



Job vacancy #2023-06073

Post-Doctoral Research Visit F/M Parallel domain decomposition techniques for time-harmonic wave propagation models

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Post-Doctoral Research Visit

Context

Wave propagation phenomena are ubiquitous in our modern society and manifest themselves in various contexts such as telecommunications, imaging techniques (medical, seismic), information processing (photonics), energy harvesting and health (biomedical applications). Numerical modeling plays an increasing role in understanding complex wave propagation phenomena or for mastering the wave interactions with our environment. Many numerical methods have been designed for the numerical solution of wave PDE models for unsteady or harmonic propagation regimes, i.e., for time-domain and frequency-domain formulations of these models. In particular high order discontinuous finite element methods, named as Discontinuous Galerkin (DG) methods or Hybridized DG (HDG) have shown significant benefit in terms of accuracy and have become popular. The resulting discretized problem reduces to the solution of a large sparse linear system of equations.

The work of this thesis will be carried out within the framework of the joint Inria Industrie Concace project team whose partners are Airbus CRT and Cerfacs, which is trilocated between Bordeaux, Issy les Moulineaux and Toulouse. In additional close interactions with other Inria teams located in various Inria centres are foreseen.

Assignment

The candidate will have to:

- Define an interface enabling the use of various boundary transfert conditions in a domain decomposition contexte
- Implement them in the C++ package Compose designed by the Concace team
- Validate the numerical and parallel performance for computations in lectromagnetism or seismic
- Disseminate the results through paper writing and talks in seminars/conferences

Main activities

The main activities will be:

1. Analyse the requirements
2. Propose flexible and generic solution
3. Develop a C++ interface

Skills

Technical skills and level required: 5 years or more of higher education or equivalent, master or engineering degree or PhD in applied mathematics or computer science with a scientific computing component. Knowledge of machine learning would be an asset.

Languages: the working language will be mainly French, but English will be used in exchanges with non-French speaking team members or collaborators.

Interpersonal skills: enjoy working and interacting in a collaborative research environment, curiosity and creativity.

Additional skills: writing scientific papers and public presentations of results.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Possibility of teleworking and flexible organization of working hours

- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Remuneration

2746€ / month (before taxes)

General Information

- **Theme/Domain** : Numerical schemes and simulations
Scientific computing (BAP E)
- **Town/city** : Talence
- **Inria Center** : [Centre Inria de l'université de Bordeaux](#)
- **Starting date** : 2023-10-01
- **Duration of contract** : 1 year
- **Deadline to apply** : 2023-10-31

Contacts

- **Inria Team** : [CONCACE](#)
- **Recruiter** :
Giraud Luc / Luc.Giraud@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

The keys to success

The main qualities expected are

- intellectual curiosity and interest in multi-disciplinary scientific activities,
- pleasure to work and exchange in a collaborative context.

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

Thank you to send:

- CV
- Cover letter
- Support letters (mandatory)
- List of publication

Defence Security :

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy :

As part of its diversity policy, all Inria positions are accessible to people with disabilities.