



## POSITION DESCRIPTION

School of Physics

Faculty of Science

### Postdoctoral Research Fellow in Nano-optics

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| <b>POSITION NO</b>                | 0046225  |
| <b>CLASSIFICATION</b>             | Level A  |
| <b>SALARY</b>                     | \$68,148 - \$93,830 p.a. (PhD entry level \$87,415)  |
| <b>SUPERANNUATION</b>             | Employer contribution of 9.5%  |
| <b>WORKING HOURS</b>              | Full-time (1.0 FTE)  |
| <b>BASIS OF EMPLOYMENT</b>        | Fixed-Term for 2.5 years   |
| <b>OTHER BENEFITS</b>             | <a href="http://about.unimelb.edu.au/careers/working/benefits">http://about.unimelb.edu.au/careers/working/benefits</a>  |
| <b>HOW TO APPLY</b>               | Online applications are preferred. Go to <a href="http://about.unimelb.edu.au/careers">http://about.unimelb.edu.au/careers</a> , select the relevant option ('Current Staff' or 'Prospective Staff'), then find the position by title or number. |
| <b>CONTACT FOR ENQUIRIES ONLY</b> | Professor Kenneth Crozier<br>Tel +61 3 8344 2249<br>Email <a href="mailto:kcrozier@unimelb.edu.au">kcrozier@unimelb.edu.au</a><br><br><i>Please do not send your application to this contact</i>   |

For information about working for the University of Melbourne, visit our website:  
[about.unimelb.edu.au/careers](http://about.unimelb.edu.au/careers)

## ***Position Summary***

The Postdoctoral Research Fellow in Nano-optics position is located within the School of Physics, at the University of Melbourne.

The Postdoctoral Research Fellow will work under the supervision of Professor Kenneth Crozier on the experimental realisation of new nano-optical devices and techniques. Some of the recent activities undertaken by the research group are:

- the demonstration of infrared photodetectors and modulators based on two-dimensional materials (including graphene),
- the demonstration of metasurfaces based on high-index dielectric materials, and
- the demonstration of optical nanotweezers based on plasmonics and silicon photonics.

The Research Fellow will design and simulate nano-optical devices on one or more of these topics, realize them experimentally by nanofabrication, and develop new methods to characterize them optically and/or electrically.

The Research Fellow will join a group whose research in nano- and micro-optics spans from basic to applied. In the addition to the topics noted above, the group's recent work has included nanowire-based photodetectors for multispectral imaging, the demonstration of quantum mechanical effects in plasmonics, and the demonstration of single molecule Raman spectroscopy using optical nanoantennas.

### ***1. Key Responsibilities***

#### **1.1 RESEARCH**

- ▶ Plan and carry out research on the nominated research project, with the goal of timely completion of the milestones of the project;
- ▶ Liaise effectively with internal and external collaborators and stakeholders, including timely preparation of reports and technical presentations, providing clear progress toward project milestones;
- ▶ Publish research outcomes on a regular basis in journals and at leading conferences;
- ▶ You are expected to significantly contribute towards the research effort of the team and develop your research expertise with an increasing degree of autonomy.
- ▶ Assist other researchers in carrying out experiments as requested by the supervisor;
- ▶ Maintain accurate and detailed records of all experiments conducted.

#### **1.2 LEADERSHIP AND SERVICE**

- ▶ Actively participate at School meetings and with guidance and where appropriate, contribute to planning activities or committee work to support capacity building in the School/discipline; and
- ▶ Effective demonstration and promotion of University values including diversity and inclusion and high standards of ethics and integrity.

### 1.3 OTHER

- ▶ Perform other tasks as requested by the supervisor or the Head of the School;
- ▶ Actively participate in the University Performance Development Framework
- ▶ Occupational Health and Safety (OH&S) and Environmental Health and Safety (EH&S) responsibilities as outlined in section 4;
- ▶ Undertake administrative duties and general laboratory duties including maintenance of the laboratory and equipment, and ordering of supplies;
- ▶ Ensure an up-to-date record of University compliance courses, such as, but not limited to, Appropriate Workplace Behaviour, PDF for Staff and Supervisors, OH &S training courses.

## 2. Selection Criteria

### 2.1 ESSENTIAL

- ▶ Completion of a PhD in one of the following disciplines: Physics, Electrical and Electronic Engineering, Materials Science, or a relevant discipline preferably in optics or related areas;
- ▶ A track record and demonstrated aptitude for quality research, as evidenced by research publications in leading journals and conferences commensurate with opportunity;
- ▶ An outstanding background in areas relevant to the project including nano-optics and nanofabrication. Candidates interested in the project on infrared photodetectors and modulators based on two dimensional materials, would ideally have a strong background in semiconductor devices based on two-dimensional materials;
- ▶ Demonstrated strong organisational skills, experience in using initiative, working with minimal supervision and the ability to prioritise tasks to achieve project objectives within timelines;
- ▶ Excellent interpersonal, and both written and verbal communication skills in English, demonstrated by presentation of research results at conferences, internal forums and through manuscript submissions;
- ▶ Demonstrated ability to work in teams and to collaborate with others.

