South Coast Biosciences Doctoral Training Partnership
2025 UG Summer Studentship Programme
Project List

Project ID	SoCoBio DTP partner	Faculty School Department	Supervisor	Start Date	End Date	Project Title	BBSRC Theme	Project overview including objectives
2025_01	NIAB EMR	Crop Science and Production Systems	Eleftheria Stavridou	01/07/2025	31/08/2025	Sustainable Nitrogen Application in Orchards	Bioscience for sustainable agriculture and food	Are you passionate about sustainable agriculture and cutting-edge technology? Join our exciting research project at NIAB East Malling, where we are developing precision techniques for nitrogen application in commercial apple orchards. Traditionally, fertiliser is applied uniformly across orchards at set times, but trees have varying nutrient needs based on their size, vigour, and crop load. By tailoring nitrogen applications, we can optimise tree growth, improve orchard uniformity, and enhance yields—benefiting both growers and the environment. In this project, you will work with the latest remote sensing technology and precision application tools to refine nitrogen management strategies. Your research will contribute to reducing fertiliser waste, minimising environmental impact, and promoting precision farming in the global fruit industry. As part of our dynamic research team, you will gain hands-on experience in: ☑ Tree fruit physiology and plant nutrition ☑ Remote sensing and precision agriculture techniques ☑ Experimental design and lab analysis ☑ Data management and statistical analysis You'll also have the opportunity to engage with other projects within the Department of Crop Science and Production Systems at NIAB. This studentship is based at NIAB East Malling, Kent, a leading centre for horticultural research. Short-term accommodation is available to rent on-site for the duration of the placement. This is a fantastic opportunity to develop your skills, contribute to impactful research, and be at the forefront of innovation in sustainable fruit production.
2025_02	NIAB EMR	Crop Science and Production Systems	Eleftheria Stavridou	01/07/2025	30/09/2025	Optimising nitrogen inputs to improve yields in control environment strawberry production	Bioscience for sustainable agriculture and food	Are you interested in cutting-edge agricultural research and sustainable food production? Join our exciting project at NIAB East Malling, where we are developing innovative nutrition management strategies to transform UK strawberry production in controlled environments (TCEA). Financial pressures have forced smaller strawberry growers out of the industry, with homegrown production falling by 25% since 2019. Meanwhile, 34% of UK demand is now met through imports. To boost UK production sustainably, we need smarter approaches to nutrient management and resource efficiency. This project will help develop a precision nitrogen (N) management model for commercial TCEA strawberry production. NIAB research has shown that N inputs can be reduced by up to 77% without compromising yield or quality. Our approach integrates advanced CO_2 enrichment technology to balance lower photosynthetic capacity, improving resource efficiency while cutting environmental impact. As part of our research team, you will gain hands-on experience in: ☑ Controlled environment agriculture and sustainable intensification ☑ Strawberry physiology, nutrition, and nitrogen-use efficiency ☑ Experimental design, lab analysis, and data management This studentship is based at NIAB East Malling, Kent, a centre of excellence for horticultural research. Short-term accommodation is available to rent on-site for the duration of the placement. This is a fantastic opportunity to contribute to pioneering research that supports sustainable UK food production while developing valuable skills for your future career. Apply now and help shape the future of strawberry farming!

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2025_03	NIAB EMR	Crop Science and Production Systems	Mark Else and Eleftheria Stavridou	01/07/2025	30/09/2025	Sensor-based precision fertigation of stone fruit to improve nutrient use efficiency, yields, and quality whilst lowering emissions	Bioscience for sustainable agriculture and food	Are you passionate about sustainable fruit production and agricultural innovation? Join our exciting research project at Niab East Malling, where we are developing cutting-edge nutrient management strategies to enhance UK stone fruit production. Despite strong demand, UK plum production has declined by 33% since 2019, and sweet cherry yields fluctuate due to weather and economic pressures. Meanwhile, 35KT of plums and 12KT of sweet cherries were imported in 2023 alone, highlighting a major opportunity for homegrown production. However, inefficient fertiliser use and excessive vegetative growth reduce yields, increase costs, and contribute to environmental losses. This project focuses on optimising nitrogen (N), phosphorus (P), and potassium (K) inputs in commercial stone fruit orchards. Using advanced soil monitoring and diagnostic technologies, we aim to reduce fertiliser waste, improve nutrient uptake efficiency, and increase marketable yields. Our approach will also generate vital data to guide industry investment in sustainable stone fruit production. As part of our research team, you will gain hands-on experience in: ☑ Stone fruit physiology, nutrition, and yield optimisation ☑ Real-time nutrient monitoring and data-driven decision-making ☑ Experimental design, lab analysis, and data management This studentship is based at Niab East Malling, Kent, a hub for cutting-edge horticultural research. Short-term accommodation is available to rent on-site during the placement. This is a unique opportunity to contribute to innovative research that will support sustainable UK fruit production and shape the future of orchard management. Apply now and help revolutionise stone fruit farming!

