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**Algae &
Organic
Matter
Laboratory**

Water treatment
Separation processes
Characterisation
Monitoring
www.aom.unsw.edu.au

Controlling algae using multi-functional cold plasma activated microbubbles

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Climate change is driving a proliferation of algal blooms in our limited water supplies. These blooms can be extremely toxic with the potential to kill fish and other living organisms, and cause water treatment plant closures. On the other hand, the planned cultivation and processing of algae at high concentrations for biotechnology is a growth industry, providing food, biofuels and bioplastics. Algal bloom management involves energy or chemical intensive oxidation processes that can destroy harmful cells and toxins in water supplies. Current algal control methods are frequently ineffective, expensive and/or unsustainable; advanced technologies are urgently required to improve on existing practices. This Australian Research Council funded Discovery project, we will investigate whether cold-plasma, a next generation oxidant that uses atmospheric air and an electrical discharge to generate highly reactive oxygen and nitrogen species (RONS) in liquid, may provide a sustainable solution to control complex algal processes. Tuneable cold plasma activated microbubbles (cPAM) can be developed by manipulating the RONS composition, to both selectively inactivate and rupture microalgae cells and encourage growth of monocultures via enhanced metabolic cell function. To realise the potential that multi-functional cPAM could bring to algal management, an understanding of the underlying mechanisms that govern the 4-phase (plasma-gas-liquid-solid) system needs to be achieved.

We are looking for two well motivated, enthusiastic PhD candidates to join the AOM Lab under the Nuisance and Harmful Algae stream to work on this challenging project. The candidates should have a background in chemical, civil or environmental engineering (or similar), and a demonstrated aptitude for undertaking laboratory work. They should be able to demonstrate excellent communication skills, a creative and positive attitude to problem solving and an ability to work both autonomously and in a team. Industry experience is desirable. The students need 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>). Further information on the project and scholarship may be obtained from A/ Prof. Rita Henderson (email: r.henderson@unsw.edu.au). Applications should submit a cover letter, academic transcript and CV to A/ Prof. Rita Henderson at UNSW Sydney.