Centre for Experimental Medicine

19.2.20

Project Title	**Investigating the role of inflammatory processes in early and progressive Multiple Sclerosis**			
Supervisor(s)	1. Prof Denise Fitzgerald 2. Dr. Yvonne Dombrowski 3. Dr. Rachael Kee (Neurologist, Clinical PhD candidate)			
School / Centre	Wellcome-Wolfson Institute For Experimental Medicine			
Principal Supervisor's Contact Details	Email: d.fitzgerald@qub.ac.uk		Tel: 028 9097 1643	
Degree Pathway for which project is suitable (✓)	Medical Science	Y		
	Biochemistry	Y		
	Microbiology			
Is project of suitable standard / subject for studentship application? (✓)	*General awards* Wolfson Foundation ?		*Subject-specific awards* British Assoc Dermatologists Digestive Disorders Foundation Pathological Society Y Other …Neuropathological Society	
Background information:	Multiple Sclerosis (MS) is a chronic inflammatory demyelinating disease of the Central Nervous System (CNS). MS causes a wide range of debilitating symptoms in patients such as paralysis, vision loss, impaired bowel and bladder function and cognitive impairment. There is a wide disease spectrum with some patients developing more active or progressive forms. The immune system is known to be involved in the pathogenesis of MS. Furthermore certain immune profiles have been shown to be involved in patients who have more active MS and develop progressive forms (Bevan *et al. Ann Neurol 2018)*. There are currently ***no*** approved disease modifying treatments for secondary progressive MS in the UK and it is often difficult to predict which patients will enter progressive stages.			
Aims / objectives	This project aims to further investigate the role of immune cells in early and progressive MS by studying how different types of immune cells influence the formation of immune cell clusters within the meninges. This work will lead to a better understanding of the roles immune cells in different stages of MS and potentially identify novel therapeutic targets or biomarkers.			
Techniques employed:	Immunohistochemistry, brightfield microscopy, fluorescence microscopy, image analysis and statistical analysis			

<table>
<tr><td>Project Title</td><td colspan="4">Regulation of inflammatory cells in the lung lining fluid: role of microRNA125</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Dr BC Schock
2. Dr M Shyamsundar
3. Dr F Furlong (School of Pharmacy)</td></tr>
<tr><td>School / Centre</td><td colspan="4">Centre for Experimental Medicine</td></tr>
<tr><td>Principal Supervisor's Contact Details</td><td colspan="2">Email:
b.schock@qub.ac.uk</td><td colspan="2">Tel:
02890 972258</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable (✓)</td><td>Medical Science</td><td>✓</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td>✓</td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard / subject for studentship application? (✓)</td><td>General awards

Wolfson Foundation</td><td>✓</td><td>Subject-specific awards
British Assoc Dermatologists
Digestive Disorders Foundation
Pathological Society
Other ……</td><td></td></tr>
<tr><td>Background information:</td><td colspan="4">Lung cells in the airway lining fluid are highly responsive to inhaled pathogens and irritants such as cigarette smoke. Such exposures lead to the activation of the innate immune response via pro-inflammatory NF-kB signalling. The ubiquitination protein A20 is an important negative regulator of this pathway but is reduced in patients with chronic obstructive airway diseases (COPD).
MicroRNAs (miRs) are small non-coding RNAs involved in the regulation of gene expression at posttranscriptional level. MiR125b regulates A20 expression, and our preliminary data show that BAL cells upregulate A20 in response to LPS. However, the levels miR125b in pulmonary immune cells is not known. Mir125b may also be regulated by glucose concentrations (Huang YF et al., 2019) and sputum glucose is increased in stable COPD and further increased during COPD exacerbations (Mallia et al, JACI 2018). Furthermore, our preliminary data show increased glucose concentration in BAL fluid during LPS-induced inflammation and when cells are exposed to cigarette smoke extract. We therefore wish to investigate the relationship between glucose concentration and A20/miR125b-regulated inflammation in bronchoalveolar lavage cells from healthy controls and smokers.</td></tr>
<tr><td>Aims / objectives</td><td colspan="4">Here, we wish to investigate the expression of miR125b and A20 mRNA in bronchoalveolar lavage cells from smokers and non-smokers exposed to bacterial LPS (to mimic acute airway inflammation).</td></tr>
<tr><td>Techniques employed:</td><td colspan="4">Using bronchoalveolar lavage cells from smokers and non-smokers exposed to bacterial LPS the student will employ the following techniques:
- Isolation of total RNA (TriZol)
- Quantitative RT-PCR for A20 and miR125b
- Transferable skills (presentations/communication skills, organisation of work, working alone and in a team).</td></tr>
</table>

