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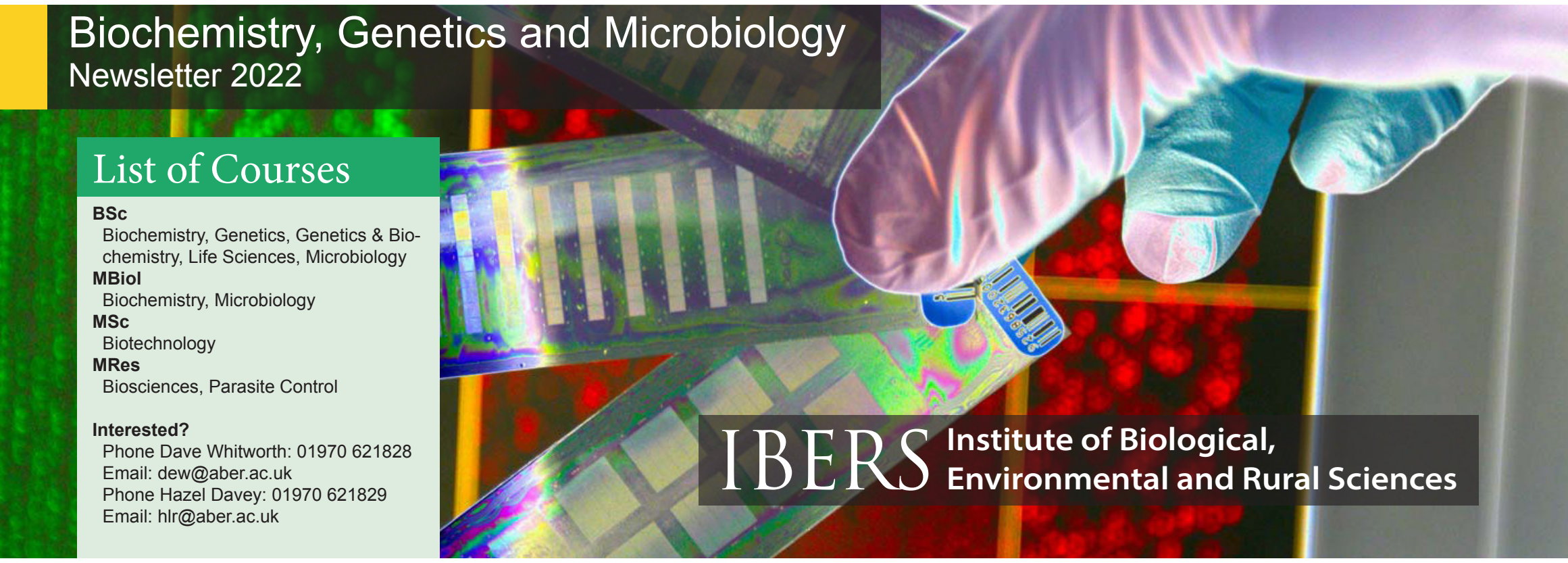
Biochemistry, Genetics and Microbiology
Newsletter 2022



List of Courses

BSc
Biochemistry, Genetics, Genetics & Biochemistry, Life Sciences, Microbiology
MBiol
Biochemistry, Microbiology
MSc
Biotechnology
MRes
Biosciences, Parasite Control

