The Royal Academy of Engineering

Senior Research Fellowship

Using motion analysis techniques and objective classifiers to characterise mechanisms of human movement and postural control

Funded by The Leverhulme Trust

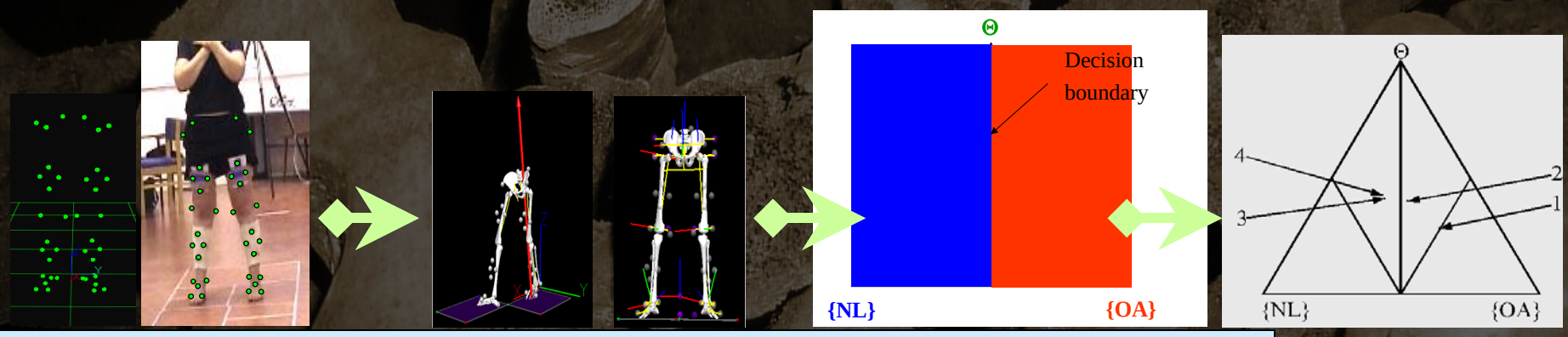
Dr Cathy Holt, Cardiff School of Engineering

Motion analysis and functional classification of human movement

Motion analysis produces information about patterns, magnitudes and variability of daily activity dynamics and analysis and assessment, involving biomechanical engineers, therapists and clinicians can be subjective

Emerging objective classification techniques produce an index of pathology away from normal without informing the user of the significance of the various gait signals thus they are unappealing to the clinical community

Dempster-Shafer Theory applied to knee function variables with simplex plot classification of subjects; osteoarthritic (OA) or normal (NL), is used to diagnose knee OA and recovery for 1-year following Total Knee Replacement surgery



Developments in orthopaedics, imaging and animal models

Brain imaging combined with motion analysis can be used to correlate brain function with movement control and adaptation to analyse degeneration and rehabilitation for diseases such as Parkinson's, Huntingdon's and for stroke

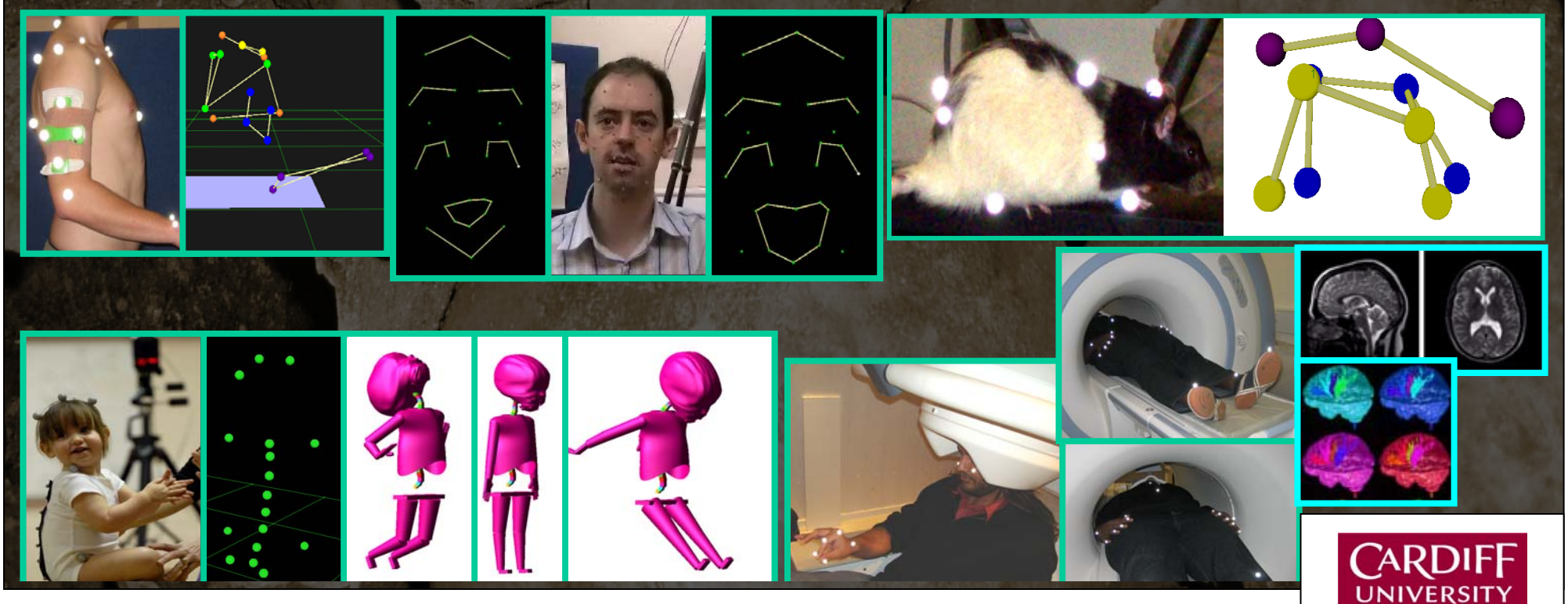
Collaborations: Cardiff University Brain Repair and Imaging Centre (CUBRIC) & Brain Repair Group to apply the classifier to human and animal motion and study movement patterns in Huntingdon's and Parkinson's disease

Objective 1 - Develop and consolidate classifier applications in orthopaedics and dentistry

Objectives 2 & 3 - Investigate its application in associated challenging, emerging research areas:

a. Define protocols for future studies synchronising measurement of brain function and analysis of motion

b. Quantitative analyses of movement disorder in Huntington's disease in patients and transgenic animals



The Leverhulme Trust

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD