

Astrophysics

POSTGRADUATE STUDY AND RESEARCH

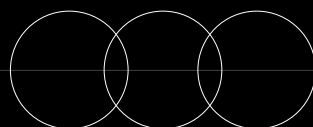


Liverpool Life

One of the most affordable and safest student cities in the UK, Liverpool is packed with attractions. There's a legendary music scene that's bigger than the Beatles; a city centre brimming with clubs, pubs, bars, restaurants and cafes; award-winning shopping facilities, museums, galleries and theatres, not to mention two Premier League football clubs, golf courses, beautiful parks and outstanding countryside just a short drive away.

Come to study in this magnificent city and you are guaranteed a second home for life.

And when it comes to exploring Liverpool, thanks to our numerous cultural partnerships, you'll have a host of opportunities to get involved with the city's arts scene during your studies. Whether it's listening to a classical concert in the newly refurbished Philharmonic Hall, watching a performance in the award-winning Everyman, or visiting Tate Liverpool in the Albert Dock, as an LJMU student you will have unprecedented access to world-class attractions.



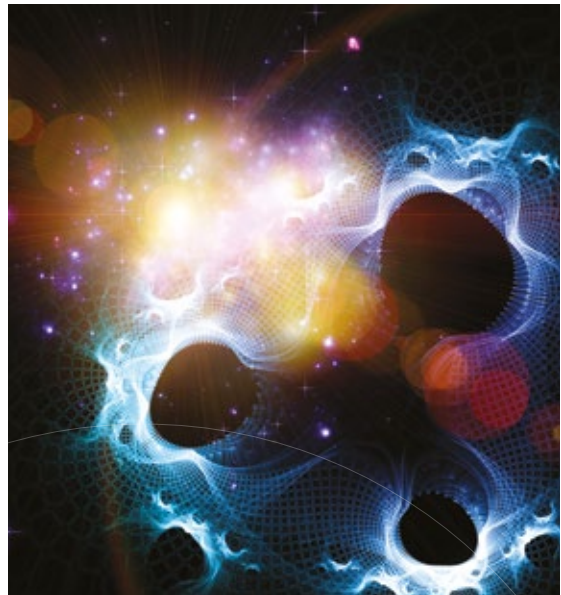
Welcome to LJMU's Astrophysics Research Institute

The Astrophysics Research Institute (ARI) is one of the world's leading authorities in astronomy and astrophysics. Its work encompasses a comprehensive programme of observational and theoretical research, telescope operation, instrument development, academic learning and outreach activities.

The ARI has been honoured with various awards and prizes including:

- A Queen's Anniversary Prize for the development of the world's largest fully robotic telescope plus an innovative educational programme (2005)
- The Times Higher award for Research Project of the Year for 'Measuring Gamma-Ray Bursts' (2007)
- The Royal Astronomical Society's 'Group Achievement Award' for work on 2-degree Field (2dF) Galaxy Redshift Survey (2008) (co-recipient)

The Institute also does a great deal of work in the community, with the National School's Observatory and Merseyside visitor attractions such as Spaceport - which attracts 100,000 paying customers a year.





Postgraduate study options

QUALIFICATIONS AVAILABLE

LJMU offers a wide range of taught and research programmes delivered by academics actively involved in innovative research and ground-breaking consultancy projects. Indeed, it is this combination of academic expertise and 'real world' experience that helps ensure our programmes: are up-to-date, accredited by key professional bodies and deliver the knowledge, skills and experience required to achieve your professional ambitions.