Project Title	**Biomarkers for the diagnosis of sepsis in children. A diagnostic accuracy study.**			
Supervisor(s)	1.Dr Thomas Waterfield 2.Dr Dara O'Donoghue			
School / Centre	Centre for Experimental Medicine			
Principal Supervisor's Contact Details	Email: Twaterfield01@qub.ac.uk		Tel:07872990521	
Degree Pathway for which project is suitable (✓)	Medical Science	X		
	Biochemistry			
	Microbiology			
Is project of suitable standard / subject for studentship application? (✓)	*General awards* Wolfson Foundation		*Subject-specific awards* British Assoc Dermatologists Digestive Disorders Foundation Pathological Society Other ……	
Background information:	Sepsis is a rare but catastrophic paediatric diagnosis. Many children present to hospital with a febrile illness and it is often difficult to distinguish a self-limiting viral illness from an early evolving sepsis. When there is uncertainty the clinicians will often use biomarkers such as C-reactive protein and cell counts to help predict the severity of the illness. Unfortunately these biomarkers have been shown to lack sufficient accuracy and several organisations, including NICE have asked for further research to assess the performance of novel biomarkers of infection.			
Aims / objectives	Assess the diagnostic accuracy of biomarkers such as Procalcitonin at identifying children with serious bacterial infection and evolving sepsis.			
Techniques employed:	A diagnostic accuracy study adhering to STARD criteria. Children will undergo additional biomarker testing on residual blood samples (index test). The reference standards will be the diagnosis of serious bacterial infection and invasive bacterial infection.			

Centre for Medical Education

Project Title	**How do healthcare professional students learn about cultural competence?**			
Supervisor(s)	1. Dr Jenny Johnston 2. Dr Helen Reid			
School / Centre	SMBDS/ CME			
Principal Supervisor's Contact Details	Email: j.l.johnston@qub.ac.uk		Tel:	
Degree Pathway for which project is suitable (✓)	Medical Science Biochemistry Microbiology	 		
Is project of suitable standard / subject for studentship application? (✓)	*General awards* Wolfson Foundation		*Subject-specific awards* British Assoc Dermatologists Digestive Disorders Foundation Pathological Society Other ……	
Background information:	The intercalating student will undertake a scoping review looking at the experiences of student healthcare professionals learning about cultural competence. This is a current 'hot topic' in medical education and offers the applicant an important opportunity to develop research skills and enhance their CV.			
Aims / objectives	Review the literature using the question 'What is known about how healthcare professional students learn cultural competence?'			
Techniques employed:	Database searching Scoping review (Arksey and O'Malley) Writing up and potential for publication			

<table>
<tr><td>Project Title</td><td colspan="4">Determination of the Feasibility of using the Forced Oscillometry Technique to measure lung function in children with pre-school wheeze.</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Dr Dara O’Donoghue

2. Dr Patrick McCrossan</td></tr>
<tr><td>School / Centre</td><td colspan="4">Centre for Medical Education</td></tr>
<tr><td>Principal Supervisor’s Contact Details</td><td colspan="2">Email:
d.odonoghue@qub.ac.uk</td><td colspan="2">Tel:07595369671</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable (✓)</td><td>Medical Science</td><td>✓</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td></td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard / subject for studentship application? (✓)</td><td colspan="2">General awards

Wolfson Foundation</td><td colspan="2">Subject-specific awards

British Assoc Dermatologists

Digestive Disorders Foundation

Pathological Society

Other ……</td></tr>
<tr><td>Background information:</td><td colspan="4">The gold-standard investigation to measure lung function in children and adults is spirometry. However this needs a level of compliance to complete forced expiratory manoeuvres. Therefore it is not possible to be able to perform spirometry in young children. Preschool wheeze is a common paediatric problem for which has proved to be frustrating to investigate and treat for the reason outlined above. There is some evidence that Impulse Oscillometry (IOS), a technique that needs minimal compliance, can be used to determine lung function by measuring airway reactance. This is only available in a few research centres, and involved taking the young child to a lung function laboratory to do the investigation. There is a new portable device available (Tremoflow) that measures airway reactance to measure lung function using the Forced oscillometry Technique FOT). This is potentially attractive as it is a portable device that needs minimal compliance and can be used in the clinic or Emergency Department. It is not known if this can be used reliably in pre-school children</td></tr>
<tr><td>Aims / objectives</td><td colspan="4">1. To determine the feasibility of using the FOT in pre-school wheeze
2. To determine the repeatability of the FOT
3. To determine if FOT can be used to measure airway reversibility in pre-school wheeze post bronchodilatation</td></tr>
<tr><td>Techniques employed:</td><td colspan="4">FOT will be used to measure lung function in children ages 2-5 in the outpatient clinic and in the Emergency Department in the Royal Belfast Hospital for Sick Children. This will be done twice and the repeatability of the measurements will be determined. These children will also have IOS measured in the lung function laboratory and the results of IOS and FOT will be compared to see if there is a correlation. Wheezy pre-school children are routinely given inhaled bronchodilators to open up the airways. FOT will be done pre and post administration of bronchodilator to see if this change in airway calibre can be measured.</td></tr>
</table>

