



**Offer #2024-07413**

## **3D urban reconstruction from GIS data (collaboration between Inria and Oslandia)**

**Contract type :** Fixed-term contract

**Level of qualifications required :** Graduate degree or equivalent

**Other valued qualifications :** Engineer in Computer Science

**Fonction :** Temporary scientific engineer

**Level of experience :** Recently graduated

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

The Inria centre at Université Côte d'Azur includes 37 research teams and 8 support services. The centre's staff (about 500 people) is made up of scientists of different nationalities, engineers, technicians and administrative staff. The teams are mainly located on the university campuses of Sophia Antipolis and Nice as well as Montpellier, in close collaboration with research and higher education laboratories and establishments (Université Côte d'Azur, CNRS, INRAE, INSERM ...), but also with the regional economic players.

With a presence in the fields of computational neuroscience and biology, data science and modeling, software engineering and certification, as well as collaborative robotics, the Inria Centre at Université Côte d'Azur is a major player in terms of scientific excellence through its results and collaborations at both European and international levels.

### **Context**

The job environment is the one of the CP4SC project, a collaborative effort that focuses on developing a cloud platform for smart cities. We will collaborate with [Oslandia](#) on C++ software components for urban reconstruction from 3D point clouds and GIS (Geographical Information Systems) data, based on the [CGAL](#) library and [SFCGAL](#) (a wrapper around CGAL that implement 2D and 3D operations on OGC (open geospatial consortium) standards models).

### **Assignment**

We will explore the automated generation of 3D urban models, either from measurement data such as 3D point clouds or from GIS data. This requires a pipeline of algorithms ranging from analysis to processing of large-scale data, through semantic classification and reconstruction of 3D meshes from data that are possibly heterogeneous, incomplete and defect-laden. Measurement data such as 3D point clouds may be acquired on a building, a city block or an entire city. The reconstruction algorithms must generate adjustable levels of detail with fine-grain and adjustable balance between complexity, resolution and approximation. The CGAL library already offers components for the aforementioned pipeline, and the SFCGAL library provides a wrapper around some of the CGAL components. The objective is to complement the pipeline for urban reconstruction and to extend the SFCGAL library.

### **Main activities**

- Devise and implement geometric algorithms
- Devise interfaces to GIS formats (Geographical Information Systems)
- Evaluate and benchmark the algorithms
- Exchanges with partners of the project

### **Skills**

Technical skills and level required:

- Geometric data structures and algorithms
- Geometry processing: 3D point sets and meshes
- Advanced C++ programming: generic programming, STL
- Experience with GIS data is a plus
- Experience with the CGAL library is a plus (see [cgal.org](http://cgal.org))

Languages: French and English

Relational skills: Ability for team work and collaborative activities

## 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 (after 6 months of employment) 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

From 2692 € gross monthly (according to degree and experience)

## General Information

- **Theme/Domain** : Interaction and visualization  
Scientific computing (BAP E)
- **Town/city** : Sophia Antipolis
- **Inria Center** : [Centre Inria d'Université Côte d'Azur](#)
- **Starting date** : 2024-06-01
- **Duration of contract** : 1 year, 1 month
- **Deadline to apply** : 2024-04-30

## Contacts

- **Inria Team** : [TITANE](#)
- **Recruiter** :  
Alliez Pierre / [Pierre.Alliez@inria.fr](mailto:Pierre.Alliez@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

### 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.