



TEM BEAM LINE SCIENTIST & RESEARCH FELLOW

DEPARTMENT/UNIT	Monash Centre for Electron Microscopy
FACULTY/DIVISION	Senior Vice-Provost and Vice-Provost (Research)
CLASSIFICATION	Level B
DESIGNATED CAMPUS OR LOCATION	Clayton campus

ORGANISATIONAL CONTEXT

This position supported by Microscopy Australia is located at the Monash Centre for Electron Microscopy, which is a Monash Research Technology Platform within the Office of the Pro Vice-Chancellor (Research and Research Infrastructure).

The **Office of the Senior Vice-Provost and Vice-Provost Research** is responsible for Managing the development and implementation of infrastructure strategy, which is aligned with the University's grand challenges as well as the needs of industry. This places Monash in the best position to address the major scientific, technical and social challenges and opportunities facing Australia now and in the future. Investing in leading-edge infrastructure and equipment are essential to support the University's research aspirations. As part of this, the University operates core research platforms, comprising cutting-edge capabilities and promoting cross discipline/organisational collaborative research. The office of the SVP&VPR also has responsibility for managing alliances (e.g. CSIRO, ANSTO, DSTO etc.) as well as the relationships across the Clayton precinct. To learn more about the Office, please visit our website: monash.edu.au/research/infrastructure.

The **Monash Centre for Electron Microscopy (MCEM)** is a central university research platform and is part of the national grid of Microscopy Australia facilities. Its mission is to enable and advance research excellence at Monash University and beyond through the provision of a world-class research capability in electron microscopy for the determination of the structure of matter down to the atomic scale.

MCEM achieves this via its dual academic and research support role, namely:

- the execution of world class research in the field of electron microscopy, and
- the provision of advanced instrumentation, expertise and training in electron microscopy to researchers across all fields of science and engineering (except biology)

The Centre provides a research capability to several hundred registered users from Monash University, other universities, government research agencies and industry. This supports many areas of science and engineering, including emerging technologies in energy production and storage, advanced electronics, transport materials, manufacturing, mining, telecommunications, food technologies, pharmaceuticals and other medical technologies.

It plays an important role in educating postgraduate students in electron microscopy, as well as providing a key complementary facility to the adjacent

Ramaciotti Centre for Cryo-Electron Microscopy and the Australian Synchrotron and Melbourne Centre for Nanofabrication (MCN), which are within walking distance. To learn more about MCEM please visit our website: <https://www.monash.edu/researchinfrastructure/mcem>.

MCEM has a suite of advanced instruments, including a double-aberration-corrected Titan³ 80-300kV fitted with pixelated and CMOS detectors for scanning CBED and 4D-STEM. In mid-2021, MCEM will receive a next generation S/TEM with outstanding spatial and energy resolution, multiple fast detectors and unique electron-optical elements to optimise performance in S/TEM. MCEM is also in the process of procuring a next generation FIB/SEM. In addition, MCEM has 1 other FEGTEM, 1 TEM, 3 FEG-SEMs and a FIB/ESEM plus a range of supporting computing, software and specimen preparation equipment.

Microscopy Australia (formerly known as the Australian Microscopy and Microanalysis Research Facility) is a national grid of university based microscopy and microanalysis laboratories which provide open access to world-class instrumentation and expertise in nanostructural characterisation capability to all Australian researchers.

Funded by the Commonwealth government under the National Collaborative Research Infrastructure Strategy (NCRIS), relevant state governments and with co-investment by the institutional partners, Microscopy Australia's mission is to enable world-class outcomes from Australian research by providing essential infrastructure for the characterisation of materials at the micro, nano and atomic scales.

Comprising nine core institutions with linkages to another five laboratories, Microscopy Australia is a large collaborative research infrastructure facility governed as an unincorporated joint venture that develops and implements a business plan annually in accordance with the overall Microscopy Australia project plan.

POSITION PURPOSE

The role of the TEM Beam Line Scientist & Research Fellow within the Monash Centre for Electron Microscopy (MCEM) is to conduct research and provide high level expertise, training and research support in advanced transmission electron microscopy to enable the research activities of the University and other researchers through Microscopy Australia. The TEM Beam Line Scientist & Research Fellow will be an expert in the operation and application of aberration-corrected S/TEM and will be involved in support for other TEM's and associated analytical and sample preparation equipment (hereafter called "the instruments").

