**Collaborative VC / PhD Scholarship: Biomechanical adaptations to changes in bicycle set-up in elite athletes**

In collaboration with the English Institute of Sport (EIS), British Cycling (BC) and the Sport and Physical Activity Research Centre (SPARC) at Sheffield Hallam University (SHU) invites applications for a PhD investigating the effect of changes to the position of a rider on a bicycle on pedalling mechanics and external power output.

Aerodynamic drag accounts for 90% of the resistive forces acting on a cyclist during track cycling, of which 80% is a result of the rider position on the bike (Oggiano et al., 2007). The significance of aerodynamics on athlete performance in cycling is well documented (Lukes et al., 2005; Underwood et al., 2011; Kyle, 2003; Gracia–Lopez, 2008). As a result, reducing aerodynamic drag has been the main driver for making changes to a cyclist’s position in British Cycling.

However, applied work at British Cycling has indicated that aggressive aerodynamic positions may negatively impact a rider’s biomechanics (through reductions in external power output and detrimental pedalling mechanics), and consequently performance. The body position which results in the highest external power output is not necessarily the position with the lowest aerodynamic drag (Underwood et al., 2010). Finding the optimal external power output to aerodynamic drag ratio and understanding the trade-off between aerodynamic positioning and rider biomechanics is crucial to identify the best position to yield the greatest performance gain. To date, little research has explored this trade-off, due to the complexity of the musculoskeletal system, the high cost and complicated nature of establishing valid aerodynamic drag measurements, as well as limited access to elite athletes (Turpin & Waiter, 2020). Research is needed to better understand the trade-off between aerodynamic drag and external power output when modifying a rider’s position on the bicycle.

The PhD will investigate the acute biomechanical impact of changes to the front end and changes to the saddle position on pedalling mechanics. The research will also explore the riders’ adaptations to these changes over a period of time to better understand an athlete’s capability to change and adapt to new positions, and ultimately determine the best rider position that both maximises power output and reduces aerodynamic drag. The PhD will be based at the National Cycling Centre in Manchester. This research will be conducted using cyclists on the British Cycling programme and will help support the Positional Optimisation theme at British Cycling for the Paris 2024 Olympic cycle and further beyond to LA 2028.

SPARC conducts research activity in several key areas and hosts four Research Groups:

* Physical Activity, Wellness and Public Health
* Sports Industry Research Group
* Sports Engineering Research Group
* Sport and Human Performance

<https://www.shu.ac.uk/research/specialisms/sport-and-physical-activity-research-centre>

In the 2021 Research Excellence Framework (REF), 88% of our research was rated as world-leading and internationally excellent (4\* and 3\*), with 80% of our research impact rated as world-leading (4\* - the remaining 20% 3\*) and 100% of our research environment judged to be 3\* or 4\*. Our innovative and applied research is funded through research councils and charities grants, in addition to investment from companies and organisations in the sport and physical activity industry. Staff have well-established national and international collaborations with academics and industry/clinical partners. We have a community of approximately 45 postgraduate students in sport and physical activity who are at the heart of contributing to our research output. All doctoral students are supported

by a comprehensive programme of doctoral training and encouraged to present their research findings at national and international conferences.

You are encouraged to contact the Director of Studies, Jon Wheat J.wheat@shu.ac.uk and Deborah Newton deborah.newton@eis2win.co.uk for further information prior to applying.

**Who should apply?**

Applicants should have a 1st or 2:1 honours degree (or equivalent) in sports science, biomechanics, engineering or a related area. An MSc. in a related area would be beneficial, as would experience of providing applied support to athletes. We are offering this as a full-time PhD scholarship. We welcome applications from all members of our community and are particularly encouraging those from diverse groups, such as members of the LGBTQIA+, BAME and disabled communities.

More details of our entry requirements can be found here [PHD Sport and Physical Activity Full time 2022 | Sheffield Hallam University (shu.ac.uk)](https://www.shu.ac.uk/courses/sport-and-physical-activity/phd-sport-and-physical-activity/full-time/2022)

**International Applicants**

International applicants please be aware that the bursary will cover only the Home fee. The shortfall between the Home and Overseas fee, currently around £10,300 per year, must be covered by the student for the 3-year duration of the studentship.

We also have a mandatory English language requirement of IELTS 7, or equivalent language qualification. This qualification should have been taken within the last two-years, with a score of at least 7 in all test areas.

**How to apply**

For more information about how to apply and an application form please visit [https://www.shu.ac.uk/research/degrees/apply](https://www.findaphd.com/common/clickCount.aspx?theid=4574&type=186&DID=1850&url=https%3a%2f%2fwww.shu.ac.uk%2fresearch%2fdegrees%2fapply)

For general enquires please contact the Health Research Institute Postgraduate Research Team via email at Health-PGR-admissions@shu.ac.uk

Submit your application and a cover letter to Health-PGR-admissions@shu.ac.uk **by the submission deadline.**  **Please do not submit your application and references** **to new-applications@shu.ac.uk**

**What is the submission deadline?**

The closing date for applications: **12 noon** **29 July 2022.**

Interviews are likely to take place during the week commencing **8th August 2022**

Start date of the scholarship: **1st October 2022**

**Further Information about the scholarship**

Scholarships are available for 36 months of full-time or 60 months of part-time funding to include:

* An annual maintenance stipend at standard UKRI stipend rates £16,062 (approx) per annum for 2022/2023 full-time study; £8,031 (approx) per annum for part-time study. The stipend is paid monthly tax free and is intended to cover basic living costs to enable you to undertake your studies.
* University tuition fees at Home levels.