Interested?
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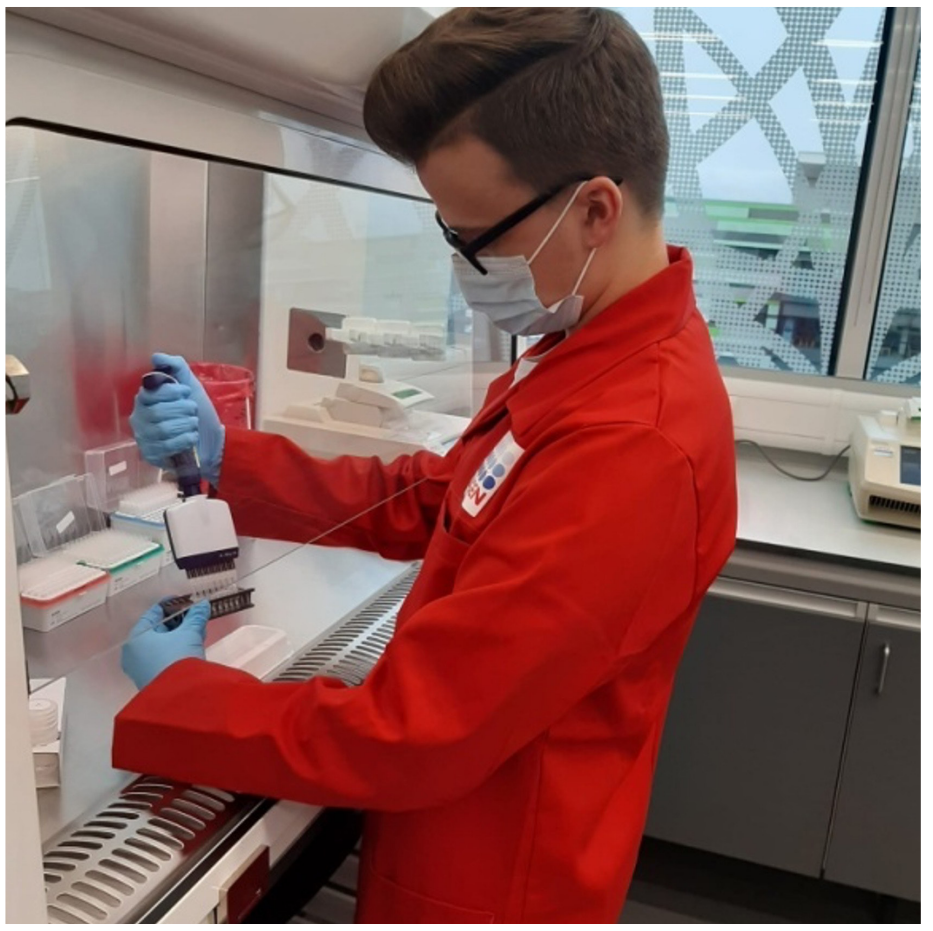
Year in Industry placement at Qiagen

The Year in industry scheme has become a popular option and allows students to spend time out in the workplace following the completion of the second year of study. Genetics student Przemyslaw Olewniczak secured a funded placement for 2022 at QIAGEN Manchester. This large multinational company specialises in molecular diagnostics and testing and is also involved in academic and pharmaceutical research.

During Przemyslaw's placement he's been assisting on a range of ongoing Next-Generation Sequencing-based projects. He has spent much of his time in the lab and had responsibility for processing clinical samples and preparing them for sequencing and carrying out sequencing using globally renowned Illumina sequencers. In addition to the practical training, he's learnt about the quality control and recording processes that operate in a clinical lab, and received access to a range of training sessions, online courses, and attend numerous project meetings. Following the placement Przemyslaw will return to Aberystwyth to complete his final year of his degree, where I'll be able to put the skills and knowledge gained to good use.



