Australian National University

Position Description

College/Division:	**College of Science**
Faculty/School/Centre:	**Research School of Physics**
Department/Unit:	**TMOS, EME**
Position Title:	**Postdoctoral Fellow**
Classification:	**Level A**
Position No:	**TBA**
Responsible to:	**Head, Department of Electronic Materials Engineering**
Number of positions that report to this role:	**0**
Delegation(s) Assigned:	

PURPOSE STATEMENT:
KEY ACCOUNTABILITY AREAS:

The Department of Electronic Materials Engineering (EME) is one of the five departments within the Research School of Physics (RSPhys). RSPhys is home to a number of major national facilities such as Australia's largest accelerator, and the Australian National Fabrication Facility (ACT Node). Hundreds of academics, technical staff and students form the School's greatest asset, its people. This critical mass of researchers is of fundamental importance in fostering the kind of interdisciplinary interactions that create modern research excellence.

The ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS), led by the Australian National University (ANU), brings together four other Australian universities (University of Technology Sydney, RMIT University, University of Melbourne and the University of Western Australia) and 13 leading international universities as well as Australian and global companies to create entirely new optics-based technologies with enormous market potential. The Centre has received $34.9 million funding from the Australian Research Council to operate from 2020-2027.

TMOS will develop the next-generation of miniaturised optical systems with functionalities beyond what is conceivable today. By harnessing the disruptive concept of meta-optics, the Centre will overcome complex challenges in light generation, manipulation and detection at the nanoscale. The Centre brings together a trans-disciplinary team of world-leaders in science, technology and engineering to deliver scientific innovations in optical systems for the Fourth Industrial Revolution.

As a Centre, we strongly believe that diversity improves ideas and innovation and leads to better outcomes and productivity. Diversity and fostering a culture of inclusiveness will be a key contributor to the scientific excellence of TMOS. TMOS aims to develop a multidisciplinary, dynamic, interactive and collaborative culture fostering future research leaders who thrive in academic excellence and are equipped with strong transferable skills.

The research activity must contribute directly to the research programs/themes of TMOS. The Postdoctoral Fellow is expected to undertake work in all three areas of academic activity – research, education and service (including outreach). The allocation of time to each area will be discussed with the position supervisor annually and be reflective of the external funding conditions that support the appointment, the appointees research agenda, school and interdisciplinary teaching requirements and leadership opportunities within the School environment. The Postdoctoral Fellow may also be required to supervise or assist in the supervision of students, and contribute cooperatively to the overall intellectual life of the School, College and University.

Position Dimension & Relationships:

The Postdoctoral Fellow will be expected to work collegially, leading by example to develop and maintain effective, productive and beneficial workplace relationships within the all academic and professional School

and College staff, students and honorary appointees, as well as with industry and TMOS stakeholders. This position will also have a mentoring role for students and will engage in collegial and productive collaborations with local, national and international colleagues.

Role Statement:

In their role as an Level A the Postdoctoral Fellow is expected to:

1) Undertake independent research in at least one of the areas listed below, with a view to publishing original and innovative results in refereed journals, present research at academic seminars and at national and international conferences, and collaborate with other researchers at a national level. This includes working as part of a team on an externally funded project subject to deadlines.
   - *epitaxial growth of novel compound semiconductors nanostructures*
   - *nanoscale semiconductor lasers and light emitters*
   - *nanoscale semiconductor sensors, photodetectors and photovoltaics*
   - *nanoscale semiconductor material and device characterisation: advanced spectroscopy and imaging*
2) Collaborate with senior staff to actively seek and secure external funding, assist to prepare and submit research proposals to external funding bodies as appropriate.
3) Where an opportunity exists, the occupant may be required to contribute to the teaching activities of the School at the undergraduate and graduate levels. This includes, but is not limited to, the preparation and delivery of lectures and tutorials, the preparation of online material, marking and assessment, consultations, and with students or acting as subject coordinators.
4) Supervise students working on individual or group projects at undergraduate, honours, graduate-coursework levels. Assist with supervision of post-graduate students.
5) Assist with the supervision of research support staff in your research area.
6) Actively contribute to all aspects of the operation of the School.
7) Assist in outreach activities including to prospective students, research institutes, industry, government, the media and the general public.
8) Maintain high academic standards in all education, research and administration endeavours.
9) Comply with all ANU policies and procedures, and in particular those relating to work health and safety and equal opportunity
10) Other duties as required that are consistent with the classification of the position.