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2025_04	NIAB EMR	Crop Science and Production Systems	Mark Else	01/07/2025	30/09/2025	High-Health Strawberry Propagation in Total Controlled Environment Agriculture (TCEA)	Bioscience for sustainable agriculture and food	Are you interested in cutting-edge agricultural technology and sustainable food production? Join our exciting research project at Niab East Malling, where we are pioneering new methods to produce high-quality, virus-free strawberry plants using Total Controlled Environment Agriculture (TCEA). With the global population expected to reach 9.7 billion by 2050, food security is a growing challenge. Traditional farming methods alone cannot meet future demand, especially with pressures from climate change, land-use constraints, and economic instability. TCEA offers a solution—allowing crops to be grown in controlled environments, independent of weather and land availability, with minimal inputs and maximum efficiency. While most vertical farms focus on leafy greens, this project aims to develop high-health strawberry plant propagules with assured cropping potential. By producing pre-programmed, disease-free plants, we can reduce reliance on imported propagules (£40M/year) and fruit (£186M/year), while cutting chemical inputs and waste (£30M/year). These plants will support sustainable UK strawberry production in polytunnels, glasshouses (CEA), and fully controlled environments (TCEA). As part of our research team, you will gain hands-on experience in: ☑ Controlled environment agriculture and vertical farming technology ☑ Strawberry propagation, plant health, and physiology ☑ Experimental design, lab analysis, and data management This studentship is based at Niab East Malling, Kent, a centre of excellence for horticultural research. Short-term accommodation is available to rent on-site for the duration of the placement. This is a fantastic opportunity to contribute to cutting-edge research that supports sustainable, high-yield food production while developing valuable skills for your future career. Apply now and help shape the future of strawberry farming!
2025_05	NIAB EMR	Plant Genetics	Chandra Yadav	01/07/2025	29/08/2025	Understanding the genetic basis of anthocyanidin synthase 1 (Ans-1) essential for raspberry breeding programs.	Understanding the Rules of Life Bioscience for sustainable agriculture and food	Fruit colour in raspberry (Rubus idaeus) is an essential trait influenced by anthocyanin biosynthesis. The anthocyanidin synthase 1 (Ans-1) gene is a key enzyme in the anthocyanin biosynthetic pathway which catalyzes the conversion of leucoanthocyanidins to anthocyanidins, a crucial step in pigment formation. Recent research stated that a long-segment DNA insertion within the second exon of Ans-1 leading to a loss-of-function mutation and this mutation correlates with the apricot-coloured phenotype in Varnes cultivar. As a result, we intend to study if this type of insertion happens in additional apricot varieties by discriminating between red-fruited and yellow-apricot raspberries. PCR-Based Genotyping entails extracting DNA from leaf samples from a variety of raspberry accessions to ensure representation of red and yellow-apricot types, followed by PCR amplification to detect genetic markers that distinguish red fruited from yellow-apricot raspberries. In addition, we will include quantitative phenotyping of fruit colour, which will involve colorimeter measurements on a larger group of raspberry accessions to capture the complete range of fruit colour variation from yellow to orange. This will let us better understand fruit colour inheritance in raspberries. Thus, by examining DNA polymorphisms and doing quantitative phenotyping on different raspberry accessions, we will be able to identify genetic markers associated with fruit pigmentation. The student will be instructed to gain hands-on experience in molecular biology procedures (DNA extraction, PCR, gel electrophoresis) and quantitative phenotyping, which will be useful for plant genetics research. Supervision will be provided by experienced researchers in plant genetics, ensuring the successful completion of the project. Furthermore, field trips will help students learn by exposing them to real-world agricultural and horticultural approaches, as well as contributing to raspberry genetics research. The Niab can provide economical short-term accommodation for international students and interns at their East Malling location.

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2025_06	NIAB EMR	Plant Breeding	Felicidad Fernández Fernández	28/07/2025	05/09/2025	Characterising berry morphology, fruit quality, and reproductive traits on haskap cultivars	Bioscience for sustainable agriculture and food	Project Overview and objectives Haskap (Lonicera caerulea) is an edible relative of honeysuckle (also known as honeyberries) native to Japan, Russia and much of Eurasia but a historically-underutilised crop. Newly bred varieties and a growing interest in farm diversification have driven cultivation in central Europe and North America. They could be an environmentally-sustainable berry crop of high nutritional value for the UK but they remain understudied. Research at Niab seeks a better understanding of the genetic variability, reproductive biology, fruit quality characteristic and key pollinator species for this niche crop. Our germplasm collection comprises ~750 unique seedlings—including breeding lines and trial selections—and 15 commercial cultivars with a wide range of fruit quality, berry shapes and breeding characteristics. The successful student will work closely with PhD candidate May Appleby who will provide much of the training and day-to-day supervision for the placement. This project will characterise a subset of Niab's diverse haskap population and optimise existing protocols and descriptors. Traits recorded will include: -Berry size and shape (length, width, depth, mass and volume) -Basic juice characteristics (pH and sugar content) -Pollen viability after storage -Seed germination rates The project will aim to improve current fruit shape descriptors ,and methodology for seed germination. The student will design and optimise a protocol for germinating haskap seeds exploring the importance of scarification and stratification techniques. The student will have the opportunity to experience applied fruit breeding with the raspberry and blackberry team and might be able to assist with sample preparation for high performance liquid chromatography to quantify ascorbic acid and resveratrol. There is some flexibility to tailor this project to the student's interests as well as the possibility to consider later start and end dates. Affordable accommodation is available on student hostels at the East Malling site.
