UMONS
Université de Mons

WE ARE HIRING

A FULL-TIME FACULTY POSITION IN ENERGY ELECTRONICS

Faculty of Engineering

The University of Mons (UMONS) announces the vacancy of a **full-time faculty position (1 FTE) at associate professor level** in the field in Engineering Sciences and technology, with a **specialized focus on Energy Electronics**. The position is to be filled from March 1, 2022, within the Electrical Power Engineering Unit of the Faculty of Engineering. It is part of an academic chair in collaboration with the "Cyber Physical System in Energy conversion and Transportation" CPSET innovation platform, a consortium of companies and research centers. The incumbent will be appointed for an initial fixed term of three years, possibly renewable for a period of two years.

Missions

Research

The position holder will develop new research activities in the field of Energy Electronics. S/He will have to interact strongly with the consortium members of the CPSET platform and the existing departments of UMONS involved with the themes covered by Energy Electronics. Depending on the needs, s/he will be asked to stimulate and coordinate multidisciplinary approaches with the research teams in place. The person hired will actively seek funding from private sector and public agencies at regional, national and European levels, participating to collaborative projects. S/he will have achieved well-recognized scientific excellence in previous research in the field of Energy Electronics (although without covering all aspects as that the theme is relatively broad). Confirmed expertise in one or more of the following fields (non-exhaustive list) is preferred:

- Power converter architectures and design
- Active devices and passive components (including their intrinsic reliability)
- Reliability of power electronic converter systems
- Control and modulation of power electronic converters
- Thermal management of power electronic systems
- Electromagnetic compatibility
- Acoustic noise control in power electronic systems
- Electrical energy storage

Knowledge of industrial applications in the field of railway transportation and/or in the space sector would be a plus.

Teaching

The applicant will be entrusted with developing teaching activities in the field of Energy Electronics, setting up links between the various underlying themes in the field. S/He will have to actively participate in teaching activities at master's and continuing education levels. These activities, mainly in English, will take place both in Mons and Charleroi. S/he will also have to support the development of the existing Joint Certificate in Energy Electronics (particularly in an international perspective) and participate to complementary training programs according to the identified needs

Job functions

- Actively seek funding and facilitate research programs;
- Ensure teaching missions (courses, seminars, industrial visits) both in master's degree and as part of continuing education;
- Propose/contribute to student's projects (internships, first year master's projects and master's degree final projects);
- Supervise doctoral theses;
- Steer the activities of the academic chair in Energy Electronics.

Suitable qualifications

The applicant will hold a doctoral degree in Engineering Sciences in the relevant field. S/He will have to:

- Prove significant experience outside her/his home institution (extended research stay abroad);
- Prove well-recognized scientific excellence supported by international publications in peer-reviewed journals;
- Demonstrate experience and skills in university level teaching (if possible, supported by formal assessments);
- Have the qualifications to conduct high-level scientific research in a multidisciplinary environment (ability to raise research funding, carry out projects, lead and manage a research team)
- Be an order and conscientious person; able to communicate easily in English (written and spoken). A minimum command of the French language (oral understanding) is a plus.

More specifically, since this position falls within the context of an academic chair in collaboration with the CPSET innovation platform, the incumbent is expected to develop partnerships with industry in the field of Energy Electronics. S/He will also propose specific training programs adapted to the needs of the industry partners and support the organization of scientific events for experts and non-experts (industrials, academics, researchers and students) in the research areas of the partnership.

Practical information

Applications must be sent by registered letter with acknowledgment of receipt to the Rector of the University of Mons, at Place du Parc, 20, B-7000 Mons (Belgium), as well as by email to secretariat.ca@umons.ac.be, within 30 days of publication of this job vacancy.

Applicants are invited to join a file, written in English or French, including the following:

- a motivation letter,
- a *curriculum vitae*,
- a full list of publications
- a research proposal plan in the field of Energy Electronics (maximum 5 pages),
- a pedagogical proposal with your vision of the teaching missions,
- a copy of the diplomas,
- a copy of your five most important publications,
- The names and contact details of two international experts.

