POSITION SHEET

POST-DOCTORAL RESEARCH FELLOW : SOCIO-SPATIAL SIMULATION AND DATA INTEGRATION FOR DENSIFICATION IN SUBURBAN AREAS

Job title	Post-doctoral research fellow with the **SUBDENSE** project
Workplace	LASTIG - 73 avenue de Paris - 94160 - Saint-Mandé
Contract type	FIXED-TERM CONTRACT (18 months)
Recruitment date	Between 2024/01/01 and 2024/06/01 (at the latest)
Level of education required	PhD in geographic information science, computer science, or urban data science

Context

The Joint Research Unit (Unité Mixte de Recherche / UMR) **LASTIG** , under the supervision of **IGN** and **Université Gustave Eiffel**, conducts a wide range of research in geographic information sciences for sustainable cities and digital territories. It has over 60 permanent and contract members. The laboratory is confronted with fundamental and operational research issues on the following subjects :

- acquisition and processing of massive multimodal data (ACTE team) ;
- geovisualization, interaction and immersion (GEOVIS team) ;
- geographic data mediation and enrichment (MEIG team) ;
- analysis of the spatio-temporal dynamics of territories (STRUDEL team).

Position

The EU **SUBDENSE** project seeks to better understand the phenomenon of suburban densification. It is an important subject in tackling climate change by reducing net land uptake and suburban areas within our cities have the greatest potential for densification. Data science and spatial analysis is combined in this project with socio-anthropological approaches (Cultural Theory) and spatial planning across different institutional contexts to identify the conditions for a successful densification or on the contrary, obstacles to densification.

The project consists of a consortium of four research partners in Germany (Technical University of Dortmund, and Leibniz Institute for Urban and Rural Ecology), France (LASTIG laboratory) and the UK (University of Liverpool). The candidate will work as part of the French team of the project, at the LASTIG laboratory. There will be opportunities to engage with all partners of SUBDENSE.

One task of SUBDENSE is to study urban densification using buildings data, i.e. at a much finer resolution than current land use land cover products, in order to consider local phenomena as well as other sources of information that can explait it. This implies working with heterogeneous data. Concerning building data, the fine specifications of buildings and parcels data products vary in time with the evolution of technologies. Data driven analysis of the evolution of a given area over 10 years must distinguish evolutions corresponding to real changes from evolutions resulting of a change in data product specifications. Integrating other sources of data to describe the context of such evolutions with respect to different factors is a big challenge since they have different spatial and temporal resolutions and are produced in different context by different producers. The position will focus on this data integration task and on spatial simulation to anticipate future densification.

Missions

More precisely, the main tasks of the postdoc will be :

— To identify, describe and formalise, in the context of the SUBDENSE project, the sources of data adapted to study the multi-dimensional context of peri-urban densification processes.
— To propose a data integration method that will combine building evolution with different contextual factors such as socio-economic, demographic, local planning, human perception (citizens, owners, and decison makers), land market, to better characterise densification and its observed causes and consequences.
— To develop an urban simulation model : adapt the SimPLU3D model to the British and German contexts ; to extend this model into a more general agent-based model of urban development including heterogeneous stakeholders ; and to conduct sensitivity analysis, model validation, and exploration of decision-making scenarios, using the OpenMOLE platform.
— Integrate your work into the SUBDENSE dashboard and engage with its users.
— To publish results in international journals and to present at international conferences.
— To participate in SUBDENSE meetings together with an international and multi-disciplinarity research team.

Profile sought

Scientific and technical skills

— *Manipulation of spatial and GIS data*
— *Excellent knowledge in data fusion, spatial statistics, and geosimulation*
— *Good programming skills in Python ; knowledge of Java/scala would be useful for the simulation part*
— *Knowledge of Open Science practices, scientific reproducibility processes and tools, including git*
— *Fluent written and spoken English in a scientific and technical context*
— *Writing scientific articles*
— *Autonomy as well as ability to work in a multi-disciplinary team*

Conditions of employment

— **Workplace :** IGN, LaSTIG – 73 avenue de Paris - 94160 - Saint-Mandé, close to metro Line 1 (Saint-Mandé) and RER A (Vincennes)
— **Teaching :** Possibility of teaching (e.g. GIS, programming) at the engineering school (ENSG) at Champs-sur-Marne (RER A Noisy-Champs)
— **Remuneration :** up to French grid based on your experience : [30 kE - 35 kE] or more if experience $>$ 3 years

Your benefits

— Join a very dynamic and international renowned French research laboratory
— Work in a multi-disciplinary context
— Creative ideas will be sustained and added value will be fully appreciated and encouraged
— Opportunity to take part in sports and artistic activities at the workplace
— Possibility to partly work from home
— Possibility to travel to scientific conferences to disseminate research.

Contacts

Please send your application (cover letter + CV in a single PDF file) with the explicit reference in your mail subject **LASTIG_SUBDENSE_POSTDOC** before January 15 2024 to all of the following addresses :

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