

Project ID	CoBio DTP part	Faculty/School/Department	Project Supervisor	Project Start Date	Project End Date	Project Title	BBSRC Theme	Project overview including objectives
01_2026	UKent	Natural Sciences	Dr Jenny Tullet	17/08/2026	25/09/2026	How the Nervous System Controls Fat Storage in different sexes	Understanding the Rules of Life; Bioscience for an integrated understanding of health	<p>Obesity is a major health problem worldwide, but it does not affect males and females in the same way. The two sexes differ in how much fat they store, where this fat is located in the body, and how obesity increases the risk of disease. However, many studies do not fully consider these sex differences, meaning that we still do not yet understand the biological mechanisms that control them.</p> <p>Recent work in our lab has identified sex-specific signalling pathways in the nervous system that influence behaviour and metabolism in the nematode <i>C. elegans</i>. In particular, we have found that the transcription factor SKN-1B plays an important role in regulating these sex-specific responses. This summer project will investigate how SKN-1B-dependent neural signalling affects fat levels in male and hermaphrodite worms.</p> <p>SKN-1B is the worm equivalent of the mammalian Nrf transcription factors, which are known to regulate metabolism and are already being explored as drug targets in humans. Because obesity and metabolic disorders show clear sex differences in people, understanding how SKN-1B controls fat regulation in a simple model organism may provide useful insights into why these differences arise.</p> <p>During the project, the student will integrate into our laboratory life (which is very friendly and collaborative). They will gain practical laboratory experience working with <i>C. elegans</i>, including worm husbandry and handling. They will use genetic mutant strains and RNA interference (RNAi) to alter gene expression, and apply microscopy techniques to measure fat levels. This will include fluorescence microscopy to visualise labelled neurons and metabolic reporters. The project will also involve basic data analysis and interpretation of experimental results.</p> <p>Overall, this project will provide hands-on training in widely used molecular and imaging techniques, while allowing the student to contribute to ongoing research into the neural regulation of fat storage in a sex-specific manner.</p>
02_2026	UKent	School of Natural Sciences	Dr Claire Melanie Boucher	01/06/2026	13/07/2026	Effect of the menstrual cycle on the thoracolumbar fascia under ultrasound in females with differing levels of low back pain	Bioscience for an integrated understanding of health	<p>This 6-week summer research project will extend a recent undergraduate investigation examining the influence of the menstrual cycle on the properties of the thoracolumbar fascia. Preliminary findings from a small sample of naturally cycling participants suggest that fascial thickness and echogenicity may vary across menstrual phases; however, the study is currently underpowered and has not yet integrated symptom burden or lifestyle factors. This project will address these limitations through additional data collection and expanded analysis.</p> <p>The primary aim is to determine whether thoracolumbar fascia thickness and echogenicity vary across the menstrual, follicular and luteal phases in naturally cycling individuals, using ultrasound imaging. Additional participant recruitment and scanning will increase statistical power and enable more robust repeated-measures analysis of phase and fascial layer effects.</p> <p>A secondary aim is to examine relationships between fascial properties and participant-reported outcomes. Previously unanalysed data from the Menstrual Distress Questionnaire, the Pelvic Pain Questionnaire (low back/pelvic girdle pain score), and the International Physical Activity Questionnaire (IPAQ) will be incorporated. These data will allow exploration of associations between fascial characteristics, pain severity and physical activity levels across the menstrual cycle.</p> <p>The project will also provide a structured opportunity for a student researcher to gain experience in participant recruitment, ultrasound data acquisition, image analysis and statistical analysis of repeated-measures data, supporting development of research and clinical skills within sports therapy and rehabilitation science.</p> <p>Overall, this project will generate novel preliminary evidence on menstrual cycle-related variation in thoracolumbar fascia properties and its potential relationship with low back pain, providing a foundation for future larger-scale studies and contributing to a limited evidence base on sex-specific musculoskeletal physiology.</p>

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03_2026	UKent	Natural sciences, Biosciences	Dr Rebecca Hall	06/07/2026	14/08/2026	Immune evasion of fungal pathogens	Understanding the Rules of Life	<p>Candida albicans is an opportunistic fungal pathogen that forms part of the natural flora of the oral, genital, and gastrointestinal tracts of healthy individuals. However, changes in the host's environment activate adaptation responses in the fungus that enable the fungus to switch from commensal growth to a more pathogenic state. The innate immune system recognises the pathogen through detection of cell wall carbohydrates, and via the deposition of complement proteins on the fungal cell surface. We have identified that in response to specific environmental conditions, C. albicans alters its cell surface enabling the pathogen to avoid the actions of our innate immune system. This immune evasion phenotype is linked to the ability of the fungus to avoid complement activation, but precisely how this is mediated and whether this occurs in other Candida species is unknown. In this project you will develop skills in mammalian cell culture, microbiology, and flow cytometry to address the following research objectives:</p> <ol style="list-style-type: none"> 1) Confirm environmental adaptation induces immune evasion in C. albicans 2) Identify whether innate immune evasion occurs in other medically important Candida species 3) Use flow cytometry to quantify the presence of human complement proteins on the fungal cell surface. <p>In addition to basic lab skills, you will also develop skills in experimental design, data analysis and presentation, critical analysis, and working as part of a team.</p>
04_2026	UPort	SELS	Dr Binuraj Menon	20/07/2026	10/09/2026	Understanding biosynthesis and enzymology of a antibiotic molecule- chloramphenicol.	Understanding the Rules of Life; Bioscience for sustainable agriculture and food; Bioscience for renewable resources and clean growth;	<p>Halogenases are a key enzyme involved in the biosynthesis of halogenated natural products, which have significant pharmaceutical and industrial applications. Understanding its structure-function relationship is essential for exploiting its catalytic potential in biocatalysis and synthetic biology. This project aims to purify and characterise halogenases and other associated enzymes from chloramphenicol biosynthesis, followed by detailed biophysical analysis to elucidate its catalytic mechanism and substrate specificity.</p> <p>The enzyme will be expressed in a suitable heterologous system and purified using affinity and size-exclusion chromatography. Characterisation will involve kinetic studies and activity assays to determine catalytic parameters. Advanced biophysical techniques such as UV-Vis spectrophotometry, high-performance liquid chromatography (HPLC), and stopped-flow spectroscopy will be employed to monitor reaction dynamics and intermediate formation. Additionally, isothermal titration calorimetry (ITC) will be used to quantify binding affinities and thermodynamic parameters of enzyme-substrate interactions. Structural insights will be pursued through computational modeling and, where feasible, crystallographic studies.</p> <p>The outcomes of this research will provide a comprehensive understanding of chloramphenicol formation, enabling its future structural engineering for improved activity and binding.</p>

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05_2026	USoton	School of Biological Sciences	Dr Salah Elias	06/07/2026	30/08/2026	Genetic fat mapping of a novel mammary stem cell subset during development	Understanding the Rules of Life	<p>Overview - The mammary gland is a dynamic, branched organ that undergoes extensive remodelling during pregnancy and lactation. Its correct architecture depends on a precise balance between proliferation and differentiation of epithelial stem and progenitor cells. Disruption of this balance can impair development and, in the presence of oncogenic mutations, promote malignant transformation. However, recent evidence suggests that mutations alone are insufficient to initiate malignancy, pointing to additional developmental mechanisms that preserve epithelial integrity.</p> <p>One such mechanism is oriented cell divisions (OCDs), which determine the spatial arrangement and fate of daughter cells. In the mammary gland, OCDs are thought to play a key role in luminogenesis—the formation of a central lumen critical for ductal architecture and milk secretion. Defects in OCDs are associated with lumen collapse, a hallmark of early malignancy, yet the mechanistic link between OCDs and luminogenesis remains poorly understood.</p> <p>Objectives - to observe how OCDs guide luminogenesis and epithelial organisation during mammary gland development, and how their dysregulation may contribute to early cancerous changes.</p>
06_2026	USoton	FELS/Biological Sciences	Prof Mark Chapman	06/07/2026	14/08/2026	To nodulate, or not to nodulate? Are climate-resilient legumes pre-adapted to the UK?	Bioscience for sustainable agriculture and food; Understanding the Rules of Life	<p>UK agriculture relies heavily on a narrow set of staple crops, however, with climate change, alternative crops will become a better fit. At the same time, the UK diet could be improved by moving away from red meat and focusing on plant-based protein sources which are grown in-country to reduce reliance on imports. Together this means legume crops such as soybeans, chickpeas and lentils, as well as lesser-known legumes such as lupins, are coming into focus. Legumes must interact positively with soil bacteria to form root nodules containing nitrogen-fixing bacteria to obtain the best yield. However, little is known about whether these novel (to the UK) crops will interact with the native bacteria.</p> <p>This project will test this association, and determine whether all soils contain the relevant bacteria, and narrow down specific bacteria that are required to maximum nodulation. The student will learn greenhouse and lab techniques - growing plants under controlled conditions with different amended soils and extracting DNA from root nodules, as well as bioinformatic analysis of sequencing data they obtain from the root nodule bacteria. They will work alongside PhD students in the lab and gain important experience in workplace-related skills. If time permits, the student will also have the opportunity to visit field plots of these crops as part of a larger network and analyse the plants in-situ for nodules.</p>

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07_2026	USoton	Faculty of Environmental Sciences, School of Biological Sciences, Microbiology	Dr Sandra Wilks	06/07/2026	17/08/2026	Investigating the antimicrobial activity of traditional remedies: the use of herbal infusions	Bioscience for an integrated understanding of health; Understanding the Rules of Life	<p>Traditional remedies have been used in communities for centuries, including products to combat bacterial infections. There remains minimal evidence on the efficacy of natural products and little investigation when compared to pharmaceutical treatments. Building on our work looking at green and red fruit teas, we have identified other infusions used in communities for treatment and reduction of symptoms linked to infections. These include pine and birch teas, widely used in many northern hemisphere countries.</p> <p>In this study, we will look take a range of reported antimicrobial infusions and test against a wide range of bacteria using our validated method. This will allow us to explore whether there is antimicrobial activity and if there is, to determine minimum inhibitory concentrations (MICs) which can be compared with antibiotics. For products showing activity on planktonic cells, we will extend the study to assess antibiofilm effects.</p> <p>The main objectives are:</p> <ul style="list-style-type: none"> •Determine the minimum inhibitory concentration (MIC) values for a range of reported antimicrobial infusions and appropriate (species-specific) antibiotics in planktonic cultures. •Using MIC values, test for activity against biofilms of a Gram-negative and Gram-positive species. <p>Main techniques: This project will involve development of standard microbiological culture techniques, maintenance of cultures, completion of MIC, MBEC (Minimum Biofilm Eradication Concentration) and MBIC (Minimum Biofilm Inhibition Concentration) assays as well as the use advanced microscopy techniques such as confocal microscopy and scanning electron microscopy.</p> <p>Outcome: Determine whether reported traditional remedies show antimicrobial activity on a range of bacteria including biofilms, providing proof of concept data for further investigation.</p>
08_2026	USoton	FELS/School of Biological Sciences	Dr Herman Wijnen	03/08/2026	11/09/2026	Decoding the role of the neurotransmitter Tyramine in Drosophila female reproductive behaviour.	