

NGS RESEARCH OPPORTUNITY

Singapore Institute for Neurotechnology
(www.sinapseinstitute.org)

The Singapore Institute for Neurotechnology (SINAPSE) brings together engineers and scientists to focus on bio-inspired solutions to important engineering problems.

Virtual and Augmented Reality & Tactile Haptic Feedback

Ph.D. Research Description

Virtual Reality (VR) is referred to as immersive multimedia or computer-simulated life. It replicates an environment that simulates physical presence in places in the real world or imagined worlds. Virtual reality can recreate sensory experiences, which include virtual taste, sight, smell, sound, and touch.

Most state-of-the-art virtual reality environments are displayed either on a computer screen or with special stereoscopic displays. However, in our Institute we have a fully immersive virtual and augmented reality CAVE (cave automatic virtual environment). This one-of-a-kind system gives the operator the life-like sense of presence within a "virtual world".

Haptic or tactile feedback is the use of advanced vibration patterns and waveforms to convey information to a user or operator. [The word 'haptics' is derived from the Greek phrase 'I touch'.] The sense of touch within a VR environment will allow the operator to feel the real world far away to enhance deep-sea or extra-solar exploration, building, repair, control of distant robots, disaster recovery, etc.

We are looking for highly motivated individuals to do research in the areas of Virtual and Augmented Reality & Haptics. The fundamental question we want to answer is: How can humans interact naturally with the real world to control robotic agents and other devices in remote locations while immersed within a virtual world with full somatosensory and visual feedback.

During the course of this PhD research topic you will gain expertise in several of the key areas that interest you the most.

- Tactile feedback (force feedback) and display, human haptic perception
- Neuroscience of touch
- Human-robot haptic interaction
- Wireless communication
- Haptic sensors and actuators
- Human-computer interaction involving haptics
- Haptic rendering and modeling

Candidates are encouraged to look up what the list of keywords mean and their relevance to virtual reality, haptics and robotics.

The National University of Singapore is one of the top 25 universities in the world, 6th worldwide (1st in Asia) in Electrical & Electronic Engineering and offers internationally competitive compensation. Source: 2014 QS World University Rankings.

To apply, please contact Prof. Nitish Thakor (Director of SINAPSE) at sinapsedirector@gmail.com or Dr. Sunil Kukreja (Head, Neuromorphic Engineering & Robotics) at sunilkukreja.sinapse@gmail.com.

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