

## **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 (50%) position in "Secure and Scalable Software Systems" is intended to further strengthen the research potential of the IDLab research group. The IDLab group is performing fundamental and applied research on the different aspects related to Internet Technology and Data Science, specifically focusing on (1) AI for robotics and IoT, (2) Machine Learning and Data Mining, (3) Semantic Intelligence, (4) Multimedia Processing, (5) Cloud and Big Data Infrastructures, (6) Electromagnetics, RF and High-speed Circuits and Systems, (7) Wireless Networking, (8) Fixed Networking, and (9) Cross-domain Research. This research is applied to a number of application domains: Health and care, transport and logistics, media, energy, and systems biology. A well-established experimental evaluation environment and a number of technology platforms support these activities. IDLAB is one of the leading international research groups in these domains.

Several courses at Ghent University require contributions based on profound knowledge and research experience in the domain of "Secure and Scalable Software Systems", e.g. the courses "Network Security", "Distributed Data Processing", "Cloud Storage & Computing" and "Software Development & Operations" for students in the Information Engineering Technology and Computer Science Engineering programs. Moreover, the research domain is also very relevant in the context of master theses, and "Engineering Project" courses.

In recent years, there has been an increasing interest in software that enables distributed cloud or edge-cloud constellations consisting of near-limitless datacenters connected to resource-constrained devices (gateways / sensors) at the edge. This evolution is leading to many new applications in several domains, including Internet of Things (IoT), large-scale distributed data processing and can be seen as a major enabler for AI-based advances. Concurrently, there is an ongoing evolution from monolithic software deployments towards scalable cloud-native systems (including workloads running on novel lightweight virtualization and isolation techniques such as WebAssembly, microVMs and unikernels). Hardening such complex distributed systems' defenses against cyberattacks is paramount when these systems are expected to handle diverse forms of sensitive data.

A good understanding of how to design secure and scalable software applications is necessary due to the complexity of data acquisition, the typical high throughput and low latency requirements, the large variety of software platforms and virtualization technologies, and the required expertise in security techniques and their specific optimizations. Therefore, algorithmic as well as experimental research on advanced software application use cases, are of utmost importance, to enable optimized and efficient software applications and to meet the stringent requirements of the users and various stakeholders in the software application domains. These elements are very important in the current and future context (a.o. for demand-driven research projects with partners from industry) and are of high strategic importance for the department.

There is a need for a part-time (50%) staff member for research and education in this domain. The staff member should show a broad knowledge and experience with applications in the domain of secure and scalable software applications. This new staff member has to work in close cooperation with the other professors in the IDLab Discover team. 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 inline 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 advanced software engineering.