

AERONAUTICS AND AEROSPACE DEPARTMENT

A wide spectrum of facilities and computational tools covers the flow range from the low-speed regime of commercial aircrafts to the supersonic and hypersonic regime of atmospheric space entry. The department focuses in particular on the modeling, simulation and experimental validation of atmospheric entry flows and thermal protection systems (TPS), including transition to turbulence and stability. The experimental studies are carried out in its top level Mach 14, Mach 6 and Induction Coupled Plasma windtunnels, for which dedicated measurement techniques have been developed e.g. involving spectroscopic laser techniques. On the computational simulation side the department has developed an extendable software platform (COOLFluid) for high performance computational flow simulation which incorporates the research on numerical algorithms, advanced physico-chemical and plasma models as well as fluid-structure interaction and conjugate heat transfer.

TURBOMACHINERY AND PROPULSION DEPARTMENT

The Turbomachinery and Propulsion department specializes in the aero-thermal aspects of turbomachinery components for aero-engines and industrial gas turbines, space propulsion units, steam turbines and process industry compressors and pumps. It has accumulated wide skills in high speed wind tunnel testing and related measurement techniques development and application. The department has acquired a world recognised expertise on steady/unsteady aerodynamic and aero/thermal aspects of high pressure, including cooling, and low pressure turbomachinery components through the design, development and use of a number of unique wind tunnels.

On the computational side, the department has over 20 years of experience in the analysis of flow in turbomachines, and in the design techniques and multi-disciplinary optimization methods or their components.

ENVIRONMENTAL AND APPLIED FLUID DYNAMICS DEPARTMENT

The Environmental and Applied Fluid Dynamics department covers all kinds of activities complementary to the other two departments related to fluid dynamics in the academic and industrial world. It has a large expertise in the study of aerodynamics, multiphase flows, vehicle aerodynamics, biological flows and environmental flows (including the study of interaction between atmospheric wind and human activities). The department is also involved in the modeling of turbulence and in the development of advanced measurement techniques for fluid dynamics.

The department has acquired a unique expertise in the study of fluid dynamics in industrial processes, with the development and construction of experimental facilities dedicated to the study of industrial processes and also in the simulation of industrial flows using CFD (Computational Fluid Dynamics) codes.



VON KARMAN INSTITUTE FOR FLUID DYNAMICS

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ACADEMIC PROGRAMMES

RESEARCH MASTER IN FLUID DYNAMICS

PHD PROGRAMME

STAGIAIRE PROGRAMME

FINAL YEAR PROJECT

APPLIED RESEARCH PROGRAMMES

VON KARMAN
INSTITUTE
FOR
FLUID
DYNAMICS

RESEARCH MASTER IN FLUID DYNAMICS (Diploma Course)

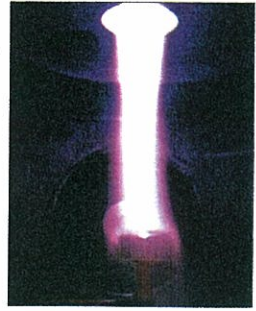
nine months, master-after-master level



The main programme offered by the Institute is the yearly course at the level "master-after-master" (former VKI Diploma Course), taking place from October until June. Specializations in aeronautics and aerospace, turbomachinery and propulsion, environmental and applied fluid dynamics are proposed.

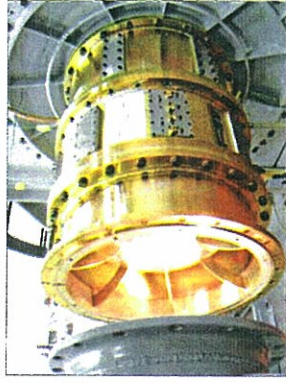
Approximately thirty-five engineers and scientists drawn from ten or more countries attend this programme taking place in a unique international team spirit. They are offered a wide selection of specialized courses on various aspects of fluid dynamics and are given the opportunity to perform personal research projects under close guidance by members of the faculty.

The projects may be experimental, theoretical, or numerical in nature. Thus the VKI research master in fluid dynamics, focusing on teaching research by doing research, complements, rather than duplicates, the teaching programmes of universities.



STAGIAIRE PROGRAMME

two or three months, university students

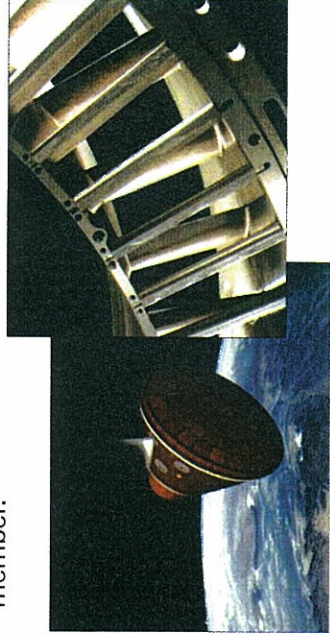


Qualified undergraduate students from universities may become acquainted with the work of the fluid dynamicist through participation in a research project at the VKI. The duration of the programme is typically two to three months.

FINAL YEAR PROJECT

university students

University students enrolled in an engineering, industrial engineering or physics B.S. or M.S. programme may carry out their final year project at a laboratory of the von Karman Institute under the supervision of a VKI faculty member.



PHD PROGRAMME

continuation of research master



Candidates typically enter this programme after completing the research master in fluid dynamics. The thesis may be presented in English, French or Dutch at any Belgian universities to obtain a degree of doctor in applied sciences or at a university abroad. Presently, about 40 candidates are enrolled in the doctoral programme.

The benefits for the PhD candidate are considerable, allowing to perform research based on the outstanding facilities and unique experience available at the VKI and to work in an international top level environment with colleagues from all over Europe.

APPLIED RESEARCH PROGRAMMES

continuation of research master

Graduates of the research master may be further instructed in the methodology of applied fluid dynamics and the practice of independent research for periods from some months to one year (ARO programme).

Post-doctoral research is performed in the advanced-level applied research programme (AAR programme).