Offre n°2025-08777

PhD Position F/M Compact mesh generation for geological models

Le descriptif de l'offre ci-dessous est en Anglais

Type de contrat : CDD

Niveau de diplôme exigé : Bac + 5 ou équivalent

Fonction : Doctorant

A propos du centre ou de la direction fonctionnelle

The Inria centre at Université Côte d'Azur includes 42 research teams and 9 support services. The centre's staff (about 500 people) is made up of scientists of di?erent 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 regiona 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.

Contexte et atouts du poste

This PhD proposal is part of a larger "Defi" project between BRGM and INRIA. The candidate will
be integrated into a multidisciplinary team that includes members of both institutes. The candidate will work in the Titane research team of Inria, located at Sophia Antipolis, France.

Mission confiée

One of the fundamental challenges of geology is to understand the soil, the subsoil and its history, which makes it of great importance to society. Mapping the different types of underground rocks is the key to optimal access to water and natural resources. Knowledge of soils and their chemical composition is necessary to ensure the viability of certain plant species, and thus protect biodiversity. Finally, the study of the physics and history of landscapes improves our understanding of risks, which is key to anticipate and prevent landslides, floods, coastal erosion, etc.

One of the key challenges in the field for interactive visualization and physical simulation is to digitalize the soil and subsoil in 3D with explicit mesh-based representations. Acquired on site, geological knowledge is traditionally interpolated with implicit functions that predict the shape in the 3D space of various geological objects such as subsoil layers or faults. Mesh generation techniques are then used to create a mesh data structure that conforms to the zero value of implicit functions. These mesh generation techniques however suffer from several issues. They typically produce dense meshes, conform poorly to implicit surface intersections or discontinuities, and scale poorly to large scenes.

The main objective of this PhD is to design and implement solutions to the mesh generation problems mentioned above. In particular, the PhD candidate will investigate efficient and scalable algorithms that can produce lightweight 3D meshes whose cells conform to the implicit functions and their intersections. One of the main challenges will be to minimize the number of implicit function evaluations, as they often are computationally expensive.

More info about this job offer can be found at
https://team.inria.fr/titane/files/2025/03/PhD_offer_geological_models.pdf

Principales activités

see assignments.

Compétences

Technical skills and level required : good knowledge in computational geometry and/or geometry processing and/or applied mathematics, be able to program in C/C++, be fluent in English, and be creative and rigorous.

Avantages

- 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

Rémunération

Gross Salary:

1st year : 2200 € per month

2nd and 3rd year : 2300 €per month

Informations générales

- **Thème/Domaine :** Interaction et visualisation
  Calcul Scientifique (BAP E)
- **Ville :** Sophia Antipolis
- **Centre Inria :** Centre Inria d'Université Côte d'Azur
- **Date de prise de fonction souhaitée :** 2025-10-01
- **Durée de contrat :** 3 ans
- **Date limite pour postuler :** 2025-04-27

Contacts

- **Équipe Inria :** TITANE
- **Directeur de thèse :**
  Lafarge Florent / Florent.Lafarge@inria.fr

A propos d'Inria

Inria est l’institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l’interface d’autres disciplines. L’institut fait appel à de nombreux talents dans plus d’une quarantaine de métiers différents. 900 personnels d’appui à la recherche et à l’innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 200 start-up. L'institut s'e?orce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Consignes pour postuler

Sécurité défense :
Ce poste est susceptible d’être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L’autorisation d’accès à une zone est délivrée par le chef d’établissement, après avis ministériel favorable, tel que défini dans l’arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l’annulation du recrutement.

Politique de recrutement :
Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.