



**University of
Sunderland**



With images: Image attached. Shows a rider wearing the Xsens™ MVN inertial motion capture suit, with sample screen captures from the MVN Studio™ data capture software. High resolution version available on request from liz.gandy@sunderland.ac.uk.

Video game technology aids horse rider assessment

HORSE riders' balance, symmetry and poor posture could be improved thanks to an innovative body suit that works with motion sensors, commonly used by movie makers and the video games industry.

New research by Elizabeth Gandy, a senior lecturer in the University of Sunderland's Department of Computing, Engineering and Technology, uses inertial motion sensors worn in the Xsens™ MVN body suit, is now showing promising results as a method of assessing rider asymmetry and lower back pain and injury risk.

The research has been supported by funding from the University's Faculty of Applied Sciences Digital Innovation research beacon and has now been published in the Sports Technology journal titled: 'A preliminary investigation of the use of inertial sensing technology for the measurement of hip rotation asymmetry in horse riders'.

Elizabeth said: "Lower back pain affects around one-third of the UK adult population and studies have reported that some of the highest injury rates are to be found in equestrian sports. Despite this, limited scientific research has been carried out into the effects of asymmetry and poor posture on rider health.

"The incorporation of inertial motion sensors into a body-worn suit is an emerging technology, which provides a non-constraining alternative to video capture for motion analysis. Examples include medical research and applications within the video game and film industries."

To evaluate the potential of this technology for rider assessment, Elizabeth and colleagues, in collaboration with research associates from the Saddle Research Trust, carried out a postural analysis of 12 riders wearing the Xsens™ MVN inertial motion capture suit. Hip angle rotation was measured and software developed to customise the analysis of the data for rider analysis. Results revealed the presence of asymmetry in all of the 12 riders studied, with up to 27° difference between left and right hips, 83 per cent with greater external rotation of the right hip.

“This preliminary study has demonstrated that the use of the inertial motion sensor suit provides an efficient and practical method of assessing riders during a range of movements,” explained Elizabeth. “Furthermore, the technology could potentially provide a tool to meet the needs of riders and coaches, for assessment within training and competitive environments.”

The MNV Biomech is a 3D human kinematic, camera-less measurement system, with integrated small tracking sensors placed on the joints, which can communicate wirelessly with a computer to capture every twist and turn of the body and is displayed as an avatar and a 3D set of data on screen.

From biomechanics, sports science, nurse training, rehabilitation and ergonomics are just some of the areas the University of Sunderland’s researchers and students are now exploring since investing in the hi-tech suit in 2011, developed by Dutch company Xsens.

Previously used to create the animated alien in the science fiction movie ‘Paul’, the suit works with sensors and can be used in most environments, both internal and external. Previous technology at the university meant any 3D motion capture data had to be recorded via fixed cameras in a lab.

The full results of the Elizabeth’s study will be presented at the second Saddle Research Trust International Conference, to be held in Cambridge on 29th November 2014 at Anglia Ruskin University.

The conference is supported by World Horse Welfare (WHW) and is approved by the British Equine Veterinary Association (BEVA). Advance tickets are £100 but you can take advantage of 15 per cent discount if you book by 1st June, £75 for SRT, BEVA, WHW, BETA members and students or £150 on the door.

More details and the full conference programme can be found at:

<http://saddleresearchtrust.com/conference.html>

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Notes to editors

- Publication reference: Gandy E.A., Bondi A., Hogg, R, & Pigott, T.M.C. (2014). A preliminary investigation of the use of inertial sensing technology for the measurement of hip rotation asymmetry in horse riders. *Sports Technology*. doi: 10.1080/19346182.2014.905949. Available from:

<http://www.tandfonline.com/doi/full/10.1080/19346182.2014.905949>

- The University of Sunderland Faculty of Applied Sciences Digital Innovation Beacon brings together researchers from throughout the digital economy to conduct research that leads to breakthroughs in innovation and strategic questions, focussing on four key themes: Big data; Energy efficient and safe vehicles; Informatics for business and management; Technology-enhanced living. Further information can be obtained from:

<http://www.sunderland.ac.uk/research/areasofresearch/digitalinnovationbeacon/>

- The Saddle Research Trust was founded in 2009 to promote the welfare of the ridden horse and to raise awareness of the widely underestimated issues surrounding saddles, equine backs and performance. Trust Director, Anne Bondi, is currently undertaking a Professional Doctorate Research Programme at the University of Sunderland, studying the interaction of horses, saddles and riders. The SRT facilitates collaborations between its Research Associates and promotes objective scientific research in order to further its aims. Further information can be obtained from:

<http://saddleresearchtrust.com/>