



Position description

Research Fellow in Astrophysics

Department/Unit	School of Physics and Astronomy
Faculty/Division	Faculty of Science
Classification	Level A/B
Work location	Clayton campus
Date document created or updated	12 October 2015

Organisational context

Monash is a university of transformation, progress and optimism. Our people are our most valued asset, with our academics among the best in the world and our professional staff revolutionising the way we operate as an organisation. For more information about our University and our exciting future, please visit www.monash.edu

The **Faculty of Science** works through frontiers via our research, teaching and our partnerships with industry, government and individual supporters. Our five schools offer a large and diverse range of disciplines in undergraduate and postgraduate courses. Ten schools from other University faculties contribute to science teaching at all levels, allowing students to choose their studies from physical, biological, biomedical, behavioural, environmental, mathematical and computer sciences. In terms of research, our respected researchers are at the top of their game. Their work spans the theoretical to the applied, contributes to new knowledge and technologies, and challenges how we interact with the world. To learn more about the Faculty of Science, please visit our website: www.monash.edu/science/

The School of Physics and Astronomy is a new School located within the Faculty of Science. It was formed in 2015 as a result of merging the former School of Physics with astrophysicists from the School of Mathematical Sciences. The School aims to position itself as one of the top physics and astronomy research and teaching departments in Australia. In the past five years the School has gone through an exciting period of renewal – investing significantly in people and facilities. The School of Physics and Astronomy is committed to teaching and research of the highest quality in astronomy, astrophysics, experimental physics, and theoretical physics; it aims to produce graduates with a solid foundation in physics and astrophysics. We are recognised internationally for research in several fields of physics and astrophysics; however, we are focused on significantly strengthening our research base to achieve the status of a top ranked international department.

In the 2015 national audit of research excellence (ERA), the School achieved the maximum overall rating of 5 for Physical Sciences, including the maximum rating of 5 in each of our assessed fields of research (spanning astronomy and astrophysics, atomic and molecular physics, nuclear physics, particle physics, condensed matter physics and optics).

The School has research strengths in astronomy and astrophysics, ultracold atomic gases, x-ray optics and biomedical imaging, gravitational wave physics, electron microscopy and diffraction, condensed matter physics and high energy particle physics. Currently the School is actively involved in six research centres:

- The Monash Centre for Astrophysics (MoCA - <http://moca.monash.edu>)
- The ARC Centre of Excellence for Particle Physics at the Terascale (CoEPP) <http://www.coepp.org.au/>
- The ARC Centre of Excellence for Future Low Energy Electronics Technologies (starting 2017)
- The ARC Centre of Excellence for Gravitational Wave Discovery (starting 2017)
- The Monash Centre for Electron Microscopy (MCEM - <http://mcem.monash.edu.au>)

- The Monash Centre for Atomically Thin Materials MCATM (<https://www.monash.edu/atomically-thin-materials>).

In addition, the School has over a dozen Australian Research Council funded programmes and is an active user of the Australian Synchrotron and the Melbourne Centre for Nanofabrication, which are located adjacent to the Clayton Campus of Monash University.

Modern laboratory facilities are a high priority in the School's Strategic Plan. In 2013 the School's research laboratories relocated to a new building - the \$175M New Horizons Centre (NHC).

Astronomy and Astrophysics

The School hosts the Monash Centre for Astrophysics, which is one of the most diverse astrophysics research groups in Australia. Major areas of research include: active galaxies, astrophysical fluid dynamics and magnetohydrodynamics, galaxy evolution, first stars, the formation of stars, stellar evolution, stellar nucleosynthesis, nuclear astrophysics, chemical evolution, galactic archaeology, supernovae, supernova remnants, neutron stars, stellar transients, supermassive black holes, high energy astrophysics, gravitational wave astronomy, stellar and planetary dynamics, and exoplanets.

The Australian astrophysics community is heavily involved in major observational and computational facilities, including the Australian Square Kilometre Array Pathfinder (ASKAP), the Giant Magellan Telescope, the Australian Astronomical Observatory, Skymapper, HERMES, NCI, and the Green II and gSTAR supercomputers. In addition the School conducts research into particle physics and cosmology through the ARC Centre of Excellence for Particle Physics at the Terascale (CoEPP). It is also member of the Joint Institute for Nuclear Astrophysics and has close collaborations with the Center for Nuclear Astrophysics at Shanghai Jiao Tong University.

Applicants will be considered in any of the School's current research areas in astronomy and astrophysics; however, exceptional applicants in other areas of astronomy and astrophysics are also encouraged to apply.

Further information about the position and the School of Physics and Astronomy is available at:

<http://www.physics.monash.edu.au/employment.html#academic>

<http://www.physics.monash.edu.au/>

OzGrav is a \$40M Centre of Excellence funded by the Australian Research Council starting in 2017. The mission is to capitalize on the historic first detections of gravitational waves to understand the extreme physics of black holes and warped spacetime, to inspire the next generation of Australian scientists and engineers through this new window on the Universe. The Centre brings together leading researchers from five Australian universities working on three themes: astrophysics, data, and instrumentation.

