



# RESEARCH FELLOW - MODELLING OF ELECTRONIC MATERIALS

<b>DEPARTMENT/UNIT</b>	Department of Materials Science and Engineering
<b>FACULTY/DIVISION</b>	Faculty of Engineering
<b>CLASSIFICATION</b>	Level A
<b>DESIGNATED CAMPUS OR LOCATION</b>	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).

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. To learn more about the Faculty of Engineering, please visit our [website](#).

The **Department of Materials Science and Engineering (MSE)** aims to provide the highest quality teaching and research. We are the #1 ranked Materials Science and Engineering Department in Australia and are consistently in the top 50 departments worldwide (#34 in QS 2021), with much success in obtaining significant funding and delivering industry impact. Our research is focussed in the areas of Additive Manufacturing, Biomaterials, Functional and Energy Materials, Metals and Alloys, Polymers and Materials Theory, Modelling and Characterisation. Our researcher community consists of around 100 PhD students and 50 Research Fellows working in one or more of these areas, and the Department has around 140 academic and professional staff members of whom approximately 30% are female. The enabling aspects of a Materials Engineering Bachelors degree combined with the multidisciplinary nature of skills learned means our graduates are in high-demand across industry, as well as in research. MSE strives to provide a welcoming and open culture that is inclusive of students and staff of diverse genders, sexes, sexualities, religions and cultures, and people with disabilities. We welcome applications from individuals representing these diverse groups. In accordance with Monash University's

commitment to Athena Swan principles, we particularly encourage applications from women. Monash University supports staff with young children and caregiving responsibilities through a range of programs, policies and resources (see [www.monash.edu/gender-equity/parents](http://www.monash.edu/gender-equity/parents)). To learn more about our Department and the work we do, please visit our website ([www.monash.edu/engineering/departments/materials](http://www.monash.edu/engineering/departments/materials)).

The **ARC Centre of Excellence for Future Low-Energy Electronics Technologies (FLEET)** aims to reduce the energy used by electronics by developing novel devices based on topological materials, exciton/exciton-polariton condensates, and non-equilibrium topological and superfluid phenomena. The FLEET research program spans theory and experiment, science and engineering, and uses various platforms ranging from ultra-cold atoms to atomically thin materials.

Enabled by the new science of atomically thin materials, FLEET brings together over 40 world-leading experts to develop a new generation of ultra-low-power devices. Headquartered at Monash University, the FLEET network comprises 20 chief investigators at seven Australian institutions and 53 partner and associate investigators at 27 institutions worldwide, and over 100 HDR students and postdoctoral fellows. The team is highly interdisciplinary with high-profile researchers from atomic physics, condensed matter physics, materials science, electronics, nanofabrication and atomically thin materials.

With over \$40M investment from the Australian Research Council (ARC) and contributing organisations, FLEET is poised to make a significant global impact in the electronics and energy sectors. By building strategic and strong partnerships with Australian and international industry, research institutions and government, FLEET aim to build capacity for advanced electronics research in Australia and train the workforce for the next generation of electronic materials researchers and future semiconductor industry. To learn more about FLEET, please visit our website: [www.fleet.org.au](http://www.fleet.org.au).

An important part of FLEET's mission is to create and maintain an equitable, diverse and inclusive working environment that resolves conflicts between scientific research and personal circumstances or identity. In particular, FLEET offers mentoring programs and other career development initiatives for all researchers to create equity at the workplace and retain scientists from under-represented groups. FLEET supports family-friendly and flexible work arrangements, including part-time employment options, to focus on outputs rather than physical attendance.

The **Computational Materials Laboratory** located within the Department of Materials Science and Engineering, focuses on the structure-property relationships in a wide variety of materials, ranging from low-dimensional materials for electronic and energy applications to structural alloys. We employ a broad range of computational tools including first principles quantum mechanical methods and molecular dynamics simulations. In addition, the Computational Materials Laboratory has access to several high-performance computing facilities within Australia, including the National Computing Infrastructure in Canberra and the Pawsey Supercomputing Facility in Perth. For more information, please visit [www.monash.edu/engineering/nikhilmedhekar](http://www.monash.edu/engineering/nikhilmedhekar).

## POSITION PURPOSE

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A Level A research-only academic is expected to contribute towards the research effort of the University and to develop their research expertise through the pursuit of defined projects relevant to the particular field of research. More specifically, the Research Fellow Level A will conduct research on **atomistic modelling of electronic materials**.

The Research Fellow will work on a project led within the Computational Materials Laboratory, aiming to discover and design the properties of materials that are relevant to low energy electronics technologies. These materials include, but are not limited to, low-dimensional materials, topologically non-trivial materials, and multiferroic materials. This project is a part of the larger ARC Centre of Excellence in Future Low Energy Electronics Technologies (ARC CoE FLEET). This Research Fellow will focus on employing a combination of atomistic first principles methods to simulate electronic structure and transport in various materials of interest. This project also offers an opportunity to collaborate with experimental researchers within FLEET focusing on the broader goal of developing future low energy electronic devices.

**Reporting Line:** The position reports to the relevant senior academic within the Computation Materials Laboratory, Department of Materials Science and Engineering

**Supervisory Responsibilities:** Not applicable

**Financial Delegation:** Not applicable

**Budgetary Responsibilities:** Not applicable

## **KEY RESPONSIBILITIES**

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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 their research project(s)
6. Design and operation of advanced simulations 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
9. Other duties as directed from time to time

## **KEY SELECTION CRITERIA**

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### **Education/Qualifications**

1. The appointee will have:
  - A doctoral qualification in materials science/condensed matter physics or a closely related discipline.

### **Knowledge and Skills**

2. Demonstrated hands-on skills and experience in ab initio first principles and transport simulations, preferably with applications to electronic materials
3. Demonstrated skills and experience in utilising advanced computer software for first principles simulations and the use of such software on high performance computing facilities
4. Demonstrated skills and experience in basic programming as applied to scientific computing and interfacing with high performance computing facilities
5. A sound understanding of condensed matter physics as applied to electronic devices
6. Demonstrated analytical and manuscript preparation skills, including a track record of refereed research publications
7. Ability to solve complex problems by using discretion, innovation and the exercise of diagnostic skills and/or expertise

8. Well-developed planning and organisational skills, with the ability to prioritise multiple tasks and set and meet deadlines
9. Excellent written communication and verbal communication skills with proven ability to produce clear, succinct reports and documents
10. A demonstrated awareness of the principles of confidentiality, privacy and information handling
11. A demonstrated capacity to work in a collegiate manner with other staff in the workplace

## **OTHER JOB RELATED INFORMATION**

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- Travel to other campuses of the University may be required
- 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

## **GOVERNANCE**

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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.