MSc Behavioural Neuroscience Research supervision 2024/2025

Academic Staff - UCD School of Psychology

	Projects with funding		
Name	**Project/Research area**	**Garda vetting required ?**	**More info….**
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Assoc Prof Laura Taylor	**Project 1:** Developing Belief Network (DBN - ROI Site)	Yes	P.5
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Name	**Project/Research area**	**Garda Vetting required ?**	**More info …**
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Dr Áine Ní Choisdealbha Prof Nuala Brady	Localising hand- and foot-related motor activation in the developing brain	Yes	P.17
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Dr Brendan Rooney	**TBA**		

Projects with Funding

Dr Katie Gilligan Lee

Project 1:

Cognitive interference in the Spatial domain: Designing a dual-paradigm protocol to investigate the role of spatial reasoning for mathematics.

Supervisor: Dr. Katie Gilligan-Lee

Details of funding: The student will be joining an international collaboration that is being led by Dr. Katie Gilligan-Lee (UCD) and Dr. Cori Bower (California State University). Other collaborators include Prof. Kelly Mix and Victoria Alexander (University of Maryland), and Dr. Zachary Hawes (University of Toronto).

The student will be hired to work as a research assistant on this project for one day per week for approximately 30 weeks. In this capacity, they will work with the broader team to design the spatial interference paradigm, write a study pre-registration, collect data, curate data, assist with data analysis, and contribute to publication writing. They will attend team meetings (remotely).

The student will use data collected to complete their MSC dissertation. This will be on a tangential question to the main research questions of the project. The student will not be paid for the specific time they spend working on their MSC thesis, e.g., writing or analysis specific to their thesis question.

Background:

Spatial thinking is the ability to reason about shape and space. It is essential for everyday living, e.g., filling the dishwasher, navigating to college. Beyond its' importance in everyday living there is convincing evidence of an association between children and adults' spatial skills and their math performance (e.g., Atit et al., 2022). This evidence has recently been expanded to suggest a causal effect of spatial skill on mathematics, that is that training spatial skills leads to gains in mathematics performance (Hawes, Gilligan-Lee & Mix, 2022). However, the mechanisms that underpin space-mathematics relations remain undetermined, and it is still unclear under what conditions and for whom spatial skills can optimally support math problem solving

Aim: The aim of this project is to understand which cognitive developmental mechanisms (spatial cognition, language, and executive function) better support different types of math problem solving by implementing various types of interference during math problem solving. We will use a dual-task paradigm to generate interference.

In studies using the dual-task paradigm, an individual is presented with two tasks to solve simultaneously: a target problem/task (e.g., mathematics) and the interference task (e.g., spatial task). If the target task requires the cognitive skills being utilised in the interference paradigm, then performance and reaction time on the target task (mathematics) will be degraded when interference is present.

Method:

Design: This is a cross-sectional behavioural study. Participants will complete mathematics assessments in the presence and absence of different forms of cognitive interference. The specifics of the interference paradigm have yet to be established but this may require face-to-face or online cognitive assessments.

Participants: Across two phases this project will investigate the efficacy of our spatial interference paradigm on mathematics problem solving in (a) adults, and (b) children aged 10-12 years.

Background reading: Atit, K., Power, J.R., Pigott, T. et al. (2022). Examining the relations between spatial skills and mathematical performance: A meta-analysis. Psychonomic Bulletin and Review, 29, 699–720. https://doi.org/10.3758/s13423-021-02012-w
Hawes Z.H., Gilligan-Lee K.A.G., Mix K.S (2022). Effects of spatial training on mathematics performance: A meta-analysis. Developmental Psychology, 58(1):112-137. https://doi:10.1037/dev0001281

Esmaeili Bijarsari, S. (2021). A current view on dual-task paradigms and their limitations to capture cognitive load. Frontiers in psychology, 12, 648586

Other comments:
The student's specific research questions will be determined with their input once their project begins. However, the overarching goal of the project is to establish the mechanistic role of spatial reasoning in mathematics performance.

It is anticipated/encouraged that the student who completes this project will become an active member of the Cognition, Development and Learning Lab. This will include attending lab meetings, journal clubs and writing groups where possible.

Please feel free to contact me with any questions that you might have (katie.gilligan-lee@ucd.ie)

Assoc Professor Laura Taylor

Project: 1 Developing Belief Network (DBN - ROI Site)

Supervisor: Laura Taylor

Funding: Yes; part-time (~5 hours/week at hourly rate).

Background: Supporting the Developmental Belief Network (DBN), our team is interested in *how* children construct and revise their theories about the world, especially when directly observing a phenomenon is not possible. Our research aligns with the Network's focus on: *How does the transmission of religious cognition and behavior vary within and between populations?* We will investigate unique *within-culture variation* in the historical narrative of ethno-religious identity and conflict that pervades families, schools, and communities in NI, and *cross-cultural variation* in children's exposure to religion and sectarian conflict between NI and RoI, and resulting influences on the acquisition and development of religious and scientific beliefs.