Postgraduate Certificates (PgCert) and Diplomas (PgDip)

- can act as stand-alone professional qualifications
- can mark interim achievements en route to a full (taught) masters qualification

The Postgraduate Certificate or Diploma in Education (PGDE or PGCE)

- offers a route into teaching for those with an undergraduate degree
- focuses on developing teaching skills

Taught Masters (MA, MSc, MBA)

- builds on undergraduate knowledge and skills
- can be studied 12 months full-time, with a two year part-time option often available
- often enables you to select specialist optional modules based on your own interests
- involves a dissertation
- sometimes available for those with little/no academic experience in the subject area

Master of Research (MRes)

- focuses on individual research project work
- ideal if you want to pursue a research career
- provides you with an academic mentor who will become your Director of Studies should you progress to a PhD programme

MPhil

- focuses on using appropriate research methods and techniques to conduct an independent enquiry
- can be completed in one to four years, depending if you are a full or part-time student

Doctorate or PhD

- focuses on making an original, personal contribution to the understanding of a problem, the advancement of knowledge or the generation of new ideas
- takes between three and six years to complete, depending on your mode of study

Leading the way in education

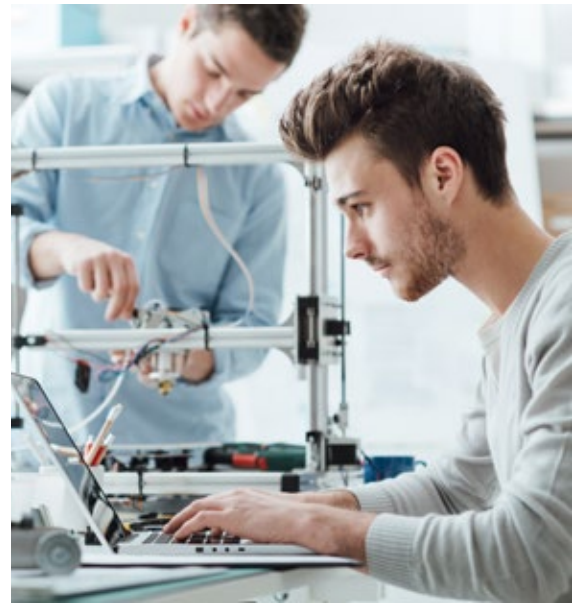
In 2016, LJMU became the first university to receive two commended judgements in the Higher Education Review by the Quality Assurance Agency (QAA).

All UK universities undergo a rigorous independent review by the QAA to check that they meet set standards. Our review saw us far exceeding the criteria, being commended for the quality and enhancement of our student learning opportunities and being praised for nine other areas of good practice.

The benefits of studying at LJMU were clearly outlined by the QAA. The report commented on our:

- provision of clear expectations for students
- curriculum enhancing placements
- continual development of teaching staff
- work, enabling students to reach their graduate potential
- programme monitoring and improvement processes
- ability to collect and act on student feedback
- identification of enhancement opportunities for students
- strengthening collaborative partnerships
- partnerships with postgraduate research students

This ground-breaking result means that, as a future student, you can have total confidence that LJMU delivers an exceptional learning experience and ranks amongst the very best in the UK.



Why study at LJMU?



A global university

LJMU is a global university, welcoming students and staff from over 100 different countries and working in collaboration with businesses, professional bodies and educational institutions from all over the world.

We offer students and staff exciting opportunities to work, train or study overseas, encouraging them to embrace international employment opportunities. Our appetite for collaboration has created huge success and inspired our graduates to see beyond national boundaries and cultural traditions.

Excellent facilities

In 2004, LJMU designed and built the Liverpool Telescope, one of the world's largest and most sophisticated ground-based robotic telescopes. Since then, the ARI has played an instrumental role in the development of a global network of robotic telescopes that have helped to revolutionise the study of astronomy.

The two metre Liverpool telescope is situated on an extinct volcano at the Observatorio del Roque de Los Muchachos in the Canarian island of La Palma. Thanks to its unique combination of rapid slew speed, robotic control software and purpose-built instrumentation, the telescope can respond quickly to transient events, such as gamma ray bursts - the brightest electromagnetic events known to occur in the universe.

