



**Offer #2024-07616**

## **Post-Doctoral Research Visit F/M Aggregation techniques in the Benders decomposition strategy**

**Contract type :** Fixed-term contract

**Level of qualifications required :** PhD or equivalent

**Fonction :** Post-Doctoral Research Visit

### **About the research centre or Inria department**

The Inria University of Lille centre, created in 2008, employs 360 people including 305 scientists in 15 research teams. Recognised for its strong involvement in the socio-economic development of the Hauts-De-France region, the Inria University of Lille centre pursues a close relationship with large companies and SMEs. By promoting synergies between researchers and industrialists, Inria participates in the transfer of skills and expertise in digital technologies and provides access to the best European and international research for the benefit of innovation and companies, particularly in the region. For more than 10 years, the Inria University of Lille centre has been located at the heart of Lille's university and scientific ecosystem, as well as at the heart of Frenchtech, with a technology showroom based on Avenue de Bretagne in Lille, on the EuraTechnologies site of economic excellence dedicated to information and communication technologies (ICT).

### **Context**

Discrete optimization methods can be applied to solve a wide range of practical problems. Such problems are often formulated as either integer, or mixed-integer, programs which enables them to be solved using mathematical programming techniques. However, to this day, integer and mixed-integer programs remain extremely hard to solve. An approach that has undoubtedly proven its worth in this context is Benders decomposition.

### **Main activities**

In this postdoc, the candidate will investigate how the use of general aggregation strategies can be applied to large-scale optimization models in the context of enhancing Benders' decomposition. In previous work, it was shown how scenario subproblem aggregation can produce a strengthened Master's formulation, which, in turn, helps to accelerate the overall search process. The aim here will be to generalize this approach and develop a methodological framework to produce model approximations through the use of both column and row aggregation techniques that can define valid inequalities that reinforce the classical Benders cuts.

### **Skills**

The post-doctoral candidate should have experience in optimization, mathematical modelling, and linear and integer programming. She/he must have good programming skills (particularly experience on C++ or Java).

### **Benefits package**

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- 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

### **General Information**

- **Theme/Domain :** Optimization, machine learning and statistical methods  
Scientific computing (BAP E)
- **Town/city :** Villeneuve d'Ascq

- Inria Center : [Centre Inria de l'Université de Lille](#)
- Starting date : 2024-09-01
- Duration of contract : 2 years
- Deadline to apply : 2024-05-24

## Contacts

- Inria Team : [INOCS](#)
- Recruiter :  
Brotcorne Luce / [Luce.Brotcorne@inria.fr](mailto:Luce.Brotcorne@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.

**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

Applications must include a cover letter, an updated CV and a recommendation letter.

### **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.