

# Groundbreaking Therapies for Stroke & Elderly Rehabilitation 長者運動及中風復康新科技

## Current challenges

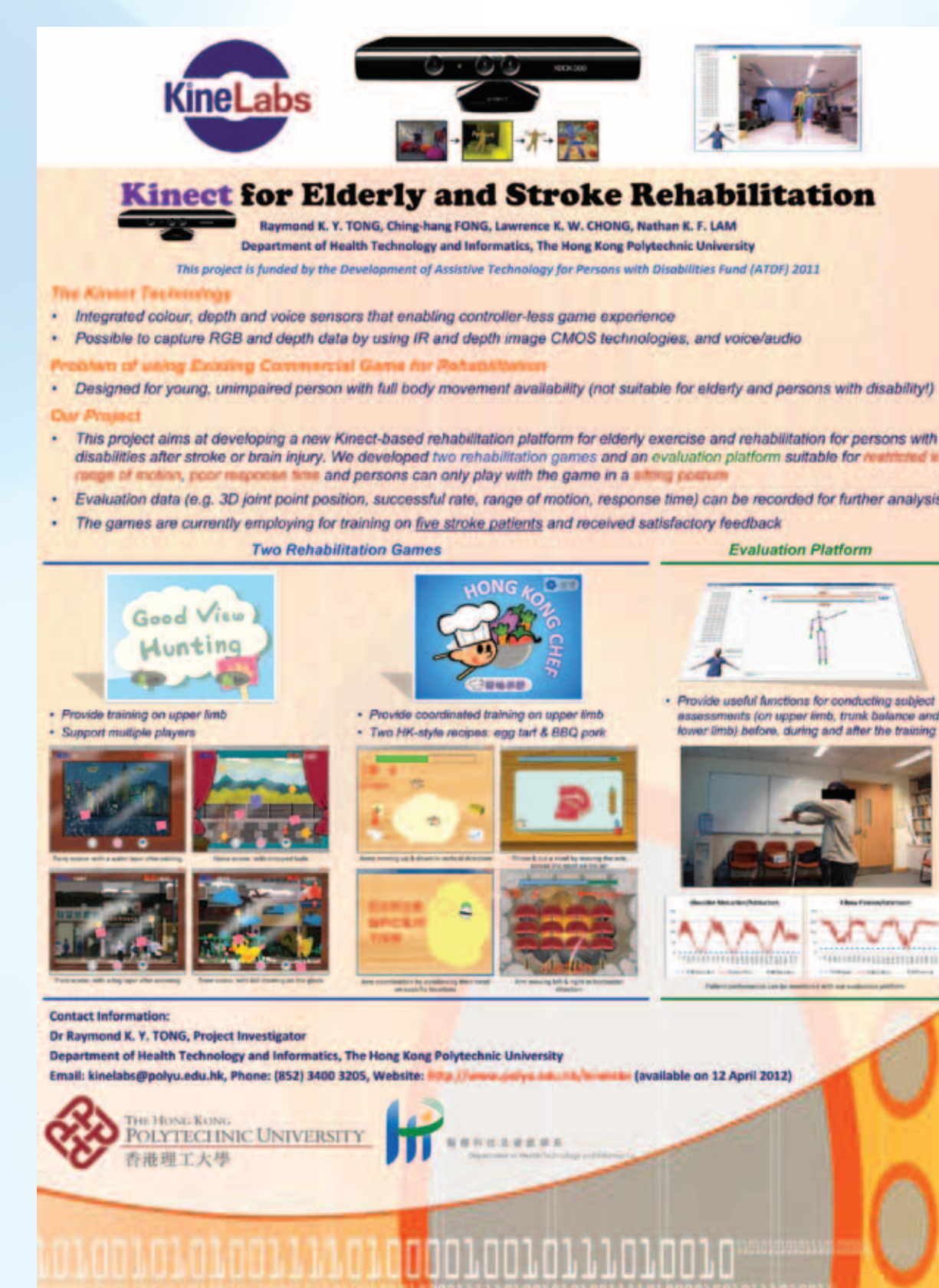
Stroke is the number four killer behind heart disease and cancer in Hong Kong, with over 25,000 people suffering from it every year. Stroke patients often suffer from speech impairment, memory loss and physical disability. Some may even experience paralysis, which greatly affects their activities of daily living. On the road to rehabilitation, stroke patients are often required to engage in a series of monotonous repetitive therapeutic exercises. This long and routine process will make the patients lose motivation and ultimately give up on therapy. Conventional rehabilitation therapies generally employ machinelike exercises and trainings. Therefore, it may take longer time for the effects and improvements to become significant.



