POSITION DESCRIPTION

School of Physics
Faculty of Science

Research Fellow in Numerical Cosmology

POSITION NO	3556708
CLASSIFICATION	Level A
SALARY	Level A: $87,266 - $118,416 p.a. (pro rata for part-time) (*PhD entry level $110,319 p.a.)
SUPERANNUATION	Employer contribution of 17%
WORKING HOURS	Full Time (1 FTE)
BASIS OF EMPLOYMENT	Fixed term for 2 years
OTHER BENEFITS	https://about.unimelb.edu.au/careers/staff-benefits
HOW TO APPLY	Online applications are preferred. Go to http://about.unimelb.edu.au/careers, select the relevant option ('Current Opportunities' or 'Jobs available to current staff'), then find the position by title or number.
CONTACT FOR ENQUIRIES ONLY	Dr. Hayley Macpherson Email hayley.macpherson@unimelb.edu.au *Please do not send your application to this contact*

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

Acknowledgement of Country

The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi Wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).

The University also acknowledges and is grateful to the Traditional Owners, Elders and Knowledge Holders of all Indigenous nations and clans who have been instrumental in our reconciliation journey.

We recognise the unique place held by Aboriginal and Torres Strait Islander peoples as the original owners and custodians of the lands and waterways across the Australian continent, with histories of continuous connection dating back more than 60,000 years. We also acknowledge their enduring cultural practices of caring for Country.

We pay respect to Elders past, present and future, and acknowledge the importance of Indigenous knowledge in the Academy. As a community of researchers, teachers, professional staff and students we are privileged to work and learn every day with Indigenous colleagues and partners.

Position Summary

The Astrophysics Group in the School of Physics at the University of Melbourne invites applications for a Postdoctoral Research Position in Numerical Cosmology, working with Dr Hayley Macpherson.

The position will provide the opportunity for a highly motivated postdoctoral researcher to make contributions to the field of inhomogeneous cosmology, making use of state-of-the-art numerical relativity simulations of large-scale structure formation. The successful applicant will investigate cosmological observables in a nonlinear general-relativistic framework, making comparisons to widely adopted gravitational approximations and determining their accuracy for future cosmological surveys. We are particularly interested in candidates with their own vision for the specific direction of study within numerical inhomogeneous cosmology, as well as those who intend to collaborate with other members of the Astrophysics Group or more broadly within the School of Physics. Potential directions include (but are not limited to) gravitational lensing, gravitational waves, local anisotropy of expansion, peculiar velocities, and/or numerical relativity code development.

We encourage applicants from under-represented groups, including Aboriginal and Torres Strait Islander people. To allow us to consider performance relative to opportunity, we also invite applicants to provide a brief statement (up to 1 page) that describes circumstances that may have affected their career development or progression, including career interruptions or delays, periods of part time work, or forms of bias they have experienced.

1. Key Responsibilities

As with all positions, career achievements will be interpreted relative to opportunity, including career disruptions due to caring responsibilities, time in industry, illness etc.

The position description should be read alongside Academic Career Benchmarks and Indicators. A level A academic is acquiring skills and building academic achievements (oriented towards the benchmarks).

1.1 RESEARCH AND RESEARCH TRAINING

The appointee will be expected to:

- You are expected to significantly contribute towards the research effort of the team and to develop your research expertise with an increasing degree of autonomy.
- Under the guidance and support of Senior Academic staff conduct internationally competitive research, resulting in publications in high impact journals.
- Contribute to and publish academic papers and other scholarly outputs to a high academic standard in accordance with the research expectations of the University of Melbourne
- Actively participate in research seminars and conferences to disseminate research findings as opportunities arise.
- Contribute to the preparation, or where appropriate individual preparation of research proposal submissions to internal or external funding bodies as relevant.
- Undertake administrative functions and obligations primarily connected with the staff member's area of research.
- Contribute to and assist in the co-supervision and training of research students primarily at undergraduate level.
- Engage with relevant professional and industry bodies and stakeholders to foster collaborative partnerships.

1.2 EDUCATION AND LEARNING

The appointee will be expected to:

- Contribute to teaching, training, scientific mentoring and supervision of students.
- Contribute to the effective supervision of junior research staff in the appointee's area of expertise.

1.3 LEADERSHIP AND SERVICE

The appointee will be expected to:

- Actively participate at School meetings and with guidance, contribute to planning activities or committee work to support capacity building in the School/discipline.
- Actively participate in activities within the School and Faculty to support Diversity and Inclusion.
- Contribute to, or present research to the public to elevate public awareness of educational and scientific developments and promote critical enquiry and public debate within the community where appropriate.
- Effective demonstration and promotion of University values including diversity and inclusion and high standards of ethics and integrity.
- Actively contribute to School activities such as Open day to promote student engagement.

1.4 OTHER DUTIES

The appointee will be expected to:

- Perform other tasks as requested by the supervisor or the Head of School
- Actively participate in the University Professional Development Framework

- 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.
- Occupational Health and Safety (OH&S) and Environmental Health and Safety (EH&S) responsibilities as outlined in section 4.

2. Selection Criteria

2.1 ESSENTIAL

- Completion (or near completion) of a PhD in physics, astrophysics or a related discipline
- Demonstrated experience in numerical cosmology or general relativity (broadly defined, e.g. simulations or numerical data analysis).
- A demonstrated aptitude for research, with a sound publication record in relevant areas, commensurate with experience and opportunities.
- Demonstrated ability to prepare research reports and manuscripts for publication.
- Strong evidence of ability and desire to build an academic research career trajectory.
- Excellent interpersonal and both written and oral communication skills in English.
- Excellent ability to work co-operatively and positively in a multi-disciplinary research-based team environment and liaise with people from diverse backgrounds.
- Demonstrated excellent organisational skills to meet deadlines and bring projects to a timely completion.
- Demonstrated ability to develop, administer and see through to completion appropriately designed research projects with limited supervision.

