

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences de l'Ingénieur

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Skin mechanics involved in dynamic touch

Our sense of touch is essential in everyday life. It enables us to execute fast and accurate manipulations with our fingers. The loss of tactile sensations severely impairs these capabilities. Tactile information relies on thousands of sensors, called mechanoreceptors, distributed all over the skin surface. These mechanoreceptors act as transducers, i.e., they convert mechanical stresses into electrical signals that are transmitted to the central nervous system. The hands and fingers are the source of most tactile interactions and contain a high density of these sensors. To better understand how the tactile system works, it is crucial to understand the properties of the signals produced by the mechanoreceptors and to relate them to the mechanics taking place in the skin.

In this thesis, methods were developed to measure the deformations of the fingertip skin during precisely controlled stimulations mimicking tactile interactions of everyday life. In a first part, vibrations resulting from the active exploration of textured surfaces with the fingertip were recorded in the forearm, showing that these vibrations travel along the hand and forearm and can be sensed far away from the contact point. In the second part, we described contact changes and strains taking place in the skin at the interface between the finger and the contact during the onset of a slip. These measurements provide an insight on the information available at the contact region during object manipulation. In the third part, we recorded fingertip afferent neuron responses to similar stimuli and showed a specific response of some neurons to the slips taking place in the contact area.

In all three parts, our results provide useful information for the design of sensory prostheses and tactile displays.

Vendredi 31 octobre 2014 à 17h00

Auditoire BARB 94
Place Sainte Barbe, 1
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Membres du jury :

Prof. Jean-Louis Thonnard (UCL), Promoteur
Prof. Philippe Lefèvre (UCL), Promoteur
Prof. Paul Van Dooren (UCL), Président
Prof. André Mouraux (UCL), Secrétaire
Prof. Vincent Hayward (Université Pierre et Marie Curie, France)
Prof. Benoni Edin (UMEA Universitet, Suède)