

Postdoctoral researcher / Research engineer in Human Machine Interaction – Augmented Reality / Virtual Reality (AR/VR)

Keywords: Human Machine Interaction, Virtual Reality, Virtual Reality Training Systems (VRTS), Virtual Reality Learning Environments (VRLE), Dynamic Learning Scenarios, Artificial Intelligence, Augmented Reality, Collaborative Interactions, Industry of the Future, Human Machine Collaboration, Modelling.

Context of the LINEACT Laboratory from the CESI group:

As a network of higher education and skills training, CESI pursues its societal mission by enabling students, apprentice and employees to become an actor in the company and society transformations, thanks to its Engineering school, High school of apprentices, School of manager training and its certification activity. As an **innovation laboratory**, **LINEACT CESI** anticipates and supports the technological mutations of the sectors and services related to industry and construction. LINEACT CESI is organised around two interdisciplinary scientific themes: "Learning and Innovation" and "**Engineering and Digital Tools**". They are applied into two domains: "**Industry of the future**" and "city of the future". Orientations of the "Engineering and Digital Tools" research theme focus on modelling, simulation and data analysis of industrial or urban systems. Research works are also focusing on **Human Machine Interactions** and particularly on **virtual and augmented environments**.

To support these research and training activities, the laboratory located on the Rouen campus has an Industry of the Future demonstrator. It gathers a flexible production workshop, robotics, simulation tools and augmented reality (AR) and virtual reality (VR) tools. In addition, we are developing the digital twin of this demonstrator as well as proofs of concept in AR, collaborative environments in VR or Virtual Reality Training Systems (VRTS).

In order to support Research and Training activities, a technical platform dedicated to virtual environments and human-machine interactions has been set up. Currently, the LINEACT laboratory has the following hardware for virtual reality: HTC Vive Pro Eyes, immersive helmets, HTC and Valve Index controllers, VIVE trackers, Manus VR gloves and dedicated machines. In addition, installation of a 4-sided CAVE is planned for the first quarter of 2020. For the motion capture, the laboratory has an Optitrack cameras set with the Motive: Body software and some Perception Neuron combinations. As far as the augmented reality is concerned, LINEACT has Microsoft HoloLens headsets, a meta vision headset, Epson Moverio BT-200, Vuzix smart glasses and tablets. New specific equipment dedicated to instrumented VRTS such as VR headsets with ocular activity monitoring or physiological sensors (EEG, ECG, EDA, EMG) are set up. The technical platform has also integrated the iMotions software to store, analyze and visualize data synchronized during sessions in these instrumented environments.

NumeriLab¹ project on digital and instrumented environments for human learning relies on multidisciplinary skills in the fields of Digital Sciences, Computer Science, Social and Cognitive Sciences. The Research and Innovation (R&I) issues concern the modelling and development of these digital and instrumented environments and the associated scripting and pedagogical monitoring tools to enable their use as learning environments. They also focus on the activities, traces and learning data analysis to enable dynamic and adaptive simulations and to evaluate the impact on the acquisition of knowledge and skills.

¹ NUMERILAB project is supported and financed by the Normandy region and the European Regional Development Funds (FEDER).

Missions:

Assigned missions in the NumeriLab project will be:

- To develop the research work and publish it in international conferences or journals. Depending on the profile, the research work will focus on modelling the learner and his/her interactions and/or the development of dynamic situations based on the automatic analysis of activities in VRTS. The VRTS studied will focus on situations in the context of the industry of the future such as collaborative human-robot activities.
- Setting up and exploiting the VRTS experiments.
- Supervising research internships.
- Participate in the development of the technical platform dedicated to virtual and augmented environments.
- Participate in project deliverables.

Type of contract:

18-month fixed-term contract to be filled as soon as possible.

Location:

The work will take place in the LINEACT CESI laboratory on the Rouen Campus.

Candidate's profile:

- Ph.D. in Computer Science on one of these topics: HMI, AR, VR, Machine Learning, Deep Learning
- Skills in Unity – C# and more precisely in AR and VR usage.
- Skills/knowledge in UML object modelling would be a plus.
- Skills/knowledge in machine learning / Deep learning would be a plus.
- Writing ability.
- Human skills: Good interpersonal skills, Open-mindedness, Adaptability.

Contacts:

- Vincent HAVARD (vhavard@cesi.fr), Research, LINEACT CESI Rouen Campus.
- David BAUDRY (dbaudry@cesi.fr), Head of research team "Engineering and Digital Tools", LINEACT CESI.

How to apply:

Please send your application to Vincent Havard vhavard@cesi.fr with the subject line: "[Application] post-doc NumeriLab".

Your application should include:

- The candidate's research resume,
- A cover letter explaining his/her motivation for the proposed subject,
- The defended thesis and the rapporteurs' reviews,
- The two main publications,
- Any letters of recommendation

*Please send all the documents in a zip file called **LASTNAME first name.zip**.*