<table>
<tr><td>Project Title</td><td colspan="4">Trauma, cytokines and psychosis</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Ciaran Mulholland, CME
2. Donncha Hanna, School of Psychology</td></tr>
<tr><td>School / Centre</td><td colspan="4">CME/Psychology</td></tr>
<tr><td>Principal Supervisor's Contact Details</td><td colspan="2">Email:
c.c.mulholland@qub.ac.uk</td><td colspan="2">Tel: 07703736713</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable (✓)</td><td>Medical Science</td><td>X</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td>X</td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard / subject for studentship application? (✓)</td><td>General awards

Wolfson Foundation</td><td></td><td>Subject-specific awards

British Assoc Dermatologists

Digestive Disorders Foundation

Pathological Society

Other ……</td><td></td></tr>
<tr><td>Background information:</td><td colspan="4">Early studies on factors in psychosis:
- genes (e.g. twins / adoption studies).
- neurotransmitters such as dopamine (Van Rossum, 1966; Carlson, 1972).
More recent studies:
– trauma (Bebbington et al., 2004; Varese et al., 2012)
- the immune system, e.g. pro-inflammatory cytokines (Baumeister, et al., 2016).
Trauma contributes to the pro-inflammatory state seen in patients with psychosis (Di Nicola et al., 2013). There appears to be an interplay between trauma and biology in psychosis, but not everyone who experiences trauma develops psychosis.

Does cognitive architecture play a role in the interaction between trauma, immune responses (e.g. increased pro-inflammatory cytokines) and psychosis?</td></tr>
<tr><td>Aims / objectives</td><td colspan="4">1) Does trauma predict levels of pro-inflammatory cytokines?
2) If so, is there a direct link or is it mediated by trauma appraisals / coping style?
3) Does group membership (control / ultra high risk / first episode) predict levels of pro-inflammatory cytokines?
4) If so, is there a direct link or is it mediated by trauma and / or cognitive architecture (trauma appraisals, coping)?</td></tr>
<tr><td>Techniques employed:</td><td colspan="4">Recruit controls from QUB students.
Recruit ultra high risk patients from STEP programme (NHSCT).
Recruit first episode participants from Early Intervention Team (BHSCT)
Following agreement to participate with informed consent each participant will give a blood sample and complete the trauma and coping questionnaires.
Blood samples will be analysed for levels of pro-inflammatory cytokines to be used as dependent variable in analyses with questionnaire scores as predictor variables.</td></tr>
</table>

<table>
<tr><td>Project Title</td><td colspan="4">Promoting deceased organ donation: activating medical students' critical consciousness through forum theatre</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Dr Helen Reid[1]
2. Dr Paul Murphy[2]
3. Prof Gerry Gormley[1]</td></tr>
<tr><td>School / Centre</td><td colspan="4">1) CME, SMDBS 2) School of Arts, English and Languages</td></tr>
<tr><td>Principal Supervisor's Contact Details</td><td colspan="2">Email: helen.reid@qub.ac.uk</td><td colspan="2">Tel: ext 2442</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable</td><td>Medical Science</td><td>✓</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td></td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard for studentship application?</td><td>General awards

Wolfson Foundation</td><td>✓</td><td>Subject-specific awards

Northern Ireland Kidney Research Fund</td><td>✓</td></tr>
<tr><td>Background information:</td><td colspan="4">Introduction
Since the first reported successful kidney transplant in 1954, organ donation has become a well-established therapy. Receiving a transplanted organ can have a transformative impact on an individual's life. However, organ-shortage remains one of the main challenges in organ-transplantation. Deceased organ donation is one pathway of offering organs for donation. In essence, deceased organ donation is the process of giving an organ (or a part of an organ), at the time of a donor's death, for the purpose of transplantation to another person. Despite the increased rates of decreased organ donation, there continues to be a critical need to meet the increasing numbers of patients whose life could be transformed by receiving an organ donation.

A matter for all healthcare professionals and students, organ donation is an important aspect of end-of-life care. In the United Kingdom the General Medical Council (GMC) mandate a duty of care for medical practitioners to identify potential organ donors and be prepared to explore the option of deceased donation when a patient is close to death. Therefore there is an imperative for all doctors, including medical students, to receive training in the process of organ donation. Whilst staff directly involved in deceased donation require expert knowledge and skills, all healthcare practitioners need to be best prepared if they encounter a potential opportunity for deceased organ donation. It is acknowledged that deceased organ donation is a complex and emotive process – particularly given that deceased donation occurs at times of significant family distress.

