



AERONAUTICS AND AEROSPACE DEPARTMENT

A wide spectrum of facilities and computational tools covers the flow range from the low-speed regime of commercial aircraft to the supersonic and hypersonic regime of atmospheric space entry. The department focuses in particular on the modelling, simulation and experimental validation of atmospheric entry flows and thermal protection systems, including transition to turbulence and stability. The experimental studies are carried out in its world-class Mach 14, Mach 6 and Inductively Coupled Plasma windtunnels, for which dedicated measurement techniques have been developed, e.g. involving spectroscopic laser techniques. Recently the department initiated a strong activity on small satellite developments and launching (CubeSat Programme QB50). On the computational 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 wind tunnel testing over a wide range of Mach and Reynolds numbers 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.

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



ENVIRONMENTAL AND APPLIED FLUID DYNAMICS DEPARTMENT

The Environmental and Applied Fluid Dynamics department studies and teaches fluid dynamic aspects of environmental and industrial processes. Research themes are aeroacoustics, multiphase flows, wind technology, and bluff-body aerodynamics. The department has 40 years of expertise in experimental fluid dynamics at full-scale and model-scale, including the design, construction and testing of dedicated experimental facilities, and the development of traditional and advanced, laser-based and acoustic measurement techniques. Since 20 years, numerical modeling is performed using CFD (Computational Fluid Dynamics), and includes the development of turbulence models. Current research activities are nano-particle flows, pollutant dispersion, wind energy, pedestrian wind comfort, wind loading on structures, acoustics of turbines, heat and mass transfer of industrial processes, and bubble and spray dynamics.



VON KARMAN INSTITUTE FOR FLUID DYNAMICS

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ACADEMIC PROGRAMMES



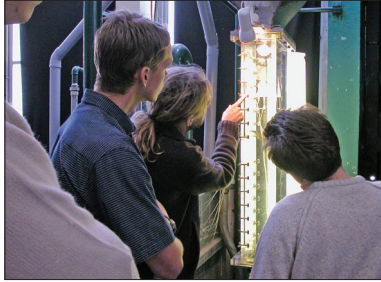
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RESEARCH MASTER IN FLUID DYNAMICS (minimum 60 ECTS)

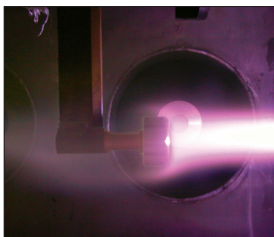
nine months, Master after Master level



The main programme offered by the von Karman Institute is the annual Research Master at the level "Master after Master", taking place from October until June. The programme is officially accredited in the frame of the European Bologna agreement for higher education. Options are provided in aeronautics and aerospace, turbomachinery and propulsion, environmental and applied fluid dynamics.

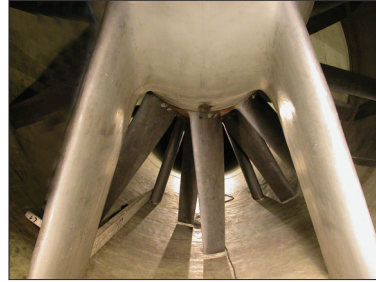
Approximately thirty-five engineers and scientists from ten or more countries attend this programme taking place in a unique international team spirit environment. They are offered a wide selection of specialized courses (min. 30 ECTS) on various aspects of fluid dynamics and are given the opportunity to perform a personal research project (30 ECTS) under close guidance by members of the faculty. The projects may be experimental, theoretical, or numerical in nature.

The VKI research master in fluid dynamics, focusing on teaching research by doing research, complements the master programmes of universities with a profound research oriented specialization.



SHORT TRAINING PROGRAMME

two or three months, university students

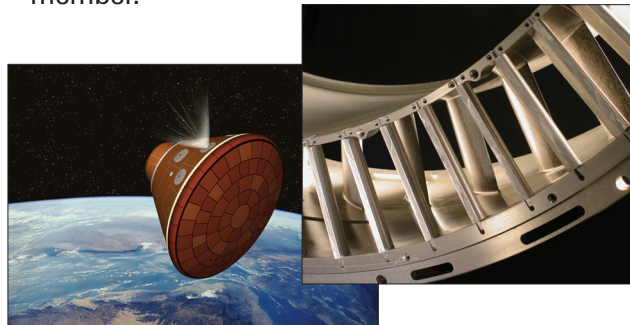


Qualified undergraduate students from universities may become acquainted with the work of the fluid dynamicist through participation in a research project at the VKI. The duration of the programme is typically two to three months.

MASTER THESIS PROGRAMME

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 PhD thesis may be presented in English, French or Dutch at any Belgian university or at a university abroad leading to a degree of doctor in applied sciences. Presently, about 60 candidates are enrolled in the doctoral programme.

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

APPLIED RESEARCH PROGRAMME

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).

POSTDOC PROGRAMME

continuation of PhD

The post-doctoral research programme allows selected top level researchers to pursue their research after the PhD, taking profit of the unique research facilities of VKI.