



**Offer #2024-08518**

## **Internship: Haptic feedback to simulate walking on different terrains in Virtual Reality**

**Contract type :** Internship

**Level of qualifications required :** Master's or equivalent

**Fonction :** Internship Research

### **About the research centre or Inria department**

The Inria Centre at Rennes University is one of Inria's eight centres and has more than thirty research teams. The Inria Centre is a major and recognized player in the field of digital sciences. It is at the heart of a rich R&D and innovation ecosystem: highly innovative PMEs, large industrial groups, competitiveness clusters, research and higher education players, laboratories of excellence, technological research institute, etc.

### **Context**

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### **Assignment**

#### **Context :**

This internship will take place in the Seamless team at Inria Rennes. The team specializes in virtual reality and human-computer interactions. During the internship, the intern will explore a multi-disciplinary field that encompasses virtual interactions (programming) and haptic feedback (mechanical engineering, CAD, and robotics).

Many virtual reality applications require users to walk through a virtual environment (e.g., rehabilitation, games, virtual visits, etc). Due to space constraints and to minimize user fatigue, these applications often use a technique called "Walking-In-Place." This approach allows users to control the walking of their virtual character while remaining in the same physical location by performing movements like raising their legs, swinging their arms, or cycling. The technique is efficient; however, since users are not actually walking, the experience can feel less engaging than real walking.

To enhance the user experience of walking, compelling virtual environments can be implemented (e.g., forest, beach, mountain) and haptic (touch) feedback corresponding to the different virtual ground (e.g., mud, sand, snow) can be implemented. Until now, the main haptic strategy consisted of using vibrations underfoot to reproduce different ground, but this feedback is unrealistic and uncomfortable for some users. Another approach will be explored in this internship.

More information can be requested by contacting: [justine.saint-aubert@irisa.fr](mailto:justine.saint-aubert@irisa.fr)

#### **Assignments:**

The internship aims to design haptic feedback to simulate different ground materials and render a compelling experience of walking to Virtual Reality users. The intern will implement the walk of a virtual character in various scenes in Virtual Reality. The virtual walking movement will be based on users' movements tracked by the Virtual Reality system. He/She will design a haptic system to simulate different materials and conduct a user study to test its interest in user experience. The internship could lead to writing a scientific paper, depending on the advancement.

## Main activities

- Bibliographical study
- Programming virtual environments in Unity (C#)
- Designing and implementing the haptic interface (CAO, 3D printings)
- Conducting a user study to validate the interface
- Writing of scientific reports

## Skills

- Skills in programming AND/OR in mechanical engineering, robotics
- Curiosity and adaptability
- Ability to understand and write in English

## Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training

## General Information

- **Theme/Domain** : Interaction and visualization  
Software Experimental platforms (BAP E)
- **Town/city** : Rennes
- **Inria Center** : [Centre Inria de l'Université de Rennes](#)
- **Starting date** : 2025-02-03
- **Duration of contract** : 6 months
- **Deadline to apply** : 2025-01-31

## Contacts

- **Inria Team** : [SEAMLESS](#)
- **Recruiter** :  
Saint-aubert Justine / [justine.saint-aubert@inria.fr](mailto:justine.saint-aubert@inria.fr)

## About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

**Warning** : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

## Instruction to apply

### Defence Security :

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

### Recruitment Policy :

As part of its diversity policy, all Inria positions are accessible to people with disabilities.