FULL-TIME ACADEMIC POSITION IN AERONAUTICAL ENGINEERING (M/F)

BRUSSELS SCHOOL OF ENGINEERING

Reference: 2022/A014
Application deadline: 10/01/2022
Start date: 01/10/2022

Job description

The School of Engineering (EPB) of the Université Libre de Bruxelles (ULB) offers a full-time academic position in Aeronautical Engineering.

1. Context

Access to space demand and related projects coupled with detailed understanding of fluid dynamics, with among others high speed (reacting) flows, require a deep know-how in all fields of fluid flows. More specifically, this research and education domain is currently strongly linked with numerical flow simulations in the field of Computational Fluid Dynamics (CFD) with a need for experimentally validated models. This context raises new development challenges, calling for cutting-edge research in the field of aeronautical engineering.

The successful applicant (M/F) will develop research and education in the domain of aeronautical engineering, in the widest sense. They will be part of a research team, already active in the experimental and numerical characterization of renewable fuels combustion and aircraft propulsion.

2. Area of Research

High-speed flows (supersonic and hypersonic) are present in aircraft, rockets, descending vehicles and in various components such as combustion chambers and exhaust nozzles or intakes, and in many other applications. They are characterized by complex flow phenomena such as large gradients of gas parameters, shock waves, expansion waves, boundary layer interactions, gas dynamic instabilities, extremely high heat fluxes, etc.

Research activities aiming at the development of novel numerical tools in the field of CFD and high-speed flows, coupled with experimental techniques and experimental validation strategies and deep theoretical know-how in the field of boundary layers, turbulence, vortex structures and reacting flows applied to aeronautical and aerospace engineering are expected.

Research areas of interest include, but are not limited to:

- CFD simulation tools
- Experimental model development
- Data assimilation and machine-learning applied to aeronautical engineering
- Flows with or without combustion (particularly in hypersonic conditions)
- Shock wave boundary layer interactions
- Complex flow structures in supersonic exhaust flows
- Vortices and vortex structures in high speed (BL) flows.

The successful applicant will benefit from existing research and experimental equipment of the Aero-Thermo-Mechanics Department ("ATM") of ULB but will also work in close collaboration with the professors, PhD students, researchers and labs of the von Karman Institute for Fluid Dynamics ("VKI") located at 10 km from the ATM Department. The development of this close collaboration will be a key point in the evaluation of the candidates as the career of the candidate is intended to be largely enriched by this coupled expertise between both research teams and labs. The candidate will also be part of the joint research group BRITE (Brussels Institute for Thermal-fluid systems and clean Energy) involving the ATM department of ULB and the mechanical engineering department of ULB sister university, VUB.

3. Educational and scientific goals

The successful applicant is expected to have demonstrated a strong research interest, and to have developed expertise in the field of high-speed flows (non-reacting, reacting or with combustion). The applicant will develop research in the domain of aeronautical engineering within the ATM Department, leading to a scientific output of international level. The successful applicant is expected to initiate their own research programs leading to the development of a research team within ATM, in close collaboration with the von Karman Institute for Fluid Dynamics, consolidating and feeding a long-standing collaboration between the two institutions.

Collaborations with other faculty members of the ATM department and of the Brussels School of Engineering (Ecole polytechnique de Bruxelles), leading to joint research initiatives, will be expected. In particular, teamwork with colleagues in the fields of aircraft propulsion, hybrid rocket engines, innovative combustion techniques, hydrogen combustion, flameless combustion, CFD codes and tools, turbulence modeling, optimization techniques in flow numerical simulations, wind turbine and wind farms flow simulations can be considered.

The applicant will be invited to apply for grants from regional, national and international levels enabling to develop their research, with the help of the ULB Research Department (TTO). Any proven experience regarding project definition and grant writing will be considered as an asset. A background in managing research projects with other research institutions as well as with industry would also be an asset. Industrial collaboration will be triggered and favored from the start of the career at ULB-ATM.

The teaching responsibilities of the prospective candidate will encompass various types of activities, including lectures, tutorials and project-based learning at the Bachelor and Master level in the Brussels School of Engineering (Ecole polytechnique de Bruxelles). Proven teaching skills with experience in teaching in English and in French will be considered as an asset.

