



Offre n°2024-07165

PhD Position F/M [Campagne Allocation Région 2024] High-dimensional data analysis in the framework of survival modelling in presence of competing risks.

Type de contrat : Fixed-term contract

Niveau de diplôme exigé : Graduate degree or equivalent

Fonction : PhD Position

A propos du centre ou de la direction fonctionnelle

The Inria University of Lille centre, created in 2008, employs 360 people including 305 scientists in 15 research teams. Recognised for its strong involvement in the socio-economic development of the Hauts-De-France region, the Inria University of Lille centre pursues a close relationship with large companies and SMEs. By promoting synergies between researchers and industrialists, Inria participates in the transfer of skills and expertise in digital technologies and provides access to the best European and international research for the benefit of innovation and companies, particularly in the region.

For more than 10 years, the Inria University of Lille centre has been located at the heart of Lille's university and scientific ecosystem, as well as at the heart of Frenchtech, with a technology showroom based on Avenue de Bretagne in Lille, on the EuraTechnologies site of economic excellence dedicated to information and communication technologies (ICT).

Contexte et atouts du poste

The PhD candidate will join both the MODAL team based in the Inria center at the University of Lille (France) and the METRICS unit research based in the Faculty of Medicine at the University of Lille.

Inria MODAL team is specialised in statistical learning and most of her members also belong to Paul Painlevé laboratory, whose research covers a broad spectrum of mathematical research.

METRICS is a multidisciplinary public health research team that brings together clinicians and methodologists in the fields of ergonomics, biostatistics, medical informatics, data science and health economics.

Mission confiée

The aim of the PhD thesis is to develop a new statistical method for variable selection in the context of survival analysis, with competing risks, where measurements are repeated over time on thousands of variables simultaneously.

For example, the aim will be to identify new omics markers (transcriptomics, metabolomics, proteomics) for predictive purposes in order to adapt patients' treatment (Precision Health). The originality of the statistical approach consists in simultaneously addressing three scientific challenges: i) high-dimensional analysis (more variables than individuals), ii) analysis of competing risks in the context of survival models and iii) analysis of longitudinal data (repeated measurements on the same individuals).

Results are expected both in terms of biostatistical methodology and software to provide a clinical decision support tool.

Principales activités

The main objective is to develop a statistical method for selecting variables in a context of survival prediction in the presence of competing risks.

Secondary objectives are:

- to improve the search for biomarkers in analyses with repeated omics data
- to develop a decision-support software tool that can be generic and can be used in any context of high-dimensional data analysis with survival models in the presence of competing risks.

PhD candidates who want to understand the concepts necessary for this PhD can read the following references:

- related to statistics

[1] Fine and Gray (1999) A proportional hazards model for the subdistribution of a competing risk. Journal of the American statistical association, 94(446):496–509.

[2] Chi and Ibrahim (2006) Joint models for multivariate longitudinal and multivariate survival data. Biometrics, 62(2):432–445.

[3] Binder, Allignol, Schumacher, and Beyersmann (2009) Boosting for high-dimensional time-to-event data with competing risks. Bioinformatics, 25(7):890–896.

- related to one application which motivated the PhD subject (proteomics data analysis)

[4] Heyse, Vandewalle, Marot, Amouyel, Bauters, and Pinet (2023) Identification of patient subtypes based on protein expression for prediction of heart failure after myocardial infarction. Iscience, 26(3).

Compétences

The candidate must hold a MSc in Biostatistics.

Technical skills and level required :

- Proficiency in R and at least one scripting language (e.g. python)
- In-depth knowledge of statistical learning to handle high-dimensional data
- Basic knowledge of biology (molecular and cellular biology, genomics and genetics)

Other valued appreciated : creativity, independence, team working and communication skills

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** : Computational Biology Statistics (Big data) (BAP E)
- **Ville** : Villeneuve d'Ascq
- **Centre Inria** : [Centre Inria de l'Université de Lille](#)
- **Date de prise de fonction souhaitée** : 2024-10-01
- **Durée de contrat** : 3 years
- **Date limite pour postuler** : 2024-04-30

Contacts

- **Équipe Inria** : [MODAL](#)
- **Directeur de thèse** :
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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'efforce 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

Please send us your CV and cover letter.

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.