Skill Base:

A Level A academic will work with the support and guidance from more senior academic staff and is expected to develop their expertise in teaching and research with an increasing degree of autonomy. A Level A academic will normally have completed four years of tertiary study or equivalent qualifications and experience and may be required to hold a relevant higher degree.

A Level A academic will normally contribute to teaching at the institution, at a level appropriate to the skills and experience of the staff member, engage in scholarly, research and/or professional activities appropriate to their profession or discipline, and undertake administration primarily relating to their activities at the institution. The contribution to teaching of Level A academics will be primarily at undergraduate and graduate diploma level.

SELECTION CRITERIA:

1) A PhD (or awarding of a PhD within six months of appointment commencement) in Physics, Electrical/Electronics Engineering, Materials Science, or equivalent qualifications and experience in a related area, with a track record of independent research in the above fields as evidenced by publications in peer-reviewed journals and conferences.
2) Evidence of the ability to articulate and prosecute innovative research in at least one of the following fields:
   a) epitaxial growth of novel compound semiconductors nanostructures
      - *experience in the growth of compound semiconductors using epitaxial techniques such as MOCVD or MBE*
      - *experience in characterisation of the grown layers/nanostructures using techniques such as XRD, electron microscopy, photoluminescence and electrical measurements*

   b) nanoscale semiconductor lasers and light emitters
      - *ability to design semiconductor lasers and light emitters using simulation tools such as LaserMOD, Lumerical, COMSOL*
      - *experience in the fabrication of the lasers and light emitters within a cleanroom environment*

- *experience in the characterisation of the devices such as L-I, L-L, I-V plots and near/field measurements*

c) **nanoscale semiconductor sensors, photodetectors and photovoltaics**

- *ability to design semiconductor sensors, photodetectors and photovoltaics using simulation tools such as Lumerical, COMSOL or Silvaco.*
- *experience in nanoscale fabrication of sensors, photodetectors and photovoltaics within a cleanroom environment*
- *experience in the optical/electrical characterisation of the devices such as voltage-current, photocurrent and quantum efficiency measurements*

d) **nanoscale semiconductor material and device characterisation: advanced spectroscopy and imaging**

- *experience in designing and building optical/electrical setups for advanced characterisation of nanoscale semiconductor materials and devices, such as time-resolved measurements, single photon detection and optical imaging*
- *experience in optics and photonics with additional knowledge of imaging and computational optics highly desirable*

3) An ability and commitment to contribute to bids for competitive external funding to support individual and collaborative research activities.
4) Evidence of an ability and willingness to teach at all levels.
5) The ability to assist in the supervision of students working on research projects.
6) The ability to work as part of a team and to meet deadlines.
7) Excellent oral and written English language skills and a demonstrated ability to communicate and interact effectively with a variety of staff and students in a cross-disciplinary academic environment and to foster respectful and productive working relationships with staff, students and colleagues at all levels.
8) A demonstrated understanding of equal opportunity principles and policies and a commitment to their application in a university context.

The ANU conducts background checks on potential employees, and employment in this position is conditional on satisfactory results in accordance with the Background Checking Procedure which sets out the types of checks required by each type of position.

Supervisor/Delegate Signature:		**Date:**	26/09/2022
Printed Name:	**Professor Lan Fu**	**Uni ID:**	**U9715386**

References:

General Staff Classification Descriptors

Australian National University

Pre-Employment Work Environment Report

Position Details

College/Div/Centre	**College of Science**	**Dept/School/Section**	**Research School of Physics**
Position Title	**Postdoctoral Fellow**	**Classification**	**Level A**
Position No.		**Reference No.**	

In accordance with the Work Health and Safety Act 2011 (Cth) the University has a primary duty of care, so far as reasonably practicable, to ensure the health and safety of all staff while they are at work in the University.

- This form must be completed by the supervisor of the advertised position and appended to the back of the Position Description.
- This form is used to advise potential applicants of work environment and health and safety hazards prior to application.
- Once an applicant has been selected for the position they must familiarise themselves with the University WHS Management System via Handbook guidance https://services.anu.edu.au/human-resources/health-safety/whs-management-system-handbook
- The hazards identified below are of generic nature in relation to the position. It is not correlated directly to training required for the specific staff to be engaged. Identification of individual WHS training needs must be in accordance with WHS Local Training Plan and through the WHS induction programs and Performance Development Review Process.
- 'Regular' hazards identified below must be listed as 'Essential' in the Selection Criteria - see ' Employment Medical Procedures' at http://info.anu.edu.au/Policies/_DHR/Procedures/Employment_Medical_Procedures.asp

Potential Hazards

- Please indicate whether the duties associated with appointment will result in exposure to any of the following potential hazards, either as a **regular** or **occasional** part of the duties.

