Institute of Engineering and Management of Grenoble Alpes University

Grenoble INP - UGA is a member of **international** engineering and management education and research **networks.** It is widely recognized in national and international rankings**.**

8 schools + **38** laboratories

8 350 students

1 300 teaching, research, administrative and technical staff

Grenoble INP-UGA is a renowned public institution of higher education and research, and a major player in the Grenoble ecosystem. It is the engineering and management institute of Grenoble Alpes University, and plays a leading role in the scientific and industrial community.

Associate Professor

Research profile field	DIGITAL ELECTRONICS
Requested job profile	Associate Professor
Ministerial reference for the position	61-63 MCF 0462
CNU Section	61-63
Job location	Grenoble and Saint Martin d'Hères campus (SPINTEC laboratory)
Hiring date	01/09/2024 (DD/MM/YY)
keywords	Frugal digital electronics, design of embedded systems, design of digital architectures in disruptive technologies

Grenoble INP - UGA is a leading public institution accredited with the French label "Initiative d'excellence". It offers innovative engineering and management programs, with an increasing internationalization of its course offers. The courses are grounded in sound scientific knowledge and linked to digital, industrial, organizational, environmental and energy transitions. The Engineering and Management Institute of Grenoble Alpes brings together more than 1300 staff members (teacher-researchers, lecturers, administrative and technical staff) and 8 350 students, located on 8 sites (Grenoble INP - Ense3, Grenoble INP - Ensimag, Grenoble INP - Esisar, Grenoble INP - Génie industriel GI, Grenoble INP - Pagora, Grenoble INP - Phelma, Polytech Grenoble, Grenoble IAE and the INP Prepa). Grenoble INP is also a highly-ranked institution of higher education and research, leading the way in the fields of engineering and management on an international scale. It is a member of a large number of international academic and research networks. It is part of the European University UNITE!.

As part of Grenoble Alpes University, Grenoble INP has associated guardianship of 38 national and international research laboratories and of technological platforms. The research conducted there benefits both its socio-economic partners and its students. Grenoble INP is at the heart of the following scientific fields: physics, energy, mechanics and materials; digital; micronanoelectronics, embedded systems; industry of the future, production systems, environment; management and business sciences.

Grenoble INP - UGA is an equal opportunity employer committed to sustainability. Grenoble INP-UGA celebrates diversity and equity and is committed to creating an inclusive environment for all employees. All qualified applications will be considered without discrimination of any kind.

Teaching

School: Grenoble INP - Phelma

School website: https//phelma.grenoble-inp.fr/

Contact: alice.caplier@grenoble-inp.fr

School presentation:

Grenoble INP Phelma is an engineering school of the Grenoble Polytechnic Institute. It offers students a wide choice of courses at the cutting edge of scientific and technological progress: micro & nanotechnologies, instrumentation, energy, innovative materials, information technologies, biomedical engineering, process engineering and the environment. It welcomes more than 1,400 students in 11 engineering courses, including one apprenticeship, and a dozen masters courses. The teaching staff is made up of around one hundred full professors and over 300 part-time lecturers. The administrative and technical staff numbers around fifty. The school has two sites: the Minatec site in Grenoble and the university campus in Saint-Martin d'Hères. While reaffirming its three main pillars of physics, electronics and materials, Phelma is ensuring that the training of its engineering students and masters students evolves in line with changes in careers, linked primarily to the energy transition and the digital transition.

Teaching Profile:

Embedded microelectronics and electronics account for around 25% of scientific teaching at Phelma, from transistors to embedded systems, including logic circuits, computer architectures, memories and embedded computing. The associate professor: will be involved in teaching VLSI digital microelectronics on ASIC and FPGA targets, hardware modelling languages (SystemVerilog, CHDL, etc.), design flows at system and circuit levels, and the design of optimised, energy-efficient circuits and architectures for embedded systems. He or she will also be involved in first-year analogue electronics courses (conventional and apprenticeship), and in the Integrated Electronic Systems (SEI), Embedded Systems and Connected Objects (SEOC), Signal Images Communication and Multimedia (SICOM, joint course with Ense3) and Microelectronics and Telecoms (MT) apprenticeship courses.

As practical teaching plays an important role at Phelma, it will be necessary to provide a significant proportion of teaching in the context of design offices, projects and practical work.

Particular attention should be paid to training students in engineering in the context of the ecological transition, which means that the person recruited should, if not have skills in this field, at least have an interest in it, so as to ensure that teaching evolves to take account of the constraints associated with this transition.