The ARI is now scoping out the technical requirements and scientific goals for the New Robotic Telescope or NRT. This will build on the Institute's existing success in the field of 'time domain astronomy', which covers observations of astronomical objects that change in brightness or position over time e.g. near-Earth objects such as asteroids, cosmic explosions such as supernovae, and extrasolar planets.

The Liverpool Telescope has had a phenomenal impact on research, public understanding and public engagement with science through the National School Observatory (NSO).

The NSO enables schools in the UK and Ireland to request observations from the Liverpool Telescope. It has around 3,000 registered schools, with over 11,600 teachers and pupils benefitting from free and full access to its facilities.

Employment Opportunities

The Faculty of Engineering and Technology has an excellent employability record. Indeed, the number of postgraduates in professional and management positions six months after graduation stood at an impressive 95% in 2015.

First class learning resources

LJMU has three libraries: the Aldham Robarts library at the Mount Pleasant Campus, the Avril Robarts library in the City Centre and the IM Marsh library.

A hub for all front-line student services, our libraries are the place to: register and enrol, hand in your coursework, pay fees and get guidance on anything related to the student experience. All libraries have WiFi so you can work on your own device, borrow a laptop or book a PC. You can also book a space to work quietly with friends and can print, copy and scan items here too.

In essence, our libraries offer:

- 2,000 study spaces - including designated postgraduate areas for when you need some quiet time to focus and meeting areas so you can collaborate in groups
- helpful and friendly academic liaison librarians for each Department/Faculty
- Wi-Fi access
- networked PCs and access to 2000+ applications
- laptops you can borrow when you need to be out and about
- helpdesk and induction sessions to familiarise yourself with the resources and facilities available
- a user-friendly search engine to search more than 820,000 items including 650,000 printed resources, 129,000 e-Books, 45,000 electronic journal titles, online newspapers, legal databases, company journals and special collections

World-leading research

In 2014, an amazing 99% of LJMU physics-related research submitted for the REF was classed as world-leading or internationally important. This research is divided into:

- Star formation and stellar populations
- Galaxy formation and evolution
- Computational galaxy formation
- Time domain astrophysics (particularly novae, supernovae and gamma-ray bursts)
- Astronomical instrumentation

LJMU's Astrophysics Research Institute has formal partnerships with several major international projects including: CTA gamma-ray observatory, LIGO-Virgo gravity wave experiments, Euclid, Sloan IV Digital Sky Survey project, WEAVE on the William Herschel Telescope, LOFAR and the LSST.

Research is underpinned by external grant funding, including the STFC for science exploitation. ARI staff also have access to the 2m Faulkes Telescopes in Hawaii and Australia and the 2.4m Yunnan Telescope in China.

In 2008, Institute staff led the development of the ASTRONET Infrastructure Roadmap for the future of European astronomy on behalf of STFC and other European funding agencies. They continue to serve on national and international committees and panels of the Research Councils and other bodies.

“I would encourage anyone to come to LJMU to study at postgraduate level.”

Mature student, Catherine Gadd

Our people

Our academics have the specialist knowledge and industry insight to make a real difference to your future. Here are just some of the tutors based in the Astrophysics Research Institute.



PROF PHILIP JAMES

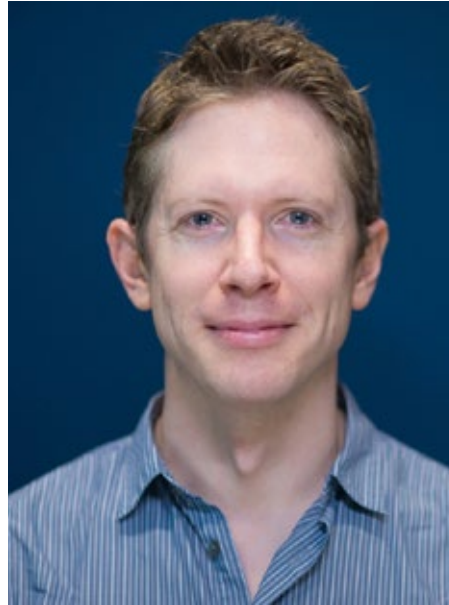
Astrophysics/Observational Astrophysics

“I encourage students to ask questions, no matter how basic or naïve they may seem. Every so often a question from a student will contain or point to an important truth.”

