'Arts et Métiers, France
- 15:45 Noise from automotive components
Prof. X. Gloerfelt

FRIDAY MARCH 13

- 09:00 Prediction of broadband noise in internal flows
Dr. C. Schram, LMS International, Belgium
- 10:45 Self-sustained oscillations of internal flows
Prof. A. Hirschberg, Technical University Eindhoven, The Netherlands
- 14:00 Synthesis and discussion
Prof. M. Roger and Prof. A. Hirschberg
- 15:30 Departure of VKI bus

PRACTICAL INFORMATION

Each lecture lasts for 75 minutes. Coffee breaks are organized between 10:15 and 10:45 (except Monday morning between 10:45 and 11:15) and between 15:15 and 15:45. Lunch is organized between 12:00 and 14:00 (except Monday between 12:30 and 14:00).

Please pass this announcement to someone who may be interested if you are unable to attend the Lecture Series yourself



VON KARMAN INSTITUTE
FOR FLUID DYNAMICS



- INTRODUCTION TO CFD
(12-16 JANUARY 2009)
- ADVANCES IN LAMINAR-TURBULENT TRANSITION
MODELING
(12-15 JANUARY 2009 - AT THE WRIGHT STATE UNIVERSITY, OHIO, USA)
- RECENT ADVANCES IN PARTICLE IMAGE VELOCIMETRY
(26-30 JANUARY 2009)
- MODELING AND COMPUTATION OF NANOPARTICLES IN
FLUID FLOWS (RTO-AVT-VKI)
(9-12 FEBRUARY 2009)
- FLOW CONTROL: FUNDAMENTALS, ADVANCES AND
APPLICATIONS
(2-6 MARCH 2009)
- AERODYNAMIC NOISE FROM WALL-BOUNDED FLOWS
(9-13 MARCH 2009)
- LIQUID FRAGMENTATION IN HIGH-SPEED FLOW
(16-18 MARCH 2009)
- NUMERICAL INVESTIGATIONS IN TURBOMACHINERY:
THE STATE OF THE ART
(20-24 APRIL 2009)
- HIGH PERFORMANCE COMPUTING OF INDUSTRIAL
FLOWS
(5-7 MAY 2009)
- ADVANCED HIGH TEMPERATURE INSTRUMENTATION
FOR GAS TURBINE APPLICATIONS
(11-14 MAY 2009)
- TURBULENT COMBUSTION
(25-29 MAY 2009)
- 36TH CFD.ADIGMA COURSE ON VERY HIGH ORDER
DISCRETIZATION METHODS
(JUNE 8-12, 2009)

OTHER CONFERENCES:

- PHYSMOD 2009: INTERNATIONAL WORKSHOP
ON PHYSICAL MODELLING OF FLOW AND DISPERSION
PHENOMENA
(24-26 AUGUST 2009)
- 4TH SYMPOSIUM ON INTEGRATION CFD AND
EXPERIMENTS IN AERODYNAMICS
(14-16 SEPTEMBER 2009)

COURSE FEE

The fee for the lecture series is 1300 euro, applicable to citizens of NATO countries contributing to the financing of the VKI (Belgium, Czech Republic, France, Germany, Hungary, Iceland, Italy, Luxemburg, Norway, Portugal, Spain and Turkey). For citizens of other NATO countries and of NATO partner countries, the fee is 1700 euro. For non-NATO citizens the fee is of 1850 euro. These prices include 21% VAT.

The fee includes printed notes, transport between VKI from and to the recommended hotels in the center of Brussels, lunches, beverages, and administrative costs.

FELLOWSHIPS

To encourage greater participation in our Lecture Series programme by university members, the Institute has established a limited number of VKI Lecture Series fellowships for citizens of NATO countries contributing to the financing of the VKI, as well as for citizens of other NATO countries coming from a university in a VKI financing country. The recipient of such fellowship is entitled to attend the Lecture Series at a reduced fee, which will be of 650 euro (VAT included) for assistants not having a Ph.D. degree and for Ph.D. candidates, or 300 euro (VAT included) for undergraduate students. The request to be considered for an award must accompany the application to attend the Lecture Series, and the applicant must provide a recommendation letter from his or her professor; if not done so, the request will not be taken into consideration. All possible alternative sources of funding should be investigated before aid is requested under this scheme, so that those most in need will benefit.

