

## Research themes

### Perception and action

Research in this theme includes pioneering studies of eye movement behaviour during locomotion in man and the visual guidance of walking.



Recent studies have identified age-related changes in the sampling and processing of sensory information during walking and the risk of trips and falls in older adults and have investigated the potential of sensorimotor training exercises for improving safe mobility in healthy older adults, as well as for rehabilitation in stroke survivors. Research is also carried out to understand the interactive neural processes of perception and interceptive action from simple prehension to complex sport performance in normal aged subjects and in patients with mild concussion and long-lasting brain injury.

### Programmed control

Research in this theme focuses on human standing, balancing, and postural maintenance. These studies investigate the ethology of the nervous system – that is its characteristic behaviour when unperturbed by a stimulus. New ways of examining and modelling the fluctuating output of the nervous system have been devised. The effect of perturbing the motor program is also studied. In principle, understanding the mechanisms that integrate themes i) and ii) will illuminate the way that the CNS deals with what it anticipates and with the unexpected. It will also help to find ways of improving performance in sport and support basic movement rehabilitation following muscle, bone and brain injury.

### Sporting Performance

The interaction between the human actor and environment in sporting performance has been studied in collaboration with the School of Engineering. This research has shown that sport equipment does not always provide the advantage claimed by manufacturers.

In collaboration with the Exercise Metabolism Research Group the effects of the development of progressive fatigue on loss of coordination and psychological/mental variables related to performance and motor control during the triathlon and the effect of optimal sports nutrition are being studied. Other applied work focuses upon the biomechanics of rowing interfaced with the mechanics of the boat. A computer model is under development, which is one of the most comprehensive rower-boat models in the world.

This research has received support from Biomedical Research, Ireland, Leverhulme, SPARC, Stroke Association, Wellcome Trust.

