Programme

ONLINE REGISTRATION AVAILABLE
https://www.vki.ac.be/registration

It is highly recommended to send 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.

EARLY REGISTRATION FEE (until 2/04/14)

VAT included	Type 1 (€)	Type 2 (€)	Type 3 (€)
Normal Fee	945	1235	1345
PhD Cand. Fee **	475	475	675
Undergraduate Student Fee **	210	210	280

COURSE FEE (4 days + 1 free session)

VAT included	Type 1 (€)	Type 2 (€)	Type 3 (€)
Normal Fee	1350	1760	1920
PhD Cand. Fee **	675	675	960
Undergraduate Student Fee **	300	300	400

Type 1: Permanents residents of NATO countries funding VKI: Belgium, Czech Rep., France, Germany, Hungary, Iceland, Italy, Luxemburg, Norway, Portugal, Spain and Turkey
Type2: Permanents residents of NATO countries not funding VKI or NATO partners countries
Type 3: Permanents residents of non-NATO countries
** 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.
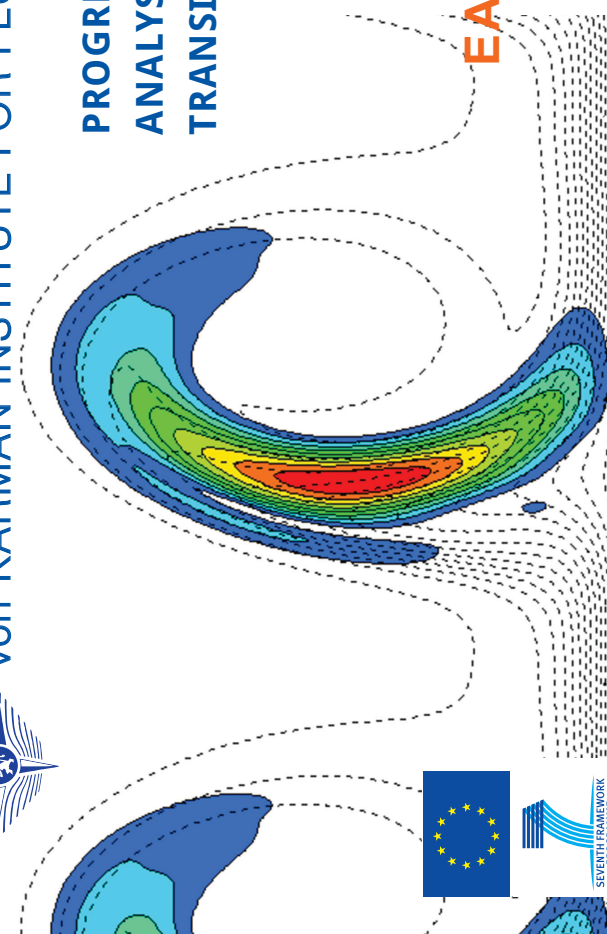
von KARMAN INSTITUTE FOR FLUID DYNAMICS

PROGRESS IN FLOW INSTABILITY ANALYSIS AND LAMINAR-TURBULENT TRANSITION MODELING

June 2-6, 2014

NEW!
**EARLY REGISTRATION 30% REDUCTION**

INTRODUCTION

Flow instability analysis plays an active role in the identification and explanation of some of the most challenging topics of fluid mechanics. Many applications, such as a heat shield design for re-entry vehicles, control surface effectiveness, air vehicles drag, heat transfer prediction in turbine blades, or even cavity unsteadiness, detached flows, buffet or aeroacoustics, just to name a few, would benefit from a detailed analysis of flow stability.

On the other side, the availability of greater computational power and improvement of measurement techniques provided in the past years more and more information on the unstable phenomena that show up at different flow regimes. These activities enabled many theoretical advances in the study of instability, empowering a significant extension of this kind of analyses to more complex flows.

In this regard the course will cover several aspects of the stability theory dealing with different phenomena and scenarios. Lectures will range from traditional linear stability method to parabolized stability equations and global stability. Moreover they will address compressible and incompressible flows stability in laminar and turbulent regimes, describing theoretical foundations, numerical methods and applications.

The directors of this VKI Lecture Series are Prof. Eusebio Valero from Universidad Politécnica de Madrid and Dr. Fabio Pinna from the von Karman Institute for Fluid Dynamics.

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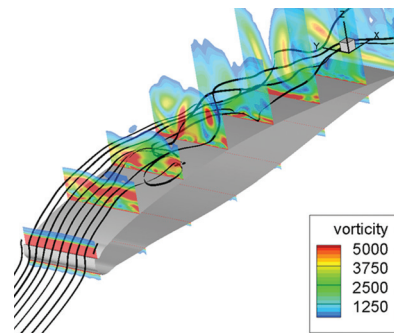
VON KARMAN INSTITUTE

VKI is a non-profit international educational and scientific organisation, hosting 3 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.

PROGRAM SCHEDULE

MONDAY 2 June 2014 - Introduction and fundamental mathematics

8:30	Welcome
9:00	Path to transition and introduction to stability problems
	W. Saric, Texas A&M University, USA
10:30	Coffee break
11:00	Linear Stability Theory
	S. Ozgen, Middle East Technical University, Turkey
12:30	Lunch
14:00	Parabolized stability equations
	H. Reed, Texas A&M University, USA
15:30	Coffee break
15:45	Stability of boundary layer flows at different regimes
	F. Pinna, von Karman Institute, Belgium
17:00	Welcome drink

TUESDAY 3 June 2014 - More advanced mathematics. Application to physics

9:00	Non modal stability
	D.S. Henningson, KTH, Sweden
10:30	Coffee Break
11:00	Non modal global stability
	D.S. Henningson
12:30	Lunch

14:00	Sensitivity and receptivity
	W. Saric/H. Reed
15:30	Coffee break
15:45	Stability of hypersonic flow and BL
	H. Reed

WEDNESDAY 4 June 2014 - Numerical and experimental methods

9:00	Experimental techniques I
	W. Saric
10:30	Coffee break
11:00	Experimental techniques II
	W. Saric
12:30	Lunch
14:00	Numerical methods (stability)
	E. Valero, Polytechnic University of Madrid, Spain
15:30	Coffee break
15:45	Numerical methods (DNS/LES)
	E. Valero

THURSDAY 5 June 2014 - More complex applications

9:00	Global linear instability - Theory and Implementation
	V. Theofilis, Polytechnic University of Madrid, Spain
10:30	Coffee break
11:00	Global linear instability - Applications
	V. Theofilis

12:30	Lunch
14:00	Separated boundary layer transition
	O. Marxen, Imperial College London, UK
15:30	Coffee break
15:45	Comparison of stability of compressible and incompressible flows
	O. Marxen

FRIDAY 6 June 2014 - EU FP7 project ANADE

FREE REGISTRATION FOR THE SPECIAL SESSION ONLY

8:45	Some applications of linear and nonlinear instability analysis at DLR Göttingen
	S. Hein, DLR Göttingen, Germany
9:45	Application of receptivity and sensitivity analysis to thermoacoustic instability
	M. Juniper & L. Magri
10:45	Coffee break
11:15	Linear stability analysis applied to a counter-rotating vortex aircraft wake model
	L. Gonzalez
12:15	Lunch
14:15	Applications of linear stability theory to complex geometries by means of high-order methods
	G. Rocco and C. Cantwell
15:15	Coffee break