Training in deceased organ donation has many challenges. None more than it being inappropriate for junior staff to lead a donation discussion with families. Furthermore it may be insensitive for medical students to observe this process, particularly given the large numbers of medical students in training. Simulation based training can provide learning</td></tr>
</table>

	opportunities which may not be readily available in the workplace. In the UK there is a National Deceased Donation Course for Intensive Care Medicine trainees. Such specialised training has been shown to improve practitioners' preparedness for dealing with the process of decreased organ donation. However there remains a need to further enhance the awareness of the complex technical, emotional and social processes involved in organ donation to the wider community of healthcare professionals. **Beyond naïve learning: *awakening social responsibility about organ donation*** Despite the rise in *organ-donations*, *organ-shortage* is one of the main limitations in organ-transplantation. At a societal level, there is a drive to promote deceased organ donation for potential recipients. Beyond the clinical process, there is a moral imperative on healthcare professionals to contribute to the wider conversation on decreased organ donation. Moreover, medical schools have an obligation to foster doctors who are conscious of the social and cultural dynamics of healthcare, thereby leading change. However there is a tendency for the teaching of organ donation to be more on a knowledge-based approach. Such an approach runs the risk of trivializing a deeper engagement with the essential aspects regarding deceased organ donation. Freire advocated *critical pedagogy* as a means of empowering people to effect societal change. Nurturing *critical consciousness* (i.e. the ability to recognise and analyse systems of inequality and the commitment to take action against these systems) has the potential to empower learners to effect societal change. Instead of emphasising competencies, *critical consciousness* focuses on deeper levels of awareness and understanding of the social, cultural and even emotional dynamics in healthcare; potentially transforming a naïve view of deceased organ donation to a more critical one. Given doctors' privileged position in society, they have capacity to effect change in society. Applying critical consciousness approaches to medical education may unearth values that have potential to impact social accountability. Evidence also suggests that critical pedagogy can foster greater compassion in doctors. **Forum theatre: *incorporating critical pedagogy into medical education?*** Incorporating *critical pedagogy* into medical education requires a nuanced approach, attentive to different contexts and existing pedagogies. Increasingly healthcare is drawing upon the arts in transforming healthcare education to enhance *critical consciousness*. One such modality is *Forum Theatre*. Forum theatre is a public engagement method pioneered by Augusto Boal as a constituent element within his broader dramaturgical framework the Theatre of the Oppressed. Forum theatre promotes the engagement of audiences with live performance by combining the role of spectator and actor into the neologism 'spectactor'. Spectactors have the power to stop and change the performance. The strategy breaks through the barrier between performers and audience, putting them on an equal footing and enables

	participants to rehearse alternative courses of action which could be applicable to their everyday lives. As part of Theatre of the Oppressed, the issues dealt with in forum theatre are often related to areas of social justice with aims to explore solutions to oppression featured in the performance. For example, the global need for greater deceased organ donation. Forum theatre creates a safe space to discuss sensitive issues and encourage individuals to speak up about such issues in a critical and empowering way. Forum theatre typically involves a scenario, usually indicating some kind of oppression, which is shown twice. During the replay, any member of the audience ('spectactor') is allowed to stop the performance, step forward and take the place of one of the oppressed characters, showing how they could change the situation to enable a different outcome. Several alternatives may be explored by different spectactors. The other actors remain in character, improvising their responses. A facilitator (The Joker) is necessary to enable communication between the players and the audience. In this proposed research, we consider the potential of forum theatre in nurturing social accountability in medical students around deceased organ donation and fostering an intrinsic orientation to take action.
Aims / objectives	This project aims to explore the embodied lived experiences of forum theatre on medical students' understanding of decreased organ donation. We will achieve this aim by the following objectives • Establish a multiprofessional research team including PPI • Develop a forum theatre scenario based on deceased organ donation • Pilot this forum theatre scenario • Perform the forum theatre scenario with medical students as participants • Elicit participants' lived experiences of the forum theatre piece
Techniques employed:	• Establish a multi-professional research team including PPI from the Northern Ireland Kidney Patient Association • Perform a literature review • Develop a research protocol and seek ethical approval • Develop and pilot a forum theatre scene regarding deceased organ donation • Recruit, sample and consent medical students to take part in the forum theatre scenario • Capture participants' experiences via face-face interviews and audio-diaries • Using hermeneutic phenomenology, with influences of Merleau-Ponty's work on embodiment, data will be analysed using Template Analysis • Disseminate the work via conferences and published paper(s) • Scope where the outputs of this project could be implemented into medical curricula.

<table>
<tr><td>Project Title</td><td colspan="4">StudentsToo: Medical students' perceptions of boundary crossing when examining patients</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Dr Grainne Kearney
2. Dr Diane Wilson
3. Prof Gerry Gormley</td></tr>
<tr><td>School / Centre</td><td colspan="4">Centre for Medical Education</td></tr>
<tr><td>Principal Supervisor's Contact Details</td><td colspan="2">Email:
g.kearney@qub.ac.uk</td><td colspan="2">Tel: Ex 5840</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable (✓)</td><td>Medical Science</td><td>x</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td></td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard / subject for studentship application? (✓)</td><td>General awards

Wolfson Foundation</td><td>x</td><td>Subject-specific awards

British Assoc Dermatologists

Digestive Disorders Foundation

Pathological Society

Other ……</td><td></td></tr>
<tr><td>Background information:</td><td colspan="4">In recent years there have been a number of high-profile cases where doctors' examination approaches have been misconstrued by patients as inappropriate advances. In wider society, the #MeToo movement has similarly focused minds on the need for explicit consent. We previously explored how any examination has the potential to be considered invasive of a patient's personal space. We suspect that examinations are such a routine part of a medical student or doctors' work that there is the potential for them to overlook how a patient might feel (i.e. adopt the 'clinical gaze').