## Our solutions

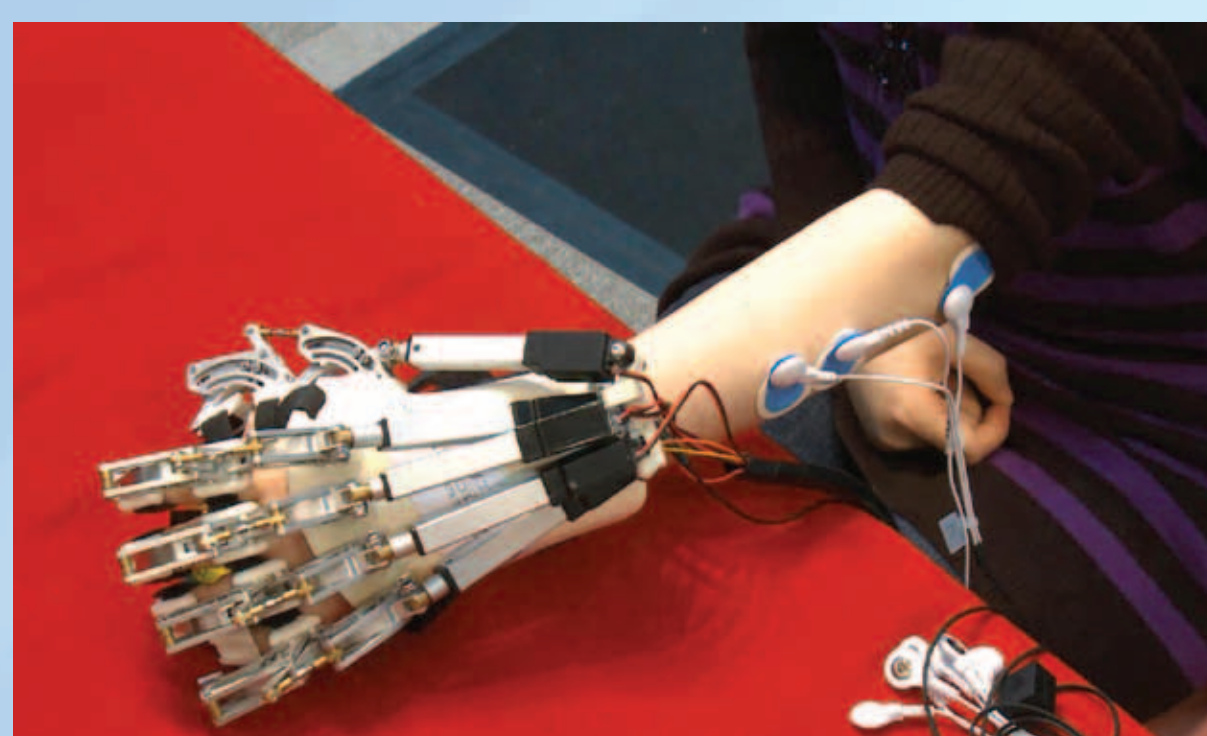
To make the therapeutic exercises more interesting and effective, PolyU researchers developed both a hardware device and a software platform for stroke and elderly rehabilitation.

- "Robotic hand" is an intention-driven training device which aims to rebuild the effective communication between the brain and the hand. It starts off monitoring the patient's own intention to move by detecting electrical muscle activity through electromyography. A nervous response will set the robotic hand in motion, which moves the stiff hand along with the patient's will and intention.
- "KineLabs" is a free software platform with three rehabilitation games for elderly people and persons after stroke to have fun while enhancing their motor skills in a 3D virtual environment. Using kinetic game sensor in stroke rehabilitation settings, KineLabs is able to provide coordinated training on upper limb, lower limb and trunk balance.



## Impact to the world

Our innovative therapies not only boost progress and recovery, but also promote healthy ageing, revitalizing lives of many stroke patients and elderly.



## 目前之挑戰

中風是香港的第四號殺手，每年都有超過2.5萬人中風，患者可能會身體部份麻痺，甚至癱瘓，影響到日常活動。中風復康過程往往需要病人重複相同的身體動作，過程單調，令病人缺乏持之以恆的動力。而且許多康復療法都是較機器式的練習，治療的效果未見明顯。

## 理大之解決方案

為了改善中風復康的療效，理大的科學家在硬件和軟件上皆尋求創新，希望幫助更多的中風病人。

- 「肌動機械手」是一套有效地幫助中風病人作出腦手協調訓練的儀器，它就能透過肌電圖 (EMG) 監測到病人想活動手部的意欲，神經反應就會令到機械手活動起來，讓僵硬的手隨著病人的指令而伸縮。
- 「KineLabs」是一套免費軟件平台，提供三個用3D電腦體感技術的上肢和下肢康復及運動遊戲，融合人體動作和趣味遊戲有助長者運動及中風復康訓練，同時也可以在3D虛擬環境中提升他們的反應和運動能力。

## 對世界之影響

這些嶄新的中風復康技術，不但令治療的過程更加生活化、更加有趣味，有助加速病人的康復進度，而且能夠促進健康頤年，重燃中風病人及長者生命的希望。