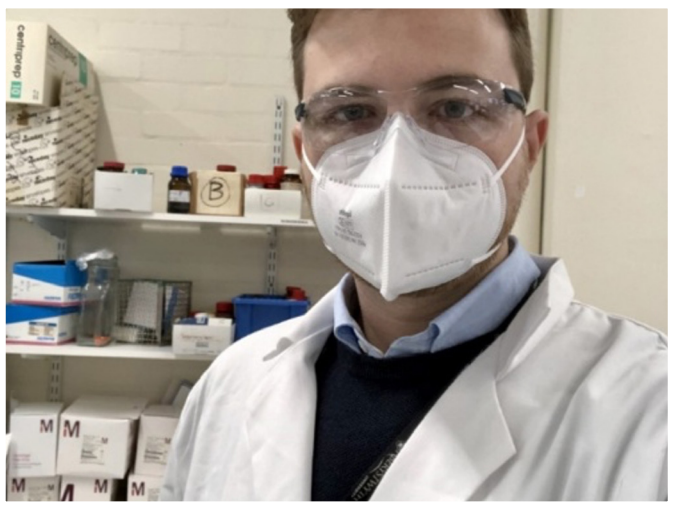
Genetics student Przemyslaw Olewniczak

Tracy Knight

A novel role for microbes in the diagnosis of prostate cancer

Prostate cancer is the second most common cause of cancer in men. In 2018, over 1 million new cases of PCa were diagnosed globally, with approximately 359,000 deaths caused by the disease. What is not known is that a PCa can be diagnosed when, in fact, the patient has a much less dangerous disease - benign prostatic hyperplasia (BPH). This is a problem as follow up tests to confirm whether a patient has PCa or BPH often can have harmful and distressing side effects. Conditions such as BPH may be associated with persistent inflammation and this is here where microbes come in. Persistent infections, mostly likely symptomless, could lead to conditions such as BPH. In a newly approved study Omics Approaches to Urological Cancer Diagnosis ('OSCAR'), Aberystwyth University scientists are collaborating with clinicians at Betsi Cadwaladr University Health Board to help in the diagnosis of PCa and BPH. In work which is funded via the Knowledge Economy Skills Scholarships (KESS2) and a grant from the Institute of Biomedical Science (IBMS), scientists are looking at microbiomic changes in the urine of patients which are later diagnosed as suffering from PCa or BPH. The microbiome represents the total microbial populations in a sample, and Tracy Knight (who graduated from Aberystwyth in 2020 with an MBiol in Biochemistry) is assessing this to help in PCa/BPH diagnosis and reveal some underlying pathological mechanisms.

Research volunteering leads to identification of novel proteins



Jakub Hantabal

In 2021 during year 2 of his BSc Biochemistry degree, Jakub Hantabal undertook some volunteer research which helped define his dissertation research project he is currently completing in his final year. Jakub had an interest in Alzheimer's disease, and the protein involved in the associated pathology known as Tau and decided to investigate the role of Tau proteins in invertebrates, specifically parasites. In doing so, Jakub has identified a novel Tau protein in the parasitic liver fluke that could potentially bind to microtubules as demonstrated for human Tau. Jakub is now exploring Tau microtubule binding in the liver fluke using Co-Immunoprecipitation which my help us understand the role of Tau and microtubules in the mode of action of antiparasitic drugs.

Developing graduate-level expertise in the workplace

Iuliana Macovetchi

Alongside the standard teaching program, the university offers lots of opportunities to strengthen our students' job prospects by fostering the development of essential skills. The long running ABERforward scheme provides real-work learning and development opportunities to Aberystwyth University students and graduates. Often these placements are paid and are designed to build graduate-level expertise and career management skills. Final year Genetics and Biochemistry student Iuliana Macovetchi took up one of these placements in the summer of 2021, joining the research group led by Dr Jessica Adams.

Over an 8-week period Iuliana worked as a research assistant at the Gogerddan campus, during which she was able to apply the knowledge acquired throughout her degree. She participated in a research project that determined the level of antioxidants and proteins in seaweed collected at different times and from different regions. Iuliana said "this placement offered me a chance to refine my abilities as a biochemist and to learn new skills from accomplished scientists. It was a great experience that helped me understand the challenges, and satisfaction, encountered in a real-life research environment.

Walter Idris summer placement to explore parasitic vesicles

Electron micrograph of EVs (left) produced by parasitic helminths (right)

Recently, parasitic worms have been demonstrated to produce small extracellular vesicles (EVs), which have been well known in human and mammalian research. Consequently, there is a need to explore these parasite-derived EVs which have been proposed to modulate the host immune system, interact with host cells and even remove anti-parasitic drugs. However, routine methods to examine parasite EVs to standardise approaches across laboratories are lacking as this is a new and emerging field. Corey Steele, now a third year BSc biochemistry student, was awarded, and completed, a prestigious Walter Idris summer placement in 2021 which allowed her to investigate common protein markers on parasitic worm EVs. Corey employed a bioinformatics approach to examine the genomes of numerous parasites and hopes to use this information to generate a range of molecular markers that can be used to confirm populations of parasite EVs. Corey is now developing protein purification skills during her final year dissertation project.

International Year in industry placement

Spending time in a different country offers many benefits and gives students to opportunity to develop personal skills, self-confidence, and intercultural understanding. During the third year of his 4-year Genetics degree Wojciech Kuziuta travelled to Valencia, Spain, to join the research group of Dr Alberto Carbonell at The Institute of Molecular and Cellular Biology of Plants. Dr Carbonell's research group examines different areas of RNA biology in plants and seeks to understand how RNA controls diseases and how genetic engineer can be used to regulate gene expression.

During his placement Wojciechwas trained to carry out a broad range of lab techniques and was given his own research project to work. He carried out experiments that involved cloning DNA, analysing RNA, and genetic engineering. On top of having the experience of working in a professional lab, Wojciech enjoyed life in Valencia. He said "I fell in love with Spain and its culture. I met many amazing people from all over the world and had the chance to participate in different events and trips across Spain. I feel like this experience has been one of the best in my life". Since returning to complete his degree Wojciech has continued to carry out research in the same area for his final year research project. Following the completion of his degree Wojciech plans to pursue a career in plant biotechnology and this experience will greatly aid him achieve this ambition.

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