In previous research, we looked at Simulated Patients' (SPs) perceptions of examinations that crossed their personal boundaries. (1) Highly emotive themes in this work included how the SP's negotiated power with students during these examinations. SPs reported feeling disempowered when they perceived that the student had deviated from the terms of the consent and used their agency therefore to resist.
SPs talked of how they perceived students felt during such examinations but research has not specifically looked at the students' experiences. This proposed project will compliment our previously published work in this area.

References
1) Kearney, G.P., Gormley, G.J., Wilson, D. and Johnston, J.L. Blurred boundaries: sexuality and power in standardised patients' negotiations of the physical examination. Adv Simul 3, 11 (2018)</td></tr>
<tr><td>Aims / objectives</td><td colspan="4">Aim – to explore medical students' perceptions of boundary crossing during physical examination of patients

This aim will be achieved through the following objectives
1) Perform a literature review relating to this topic
2) To use qualitative data collection methods and data analytic techniques to explore perceptions that medical students hold and their experiences of boundary crossing examinations that they have been involved in.</td></tr>
</table>

	3) To devise guidance for students and tutors on navigating boundary crossing examinations 4) To prepare a paper for publication based on this research project
Techniques employed:	The student will learn about a variety of qualitative data collection methods such as semi-structured interviews and focus groups, in order to select an appropriate method for this project. They will recruit and consent medicals students to take part in the study, The student will learn about the analytical process of thematic analysis and grounded theory, and about phenomenology when considering analysis of the data. The student will perform a relevant literature review. The results of this study will be presented at conferences and prepared as a paper for academic publication. The results of this study will help form guidance for students and tutors on navigating boundary crossing examinations.

Project Title	**The role of conversation during intravitreal eye injections.**			
Supervisor(s)	1. Dr Michael Williams 2. Dr Catrin Rhys			
School / Centre	1. MW: Centre for Medical Education, SMDBS, QUB 2. CR: School of Communication and Media, UUJ			
Principal Supervisor's Contact Details	Email: m.williams@qub.ac.uk		Tel: c/o 028 90245133	
Degree Pathway for which project is suitable (✓)	Medical Science	✓		
	Biochemistry			
	Microbiology			
Is project of suitable standard / subject for studentship application? (✓)	*General awards* Wolfson Foundation	✓	*Subject-specific awards* British Assoc Dermatologists Digestive Disorders Foundation Pathological Society Other ……	
Background information:	Intravitreal eye injections (IVIs) are the most commonly performed ophthalmic procedure in the developed world, usually performed for treatment of macular degeneration or diabetic macular oedema. Patients are accepting of the procedure as they are driven by fear of losing vision without treatment, but nevertheless experience variable amounts of anxiety before and during injections. Conversational practice in the injection room varies: for some patients it may reassure and relax them, while some *injectors* may believe that conversation distracts or even may increase infection risk. This project will use the empirical linguistic method of 'conversation analysis' (CA) to explore the role of talk in the intravitreal injection room. CA is an established method used by researchers from several disciplines to analyse the sequence and actions of what is said. The insights gained may be both therapeutic and linguistic in nature.			
Aims / objectives	To explore the role of conversation during intravitreal injections using conversation analysis			
Techniques employed:	Ethics committee approval has been granted, and an application for Trust governance approval is in progress. The project will then involve identifying approximately 15 participants, seeking their consent, setting up recording equipment, transcribing the conversations ('the data'), notating the transcripts using 'Jeffersonian notation', and then working with the supervisors to analyse and write up findings. The hope is this will lead to conference presentations and a submission for publication.			

