Programme

LECTURE SERIES
2013-2014

VKI-LS

- ☐ INTRODUCTION TO MEASUREMENT TECHNIQUES
  October 7-11, 2013
- ☐ ADVANCED POST-PROCESSING OF EXPERIMENTAL AND NUMERICAL DATA
  November 4-8, 2013
- ☑ FLUID MECHANICS AND CHEMISTRY FOR SAFETY ISSUES IN HLM NUCLEAR REACTORS
  November 25-27, 2013
- ☐ 37TH ADVANCED VKI CFD LECTURE SERIES: RECENT DEVELOPMENTS IN HIGHER ORDER METHODS AND INDUSTRIAL APPLICATION IN AERONAUTICS
  December 9-12, 2013
- ☐ INTRODUCTION TO COMPUTATIONAL FLUID DYNAMICS
  January 20-24, 2014
- ☐ HYPERSONIC FLIGHT TESTING (VKI-STO-AVT-234)
  March 24-28, 2014
- ☐ INTRODUCTION TO OPTIMIZATION AND MULTIDISCIPLINARY DESIGN IN AERONAUTICS AND TURBOMACHINERY
  April 7-11, 2014
- ☐ LARGE EDDY SIMULATION
  May 5-9, 2014
- ☐ SPECTROSCOPY AND SPECTROSCOPIC MEASUREMENT TECHNIQUES FOR AEROSPACE FLOWS
  May 13-16, 2014
- ☐ SMALL AEROPLANE DESIGN
  May 20-22, 2014
- ☐ UNCERTAINTY QUANTIFICATION IN COMPUTATIONAL FLUID DYNAMICS (VKI-STO-AVT-235) AT STANFORD, CALIFORNIA
  May 26-27, 2014
- ☐ PROGRESS IN FLOW INSTABILITY ANALYSIS AND LAMINAR-TURBULENT TRANSITION MODELING
  June 2-6, 2014
- ☐ PHYSICS OF SLOSHING LIQUIDS: EXPERIMENTS AND MODELING
  September 1-5, 2014
- ☐ UNCERTAINTY QUANTIFICATION IN COMPUTATIONAL FLUID DYNAMICS (VKI-STO-AVT-235)
  September 22-26, 2014

VON KARMAN INSTITUTE

VKI is a non-profit international educational and scientific organisation, hosting three departments (aeronautics and aerospace, environmental and applied fluid dynamics, and turbomachinery & propulsion).

It provides post-graduate education in fluid dynamics (research master in fluid dynamics, former "VKI Diploma Course", doctoral program, short training program and lecture series) and encourages "training in research through research". The von Karman Institute undertakes and promotes research in the field of fluid dynamics.

It possesses about fifty different wind tunnels, turbomachinery and other specialized test facilities, some of which are unique or the largest in the world. Extensive research on experimental, computational and theoretical aspects of gas and liquid flows is carried out at the VKI under the direction of the faculty and research engineers, sponsored mainly by governmental and international agencies as well as industries.

The von Karman Institute organizes each year about 12 one-week Lecture Series on specialized topics in the field of aerodynamics, fluid mechanics and heat transfer with application to aeronautics, space, turbomachinery, the environment and industrial fluid dynamics. These courses have gained over the years world wide recognition for their high quality, which is the result of a careful choice of subjects of current interest and lecturers known for their excellency and willing to co-operate in building up well-structured courses.

von Karman Institute for Fluid Dynamics
Waterloosesteenweg 72
1640 Sint-Genesius-Rode, Belgium

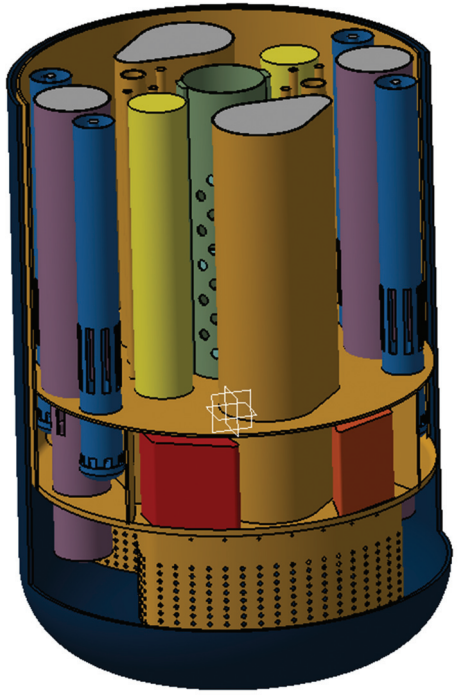
Phone: +32(0)2 359 96 04, Fax: +32(0)2 359 96 00
E-mail: secretariat@vki.ac.be, Website:
https://www.vki.ac.be, TVA BE 0407 185 709

