

I have been fascinated by science for as long as I can remember. I explored various disciplines during my undergraduate studies, including evolutionary biology, biophysics, optical physics, and astronomy. Astronomy stood out to me as a nice amalgamation of all physics disciplines while offering ample room for imagination. Plus, who doesn't like beautiful astronomy images!

Dr Anshu Gupta
ASTRO 3D Research Fellow, Curtin University



I faced a tough decision between civil engineering, politics, and astrophysics for my career, but ultimately, I was drawn to astrophysics. Even though physics was my weakest subject in school, and studying it at university was not always easy, it fascinates me the most! I enjoy exploring our world and our cosmos through experiments and observations and using maths and logic to advance our understanding.

Dr Sven Buder
ASTRO 3D Early Career Researcher, Australian National University



As a child, I was fascinated by the Milky Way and knew I wanted to become a scientist. After studying art in secondary school, I majored in physics and mathematics in university, pursued a career in digital marketing, and later studied more maths, particularly statistics (Yes, I love maths!). Now, I'm doing a PhD in astrophysics, applying my statistical knowledge to study gravitational waves. I have come full circle!

PhD student Valentina Di Marco
OzGrav, Monash University



You have an edge if you've done a PhD in astronomy. You have a different understanding of data. Ultimately, learning about algorithms is easy, but learning about data interpretation and interpreting your results is a challenge, and it's something that astronomy PhD students have mastered.

Dr Rob Bassett
Machine Learning Engineer



Astronomy as a career is very rare. Astronomers wear multiple hats. It's a very hardcore science, and it allows you to do very deep work and deep thinking, which gives you the skills to learn anything that is new in the wild of our industry world.

Dr Tiantian Yuan
Principal Data Scientist - Client Lead, Space Tech



You've proven that you know how to learn, that you can learn rapidly. You can handle tasks that have no clear end point. That's useful for a lot of places!

Dr Pascal Elahi
Supercomputing Applications Specialist



ASTRONOMY & ASTROPHYSICS

LAUNCH YOUR CAREER IN MANY DIRECTIONS

Astrophysicists use telescopes and other observational instruments to gather data about the Universe.

They collaborate with other scientists, and apply mathematics, and other sciences to interpret their observations.



WHERE CAN I FIND MORE INFORMATION?

- Astronomical Society of Australia <https://asa.astronomy.org.au>
- Where to with Physics <https://wheretowithphysics.org.au>
- Australian universities that offer astronomy and astrophysics as a study program. Some may also offer Year 10-12 work experience programs.
- Your school's career advisor.



WHAT ARE ASTRONOMY AND ASTROPHYSICS?

Astronomy and astrophysics are essentially the same and the terms 'astronomy' and 'astrophysics', and 'astronomer' and 'astrophysicist' are often used interchangeably. They comprise a field of science that focuses on the study of:

- celestial objects and phenomena like stars, planets, galaxies and black holes
- the structure and evolution of the Universe
- the fundamental laws of physics governing the cosmos.

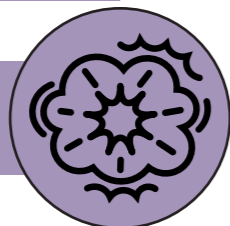
WHAT KNOWLEDGE AND SKILLS WILL STUDYING ASTROPHYSICS GIVE ME?

Whether you pursue a career in astrophysics or move into other fields, the skills gained through studying astrophysics are highly transferable and valuable. Many astrophysicists find fulfilling careers in universities, research institutions, space agencies, science communication, data science, and technology industries...just to name a few.

Knowledge

Skills

Big Bang theory and the expanding Universe



Mathematical, computer programming and analytical skills to model and interpret large data sets

Observational techniques – radio, optical, x-ray, infrared, gamma-ray



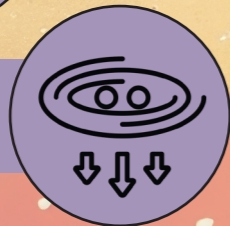
Critical thinking to evaluate theories and observations

Cosmology



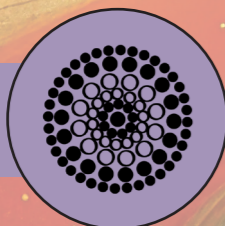
Research skills to conduct independent research, gather and analyse data

Planetary systems, stellar physics and galaxies



Communication skills – writing research papers, giving presentations, engaging with the public

Dark matter, dark energy and gravitational waves



Indigenous astronomy and archaeoastronomy



Using advanced technologies, including telescopes, detectors and computational tools (supercomputers)

Astrochemistry and astrobiology

WHAT TYPES OF JOBS CAN I DO IF I STUDY ASTROPHYSICS?

Astrophysics is a highly versatile degree that can prepare you for many different jobs in Australia and overseas. The higher your qualification, the more senior the job you can apply for, whether in universities or industry.

In a university or research organisation

Being a professional astrophysicist is an intellectually challenging and rewarding career. After completing a PhD, those seeking to work in a university doing research continue into postdoctoral research contracts and then, in time, hope to secure a permanent (or tenured) position.

Branches of Astrophysics



Observational astrophysicists collect and analyse data using radio, optical and space-based telescopes. Many telescopes are automated and operated remotely from the comfort of an office.



Theoretical astrophysicists use computers and supercomputers to develop mathematical models and frameworks to explore and test astrophysical processes.



Instrumental astrophysicists design accessories (e.g., spectrographs) to extend the versatility of telescopes.

In industry

Astrophysics graduates are multi-skilled and highly sought after.

They get jobs in:

- data science and analytics
- climate modelling
- biomedical research and imaging
- renewable energy
- technology and software development
- financial modelling
- space agencies and defence
- Artificial intelligence (AI) and machine learning
- Science communication
- Science education

STUDY PATHWAYS

Secondary School Year 11 and 12

Core: Physics & higher level Mathematics**

Electives: Coding & Engineering

University undergraduate degree 3 years

Bachelor of Science (Physics major)

Core: Physics & Mathematics

Electives (suggested): Computer Science, Astronomy & Astrophysics

Industry

Graduate entry/junior level

4th year Honours

Specialisation in Astrophysics or Physics

Research project and/or coursework

University postgraduate degree

Masters in Astrophysics 2 years

Research project and coursework

Industry

Graduate entry/junior management level

University postgraduate degree

PhD - 3/4 years

Substantial piece of original research presented as a thesis

Professional astrophysicist

Academic researcher and teacher in a university/observatory

Industry

More senior entry depending on years of experience

**To be as prepared as possible for university study, you are recommended, as a minimum, to take Mathematical Methods (or equivalent) in Years 11 and 12. If you are comfortable taking Specialist Maths, you will find this helpful. There are other pathways if you need the prerequisite maths skills.

IN BRIEF

In Years 11 and 12, study physics and high-level mathematics.

To study astrophysics at university, enrol in a Bachelor of Science degree with a major in physics. Choose astrophysics electives, as well as research project units. Learn to code.

Studying astrophysics equips you with a range of skills beneficial for a career in astrophysics and a range of other professions.

Astrophysics graduates are highly sought after in data science, climate, biomedical, energy, technology, finance and space industries.