### 2.2 DESIRABLE

- ▶ Ability to co-supervise junior team members, including students.
- ▶ The ability to attract external funding through grant applications and/or support in funded joint projects with others internal or external to the University; and
- ▶ Experience in assisting with supervision of students undertaking undergraduate or higher degree research projects.

### ***3. Equal Opportunity, Diversity and Inclusion***

The University is an equal opportunity employer and is committed to providing a workplace free from all forms of unlawful discrimination, harassment, bullying, vilification and victimisation. The University makes decisions on employment, promotion and reward on the basis of merit.

The University is committed to all aspects of equal opportunity, diversity and inclusion in the workplace and to providing all staff, students, contractors, honorary appointees, volunteers and visitors with a safe, respectful and rewarding environment free from all forms of unlawful discrimination, harassment, vilification and victimisation. This commitment is set out in the University's People Strategy 2015-2020 and policies that address diversity and inclusion, equal employment opportunity, discrimination, sexual harassment, bullying and appropriate workplace behaviour. All staff are required to comply with all University policies.

The University values diversity because we recognise that the differences in our people's age, race, ethnicity, culture, gender, nationality, sexual orientation, physical ability and background bring richness to our work environment. Consequently, the People Strategy sets out the strategic aim to drive diversity and inclusion across the University to create an environment where the compounding benefits of a diverse workforce are recognised as vital in our continuous desire to strive for excellence and reach the targets of Growing Esteem.

### ***4. Occupational Health and Safety (OHS)***

All staff are required to take reasonable care for their own health and safety and that of other personnel who may be affected by their conduct.

OHS responsibilities applicable to positions are published at:

<http://safety.unimelb.edu.au/topics/responsibilities/>

These include general staff responsibilities and those additional responsibilities that apply for Managers and Supervisors and other Personnel.

### ***5. Other Information***

#### **5.1 SCHOOL OF PHYSICS**

[www.physics.unimelb.edu.au/](http://www.physics.unimelb.edu.au/)

The University of Melbourne's School of Physics is one of Australia's leading Physics Schools. It has achieved this status through the high quality of its research and teaching programs. The School offers a wide range of physics subjects to undergraduate and postgraduate students, and performs research in the following areas: Astrophysics, Atomic, Molecular and Optical Physics, Experimental Condensed Matter Physics, Experimental Particle Physics, Materials Science, Physical Biosciences, Theoretical Condensed Matter Physics and Theoretical Particle Physics.

The School of Physics hosts the ARC Centre of Excellence in Particle Physics at the Terascale and the Melbourne nodes of the ARC Centre of Excellence for Quantum Computation and Communication Technology, the ARC Centre of Excellence for Advanced

Molecular Imaging and the ARC Centre of Excellence for All-Sky Astrophysics. The School also plays a major role in the Australian Synchrotron research program.

Currently some 25 academics, 51 research-only staff, more than 95 postgraduate students and 72 associates supported by 23 professional staff make up the School of Physics. The School additionally hosts an Australian Laureate Fellow, 5 ARC Future Fellows, and 4 ARC Discovery Early Career Researcher. Skilled technical staff operate, maintain and develop complex instrumentation and equipment to support the teaching and research activities of the School. The School is located in the David Caro building on the Swanston Street boundary of the University campus. The Head of School and the majority of the Professional staff are housed on the ground floor of the building to act as the first point of contact for students, staff and visitors.

## 5.2 FACULTY OF SCIENCE

<http://www.science.unimelb.edu.au>

Science at the University of Melbourne is the most highly ranked Faculty of Science in Australia.\* Science is defined by its research excellence in the physical and life sciences and is at the forefront of research addressing major societal issues from climate change to disease. Our discoveries help build an understanding of the world around us.

We have over 150 years of experience in pioneering scientific thinking and analysis, leading to outstanding teaching and learning and offer a curriculum based on highly relevant research, which empowers our STEM students and graduates to understand and address complexities that impact real world issues and the challenges of tomorrow.

We aspire to engage the broader community with the impact that Science has on our everyday lives. Through the strength of our internships and research project offerings, our students are provided opportunities to engage with industry partners to solve real-world issues.

The Faculty of Science has over 55,000 alumni and is one of the largest faculties in the University comprising seven schools: BioSciences, Chemistry, Earth Sciences, Ecosystem and Forest Sciences, Geography, Mathematics and Statistics, and Physics.