For more information see:

<http://www.monash.edu/science>

<http://www.physics.monash.edu.au>

Position purpose

The postdoctoral Research Fellow will join the new ARC Centre of Excellence for Gravitational-wave Discovery (OzGrav) in order to carry out research in gravitational-wave astronomy. The position will collaborate with academics within the OzGrav faculty on one or more strategic areas:

- Analysis of data from LIGO and/or the Parkes Pulsar Timing Array and the development of search / parameter estimation algorithms
- Astrophysics and modelling of gravitational-wave sources
- Electromagnetic observations including searches for optical counterparts with GOTO (<http://goto-observatory.org>)

The Research Fellow will also collaborate with OzGrav members at other partner universities and publish papers in high-impact journals, present results at major conferences and collaboration meetings, and assist in the supervision of students.

Reporting line: The position reports to the appropriate academic within the school

Supervisory responsibilities: Not applicable

Financial delegation and/or budget responsibilities: Not applicable

Key result areas and responsibilities

A **Level A** research only academic shall work with support, guidance and/or direction from staff classified at Level B and above and with an increasing degree of autonomy as the research academic gains in skill and experience.

- 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
- Involvement in professional activities including, subject to availability of funds, attendance at conferences and seminars in the field of expertise
- Limited administrative functions primarily connected with the area of research of the academic
- Development of a limited amount of research-related material for teaching or other purposes with appropriate guidance from other staff
- Occasional contributions to teaching in relation to her/his research project(s)
- Experimental design and operation of laboratory and technical equipment or conduct of research procedures
- 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
- Provide advice within the field of the staff member's research to postgraduate students

A **Level B** research-only academic is expected to carry out independent and/or team research within the field in which he/she is appointed and to carry out activities to develop her/his research expertise relevant to the particular field of research.

- The conduct of internationally competitive research either as a member of a team or independently and the production of high-quality journals, as defined by the Faculty, and of conference and seminar papers from that research
- Supervision of research-support staff involved in the staff member's research
- Guidance in the research effort of junior members of research-only Academic staff in her/his research area
- Contribution to the preparation or, where appropriate, individual preparation of research proposal submissions to external funding bodies
- Involvement in professional activities including, subject to availability of funds, attendance at conferences and seminars in the field of expertise
- Administrative functions primarily connected with her/his area of research
- Occasional contributions to the teaching program within the field of the staff member's research
- Co-supervision or, where appropriate, supervision of major honours or postgraduate research projects within the field of the staff member's area of research
- 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

Key selection criteria

Level A

Education/Qualifications

1. The incumbent should possess:
 - a PhD in astrophysics (applicants who are nearing completion of a PhD may be considered)

Knowledge and Skills

2. A demonstrated aptitude for research with a sound record of publication, commensurate with experience and opportunities

3. Ability to solve problems by using discretion, innovation and the exercise of diagnostic skills within areas of functional responsibility or professional expertise
4. Well-developed written communication and verbal communication skills with proven ability to effectively analyse information and produce clear, succinct reports and documents which requires interaction with others
5. Planning and organisational skills, with the ability to prioritise multiple tasks and set and meet deadlines
6. Demonstrated well-developed computer literacy and proficiency in the production of high level work using languages and domain-specific software, with the capability and willingness to learn new packages as appropriate
7. Experience in gravitational-wave astronomy (or closely allied field) and /or experience in time-domain optical astronomy

Level B

Education/Qualifications

1. The incumbent should possess:
 - a PhD in astrophysics

Knowledge and Skills

1. Ability to solve problems by using discretion, innovation and the exercise of high level diagnostic skills within areas of functional responsibility or professional expertise
2. Excellent written communication and verbal communication skills with proven ability to effectively analyse information and produce clear, succinct reports and documents which requires interaction with others
3. Planning and organisational skills, with the ability to prioritise multiple tasks and set and meet deadlines
4. Demonstrated well-developed computer literacy and proficiency in the production of high level work using languages and domain-specific software, with the capability and willingness to learn new packages as appropriate
5. Where appropriate, demonstrated ability to supervise, develop and motivate staff
6. A record of outstanding research publishing in journals, conference papers, reports or professional or technical papers
7. Experience in gravitational-wave astronomy (or closely allied field) and/or experience in time-domain optical astronomy
8. The ability to obtain external grants for research
9. The ability to successfully supervise postgraduate research students
10. Demonstrated ability to effectively work in multidisciplinary teams but also independently across multiple projects and to make a contribution to research and scholarship

Other job-related information

- Travel for extensive periods to the international prototype site, as well as the partner institution, will be required
- Out of hours work (including evenings, weekends and public holidays) will occasionally be necessary during observing runs
- Prototype deployment and testing will involve peak periods of work during which the taking of leave may be restricted

Legal compliance

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.