Across three aims, we investigate variation in verbal and nonverbal transmission of natural and supernatural beliefs to children. The aims expand the range of influence from families to schools to ritual to community consensus and division. In Primary Aim 1, we will examine the influence of within-culture variation in family ethno-religious socialization, moderated by exposure to religious conflict, on children's confidence in the existence of supernatural and natural entities. In Primary Aim 2, we will investigate the effects of within-cultural variation in school norms of religiosity on children's confidence in, and epistemic justification of, supernatural and natural beliefs. In Primary Aim 3, we assess how participation in rituals in schools in religiously homogeneous RoI and religiously divided NI affects the development of ontological boundaries.

Background Reading:
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0292755
(Wave 1 protocol for the DBN project)
Taylor (2020). Developmental Peacebuilding Model.

McLoughlin, N., Davoodi, T., Cui, Y. K., Clegg, J. M., Harris, P. L., & Corriveau, K. H. (2021). Parents' Beliefs about Their Influence on Children's Scientific and Religious Views: Perspectives from Iran, China and the United States, *Journal of Cognition and Culture*, *21*(1-2), 49-75. doi: https://doi.org/10.1163/15685373-12340096
* Useful to get a sense of the broader work of the DBN in terms of cross-cultural comparisons of religious beliefs in children/families

Useful Web Links:
https://helpingkidslab.com/

https://developingbelief.com/

Comments: The position will also include participation in the Helping Kids! lab related projects.

Assoc Professor Laura Taylor

Project 2: Generation EU (GenEU)

Supervisor: Laura Taylor

Funding: Yes; part-time (~5 hours/week at hourly rate).

Garda Vetting: Not for project but yes for additional opportunities thorugh the Helping Kids Lab

Background: This post is part of the *Helping Kids!* lab.

Europe has always faced the challenge of identity. In the European Union's (EU) formation, new mechanisms provided shared symbols and meaning for citizens to promote peace in the region. Becoming part of the EU, and gaining access to those shared symbols, motivates many governments. At the same time, children learn best when they feel included. A superordinate, or shared national identity has benefits for child well-being and social inclusion. Yet, how a more inclusive superordinate identity, such as being *European,* may influence these child outcomes remains unexplored.

Generation EU (GenEU) aims to understand (a) when and how children learn about this shared European identity and (b) the implications of a European identity for children's well-being and social inclusion. GenEU argues that these two child outcomes are key to the European project's goals of peace and prosperity. The project findings will yield scientific discovery, bridging disciplines, to shed new theoretical light on how a supraordinate identity can affect individuals and society.

Background Reading:
Taylor (2020). Developmental Peacebuilding Model

Taylor, L. K., Corbett, B., Maloku, E., Tomovska Misoska, A., Tomašić Humer, J., & Dautel, J. B. (2023). Strength of Children's European Identity: Findings from Majority and Minority Groups in Four Conflict-affected Sites. *European Journal of Developmental Psychology, 20*(5), 776-796. Online **here**. *Open Access

Barret (1996). English children's European Identities.

Lennon Malbasha, Dautel, & Taylor (2022). Irish and European symbols.
[*UG thesis project 2019-20]

Useful Web Links:
https://helpingkidslab.com/

https://www.bluestarprogramme.ie/

Comments:
The position will also include participation in the Helping Kids! lab related projects.

Projects with no Funding

Dr Judith Bek

Project 1: Dance and music for Parkinson's disease

Supervisor(s): Dr Judith Bek**,** Associate Professor Nuala Brady, Dr Sarah Cooney

Garda Vetting: No

Background: Dance is found to have beneficial effects for people with Parkinson's disease (PD), including improvements in movement (e.g., gait and balance) and non-motor symptoms such as mood and cognition. Unlike other forms of physical therapy or exercise, dance is a multidimensional activity involving many elements that could influence outcomes. For example, music is intrinsic to most forms of dance, and music-based therapies can be effective for people with PD, but its role within outcomes of dance for PD is unclear. Additionally, therapeutic dance programs for PD are increasingly delivered through online platforms, which allows greater access and flexibility, but it can be more difficult to evaluate the effects of dance in this digital context.
This study will investigate the impact of music within dance for people with PD on motor and non-motor outcomes. The study will be conducted online, using new video-based motion capture techniques to analyse movements remotely.
Participants will practice a series of dance sequences from video demonstrations with or without music, and measures of movement (kinematics) and mood will be compared between groups.

