



RECRUITMENT OF ASSOCIATE PROFESSORS 2020 SESSION

Grenoble INP, Engineering Institute of the Univ. Grenoble Alpes, labeled Initiative of Excellence, is a public institution offering engineering courses with solid basic scientific content, a high technological specialization in connection with strong societal challenges related to digital, industrial, environmental and energy transitions. and a major internationalization of its courses. Grenoble INP employs more than 1,200 people (associate and full professors, lecturers, administrative and technical staff) and has 5,500 students in its 6 engineering schools (Ense3, Ensimag, Esisar, GI, Pagora, Phelma) and the Prépa des INP. From 2020, Polytech Grenoble and Grenoble IAE join Grenoble INP and considerably expand its training offer. Grenoble INP is recognized in national rankings as one of the leaders in engineering with international visibility. It is member of international engineering networks as well as the European university UNITE!.

Grenoble INP is a mother institution of more than 30 research laboratories, some of them international, and platforms where state-of-the-art research is carried out to develop knowledge, promote it to our industrial partners and transfer it to students. Grenoble INP is thus at the heart of the technological challenges of the future: Energy and materials; Digital sciences; Micro nanotechnology; Future industry and eco-efficient production in which international rankings recognize it as a leading player.

POSITION DESCRIPTION

Short profile : (150 caractères max) Autonomous cyber-physical systems and digital trust : design, modeling, validation, implementation, certification

Category : MCF

Job number : 27 MCF 0168

Field of expertise: section 27

Recruitment date : 01/09/20

Location : Grenoble

Key words : Autonomous cyber-physical systems and digital trust : design, modeling, validation, implementation, certification

TEACHING

School: Ensimag

School website: <http://ensimag.grenoble-inp.fr/>

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Ensimag is one of the best French engineering school in the digital and information technology domain. It offers very high-level conceptual and technological classes in the fields of computer science and applied mathematics. It prepares people for digital engineering jobs in many sectors, its core sectors such as information systems, banking, embedded systems, networks, but also the industry as a whole, for digitalization, design and decision-making tools.

Ensimag, a reference school of higher education for digital and information technology, wants to consolidate and develop its classes in the field of safe and secure computer systems in the broadest sense. Our engineering students are introduced to cybersecurity concerns from the first year on. In addition, Ensimag offers several specialized courses in this field and is involved in two masters that are specialized in security (Cybersecurity second year master and Master RIE). The person recruited will have to reinforce the Ensimag "Safety" teaching team and,

quickly, take an important place in it, in particular by participating in the implementation of long term labs practicals, and by proposing new teaching content. The transversal consideration of safety, from design to operation, is an open site, in particular by considering the use of external hardware or software components. The recruited person will also have to demonstrate good computer and mathematical skills with a motivation for applications. He or she will have to invest in the teaching of the Ensimag common core curriculum (especially in the 1st and 2nd years) which forms the basis of our engineering students, at the interface between computer science and applied mathematics. From the beginning of the academic year, he or she should be able to participate in the common core curriculum in algorithmic and programming classes (1st and 2nd year), in the operating system design class as well as in the general courses in Security at Ensimag (1st year and general courses during 3rd year). He or she will also have to participate in the sustainability of labs/project in the field of application security (vulnerabilities and protections) in fields such as web applications, communications, embedded codes and operating systems.

In collaboration with the pedagogical teams concerned, he or she should be involved in the development of project-based teaching and digital training. Ultimately, we expect the recruited person to be able to intervene and propose educational content in one of the following specialties: security of embedded applications, tools for security evaluation including reverse and AI-based techniques, data processing for security, secure infrastructures including blockchains and security analyses, risk analysis and information systems security.

RESEARCH

Laboratory : Verimag (UMR 5104 Grenoble-INP, UGA et CNRS)

Equipes : PACSS, RSD, Synchrone, Tempo

Web site : <https://www-verimag.imag.fr/>

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The Verimag laboratory develops basic and applied research for the design of safe and secure cyber-physical systems: (1) semantics and validation of program and system properties, fundamental aspects and development of scalable tools, high level models and hardware/software interface; (2) Methods and tools for the correct and efficient implementation of cyber-physical systems: domain-specific programming languages, compilers, model-driven approaches, components, distribution and parallelization, optimization, etc.; (3) Methods and tools for the modeling, analysis and simulation of the whole cyber-physical system: discrete/continuous hybrid systems, hardware/software architectures, etc.

Research profile : Autonomous Cyber-Physical Systems and Digital Trust: Design, modeling, validation, implementations, certification

Cyber-physical systems (CPS) evolve towards more autonomy and adaptability, which incurs more vulnerabilities to faults or attacks. Moreover, there is a tendency to include AI components for environment sensing and decision making. In domains where CPS were already critical, these evolutions bring more safety, security and lifespan problems; trade-offs between cost, quality and security are more difficult to find.

These evolutions require a new look at the whole design flow, from early specifications to systems architecture, in order to ensure validation and certification, and a sufficient lifespan. It is a very important requirement for autonomous systems to be acceptable, in all application domains. On the other hand, IA techniques are sufficiently mature to explore their use as an aid to compilation, debugging, proofs, etc.

The candidate will join the Verimag laboratory, to work on one or more of the following topics:

- Tools for the development, validation and certification of current CPS, for both safety and security constraints
- Formal reasoning on software in the presence of active attackers, analysis of counter-measures
- Validation and certifications of CPS that include AI components
- Proven implementations of AI algorithms, either in software or using dedicated hardware, compilers.
- Correct-by-construction implementations, model-driven approaches, faults, attacks and resilience properties.
- Test, simulation, and modeling for autonomous systems and their physical and human environments.

The excellence of the applicants' research activities must be certified by recent publications in high quality international journals or conferences in their field.

PARTICULARITIES AND CONSTRAINTS

Administrative activities linked to the functions of associate professor, responsibility of teaching unit or department.

HOW TO APPLY

Online application must be done on the website Galaxie from february the 25th 2020, 10 am (GMT+1) to April the 09th 2020, 16 pm (GMT+1). Postal applications won't be accepted.

The interview will include simulation/situational exercises. The interview will be held in French; a part of it could be held in English. Further information will be provided with the letter of convocation.