Luca Angius BSc, MSc, PhD, FHEA

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RESEARCH INTEREST

My research primarily investigates the brain to muscle relationship during physical exercise, exploring the neurophysiological mechanisms underlying exercise-induced fatigue and exercise tolerance. My research focuses on the application of non-invasive brain stimulation techniques, such as transcranial magnetic stimulation (TMS), including transcranial direct current stimulation (tDCS) and transcutaneous nerve stimulation to elucidate the role of the central nervous system in regulating exercise. More recently, I have started working on the effect exercise on motor unit behavior, aiming to understand the neurophysiological mechanisms that modulate muscle activation during fatiguing exercise.
The overarching objective of this work is to unravel the neurophysiological and psychological mechanisms underpinning fatigue during physical exertion, with the ultimate goal of leveraging these insights to enhance physical performance and quality of life in both healthy adults and individuals with neurological conditions.

EDUCATION

2020	**Fellowship of the Higher Education Academy (FHEA).**
2012 - 2016	**PhD in Sport & Exercise Science and Sports Therapy,** University of Kent (UK).
2010 - 2013	**PhD in Biology Biochemistry of Human and Environment**, University of Cagliari (IT).
2006 - 2008	**MSc in Sport Science**, University of Cagliari (IT).
2003 - 2006	**BSc in Sport Science**, University of Cagliari (IT).

ACADEMIC WORKING EXPERIENCE

April - 2024	**Research Fellow**, Gordon Center for Medical Imaging, Massachusetts General Hospital, Harvard University.
Since 2022	**Assistant professor/Senior Lecturer,** Northumbria University, Newcastle (UK).
2021 - 2022	**Lecturer**, Northumbria University, Newcastle (UK).
2018 - 2021	**Vice Chancellor's Research Fellow,** Northumbria University, Newcastle (UK).
2017 - 2018	**Postdoctoral research associate and Associate Lecturer,** University of Kent (UK).

ACADEMIC MEMBERSHIPS

- **American Physiological society (APS)** – Regular member from 2014.
- **European College of Sport Science (ECSS)** – Member from 2013.
- **The Physiological Society** – Affiliate Member from 2013.

PEER-REVIEWED SELECTED PUBLICATIONS

1. **Angius L.**, Ansdell P., Škarabot J., Goodall1 S., Thomas K., Gowper C., Santarnecchi E., Kidgell D.J., Howatson G. Anodal tDCS improves neuromuscular adaptations to short-term resistance training of the knee extensors in healthy individuals. *Journal of Neurophysiology*. Accepted for publication. October 2024.
2. Martens G., Hody S., Bornheim S., **Angius L.,** Fregni F., Ruffini G., De Beaumont L., Kaux J-F., Thibaut A., Bury T. Can transcranial direct current stimulation (tDCS) over the motor cortex increase endurance performance in running? A randomized controlled trial. *Plos One.* October 2024. Accepted for publication
3. Hayman O., Ansdell P., **Angius L**., Thomas K., Horsbrough L., Howatson G., Kidgell D.J., Škarabot J. & Goodall S. Changes in motor unit behaviour across repeated bouts of eccentric exercise. *Experimental Physiology.* 2024 Sep 3. doi: 10.1113/EP092070.
4. **Angius L.,** Del Vecchio A., Goodall S, Thomas K., Ansdell P., Atkinson E., Farina D., Howatson G. Supraspinal, spinal, and motor unit adjustments to fatiguing isometric contractions of the knee extensors at low and high submaximal intensities in males. *Journal of Applied Physiology*. 2024 May 2. doi: 10.1152/japplphysiol.00675.2023.
5. **Angius L.,** Critical considerations on tDCS-mediated changes in corticospinal response to fatiguing exercise. *The Journal of Physiology.* 2022 Dec; doi.org/10.1113/JP284152.
6. Ansdell P, Brownstein CG, Škarabot J, **Angius L**, Kidgell D, Frazer A, Hicks KM, Durbaba R, Howatson G, Goodall S, Thomas K. Task-specific strength increases after lower-limb compound resistance training occurred in the absence of corticospinal changes in vastus lateralis. *Experimental Physiology.* 2020 May 4. doi: 10.1113/EP088629.
7. **Angius L**, Crisafulli A. Exercise intolerance and fatigue in chronic heart failure: is there a role for group III/IV afferent feedback*? European Journal of Preventive Cardiology*. 2020 Feb 11:2047487320906919.