Suggested background reading:

- Bek, J., Arakaki, A. I., Lawrence, A., Sullivan, M., Ganapathy, G., and Poliakoff, E. (2020). Dance and Parkinson's: a review and exploration of the role of cognitive representations of action. Neurosci. Biobehav. Rev. 109, 16–28. doi: 10.1016/j.neubiorev.2019.12.023
- Bek, J., Groves, M., Leventhal, D., and Poliakoff, E. (2021). Dance at home for people with Parkinson's during COVID-19 and beyond: participation, perceptions, and prospects. Front. Neurol. 12:678124. doi: 10.3389/fneur.2021.678124
- Karageorghis, C. I., Rose, D., Annett, L. E., Bek, J., Bottoms, L., Lovatt, P. J., et al. (2020). The BASES expert statement on the use of music for movement among people with Parkinson's. Sport Exerc. Sci.

Weblinks:

Other comments:

Project 2: The influence of experience in sports on motor imagery

Supervisors: Dr Judith Bek, Assoc Prof Nuala Brady, Dr Sarah Cooney
Garda Vetting: No
Background: Motor imagery (imagined movement with associated images and sensations) is an established technique for training and rehabilitation in sport, and has more recently been applied in interventions for patients with neurological conditions. Individual differences in motor imagery ability are widely documented, but the sources of these differences are not well understood. In addition to influences of demographic characteristics such as age and gender, motor imagery ability may also be altered through experience with activities that promote the use of imagery or engage aspects of the body schema. A recent study found that experience in sports and music influenced performance on an implicit test of motor imagery/body schema (hand laterality judgement), but not a self-report (questionnaire) measure of motor imagery.

This study will take a systematic approach to understanding the influence of experience in sports on motor imagery and body schema, by comparing groups of participants with and without experience in different types of sports and activities (e.g., team sports, individual sports, dance) on a range of measures designed to assess dimensions of motor imagery and body schema

Background Reading:

- Bek, J., O'Farrell, R., & Cooney, S. M. (2024, preprint). Experience in sports and music influences implicit motor imagery. https://doi.org/10.31234/osf.io/s928z
- Ladda, A. M., Lebon, F., & Lotze, M. (2021). Using motor imagery practice for improving motor performance – A review. *Brain and Cognition, 150,* 105705. https://doi.org/10.1016/j.bandc.2021.105705
- Moran, A., & O'Shea, H. (2019). Motor imagery practice and skilled performance in sport: From efficacy to mechanisms. In *Skill Acquisition in Sport* (3rd ed.). Routledge

Professor Nuala Brady

Project no 1 Brain lateralization in reading words and faces in dyslexia

Supervisor: Nuala Brady

Background:
Developmental dyslexia is very common with prevalence estimated between 5% and 17%, and dyslexia is often associated with neurodevelopmental disorders such as ADHD and autism. Traditionally, anomalous phonological processing – the way in which words are sounded out - has been considered the primary deficit underlying dyslexia. Recent findings argue for a reconceptualization of dyslexia as a multifaceted disorder, one in which anomalous visual processing may occur independently of or in conjunction with poor phonological processing (e.g., Sigurdardottir et al., 2015; Gabay et al., 2017; Brady et al, 2021). This project will investigate brain lateralisation in young adults with dyslexia, using eye tracking methodology to investigate visual field bias in viewing faces (Åsberg Johnels et al., 2022) and in viewing both isolated words and sequential words during a natural reading task, and will examine the relation of visual field bias to reading scores,

The School of Psychology has invested in state of art eye tracking technology (both stationary and portable Eye Link systems) and this project will allow for analysis of pupil diameter data coordination as well as visual field bias during all tasks. This project would suit students with an interest in dyslexia and its relationship to neurodevelopmental conditions.

Background Reading:

- Brady, N., Darmody, K., Newell, F. N., & Cooney, S. M. (2021). Holistic processing of faces and words predicts reading accuracy and speed in dyslexic readers. *PloS one*, *16*(12), e0259986.

- Sigurdardottir HM, Ivarsson E, Kristinsdottir K, Kristjansson A. Impaired Recognition of Faces and Objects in Dyslexia: Evidence for Ventral Stream Dysfunction? Neuropsychology. 2015;29: 739–750. pmid:25643213

- Gabay Y, Dundas E, Plaut D, Behrmann M. Atypical perceptual processing of faces in developmental dyslexia. Brain and Language. 2017;173: 41–51. pmid:28624595

- Åsberg Johnels, J., Galazka, M. A., Sundqvist, M., & Hadjikhani, N. (2022). Left visual field bias during face perception aligns with individual differences in reading skills and is absent in dyslexia. *British Journal of Educational Psychology*

Web Links:
https://www.ucdperceptionmotorcog.com/team-extended

Other Comments
Would suit two students working together, great opportunity to develop skills in the acquisition and analysis of eye tracking data 31/7

