Project title:	**Forces in motion: Combining muscle-sensing tools with wearable exoskeletons during human walking**
Hours of engagement & delivery mode	30-36 hours per week Onsite St Lucia: Otto Hirschfeld (81)
Description:	The project combines electromagnetic sensors to characterize human muscle forces with an ankle exoskeleton to "offload" forces during walking. One of the grand challenges in human biomechanics is to non-invasively measure the forces produced by muscles as people move. Our team has developed novel tools to achieve this during simple, single-joint tasks and is now ready to extend these methods to more dynamic activities like human walking. Ankle exoskeletons are wearable devices that provide assistance or resistance at the ankle joint to augment movement by offloading biological tissues, with applications across health and disease. This research has the potential to transform how we assess and support human mobility by enabling direct, non-invasive measurement of muscle forces during natural movement and informing the design of next-generation assistive technologies The Neuromuscular Biomechanics Lab at UQ houses state-of-the-art facilities for performing biomechanical and motor control research. Our Gait Lab includes a comprehensive suite of tools: 3-dimensional motion capture, high-end ultrasound/elastography imaging devices, electrophysiological measurement tools, force plates and motor-driven dynamometers, and an instrumented treadmill capable of measuring ground reaction forces in all three dimensions for each and every step.
Expected learning outcomes and deliverables:	The successful candidate student will be exposed to a variety of experimental tools and the control and use of portable robotic ankle exoskeletons. The scholar may gain skills in biomechanical data collection including 3D motion capture, ultrasonography, electromyography, coding and data analysis using matlab and/or other programming languages, and more broadly understand how devices and biology interact to augment and restore movement. They may be expected to work as part of a team to collect biomechanical experimental data in healthy human subjects and will have the opportunity to generate publications from their research. This research is part of a collaboration between the University of Queensland, CSIRO, and international collaborators.
Suitable for:	This project is suitable for students with a background in engineering, physics, computer sciences, mathematics, or biomedical sciences. It is expected that that student is curious, motivated, and eager to learn new skills and work within an inter-disciplinary and positive research environment.
Primary Supervisor:	A/Prof Taylor Dick t.dick@uq.edu.au https://biomedical-sciences.uq.edu.au/research/groups/neuromuscular-biomechanics

Further info:	The supervisor MUST be contacted by students prior to submission of an application