

Position description

Research Fellow

Department/Unit	School of Chemistry and Chemical Engineering Department
Faculty/Division	Science and Engineering
Classification (salary rates)	Level A
Work location	Clayton campus

Organisational context

Monash is a university of transformation, progress and optimism. Our people are our most valued asset, with our academics among the best in the world and our professional staff revolutionising the way we operate as an organisation. For more information about our University and our exciting future, please visit www.monash.edu

The **Faculty of Science** works through frontiers via our research, teaching and our partnerships with industry, government and individual supporters. Our five Schools offer a large and diverse range of disciplines in undergraduate and postgraduate courses. Ten Schools from other university faculties contribute to science teaching at all levels, allowing students to choose their studies from physical, biological, biomedical, behavioural, environmental, mathematical and computer sciences. In terms of research, our respected researchers are at the top of their game. Their work spans the theoretical to the applied, contributes to new knowledge and technologies, and challenges how we interact with the world. To learn more about the Faculty of Science, please visit our website: www.monash.edu/science/

The **School of Chemistry** is located in the Faculty of Science and is one of the leading Chemistry Schools in Australia (as per national benchmarking statistics) with an international reputation for its quality research programs and postgraduate training. The School has within it, the Centre for Green Chemistry, Water Studies Centre, Centre for Biospectroscopy, a node of the ARC Centre for Electromaterials Science and members associated with two Cooperative Research Centres. The objectives of the School are to undertake and publish high quality research, promote industry and government engagement and to provide internationally recognized programs in Chemistry for undergraduate and postgraduate students. The School of Chemistry is taking a lead role in Monash's partnership with the Federal Government in the development of Green Chemical Futures (GCF) - a \$75 million investment in the future of chemical sciences. The long term objective of the GCF initiative is to produce a pipeline for the technologies and resources needed by an industry striving for a lower environmental footprint and to produce chemistry graduates of the highest calibre armed with knowledge that will help transform industry into the future.

The **Faculty of Engineering** is one of the largest in Australia, renowned worldwide for the quality and calibre of our teaching, research and graduates. We offer a comprehensive range of undergraduate, graduate, postgraduate and higher degree by research programs in a wide range of engineering disciplines. Our research activities provide a platform for establishing a thriving educational enterprise and our staff are committed to creating a dynamic learning environment. The research activities range from fundamental studies to research with a strong applications orientation.

At **Chemical Engineering Department**, our research explores a wide range of chemical engineering disciplines, including chemical reactor engineering, coal conversion processes and particle technology. And our researchers are leading the way. Not only are we the number one chemical engineering faculty in Australia – we're among the very best in the world. To learn more about the Faculty of Engineering, please visit our [website](#).

Position purpose

A Level A research-only academic is expected to contribute towards the research effort of the university and to develop her/his research expertise through the pursuit of defined projects relevant to the particular field of research.

Reporting Line: The position reports to a Senior Academic in the School, under broad direction

Supervisory responsibilities: Not applicable

Financial delegation and/or budget responsibilities: Not applicable

Key responsibilities

A Level A research-only academic shall work with support, guidance and/or direction from staff classified at Level B and above and with an increasing degree of autonomy as the research academic gains in skill and experience.

Specific duties required of a Level A research-only academic may include:

1. The conduct of research under limited supervision either as a member of a team or, where appropriate, independently and the production or contribution to the production of conference and seminar papers and publications from that research
2. Involvement in professional activities including, subject to availability of funds, attendance at conferences and seminars in the field of expertise
3. Limited administrative functions primarily connected with the area of research of the academic
4. Development of a limited amount of research-related material for teaching or other purposes with appropriate guidance from other staff
5. Occasional contributions to teaching in relation to her/his research project(s)
6. Experimental design and operation of advanced laboratory and technical equipment or conduct of advanced research procedures
7. Attendance at meetings associated with research or the work of the organisational unit to which the research is connected and/or at departmental, school and/or faculty meetings and/or membership of a limited number of committees
8. Advice within the field of the staff member's research to postgraduate students

Key selection criteria

Education/Qualifications

1. The incumbent should possess:
 - a PhD in Chemistry or a related discipline from a recognised university, or equivalent qualifications and research experience in the area; or
 - an equivalent combination of relevant experience and/or education/training

Knowledge and Skills

2. Deep fundamental knowledge in physical chemistry (in particular, electrochemistry) and physics (in particular, optoelectronics).
3. Outstanding chemical laboratory skills and highest standards of safe laboratory work. Experience in fabrication and characterisation of organometal halide perovskite solar cells is highly desirable.
4. The ability to work independently in a research environment (with limited supervision).
5. The ability to work as part of a team.
6. The ability to prepare and communicate the aims and outputs of research projects in a range of formats including formal and informal oral presentations, refereed research papers and reports.
7. Well-developed computer literacy (i.e. word processing and use of databases).

Other job related information

- Travel (e.g. to other campuses of the University) may be required
- There may be peak periods of work during which the taking of leave may be restricted

Legal compliance

Ensure you are aware of and adhere to legislation and University policy relevant to the duties undertaken, including: Equal Employment Opportunity, supporting equity and fairness; Occupational Health and Safety, supporting a safe workplace; Conflict of Interest (including Conflict of Interest in Research); Paid Outside Work; Privacy; Research Conduct; and Staff/Student Relationships.

Project Description

A significant challenge posed by the electrodes of perovskite solar cells is the chemical compatibility and stability of the resulting device. To date, gold is most commonly used as the rear contact material. However, as well as being too expensive, gold has been found to diffuse into the perovskite layer, degrading the solar cells. Other metals have been explored to a limited extent, but the data with regards to long term stability is missing and inconclusive. To address this problem, researchers from the Australian National University (Prof. K. Catchpole, A/Prof. K. Weber, A/Prof T. White) and Monash University (Prof. U. Bach, Dr. A. N. Simonov) have initiated a joint research project. The work will be undertaken by a team of two research fellow (one at each university) and two PhD students (one at each university), and will focus on exploring a range of new promising materials as counter electrodes in perovskite solar cells. A special emphasis will be put on establishing the mechanisms and investigating kinetics of degradation of electrodes, perovskites and hole transporting materials under the operating conditions *via* a combination of electrochemical, electrical and spectroscopic techniques. The project will involve extensive *ex situ* and *in situ* characterisation beyond standard photovoltaic tests.

The project academic supervisors will be Dr. Alexandr N. Simonov (School of Chemistry) and Prof. Udo Bach (Chemical Engineering Department). The appointment will be through the School of Chemistry, but the work will be equally co-supervised by academics from two departments. The work on the project will be undertaken in the [Monash University Renewable Energy Laboratory](#).