

## Match of the vacancy within the Strategic Goals of the Department

### Global Strategic Goals of the Faculty of Engineering and Architecture at Ghent University

New members of the Professorial Staff (i.e. Assistant Professors, Associate Professors, Full Professors and Senior Full Professors) are expected to develop (research) activities aimed at engineering applications or architecture and to join, as far as is possible, existing research groups rather than to separately create (very) small new and isolated research groups.

The research activities within the Faculty of Engineering and Architecture are only partially realized by employees that are funded directly by the government (Professorial Staff, Assisting Academic Personnel, and Administrative & Technical Personnel) or through research funds provided by the university itself. Indeed, a considerable share of research activities within the Faculty of Engineering and Architecture is realized by researchers that are funded through external national/Flemish or international resources (e.g., FWO-Flanders/Research Foundation-Flanders, VLAIO-Flanders/Flanders Innovation & Entrepreneurship, EU, contract research in cooperation with companies). While the latter concerns external funding, the research activities are in fact managed by internal Professorial Staff members that succeed in acquiring external funding based on their expertise and experience.

If the Faculty of Engineering and Architecture wants to safeguard its competitive position (internationally and nationally), it will continuously have to succeed in acquiring the necessary external funding. It is therefore the Faculty's strategy to preferably create vacancies in domains in which chances are high that such external funding can be acquired. This aspect is explicitly considered during the appointment procedure of Professorial Staff members within the Faculty of Engineering and Architecture.

### Strategic Goals of the Department - match with the vacancy

The Department of Electromechanical, Systems and Metal Engineering has the ambition to offer solutions to societal challenges such as the ambitious climate goals, the electrification of mobility and machines, the transition to a circular economy, and the rise of artificial intelligence. Hereto the department strives to excellent research in three main themes: 'Dynamic systems', 'Sustainable energy', and 'Metals and metal structures'. The educational and scientific activities of Dynamical Systems and Control (DySC), one of the research groups of the department, focus on the theme Dynamic systems.

The academic staff of professors, post-doctoral and doctoral researchers of DySC built up a project portfolio of both fundamental research projects, and application-oriented projects targeting a wide range of industrial sectors such as electromechanical engineering and manufacturing industry.

The academic staff provides education to Bachelor (BSc) and Master (MSc) students in both engineering and engineering technology. Courses are related to system dynamics and control.

This vacancy concerns a full-time professorship with a mission of research, education and services. The **research** area is '**control of nonlinear electromechanical systems**' and will be directly linked to the activities of system analysis, stabilization and optimal trajectory planning.

The newly appointed professor will contribute to the development of innovative control architectures for nonlinear electromechanical systems.

The objective is to acquire high precision and low energy consumption under variable conditions using dedicated numerical tools. Research is needed towards the characterisation and stabilisation of nonlinear phenomena in need of planning and learning control.

The field of applications covers different types of machines, rotor dynamics, flexible manipulators and robotics.

It will be expected to acquire funds and initiate research activities that enrich the research portfolio of DySC.

This requirement involves fundamental work on development of control architectures, advanced dynamic optimization techniques (e.g. multiple shooting, energy based perturbation techniques). This will necessitate collaborations with (international) research groups having complementary expertise.

The newly appointed professor will **lecture** various course units in the disciplines of control engineering.

This teaching assignment will comprise courses for Bachelor students (language of instruction is Dutch) and Master students (language of instruction is English/Dutch) in the study programs 'Engineering' and 'Engineering Technology'. More specifically: process instrumentation, control theory and techniques.

Various teaching methods will be used, such as lectures, seminars, practical's, and (research) projects, wherein education innovation is of paramount importance. The exact courses will be identified in close consultation with the other professors of DySC, striving towards balanced and coherent teaching assignments.