

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 Information Technology (INTEC) provides high quality education from undergraduate to postgraduate level based on the excellence of its research. To excel internationally, research efforts focus on carefully chosen domains so as to achieve a critical density in each of them. An important aspect of INTEC's research strategy is to assure its relevance through a close cooperation with industrial partners, often in the framework of European Union projects and in close cooperation with imec. Another cornerstone of its education and research strategy is to instill entrepreneurship and to stimulate spin-off incubation in line with the technology transfer policies of Ghent University.

The part-time (10%) position in "HF-System on Chip" is intended to further strengthen the research potential of the IDLab research group Quest. The Quest (Quantum Mechanical & Electromagnetic Systems Modelling) Lab is performing fundamental and applied research on the modelling of state-of-the-art (nano)electronic devices and systems, which nowadays operate at very high frequencies and are often also extremely miniaturized. As developing high-performance models stands or falls with thorough validation and testing, a well-established software development and measurement environment supports Quest's activities. This environment consists of high-performance multiprocessor computation nodes and of characterization and test equipment including two anechoic chambers, several 4-port network analyzers, mmWave range extenders up to 170 GHz, signal analyzers, etc.

A major challenge in state-of-the-art design of systems-on-chip (SoCs) and systems-in-package (SiP) lies in getting the high-frequency (HF) signals of the die, through the package, and onto the printed circuit board. In this context, traditional circuit solvers, founded on Kirchhoff's laws, can no longer keep track, as they assume the modelled structures to be electrically small; an assumption that becomes increasingly invalid according to the International Roadmap for Devices and Systems (IRDS™). As the design of novel HF SoCs and SiPs critically depends on the accurate electromagnetic (EM) modelling of their interconnects and packages, only full-wave approaches – directly solving Maxwell's equations – suffice, as these account for all pertinent EM phenomena such as the skin-effect, proximity-effect, slow-wave effect, etc. For this purpose, new full-wave solvers that handle the complex geometries, materials and EM phenomena encountered in the packages and interconnect structures pertaining to HF SoCs and SiPs have to be constructed.

There is a need for a part-time (10%) staff member for research and education in this domain. The staff member should show a broad theoretical knowledge and experience with applications in the domain of EM modelling of advanced interconnect and packaging structures in HF systems on chip. This new staff member has to work in close cooperation with the IDLab Quest lab. A successful candidate should demonstrate international recognition and high-quality international collaboration. It is also crucial that the staff member can attract and lead research projects, and give guidance to doctoral and master students. In view of the global challenges on sustainability, a research vision in line with the SDGs is a definite asset. Good knowledge of English is important for establishing new contacts in a rapidly changing international context. Besides excellent research skills, the new staff member should also possess the necessary didactic, organizational and communicative skills for teaching at an academic level in the domain of EM modelling and design of HF systems, interconnects and packages.