Dr Meadhbh Brosnan

Project: Neural signatures of response speed in younger and older adults

Supervisors: Dr Meadhbh Brosnan

Garda Vetting: No

Background: Response speed, i.e., the speed at which individuals can respond to sensory sensory information in the environment, is considered a foundational facet of cognition on which all higher cognitive functions rely[1]. As such, response speed is impaired in a wide range of clinical conditions including ADHD, dyslexia, depression, stroke, and Alzheimer's Disease (e.g.[2]). Several lines of work indicate a critical role for frontal regions of the brain in response speed. For example, frontal lesions acquired through stroke lead to response speed deficits[3]. Correspondingly, stimulating the frontal lobes using transcranial electrical stimulation (TeS) improves response speed in older adults[4]. Despite these findings, we lack an understanding of the precise mechanisms by which frontal regions modulate speed. Electroencephalography (EEG) offers excellent temporal resolution to explore activity in frontal regions of the brain in near real-time. This project will use EEG to identify frontal signatures contributing to inter-individual differences in response speed in both healthy younger and older adults. An existing EEG dataset will be used to examine these neural metrics (for recent work using this dataset see[5]).
The outcomes of this project will inform the development of novel neuroscience-led approaches to rehabilitation interventions aimed at remediating cognitive deficits in a wide range of clinical cohorts.
The MSc candidate will examine neural EEG metrics using customised MATLAB codes (no prior experience necessary), will attend regular lab meetings at the Translational and Cognitive Neuroscience UCD lab (https://meadhbhbrosnan.com), and will have the opportunity to collaborate with graduate students and colleagues locally and internationally (https://meadhbhbrosnan.com/people/). Funding will be available to attend, and present project findings, at an international conference

Background reading:

1. Salthouse, T.A., 1996. The processing-speed theory of adult age differences in cognition. *Psychological review*, *103*(3), p.403.
2. Edwards, J.D., Xu, H., Clark, D.O., Guey, L.T., Ross, L.A. and Unverzagt, F.W., 2017. Speed of processing training results in lower risk of dementia. *Alzheimer's & Dementia: Translational Research & Clinical Interventions*, *3*(4), pp.603-611.
3. Duncan, J., Bundesen, C., Olson, A., Humphreys, G., Chavda, S. and Shibuya, H., 1999. Systematic analysis of deficits in visual attention. *Journal of Experimental Psychology: General*, *128*(4), p.450.
4. Brosnan, M.B., Demaria, G., Petersen, A., Dockree, P.M., Robertson, I.H. and Wiegand, I., 2018. Plasticity of the right-lateralized cognitive reserve network in ageing. *Cerebral Cortex*, *28*(5), pp.1749-1759.
5. Brosnan, M., Pearce, D.J., O'Neill, M.H., Loughnane, G.M., Fleming, B., Zhou, S.H., Chong, T., Nobre, A.C., Connell, R.G. and Bellgrove, M.A., 2023. Evidence accumulation rate moderates the relationship between enriched environment exposure and age-related response speed declines. *Journal of Neuroscience*, *43*(37), pp.6401-6414.

Useful web links: https://meadhbhbrosnan.com

Dr Sarah Cooney

Project: The bodily self: Interoception, Emotions and Body image

Supervisor: Dr Sarah Cooney

Garda Vetting: No

Background: Interoception is a multidimensional construct that refers to sensing, becoming aware of, and interpreting internal physiological signals from key bodily systems (e.g., gastrointestinal, respiratory, and cardiovascular systems) (e.g., Garfinkel et al., 2015).
Building on peripheral theories of emotions interoception is linked to recognising and regulating emotional states (James, 1884; Damasio, 1994; Craig, 2004). It has been proposed that where there is poor emotion recognition (Alexithymia) there is an impairment with processing and interpreting internal bodily signals (Brewer et al., 2016). Evidence suggests that atypical interoception and emotion recognition are experienced in several mental health conditions including conditions where a disturbance in body image is a central diagnostic feature e.g., Anorexia Nervosa (Jacquemot & Park, 2020: Pollatos et al., 2008).
Indeed, interoception has a strong association with body image (e.g., Naraindas & Cooney, 2023): whereby, low interoception predicts heightened negative attitudes towards the appearance of the body in those *with* and *without* eating disorders (see Badoud & Tsakiris, 2017 for review). The current project investigates the interrelationship between dimensions of internal body awareness (interoception), body image and the ability to recognise emotional states. Taking a psychological network approach (Borsboom., 2017) this project aims to identify intervention points and outcomes for future interoceptive based interventions.

The successful candidate will benefit from working closely with members of UCD Body Lab including a current PhD student. The project is ideal for someone with an interest in research design and advanced statistical analysis with opportunities to pursue a research PhD in the future. The student will be expected to show initiative and be highly motivated to acquire the required technical skillsets.

