



# RESEARCH FELLOW – ELECTRON MICROSCOPY WITH PIXELATED DETECTORS

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| DEPARTMENT/UNIT  | Materials Science and Engineering |
| FACULTY/DIVISION | Faculty of Engineering            |
| CLASSIFICATION   | Level A                           |
| WORK LOCATION    | Clayton campus                    |

## ORGANISATIONAL CONTEXT

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Everyone needs a platform to launch a satisfying career. At Monash, we give you the space and support to take your career in all kinds of exciting new directions. You'll have access to quality research, infrastructure and learning facilities, opportunities to collaborate internationally, as well as the grants you'll need to publish your work. We're a university full of energetic and enthusiastic minds, driven to challenge what's expected, expand what we know, and learn from other inspiring, empowering thinkers. Discover more at [www.monash.edu](http://www.monash.edu).

### Faculty of Engineering

The **Faculty of Engineering** is one of the largest in Australia, renowned worldwide for the quality of our teaching and research and the calibre of its graduates.

The Faculty has five departments and one division operating from the Clayton campus of Monash University – Biological Engineering, Chemical Engineering, Civil Engineering, Electrical and Computer Systems Engineering, Materials Engineering and Mechanical and Aerospace Engineering. The School of Engineering operates from the Malaysian Campus. In addition, there are 15 research institutes and centres with researchers involved in more than 12 cross institutional centres focusing on key technologies. Monash Engineering also has strong links with other research organisations including CSIRO and DSTO.

A member of the influential Group-of-Eight (GO8) research universities, the Faculty of Engineering is involved in extensive research activities. To support this activity and the teaching program the Faculty has well-equipped laboratories and many items of large infrastructure, from advanced imaging and visualisation facilities and electron microscopes, to the largest wind tunnel in the southern hemisphere.

Monash Engineering currently has around 400 staff, 300 higher-degree research students and more than 4000 coursework students enrolled in Australia. The budget for the Faculty is approximately \$110M.

The **Department of Materials Science and Engineering** is one of the Departments in the Faculty of Engineering at Monash University. Research in Materials Engineering at Monash University received the top ranking of 5/5 ("well above world-standard") in the recent national research rankings "Excellence in Research for Australia". The Department's research interests span the whole materials field - with expertise in metals and alloys, biomaterials and tissue engineering, nanomaterials, graphene, polymers, ceramics, composites, corrosion, advanced materials characterisation and materials modeling.

## The Monash Centre for Electron Microscopy (MCEM)

The MCEM (<http://mcem.monash.edu.au/>) is a central university research facility that conducts research in electron microscopy and provides advanced instrumentation, expertise and training in electron microscopy to researchers across the physical sciences and engineering.

The MCEM has a suite of advanced instruments, including a double-aberration-corrected Titan<sup>3</sup> 80-300kV fitted with pixelated and CMOS detectors for scanning CBED and 4DSTEM. In late 2019, it will install a next generation high energy and spatial resolution S/TEM FEG-TEM with a customised electron-optical configuration for optimum performance in scanning CBED and 4DSTEM. In addition, it has 2 other FEG-TEMs, 1 TEM, 3 FEG-SEMs (one fitted with a Delmic angle-resolved cathodoluminescence spectrometer) and a FIB/ESEM plus a range of supporting computing, software and specimen preparation equipment. MCEM staff provide expert advice and training to researchers using the Centre. In addition, MCEM academic and research staff conduct their own specialised research programmes in fundamental and applied microscopy.

MCEM is located on the Clayton Campus in a dedicated electron microscopy building, specifically designed to provide exceptional mechanical, thermal and electro-magnetic stability to optimise instrument performance. It is adjacent to and works closely with the Ramaciotti cryo-EM centre, which includes a Titan Krios and Helios cryo-FIB system.

## POSITION PURPOSE

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The person appointed to this position will conduct high-quality research in the development of new methods in electron microscopy to characterize nanoscale oxide and perovskite-based materials. This will involve the development of quantitative methods for determining atomic structures using aberration-corrected TEM and STEM, including scanning CBED and 4D-STEM using high performance pixelated and single electron detectors. These methods will be applied to important nanoscale oxide, perovskite and other materials systems.

The position will be based in the Department of Materials Science and Engineering and will involve extensive interaction with the Monash Centre for Electron Microscopy.

**Reporting Line:** The position reports to Professor Joanne Etheridge

**Supervisory Responsibilities:** Not applicable

**Financial Delegation:** Not applicable

**Budget Responsibilities:** Not applicable

## KEY RESPONSIBILITIES

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1. Conduct research under limited supervision in the area of quantitative aberration-corrected transmission electron microscopy of nanoscale oxide, perovskite and other material systems under the direction and guidance of Prof. Etheridge
2. Develop quantitative methods in aberration corrected transmission electron microscopy with pixelated detectors and related techniques for the characterisation of nanoscale oxide and perovskite systems
3. Contribute to the production of high-quality journal, conference and seminar papers and publications from that research
4. Participate in professional activities including attendance at conferences and seminars in the field of expertise
5. Undertake limited administrative functions primarily connected with the area of research of the academic
6. Contribute occasionally to undergraduate/postgraduate teaching in relation to her/his research project(s)

## KEY SELECTION CRITERIA

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### Essential

1. A Ph.D. qualification in a relevant area, from a recognised university
2. Demonstrated high level expertise in each of the following areas:
  - Acquisition and analysis of scanning CBED, scanning NBD and 4D STEM data using an EMPAD on an aberration-corrected FEG-TEM
  - Atomic Resolution aberration-corrected Scanning Transmission Electron Microscopy
  - Scanning nanobeam diffraction of amorphous materials and materials with short range order
  - Pair distribution function analysis of synchrotron diffraction data
  - Convergent Beam Electron Diffraction
3. Demonstrated ability to produce high-quality research outcomes
4. Established strong interpersonal skills to interact effectively with students and academic and professional staff
5. Excellent communication skills to effectively relate scientific material, both orally and in writing
6. Demonstrated ability to conduct research in an independent manner or under limited supervision, and in association with other academic staff

## OTHER JOB RELATED INFORMATION

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- Occasional travel may be required to visit the Canadian Centre for Electron Microscopy and/or to attend national and/or international conferences and/or to visit international collaborators, if required
- Experimental work may require instrumental bookings outside of normal working hours

## LEGAL COMPLIANCE

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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.