With a PhD in Astrophysics from Imperial College London and research postings at the Royal Observatory in Edinburgh and the University of Hawaii in Honolulu, Professor Philip James has spent more than a year observing the night skies at mountain-top observatories in the Canaries, Hawaii and South Africa.

Specialising initially in spiral and dwarf galaxies and latterly in supernovae, Phil has written and contributed to a large number of publications. He considers one of the most enjoyable aspects of his role to be supervising MSc and PhD project students as they begin their research.

Outside of academia, Phil has a US private pilot's licence for glider flying and used to be a keen hang-glider pilot, flying in the UK, France and Spain.



DR MATT DARNLEY

Astrophysics

“I enjoy linking the research I carry out with the teaching I deliver - particularly on the Time Domain Astronomy module.”

With an undergraduate degree in physics from the University of Oxford (Lincoln College) and a PhD in astrophysics from LJMU, Matt has been working as a senior lecturer at LJMU for over 10 years. He has recently become a Reader in Time Domain Astrophysics.

His research interests include: time domain astronomy; explosive transients, including novae and their link to Type Ia supernovae; luminous red novae; extragalactic microlensing; observational astronomy and hydrodynamic modelling. He has published widely in these areas.

Outside of academia, Matt is a strong middle/long distance runner.

“The Astrophysics Research Institute inspires and stimulates people of all ages through its world-leading research.”



WHAT OUR STUDENTS THINK...

Graduating with a BSc in Natural Sciences from the Open University, Andrew Hanson decided to study for a masters in Astrophysics, fitting his education around his family life and his work as a senior manager in the health service.

“This unique programme for distance learning students plugged a much-

needed gap for those wanting to go on to postgraduate study.

For distance learning programmes there isn't usually a lot of direct interaction with other students and staff but the team at LJMU has been good at trying to bridge this and I have had support from the tutors and teams delivering each module.

The modules themselves have been very well delivered and supported with examples and further reading from current research. I particularly enjoyed the novae and supernovae portions of the time-domain module which were incredibly in-depth.”

Astrophysics

MSc

Open to international students

Offering access to research-class facilities and expertise, this MSc in Astrophysics is delivered by world-leading experts and designed to facilitate further postgraduate study.

Why study this course at LJMU?

Astrophysics is enjoying an unprecedented burst of new discoveries and, as a result of revolutionary techniques, new opportunities are emerging to explore planets, stars, galaxies and the entire Universe. LJMU's Astrophysics Research Institute has played a leading role in many of these advances and our programme offers you the chance to benefit from our expertise and further your academic career in this exciting and dynamic field.

This distance-learning MSc will give you the foundations from which to carry out further research through a PhD or equivalent. Each programme module provides you with the opportunity to explore current literature, with support from experienced tutors, all of whom are engaged in cutting-edge research. You will develop high-level skills in: computing, accessing and manipulating complex data from large databases, assimilating information from research literature and scientific writing.

Many research topics on the course involve observational studies, which can be supported by access to the Liverpool Telescope, a two metre aperture research-quality robotic telescope, designed and built by LJMU experts and sited on La Palma in the Canary Islands. The robotic nature of the telescope means that you interact with it via a computer interface, giving unrivalled flexibility for studying rapidly changing objects in the night sky.

You will study the following modules:

- Astrophysical Concepts
- Astrophysics Project
- Observational Astrophysics

Optional modules are also available covering topics such as:

- Cosmology
- Computational Astrophysics
- Time-Domain Astrophysics

Teaching and assessment

Programme assessment is via a combination of online progress tests, written assignments, formal written exams, project reports, the dissertation and oral presentations.