Background Reading:

- Naraindas, A. M., & Cooney, S. M. (2023). Body image disturbance, interoceptive sensibility and the body schema across female adulthood: A pre-registered study. *Frontiers in Psychology*, *14*, 1285216.
- Borsboom D (2017) A network theory of mental disorders. World Psychiatry 16:5–13.https://doi.org/10.1002/wps.20375
- Garfinkel, S. N., Seth, A. K., Barrett, A. B., Suzuki, K., & Critchley, H. D. (2015). Knowing your own heart: distinguishing interoceptive accuracy from interoceptive awareness. *Biological psychology*, *104*, 65-74.
- Pollatos O, Kurz A, Albrecht J, Schreder T, Kleemann A, Schöpf V, et al. Reduced perception of bodily signals in anorexia nervosa. Eating Behav (2008) 9(4):381–8. doi: 10.1016/j.eatbeh.2008.02.001
- Tsakiris M, Jimenez A, Costantini M. Just a heartbeat away from one's body: interoceptive sensitivity predicts malleability of body-representations. Proc R Soc B: Biol Sci (2011) 278(1717):2470–6. doi: 10.1098/rspb.2010.2547 Brewer, R., Cook, R., & Bird, G. (2016).

- Naraindas, A. M., & Cooney, S. M. (2023). Body image disturbance, interoceptive sensibility and the body schema across female adulthood: A pre-registered study. *Frontiers in Psychology*, *14*, 1285216.
- Borsboom D (2017) A network theory of mental disorders. World Psychiatry 16:5–13.https://doi.org/10.1002/wps.20375

- Garfinkel, S. N., Seth, A. K., Barrett, A. B., Suzuki, K., & Critchley, H. D. (2015). Knowing your own heart: distinguishing interoceptive accuracy from interoceptive awareness. *Biological psychology*, *104*, 65-74. and body image concerns?. *Neuroscience & Biobehavioral Reviews*, *77*, 237-246.

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- Pollatos O, Kurz A, Albrecht J, Schreder T, Kleemann A, Schöpf V, et al. Reduced perception of bodily signals in anorexia nervosa. Eating Behav (2008) 9(4):381–8. doi: 10.1016/j.eatbeh.2008.02.001
- Tsakiris M, Jimenez A, Costantini M. Just a heartbeat away from one's body: interoceptive sensitivity predicts malleability of body-representations. Proc R Soc B: Biol Sci (2011) 278(1717):2470–6. doi: 10.1098/rspb.2010.2547
- Brewer, R., Cook, R., & Bird, G. (2016). Alexithymia: a general deficit of interoception. *Royal Society open science*, *3*(10), 150664.
- Jacquemot, A. M. M. C., & Park, R. (2020). The role of interoception in the pathogenesis and treatment of anorexia nervosa: a narrative review. *Frontiers in psychiatry*, *11*, 281.
- Badoud, D., & Tsakiris, M. (2017). From the body's viscera to the body's image: Is there a link between interoception

Useful web links: https://www.ucdbodylab.com/

Associate Professor Michelle Downes

Project 1: An exploration of executive functions in screen and non-screen play in 12-18 month olds

Supervisor(s): Assoc Professor Michelle Downes

Background: Infants and toddlers are exposed to screens in active ways (to entertain, educate, distract), and passively (background TV, parent phone use) from very early on in life. The current study plans to address existing research gaps in our knowledge of infant behaviour in the context of screens and how interaction with screens links to other developmental skills in the context of play. Measures will include an eye-tracking paradigm, an adapted version of ScreenQ (a 15-item parent report measure of screen exposure), the Early Executive Functions Questionnaire and a tabletop play tool. Items from the Bayley Scales of Infant Development (BSID-IV) will be used. A better understanding of how digital devices are used during infancy and the potential impact on cognitive development will allow for development of effective early interventions.

Suggested background reading:

Hendry, A., & Holmboe, K. (2021). Development and validation of the Early Executive Functions

Questionnaire: A carer-administered measure of executive functions suitable for 9- to 30-month-olds. *Infancy*, *26*(6), 932-961. https://doi.org/10.1111/infa.12431
Downes, M., Kelly DJ., Day, K., Marlow, M., & de Haan, M. (2018). Visual Attention Control Differences in 12 month old preterm infants. *Infant Behavior & Development*. DOI: 10.1016/j.infbeh.2018.01.002.

McHarg, G., Ribner, A. D., Devine, R. T., & Hughes, C. (2020). Screen time and executive function in toddlerhood: A longitudinal study. *Frontiers in Psychology*, *11*, 570392.