TASK	regular	occasional	TASK	regular	occasional
key boarding	☒	☐	laboratory work	☒	☐
lifting, manual handling	☐	☒	work at heights	☐	☒
repetitive manual tasks	☐	☒	work in confined spaces	☐	☒
Organizing events	☐	☐	noise / vibration	☐	☒
fieldwork & travel	☐	☒	electricity	☐	☒
driving a vehicle	☐	☒			
NON-IONIZING RADIATION			**IONIZING RADIATION**		
solar	☐	☒	gamma, x-rays	☒	☐
ultraviolet	☒	☐	beta particles	☐	☐
infra red	☒	☐	nuclear particles	☐	☐
laser	☒	☐			
radio frequency	☐	☒			
CHEMICALS			**BIOLOGICAL MATERIALS**		
hazardous substances	☒	☐	microbiological materials	☐	☐
allergens	☐	☐	potential biological allergens	☐	☐
cytotoxics	☐	☐	laboratory animals or insects	☐	☐
mutagens/teratogens/ carcinogens	☒	☐	clinical specimens, including blood	☐	☐
pesticides / herbicides	☐	☐	genetically-manipulated specimens	☐	☐
			immunisations	☐	☐

OTHER POTENTIAL HAZARDS (please specify):

Supervisor/Delegate Name:	Professor Lan Fu	**Date:**	**26/09/2022**

Australian National University

Position Description

College/Division:	**College of Science**
Faculty/School/Centre:	**Research School of Physics**
Department/Unit:	**TMOS, EME**
Position Title:	**Research Fellow**
Classification:	**Level B**
Position No:	**TBA**
Responsible to:	**Head, Department of Electronic Materials Engineering**
Number of positions that report to this role:	**0**
Delegation(s) Assigned:	

PURPOSE STATEMENT:
KEY ACCOUNTABILITY AREAS:

The Department of Electronic Materials Engineering (EME) is one of the five departments within the Research School of Physics (RSPhys). RSPhys is home to a number of major national facilities such as Australia's largest accelerator, and the Australian National Fabrication Facility (ACT Node). Hundreds of academics, technical staff and students form the School's greatest asset, its people. This critical mass of researchers is of fundamental importance in fostering the kind of interdisciplinary interactions that create modern research excellence.

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As a Centre, we strongly believe that diversity improves ideas and innovation and leads to better outcomes and productivity. Diversity and fostering a culture of inclusiveness will be a key contributor to the scientific excellence of TMOS. TMOS aims to develop a multidisciplinary, dynamic, interactive and collaborative culture fostering future research leaders who thrive in academic excellence and are equipped with strong transferable skills.

The research activity must contribute directly to the research programs/themes of TMOS. The Postdoctoral Fellow is expected to undertake work in all three areas of academic activity – research, education and service (including outreach). The allocation of time to each area will be discussed with the position supervisor annually and be reflective of the external funding conditions that support the appointment, the appointees research agenda, school and interdisciplinary teaching requirements and leadership opportunities within the School environment. The Postdoctoral Fellow may also be required to supervise or assist in the supervision of students, and contribute cooperatively to the overall intellectual life of the School, College and University.

Position Dimension & Relationships:

The Postdoctoral Fellow will be expected to work collegially, leading by example to develop and maintain effective, productive and beneficial workplace relationships within the all academic and professional School

and College staff, students and honorary appointees, as well as with industry and TMOS stakeholders. This position will also have a mentoring role for students and will engage in collegial and productive collaborations with local, national and international colleagues.

Role Statement:

In their role as an Academic Level B the Research Fellow is expected to:

