



**Offre n°2025-09012**

## **PhD Position F/M Generating expressive motions for humanoid robots**

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

**Niveau de diplôme exigé :** Graduate degree or equivalent

**Fonction :** PhD Position

### **Contexte et atouts du poste**

The position is funded by the ANR project OSTENSIVE, focused on generating motions that convey the purpose of an action in a natural and expressive way. In this context, the HUCEBOT team is involved in designing robot motions that are expressive and facilitate the communication.

About the team:

The candidate will join the Human Centered Robotics team (HUCEBOT) in the Inria Center of the University of Lorraine in Nancy, France.

The team HUCEBOT develops control, learning, and interaction skills of human-centered robots, such as humanoid, mobile manipulators and exoskeletons. The team develops learning and control algorithms for teleoperated / supervised / autonomous robots, involved in complex manipulation tasks in man-made environments. It also develops prediction and control techniques for wearable exoskeletons designed to assist humans at work. The team has excellent robotics facilities, including several humanoid robots (Talos, iCub, G1), manipulators, drones, passive and active exoskeletons, wearable sensors, force plates etc. Its laboratory has a 3D printing facility and a mechatronic workshop for prototyping and maintenance.

The team consists of many research scientists, postdocs, PhD and has the support of 1 software and 1 mechatronics engineer. The team is international - English and French speaking. French is not required, although free French classes are available in the institute for non-French speakers.

About the laboratory and Nancy:

The Inria Center of the University of Lorraine, is co-located with the Loria laboratory, in the Science and Technology Campus of the University of Lorraine (Nancy, France), next to the Botanical Gardens, at 20 minutes by public transportation or bike from the Nancy train station and City Center. Several student residences and facilities are at walking distance. Nancy is a University town, with a high quality of life and a vibrant student and expat community.

## **Mission confiée**

The position is about the design of expressive motions for humanoid robots, e.g., biped robots. The PhD student will collaborate with the engineers of the team to build expressive motions for the many robots of the teams, with a specific focus on humanoid robots such as G1.

To generate the motions, we will explore different strategies, to investigate the limitations and advantages of each in terms of explainability, communication to the partner, communication to the observer, expressivity and human-likeness.

For example, we will take inspiration from the work of Vianello et al. to leverage null-space projection to generate variations of a movement while doing a task; the work of Disney ([https://la.disneyresearch.com/wp-content/uploads/BD\\_X\\_paper.pdf](https://la.disneyresearch.com/wp-content/uploads/BD_X_paper.pdf)) using reinforcement learning from several simulated behaviors; or, we will adopt a different strategy and will apply MAP-elite to generate behaviors exhibiting quality diversity of expressive metrics. We will also consider stochastic optimal control and trajectory optimization to optimize for different criteria, which include the presence of observers potentially interacting with the robot.

The motion generation will integrate the existing low-level whole-body control libraries we use in the team, such as CARTESI/O, OpenSOT, and LLM/VLM and more generally foundation models for motion generation.

Validation on a real world platform such as one of our humanoid robots is fundamental.

The candidate will also interact with the other partners of the OSTENSIVE project to conduct common experiments.

## **Principales activités**

- Review state of the art in expressive and ostensive motion generation

- Generate expressive behaviors for real robots.
- Test generated behaviors on the real robot interacting with humans.
- Collaborate with the team to communicate on the current experiments and developments.
- Demonstrate the research work on real robots.

## Compétences

- Technical skills:
  - Very good programming skills (python, C++).
  - Background in robotics, or Ability to understand mechatronics.
  - Excellent skills and/or experience with reinforcement learning, optimization, numerical optimization, and/or generative AI models.
- Soft skills:
  - Excellent communication skills at work, and ability to report progress
  - Proactivity.
  - Not afraid of challenging projects.
  - Rigour and intellectual honesty
  - Curiosity and desire to learn
  - Practical mindset and ability to develop robust and reliable solutions
  - Autonomy and organizational skills
  - Love working in a multi-cultural environment
  - Team player

## 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

2200 € gross/month

## Informations générales

- **Thème/Domaine** : Robotics and Smart environments  
Software engineering (BAP E)
- **Ville** : Villers lès Nancy
- **Centre Inria** : [Centre Inria de l'Université de Lorraine](#)
- **Date de prise de fonction souhaitée** : 2025-10-01
- **Durée de contrat** : 3 years
- **Date limite pour postuler** : 2025-07-16

## Contacts

- **Équipe Inria** : [LARSEN](#)
- **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.

## L'essentiel pour réussir

Bachelor Degree or Master Degree studies in Computer Science, Robotics, Engineering or AI.  
Excellent communication in English; French is a plus.

**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.