



2027 Summer Research Project_ Dr Coakley

Section	Description
Project title	Protecting the nervous system: from nanoscale architecture to gene discovery
Hours & delivery	20 – 36 hours per week at the School of Biomedical Sciences, Sir William MacGregor Building (64), St Lucia campus
About the project (150–250 words)	What keeps neurons from breaking under physical stress? External tissues construct intricate, protective scaffolds to shield fragile axons—and we are mapping them at the nanoscale. Paired with advanced <i>C. elegans</i> genetics and super-resolution microscopy, our team recently uncovered a novel epidermal periodic skeleton that preserves axonal integrity (Science Advances, 2026). Join us to discover the molecular pathways and cellular machinery that shield the nervous system from mechanical failure.
What you'll do (100-150 words)	As an undergraduate researcher in our lab, you will get hands-on experience at the frontlines of neurobiology, contributing to active discovery projects alongside experienced team members. You will assist with molecular cloning, CRISPR/Cas9 genome engineering, and perform microinjections to manipulate key genes in vivo. Working with <i>C. elegans</i> , you could contribute to functional genetic screens for novel neuroprotective pathways while learning super-resolution microscopy and quantitative image analysis to map cellular structures at the nanoscale.
What you'll learn (100–150 words)	By joining our lab, you will gain comprehensive, practical training in modern discovery science and molecular neuroscience techniques. You will develop key technical skills in molecular cloning, CRISPR/Cas9 genome editing, microinjection, and <i>C. elegans</i> genetic screening methods. On the imaging front, you will build proficiency in operating advanced super-resolution microscopy platforms and performing quantitative image analysis using software tools like Fiji/ImageJ. Beyond technical protocols, you will learn how to design rigorously controlled experiments, interpret complex data sets, and communicate scientific findings within a collaborative research environment.
Project outcomes (75–125 words)	This project offers an authentic, hands-on introduction to discovery science in a fun and supportive environment. You will gain a high-value technical toolkit spanning molecular biology, genetic workflows, and super-resolution imaging, while developing real-world skills in experimental design and quantitative data analysis. Ultimately, you will come away with genuine lab experience, strong practical capabilities, and dedicated mentorship to support your future academic or career goals.
Who should apply? (75–125 words)	We are looking for curious, creative thinkers who are eager to ask big questions about how cells work. Science is an iterative process of trial, error, and discovery, so we value brave, resilient individuals who aren't afraid to fail, troubleshoot, and try again. If you are clever, detail-oriented, and genuinely excited about hands-on discovery science, you will thrive in our lab.
Team & supervision (75–125 words)	Dr Sean Coakley Coakley Lab
Additional opportunities (optional)	Students will have opportunities to engage with the broader research community through participation in laboratory meetings, where they may present their work and discuss scientific findings. The project may also provide a pathway to future Honours, HDR or ongoing undergraduate research opportunities within the laboratory.



Additional requirements (if applicable)	Before commencing laboratory work, students will be required to complete laboratory onboarding and compliance processes. This includes a range of mandatory online training modules relevant to working in a PC2 research environment, such as biosafety, occupational health and safety (OHS) responsibilities, manual handling, chemical safety, and laboratory risk management. Students must follow all laboratory safety procedures and maintain accurate experimental records.
Contact	Yes, students must contact the supervisor before applying. Direct enquiries to: s.coakley@uq.edu.au