

## Sport Science and Human Health Newsletter 2022

### List of Courses

#### BSc

Sport & Exercise Science  
Biomedical Sciences (Nutrition, Health  
and Exercise)  
Human Biology & Health  
Life Sciences

#### MBiol

Biology

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**IBERS** Institute of Biological,  
Environmental and Rural Sciences

### Special issue: Research led teaching

For this newsletter, the focus is on 'Research led teaching'. What that is? Well, it first means that your lecturers who deliver the modules are doing research alongside their teaching. For example, during the summer or as part of research groups who have researchers focussing on the research year round.

More importantly, your lecturers are embedding their research in their teaching activities. This could be current research, or previous research expertise. It also involves general skills, such as statistical analysis and research designs; skills that have emphasis in modules like **BR12410 Study and Communication Skills**, **BR25620 Research Methods** and the **BR36440 Research Project's Dissertation**.

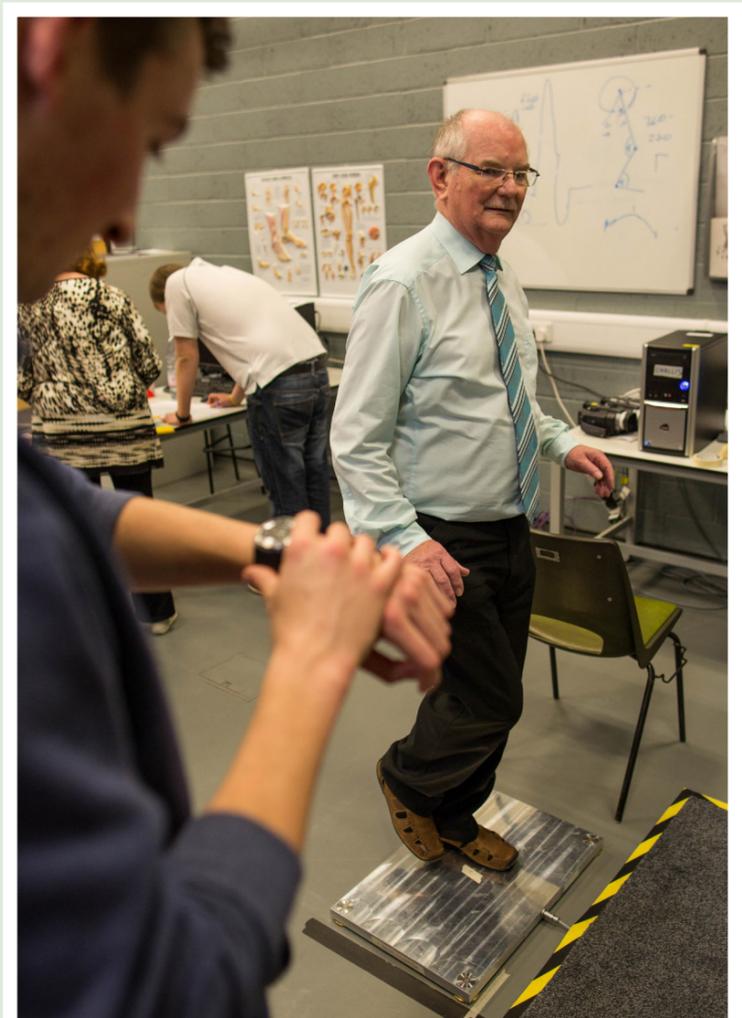
The research being done is also an opportunity for students to get involved. As participants, as volunteers, as part of the dissertation or as paid members of the research team, typically for short projects. These experiences add to your experiences as a student. They can help you stand out from the crowd and give you an advantage when applying for jobs after graduation.

This special issue focuses on all these things and gives a flavour of the research that is done by your lecturers. If you want to find out more about the research itself, visit our research websites such as [www.WARU.org.uk](http://www.WARU.org.uk), <https://stroke.aber.ac.uk/>, or <https://ruralhealth.aber.ac.uk/> and explore some of the facilities available.

### Strength, balance, and mobility of older adults

As part of the Wellbeing and health Assessment Research Unit, colleagues have been researching the general physical decline due to 'getting older'. The decrease in muscle mass starts to occur after your 30s, but typically progresses faster the older you get. However, the rate of decline varies massively between people. Those that seem to be most active, do some form of strength training and balance training, appear to show the least decline. More importantly, that means they maintain the best mobility, strength, and balance. "Actually, measuring someone's usual walking speed and grip strength is a good indicator of overall health, and I wished that the likes of the NHS would make them routine health monitoring assessments, just like blood pressure, or diabetes", according to Dr Marco Arkesteijn.

Examples of research done at Aberystwyth University include intervention studies, qualitative research and observational studies. Intervention studies have focused how to persuade older adults to become more active, supported with online monitoring tools. During teaching, intervention designs feature heavily in modules such as **BR26320 Improving Physical activity and Sport Performance** and **BR34420 Training and Performance Enhancement**. Qualitative research is part of various studies to gain more insight into people's opinions. For example, on how the COVID19 pandemic has made some people more active, and more outdoorsy, whereas for others it reduced their physical activity. This is for example covered in **BR16120 Psychology of Physical Activity and Health**, where students do a similar qualitative data analysis. Observational studies include how fatigue affects the balance and gait of older adults, or a comparison of strength exercises to target specific muscles. The equipment used is taught in practicals for modules like **BR16420 Anatomy and Kinesiology** and **BR26420 Motor Learning and performance**, whilst the research itself is embedded in lectures or seminars.



