

Deadline for registration of applications on Galaxie:

March 31, 2022 at 4 pm

JOB DESCRIPTION

Emploi : Professor of Universities
Section du CNU : 60
Département : GMA
Laboratoire : Laboratoire de Génie Civil et Génie Mécanique (LGCGM)
Profil : mechanical engineering

Employment environment:

INSA Rennes, a founding member of the INSA Group, is the largest public engineering school in Brittany. It welcomes 2,200 students and apprentices and graduates more than 340 engineers, 60 masters and 40 PhDs per year. Composed of 10 teaching departments, including 7 specialties and an apprenticeship program, and supervised by 6 research laboratories, INSA employs approximately 500 public employees (research professors, teachers, permanent and contractual employees) and more than 400 temporary employees, particularly from companies.

By positioning itself as an impact institute, INSA Rennes intends to be part of a positive metamorphosis aimed at building a more just and sustainable world for future generations. Being an engineering school today, producing skills and knowledge, requires more than ever to assert its responsibility; to anticipate the impact of inventions on individuals, society and the environment; to place itself at the service of a reasoned economy and social progress that is a source of well-being.

More aware than ever of its social impact, the school also intends to go further in diversifying profiles and providing each student with the keys to fulfill his or her potential and succeed in his or her studies, regardless of the educational investment he or she made before entering a prestigious school.

The Impact Institute is first and foremost a lever for transformation in the service of society and for meeting the challenges of the 17 sustainable development goals defined by the United Nations.

This affirmed trajectory has been materialized by the adoption of its 2021-2026 strategic project, which can be consulted on the institution's website: www.insa-rennes.fr

Research laboratory of affiliation : LGCGM, Rennes

Name of laboratory director: Hugues Somja- hugues.somja@insa-rennes.fr

Tel laboratory director: 02 23 23 82 87

Laboratory URL: <http://www.insa-rennes.fr/lgcfgm> and <https://lgcfgm.fr>

The Civil and Mechanical Engineering Laboratory (LGCGM) is a research lab that brings together professors and researchers from INSA Rennes and the University of Rennes 1. The laboratory is structured around 6 research axes:

- Ecomaterials for construction ;
- Building energy : Performance of Systems and Associated Materials, and Quality of Environments;
- Mechanics of materials and processes ;
- Calibration and control of robotic systems;
- Heterogeneous materials, fluids and transfers;
- Engineering of metallic, mixed and hybrid structures.

The current staff of the laboratory is: 44 teacher-researchers, 9.5 FTE BIATSS, 40 PhD students. The LGCGM laboratory supports training through research within the Master 2 - Design Engineering, Mechanical,

Materials, Civil Engineering course and the Master 2 - Water Sciences, modeling transfers in hydrology and hydro-cube for which INSA is co-accredited with several universities and engineering schools in Brittany.

The LGCGM develops applied research combining experimentation and modeling. It hosts leading partnership activities, in the context of institutional projects (particularly European) and large-scale industrial projects. It is the backbone laboratory of the PFT GCM technology platform accredited by the MESRI. These activities are based on structuring equipment that has been the subject of substantial investments.

The material resources of the LGCGM include:

- a platform of intensive scientific calculation;
- equipment for the mechanical and physico-chemical characterization of civil engineering materials;
- Modular buildings for mechanical tests on large structures with large capacity vertical and horizontal jacks (up to 150 tons).

Equipment for characterizing the dynamic behavior of materials, including: a bi-axial stress test bench; dynamic and thermal cameras; Hopkinson bar mechatronics test bench; thermal chamber, induction furnace, high-temperature induction heating; Marciniak-type stamping device; instrumented macro indentation bench; instrumented micro indentation bench; portable instrumented indentation bench Altisurf 3D profilometer for the measurement of relief and surface condition without contact;

-A robotic platform with in particular : Serial and parallel robots; Dynamic 6D multipoint non-contact metrology system: NIKON K600-10; API Radian laser tracker; Vibration analysis system (modal analysis, transfer function analysis and in-service diagnostics); Single-point laser vibrometer; Control system: dSpace 1103, 1104 cards; Dynamic amplifier and filter; Piezoelectric actuators

Teaching Department: Mechanical and Automatic Engineering (GMA)

Name of department director: Lionel Léotoing, lionel.leotoing@insa-rennes.fr

Tel department director. : 02 23 23 83 76

The objective of the mechanical and control systems engineering department (GMA) is to train engineers in two complementary areas: the mechanical engineering and the control systems engineering. The transversality of the skills provided in these two fields allows the GMA engineer to address all the technical and scientific problems linked to the development, dimensioning, optimisation and production of a mechatronic system, as well as to the management of industrial projects. This multidisciplinary training favours the integration of future engineers in the technological context of industry 4.0.

Specific skills required:

Research:

The person recruited will be assigned to the LGCGM in order to contribute to the deployment of the scientific project of the Unit, and more particularly that of the thematic axis: Mechanics of materials and processes.

The main objective of the work will be to develop new or improved metal forming processes based on thermo-mechanical characterization of materials under complex loads.

It will be able to rely on the experimental devices developed by the axis which allowed the validation of two original procedures for the identification of complex anisotropic plasticity criteria and viscoplastic strain hardening laws for large deformations. The improvement of these experimental devices should allow the

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recruited person to extend the experimental characterization over a larger range of temperature and stresses, in order to widen the spectrum of the covered shaping operating conditions.

He/she will also contribute to the work on the characterization of the microstructure of alloys including titanium, in order to optimize the forming of titanium parts used in aeronautics and other mechanical engineering sectors.

Finally, his work should include an opening towards non-metallic materials: glass, epoxy, thermoplastic and bio-sourced matrix composites, ... and thus contribute to the multi-disciplinary projects of the LGCGM.

The person recruited will have to integrate his action in the strategic objectives of the unit and of INSA Rennes. Thus, his/her projects will have to integrate the stakes of the current energy and environmental transition.

He/she will seek, through his/her actions, to reinforce the integration of the unit in the site and regional policies. Finally, it will contribute to increasing the unit's influence at the national and international levels.

An effective experience of steering and supervision functions, ensured in conjunction with the development of his/her scientific work, will be particularly appreciated.

Teaching:

The person recruited will have to contribute to the evolution of the training by integrating the skills associated with this new context. He/she will have to be involved in the teaching related to the design and manufacturing of mechatronic systems over the three years of the engineering cycle. The courses concerned cover a large part of the product life cycle. Depending on the skills of the person recruited, these courses will be taught in at least one of the three training pillars: "Mechanics and Materials", "Design and Processes" and "Automation and Modelling". A transverse profile is desirable to develop teaching activities through multidisciplinary projects around the integrated design of products. The person recruited will be involved in a pedagogical innovation approach, adapting it to the different training paths (under student and apprentice status).

Considerable experience is required to take on pedagogical responsibilities, since a strong involvement is expected within the pedagogical team in order to pursue the developments underway (continued deployment of training by apprenticeship, implementation of the skills approach, integration of sustainable development issues, etc.).

Specific skills required: integrated design of mechatronic systems, solid mechanics, fluid mechanics, modeling of mechanical systems, product manufacturing, industrial systems engineering

More information:

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Research contact at LGCGM : Hugues Somja, hugues.somja@insa-rennes.fr

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