follow us on twitter

twitter.com/vki_vonkarman

von KARMAN INSTITUTE
FOR FLUID DYNAMICS

FLUID MECHANICS AND CHEMISTRY FOR SAFETY ISSUES IN HLM NUCLEAR REACTORS



November 25-27, 2013

SEVENTH FRAMEWORK PROGRAMME

INTRODUCTION

VON KARMAN INSTITUTE
FOR FLUID DYNAMICS

The objective of the Lecture Series is to provide a state-of-the art review of the current knowledge and future challenges in Fluid Mechanics, Chemistry and Safety for Heavy Liquid Metal Nuclear Reactors. The Lecture Series will provide general lessons on these three different topics as well as more specialized lectures related to current research activities in the field of HLM reactors.

The Course will start with the presentation of a future HLM reactor, the Myrrha reactor and will then be followed by a description of the challenges in chemistry from a theoretical and experimental viewpoint. The second day will be devoted to thermal-hydraulics challenges of HLM reactors both from modeling, numerical (CFD), and experimental point of view. Demonstration on two VKI test benches will be organized at the end of the day. Finally, the course will review the different challenges in safety and provide more insights in some typical safety related problems. The Lecture Series is intended to provide enough introductory material to welcome novices in the field but also advanced information for expert researchers.

This Lecture Series is organized in the framework of the SEARCH and MAXSIMA Collaborative Project from the European Union Seventh Framework (FP7) program. Most of the lecturers are scientists actively involved in one of these research projects. It is a unique opportunity to bring experts in these fields and raise fruitful discussions.

The lecture series directors are Prof. Jean-Marie Buchlin and Mr. Philippe Planquart from the von Karman Institute for Fluid Dynamics.

SCHEDULE

MONDAY 25 November 2013

09:00 Welcome address by VKI
09:15 Introduction to MYRRHA reactor
M. Schyns, SCK-CEN, , Belgium
10:15 Coffee break
10.30 Challenges in chemistry in HLM reactors
J. Van den Bosch, SCK-CEN, Belgium
11:30 Fuel liquid interaction
T. Retegan, Chalmers, Sweden
12:30 Lunch
14:00 Release and capture of radioisotopes
J. Neuhausen, PSI, Switzerland
15:00 Coffee break
15:30 Challenges in thermal hydraulics for liquid metal cooled reactors
D. Tenchine, CEA, France
16.30 Welcome reception

TUESDAY 26 November 2013

08:30 Application of CFD approaches to the simulation of LMFR fuel bundles and the reactor pool
F. Roelofs, NRG, The Netherlands
09:30 Mixing and stratification (System code) + Simmer
G. Bandini[1] & N. Forgione[2], [1]ENEA, [2]UNIPI, Italy
10:30 Coffee break
11:00 Towards a full 3D CFD simulation of a HLM reactor
V. Moreau, CRS4, Italy
12:00 Lunch
13:30 Turbulence modeling at Low Prandtl number
Y. Bartosiewicz, UCL, Belgium
14:30 Validation of thermal hydraulic codes for liquid metal cooled reactors
D. Tenchine, CEA, France
15:30 Coffee break
16:00 Water modeling of a HLM reactor
P. Planquart, VKI, Belgium
16:30 Lab visit (water model+ sloshing)

WEDNESDAY 27 November 2013

09:00 Sloshing phenomena - experimental and numerical study
K. Myrillas, VKI, Belgium
10:00 Safety issues
B. Arien, SCK-CEN, Belgium
11:00 Coffee break
11:30 SGTR problems
M. Tarantino, ENEA, Italy
12:30 Lunch
14:00 Integral and reduced order modeling for the simulation of fuel bundles and the reactor pool
A. Class, KIT, Germany
15:00 Fuel bundle experiments
I. Di Piazza, ENEA, Italy
16:00 End of Lecture Series – final coffee

ONLINE REGISTRATION AVAILABLE

https://www.vki.ac.be/registration

It is highly recommended that the registration 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.

COURSE FEE (3 days)

The Lecture Series is free of charge for the members of SEARCH and MAXSIMA research projects.

Thanks to the European FP7 SEARCH project, the registration fee is reduced to **500 €** per participant (VAT included).

For undergraduate student, the fee is 225 € (VAT included). 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.

REDUCTION

-50% for the 3rd & 4th, ... participant in the same company.

The fee includes printed notes, lunches, beverages, and administrative costs.