University of Birmingham

Dr Mark Elliott

Research Fellow in Human Movement Timing and Coordination

School of Psychology (/schools/psychology/index.aspx)

Contact details

Telephone +44 (0)121 414 7260 (tel:+44 121 414 7260)

Email m.t.elliott@bham.ac.uk (mailto:m.t.elliott@bham.ac.uk)

Twitter @dr_mte (http://twitter.com/@dr_mte)

School of Psychology
University of Birmingham
Edgbaston
Birmingham
B15 2TT
UK

About

Dr Elliott is a Research Fellow in the Sensory Motor Neuroscience (SyMoN) lab. His work investigates how the brain combines information across the senses such that we are able to time and coordinate movements with our surrounding environment. He is currently investigating how groups of people move together in synchrony, occurring in scenarios such as dance, music or simply walking together. Dr. Elliott is the author of the MatTAP toolbox for movement timing experiments.

Qualifications

PhD Biomedical Engineering (Aston); MEng(Hons) Electronic Systems Engineering (Aston)

Biography

Dr Mark T. Elliott graduated with an MEng in Electronic Systems Engineering from Aston University in 2000. He spent 3 years working in the telecommunications industry before deciding to return to Aston University to do his PhD in Biomedical Engineering. During his PhD he developed novel systems and algorithms for automatically discriminating between normal and affected walking. Dr Elliott joined the University of Birmingham in 2007 as a research fellow on a BBSRC funded research grant. He is currently co-investigator on a 42-month EPSRC grant investigating group movement timing.

Teaching

Cognitive Neuropsychology and Rehabilitation (Modules: Gait, Motor Control, Multisensory)

Research

Dr. Elliott's research investigates how we use sensory information to time and synchronise our movements. These can be 'automatic' everyday movements such as walking or nodding our head along to a song; or those which are more complicated, such as a musician playing in an orchestra or a dancer performing complex choreographed movements.

He has recently investigated how the brain integrates multisensory timing information when people are synchronising movements to repetitive events or rhythms. This research has led to the development of Bayesian models that allow estimation of the expected timing errors in movements based on the statistics of the sensory events being synchronised with. This research was funded by the BBSRC in the UK.

He is now investigating how people synchronise actions when moving together as a group. It is known that people can be influenced by others in their actions and indeed on occasions find themselves moving in synchrony with another person (e.g. when walking). In some situations group synchrony can cause problems. For example, the famous Millenium Bridge issue in London, where large scale synchrony of movements led to extreme interactions with the bridge's structure. His current work is investigating what sensory information is required that leads to a group of individuals becoming synchronised. In particular, he is interested how the brain combines visual timing information from each member of the group as a cue for one's own movement. The models produced in this research will be done in collaboration with the Vibration Research Group at Sheffield University. It is hoped these models will allow more advanced bridge and stadium structures to be designed. This research is being funded by the EPSRC in the UK.

Publications

Wright, R. L., & **Elliott, M. T.** (2014) Stepping to phase-perturbed metronome cues: multisensory advantage in movement synchrony but not correction. Front. Hum. Neurosci. **8**:724. doi: 10.3389/fnhum.2014.00724

Sofianidis, G., **Elliott, M. T.**, Wing, A. M., & Hatzitaki, V. (2014). Can dancers suppress the haptically mediated interpersonal entrainment during rhythmic sway?. Acta psychologica, 150, 106-113.

Elliott, M. T., Wing, A. M., & Welchman, A. E. (2014). Moving in time: Bayesian causal inference explains movement coordination to auditory beats. Proc. R. Soc. B, 281(1786), 20140751. *DOI:10.1098/rspb.2014.0751*

Racic, V., Wang, S., Brownjohn, J.M.W., **Elliott, M. T.**, Wing, A. (2013) Effect of sensory stimuli on dynamic loading induced by people bouncing. IMAC XXXI: A Conference and Exposition on Structural Dynamics, 11-14 February, Orange County, California, USA.

Elliott, M. T., Wing, A. M., & Welchman, A. E. (2011). The effect of ageing on multisensory integration for the control of movement timing. Exp Brain Res, 213(2), 291-298. *DOI: 10.1007/s00221-011-2740-x*

Noormohammadi, N., Brownjohn, J. Wing, A., Racic, V., Johannsen, L., **Elliott, M.** (2011). Effect of different cues on spectators' synchronisation, a vibration engineering approach. Proceedings of the 8th International Conference on Structural Dynamics, EURODYN 2011.

Elliott, M. T., Wing, A. M., & Welchman, A. E. (2010). Multisensory cues improve sensorimotor synchronisation. Europ J Neurosci, 31, 1828-1835. *DOI: 10.1111/j.1460-*

9568.2010.07205.x

Elliott, M. T., Petra, I., Ma, X., Brett, P. N., & Holding, D. J. (2009). Quantifying sway through surface deflection patterns: a novel approach using distributive tactile sensing. P I Mech Eng H, 223(7), 903-911. *DOI: 10.1243/09544119JEIM509*

Elliott, M. T., Ma, X., & Brett, P. N. (2009). A smart sensing platform for the classification of ambulatory patterns. P I Mech Eng H, 223(5), 567-575. *DOI: 10.1243/09544119JEIM523*

Elliott, M. T., Welchman, A. E., & Wing, A. M. (2009). Being discrete helps keep to the beat. Exp Brain Res, 192(4), 731-737. *DOI:10.1007/s00221-008-1646-8*

Elliott, M. T., Welchman, A. E., & Wing, A. M. (2009). MatTAP: A MATLAB toolbox for the control and analysis of movement synchronisation experiments. J Neurosci Meth, 177(1), 250-257. *DOI:10.1016/j.neumeth.2008.10.002*

Media experience

"Today" BBC Radio 4. (May 2014) Live interview discussing my recent paper and the science behind DJ beat mixing.
See: **http://www.bbc.co.uk/news/entertainment-arts-27498611 (http://www.bbc.co.uk/news/entertainment-arts-27498611)**

"The Naked Scientists" BBC Cambridge/BBC 5 Live. (May 2014) Live interview discussing my recent paper and the science behind DJ beat mixing.

The Conversation: Smart DJs use maths to mix the perfect beat. (May 2014) Wrote article for the general public covering my current research. **https://theconversation.com/smart-djs-use-maths-to-mix-the-perfect-beat-27003 (https://theconversation.com/smart-djs-use-maths-to-mix-the-perfect-beat-27003)**