



# SPACE

awareness

## WHO IS AN ASTROCHEMIST?

Field Astrochemistry  
Type Research  
Level of study PhD

## What is it about?

Astrochemists are part Astronomers and part Chemists. They intensely study the periodic table — but within the context of space rather than of Earth. As an Astrochemist, you don't only observe stars, but you also examine, analyze, and dissect them. Astrochemists take a much closer look and study the different aspects of all the fascinating objects in the universe on a molecular level in hopes to answer questions how they were formed.

They study the chemical composition - mostly molecules and ions - that exists in outer space, including those that make up the gaseous matter of future stars, suns, and even whole solar systems. Some of those chemicals, like hydrogen, also exist on earth. Others exist only in space. All, however, have a role to play in the composition of the universe, and it's your mission as an Astrochemist to figure out what that role is.

## What would I do every day?

Astrochemists use radio telescopes to detect the electromagnetic radiation that's given off by objects in space. By detecting infrared, ultraviolet, gamma, and radio waves, you can establish what substances are in space and in what quantities, which—combined with information from Astronauts, Astrophysicists, and even Meteorologists begin to tell the story of how the universe was made. They use theoretical models as well as computer visualizations to help them explain their observations in terms of known physical and chemical principles. In this way they study the origins of extraterrestrial bodies and the chemical processes that have shaped their present forms.

## Where can I work?

Astrochemists are employed by universities, planetariums, museums, research institutes, and government agencies. Because this is such a small field, and because many projects require international collaborations, persons wishing to pursue astrochemistry as a career should be willing to consider traveling or living abroad.

Astrochemistry is a relatively new interdisciplinary vocation, and the field is growing; however, demand is still small compared with other occupations. Several sources note that, although there seem to be enough astronomy postdoctoral positions to go around, finding a permanent job is difficult. Because most positions rely on some form of government funding, budget cuts and freezes may affect the number and types of positions available in EU.

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

Astrochemists require a solid background in chemistry, astrophysics or a related scientific field and an understanding of data analysis. Most positions are research-oriented and require a Ph.D. and additional experience in a field of specialization such as geosciences, physics, mathematics, or chemical biology. This cross-disciplinary background is especially helpful when collaborating with colleagues in other areas of expertise. Work with observational instruments requires at least a Bachelor's Degree in Engineering, Radio Physics or similar. In order to model physical processes you have to be a top-notch specialist in programming and have a strong background in theoretical physics, astrophysics and mathematics.

## This is a job for me if...

An astrochemist must understand the underlying principles of data analysis and simulations to set up conditions and parameters and to ensure that the results are meaningful and properly interpreted. This requires patience, logical thinking, precision, and attention to detail.

Because astrochemistry is a research-oriented field, astrochemists must maintain a keen curiosity and a drive to discover new knowledge. They must stay current on new technologies and scientific findings that can help them further with their research, and they must use creative thinking to solve complex problems in innovative ways. Most astrochemists share these traits:

**Logical Thinker:** You take a step-by-step approach to analyze information and solve problems.

**Detail Oriented:** You pay close attention to all the little details.

**Trustworthy:** You are known for your personal integrity and honesty.

## Learn more about what an astrochemist does with Anita Dawes

*Image: Large Magellanic Cloud galaxy in infrared light* **Credit: ESA/NASA/JPL-Caltech/STScI**



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