METHODS OF PAYMENT

Payment 2 weeks prior to the beginning of the course (name and course title clearly indicated) by bank transfer to our account Nr 210-0315330-35 at Fortis Bank, avenue de la Forêt de Soignes 322, 1640 Rhode-Saint-Genèse, Belgium, IBAN BE57 2100 3153 3035 (strongly recommended). SWIFT BIC GEBABEBB.

Late registration can be paid in cash (EURO), or by VISA or Eurocard at the beginning of the course.

PROCEEDINGS

Lectures will be given in English and printed notes will be distributed during registration. Proceedings of other non-RTO lecture series may be purchased at VKI (by e-mail: vanhaelen@vki.ac.be or by fax : 32 2 359 96 00). Information can be found on <http://www.vki.ac.be>.

HOW TO REGISTER

It is highly recommended that the registration/hotel reservation form is sent at the latest 15 days before the beginning of the course. A letter of acceptance and additional information will be sent on receipt of the application form.

ACCOMMODATION & TRANSPORT

Participants are advised to make their reservations as early as possible. VKI secretariat (secretariat@vki.ac.be) can book rooms upon request in the recommended hotels listed below. Daily rates include all charges and continental breakfast. These prices could be subject to changes. **However, participants could occasionally find special offers on hotel websites.**

Hôtel des Colonies
<http://www.hotel-des-colonies.com> Single: 120 € / Double: 140 €

Hôtel Vendôme
<http://www.hotel-vendome.be> see the website

Hôtel Marivaux
<http://www.marivaux.be> see the website

Thon Hotel Brussels City Centre
<http://www.thonhotels.be/> Single: 142 € / Double: 174 €

Hôtel Le Dôme
<http://www.hotel-le-dome.be> Single: 125 € / Double: 145 €

Progress Hôtel
<http://www.progresshotel.be> Single: 200 € / Double: 220 €

A youth hostel, the Sleepwell, is within walking distance of the recommended hotels. We invite you to make your own reservation through their website: <http://www.sleepwell.be>.

The hotels situated in Brussels are all within walking distance from the Place Rogier. A train service links the airport with the Gare du Midi. Complete your journey to the hotel/youth hostel by taxi. Each morning and evening, bus transport will be provided between the Place Rogier and the von Karman Institute, located in Rhode-Saint-Genèse, a suburb south of Brussels.

The following hotels are also recommended, particularly for those who travel by private car.

Auberge de Waterloo****
Chaussée de Waterloo 212 - 1640 Rhode-Saint-Genèse
Tel: +32 (0)2 358 35 80 - Fax: +32 (0)2 358 38 06
<http://www.aubergedewaterloo.be>
(1 single room: +/- 106€)

Gravenhof Hotel
Alsembergsesteenweg 616 - B-1653 Dworp
Tel: +32 2 380 44 99 - Fax: +32 2 380 40 60
<http://www.gravenhof.be>
(1 single room: +/- 105 €, breakfast not included)

For more information about the location of the Institute and the hotels, please visit our website on <http://www.vki.ac.be>.

HOTEL RESERVATION (if applicable)

I require accommodation at Hotel for person(s)
 Single: Double: Date of arrival:
 I shall require transport to and from the Institute
 I do not require transport to and from the Institute
 Please indicate any special needs (e.g. vegetarian, ...):

Date: Signature:

Mr Mrs
 Family name:
 Name & full address of organisation, institution or university:
 Phone nr:
 Position or title:
 Asking a reduced fee and joining a recommendation letter as: undergraduate student Ph.D. candidate or University assistant
 Company / University VAT number:
 VAT of the von Karman Institute: BE 0407 185 709
 Firstname:
 Fax nr:
 E-mail:
 Nationality:

Lecture Series Title: AERODYNAMIC NOISE FROM WALL-BOUNDED FLOWS