<table>
<tr><td>Project Title</td><td colspan="4">Interaction in the Setting of Visual Impairment</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Dr Michael Williams</td></tr>
<tr><td>School / Centre</td><td colspan="4">1. MW: Centre for Medical Education, SMDBS, QUB</td></tr>
<tr><td>Principal Supervisor's Contact Details</td><td colspan="2">Email: m.williams@qub.ac.uk</td><td colspan="2">Tel: c/o 028 90245133</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable (✓)</td><td>Medical Science</td><td>✓</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td></td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard / subject for studentship application? (✓)</td><td>General awards

Wolfson Foundation</td><td>✓</td><td>Subject-specific awards
British Assoc Dermatologists
Digestive Disorders Foundation
Pathological Society
Other ……</td><td></td></tr>
<tr><td>Background information:</td><td colspan="4">People with visual impairment (VI) interact in a sighted world. Visual cues are a central part of communication, but not available for those with VI. How sighted people adjust their talk in interactions with others with VI may affect several outcomes, including ability to achieve the task in hand, as well as quality of life and even mood and wellbeing of those with VI. Conversation Analysis is a formal method used to understand the detail of actions and sequences short segments of talk. CA is an established method used by researchers from several disciplines to analyse the sequence and actions of what is said. The insights gained may be both therapeutic and linguistic in nature.</td></tr>
<tr><td>Aims / objectives</td><td colspan="4">This study will focus on the detail of how sighted participants talk in naturalistic settings to those with visual impairment.</td></tr>
<tr><td>Techniques employed:</td><td colspan="4">The project will then involve identifying approximately 15 participants, seeking their consent, setting up recording equipment, transcribing the conversations ('the data'), notating the transcripts using 'Jeffersonian notation', and then working with the supervisors to analyse and write up findings. A scenario will be created to capture naturalistic conversation while making coffee in a lab-type environment. Given the novelty of this approach in ophthalmology, the hope is this will lead to conference presentations and a submission for publication.</td></tr>
</table>

Centre for Public Health

Project Title	**Evaluation of homocysteine interactions with renal function and coronary heart disease risk factors and outcomes in the Prospective Study of Myocardial Infarction (PRIME).**			
Supervisor(s)	1. Dr Gareth McKay 2. Prof Jayne Woodside			
School / Centre	Centre for Public Health			
Principal Supervisor's Contact Details	Email: g.j.mckay@qub.ac.uk		Tel: 028 9097 8958	
Degree Pathway for which project is suitable (✓)	Medical Science	✓		
	Biochemistry	✓		
	Microbiology	✓		
Is project of suitable standard / subject for studentship application? (✓)	*General awards* Wolfson Foundation		*Subject-specific awards* British Assoc Dermatologists Digestive Disorders Foundation Pathological Society Other ……	
Background information:	The PRIME study included 10,600 men aged 50–59 years examined in 1991–1994 in Northern Ireland (NI) and France and followed annually for deaths and cardiovascular events for 10 years. Recent evidence suggests homocysteine is an independent predictor of coronary heart disease (CHD) but elevated homocysteine may be deleterious only in the presence of other CHD risk factors. Measures of homocysteine, renal (cystatin C and serum creatinine) and liver (bilirubin) function were obtained in a sub-group of 1000 study participants. This project will evaluate homocysteine levels with respect to renal and liver function and established CHD risk factors to determine whether elevated homocysteine levels are independently associated with CHD outcomes or are attenuated by other factors. Homocysteine concentration is dependent on renal function although few studies have adjusted for renal function. Cystatin C is a more sensitive biomarker than creatinine, especially at better renal function. This study will evaluate variation in the effects of homocysteine in those with established or newly diagnosed CHD.			
Aims / objectives	The objective of this study is to evaluate homocysteine levels with renal and liver function and CHD risk factors and disease outcomes in a nested cross-sectional analysis of the PRIME study participants.			
Techniques employed:	This project will require a literature review and an understanding of the subject area. Appropriate statistical approaches will be used to evaluate associations with disease outcomes, while adjusting for potential confounders. This will necessitate an understanding of the statistical package SPSS. Syntax codes are available. A manuscript detailing key study findings will be submitted for publication.			

Project Title	**What happens after discharge from hospital to people who develop delirium following elective arthroplasty? An evaluation of current practice in the UK and Ireland.**			
Supervisor(s)	1. Dr Emma Louise Cunningham 2. Professor David Beverland			
School / Centre	Centre for Public Health (in association with the Outcomes Assessment Unit, Musgrave Park Hospital, Belfast Trust)			
Principal Supervisor's Contact Details	Email: Emma.cunningham@qub.ac.uk		Tel: 07815796863	
Degree Pathway for which project is suitable (✓)	Medical Science Biochemistry Microbiology	√		
Is project of suitable standard / subject for studentship application? (✓)	*General awards* Wolfson Foundation		*Subject-specific awards* British Assoc Dermatologists Digestive Disorders Foundation Pathological Society Other ……	
Background information:	Neither the American Geriatrics Society (2015), National institute for Health and Care Excellence (2019) or the Scottish Intercollegiate Guidelines Network (2019) guidelines regarding management of delirium contain any specific recommendations for the follow up of people who develop delirium following elective surgery. In order to conduct the research needed to inform future guidelines we need to understand current practice in this area.			
Aims / objectives	This project will evaluate the current evidence base and practice aiming to: 1. Review the published literature examining follow up of people who develop delirium following elective arthroplasty surgery. 2. Establishing current practice in elective surgical units in the UK and Ireland. 3. Clarify what current practice is in a single elective surgical unit.			
Techniques employed:	Methods will include literature review, survey and clinical audit. The student will therefore learn important research and service evaluation skills that will inform their future clinical practice as well as becoming acquainted with clinicians and clinical practice in these specific fields.			