The successful applicant will be involved in academic related support activities, among which an involvement in the academic management at the level of the course program, Department, Faculty or University, and a contribution to Community / Societal service and student recruitment activities of the School.

4. Teaching workload

In the first 3 years, the appointed academic will take the responsibility of the following existing courses of the BSc and BRUFACE MSc programs in Electro-Mechanical Engineering:

- MECA-H-305 - Fluid Mechanics II - 5 ECTS (followed by the BA3 students of the option Electro-Mechanical Engineering, in English)
- MECA-H-402 - Aerodynamics (followed by MA1 students in Electro-Mechanical Engineering in the BRUFACE program, in English)
- MECA-H-407 - Numerical Methods in Aero-Thermo-Dynamics (CFD1) - 5 ECTS (followed by MA1 students in Electro-Mechanical Engineering in the BRUFACE program, in English)
- Supervision of MA1 projects (5 ECTS) proposed by the applicant (done by MA1 students in Electro-Mechanical Engineering, in English)
- Supervision of Master’s Theses (24 ECTS) proposed by the applicant (done by MA2 students in Electro-Mechanical Engineering, in English)

Other courses as MECA-H-522 (CFD2) or ELEC-H-508 (Thermal Power Plants) might be added (in part-time) later on.

The candidate will also be asked to participate to additional teaching activities such as labs or student projects at the BSc level and MA2 internships in industry or research centers in Belgium or abroad.

The teaching workload may evolve gradually.

Qualifications required

PhD Degree (with doctoral thesis) in Engineering.

Skills required

- Applicants should have at least 4 complete years of research experience at the time of the recruitment.
- A post-doctoral experience and an excellent scientific record relative to seniority are a plus.
- Exchange periods outside of the applicants’ home institution (during or after their PhD) will be taken into consideration when evaluating the applications.
- Ability to develop experimental research activities will be considered as an asset.
- Applicants who do not speak French (level C1) may be granted a period of adaptation, but they must be able to teach in French at the end of the 3rd year following their appointment.
- Level C1 in English is expected. Candidates must be capable of teaching in English at the time of their appointment.

Interested?

For more information, please contact Prof. Patrick Hendrick (phone: +32 478 54 96 06 – E-mail: patrick.hendrick@ulb.be).

Applications must be sent by e-mail to the rectorate of the Université Libre de Bruxelles (rectrice@ulb.be) and to the faculty deanship (le-doyen-polytech@ulb.be).

They must include the following:

- an application letter;
- a Curriculum vitae including a list of publications: if you want you can complete a standard form via our website at https://www.ulb.be/fr/documents-officiels/completer-votre-cv-en-ligne. Once completed, it must be downloaded and attached to the application file.
- a 7,000-character report (4 pages) presenting the applicant’s research activities and a research project, including how these will integrate into ULB’s research teams;
- a teaching dossier including a 7,000-character report (4 pages) on the applicant’s previous teaching activities and a teaching project for the first five years in this position; these must be relevant to the faculty and to the teaching profiles for the programmes to which the applicant is to contribute;
- a note on the applicant’s international achievements and projects (no more than 4 pages);
- the names and e-mail addresses of five referees (respecting the gender balance) who may be contacted by those in charge of evaluating applications. These referees should not have conflicts of interest because of family or emotional ties.
The appointment to the academic staff of ULB is made at “Chargé de cours” level. As of their appointment, members of academic staff are authorised to use the honorary title of “Professeur”.

Equal opportunities policy

ULB’s personnel management policy is geared towards diversity and equal opportunities.

We recruit candidates on the basis of their skills, irrespective of age, gender, sexual orientation, origin, nationality, beliefs, disability, etc.

Would you like to be provided with reasonable accommodation in the selection procedure because of a disability, disorder, or illness? Please contact Marie Botty, the person in charge of diversity aspects for the academic and scientific staff (marie.botty@ulb.be). Be assured of the confidentiality of this information.


The Brussels School of Engineering is active member of the European project CALIPER, aiming at gender equality in STEM disciplines (Science, Technology, Engineering and Mathematics). As such, the faculty implements a Gender Equality Plan to boost female researcher’s role in STEM field. Both genders will be represented in the selection committee.

You will find all the regulations relating to academic careers on our site at: http://www.ulb.ac.be/emploi/academique.html.