Offre n°2025-09078

PhD Position F/M Neural Representations of Multilingual Language Processing

Type de contrat : Fixed-term contract

Niveau de diplôme exigé : Graduate degree or equivalent

Fonction : PhD Position

Contexte et atouts du poste

The PhD will be supervised by Benoît Sagot at Inria (Inria Paris centre) in the ALMAnaCH project-team (http://almanach.inria.fr/index-en.html) and within the PRAIRIE-PSAI institute. It will be co-supervised by Demian Wassermann (Inria Saclay center, project-team MIND), and will take place in close collaboration with Christophe Pallier (NeurSpin). It will be financed by Benoît Sagot's PRAIRIE-PSAI chair.

Mission confiée

PhD topic

Understanding how the brain encodes language remains one of the core challenges in cognitive neuroscience. In recent years, advances in nat- ural language processing (NLP)—particularly with brain-inspired neural network architectures—have opened new perspectives to explore how linguistic information is represented. By bringing together tools from both neuroscience and NLP, researchers can now directly compare the represen- tations learned by computational models with patterns of brain activity. This cross-disciplinary approach enables the development of more grounded and data-driven hypotheses about how language is processed in the human brain.

Although some multilingual datasets include stimuli and recordings in multiple languages (Li et al., 2022), to our knowledge, there is no fMRI neuroimaging dataset in which bilingual individuals perform the same task in both of their languages. To address this, our plan is to collect fMRI data from bilingual participants who speak both their first language (L1) and second language (L2) at a native or near-native level. We will examine how their brains respond to each language and how those responses relate to representations generated by computational models.

Overall, this PhD project will use tools from NLP to better understand how the brain understands and organizes multiple languages. By comparing brain activity

recorded during natural listening with deep learning model embeddings, we hope to reveal where artificial and biological language systems might converge. Focusing on bilingual individuals will allow us to study how the brain responds to the same meaning expressed in different languages. With this project, our aim is to understand whether the brain uses a shared or language-specific system to represent meaning and how closely these systems resemble the ones used by modern language models, or vice versa.

Principales activités

Main activities

The candidate’s main activities will include:

- keeping up-to-date with related work on the topic with regular reading
- carrying out research on the topic outlined above, both in the development of new ideas, positioning with respect to related work and validation of the methodology via experiments and analysis
- presenting their work work both internally to colleagues and externally in the form of conference/journal/workshop papers and in the final PhD thesis
- interacting and exchanging with colleagues on related topics

The PhD position is a 3-year funded position to start from the 1st September 2025.

Compétences

They should have a good level in programming (python), experience with neural networks and neuroscience and an interest in natural language processing and neuroimagery. A good written and spoken level of English is required. Knowledge of French and/or other languages is a plus.

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
- Social security coverage

Informations générales

- **Thème/Domaine :** Language, Speech and Audio
- **Ville :** Paris

- **Centre Inria :** Centre Inria de Paris
- **Date de prise de fonction souhaitée :** 2025-09-01
- **Durée de contrat :** 3 years
- **Date limite pour postuler :** 2025-07-31

Contacts

- **Équipe Inria :** ALMANACH
- **Directeur de thèse :**
  Sagot Benoit / Benoit.Sagot@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.

L'essentiel pour réussir

The position is a 3-year funded PhD position of starting on the 1st September 2025 at the earliest. Candidates should have a Master 2 or equivalent (e.g. engineering school) in a (or several of the) relevant fields (neuroscience, artificial intelligence, machine learning, natural language processing).

Qualities sought:

We are looking for highly motivated candidates with a strong background in the above-listed relevant fields. Ideally, candidates should be able to show initiative, creativity and have a good eye for analysis of data and results.

To apply:
In your application (which can be in English or in French), please include:

- CV
- Letter of motivation
- Optionally an example of your previous written work (if possible related to NLP), for example a master's thesis, research paper, etc.
- Certificat of Master's/engineering degree and grade breakdown

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.