Research

Host laboratory: SPINTEC (UMR 8191 Grenoble-INP, UGA, CEA et CNRS)

Lab website: **http://www.spintec.fr/**

Contact: direction.spintec@cea.fr

Laboratory presentation:

SPINTEC is an academic spintronics research laboratory, whose mission ranges from the production of new fundamental knowledge to its optimisation and shaping into innovations for industry. Its hallmarks are high-level publications, an active intellectual property protection policy and strong academic and industrial partnerships. Set up in 2002, with Grenoble INP, UGA, CEA and CNRS as its institutional supervisors, the laboratory now has over a hundred staff, making it one of the three largest spintronics laboratories in the world. The laboratory has contributed to key discoveries in industrial spintronics and has spun off four start-ups, with three others at various stages of development. The laboratory is heavily involved in education through research, training around ten PhD students each year, and supporting four major international schools: ESONN, ESM, InMRAM and QEM.

Research Profile:

The last decade has seen the emergence of numerous studies around integrated nanoelectronic technologies for a growing number of application areas, ranging from the Internet of Things, to integrated and specialised components for the management and optimisation of energy consumption, environmental monitoring, safety and security in the automotive and space industries, assistance and control in the healthcare field, and hardware implementations of AI algorithms.

Current mature and emerging nanoelectronic technologies present a large number of challenges for the design and validation of digital and mixed circuits and architectures. To enable these technologies to be used on a large scale, but in a sensible way, disruptive innovations are required to find a better compromise between computing power and electricity consumption. For example, one of the key points is to rethink computing architectures, to overcome the limitations inherent in the classic Von-Neumann computing model. The general idea is to bring the place of computation closer to the data to be processed, by moving it to the peripheral circuits of memories (Near-Memory Computing), or even integrating it directly into the memory (In-Memory Computing). Another key point is the optimised design of digital computing core architectures based on emerging technologies that are secure and safe in operation.

SPINTEC has major strengths in the development of these new paradigms, combining in a single dynamic a large number of the required areas of expertise: nanofabrication, electrical testing, theoretical understanding and modelling of the physical and electrical phenomena involved, design of circuits and architectures through to their integration in demonstrators. This has led to the laboratory's involvement in a number of large-scale projects: a specific chair at the Grenoble artificial intelligence institute MIAI, the international ANR-DFG NEUSPIN and ANR-NSF STOCHASPIN projects, and participation as a key partner in the PEPR Electronics, PEPR SPIN and PEPR IA - Emergence projects, which started in 2023.

Description of the research areas associated with the post:

The associate professor will join the "spintronics IC design" team, providing complementary expertise in circuit design and architecture. The aim is to create a holistic chain of design and validation skills, covering all levels of abstraction and enabling the implementation of robust design/validation approaches, from circuit level to architecture and system level (models, physical and statistical exploration tools, rapid design/synthesis and simulation of circuits and architectures, etc.). The post will also be at the interface with another team in the laboratory, in particular Artificial Intelligence and MRAM.

In-memory computing will take pride of place, both because of its importance in current developments in computing architectures and because of its relevance to emerging technologies such as spintronics (and MRAM), RRAM, PCM, etc. Whatever the level of design considered, the inherent variabilities of these emerging technologies will have to be specifically considered. The ultimate aim will be to be able not only to design the elementary building blocks of these architectures (hardware accelerators) systematically, but also to bring them up through the design flow in order to integrate them into a complete computing system.

The successful candidate will have research experience in several of the following areas: design and validation of digital or mixed circuits and architectures, hardware design to optimise consumption and power, design of reconfigurable, robust and secure systems-on-chip.

His or her profile will mainly cover the highest levels of abstraction in microelectronics, from the implementation of the design flow and validation of architectures and systems, or in the design of integrated circuits at the full custom level. His or her contribution will give fresh impetus to and diversify the numerous collaborations with laboratories at both national (LIRMM, INL, IM2NP, CNRS-Thales, EMSE, C2N, etc.) and international partners (KIT, Univ of Maryland, Univ Purdue, TU Dresden, Univ. Newcastle, IHP Microelectronics) as well as industrial partners (TowerJazz, TRAD, Greenwaves, ST Microelectronics, Tiempo IC, Dolphin, Idemia, Electronic Marin...).

The research activity presented in the application must be proven, in particular by international publications.

Specific requirements

The ability to teach in English is imperative, as a number of the school's courses are given strictly in English. International experience will also be a major advantage.

Administrative activities:

In the medium term, the candidate recruited will take on traditional responsibilities for a teaching unit or practical work platform.

Special features of the post:

Teaching may be carried out at any of the school's 2 sites: Grenoble and St Martin-d'Hères.

How to apply

Applicants must submit their applications on the Galaxie Platform of the French Ministry of Higher Education and Research from the 22nd of February 2024, 10 a.m. (Paris time zone) to the 29th of March 2024, 4 p.m. (Paris time zone), deadline.

Any document sent outside the Galaxie procedure will not be considered.

The interview will include simulation/situational exercises.

The details will be communicated when the invitation is sent out. In addition, part of the interview may be carried out in English.