<table>
<tr><td>Project Title</td><td colspan="4">Are intra-articular platelet-rich plasma injections a suitable alternative to intra-articular corticosteroid injections for symptomatic management of knee osteoarthritis?</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Dr Neil Heron

2.</td></tr>
<tr><td>School / Centre</td><td colspan="4">Centre for Public Health</td></tr>
<tr><td>Principal Supervisor's Contact Details</td><td colspan="2">Email: N.Heron@qub.ac.uk</td><td colspan="2">Tel: 07808774292</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable (✓)</td><td>Medical Science</td><td>x</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td>x</td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard / subject for studentship application? (✓)</td><td>General awards

Wolfson Foundation</td><td></td><td>Subject-specific awards

British Assoc Dermatologists

Digestive Disorders Foundation

Pathological Society

Other ……</td><td></td></tr>
<tr><td>Background information:</td><td colspan="4">Musculoskeletal (MSK) conditions make up a significant workload in general practice (GP), with one in seven GP consultations being for MSK conditions (1). Patients frequently present to their GP with knee osteoarthritis (OA) symptoms (2) and a recent analysis of primary care musculoskeletal referrals to secondary care (3) found that knee OA was the commonest reason for orthopaedic secondary care referral. Moreover, symptomatic OA is one of the leading causes of adult disability in the world, with significant economic impact (4).

The United Kingdom (UK) has national guidelines for management of osteoarthritis (5), which include one of the current standard management options for these patients: intra-articular (IA) corticosteroid and local anaesthetic injection followed by exercise prescription (5). IA corticosteroid injections are often done before secondary care referral, attempting to provide symptomatic management and delay the need for surgery. However, although corticosteroid injections appear to improve pain scores in osteoarthritic patients (6), they are associated with side-effects (7) and do not appear to offer symptomatic improvement for longer than 6 weeks (6). Indeed, some authors (7) have advised against using IA corticosteroid therapy because of the deleterious effects on articular cartilage (8). Thus, research is needed to identify and show the effects of new management options for patients with knee OA, particularly in terms of offering better pain management.

One such option might be IA platelet-rich plasma (PRP) injections, which have been shown to reduce pain and improve function for knee OA patients in systematic reviews and meta-analyses (9), with improvements lasting up to 1 year (9). Moreover, IA PRP is not associated with the deleterious effects on cartilage that IA corticosteroid use is, making it a safer option for symptomatic management of knee OA. A course of treatment with IA PRP consists of 3 injections, each separated by one week. However, despite the current evidence of benefit, IA PRP is not offered as a standard treatment to those with knee</td></tr>
</table>

	OA. **<u>References</u>** (1) Jordan K, Kadam U, Hayward R, Porcheret M, Young C, Croft P. Annual consultation prevalence of regional musculoskeletal problems in primary care: an observational study. BMC musculoskeletal disorders 2010;11(144). (2) Boshuizen H, Poos M, van den Akker M, van Boven K, Korevaar J, de Waal M, et al. Estimating incidence and prevalence rates of chronic diseases using disease modeling. Population Health Metrics 2017;15(1):13. (3) Heron N, Ryans I. What Musculoskeletal (MSK) Conditions are Referred from Routine General Practice (GP) and what Impact does this have on Developing Innovative Care Models for Patients with MSK Conditions in Primary Care? International Journal of Physical Medicine & Rehabilitation 2016;4(375). (4) Cross M, Smith E, Hoy D, Nolte S, Ackerman I, Fransen M, et al. The global burden of hip and knee osteoarthritis: estimates from the global burden of disease 2010 study. Annals of the Rheumatic Diseases 2014;73(7):1323-30. (5) National Institute of Health and Care Excellence (NICE). Osteoarthritis: care and management - Clinical guideline [CG177]. National Institute of Health and Care Excellence (NICE) clinical guidelines. 2014;Feb:1. (6) Jüni P, Hari R, Rutjes A, Fischer R, Silletta M, Reichenbach S, et al. Intra-articular corticosteroid for knee osteoarthritis. The Cochrane Database of Systematic Reviews 2015;22(10):CD005328. (7) McAlindon T, LaValley M, Harvey W, Price L, Driban J, Zhang M, et al. Effect of Intra-articular Triamcinolone vs Saline on Knee Cartilage Volume and Pain in Patients With Knee Osteoarthritis: A Randomized Clinical Trial. JAMA 2017;317(19):1967-1975. (8) Dragoo J, Danial C, Braun H, Pouliot M, Kim H. The chondrotoxicity of single-dose corticosteroids. Knee Surgery, Sports Traumatology, Arthroscopy: Official Journal of the ESSKA 2012;20(9):1809-14. (9) Dai W, Zhou A, Zhang H, Zhang J. Efficacy of Platelet-Rich Plasma in the Treatment of Knee Osteoarthritis: A Meta-analysis of Randomized Controlled Trials. Arthroscopy 2017;33(3):659-670.
Aims / objectives	1) Undertake a systematic review and meta-analysis of studies which use intra-articular platelet-rich plasma (PRP) injections for symptomatic management of knee osteoarthritis and compare this to use of intra-articular corticosteroid injections.
Techniques employed:	1) Literature search. 2) Systematic review of the retrieved literature. 3) Meta-analysis of results, if possible (statistical advice will be sought within the Centre for Public Health for this analysis). 4) Article write-up and publication. 5) Option to present findings at appropriate conferences.