2025_07	NIAB EMR	Crop Science and Production Systems	Katia Zacharaki	01/07/2025	11/08/2025	Market Analysis for N-demand and CO_2 enrichment strategies	Bioscience for sustainable agriculture and food	The UK soft fruit industry faces increasing challenges due to climatic variability, rising input costs, and sustainability pressures. While Total Controlled Environment Agriculture (TCEA) presents a promising solution for more resilient, high-yield strawberry production, several barriers remain, including inefficient nitrogen use, high energy demands, and suboptimal CO_2 enrichment strategies. The N-demand project is tackling these issues through innovative nitrogen demand modeling, optimized CO_2 assimilation, and novel CO_2 capture/release technologies. As part of this project, we will conduct a market analysis to assess the commercial potential and scalability of our research outputs. This will ensure that our innovations provide value not only to the TCEA sector but also to Controlled Environment Agriculture (CEA) and conventional soft fruit production. While some solutions, such as the Nitrogen demand model for Malling Ace, are specific to strawberries, others—like our metal-organic framework (MOF)-enabled CO_2 capture technology—have applications across multiple crops and growing systems. Key Objectives of the Market Analysis: -Quantifying demand for improved nitrogen management and CO_2 enrichment solutions across TCEA, CEA, and open-field soft fruit production. -Identifying market opportunities for technology adoption, including potential industry partners, growers, investors, and competitors. -Exploring commercialisation routes and strategies, such as licensing opportunities, direct adoption by growers, integration with existing CEA technologies, and partnerships with agri-tech companies to drive market uptake. By delivering data-driven insights, this analysis will guide post-project exploitation plans, ensuring that the technologies developed contribute to higher yields, improved resource efficiency, and more sustainable UK soft fruit production. It will also inform the next phase of research and innovation, reinforcing the role of controlled environment agriculture in securing food resilience and sustainability.

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2025_08	NIAB EMR	Crop Science and Production Systems	Katia Zacharaki	01/07/2025	11/08/2025	Commercialisation Research and Competitor Analysis for TCEA strawberry propagation	Bioscience for sustainable agriculture and food	The UK strawberry industry is heavily reliant on imported propagules, with over 85% of production dependent on foreign plant material, costing more than £40M per year. This reliance limits control over plant quality, health, and yield potential, making it crucial to develop high-quality, disease-free, UK-grown propagules that can enhance productivity while reducing imports. Our project aims to revolutionize strawberry propagation by integrating precision growing strategies, controlled environment agriculture (CEA) advancements, and Total Controlled Environment Agriculture (TCEA) systems to optimize production efficiency. As part of this project, we will conduct a commercialisation study to evaluate the market potential, scalability, and competitive landscape for TCEA-grow propagules. Key focus areas include: - Assessing market demand for high-quality TCEA-grow strawberry propagules in comparison to imported and local alternatives. - Identifying commercialisation opportunities, such as direct sales to UK growers, partnerships with propagation businesses, and technology licensing to large-scale plant nurseries. - Analysing competitor strategies, including major European and international propagators. - Evaluating feasibility of TCEA systems for large-scale propagule production, assessing costs, efficiency gains, and market competitiveness. By mapping the competitive landscape, we will identify key differentiators and barriers to market entry, ensuring our innovations are commercially viable and industry-aligned. This research will inform strategic exploitation plans, helping project partners position themselves as market leaders in sustainable, high-quality strawberry propagation. Ultimately, this work will support UK growers in reducing reliance on imports, strengthening the domestic supply chain, and ensuring consistent, high-yield production that enhances both productivity and profitability in the UK soft fruit sector.