Weblinks: www.ucdbabylab.com

Other comments:

This project is best suited to a student who would like to obtain in-person lab experience working with children and has a specific interest in developmental neuropsychology/ developmental cognitive neuroscience. As this project would involve recruitment of infants the student would be flexible in terms of lab sessions to suit family schedules which could sometimes fall on weekends. Garda clearance will be required

Associate Professor Ciara Greene

Project 1: Neurophysiological markers of eyewitness memory distortion

Supervisor(s): Assoc Professor Ciara Green, Professor Klaus Kessler

Background: Previous research has demonstrated that eyewitness memory can be substantially affected by exposure to post-event misinformation. For example, if an eyewitness to a car crash sees a car drive through a green light, but later reads a newspaper report suggesting that the car had broken a red light, there is a good chance that they will later remember seeing the red light during the original event.

This project will use EEG to investigate the neurophysiological underpinnings of misinformation acceptance. Little is known about the precise EEG markers of memory distortions, but episodic memory has been linked to medial temporal lobe (MTL) functioning in interaction with prefrontal cortex (PFC), which also seems to play a crucial role in the formation of misinformation and the distinction between false and true memories (for review, e.g. Lentoor, 2023). Episodic memory processing has also been linked to theta brain oscillations (3-7Hz) that can be measured using EEG (for review, e.g. Herweg et al., 2020).
EEG will be recorded with the School's new mobile 64 electrodes system. You will have the opportunity to learn about brain oscillations and how these make our mind "tick". EEG data analysis will be conducted using advanced MATLAB toolboxes such as EEGlab and Brainstorm (see links below), adding to the student's transferrable skills. However, for achieving the best learning outcome with this project a technically minded approach is of the essence. Students will be expected to show initiative and independence in their learning. We are therefore seeking dedicated and technically minded students who would conceive of this challenge as an opportunity.

Suggested background reading:

Brassil, M., O'Mahony, C.J. & Greene, C.M. (2024). Do cognitive abilities reduce eyewitness' susceptibility to the misinformation effect? A systematic review. *Psychonomic Bulletin and Review.* https://doi.org/10.3758/s13423-024-02512-5
Friehs, M.A., Greene, C.M., Pastötter, B. (2021). Transcranial Direct Current Stimulation Differentially Affects True and False Memories in the DRM Task. *European Journal of Neuroscience*, *54*(2), 4609-4620. https://doi.org/10.1111/ejn.15337.
Lentoor, A. G. (2023). Cognitive and neural mechanisms underlying false memories: misinformation, distortion or erroneous configuration?. *AIMS neuroscience*, 10(3), 255..
Herweg, N. A., Solomon, E. A., & Kahana, M. J. (2020). Theta oscillations in human memory. *Trends in cognitive sciences*, *24*(3), 208-227.

Weblinks:
www.ucdattentionmemory.com
https://www.ucd.ie/psychology/t4media/MNClabequipment.pdf
Links to analysis software:
https://sccn.ucsd.edu/eeglab/index.php
https://neuroimage.usc.edu/brainstorm/Introduction

Other comments:
All enquiries welcome. Just email Dr Ciara Greene ciara.greene@ucd.ie or Prof Klaus Kessler klaus.kessler1@ucd.ie

Prof. Klaus Kessler

Project 1: EEG Neuromarkers of Psychosis-like thought patterns
Supervisors: Prof. Klaus Kessler & Associate Prof. Keith Gaynor (UCD)
Garda Vetting: No

Background: Recent reviews (e.g., Perrottelli et al., 2021) have highlighted that abnormal Electroencephalography (EEG) indices in patients with chronic schizophrenia can also be observed in high-risk (but subclinical) subjects and in the prodromal phase of psychosis (Atagun et al., 2020; Haigh et al., 2017; Reilly et al., 2018; Tada et al., 2019;). This supports the hypothesis that cerebral network dysfunctions appear early in the course of the disorder (Fusar-Poli et al., 2012; Kahn & Sommer, 2015) and may aid the prediction of high-risk individuals who will transition to psychosis. Crucially, most previous studies rely on only one EEG index (but see Zimmermann et al., 2010) for comparisons of high-risk (HR), first-episode psychosis (FEP) subjects, and healthy controls (HC).
Within the larger project in collaboration with the Dublin & East Treatment & Early Care Team (DETECT) – Early Intervention in Psychosis (EIP) Service, we aim to expand on previous research by (i) studying multiple EEG indices previously associated with aberrations in psychosis, (ii) examining several established tasks that tap into different neurocognitive subsystems associated with psychosis (e.g. perceptual, affective, social, executive), and (iii) including a clinical FEP group, a HR group, with two HC control groups (one with low and one with high non-clinical psychosis-proneness).
The aim for the MSc students will be to collect data (in person) for contrasting the two HC groups in the first instance. Each student will focus on one particular task. Psychosis-proneness will be assessed through self-report questionnaires. EEG will be recorded with the School's new mobile 128 electrodes system that is certified as medical equipment and will also be used for testing FEP and HR patients at a later stage of the overall project. You will have the opportunity to learn about brain oscillations and how these make our mind "tick". EEG data analysis will be conducted using Matlab toolboxes, adding to the students' transferrable skills. MSc students will also be given the opportunity to engage with the DETECT team and its service provision and clinical testing may commence towards the end of the MSc course, expanding the students' experience. We are seeking dedicated and skilled candidates who would conceive of this challenge as an opportunity.

