# Offre n°2025-08763

# Post-Doctoral Research Visit F/M Post-Doctoral Position in AI and Human-Machine Interaction for Knowledge Graph Exploration in Metabolomics

**Type de contrat :** Fixed-term contract

**Contrat renouvelable :** Oui

**Niveau de diplôme exigé :** PhD or equivalent

**Fonction :** Post-Doctoral Research Visit

## 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

The postdoctoral position will be in the Wimmics research team (Inria, Université Côted'Azur, CNRS, I3S) specialized in knowledge graphs, artificial intelligence and Web technologies. It is part of the MetaboLinkAI ANR-SNF project, which aims to revolutionize the analysis and interpretation of metabolomics data through a multidisciplinary approach. The project combines a comprehensive knowledge graph hub (MetaKH) with advanced artificial intelligence (AI) and machine learning (ML) techniques.

The main objectives of the project are to enhance the accessibility and querying of metabolomics data, improve research efficiency, and foster innovation in the field. The project aspires to go beyond current standards by developing an evolving encyclopedic knowledge base, integrating advanced AI approaches to handle experimental data uncertainties, and facilitating the exploration and evaluation of a broader range of hypotheses.

Within this framework, we will focus on developing innovative methodologies and tools, such as graph exploration methods, to improve data interaction, analytical capabilities, and uncertainty representation. A key challenge of metabolomics data (and thus MetaKH) lies in its incompleteness, variable reliability, and inherent uncertainty. AI will be leveraged to enhance the completeness and reliability of the knowledge graph while effectively addressing these uncertainties.

This postdoctoral position is specifically part of WP3.4, which aims to develop an AI-powered research assistant for MetaKH. It builds on recent advances in generative AI, natural language understanding, and knowledge graph integration. An initial version of this assistant has been designed and developed as an intuitive chatbot, facilitating researchers' interaction with metabolomics data and the MetaKH knowledge graph. This chatbot enables users to query the graph in natural language and refine their searches incrementally.

The current approach needs to be extended to support multimodal queries and integrate visualization tools tailored to metabolomics research. Furthermore, it is crucial to define relevant evaluation methods to assess the usefulness and added value of this approach for users. In the long term, the assistant will evolve into a web application incorporating dynamic feedback mechanisms, enabling continuous improvement through user interactions.

## Mission confiée

The recruited candidate will be responsible for designing and developing an LLM-based approach to query the MetaKH knowledge graph, providing personalized support as well as visual and textual solutions tailored to user needs. They will also be tasked with designing, implementing, and deploying evaluation methods with users to assess the usefulness and reliability of the assistant's results, thereby contributing to the improvement of decision-making processes in metabolomics.

The expected deliverables are:

- Publication: An approach leveraging LLMs to replicate the methods of research assistants.
- Publication: A method for evaluating conversational interfaces based on LLMs.
- Software: A stable version of the AI assistant’s source code and the web application.

The recruited candidate will collaborate with Aline MENIN and Marco WINCKLER on aspects related to human-computer interaction and data visualization, as well as with other researchers of Wimmics for topics related to the Semantic Web and LLMs.

## Principales activités

The planned activities are as follows:

- Develop interaction solutions based on LLM technologies to support the exploration of the MetaKH knowledge graph.
- Develop solutions to enhance data exploration (e.g., by combining information from multiple sources) to strengthen the decision-making processes of metabolomics experts.
- Investigate the use of analytical provenance data to optimize the graph querying process, integrating dynamic feedback that takes into account the history of exchanges and interactions.
- Propose and implement evaluation methods for the proposed solutions with end users.
- Explore strategies for transferring the scientific knowledge acquired in the field of metabolomics to other application domains that could benefit from it.
- Participate in the supervision of interns working on the MetaboLinkAI project.
- Contribute to the dissemination of results within the scientific community, notably through publications and the release of the developed software.

## Compétences

Technical skills and level required : LLM, conversational interfaces

Other valued appreciated : data visualization, semantic web, human-computer interaction

## 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: 2788 € per month

## Informations générales

- **Thème/Domaine :** Data and Knowledge Representation and Processing Information system (BAP E)
- **Ville :** Sophia Antipolis
- **Centre Inria :** Centre Inria d'Université Côte d'Azur
- **Date de prise de fonction souhaitée :** 2025-09-01
- **Durée de contrat :** 12 months
- **Date limite pour postuler :** 2025-06-30

## Contacts

- **Équipe Inria :** WIMMICS
- **Recruteur :**
  Menin Aline / aline.menin@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.