Project Title	**What is the relevance of Peripheral retinal Autofluorescence in age-related macular degeneration and diabetic retinopathy?**			
Supervisor(s)	1. Ruth Hogg 2. Tunde Peto			
School / Centre	Centre for Public Health			
Principal Supervisor's Contact Details	Email: r.e.hogg@Qub.ac.uk		Tel: 02890971654	
Degree Pathway for which project is suitable (✓)	Medical Science	X		
	Biochemistry			
	Microbiology			
Is project of suitable standard / subject for studentship application? (✓)	*General awards* Wolfson Foundation Jean Shanks Foundation		*Subject-specific awards* British Assoc Dermatologists Digestive Disorders Foundation Pathological Society Other ……	
Background information:	Autofluorescence imaging has been used clinically for a number of years to assess the accumulation of lipofuscin in RPE cells, a by-product of photoreceptor outer segment processing. It is thought that increased lipofuscin accumulation can occur as a result of both oxidative stress and inflammation, both important mechanisms in the development of age-related macular degeneration (AMD) and diabetic retinopathy (DR). The relevance of the peripheral retina in both conditions is being increasingly recognized but the role of peripheral autofluorescent patterns is not well understood. This project involves learning to evaluate Ultra-wide field retinal images for peripheral retinal Autofluorescent changes and investigating the relationship between these and traditional features of AMD and DR captured using conventional imaging. The data used will be from the Northern Ireland Cohort Longitudinal study of Aging (NICOLA) study.			
Aims / objectives	1. Characterize peripheral fluorescent changes in a population based cohort. 2. Investigate the relationship between peripheral autofluorescent changes and presence of AMD features. 3. Investigate the relationship between peripheral autofluorescent changes and presence of DR features.			
Techniques employed:	Retinal grading, epidemiology, multivariate statistical analysis (with strong statistical support provided), literature review.			

<table>
<tr><td>Project Title</td><td colspan="4">Retinal Dysfunction in older adults associated with myopia.</td></tr>
<tr><td>Supervisor(s)</td><td colspan="4">1. Dr Ruth Hogg

2. Prof Tunde Peto</td></tr>
<tr><td>School / Centre</td><td colspan="4">Centre for Public Health</td></tr>
<tr><td>Principal Supervisor's Contact Details</td><td colspan="2">Email:
r.e.hogg@qub.ac.uk</td><td colspan="2">Tel: 028 90971654</td></tr>
<tr><td rowspan="3">Degree Pathway for which project is suitable (✓)</td><td>Medical Science</td><td>X</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Biochemistry</td><td></td></tr>
<tr><td>Microbiology</td><td></td></tr>
<tr><td>Is project of suitable standard / subject for studentship application? (✓)</td><td>General awards

Wolfson Foundation</td><td>?</td><td>Subject-specific awards

British Assoc Dermatologists

Digestive Disorders Foundation

Pathological Society

Other ……</td><td></td></tr>
<tr><td>Background information:</td><td colspan="4">Myopia is an increasing Public Health concern with incidence rising worldwide. It is well known that high myopia is associated with an increased risk of retinal neovascularisation and retinal detachment in older age, however it is likely that more subtle consequences occur that are not well understood or appreciated. The Northern Ireland Cohort for the Longitudinal Study of Aging Eye study is an epidemiological study that has collected data from 3393 participants including an extensive home interview, dietary assessment and health assessment which includes multi-modal retinal imaging and visual acuity. The retinal images (colour, OCT, infra-red, autofluorescence and ultra-wide field Optomap images) have been graded for a range of retinal features providing a rich dataset for the student to work from.
https://www.qub.ac.uk/sites/NICOLA/</td></tr>
<tr><td>Aims / objectives</td><td colspan="4">Explore changes in neural layers, visual function, vision related quality of life and peripheral retinal features in myopic participants of the NICOLA study.
Undertake a systematic review of risks associated with myopia on older life in other epidemiological studies worldwide.</td></tr>
<tr><td>Techniques employed:</td><td colspan="4">systematic review, statistical analysis (with support), academic writing, retinal image analysis</td></tr>
</table>