2025_09	NIAB EMR	Plant Genetics	Felicidad Fernández Fernández	04/08/2025	05/09/2025	Phenotyping and genotyping raspberry segregating populations to understand the genetics of primocane fruiting.	Bioscience for sustainable agriculture and food	Red raspberries (Rubus idaeus) are a high-value crop. Plants in the Rubus genus grow as bushes with new canes emerging yearly from the perennial root system. Depending on the species, the new canes can be annual or biennial, and the flowering and cropping can occur in the first year of cane growth (primocane-fruiting) or the second (floricane-fruiting). Raspberries are biennial cropping and predominantly floricane-fruiting but, for the purpose of crop season extension, breeders have extensively selected for primocane-fruiting and germplasm from related species has been used to introgress enhanced expression of this trait. Temperature and photoperiod both play a role in floral bud initiation and dormancy, but the full genetic control of this trait is still poorly understood. The successful student will work closely with PhD candidate Deborah Babalola who will provide much of the training and day-to-day supervision for the placement. Deborah's PhD investigates many aspects of the primocane-fruiting genetic control and expression using a combination of QTL mapping, transcriptomic profiling. Part of her work focusses in three F1 populations segregating for a range of flowering and agronomic traits. The student will assist in the phenotypic characterisation of these populations with a particular focus on a R. idaeus x R. illecebrosus interspecific cross. This placement will be ideal for a budding botanist, but the student will also gain molecular biology skills which have a very wide application in both plant and human genetic studies, for instance tissue sampling, DNA and RNA extraction, primer design, PCR and electrophoresis. The student will have the opportunity to experience applied fruit breeding with the raspberry and blackberry team. There is flexibility with respect start and end dates and affordable accommodation is available on student hostels at the East Malling site.

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2025_10	UKent	School of Natural Sciences	Anastasios Tsaousis	07/07/2025	15/08/2025	Regenerative Practices and Their Impact on the Soil Microbiome: A Multidisciplinary Exploration	Bioscience for sustainable agriculture and food	This project offers an opportunity to delve into the dynamic interactions between regenerative agricultural practices and the soil microbiome. Regenerative agriculture aims to restore soil health and enhance biodiversity through practices that improve soil organic matter, structure, and microbial functioning—key components for sustainable agriculture. The project will involve working at research sites equipped with soil plots undergoing various regenerative treatments, including the integration of biochar and the application of protozoan cultures designed to promote beneficial bacterial communities. The student will engage with a range of scientific techniques, providing a hands-on, practical experience in microbial ecology: 1. Next-Generation Sequencing (NGS) to analyze microbial communities, 2. Monoxenic Culture Development to study interactions between protozoa and bacteria, 3. Chemical Analysis to assess soil properties altered by organic amendments, 4. Statistical Analysis using R for data interpretation. The objective is to understand how regenerative agricultural practices affect the soil microbiome and evaluate their efficacy in enhancing soil fertility and crop yield. This research is not only pivotal for advancing sustainable agricultural practices, but also offers the student a comprehensive skill set in modern ecological and microbiological methods. This project is perfect for students keen on making significant contributions to the field of sustainable agriculture, eager to gain extensive laboratory and field experience, and interested in the practical applications of microbial ecology in real-world scenarios.
2025_11	UPort	SELS	Dr Binuraj Menon	01/07/2025	17/08/2025	Exploring cryptic halogenation in nature	Understanding the Rules of Life Bioscience for sustainable agriculture and food Bioscience for renewable resources and clean growth	Only recently have natural product biochemists discovered that nature too takes advantage of the reactivity of carbon halogens bonds to guide subsequent biochemical reactions that result in the removal of the newly introduced halogen. In this project you will get hands on training to understand the biological process and enzyme involved in this mechanism. The student will be working closely with PhD students and master students working in this area. The normal tasks involve cloning, PCR, generating site directed mutants, purifying and conducting assays with enzymes, and performing other biophysical characterisations of enzymatic reactions.

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2025_12	USoton	Faculty of Environmental and Life Sciences / MechEng & Medicine / µ-VIS X-ray Imaging Centre (muvis.org)	Dr Orestis Katsamenis	30/06/2025	08/08/2025	Advancing Correlative Imaging: Developing Tools and Workflows for Integrated Imaging Across Imaging Facilities	Understanding the Rules of Life Bioscience for an integrated understanding of health	This is a six-week undergraduate internship to build on progress from a current project establishing a cross-campus correlative imaging pipeline. We are currently developing a workflow for integrating advanced imaging techniques, such as Computed microtomograpgy (µCT), optical microscopy (confocal, CARS), mass spectrometry, and electron microscopy, using demonstrator samples from environmental (coral) and biological (bone) contexts. With this internship will focus on advancing some of the critical aspects that will be identified during the initial project, with particular emphasis on refining sample preparation processes, and designing cross-instrument / cross-facility compatible sample stages. The project offers the opportunity to address challenges in transitioning samples between imaging modalities available across different facilities by designing and testing tools such as reusable sample holders or alignment fixtures. Alternatively, depending on the candidates background, the intern may refine imaging workflows, focusing on optimising specific steps in data acquisition and processing for corelative imaging applications focusing on reproducibility. The internship will result in tangible outputs, such as validated workflows, functional prototypes, or detailed process documentation. It will also provide an immersive interdisciplinary training experience for the student, combining bioscience and engineering approaches. The project's outcomes will strengthen ongoing cross-facility collaborations and enhance the utility of correlative imaging pipelines for a broad range of research applications. Objectives: (1) Design and test reusable sample holders for seamless transitions between imaging modalities; (2) Refine imaging workflows to improve reproducibility and efficiency in correlative imaging; (3) Deliver comprehensive and user-friendly documentation. Key stakeholders * µ-VIS X-ray Imaging Centre (muvis.org) - µ-VIS is the UoS core facility for µCT and part of the EPSRC National XCT Facility * Institute for Life Sciences - IfLS connects researchers across health, living systems, disruptive technologies, and data science * The Biomedical Imaging Unit at University Hospital Southampton - BIU offers advanced microscopy for research and diagnostics.