Reporting Line: The position reports to the Director, Monash Centre for Electron Microscopy

Supervisory responsibilities: Not applicable

Financial delegation: Not applicable

Budgetary responsibilities: Not applicable

KEY RESPONSIBILITIES

Specific duties include:

1. Research Support. Provide high level expertise, advice and assistance to MCEM Users to undertake research using these instruments. Research and develop methods to optimise and enhance the research capability of MCEM.
2. Provide advanced microscopy to support research projects responding to the Covid-19 pandemic.
3. Training. Provide training and supervision of MCEM Users in the safe and effective operation of these instruments. Assist in the production of technical and teaching documentation to support the training and safe operation of MCEM instrumentation. Contribute to occasional lectures and/or lecture courses and/or workshops on specialist topics in TEM provided by MCEM.

4. Collaborative Research. Collaborate with researchers from within and beyond the university on merit-based research projects, including acquiring and analysing complex data at an advanced level
5. Independent Research. Conduct international quality independent research in advanced transmission electron microscopy. Publish this research in peer-reviewed journals and, where appropriate, present it at national and international conferences and seminars.
6. Instrument and Laboratory Management. In consultation with and under guidance from the relevant Instrument Manager, assist in the management of the instruments, such as working with field service engineers and/or application specialists from microscope/accessory manufacturers; maintaining and keeping up to date software tools for data analysis; developing workflows for data management; working with eResearch and the instrument user community.
7. Provision of Administrative Support. Undertake limited administrative functions primarily connected with support of the instruments and MCEM operations, as well as relevant professional activities associated with electron microscopy. Comply with the University's Code of Conduct, OH&S responsibilities and adopting sustainable practices.
8. If appropriate, contribute to or lead the preparation of research proposal submissions to external funding bodies.
9. Participation in meetings associated with the above activities.
10. Other duties as directed from time to time

KEY SELECTION CRITERIA

Education/Qualifications

1. The appointee will have:
 - a doctoral qualification plus postdoctoral research experience (typically 3 years or more) or
 - an equivalent level of relevant research experience.

Knowledge and Skills

2. Advanced understanding of transmission electron microscope instrumentation, its operation, maintenance and optimisation.
3. Extensive expertise in the application of transmission electron microscopy to the solution of complex research problems, with high-level analytical, problem-solving and reporting skills.
4. Advanced understanding and experience in at least two of the following fields:
 - Electron scattering theory and computation
 - High level techniques in STEM or TEM (e.g. 4D-STEM, aberration correction, tomography)
 - Convergent Beam Electron Diffraction
 - High resolution electron energy loss spectroscopy and/or x-ray spectroscopy
 - Development of new S/TEM characterisation techniques and associated electron-optical designs
 - Advanced data processing techniques (e.g. machine learning)
5. Demonstrated track record of high-quality research work and refereed research publications in the area of electron microscopy (journal impact factor is not used here to assess publication quality).
6. Ability to teach and train researchers across the full range of electron microscopy techniques available on the instruments.
7. Strong interpersonal skills with the ability to liaise effectively with academic/research staff, research students, general/technical staff and external clients

8. Excellent communication skills to effectively relate scientific material, both orally and in writing.
9. High level organisational skills, with demonstrated capacity to establish and achieve goals.
10. Demonstrated ability to work autonomously and collaboratively in a complex environment.

OTHER JOB-RELATED INFORMATION

- There may be a requirement to work additional hours from time to time
- There may be peak periods of work during which taking of leave may be restricted
- Occasional travel may be required to attend national and/or international conferences and/or to visit international collaborators and/or visit other campuses of the University, if required
- Experimental work may require instrumental bookings outside of normal working hours

GOVERNANCE

Monash University expects staff to appropriately balance risk and reward in a manner that is sustainable to its long-term future, contribute to a culture of honesty and integrity, and provide an environment that is safe, secure and inclusive. Ensure you are aware of and adhere to University policies relevant to the duties undertaken and the values of the University. This is a standard which the University sees as the benchmark for all of its activities in Australia and internationally.