

# 2024 Summer Research Program – HMNS Projects

## Available Projects

Dr Bronwyn Clark .....	2
Machine learning processing of mmWave data to classify posture and location of office workers..	2
Dr Sjaan Gomersall.....	3
Health & Wellbeing Centre for Research Innovation .....	3
Dr Michalis Stylianou .....	4
Schools and Physical activity of Young People .....	4
Dr Jenna Taylor .....	5
The FITR-Heart Study Follow-up .....	5
Associate Professor Sean Tweedy.....	6
Monitoring Swimming Performance Variability in High Support Needs Para-Athletes with Cerebral Palsy .....	6

## Dr Bronwyn Clark

### Machine learning processing of mmWave data to classify posture and location of office workers.

<b>Project title:</b>	Machine learning processing of mmWave data to classify posture and location of office workers.
<b>Hours of engagement &amp; delivery mode</b>	20 hours/week with hybrid working arrangements available
<b>Description:</b>	<p>This project will develop the use of millimetre wave (mmWave) technology for assessing behaviour of office workers. mmWave is a technology that uses millimetre length electromagnetic waves reflected from the environment to provide a high-resolution 3D point cloud representation of humans. The point data can be processed using artificial intelligence algorithms to identify human movement and location. The project will involve collection of mmWave data with a ground truth on workers in a desk-based location. Students will be involved in data collection and development of artificial intelligence algorithms to classify a worker's posture (sitting/standing) and location (proximity to desk or other workers). Such algorithms can then be tested and used in detection of office behaviour for evaluating future office-based interventions to improve worker health and productivity.</p>
<b>Expected outcomes and deliverables:</b>	<p>Students will gain experience collecting data and developing algorithms for a real-world application. They will be given autonomy in developing AI algorithms and will work with researchers to implement the developed processes into a measurement procedure for office-based interventions. There is potential to be involved in a resulting paper or conference abstract.</p>
<b>Suitable for:</b>	<p>This position requires an applicant to have experience in developing and testing AI algorithms for data using a ground truth measure.</p>
<b>Primary Supervisor:</b>	Dr Bronwyn Clark
<b>Further info:</b>	<p>Please contact Dr Bronwyn Clark at <a href="mailto:b.clark3@uq.edu.au">b.clark3@uq.edu.au</a> to discuss this project prior to submitting.</p>

## Dr Sjaan Gomersall

Health & Wellbeing Centre for Research Innovation.

<b>Project title:</b>	Health & Wellbeing Centre for Research Innovation
<b>Hours of engagement &amp; delivery mode</b>	28-36 Hours per week
<b>Description:</b>	<p>The summer research student will have the opportunity to be involved in a range of research projects aligned with the Health and Wellbeing Centre for Research Innovation, a collaboration between UQ and Health and Wellbeing Queensland (Queensland health promotion agency).</p> <p>The student will be able to engage in a range of research activities which could include data collection, data management, literature reviews, scientific writing, and partner-driven scientific discussions.</p> <p>The student can expect the work to fall within three themes of the centre, Healthcare (e.g., chronic disease prevention and management), Workplaces and Children and Young People, with respect to physical activity and nutrition related research and community programs.</p>
<b>Expected outcomes and deliverables:</b>	<p>The student can expect to learn and experience foundation research skills such as data management, qualitative and quantitative research methods, literature searches, scientific writing, and communication skills. These experiences will be accrued in collaboration with industry partners (e.g. UQ Health Care) and Health and Wellbeing Queensland. It is expected that the student will establish their specific outcomes on the project in collaboration with the Centre at the start of the program as the breadth of work means that it can be tailored to each individual students experience and interest.</p>
<b>Suitable for:</b>	<p>This project would be suitable for students from Faculty of Health and Behavioural Sciences and those programs where they are training to be health professionals. This does not have to be exclusively in physical activity/exercise or nutrition related areas, but an interest in these areas is important.</p>
<b>Primary Supervisor:</b>	Dr Sjaan Gomersall
<b>Further info:</b>	<p>Please contact Dr Sjaan Gomersall <a href="mailto:s.gomersall1@uq.edu.au">s.gomersall1@uq.edu.au</a> Prior to apply for this project.</p>

## Dr Michalis Stylianou

### Schools and Physical activity of Young People.

<b>Project title:</b>	Schools and Physical activity of Young People
<b>Hours of engagement &amp; delivery mode</b>	25-30 Hours per week Project can be undertaken on campus and remotely.
<b>Description:</b>	<p>Schools are featured in frameworks and policies worldwide as a key setting for the promotion of physical activity.</p> <p>This project focuses on physical activity policies, practices, and behaviours with the aim of better understanding how active young people are and how to support their engagement in physical activity.</p>
<b>Expected outcomes and deliverables:</b>	<p>The selected applicant will gain skills associated with conducting literature searches, managing and presenting quantitative and qualitative data.</p> <p>The student may also have the opportunity to work towards a presentation or a paper for publication with the supervisors.</p>
<b>Suitable for:</b>	This project would be suitable for 2nd or 3rd year UQ enrolled students with a background and/or interest in physical activity, and its application in paediatrics/school settings.
<b>Primary Supervisor:</b>	Dr Michalis Stylianou
<b>Further info:</b>	Please contact Dr Michalis Stylianou prior to submitting your application at <a href="mailto:m.stylianou@uq.edu.au">m.stylianou@uq.edu.au</a>