Background reading:
Perrottelli, A., Giordano, G. M., Brando, F., Giuliani, L., & Mucci, A. (2021). EEG-based measures in at-risk mental state and early stages of schizophrenia: a systematic review. Frontiers in psychiatry, 12, 653642.
Zimmermann, R., Gschwandtner, U., Wilhelm, F. H., Pflueger, M. O., Riecher-Rössler, A., & Fuhr, P. (2010). EEG spectral power and negative symptoms in at-risk individuals predict transition to psychosis. Schizophrenia research, 123(2-3), 208-216.

Web links:
https://people.ucd.ie/klaus.kessler1
https://www.ucd.ie/psychology/t4media/MNClabequipment.pdf
https://people.ucd.ie/keith.gaynor
http://www.detect.ie/index.html

Further information:
All enquiries welcome. Just email Prof Klaus Kessler (klaus.kessler1@ucd.ie) or Dr Keith Gaynor (keith.gaynor@ucd.ie).

Dr Áine Ní Choisdealbha

Project 1: An EEG investigation of motor imagery use during the hand laterality task

Supervisor (s): Dr Áine Ní Choisdealbha, Prof Klaus Kessler, Prof Nuala Brady

Garda Vetting: No

Background: Mentally rotating visually-presented stimuli is a visuo-spatial task that typically requires abstract reasoning. However, there are variants of this task in which the stimuli used are images of bodies or parts of bodies, and these tasks can be performed with reference to one's own body and motor system. For example, in the hand laterality task, participants must determine if a presented hand is a left or right hand. Behavioural research has shown that participants perform the hand laterality judgment by generating a motor image of their own hand and mentally rotating it to match the stimulus. However, visual strategies are also possible, and there are reasons why they might be used instead of motor imagery. These include individual differences in hand dominance, the biomechanical difficulty of rotating to match the presented hand, and perception of the hand as being shown from a "self" or "other" perspective.
In this project, we will measure neural correlates of motor imagery during EEG as participants perform the hand laterality task. We will examine how mu desynchronization (our target measure of motor activation) changes with the biomechanical difficulty of the task, which will be manipulated in two ways – by presenting the stimulus hands at different angles of rotation, and by placing the participants' hands in an unfamiliar posture. Results will tell us more about when the switch between visual and motor strategies occurs in the hand laterality task.

Background Reading:
Ní Choisdealbha, Á., Brady, N., & Maguinness, C. (2011). Differing roles for the dominant and non-dominant hands in the hand laterality task. *Experimental Brain Research*, *211*, 73-85.

Osuagwu, B. A., & Vuckovic, A. (2014). Similarities between explicit and implicit motor imagery in mental rotation of hands: An EEG study. *Neuropsychologia*, *65*, 197-210.

Pfurtscheller, G., Brunner, C., Schlögl, A., & Da Silva, F. L. (2006). Mu rhythm (de) synchronization and EEG single-trial classification of different motor imagery tasks. *NeuroImage*, *31*(1), 153-159.

Useful Web Links: https://www.ucdperceptionmotorcog.com/team-extended

Other Comments: Would suit two students working together, great opportunity to develop skills in EEG acquisition and data analysis

Dr Áine Ní Choisdealbha

Project 1: Localising hand- and foot-related motor activation in the developing brain

Supervisor(s): Dr Áine Ní Choisdealbha, Prof Nuala Brady

Garda Vetting: Yes

Background: Infants from at least 5 months of age show some ability to anticipate the goals of familiar actions performed by others. For example, they may look to an adult's mouth if they see them pick up a cup, and after learning that an adult prefers a particular toy, they will indicate surprise if the adult reaches for a different one. The same results are not always found for a non-human actor, like a mechanical claw, engaged in the same activities. One theory of why infants are better at detecting the goals of human actors is that they use motor representations of their own bodies to match their own sensorimotor experience to the other person. Studies recording brain activity from infants show that motor activation does occur during action perception.
Infants from at least 5 months of age show some ability to anticipate the goals of familiar actions performed by others. For example, they may look to an adult's mouth if they see them pick up a cup, and after learning that an adult prefers a particular toy, they will indicate surprise if the adult reaches for a different one. The same results are not always found for a non-human actor, like a mechanical claw, engaged in the same activities. One theory of why infants are better at detecting the goals of human actors is that they use motor representations of their own bodies to match their own sensorimotor experience to the other person. Studies recording brain activity from infants show that motor activation does occur during action perception.

