

CSIRO

Solar Powered Enzymes for Ammonia Production

Internship available for Summer or Semester 1, 2022

At CSIRO, Australia's national science agency, we solve the greatest challenges through innovative science and technology, with over 4000 staff based at 57 locations throughout Australia and overseas. Our value to the Australian economy is massive. Our proud legacy invented fast Wi-Fi, Aerogard and polymer banknotes. Today we're helping to find the first gravitational waves in space, growing gluten-free grains, 3D-printing body parts and pioneering new renewable energy sources, just to name a few. With more than 1800 patents, we are Australia's largest patent holder. This ever-increasing wealth of intellectual property is a vast source of commercial opportunity and has already resulted in more than 150 spin-off companies, with many more to come.

Project: Solar Powered Enzymes for Ammonia Production

Internship Details:

- Internship Availability: Summer or Semester 1, 2022
- Internship Discipline: Chemistry
- Internship Level: Undergraduate 2nd or 3rd year; Postgraduate Coursework
- Available to International Students: Yes
- Preferred Project Skills:
 - Biochemistry
 - Molecular biology
 - Microbiology
 - Electrochemistry
- Clearances Required: No
- Host Supervisor: Dr Trevor Rapson, Research Scientist (E: trevor.rapson@csiro.au; Ph: 02 62464104)
- Location: CSIRO, Black Mountain, Acton, Canberra - mainly lab work. Computer will be provided as required.
- If necessary, does this internship offer an online only option: No

Summary:

There is a growing interest in using ammonia as a liquid carrier of hydrogen for energy applications. Currently, ammonia is produced industrially by the Haber-Bosch process, which requires high temperature and high pressure. In contrast, bacteria have naturally evolved an enzyme known as nitrogenase, that is capable of producing ammonia and hydrogen at ambient temperature and pressure. Therefore, nitrogenases are attractive as a potentially more efficient means to produce ammonia.

In this project we are developing avenues to pave the way for solar powered enzymatic production of NH₃ and H₂. Through the project you will gain experience in microbial

electrochemistry as we seek to 'industry proof' nitrogenase. This work fits within CSIRO's Hydrogen Energy Systems Future Science Platform. For more information:
<https://research.csiro.au/hydrogenfsp/who-we-are/>

Note from Science Internships Office:

This project has been approved for credit. Please note that ANU does not have a formal internship agreement with CSIRO, and the intern must abide by CSIRO's terms and conditions.