2025_13	USoton	Faculty of Environmental and Life Sciences School of Biological Sciences	Emily Brookes	01/07/2025	01/08/2025	Investigating gene regulation during human neurodevelopment	Understanding the Rules of Life	The Brain-derived neurotrophic factor (BDNF) gene encodes a neurotrophin required for neuronal development and synaptic plasticity. Levels of BDNF are downregulated in a variety of neurological disorders, including depression, stress, Alzheimer's disease, Huntington's disease, and Rett syndrome. While BDNF downregulation in these disorders is not directly causative of disease, its important consequences are demonstrated by the amelioration of symptoms after BDNF overexpression in Huntington's disease and Rett syndrome. Moreover, increases in BDNF expression are seen after the use of antidepressants, and correlate with the neuroprotection afforded by enriched environment. We are exploring the complex transcriptional regulation of the human BDNF gene, which is currently poorly understood. Several enhancers, DNA regions which promote expression, have been identified for mouse Bdnf, and demonstrated to be required for brain development or neuronal activation. The objective of the UG summer project is to investigate whether one of these enhancers is conserved in human neurons. To do this, we use human pluripotent stem cells and differentiate them into cerebral organoids, generating a 'brain in a dish'. In this model, we will assess enhancer activation and looping of the genome to allow enhancer-promoter proximity, which is required for enhancer activity. We will use CRISPR-based assays to induce loss- or gain- of enhancer activity, and assess the effect of this on BDNF expression and on human neurodevelopment through immunostaining for differentiation markers.

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2025_14	USoton	Faculty of Engineering & Physical Sciences/Engineering	Ian Williams	17/06/2025	04/08/2025	Microplastics in dairy and non-diary food products	Bioscience for sustainable agriculture and food	Investigate the types and quantities of microplastics between dairy milk and alternatives including oat, soya, and almond milk. Context: Microplastics in consumables have been a growing toxicological threat, with contamination in dairy products a significant concern due to current transport and storage (Ziani et al., 2023). Testing the quantities and types of dairy and non-dairy milk alternatives provides insight into the sources and pathways of microplastics into diets. Identifying these pathways supports detection of widespread exposure paths, necessary for implementing effective pollution control (Chen et al., 2022). Project objectives: Detect, quantify, and characterise microplastics in milk products, including cow's, sugar-free oat, almond, and soya milk. Methods (subject to changes): Preparing samples: Digestion of proteins by enzymes using proteinase K , followed by lipase treatment to remove fats. Hydrogen peroxide oxidation at will eliminate organic residues (Basaran et al., 2023). Glassware will be acid treated, then washed with ethanol and distilled water to mitigate contamination (Cras et al., 1999; Jonsson et al., 2010). Finding the microplastics: Post-digestion, samples will undergo density separation using NaCl solution. The supernatant will be filtered through Whatman filter paper using a vacuum filtration system comprising of a funnel, flask, and vacuum pump (Basaran et al., 2023). Aluminium foil will cover samples preventing cross-contamination (Badwanache and Dodamani, 2024). Filters will dry in a desiccator in clean Petri dishes before analysis. Identification: Optical microscopy will quantify and classify microplastics by size, colour, and morphology. An SEM will provide higher-resolution imaging of surfaces. EDX will identify polymer composition, e.g., C, O, Si for polyethylene and polypropylene (Da Costa Filho et al., 2021). Quantifying and analysis: ImageJ software (Basaran et al., 2023) or manual quantification using extrapolation will determine quantities. Statistical analysis using RStudio will apply ANOVA to compare microplastic loads across product types and independent T-tests against specific variables.