Any additional information can be obtained from: Prof. Christine Renotte, Dean of the Faculty of Engineering (christine.renotte@umons.ac.be).

Selected candidates will be called for an interview which will include a lesson presentation and a discussion of their teaching and research plans.

The CPSET Platform

The UMONS University Chair in Energy Electronics is supported by the CPSET Platform founded in 2018 by industrial and research actors. Alstom is one of the founding members of this technological Platform.

CPSET
Cyber Physical System in Energy conversion & Transportation

The return on experience from multiple collaborations in different industrial domains such as aeronautics, railway, space and automotive industries has pushed some industrial and research actors in Wallonia to consider strengthening the sustainability of these collaborations through the creation of a new R&D ecosystem centered on Cyber-Physical Systems (CPS). It has been implemented as a shared and open Platform, supported by training tools dedicated to critical resources.

This initiative allows to federate skills and resources over the long term in a context of multi-partnerships involving research centers, universities, university colleges and industrial actors and capitalize on the results. The involvement of research centers in the management committee together with industrial members ensures that their research efforts meet the innovation needs of the industry. It also accelerates the complete maturity growth cycle from concepts towards industrial applications.

CPSET is a new, shared and open innovation Platform with the following objectives:

- Develop and integrate technological building blocks to be integrated into complex systems in domains interconnected in terms of innovation such as railway, automotive, space and aeronautics industries;
- Allow focusing R&D resources on generic themes in order to increase the innovation capacity and efficiency of the industry in these fields;
- Create a sustainable ecosystem mixing public and industrial research actors to master the technological assets and build up a critical mass of competencies, infrastructures, equipment and collocated technical resources;
- Facilitate the transfer of technologies and competencies into the industry through services and training;
- Dynamically involve SMEs and start-ups to allow them developing their technologies and getting access to an ecosystem connected to multiple markets;
- Contribute to the creation of a regional centre of excellence by supporting training programs adapted to the needs of the industry.

The CPSET Platform is structured around the following themes:

- Simulation of complex systems: digital modelling, simulation and virtual prototyping;

- Methods and tools for the development and validation of Cyber Physical Systems (CPS), new cybersecurity testing tools and processes;
- Electrical energy conversion, energy storage and production: power electronics, high efficiency architectures, new materials and components;
- Autonomous vehicles and automated driving;
- Asset management & Infrastructure Integrity: preventive / predictive maintenance;
- New architectures for complex systems: multicore processors, distributed systems.

CPSET currently includes the four founding industrial actors (Alstom, TAS-B Alenia Space, AISIN and Sonaca), two research centers (CETIC and CENAERO) and is supported by three competitiveness clusters (Mecatech, Logistics in Wallonia and Skywin). It is open to all willing to join this collaborative approach.

A Memorandum of Understanding was established and signed at the end of 2018 by the founding partners of the Platform.

CPSET supervises over time a set of collaborative R&D projects involving at least one of the two certified research centers and at least one industrial partner and addressing some of the generic themes defined above. Each project (single or multi-industry) supported by the Platform will systematically address a generic content which will then be further deployed by the Platform in all the targeted industrial domains.

This University Chair is part of a global strategy including structured partnerships between CPSET members and Universities.

The themes of this structured partnerships are defined in the table below.

Topics and Priority Themes

CPSET
Cyber Physical System in Energy conversion & Transportation

Topics	Power Conversion	Production & Storage	Complex Systems	Methods & Tools	Autonomous Vehicles	Asset Management
Energy Electronics	• Architecture of power converters • Semiconductors and components • Digital networks applied to power converters control and command • Electromagnetic Compatibility • Thermal engineering of power converters • Energy storage					
Embedded Critical Systems			• Development processes (cycle V / Agile) • Model-based System Engineering and tools • Hardware and Software reliability • Safety by design and demonstration • Applicable standards et Certification • Cybersecurity			
Mobility					• Autonomous Vehicles / Driving assistance • Intermodal mobility / Supervision • Connected passenger / Passenger Experience • Big data / Artificial Intelligence • Asset Management / Maintenance • Human factors / Legal aspects • New business models in	

The partnership with UMONS addresses the "Energy Electronics" theme.