

PhD research position related to hardware/software co-design of flexible and modular radio and network platforms

Job offer

During the past decades we have witnessed the explosive emergence of wireless IoT (Internet of Things) technologies and standards. There is a continuous evolution of wireless technologies, covering different ranges (from short range personal areas networks, local areas networks up to wide area networks) and different spectral bands (both unlicensed industrial, scientific and medical (or ISM) bands and licensed bands). The availability of wireless networks and technologies has triggered the appearance of plenty of wireless and/or mobile devices, ranging from very small, embedded devices like wireless sensors up to more powerful devices like mobile laptops. Mobile & wireless applications have become an important part of our daily lives and as a consequence the number of mobile & wireless devices and networks that coexist in the same environment is continuously increasing. In order to perform high-quality research at IBCN, we identified the following research area where we want to strengthen our research efforts and where we offer a vacancy: hardware/software co-design of flexible and modular radio and network platforms

In the vision of the Internet of Things, future wireless networks will exist of densely deployed heterogeneous devices competing for the same (limited) wireless resources offered by heterogeneous network technologies. Every device may further run multiple applications with very diverging traffic demands (e.g. in terms of throughput, latency, reliability, energy consumption, synchronization, exposure, etc.). The goal of this PhD is to design, implement and validate flexible and modular hardware/software architectures for controlling and coordinating the wireless communication across heterogeneous wireless devices and networks, hereby guaranteeing a minimum level of quality for each application. Such HW/SW architectures have to support (re)programmability and (re)configurability, enabling (1) on the fly deployment / composition / update of physical layer, MAC layer and network protocol stacks, (2) runtime selection/combination of radio operation modes and network protocols, and/or (3) runtime (re)configuration of radio and network parameters. Such hardware/software architectures should be supported on high-end as well as on low-end devices with small footprints (low memory & processing capacity, small footprint FPGA).

Function description

We offer a competitive salary with interesting social benefits and a challenging, stimulating and pleasant research environment, where you can contribute to the worldwide research for the Future Internet. During your research, the following activities will be part of your work.

- Analyse the current wireless network technologies thoroughly and will develop new HW/SW architectures, algorithms, protocols and concepts in one of the defined research areas.
- Build up hands-on experience by implementing these HW/SW concepts and by evaluating through experimental validation on a large-scale wireless testbed (more info, see <http://ilabt.iminds.be>) or through detailed simulations.
- Participate in the framework of European and national research projects (in collaboration with industry).
- Publish and present results both at international conferences and in scientific journals.
- Work towards realizing a PhD in about 4 years.
- Build towards a future academic career through project experience & high-profile scientific publications, or towards a promising IoT industry career through collaborations with several high-impact industry partners.

Profile

We are looking for candidates with the following qualifications and skills:

- You have a Master's degree in Wireless/Radio communication, Computer Science, Informatics, ICT or Electronics. You are acquainted with the low level programming languages (C, C++). Hands-on experience with digital design (Verilog, VHDL) and FPGA programming in context of communication (Wireless/Radio perfectly) is highly desired. Experience and a strong interest in existing or new wireless network technologies are a plus.
- You are interested to do research in an academic environment either for a 4 years period in view of a PhD degree or for a 2 years period as a project researcher.
- You are able to plan and carry out your tasks in an independent way.
- You have strong analytical skills to interpret the obtained research results.
- You are a responsible, communicative and flexible person.
- You are a team player.
- You respect the predetermined milestones in research projects.
- Your English is fluent, both speaking and writing.

Information about iMinds – Ghent University research environment

iMinds is an interdisciplinary research institute for ICT innovation in Flanders, founded in 2004 (www.iminds.be) and one of the key innovative players in Belgium. The research is aimed at valorisation and is performed in close cooperation with industrial players: big companies like a.o. Alcatel-Lucent, Belgacom, Deutsche Telekom, Nokia-Siemens Networks, Philips, Thales, Volvo, Picanol, Telenet; small and medium sized enterprises like a.o. Androme, BeMobile, Comsof, DigiPolis, OneAccess, Televic, ZapFi, Multicap, GreenPeak; as well as non-profit organizations.

The research Group IBCN (Internet-based Broadband Communication Networks and Services www.ibcn.intec.ugent.be) is associated with iMinds and is also part of Ghent University. Ghent University is a leading technical university in Belgium (ranking 71 in the world in the Shanghai Ranking) and is located in a beautiful medieval, medium-sized city with a very high quality of life. The IBCN group performs fundamental and applied research on internet-based communication networks and services, more specifically with the focus on: (1) Network Modelling, Design and Evaluation, (2) Mobile & Wireless Networking, (3) High Performance Multimedia Processing, (4) Autonomic Computing & Networking, (5) Service Engineering, (6) Content and Search Management, and (7) Data Analysis and Machine Learning. Innovative solutions are developed both through fundamental research projects, as well as through collaborations with international industry partners. A well-established experimental test environment and a number of technology platforms support these activities.

The research unit of 'Mobile & Wireless Networking' consists of 30 motivated researchers performing research on the following topics: IoT, Sensor Networks, Cooperative and Cognitive Networks, Wireless Access, Self-Organizing Distributed Networks (Internet of Things) and Experimentally-supported research. Working as a researcher within this technical environment in the IBCN group can be a truly enriching experience. You will gain a lot of expertise within different application domains like health and care, transport and logistics, media, energy, smart cities, etc.

Application deadline:

Review of applications starts and will continue until the position is filled, but for full consideration please apply before July 31th, 2016. If you are interested in this job opening and your profile corresponds to the requirements listed above, please

- Send your motivation letter and CV to martine.buysse@intec.ugent.be, indicating “Application: HW/SW co-design” in the subject.
- Include a motivation letter explaining clearly the relevance of your skills for the position.
- Include the name, email address, phone number and some recommendation letter of at least two persons that we can contact for references.