

Investigating the effects of fatigue on sensorimotor control across the lifespan

This project is led by the BBSRC-funded SWBio DTP, in partnership with the ERSC-funded South West Doctoral Training Partnership (SWDTP).

Supervisory team:

Main supervisor: Prof Andrew Jones (University of Exeter)

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Host institution: University of Exeter

Project description:

We use our hands hundreds of times each day to manipulate and experience our environment, from buttoning our shirt, to lifting a full cup of coffee, to judging whether an avocado is ripe. The skill and flexibility with which we control the movements of our hands is unique in the animal kingdom. A key part of our ability to interact with objects in a skilful fashion is our ability to precisely and automatically control our fingertip forces. Under normal circumstances, this process seems natural and effortless. Under conditions of extreme fatigue, however, grasping and lifting objects can seem substantially more challenging. This is a particularly relevant issue in elderly individuals, who become fatigued far more quickly than younger individuals by a range of everyday tasks.

This PhD project will examine how different types of fatigue affect our ability to interact with objects in our environment. We will use high-resolution motion tracking and object-mounted force sensors to systematically evaluate how different types of fatigue (muscular, central, and cognitive), affect our ability to interact with objects. Although fatigue is a consequence of many different types of disease and injuries, this project will be undertaken in the context of healthy ageing. Across a series of experiments, the trainee will examine the consequences of a range of different fatiguing protocols designed to exhaust individual muscles, the cardiovascular system, or the mind of young-adult, middle-aged, and elderly populations.

This work will not only shed light on how elderly individuals respond to fatigue, but will also answer fundamental questions about how our brain combines information from the central and peripheral nervous systems to control our movements across the lifespan. Beyond these benefits, this research project could have future implications for health and safety protocols for fatigue-intensive environments (e.g., fire and rescue, offshore etc). Because of the inter-disciplinary nature of this project, the trainee will benefit from a range of unique training opportunities in behavioural and physiological research techniques across the UK and Australia.

