



UNSW
SYDNEY

Nuisance and Harmful Algae

Science-Practice Partnership

Optimising Oxidation in the Context of Nuisance and Harmful Algae

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Cyanobacteria are naturally-occurring photosynthetic microorganisms that have the capacity to produce harmful intracellular cyanotoxins and nuisance taste and odour compounds. Oxidation by chlorine, ozone or permanganate is frequently used to both inactivate cells to improve the performance of downstream coagulation and to degrade the nuisance and harmful metabolites in water supply systems. Successful oxidation of algal cells is a major challenge for water utilities. While oxidation has the potential to remove these microbially-derived micropollutants directly from the aqueous phase, the process kinetics are complicated by the presence of the cells and other organic matter. The mechanisms and efficiency of metabolite deactivation are not well-understood. Furthermore, oxidation often results in the release of intracellular toxins due to algal cell lysis stimulated by the oxidation process. This project will therefore study the impact of algal cells and organic matter on the chemical reactions that govern the oxidation of cyanobacteria and their associated metabolites. An outcome will be the development of an accurate process model for oxidation kinetics and a comprehensive metabolite mass balance.

The **Nuisance and Harmful Algae Science-Practice Partnership (NHASP)** with Melbourne Water (<http://www.algae.unsw.edu.au/>) is a multi-party initiative that seeks to more effectively manage algal blooms by introducing smart surveillance and evidence-based, cost-effective policy and asset design for the benefit of the Melbourne region and Australia.

The successful candidate(s) will join the NHASP program. The candidate should have a background in either civil, chemical or environmental engineering (or similar), a demonstrated aptitude for undertaking laboratory/field work, have excellent communication skills and will be expected to interact regularly with industry partners. The student needs to be successful in securing their own primary scholarship via a **Research Training Program (RTP)** or equivalent (<https://research.unsw.edu.au/graduate-research-scholarships>). A secondary Water Research Australia (WaterRA) top-up scholarship (<https://www.waterra.com.au/education/waterra-scholarships/phd-masters-scholarships/>) may be available for exceptional applicants.

Further information on the project and scholarship may be obtained from **Assoc. Prof. Rita Henderson** (email: r.henderson@unsw.edu.au). Applications should be submitted by email (including a cover letter, academic transcript and CV) to A/Prof Henderson at UNSW Sydney.