The Faculty is custodian of the Bio21 Molecular Science and Biotechnology Institute, Office for Environmental Programs and home to numerous Centres.

Science manages more than \$315 million of income per annum, with a staff base on the order of 270 professional staff, and more than 580 academic staff.

We offer a range of undergraduate, honours, graduate and research degrees; enrolling over 9,400 undergraduate and 2,000 graduate students. The Faculty of Science is the custodial Faculty for the BSc (Bachelor of Science). The Faculty of Science is a leader in research, contributing approximately \$80 million in HERDC income per annum. The Faculty of Science is highly research focused, performing strongly in the ARC competitive grants schemes, often out-performing the national average. The Faculty of Science is currently growing its competitiveness and standing in the NHMRC space.

The Faculty of Science provides community services and industry partnerships based on a solid foundation of research in the pure and applied sciences. The Faculty has an endowment of approximately \$78 million. The annual income from the endowment supports more than 250 prizes, scholarships and research awards.

\* Figures from the latest available data for 2015, including published international rankings data.

### 5.3 THE UNIVERSITY OF MELBOURNE

Established in 1853, the University of Melbourne is a leading international university with a tradition of excellence in teaching and research. The main campus in Parkville is recognised as the hub of Australia's premier knowledge precinct comprising eight hospitals, many leading research institutes and a wide-range of knowledge-based industries. With outstanding performance in international rankings, the University is at the forefront of higher education in the Asia-Pacific region and the world.

The University employs people of outstanding calibre and offers a unique environment where staff are valued and rewarded.

Further information about working at The University of Melbourne is available at <http://about.unimelb.edu.au/careers>.

### 5.4 GROWING ESTEEM, THE MELBOURNE CURRICULUM AND RESEARCH AT MELBOURNE: ENSURING EXCELLENCE AND IMPACT TO 2025

Growing Esteem describes Melbourne's strategy to achieve its aspiration to be a public-spirited and internationally-engaged institution, highly regarded for making distinctive contributions to society in research and research training, learning and teaching, and engagement. <http://about.unimelb.edu.au/strategy-and-leadership>

The University is at the forefront of Australia's changing higher education system and offers a distinctive model of education known collectively as the Melbourne Curriculum. The new educational model, designed for an outstanding experience for all students, is based on six broad undergraduate programs followed by a graduate professional degree, research higher degree or entry directly into employment. The emphasis on academic breadth as well as disciplinary depth in the new degrees ensures that graduates will have the capacity to succeed in a world where knowledge boundaries are shifting and reforming to create new frontiers and challenges. In moving to the new model, the University is also aligning itself with the best of emerging European and Asian practice and well-established North American traditions.

The University's global aspirations seek to make significant contributions to major social, economic and environmental challenges. Accordingly, the University's research strategy *Research at Melbourne: Ensuring Excellence and Impact to 2025* aspires to a significant advancement in the excellence and impact of its research outputs.

<http://research.unimelb.edu.au/our-research/research-at-melbourne>

The strategy recognises that as a public-spirited, research-intensive institution of the future, the University must strive to make a tangible impact in Australia and the world, working across disciplinary and sectoral boundaries and building deeper and more substantive engagement with industry, collaborators and partners. While cultivating the fundamental enabling disciplines through investigator-driven research, the University has adopted three grand challenges aspiring to solve some of the most difficult problems facing our world in the next century. These Grand Challenges include:

- ▶ Understanding our place and purpose – The place and purpose grand challenge centres on understanding all aspects of our national identity, with a focus on Australia's 'place' in the Asia-Pacific region and the world, and on our 'purpose' or mission to improve all dimensions of the human condition through our research.
- ▶ Fostering health and wellbeing – The health and wellbeing grand challenge focuses on building the scale and breadth of our capabilities in population and global health;

on harnessing our contribution to the 'convergence revolution' of biomedical and health research, bringing together the life sciences, engineering and the physical sciences; and on addressing the physical, mental and social aspects of wellbeing by looking beyond the traditional boundaries of biomedicine.

- ▶ Supporting sustainability and resilience – The sustainability and resilience grand challenge addresses the critical issues of climate change, water and food security, sustainable energy and designing resilient cities and regions. In addition to the technical aspects, this grand challenge considers the physical and social functioning of cities, connecting physical phenomena with lessons from our past, and the implications of the technical solutions for economies, living patterns and behaviours.

Essential to tackling these challenges, an outstanding faculty, high performing students, wide collaboration including internationally and deep partnerships with external parties form central components of Research at Melbourne: Ensuring Excellence and Impact to 2025.

## 5.5 GOVERNANCE

The Vice Chancellor is the Chief Executive Officer of the University and responsible to Council for the good management of the University.

Comprehensive information about the University of Melbourne and its governance structure is available at <http://www.unimelb.edu.au/governance>