

Ingénieur de Recherche en Calcul Scientifique

Position to be filled on September 1, 2018

Title of the position : Research Engineer in scientific computing

Type of recruitment: 1 year Fixed-term contract

Corps or level of recruitment: Research Engineer

Salary range: from 1765 to 2500 € / month according to experience

Location of the position (component / laboratory / postal address):

LEAT, Building Forum, Campus Sophiatech, 930 route des Colles, 06903 Sophia Antipolis FRANCE

RIFSEEP Business code: Project manager - Expert in scientific computing and / or databases

CONTEXT OF THE POSITION:

The Laboratory of Electronics, Antennas and Telecommunications (LEAT) is a Joint Unit between University Nice Sophia Antipolis (member University Côte d'Azur) and CNRS (UMR n ° 7248). It is located on the SophiaTech campus which is a training and research center dedicated to Information and Communication Technologies (ICT), associating academic actors (UNS, INRIA, EURECOM, CNRS, Polytech 'Nice Sophia, Mines Paris Tech, etc.), competitiveness clusters, numerous associations and technological platforms (CIMPACA Design, Telecom). In partnership with the CNRS, french and foreign companies, agencies and public laboratories in the framework of numerous projects, contracts and collaborations, LEAT is developing its research organized in three teams, CMA (Design and Modeling of Antennas), MCSOC (Modeling, Design of Communicating Object Systems) and ISA (Microwave Imaging and Antenna Systems).

The scientific fields of the LEAT are:

- Antennas, electromagnetism and microwaves
- Communicating objects, Optimization of wireless networks, Embedded systems and Systems on Chip

Its areas of expertise are:

- Design of multi-standard and / or reconfigurable miniature antennas and multi-antenna systems
- Numerical modeling in electromagnetism
- Metrology around antennas and diffraction
- Radar systems, microwave imaging and inverse problems in electromagnetism
- System modeling and energy management in communicating objects
- Wireless networks and sensor systems
- Reconfigurable adaptive and cognitive systems

The laboratory currently has 69 members including 30 researchers, professors, associate professors, ... and 39 post-doctoral, doctoral, master students,...

The retirement of the Research Engineer in charge of scientific computing within the unit is scheduled for September 2018. His replacement will help to maintain, develop and exploit software tools developed at LEAT and to provide scientific support to students in the field of scientific computing, which is ever more present and complex.

This recruitment will also strengthen the collaboration between Orange and the LEAT within the framework of the joint laboratory CREMANT in the field of numerical modeling in electromagnetism and contribute to the development of the TLM software for which the LEAT is an recognized expert in the fields of VLF antennas and exposure of people to electromagnetic radiation (DREP).

In the organization of the laboratory, the recruited person will be directly assigned to the research teams of the unit. Its activity will be pooled for the three teams. His missions will lead him to be involved very actively in the many projects of the laboratory. This person will have to propose solutions to requests submitted by doctoral students and researchers. It will assist doctoral and master students in the realization of their scientific computing tools. He will also be involved in the interdisciplinary research activities of the unit with other laboratories.

GENERAL MISSION :

One of LEAT's research focuses is the development of computational tools for the simulation of electromagnetic problems whose complexity is not yet accessible to commercial software. This complexity is largely related to the highly multi-scale and / or multi-physics problems arising when studying antennas in their environment. Software developed at LEAT or in collaboration with Orange within the framework of the CREMANT concern both frequency domain (SR3D software based on a Moment Method) and time domain (FP-EMMA-TLM software based on the Transmission Line Matrix method). This complexity is also due to the increasing difficulty of synthesizing radiating structures with a multiplication of constraints. Developing tools of automatic and non-intuitive design of antennas by coupling electromagnetic computation codes with optimization algorithms is then a good solution to solve this kind of problems. These can be deterministic (topological gradient), stochastic (genetic algorithms) or bio-inspired processes. Finally, 3D imaging is another research axis with a development based on the Level Sets method.

The activity around the SR3D frequency software is carried out within the framework of CREMANT, the joint laboratory with Orange. As for the developments on the TLM method, they make an extensive use of the computing resources offered by the parallel computers of the major national computing centers: the CCRT (Computing Center Research and Technology CEA, IDRIS (Institute of Development and Resources in Scientific Computing of the CNRS) and in particular the CINES (National Computer Center for Higher Education), which LEAT has benefited over the last three years, from more than 100 000 hours of calculation. In this context, the LEAT has also the objective to develop a platform for valuing the TLM method.

As part of these research activities, the recruited person will have to:

- develop and exploit the various IT tools developed at LEAT
- provide scientific support to students in the field of scientific computing
- provide scientific support for the development of computer tools,
- provide scientific support for transfer or sharing operations with other partner institutions
- also to strengthen the collaboration between Orange and the Unit within the framework of the CREMANT in the field of numerical modeling in electromagnetism
- contribute to the development of the TLM software for which LEAT is a recognized expert with the DGA
- save, improve, update and make the most of the modeling software developed each year by our PhD students
- ensure the implementation of our commercial simulation tools
- provide assistance in maintaining the LEAT computer network

This engineer will also be involved in the supervision of master's courses in the field of electromagnetic modeling. It will also be able to intervene to deliver a part of the lessons planned in numerical modeling in electromagnetic in the master ESTEL. At the laboratory level, it will be directly attached to the research teams. In this first year of fixed-term contract, given the number of implications requested, a prioritization of these missions, focused mainly on obtaining scientific results will be made.

MAIN ACTIVITIES :

- Piloting technical projects that contribute by calculation methods to the resolution of a scientific problem in its technical, human and administrative dimensions
- Provide researchers in a field with expertise in the use of mathematical methods and computer techniques for the modeling and simulation of a physical phenomenon
- Orient the choice on the relevant methods and tools according to the problem and the architecture of the targeted computing machines
- Design methods for modeling, calculating and visualizing results

- Participate in national and international research projects and related publications
- Manage the lifecycle of the calculation data, their organization and the monitoring of their exploitation until their visualization
- Transfer knowledge and skills in scientific computing through presentation and training
- Participate in the selection, acquisition, operation of high performance calculators
- Define a technological watch on the evolution of the hardware architectures and systems concerned

The activities will focus more specifically on:

- Participation in the development and use of the laboratory's internal software (Fortran language, C language, C ++, Matlab) in the field of modeling and electromagnetic simulation.
- The design, development or adaptation of new methods of analysis or simulation (numerical computation) of electromagnetism and multi-physics problems.
- The scientific support of PhD students and researchers on the scientific and computer computing parts of the various projects.

REQUIRED PROFILE :

o Degree: PhD

o Skills :

Research Engineer with strong skills in scientific calculations and numerical methods dedicated to electromagnetic modeling as well as knowledge of current commercial simulation tools. Expertise in time-based numerical methods (FDTD and TLM) would be highly appreciated. Skills in the field of computer networks can be a plus. In addition, he must accompany, advise, communicate and show pedagogy.

FURTHER INFORMATION :

The Laboratory is located in Restricted Zone (ZRR). The successful candidate will be recruited after consulting the Senior Defense Security Officer.

HOW TO CANDIDATE?

Send your CV and a Letter of Motivation to Mr. Robert STARAJ, Robert.STARAJ@unice.fr with copy to recrutement@unice.fr