1) Undertake independent research in at least one of the areas listed below, with a view to publishing original and innovative results in refereed journals, present research at academic seminars and at national and international conferences, and collaborate with other researchers at a national level. This includes working as part of a team on an externally funded project subject to deadlines.
   - *epitaxial growth of novel compound semiconductors nanostructures*
   - *nanoscale semiconductor lasers and light emitters*
   - *nanoscale semiconductor sensors, photodetectors and photovoltaics*
   - *nanoscale semiconductor material and device characterisation: advanced spectroscopy and imaging*
2) Actively seek and secure external funding including the preparation and submission of research proposals to external funding bodies.
3) Where an opportunity exists, the occupant may be required to contribute to the teaching activities of the School at the undergraduate and graduate levels. This includes, but is not limited to, the preparation and delivery of lectures and tutorials, the preparation of online material, marking and assessment, consultations, and with students or acting as subject coordinators.
4) Supervise students working on individual or group projects at undergraduate, honours, graduate-coursework and post-graduate levels.
5) Supervise and mentor Postdoctoral Fellow's and research support staff in your research area.
6) Actively contribute to all aspects of the operation of the School. This may include representation through committee memberships.
7) Assist in outreach activities including to prospective students, research institutes, industry, government, the media and the general public.
8) Maintain high academic standards in all education, research and administration endeavours.
9) Comply with all ANU policies and procedures, and in particular those relating to work health and safety and equal opportunity
10) Other duties as required that are consistent with the classification of the position.

Skill Base:

A Level B academic will undertake independent teaching and research in their discipline or related area. In research and/or scholarship and/or teaching a Level B academic will make an independent contribution through professional practice and expertise and coordinate and/or lead the activities of other staff, as appropriate to the discipline.

A Level B academic will normally contribute to teaching at undergraduate, honours and postgraduate level, engage in independent scholarship and/or research and/or professional activities appropriate to their profession or discipline. The academic will normally undertake administration primarily relating to their activities at the institution and may be required to perform the full academic responsibilities of and related administration for the coordination of an award program of the institution.

SELECTION CRITERIA:

1) A PhD in Physics, Electrical/Electronics Engineering, Materials Science or a related area, with a track record of independent research in the above fields as evidenced by publications in peer-reviewed journals and conferences, a record of developing and maintaining collaborations and by other measures such as awards, and invitations to present at conferences.
2) Evidence of the ability to articulate and prosecute innovative research in at least one of the following fields:
   a) epitaxial growth of novel compound semiconductors nanostructures
      - *experience in the growth of compound semiconductors using epitaxial techniques such as MOCVD or MBE*
      - *experience in characterisation of the grown layers/nanostructures using techniques such as XRD, electron microscopy, photoluminescence and electrical measurements*

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- *experience in optics and photonics with additional knowledge of imaging and computational optics highly desirable*

3) demonstrated ability and commitment to apply for competitive external funding to support individual and collaborative research activities.
4) Evidence of an ability and willingness to teach at all levels.
5) An ability to supervise and graduate high quality PhD/Masters research students.
6) The demonstrated ability to work as part of a team, contributing to team management and meeting deadlines for project elements.
7) Excellent oral and written English language skills and a demonstrated ability to communicate and interact effectively with a variety of staff and students in a cross-disciplinary academic environment and to foster respectful and productive working relationships with staff, students and colleagues at all levels.
8) A demonstrated understanding of equal opportunity principles and policies and a commitment to their application in a university context.

The ANU conducts background checks on potential employees, and employment in this position is conditional on satisfactory results in accordance with the Background Checking Procedure which sets out the types of checks required by each type of position.

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Printed Name:	**Professor Lan Fu**	**Uni ID:**	**U9715386**

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Position Details

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Position Title	**Research Fellow**	**Classification**	**Level B**
Position No.		**Reference No.**	

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lifting, manual handling	☐	☒	work at heights	☐	☒
repetitive manual tasks	☐	☒	work in confined spaces	☐	☒
Organizing events	☐	☐	noise / vibration	☐	☒
fieldwork & travel	☐	☒	electricity	☐	☒
driving a vehicle	☐	☒			
NON-IONIZING RADIATION			**IONIZING RADIATION**		
solar	☐	☒	gamma, x-rays	☒	☐
ultraviolet	☒	☐	beta particles	☐	☐
infra red	☒	☐	nuclear particles	☐	☐
laser	☒	☐			
radio frequency	☐	☒			
CHEMICALS			**BIOLOGICAL MATERIALS**		
hazardous substances	☒	☐	microbiological materials	☐	☐
allergens	☐	☐	potential biological allergens	☐	☐
cytotoxics	☐	☐	laboratory animals or insects	☐	☐
mutagens/teratogens/ carcinogens	☒	☐	clinical specimens, including blood	☐	☐
pesticides / herbicides	☐	☐	genetically-manipulated specimens	☐	☐
			immunisations	☐	☐

OTHER POTENTIAL HAZARDS (please specify):

Supervisor/Delegate Name:	*Professor Lan Fu*	**Date:**	**26/09/2022**