Offre n°2025-08689

Development and application of AI-based numerical modeling tools for nanophotonics

Type de contrat : Fixed-term contract

Contrat renouvelable : Oui

Niveau de diplôme exigé : Graduate degree or equivalent

Fonction : Temporary scientific engineer

Niveau d'expérience souhaité : Recently graduated

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

Atlantis is a joint project-team between Inria, CNRS and Université Côte d'Azur, which gathers applied mathematicians and computational scientists who are collaboratively undertaking research activities aiming at the design, analysis, development and application of innovative numerical methods for studying nanoscale light-matter interaction problems. In the recent years, the team has developed the DIOGENeS [https://diogenes.inria.fr/] software suite, which is organized around several numerical tools for the simulation of physical problems related to the fields of nanophotonics and nanoplasmonics. In particular, this software suite implements several high-fidelity fullwave solvers based on high-order Discontinuous Galerkin (DG) methods tailored to the systems

of time- and frequency-domain Maxwell equations possibly coupled to differential equations modeling the behavior of propagation media at optical frequencies. Moreover, DIOGENeS also includes algorithms and workflows for the inverse design of nanostructures and nanophotonic devices for harvesting and shaping nanoscale light-matter interactions. The numerical methods currently implemented in DIOGENeS are accurate and flexible but they are also time consuming. For this reason, the team has recently launched a line of research aiming at the design of novel AI-based methods by considering purely data-driven or model-driven modeling approaches.

Mission confiée

The first objective in this assignment is to participate in the development of a novel software platform that will implement AI-based methods for the study of nanoscale light-matter interactions and the design of advanced nanoscale structures and devices for various applications in the realm of planar optics. In particular, the recruited engineer wil actively collaborate with researchers, postdoctoral fellows and PhD candidates of the team who are involved in research activities on modeling methods based on artificial neural networks. As a second goal of this assignment, the recruited engineer will also actively participate in the studies conducted by the Atlantis team members for demonstrating the benefits of the developed numerical tools for concrete applications that are addressed in close collaboration with physicits from national and international labs, and with industrial partners of the team.

Principales activités

Overall, that activities that will be conducted in this assignment are:

- Development of a modular software infrastructure to host new numerical modeling methods based on various types of artificial neural networks;
- Implementation of various data-driven and model-driven methods, in close collaboration with researchers, postdoctoral fellows and PhD candidates of the team;
- Documentation for developers and users of the novel software platform;
- Use case studies in the context of academic and industrial partenerships, using numerical tools from the DIOGENeS software suite and the AI-based tools of the novel software platform;
- Post-processing and reporting of use case studies including participation to scientific publications with researchers, postdoctoral fellows and PhD candidates of the team.

Compétences

Candidates will hold a PhD degree in applied mathematics/scientific computing or computational wave physics or computational photonics.

Required skills:

- Sound knowledge of deep learning with neural networks;
- Knowledge of numerical analysis and development of finite element type methods for computational physics;
- Strong programming skills (Python and PyTorch);
- Fluent spoken and written English.

Other skills that will be appreciated:

- Experience in numerical modeling for computational electromagnetics;
- High performance computing programming models (MPI, OpenMP/OpenACC, CUDA).

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 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
- Contribution to mutual insurance (subject to conditions)

Rémunération

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

Informations générales

- **Thème/Domaine :** Numerical schemes and simulations
  Scientific computing (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 :** 12 months
- **Date limite pour postuler :** 2026-06-30

Contacts

- **Équipe Inria :** ATLANTIS

- **Recruteur :**
  Lanteri Stéphane / Stephane.Lanteri@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.