Offre n°2025-09128

PhD Position F/M An international multi-registry approach to identify pre-clinical markers of neurodegenerative disease

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

Type de contrat : CDD

Niveau de diplôme exigé : Bac + 5 ou équivalent

Fonction : Doctorant

Niveau d'expérience souhaité : Jeune diplômé

Contexte et atouts du poste

Within the framework of the PRAIRIE-PSAI initiative, we are looking for a PhD candidate to identify preclinical markers of neurodegenerative diseases using large databases of electronic health records.

Through collaboration between the Paris Brain Institute (France), the Karolinska Institute (Sweden), and the University of Queensland (Australia), we propose to use electronic health records (EHR) to identify biomedical risk factors by studying prior diagnoses (pre-clinical comorbidities), drug prescriptions, healthcare utilization, and biological test results. This analysis will leverage longitudinal EHR data from millions of patients, each followed for at least 10 years before diagnosis, across four healthcare systems: Australia, France, the UK, and Sweden, focusing on four neurodegenerative diseases: Alzheimer's disease (AD), Parkinson's disease (PD), dementia with Lewy bodies (LBD), and motor neuron diseases (MND). The goal is to identify both common and differentiating biomedical risk factors for these conditions.

Within the Inria ARAMIS team at the Paris Brain Institute (ICM), we have begun analyzing the SNDS database, which contains medical records covering 98% of the French population, to study the prodrome of neurodegenerative diseases. Similar to genome-wide analyses, phenome-wide analyses require a very large sample size due to the number of tested associations and the potentially small effect sizes of each. By integrating transnational, population-based data from four countries, we are uniquely positioned to overcome two key challenges in real-world data analysis: the typical lack of statistical power and the need to control for biases.

Mission confiée

The PhD student will perform association testing in collaboration with consortium members to identify preclinical markers associated with the risk of neurodegenerative diseases. They will examine relationships between clinical diagnoses, prescription drug use, healthcare utilization, and biological test results. These analyses will encompass disease-specific investigations (AD/PD/MS/MND) as well as cross-disorder studies, adjusting for factors such as age, sex, socioeconomic status, and disease susceptibility (e.g., family history) when possible. Given the recent emergence of large real-world databases, the PhD student will develop new statistical methods to leverage these resources effectively. Causality methods will also be developed to clarify the different relationships identified by preliminary statistical studies.

Examples of papers from the consortium:

[1] Wei D., Guinebrétièr. O. ,Fang F., Nedelec T., Ten years preceding a diagnosis of neurodegenerative disease in Europe and Australia, *eBioMedicine*, 2025

[2] Nedelec T., Couvy-Duchesne B., ... & Corvol J.C.. A comparison between early presentation of dementia with Lewy Bodies, Alzheimer's disease and Parkinson's disease: evidence from routine primary care and UK Biobank data., *Annals of Neurology*, 2023.

[3] Nedelec T, Couvy-Duchesne B, Monnet F, et al. Identifying health conditions associated with Alzheimer's disease up to 15 years before diagnosis: an agnostic study of French and British health records. *Lancet Digital Health* 2021;

[4] Nabais MF, Laws SM, Lin T, … & McRae AF. (2021) Meta-analysis of genome-wide DNA methylation identifies shared associations across neurodegenerative disorders. *Genome Biology* 22:90 https://doi.org/10.1186/s13059-021-02275-5

[5] Yazdani S, Mariosa D, Hammar N, Andersson J, Ingre C, Walldius G, Fang F. Peripheral immune biomarkers and neurodegenerative diseases: A prospective cohort study with 20 years of follow-up. Ann Neurol. 2019;86:913-926.

Principales activités

Main activities:

- bibliographical work
- data management of large data sets of medical records
- design, implementation and conduct of complex analysis plans
- critical analysis results in light of the current literature
- present results at scientific conferences and in peer-reviewed scientific journals.

Compétences

Required:

- advanced statistics (master level)
- scientific computing including data management in Python (master level)
- able to propose and implement complex data analysis plans

Understanding the key challenges of real-world data analysis would be a plus.

Languages : fluent in scientific english (oral and written)

Relational skills : able to work in multidisciplinary teams at the interface between statistics, medicine and epidemiology.

Other valued appreciated : interest in neurodegenerative diseases

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 :** Neurosciences et médecine numériques
  Biologie et santé, Sciences de la vie et de la terre (BAP A)
- **Ville :** Paris
- **Centre Inria :** Centre Inria de Paris
- **Date de prise de fonction souhaitée :** 2025-10-01
- **Durée de contrat :** 3 ans
- **Date limite pour postuler :** 2025-08-06

Contacts

- **Équipe Inria :** ARAMIS
- **Directeur de thèse :**
  Durrleman Stanley / Stanley.Durrleman@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 candidate should have the motivation to conduct a PhD in a interdisciplinary environment. Eager to learn by themselves under the guidance of the supervisors, curious about the research conducted by the peers, motivated to make scientific contributions to the field.

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.