

A/Prof Claudia Vickers

Project title:	Genetic Engineering in <i>Saccharomyces cerevisiae</i>: reconstructing/optimising metabolic and regulatory networks for improved industrial production of various products
Project duration:	<p><i>Please indicate which programs you would like your project to be available/advertised through:</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> UQ Summer Research Program (6-10 weeks); <input type="checkbox"/> UQ Winter Research Program (4-6 weeks); <input checked="" type="checkbox"/> AIBN Research Internship Program (6-12 weeks); <input checked="" type="checkbox"/> BE/ME Industry Placement (12-24 weeks); <input checked="" type="checkbox"/> Canadian Co-Op Placements (16 weeks); <input checked="" type="checkbox"/> DAAD Rise Worldwide (8-12 weeks); <input checked="" type="checkbox"/> Honours Project (39 weeks); <input checked="" type="checkbox"/> Masters Coursework Project (26 weeks).
Description:	<p>The budding yeast <i>Saccharomyces cerevisiae</i> is an important platform organism (so-called cell factory) for the production of biofuels, biochemical, and biopharmaceuticals. Our lab applies a synthetic biology approach to render yeast various novel biological properties, which aim to improve the productivities in industrial processes. We are interested in gaining novel knowledge in the areas of metabolic physiology, genetic regulation, and nutrient & environment signalling in <i>S. cerevisiae</i> under industry-relevant conditions and translating fundamental biological knowledge into standardised genetic engineering parts for industrial application. An internship/honour/masters project will be integrated in a major project in the following areas: metabolic physiology & genetics, metabolic engineering, synthetic biology, and bioprocess engineering in yeast.</p> <p>Currently, we focus on developing <i>S. cerevisiae</i> for improved production of industrial phytochemicals, including isoprenoids.</p> <p>The internship programs (~12 weeks) are open in the following topic(s):</p> <p>(1) De novo synthesis of transcriptional regulatory networks: this project in the current phase aims to develop to a regulatory protein domain library for artificial transcriptional factor synthesis. This work will involve in cloning/characterising a series of DNA-binding domains, trans-activating domains, and regulatory domains.</p> <p>The honours/masters projects (>24 weeks) are open in the following topic(s):</p> <p>(2) Reconstructing an isoprenoid synthetic pathway in yeast mitochondria: mitochondria provides a unique subcellular environment for protein maturation and metabolisms. This work will involve in developing the molecular tools for protein expression in mitochondria and examining mitochondria as an alternative subcellular organelle for isoprenoid production.</p>

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<p>Learning Objectives:</p>	<p>The internship programs are designed for the students to become familiar with molecular cloning in <i>E. coli</i> and <i>S. cerevisiae</i>, microbial cultivation, flow cytometer, etc.</p> <p>The honours/masters project are designed for the students to gain the experience on design/execute experiments in a defined topic.</p>
<p>Expected outcomes and deliverables:</p>	<p>Students may contribute to publications in the selected topics. All students will be asked to produce a report or oral presentation at the end of their project.</p>
<p>Applicant Requirements:</p>	<p>This project is open to applications from self-motivated students with a background in molecular biology, biochemistry, microbiology, or genetics.</p>
<p>Primary Supervisor:</p>	<p>A/Prof. Claudia Vickers</p>