This activation occurs in a number of brain regions, including but not limited to primary motor cortex. One feature of primary motor cortex is that it is somatotopic, that is, motor activity involving different parts of the body occurs in different regions. In this project, we will examine how motor activation occurs in the infant brain across the first year of life in response to different hand- and foot-related actions, and how this changes with age as infants gain relevant skills in reaching, grasping, and locomotion. We will use standardised questionnaires to obtain a measure of infants' own motor development, to understand how experience of using the hands and feet affect infants' responses to these actions.

Background Reading:

de Klerk, C. C., Johnson, M. H., & Southgate, V. (2015). An EEG study on the somatotopic organisation of sensorimotor cortex activation during action execution and observation in infancy. *Developmental Cognitive Neuroscience*, *15*, 1-10.

Saby, J. N., Meltzoff, A. N., & Marshall, P. J. (2013). Infants' somatotopic neural responses to seeing human actions: I've got you under my skin. *PLoS One, 8*(10), e77905.

Southgate, V., Johnson, M. H., Karoui, I. E., & Csibra, G. (2010). Motor system activation reveals infants' on-line prediction of others' goals. *Psychological Science*, *21*(3), 355-359.

Useful Web Links:

https://www.ucdperceptionmotorcog.com/team-extended

Other Comments:

Would suit two students working together, great opportunity to develop skills in EEG acquisition and data analysis and to work with infants and parents. Please note, as some parents may have a preference for visiting the lab on a weekend *students need to be available for Saturday data collection if required*.

Dr. Monika Pilch

Project 1: How fear of death affects individuals' engagement in advance care planning? Using eye-tracking methodologies to establish the role of impulsivity, emotional responding, and attentional bias in the avoidance of illness, disability, and death.

Supervisors:
Dr Monika Pilch

Background:
Advance care planning (ACP) allows people to reflect on future care scenarios and make decisions that will affect their end-of-life experience (1–4). While death is inevitable, ACP is especially crucial for those with life-limiting conditions (5). These individuals often face decisions that may cause short-term emotional suffering (e.g., confronting death through active planning), but are essential for shaping future care quality (6). Avoiding ACP due to emotional discomfort can lead to long-term negative consequences, such as dying in an unintended place. This decision-making process, known as intertemporal choice, involves weighing short-term against long-term outcomes (7). The conceptual model outlined in ***Fig.* A1** (Appendix A) provides one interpretation of how impulsivity might affect illness/disability/death avoidance. The current project will use eye-tracking methodologies to investigate intertemporal choice and the role that impulsivity (i.e., the prioritization of short-term consequences) plays in avoiding illness, disability, and death. It will also explore a range of theoretically relevant factors.

Background reading:

1. Sudore RL, Lum HD, You JJ, Hanson LC, Meier DE, Pantilat SZ, et al. Defining Advance Care Planning for Adults: A Consensus Definition From a Multidisciplinary Delphi Panel. J Pain Symptom Manage. 2017;53(5):821–32.
2. Piers RD, van Eechoud IJ, Van Camp S, Grypdonck M, Deveugele M, Verbeke NC, et al. Advance Care Planning in terminally ill and frail **References**

1. Sudore RL, Lum HD, You JJ, Hanson LC, Meier DE, Pantilat SZ, et al. Defining Advance Care Planning for Adults: A Consensus Definition From a Multidisciplinary Delphi Panel. J Pain Symptom Manage. 2017;53(5):821–32.

2. Piers RD, van Eechoud IJ, Van Camp S, Grypdonck M, Deveugele M, Verbeke NC, et al. Advance Care Planning in terminally ill and frail older persons. Patient Educ Couns [Internet]. 2013;90(3):323–9. Available from: http://dx.doi.org/10.1016/j.pec.2011.07.008
3. Jimenez G, Tan WS, Virk AK, Low CK, Car J, Ho AHY. Overview of Systematic Reviews of Advance Care Planning: Summary of Evidence and Global Lessons. J Pain Symptom Manage. 2018;56(3):436–59.
4. Sudore RL, Fried TR, Terri RF. Redefining the "Planning" in Advance Care Planning: Preparing for End-of-Life Decision Making. Ann Intern Med. 2010;153(4):256–61.
5. Zwakman M, Jabbarian LJ, van Delden JJM, van der Heide A, Korfage IJ, Pollock K, et al. Advance care planning: A systematic review about experiences of patients with a life-threatening or life-limiting illness. Palliat Med. 2018;32(8):1305–21.
6. Sun HY, Li AM, Chen S, Zhao D, Rao LL, Liang ZY, et al. Pain now or later: An outgrowth account of pain-minimization. PLoS One. 2015;10(3):1–17.
7. Bulley A, Henry J, Suddendorf T. Prospection and the present moment: The role of episodic foresight in intertemporal choices between immediate and delayed rewards. Rev Gen Psychol. 2016;20(1):29–47.

Useful web links: