



# SPACE

## awareness

### WHO IS AN ASTRONOMER?

**Field** Astronomy  
**Type** Research  
**Level of study** PhD





## What is the field about?

Astronomer is one of the oldest professions in sciences. For centuries people have been admiring the beauty of the night sky, wishing to learn what the stars and other celestial objects are, and how the Universe “works”. Astronomers are time travellers – they look way back in time, when the Universe was born. They observe light coming from stars, planetary systems and galaxies which have been just formed for us, on Earth. But in reality, it takes so much time for the light to reach us on Earth, that by the time it does, some of those objects may not exist anymore.

Astronomers attempt to understand the behaviour of matter, study conditions that exist only in space and cannot be found on Earth, and discover the particles involved in those processes. In order to do this, astronomers carry out research, both theoretical and practical. They create theories and perform experiments and observations which complement each other. Researchers build computational models which are mathematical models based on theoretical equations, that enable to simulate and visualize the behaviour of complex systems and study physical processes by analysing different parameters. Using models, astronomers can simulate, for example, the Martian atmosphere or interaction between an exoplanet and its parenting star.

## What would I do every day?

It is not a secret that astronomers no longer watch stellar objects by looking through an eye-piece of the telescope. Instead, they use high-tech equipment like powerful supercomputers and top-notch digital cameras to gather huge amount of data, which could be, for example, a set of images or graphs. They analyse data sets and come up with a theory or a model for interpretation of the physical processes.

## How much and what do I need to study?

Physics, math, chemistry and programming – these are four “whales” of education which will lead you to the stars! Since a career in astronomy is based on deep research, most astronomers have a doctoral degree (PhD), in astronomy, physics or a similar field. The duration for PhD studies can vary depending on the country, but usually it takes 4-5 years to complete this level of education.

Another side of an astronomer’s career is connected to communicating results of his/her work and exchange ideas with fellow professionals. Since an astronomer’s community is international, you have to master the English language in order to be involved in international collaborations. Psychology and social skills must be present in a list of subjects for the future astronomer. Knowing how to interact with people and teach are must-have skills for a future astronomer.

## Where can I work?

The doors of observatories, laboratories and private industry institutions are open to astronomers. You can also proceed with a career in academia by working as a postdoctoral researcher (postdoc) and, later on, as a professor in a number of departments, such as Department of Physics, Mathematics, Natural Sciences and many more. However, in the first stage of an academic career you should be prepared to have short-term contracts (1 or 2 years) and moving to different institutions and even countries.

## This is the job for me, if...

If you have an analytical mind-set and you have an eye for small details, while being able to connect these into a big picture.

### **An astronomer should be:**

**Good in communication (both written and spoken)** - you are able to explain complex theories and data sets in a simple way for the general public as well as present results to professionals in the field of astronomy at a conference or give a lecture to students. Public speaking skills will give you a big advantage and will facilitate visibility for your research and interest to more people. When applying for grants or booking observational time at a telescope, a clear explanation of your ideas and motivation will result in obtaining financial support for your studies.

**Willing to travel** – there are numerous astronomical observatories all around the world where you can apply for observational time. Observatories are usually located outside big cities, far away from light pollution. Sometimes you will have to travel to exotic and at the same time remote places where observatories are located, such as on top of a mountain or in desert.

**Motivated** – astronomers usually carry out long, mostly night-time observations. But there is a possibility that the quality or/and quantity of data you get might not be enough, and you will need to start everything all over again. If you’re motivated enough, you will get used to the astronomical “routine”, and afterwards you will realize that everything you’ve done is absolutely worthwhile as you are on the right track to reveal the secrets of the Universe!

## Learn more about an astronomer's work by:

- Watching the video “24 hours in the life of an ESO astronomer”

- Taking a look at the list of Astronomical Observatories

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**Image:** A panoramic view of the Milky Way above the ESO's La Silla Observatory in Chile

**Credit:** P. Horálek/ESO



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