8. **Angius L**, Santarnecchi E, Pascual-Leone A, Marcora SM. Transcranial Direct Current Stimulation over the Left Dorsolateral Prefrontal Cortex Improves Inhibitory Control and Endurance Performance in Healthy Individuals. *Neuroscience*. 2019 Sep 5. doi:10.1016/j.neuroscience.2019.08.052.
9. **Angius, L.,** Pascual-Leone, A., Santarnecchi, E. Brain stimulation and physical performance. *Progress in Brain Research. 2018;* 240:317-339.
10. **Angius, L.,** Mauger, A.R., Hopker, J.G, Pascual-Leone, A., Santarnecchi, E., Marcora, S.M. Bilateral extracephalic transcranial direct current stimulation improves endurance performance in healthy individuals. *Brain Stimulation. 2018 Jan - Feb;11(1):108-117.*
11. **Angius, L**., Hopker, J.G, & Mauger, A. R. (2017). The Ergogenic Effects of Transcranial Direct Current Stimulation on Exercise Performance. *Frontiers in Physiology*, *8*, 90.
12. Smirmaul, B. P. C., de Moraes, A. C., **Angius, L**., & Marcora, S. M. (2017). Effects of caffeine on neuromuscular fatigue and performance during high-intensity cycling exercise in moderate hypoxia. *European Journal of Applied Physiology*, *117*(1), 27–38.
13. **Angius, L**., Pageaux, B., Hopker, J.G, Marcora, S. M., & Mauger, A. R. (2016). Transcranial direct current stimulation improves isometric time to exhaustion of the knee extensors. *Neuroscience*, *339*, 363–375.
14. **Angius, L.,** Hopker, J. G., Marcora, S. M., & Mauger, A. R. (2015). The effect of transcranial direct current stimulation of the motor cortex on exercise-induced pain. *European Journal of Applied Physiology*, *115*(11), 2311–2319.
15. Pageaux, B., **Angius, L**., Hopker, J.G., Lepers, R., & Marcora, S. M. (2015). Central alterations of neuromuscular function and feedback from group III-IV muscle afferents following exhaustive high-intensity one-leg dynamic exercise. *American Journal of Physiology. Regulatory, Integrative and Comparative Physiology*, *308*(12), R1008–1020.
16. Marongiu, E., Piepoli, M., Milia, R., **Angius, L**., Pinna, M., Bassareo, P., Roberto, S., Tocco, F., Concu, A., Crisafulli, A. (2013). Effects of acute vasodilation on the hemodynamic response to muscle metaboreflex. *American Journal of Physiology. Heart and Circulatory Physiology*, *305*(9), H1387–1396.
17. Crisafulli, A., Tocco, F., Milia, R., **Angius, L**., Pinna, M., Olla, S., Roberto, S., Marongiu, E., Porcu, M., Concu, A. (2013). Progressive improvement in hemodynamic response to muscle metaboreflex in heart transplant recipients. *Journal of Applied Physiology (Bethesda, Md.: 1985)*, *114*(3), 421–427.
18. Roberto, S., Marongiu, E., Pinna, M., **Angius, L**., Olla, S., Bassareo, P., Tocco, F., Concu, A., Milia, R., Crisafulli, A. (2012). Altered hemodynamics during muscle metaboreflex in young type 1 diabetes patients. *Journal of Applied Physiology (Bethesda, Md.: 1985)*, *113*(8), 1323–1331.

BOOK CONTRIBUTIONS

1. **Angius L.,** Staiano W. and Tempest G.D. Exploring the psychophysiological mechanisms underlying the relationship between cognitive function and exercise performance. Sport and Exercise Psychophysiology, Springer.

INVITED LECTURES AND RESEARCH SEMINARS

1. **Angius L.** *Non-invasive brain stimulation to treat fatigue during exercise*. Spaulding Neuromodulation Center, Harvard University, Cambridge, 25-07-2024.
2. **Angius L.** *Applications of exercise and brain stimulation for physical and mental health*. Massachusetts General Hospital, Harvard University, Boston, 02-07-2024.
3. **Angius L.** Testing neuromuscular function. Gordon Center for Medical Imaging, Massachusetts General Hospital, Harvard University, Boston, 06-06-2024.
4. **Angius L.,** *The effect of brain stimulation on exercise performance: state of the art and future perspectives.* Institute of Molecular Bioimaging and Physiology, University of Milano, 15-12-2016.

ORAL COMUNICATIONS IN CONFERENCES

1. **Angius L.,** Ansdell P., Škarabot J., Goodall S., Thomas K., Howatson G. *Anodal-tDCS improves short-term strength training adaptations of the knee extensors in healthy recreational individuals: a neurophysiological study.* European College of Sport Science 2023, Paris.
2. Mauger A., Hendy A. and **Angius L.** *Brain stimulation: an emerging phenomenon in sport and exercise.* Invited plenary session at the European College of Sport Science 2019, Prague.
3. Marcora S., & **Angius L.** *Transcranial direct current stimulation over the left dorsolateral prefrontal cortex improves inhibitory control and endurance performance.* European College of Sport Science 2018.
4. **Angius L.,** Marcora S., Hopker J. and Mauger A. *Transcranial direct current stimulation improves cycling performance in healthy individuals.* The Biomedical Basis of Elite Performance 2016, The Physiological Society.
5. **Angius L.,** Pageaux B., Hopker J., Marcora SM., Mauger AR. *Transcranial direct current stimulation improves isometric time to exhaustion performance of lower limbs.* Physiology 2015, The Physiological Society.