Macquarie's physics and astronomy research is world leading. In the Excellence in Research for Australia (ERA) 2012 evaluation our physical sciences research received a rating of 5 out of 5 – ‘performance well above world standard’, as did our research in the sub-disciplines of astronomical and space sciences, and quantum physics.

Our scientists enjoy outstanding international collaborative links, and publish their research in high impact journals.

As an HDR candidate you will work alongside outstanding researchers on fundamental and applied physics in optics, photonics and lasers; astronomy and astrophysics; or quantum information science. Projects include:

- discovering exo-planets in the process of formation
- studying the impact that swallowed planets have on their dying stars
- building new powerful lasers with pure diamond crystals
- using nanoparticles to identify diseases
- constructing 3D quantum logic circuits using high-intensity femtosecond lasers
- designing new sensors based on levitated quantum mechanical systems
- harnessing the angular momentum of light at the quantum level

Macquarie physicists have partnered in successful commercial ventures leading to spinoff companies such as semiconductor producer BluGlass Ltd, and Laser Micromachining Solutions which provides micro-fabrication services to companies and universities across Australia.

Graduates from Macquarie have obtained academic, post-doctoral research, industry and government positions, making successful careers in Australia and internationally.
Highlights

• Macquarie is home to major nodes in the ARC Centre of Excellence for Ultrahigh-bandwidth Devices for Optical Systems, the ARC Centre of Excellence for Engineered Quantum Systems, and the OptoFab node of the Australian National Fabrication Facility.

• Strong collaborations with Australian Astronomy Observatory (AAO) and CSIRO Astronomy and Space Science.

• Macquarie is home to Future Fellows, Super Science Fellows, and Young Tall Poppy Science Award winners.

Support

HDR candidates are provided with strong academic and administrative support. This includes:

• Commencement and Completion programs
• Discipline-specific research training units, including workshops in research communication, presentation skills, academic writing skills, thesis planning, and poster preparation
• Experienced supervisors and department-based higher degree research directors
• Financial support for eligible candidates for a range of research-related activity
• Regular progress reports and interviews, and/or work-in-progress presentations in which research candidates receive feedback on their work from a panel of academics in their field

Research leaders

Macquarie is home to many internationally renowned researchers, including:

Professor Ewa Goldys, Professor Brian Orr and Professor Jim Piper are Fellows of the Optical Society of America.

Professor Quentin Parker, who leads the Research Centre for Astronomy, Astrophysics and Astrophotonics, now chairs the International Astronomical Union working group on sky-surveys.

Dr Peter Rohde and Associate Professor Gabriel Molina-Terriza have recently published in prestigious journals Science and Nature Physics.

Internationally competitive student travel awards for conferences in the US have recently been won by Jiangbo Zhao, Yiqing Lu and Ondrej Kitzler.

Candidates Jana Say, Robert Williams, Simon Gross and Tom Meany, and Dr Nem Jovanovic recently received awards at international conferences.