



## **PhD Grants from the China Scholarship Council: Co-operation Program with the UTs and INSAs (France), Program 2021**

### **Thesis subject :**

Design and development of haptic user-interfaces compatible with the virtual reality system dedicated to workstation design and training.

### **Keywords:**

Virtual reality, haptic, user-interface, ergonomics, work system, design, interaction

### **Description:**

Virtual reality (VR) has been used to design the work system as much as possible adapted to the human users. This tool gives the possibility to best design a work-system (ergonomically adapted to the users) by immersing operators/final users in a virtual environment and obtaining their feedback. However, the final users when are immersed in VR often express dissatisfaction about the lack of feedback and the sense of touch in VR. This gap causes more differences between the work system simulated and developed in VR and future work system will be established based on the VR simulation. The design of haptic (touch-based) devices have improved the dialogue and interaction between a user and a system simulated in VR, and the more realistic sensation/feedback might produce that help to better integrate the human factors in the design phase of a work system.

Many different engineering devices have been developed in the area of haptic user-interface. However, the question is whether the current haptic devices are suitable for VR system dedicated to the ergonomics work system design. We need at this stage to improve the haptic interface design, interaction, and experiences, particularly from user points of view.

Therefore, this Ph.D. thesis focus on how to best design a haptic interface to be adapted with the VR system for the design and development of an ergonomic work system. The Ph.D. candidate, at the first stage, has to provide a panoramic vision of haptic technology used in VR, particularly the VR dedicated to ergonomic design. This step is mainly dedicated to a literature review and knowing/digging the actors of haptic system design in the world. The second step is assigned to evaluate the user acceptance/experiences of haptic technology on VR. A survey has to be designed and conducted at this stage. In the third stage, the experimental study has to be conducted to investigate the effectiveness/weakness of the haptic technology used currently for ergonomic simulation in VR. Finally, a heuristic/guideline should be developed for the use of haptic in VR for ergonomic design which would allow developers and designers of haptic technology to create an effective haptic system for ergonomic design in VR.

### **Expected background of the Ph.D. candidate:**

Virtual reality, Informatics, industrial and system engineering, process optimization, Ergonomic/human factor engineering



### Supervision of the research works :

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