## Dr Jenna Taylor

### The FITR-Heart Study Follow-up.

<b>Project title:</b>	The FITR-Heart Study Follow-up
<b>Hours of engagement &amp; delivery mode</b>	36 hours per week. Hybrid – On-site attendance will be required for a least part of the project, with some administrative work able to be done remotely.
<b>Description:</b>	<p>This is a follow-up study, recruiting participants who completed a randomised controlled trial (7+ years ago) that investigated high-intensity interval training in cardiac rehabilitation.</p> <p>The study will be investigating the long-term effect on outcomes such as cardiorespiratory fitness, body composition, vascular function, blood markers, exercise/physical activity habits, and dietary intake.</p>
<b>Expected outcomes and deliverables:</b>	<ul style="list-style-type: none"><li>- Assist with and learn how to coordinate a research study (e.g., recruitment, scheduling, communicating with participants).</li><li>- Assist with and learn exercise-related research skills such as cardiopulmonary exercise testing, measurements of vascular stiffness, collecting accelerometry data, administering exercise and physical activity related questionnaires, and processing blood samples.</li><li>- Learn about ultrasound assessments to measure peripheral vascular function and brain blood flow regulation.</li></ul>
<b>Suitable for:</b>	<ul style="list-style-type: none"><li>- Self-motivated, organised, and professional nature</li><li>- Good interpersonal skills</li><li>- Strong attention to detail</li><li>- Interest in postgraduate research (desirable)</li></ul>
<b>Primary Supervisor:</b>	Dr Jenna Taylor
<b>Further info:</b>	Please contact Dr Jenna Taylor at <a href="mailto:jenna.taylor@uq.edu.au">jenna.taylor@uq.edu.au</a> should you be interested in this placement.

## Associate Professor Sean Tweedy

### Monitoring Swimming Performance Variability in High Support Needs Para-Athletes with Cerebral Palsy.

<b>Project title:</b>	Monitoring Swimming Performance Variability in High Support Needs Para-Athletes with Cerebral Palsy
<b>Hours of engagement &amp; delivery mode</b>	6 Weeks On-site attendance required
<b>Description:</b>	<p>This research project aims to further understand the observed fluctuations in training performance of three high support needs para-athletes with cerebral palsy who are engaged in land/water based aerobic training and resistance training. The investigation will span six weeks, during which a comprehensive set of variables potentially influencing performance will be monitored. These factors include heart rate (during swimming training - temple HR monitor), pool and air temperature, length of training pool, sleep/diet habits, cognition (mood questionnaire), rating of perceived exertion (omni), blood lactate levels (further ethics approval required), training volume and consistency, land-based aerobic activity, muscle tone (may be subjective), and medications. The study will consistently monitor performance across various swimming drills and distances (e.g., 200m consistent effort, high-intensity 50m effort) to identify potential correlations between these variables listed above and the observed variability in performance metrics (lap time, body position while swimming, athlete informed metrics on musculature or cardiorespiratory fatigue).</p>
<b>Expected outcomes and deliverables:</b>	<p>Gaining further insights into the complex interaction between physiological, environmental, and psychological factors that may contribute to performance variability in para-athletes with cerebral palsy. Develop further expertise in the use of various monitoring tools such as heart rate monitoring, blood lactate measurement, and subjective scales including the Omni RPE.</p> <p>Contribute to the broader understanding of performance adaptations and needs specific to para-athletes with cerebral palsy, which could inform future training protocols and therapeutic interventions.</p> <p>Analyse collected data to identify any significant patterns, trends or noting any observations and potential correlations with the monitored factors.</p> <p>Present research findings in a digestible format which could be utilised in future publications regarding high support needs athletes.</p>
<b>Suitable for:</b>	<ul style="list-style-type: none"><li>- 3rd or 4th year exercise or exercise physiology student</li><li>- able to attend on-campus for duration of project</li><li>- able to work with people with moderate-severe disabilities, including assistance with transfers in/out of the swimming pool</li><li>- experience of any kind in Para sport would be favourable</li></ul>
<b>Primary Supervisor:</b>	Associate Professor Sean Tweedy
<b>Further info:</b>	Interested applicants can contact <a href="mailto:research-admin@hmns.uq.edu.au">research-admin@hmns.uq.edu.au</a> for further information.