2025_15	USoton	Faculty of Environmental and Life Sciences School of Psychology	Christoph Witzel	07/07/2025	15/08/2025	Validating behavioural tasks to probe the stages of colour processing from the eyes to the visual cortex	Understanding the Rules of Life	In this project, you will investigate the neural mechanisms underlying human colour perception by comparing behavioural experiments with computational models of neural processes. Human colour perception is the result of several stages of processing, starting with the excitation of the photoreceptors in the eyes, propagating to the retinal ganglion cells, the LGN in the thalamus, and the double-and single-opponent cells in the primary visual cortex, until the colour signal reaches higher visual areas that produce the subjective experience of colour. We have designed psychophysical tasks that target precisely each of these different stages. In those tasks, human observers are asked to match a real colour to an illusory colour that is specific to the respective stage of processing. It is key to psychophysics that colour presentation is rigorously calibrated and controlled to allow establishing mathematical laws relating perception (as measured by observer responses) to physical and sensory characteristics of the colour stimuli. The aim of the project is to validate those tasks by comparing the measurements from those tasks with predictions from computational models of each stage of processing. We will also measure eye movements as they are important for predicting the strength of illusory colours across individuals. You will help calibrating the experimental set-up, piloting (polishing and streamlining) the tasks, recruit participants and collect data, compare data with the computational models, and present and discuss preliminary results in our weekly lab meetings. During the project, you will work closely together with me, Christoph Witzel, and my PhD student, Rio Coleman, who will be using these tasks for his SoCoBio-funded PhD project. You will acquire theoretical knowledge about colour processing, technical skills on colour calibration, psychophysics, and eye movements, and general research skills in terms of research communication, lab management, computational modelling and data analysis.

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2025_16	USoton	Faculty of Environmental and Life Sciences School of Biological Sciences	Sandra Wilks	01/07/2025	11/08/2025	Investigating antimicrobial resistance development in captive animals	Understanding the Rules of Life	Antimicrobial resistance (AMR) is a major global challenge but remains poorly understood in captive animal populations. Working with Marwell Zoo, we are working to understand how the microbiome of different animal species changes over their life course, and whether antimicrobial resistance genes are transferred between species in shared enclosures, or present in the enclosure environment. This work is building a microbial map of the zoo and providing important information on the interactions between the captive animals, native wild species who access the same areas, and the environment around (soil, water, vegetation). In the proposed work, we will focus on the water trough provided within this shared enclosure and investigate the microbial communities found within the water and on the surfaces as biofilms. The study will have the following structure to be completed across the 6 week placement: Milestone 1: Observe use of the water trough by individual animals, noting any interactions between species. Milestone 2: Collect water samples for analysis. Milestone 3: Collect samples from the water trough inner surface. Milestone 4: Analyse samples using a combination of culture, PCR, and sequencing techniques. All sample types will be assessed for the presence of culturable bacteria using standard growth methods. In addition, PCR-based approaches will be used to assess for the presence of AMR genes. All samples will also undergo DNA extraction for subsequent sequencing analysis. The study will enhance our knowledge of the role of drinking water in transference of AMR genes between individual animals as well as improving our understanding of the environmental microbiome communities associated with the water and biofilm communities on the trough surface.
2025_17	USoton	Faculty of Engineering and Physical Sciences School of Electronics and Computer Science	Dr Ernesto E. Vidal-Rosas	01/07/2025	12/08/2025	Investigating the feasibility of respiration monitoring using near-infrared spectroscopy	Bioscience for an integrated understanding of health	Respiratory diseases are a major health concern in the UK, affecting one in five individuals and costing approximately £188 billion annually. Current monitoring methods, such as manual counting, respiration belts, and end-tidal carbon dioxide (EtCO2) measurement, have limitations in accuracy, comfort, and are unsuitable for long-term continuous monitoring. Continuous respiratory monitoring is crucial, as many conditions develop progressively. However, hospital-based monitoring is resource-intensive and provides an incomplete picture. Wearable medical devices offer a promising solution for real-time health tracking, but an ideal, cost-effective, and comfortable long-term respiratory monitoring system is lacking. Near-infrared spectroscopy (NIRS) uses light to interrogate biological and physiological signals, including respiration, heart rate, and oxygenation. A pilot study demonstrated a strong correlation (92%) between NIRS and standard pressure belt measurements. The project aims to further investigate respiration monitoring and contribute to the optimisation of the current design. The project will provide experience on state-of-the-art near-infrared spectroscopy technology. The candidate will be working alongside a PhD student working on the same area of research. The project involves collecting physiological signal using NIRS sensors and carry out the associated data processing. One of the challenges includes separating the respiration signal from other signals and to find the optimal location of a wearable NIRS sensor. The project aligns with BBRC Bioscience for an integrated understanding of health, specifically in the theme “Transformative technologies for health”, which aims to support research that seeks to integrate biological data with sensors for the development of wearables (BBSRC Strategic Research and Innovation Framework, page 22). The expected outcome is a set of design parameters that include NIRS sensor source-detector separation, optimal location of NIRS monitor, and a basic processing pipeline of NIRS signals. The project will contribute to designing a reliable wearable device for real-time respiratory diagnostics, enabling timely disease detection and personalized treatment.

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2025_18	USoton	Faculty of Environmental and Life Sciences	Jan Janouskovec	07/07/2025	15/08/2025	RNA isolation and sequencing from marine phytoplankton cultures	Understanding the Rules of Life Bioscience for renewable resources and clean growth	The student will contribute to research aimed at generating new transcriptome data from eukaryotic phytoplankton for enzyme mining and evolutionary studies. The initial objective is to generate data from little known species of dinoflagellate algae that have cultures available in public culture collections. These include species producing toxins and bioluminescence. Around a dozen of strains will be ordered and pre-cultured before the studentship begins. The work will take place in a molecular laboratory equipped for cell culturing and RNA extraction. The output will be a set of quality-checked RNA samples shipped for commercial sequencing. The student will work together with a PhD student and the supervisor to prepare samples for RNA-Seq through three stages: 1) cell culturing, 2) RNA isolation, 3) sample quality checks. The studentship will involve the following skills and experience: - media preparation for cell culturing and sterile cell transfer techniques - culturing phytoplankton cell in marine media under different physiological conditions - microscopy and quantifying cell number by using a counting slide - cell harvesting and RNA extraction by using Trisol and commercial column kits - RNA quantification by using Nanodrop spectrophotometry - RNA integrity checks by using agarose gel electrophoresis and Tapestation. - sample shipping and communicating with service providers - summarizing metadata on strain cultivation and sample quality in a written and oral form - working with a PhD student and weekly tripartite meetings with the supervisor
2025_19	USusx	School of Psychology	Dominique Makowski	04/08/2025	12/09/2025	Neurophysiological Correlates of the Cognitive Processing of AI-Generated Content	Understanding the Rules of Life Bioscience for an integrated understanding of health	The placement will take place at the Reality Bending Lab, in the School of Psychology of the University of Sussex. Led by Dr Dominique Makowski, the team researches reality perception, fake news, illusions, fiction, deception, and self-control, by recording signals from the body (ECG, EDA...) and the brain (EEG), using advanced computational modelling (Bayesian stats, chaos theory, mixed models...). In this placement, you contribute to a project investigating the neural (EEG) and physiological (bodily signals, including ECG, breathing, Skin conductance) correlates of the cognitive processing of real vs. AI-generated emotional images. You will learn how to collect and record this type of data, and get familiar with elements of signal theory and signal processing. You will contribute to data preprocessing and analysis, developing valuable skills in programming languages such as R and Python. The objectives are: - Learning neurophysiological data recording - Learning how to operate and run experiments with Human subjects - Learning elements of neuroscientific programming - Contribute to a research project about Humans and AI-generated content More details can be found on the lab website: https://realitybending.github.io/
2025_20	USusx	School of Psychology	Dr Charlotte Rae	21/07/2025	29/08/2025	How does a 4 day working week change staff wellbeing?	Bioscience for an integrated understanding of health	In a 4 day working week, full-time employees reduce the time they spend at work to 4 days, while keeping their full-time salary. The objective of this project is to investigate how multi-dimensional aspects of wellbeing change when staff switch to a 4 day working week. Working with employers who take part in the Sussex 4 Day Week trial (www.sussex4dayweek.co.uk), this project will study how three important aspects of wellbeing change on a 4 day week. Firstly, the project will study how interoception – the process by which we sense bodily signals of stress, such as a fast heartbeat – changes, using heartbeat perception tasks. These are administered in person, and the student will gain hands on experience of in-lab cognitive testing with participants. Secondly, the project will study how sleep duration changes, by analysing sleep diary data. Thirdly, the project will study how a 4 day week changes the amount of time spent on wellbeing activities, such as exercise, after switching to a 4 day week. Through this, the student will develop their data analysis skills in processing sleep and time use diary data, using excel and R (according to the student's existing skillset, and areas for development). There should also be the opportunity to observe MRI brain scanning and the processing of blood samples, as part of the wider project. As well as practical skill development, the student will gain experience in learning how laboratory-based methods can be applied to real world experimental settings.

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2025_21	USusx	School of Life Sciences Department of Chemistry	Haitham Hassan	01/07/2025	11/08/2025	Precision Kinase Targeting Using Triazine-Focused DNA-Encoded Chemical Libraries	Bioscience for an integrated understanding of health	Many cancers are characterized by dysregulated kinase activity. Kinases, which catalyse protein phosphorylation, play a crucial role in regulating various cellular functions. Human cells contain over 500 kinase proteins. Currently, there are 37 FDA-approved kinase inhibitors used to treat different cancers, and an additional 150 kinase-targeted drugs are in clinical trials for various diseases. However, these inhibitors target only 30% of the human kinome.1, 2 A major challenge in identifying kinase inhibitors is achieving selectivity. DNA-encoded chemical libraries (DECL) offer immense potential in this area by enabling the screening of millions of molecules to discover selective kinase inhibitors. DECLs provide a vast and diverse chemical space for hit identification. This technique involves synthesising DNA-tagged molecules, each uniquely coded by a DNA sequence, which can be rapidly screened against protein targets. This accelerates the discovery process by allowing the rapid synthesis and screening of millions of compounds. In this project, we will target the key hinge region in the ATP binding site of kinases by the synthesis of Triazine-focused DNA-encoded chemical library (DECL). Triazine benefits from the crucial hinge binder pharmacophore, which facilitates binding to numerous kinases. The vast potential of the DECL to screen millions of compounds could lead to the discovery of selective inhibitors for the kinase of interest. Positive controls will be conjugated to DNA code and incorporated in the DECL. The screening of the DECL will be performed against protein of interest and potential hits will be synthesised off-DNA.
2025_22	USusx	Ecology & Evolution School of Life Sciences	Beth Nicholls	01/07/2025	30/09/2025	How do local and landscape factors affect species involved in biological control in urban agriculture?	Bioscience for sustainable agriculture and food	Urban agriculture (UA) is increasingly acknowledged as a sustainable solution to the challenges of the current damaging global food system and increasing urban populations. UA has a myriad of benefits including improving mental health and wellbeing, promoting community cohesion, providing habitat for wildlife and providing local, fresh and nutritious food. Evidence suggests that small-scale UA can be as productive as conventional farming and typically uses fewer synthetic fertilisers and pesticides. However, without the reliance on pesticides, alternative pest control methods are required. One suggested method of sustainable pest control is increasing biological control. Many animals are involved in biological control including, birds, mammals, arachnids and insects. Arthropods such as ground beetles and ground dwelling spiders are predators of common crop pests and thus may act as important biological control species in UA. However, these species are sensitive to environmental change including urbanisation. Thus, it is vital to understand how both local plot/site level variables and landscape variables effect the richness and abundance of these species. This study will use pitfall traps within allotment plots across Brighton and Hove, UK to identify the abundance and richness of ground beetles and ground dwelling spiders within allotment plots. Floral and vegetation surveys will be conducted to quantify plot and site level variables which may affect the target species such as percentage woody perennial cover and light pollution levels. Landscape mapping tools will be used to quantify the landscape level vegetation cover to analyse the effect of widescale urbanisation. This research will be incorporated with other research in UA in Brighton and Hove to inform growers on best practice and local government on sustainable policy for these areas. Candidates should have a strong interest in sustainable agriculture and ecology and be interested in expanding their plant and animal survey field skills.
2025_23	USusx	Ecology & Evolution School of Life Sciences	Elizabeth Nicholls	01/07/2025	30/09/2025	How do bees taste floral rewards? Investigating the neural basis of amino acid detection in bumblebees	Understanding the Rules of Life Bioscience for sustainable agriculture and food	When foraging, pollinating insects like bees make choices based on the nutritional quality of rewards offered by flowers: nectar mainly provides sugars for metabolic energy, while pollen supplies proteins and lipids for brood development and reproduction. While bees are known to evaluate the sugar concentration in nectar via taste organs on their mouthparts and antennae, far less is understood about whether and how bees can detect other compounds, such as proteins and their building blocks, amino acids. Our lab has recently discovered that bumblebees can taste the amino acid valine via their mouthparts. However, it remains unknown whether bumblebees perceive this compound via their sugar receptor, like some flies do, or whether valine is detected by a dedicated receptor. This project will investigate this question by exposing taste organs to solutions containing sucrose and valine in different amounts, and recording the response activity of gustatory receptors. During your studentship, you will receive full training on how to record receptor neurons' activity via extracellular electrophysiology, a widely used technique to study neuronal activity in real-time, as well as guidance on how to analyse this data. No prior experience is required, just good manual dexterity and willingness to learn. Beyond these experiments, depending on your interests, you may also learn how to care for indoors bumblebee colonies, be part of an active and varied lab, and explore more about sensory neuroscience, behavioural analysis, feeding ecology, data visualisation, and scientific writing.

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2025_24	USusx	Department of Ecology & Evolution School of Life Sciences	Maria Clara Castellanos	01/07/2025	15/09/2025	Variation in floral nectar composition and consequences for pollination	Understanding the Rules of Life Bioscience for sustainable agriculture and food	Nectar is a crucial reward offered by plants to floral visitors in exchange for pollination. The amount, but also 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 variability in nectar sugar composition across individual plants and flowers within plants is limited. Filling this gap is important to understand how much of the variability is caused by environmental conditions alone and how much has a genetic basis that can later be used to breed crops that are better for pollinators and productivity. Objectives: This project aims to measure the sources of variation in nectar composition across flowers and plants of crops and wild plants. Composition here refers to the relative amounts of different sugars found in nectar, that you will measure using HPLC techniques. Focal plants will include species growing in the greenhouse that are part of ongoing projects in the lab, including orphan African crop Lablab purpureus, common bean (Phaseolus vulgaris) and foxglove (Digitalis purpurea). In this project you will develop skills in sample collection and preparation, HPLC analysis done in collaboration with the Chemistry department, and analysis of HPLC results. For students interested in fieldwork, there is also the option of adding a field component measuring nectar in foxglove populations. The exact dates of the project can be discussed.