2.2 DESIRABLE

- An enthusiasm for research in cosmology and general relativity and a curiosity about the foundational aspects of physics.
- Expertise in high performance computing systems, handling of simulated data, and experience with Python, (modern) Fortran, C++, and/or related languages.
- Knowledge of theoretical cosmology and general relativity.
- The ability to attract external funding through grant or computing applications and/or support in funded joint projects with others internal or external to the university.
- Experience in assisting with supervision of students undertaking undergraduate or higher degree research projects.

2.3 OTHER JOB-RELATED INFORMATION

- Occasional work out of ordinary hours, travel, etc.
- This position requires the incumbent hold a current and valid Working with Children Check. The University of Melbourne is dedicated to safeguarding the welfare of all community members, especially those most vulnerable. As part of our commitment to child safety and in line with the Victorian Child Safe Standards, this position will be required to hold a valid Employee WWCC, regardless of where in the University an employee may work or what work they do.

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 Advancing Melbourne strategy that addresses 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 Advancing Melbourne.

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:

https://safety.unimelb.edu.au/people/community/responsibilities-of-personnel

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

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 https://about.unimelb.edu.au/strategy/governance

6. Strategy 2030: Resilience

As set out in the University of Melbourne's Strategy 2030, our purpose is to benefit society through the transformative impact of our education and research. This can only be achieved by building a resilient institution, empowering our people, and working toward shared ambitions.

Our aspiration for 2030 is to be a world-leading, globally connected Australia university with students at the heart of everything we do. Strategy 2030 provides a sharp focus to advance our shared ambitions and guide us through to 2030.

It elevates three core ambitions:

• Exceptional Education: Educating our outstanding students to thrive in complexity

• Transformational Research: Creating knowledge, fostering innovation and transforming lives

• Our Resilient University: Serving and connecting Country, people and community

The strategy identifies our University's distinctive capabilities including Indigenous scholarship, world-class curriculum, our diverse community and our global research networks and precincts.

Four focus areas for action guide decision-making and ensure the University is equipped for challenges ahead. These are: Empowering people and performance, Improving student experience, Partnering for impact and Leading with a future-focus.

For more information, visit https://about.unimelb.edu.au/strategy/strategy-2030

7. Other Information

7.1 SCHOOL OF PHYSICS

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 following ARC Centre of Excellence groups:

- ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS)
- ARC Centre of Excellence for Dark Matter Particle Physics
- ARC Centre of Excellence for Gravitational Wave Discovery
- ARC Centre of Excellence in All Sky Astrophysics
- ARC Centre of Excellence for Quantum Computation and Communication Technology (CQC^{2}T)

The School also plays a major role in the Australian Synchrotron research program, and in the development of the Stawell Underground Physics Laboratory.

Currently some 30 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 1 Thomas Baker Chair and Melbourne Laureate Professor, 2 ARC Future Fellows and 1 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 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.

7.2 FACULTY OF SCIENCE

www.science.unimelb.edu.au

Science at Melbourne is a global leader across discovery and applied scientific research and education. Science begins with curiosity, and we are dedicated to understanding the universe from the level of sub-atomic particles to the solar system. We aim to be leaders who positively impact the community locally and globally, addressing major societal issues from climate change to disease. Our discoveries help build an understanding of the world around us.

Our strength is our breadth of expertise. The Faculty is home to seven schools: Agriculture, Food & Ecosystem Sciences; BioSciences; Chemistry; Geography, Earth & Atmospheric Sciences; Mathematics & Statistics; Physics; and Melbourne Veterinary School.

The Faculty is also custodian of the Bio21 Molecular Science and Biotechnology Institute, Melbourne Energy Institute, Melbourne Biodiversity Institute, Oceania Institute, Office for Environmental Programs, Australian Mathematical Sciences Institute (AMSI) and the Indigenous Knowledge Institute and home to numerous Centres.

We are committed to the values of curiosity, excellence, impact and integrity. With deep disciplinary knowledge our faculty is uniquely positioned to take a globally leading role in understanding, exploring and shaping our world and humanity, within a truly comprehensive Faculty of Science.

We have more than 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. We aim to train students with the knowledge and intellectual flexibility to drive the industries of tomorrow and lead across all levels of society.

We offer a range of undergraduate, honours, graduate and research degrees, enrolling and supervising 15,500 undergraduates, 1,400 Master's students and over 1,000 PhD researchers in 2024.

We are dedicated to delivering transformative educational outcomes, underpinned by research, and an inclusive and inspiring student experience.

Excellence comes in many forms and diversity of thought, perspective and disciplines is essential to deliver globally leading science. At the core of our success is our focus on an inclusive environment for all in our community. Our Faculty's focus on equity, inclusion and belonging is grounded in our endeavour to ensure we are best placed to advance research, teaching and serve diverse national and global communities.

As a Science community we sit across five of the University's campuses – Parkville, Dookie, Burnley, Creswick and Werribee. This reach provides us with a unique perspective that is beneficial to our teaching and research. It also means we can offer our students a greater variety of learning experiences and internships to engage with industry partners to solve real-world issues.

7.3 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