The research project and dissertation are examined by a written report and an oral presentation/interview. In most cases the interviews are via video link, though you may opt to come to Liverpool to do this in person.

Graduate employment

This programme is particularly focused on preparing you for a research career in astronomy, astrophysics, space science or related disciplines. In these areas, entry to top-level research is almost always via the PhD route, and it is anticipated that most students will be interested in further study at PhD level and beyond.

The ARI has a long-standing and healthy PhD programme, and we are well-placed to help you in applying for PhD places on our own programme and in other institutions world-wide.

“Both carrying out new research to discover new things about the Universe and the wealth of friendly, knowledgeable and experienced academics at LJMU are real highlights of my time here.”

Claire Burke,
Astrophysics Research Institute

Distance Learning. Study full-time over one year or part-time over two years

Entry Requirements:

Minimum 2:2 in physical sciences or a STEM subject, degree level physics knowledge and competence in maths techniques plus a reference. Non-standard applications are welcome.

IELTS 6.5 (minimum 5.5 in each component) or equivalent.

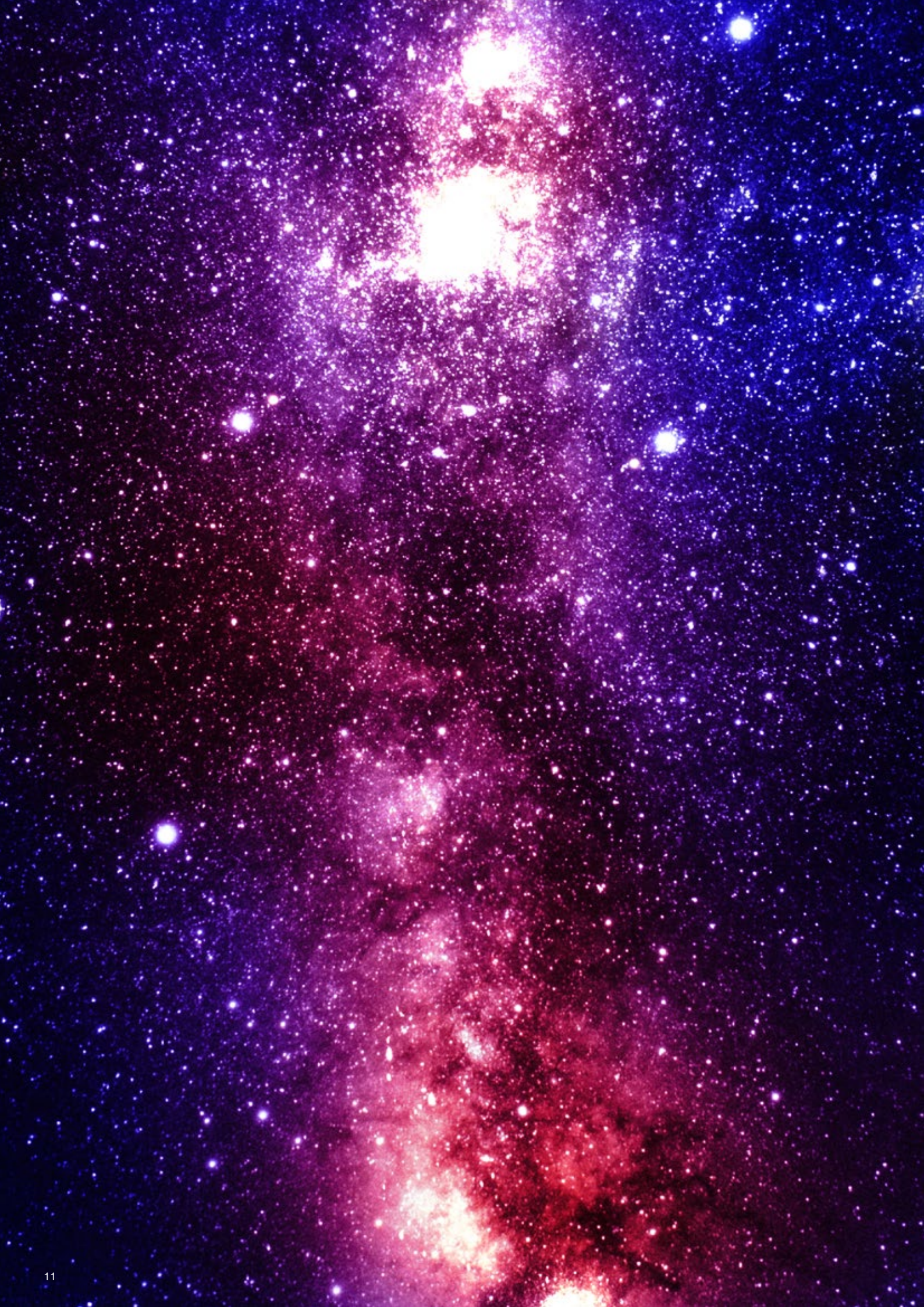
Fees:

See website for details.

Programme Leader:

Prof Phil James P.A.James@ljmu.ac.uk







This innovative MSc in Observational Astrophysics is delivered by world leading academics. It provides access to LJMU's research class robotic Liverpool Telescope and is designed as a route to PhD study.

Why study this course at LJMU?

This masters has been developed to enable students, throughout the world, to share in new discoveries about the universe we live in.

The programme is ideal if you have a strong background in mathematics and a good knowledge of basic physics at degree level. Entry to top-level research in this field is almost always via the PhD route, and it is anticipated that most of the students taking this MSc will be interested in further study at PhD level and beyond.

The programme emphasises independent student learning and each module provides you with the opportunity to explore current literature, with support from experienced tutors, all of whom are engaged in cutting-edge astrophysical research.

All learning materials are delivered by Blackboard, LJMU's Virtual Learning Environment, and you will have access to all major astrophysical research journals and a carefully selected range of e-books to support your studies and extend your reading.

During your studies you will be able to access the Liverpool Telescope, one of the world's largest robotic telescopes, which was designed, built and is now owned and operated by LJMU. Over the last decade, this has become one of the most flexible and powerful observatories for the study of rapidly varying sources such as gamma-ray bursts, novae and supernovae.

Teaching and assessment

You will be tested via a combination of online progress tests, written assignments, formal written exams, project reports and oral presentations. Most taught modules include a written exam.

The research project and dissertation includes a written report and an oral presentation/interview. In most cases interviews are carried out via video link, although you may opt to come to Liverpool to do these in person.

Graduate employment

This Observational Astrophysics MSc programme is focused on preparing you for a research career in astronomy, astrophysics, space science or related disciplines.

The MSc also provides key transferable skills in: computing, accessing and manipulating complex data from large databases, assimilating information from research literature, and scientific writing. These skills are vital for a broad range of careers in academic and industrial research.



Distance learning. Study full-time over one year or part-time over two years

Entry Requirements:

Minimum 2:2 in physical sciences or a STEM subject, degree level physics knowledge and competence in maths techniques plus a reference. Non-standard applications are welcome.

IELTS 6.5 (minimum 5.5 in each component) or equivalent.

Fees:

See website for details.

Programme Leader:

Prof Phil James P.A.James@ljmu.ac.uk

You will study the following modules:

- Astrophysical Concepts
- Observational Astrophysics
- Time-Domain Astrophysics
- Observational Astrophysics Project

Optional modules are also available covering topics such as:

- Cosmology
- Computational Astrophysics

Research opportunities

Work alongside leading researchers, using world-class telescopes and other facilities when you study for an MPhil/PhD full or part-time over 12-48 months.

The ARI has a proud history of innovation in teaching, research and student support. We offer you the opportunity to join a thriving postgraduate research community, with dedicated expert supervision and support, where both home and international students can flourish.