Understanding the Rules of Life; Bioscience for sustainable agriculture and food; Bioscience for an integrated understanding of health	<p>Aminergic neurotransmitters control ovulation across many taxa including humans and fruit flies. Adrenergic signalling controls mammalian ovulation both via the Hypothalamic-Pituitary-Gonadal axis as well as more direct ovarian innervation. In analogy, octopamine (OA) and tyramine (TA) control ovulation in insects such as the genetic model organism Drosophila melanogaster. Studies of the role of aminergic control of female reproductive behaviour in insects will not only provide a valuable comparative perspective, but also insights expected to inform management of insect pests and disease vectors. This project will explore an emerging role for TA, in particular, in aspects of Drosophila female reproductive behaviour, including both egg laying preference and ovarian diapause. Its objectives are to 1) confirm that TA plays a role in oviposition choice and female reproductive diapause and 2) to identify the TA receptors and neurons involved in mediating this role. A behavioural genetics approach will be taken in Drosophila melanogaster to determine relevant phenotypes of mutations impacting TA biosynthesis as well as the known TA receptors. By spatiotemporally targeting genetic rescue and RNA interference to neurons of interest, it will be possible to identify the responsible neural circuits. This project will provide training in Drosophila husbandry and genetics, behavioural assays, ovary dissection and imaging as well a quantitative data analysis. The student will be embedded in the Wijnen research laboratory and participate in lab meetings, seminars and journal clubs.</p>

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09_2026	USoton	Faculty of Engineering/School of Electronics and Computer Science	Dr Ernesto E. Vidal-Rosas	01/07/2026	13/08/2026	Advance continuous monitoring of tissue oxygenation in prosthetic limbs using near-infrared spectroscopy	Bioscience for an integrated understanding of health	<p>During early stage rehabilitation after amputation, the supporting tissues are not mechanically conditioned to support load, and therefore are vulnerable to damage from prosthetic-induced stress, which result in stump ulcers. Prolonged tissue deformation is the mechanism that produces damage, by occluding blood and lymphatic vessels, leading to a decrease of tissue oxygenation and accumulation of waste product.</p> <p>Near-infrared spectroscopy (NIRS) is a non-invasive, portable, and real-time, optical technique used to measure tissue oxygenation. NIRS calculates regional oxygen saturation and changes in haemoglobin concentrations to assess blood perfusion and oxygen consumption in tissues and muscle. A wearable Near-Infrared Spectroscopy (NIRS) system fitted inside a prosthesis can play an important role in early-stage rehabilitation after primary amputation, by proving relevant physiological parameters including oxyhemoglobin (HbO₂), deoxyhemoglobin (Hb), total hemoglobin (blood volume, and regional oxygen saturation (rSO₂ or StO₂))</p> <p>We have developed a small NIRS system using flexible electronic that be use to monitor tissue oxygenation. The aim of the of the project is to develop a protocol that applies representative loads, which can be used to evaluate the monitoring system</p>
10_2026	USusx	Brighton and Sussex medical school, Department of Engineering	Dr Jimena Berni & Dr Carlo Tiseo	06/07/2026	14/08/2026	Cybernetic Modelling of the Evolution of Motor Control Across Species	Bioscience for an integrated understanding of health; Understanding the Rules of Life	<p>Animals have evolved extremely efficient and resilient ways of interacting with the environment maximising the chance of successful encounters. This characteristic is conserved across species despite the different cognitive and motor abilities. Interestingly, during evolution, animals' nervous systems have added more complex structures built on top of the primitive nervous system of primitive species. What role have these structures played in the preservation of new species? It is challenging to isolate each neuronal structure in a single animal. However, approaching this research across multiple species at different levels of evolution will enable to isolate motor circuits and understand how the higher structures have developed and been integrated during evolution.</p> <p>In this project you will work with Drosophila larvae, that possess a simple nervous system, and perform mostly "reflex" behaviours allowing to isolate the lower level motor control: the "spinal cord". You will 1) study the larval response to distinct sensory inputs in a foraging experiment and if time permits 2) develop a dynamic simulation of a foraging experiment using a virtual artificial larva.</p>