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## Brief Lifestyle Interventions for People at Risk of Developing Diabetes

Staff at Aberystwyth University from the Centre for Excellence in Rural Health Research have been working closely with colleagues in the NHS and across the Welsh universities to evaluate the effectiveness of a diabetes prevention programme (DPP). The findings of this research have been incorporated into a number of modules across the Sport and Exercise Science, Human Biology and Health and Biomedical Sciences schemes.

In 2020, Wales had the highest prevalence of diabetes in the UK with 209,015 people diagnosed, 8.0% of the population. It is also estimated that a further 580,000 are at risk of developing type 2 diabetes and if the current increase in prevalence continues, 311,000 people in Wales will have diabetes by 2030. Working with GPs in the North Ceredigion and Neath Port Talbot areas, staff and research students from Aberystwyth and Swansea Universities evaluated the use of a brief intervention for people at risk of developing diabetes. Delivered through primary care, the brief intervention involved a 30-minute face-to-face consultation with a health care practitioner. During the consultation the patient was given information on diabetes and how they could reduce their risk of developing the condition. Twelve months after the consultation we evaluated to impact by comparing the number of people who had either, reduced their blood glucose, or who had developed diabetes, to the expected number if there had been no intervention. The percentage of people who had reduced their glucose was between 37 and 62% (expected would be 6 – 16%) while the number who had developed diabetes was 2 – 3% (expected 5 – 10%). “These results contributed to Public Health Wales (PHW) deciding to extend the programme across the whole of Wales”, says Dr Rhys Thatcher. As part of the All Wales Diabetes Prevention Programme (AWDPPP) staff from Aberystwyth University are now working with colleagues at Swansea and Bangor Universities to monitor and evaluate the new programme.



Students have the opportunity to become involved in the diabetes research that takes place in the Department during their research project and the findings of the AWDPPP are included in the content of a several modules. In the third-year module, BR36920 Exercise Management in Health and Chronic Disease students discuss the underlying causes of diabetes and reflect on public health interventions targeting diabetes prevention. The students critically evaluate the AWDPPP and explain changes in blood glucose in relation to lifestyle changes and theories of behaviour change. The AWDPPP is also examined in a second third-year module, **BR37320 Solving Societal Issues using Applied and Integrated Approaches** where students identify and reflect on a specific issue affecting society and suggest workable solutions to address the issue.

## Research, Innovation and Education for Stroke Rehabilitation

A close collaboration with Dr Akanyeti from the Department of Computer Science and Dr Federico Villagra Povina from IBERS allowed us to form a research group named AberStroke at Aberystwyth University. We are an international research group investigating how stroke impacts mobility and design interventions that help meaningful recovery. Our research is highly interdisciplinary leveraging methods from Computer Science, Neuroscience, Biology, Human Biomechanics, Clinical Exercise Therapy and Psychology, and collaborative working closely with the NHS, Welsh Government, local communities, and our industry and academic partners.

Every year 15 million people in the World and 100,000 British citizens have strokes. Two thirds of stroke patients leave the hospital with a disability associated with walking, balance, and coordination, which we cover in BR26420 Motor Learning and Performance. It is common that stroke survivors end up living homebound with little or no physical activity (e.g., uninterrupted sitting for the entire day), and they suffer from loneliness, lack of confidence and low self-esteem. When patients do not move, they are less likely to recover and they are more likely to experience further health complications such as depression, falling, having another stroke or heart attack.

One of the aims of our research is to break the vicious circle of stroke by developing interventions to encourage Stroke survivors to be more active. We are developing interventions to reduce sedentary time in their homes. When patients are sent home, they tend to be more sedentary than healthy, age-matched volunteers. Interventions are needed to encourage a reduction in overall sedentary time, and regular breaks in prolonged periods of sedentary behaviour. We also use this scenario in BR37320 Solving societal issues using applied and integrated approaches. We are currently working and recruiting Strokes patients to improve their physical and mental wellbeing through technology aided rehabilitation programs. This research offers students to contribute, for example those who are part of this project for their Year in Industry placement. We are developing intelligent wearable systems that can be used as a diagnostic, therapeutic, recovery monitoring and follow-up tool. Our aim is for democratising stroke rehabilitation using wearable technology, rehabilitation programs, robotics, and artificial intelligence by making cheaper, more accessible and personalized.

## Omics approaches and cancer



Cancer continues to be a major problem with 9.6 million deaths linked to it in 2018. These deaths are often associated with a late diagnosis which makes cancer very difficult to treat. However, the early signs of cancer are often hard to detect. The rates of cancer detection could improve if higher risk groups of people, for example, smokers were targeted for regular checks with a cheap and easy to administer test. “Our experience of SARS CoV2 testing using lateral flow tests during the Covid-19 pandemic has shown us how successful this can be”, says Professor Luis Mur. Working with clinicians in Betsi Cadwaladr University Health Board, Aberystwyth University has secured approval for two new studies “Omics Approaches to Urological Cancer Diagnosis” (‘OSCAR’) and “OMICs Approaches to Breast Cancer” (‘BECA’). This topic links directly to BR25920 Cell and Cancer Biology. Both studies are strongly patient focused and are looking at changes in biofluids like blood and urine that are linked to early cancer changes. Most often these changes are biochemical in nature, and these are assessing “metabolomic” techniques where 1000s of biochemicals can be measured in much less than 1 mL of fluid. This is covered in for example BR22220 Immunology, and BR26620 Proteins and Enzymes. Using wider commercial expertise, these biochemical “markers” can be used to make new cancer focused lateral flow kits. This exciting work has been aided by contributions from students and has featured in many undergraduate projects. These studies give real world insights that contribute towards teaching, such as BR36120 Molecular Pharmacology. The projects are examples of how studying at University can produce work that makes a real difference to the wider population.