We welcome applications for doctoral research in:

- star formation and stellar populations
- galaxy formation and evolution
- computational galaxy formation
- time-domain astrophysics (particularly novae, supernovae and gamma ray bursts)
- astronomical instrumentation

For more information
please visit:
ljmu.ac.uk/research



Student support

All LJMU students have access to a wealth of support services to make your time with us as happy and fulfilling as possible.

Counselling and mental health

Our free service offers one-to-one and group counselling sessions, as well as mental health guidance and support.

Disability

We have disability co-ordinators in every academic School and an on-site assessment room for those with additional needs.

English language support for international students

We provide pre-sessional English courses for those whose language capability does not meet entry requirements. See ljmu.ac.uk/isc for more details.

Funding

Our team provide information on postgraduate funding including loans, grants and bursaries as well as offering guidance on budgeting and money management.

Spiritual support

Confidential, non-judgemental pastoral care and support is available for students of all beliefs and backgrounds. We have facilities for quiet meditation, prayer and contemplation on each campus, as well as dedicated space for Muslim prayers.

Student advice and wellbeing

Our team offer advice and guidance on issues ranging from health to accommodation and childcare.

Study skills

Workshops are available on various aspects of postgraduate study, including academic writing, effective reading skills, exam and revision skills, report writing and IT skills.

Support for international students

As well as a 'meet and greet' service when you arrive in the UK, our international team will help with issues such as your visa, setting up a UK bank account and an email address and registering with the police, contact: international@ljmu.ac.uk

“In my opinion the support on offer is one of the main benefits of studying at LJMU.”

Stephen Smith, LJMU student



Career guidance

Research shows that postgraduates earn, on average, 24% more than those with an undergraduate degree.

Postgraduate study at LJMU is geared towards meeting the needs of employers and an impressive 96% of our postgraduates are in work or further study six months after graduation.*

Develop the skills you need

We offer an exceptional careers support service which enables you to demonstrate to potential employers that you have the skills and experience they are looking for.

Additional support

Our careers centre runs regular workshops and webinars covering topics such as CV writing, application forms, interviews, assessment centres, psychometric testing and more. Our Faculty careers zones at Byrom Street, IM Marsh and the Aldham Robarts library host regular employer visits where you can meet, network and discuss career opportunities.

Careers support for postgraduate researchers

Catering for the specific needs of Postgraduate researchers, our three month 'Your Career, Your Choice' programme enables you to complete up to 12 interactive workshops. You will receive one-to-one career coaching as well as developing practical skills in writing impactful CVs, job hunting, preparing for interviews and creating an online profile.

Entrepreneurship

If you have ambitions to be your own boss or work freelance, expert help is available from our Centre for Entrepreneurship. As well as providing mentoring services, the Centre helps entrepreneurs to achieve key milestones by offering advice on a wide range of topics including access to funding.

**HESA 2016*



“My studies at LJMU and the help I have received from the careers team have given me the confidence to go out and work in industry, applying the knowledge and skills I have gained at LJMU.”

Omer Chiyoyo Kamwena, LJMU student



Accommodation

All new LJMU students are guaranteed a room endorsed by the University no matter what your level of study.

For further details of University endorsed accommodation, go to:
ljmu.ac.uk/postgraduate/accommodation

For details of private rental accommodation go to:
liverpoolstudenthomes.org.uk

Funding your studies

An annual tuition fee is payable for all postgraduate courses, either in full at the beginning of the academic year or in instalments throughout the year.

For details of full and part-time annual tuition fees, please see individual programme factfiles. You can search for your specific programme at ljmu.ac.uk/courses/postgraduate

For information about loans, scholarships and bursaries to fund your postgraduate study, go to: ljmu.ac.uk/postgraduate-funding

LJMU graduates will also find details of the 20% tuition fee reduction here.



**Astrophysics Research
Institute**

Byrom Street, Liverpool, L3 3AF

T: 0151 231 2777

E: fetadmissions@ljmu.ac.uk

W: ljmu.ac.uk



@LJMUFET



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