11_2026	USusx	School Life Science	Dr Edward Wright	01/07/2026	12/08/2026	Characterising the cross-reactivity of antibodies targeting tick-borne encephalitis virus	Understanding the Rules of Life; Bioscience for an integrated understanding of health	<p>Arboviruses, including tick-borne encephalitis virus (TBEV), are transmitted via an arthropod vector. In recent years climate change has resulted in these vectors being able to survive and spread the diseases in regions of the world not previously possible. In fact, following the first reported case of TBEV in the UK in 2022 there have now been ~15 documented to-date. TBEV can have severe consequences for animal and human health, causing hundreds of millions of cases each year, and a similar scale of economic losses to the global economy. Approximately a third of cases result in meningitis or encephalitis and long term neurological sequela. Therefore, a greater understanding of the antigenicity of TBEV is needed to improve existing vaccines.</p> <p>This study will advance our understanding of TBEV and identify cross-reactive epitopes, which will inform vaccine and even antiviral development. This will be achieved through establishing optimised single round infectious particle (SRIP)-based assays for TBEV and using these to determine the breadth and potency of cross-reactive antibodies stimulated by infection or vaccination with one isolate against other isolates. This, coupled with bioinformatic analysis and published data, will inform the identification of broadly reactive epitopes that will be used to design highly effective vaccine antigens.</p>

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12_2026	USusx	Psychology	Dr Emiliano Merlo	01/07/2026	30/09/2026	Memory suppression mechanisms in the pond snail <i>Lymnaea stagnalis</i>	Understanding the Rules of Life	<p>Animals predict upcoming natural rewards based on learning associations between environmental cues that predict their availability. When cues no longer predict rewards, cue-reward associations are suppressed by a process called memory extinction. Extinction does not erase the original cue-reward memory, but temporarily inhibits it by establishing a new cue-no-reward memory. Learning and suppressing cue-reward associations are key processes to adapt to an ever changing environment, but little is known about the memory suppression mechanisms at the neural level. Both vertebrate and invertebrate animals extinguish cue-reward associations, indicating this attribute has been evolutionarily conserved for at least 600 million years. Defining the core memory suppression mechanisms shared between these distant animal groups is key to understand memory suppression in humans. Such knowledge can help developing novel treatments for psychiatric disorders linked to aberrantly persistent memories such as post-traumatic stress or substance use disorders.</p> <p>In rodents, memory suppression through extinction requires the activity of the protein phosphatase calcineurin. In the pond snail <i>Lymnaea stagnalis</i> suppression of an outdated cue-food memory increased calcineurin levels, but we do not know if this molecular change is required for memory extinction, or what neurons are affected by it.</p> <p>In the present project we will be investigating the role of calcineurin in the suppression of food memories in the pond snail. We will: 1) use pharmacological interventions to test if the activity of calcineurin is required for memory suppression; and 2) define the neuronal subpopulation that express calcineurin after extinction.</p> <p>Students taking part in this project will learn how to conduct behavioural experiments, perform pharmacological interventions and immunofluorescence staining of the whole brain.</p>
13_2026	USusx	Department of Ecology & Evolution, School of Life Sciences	Maria Clara Castellanos	01/07/2026	30/09/2026	Costs of floral nectar production and consequences for pollination	Bioscience for sustainable agriculture and food; Understanding the Rules of Life	<p>Nectar is a crucial reward offered by plants to floral visitors in exchange for pollination. The amount and the composition of the nectar play an important role in pollinator attraction that has implications both for improving yield and pollinator conservation. Our knowledge on the actual costs of producing nectar to the plant is limited. Filling this gap is important to understand the role that this important reward plays in the selection of crops that are better for pollinators and food production.</p> <p>Objectives: This project aims to measure the reproductive costs of producing nectar in an experimental setting. Focal plants will include species growing in the greenhouse that are part of ongoing projects in the lab, including common beans (<i>Phaseolus vulgaris</i>) snapdragons (<i>Antirrhinum</i> sp.) and foxgloves (<i>Digitalis purpurea</i>).</p> <p>In this project you will develop skills in sample collection and preparation, experimental design, nectar biology, and plant reproduction. For students interested in fieldwork, there is also the option of adding a field component measuring nectar in wild populations.</p> <p>The exact dates of the project can be discussed.</p>