

# Williamina Fleming

## Biography

In 1879, Williamina Fleming found herself pregnant and alone in Boston, Massachusetts, at the age of just 23. The year before, she had worked as a teacher before emigrating from Scotland with her then husband in search of a new life. However the relationship had unexpectedly ended, leaving her facing the prospect of being a single parent in an unfamiliar country, with no money and nowhere to live.

Fleming applied for a job as a maid and housekeeper at the house of Edward Pickering, who was a professor of astronomy and director of the Harvard College Observatory. Pickering was impressed by the aptitude of Fleming, and soon offered her a job as an assistant at the observatory.



*'The Harvard Computers' - The group of women who worked as 'computers' for Edward Charles Pickering.  
Image Credit: Harvard College Observatory*

At the time, one of the observatory's main functions was photographing and cataloguing stars. Fleming's job at this time was to examine spectra of stars – which are the breakdown of the light from stars – and examining these spectra is still to this day the best way of understanding what elements are contained within any star.

Fleming examined thousands of these spectra and developed a new system of categorising stars based on their hydrogen content. While it has evolved since then as observational techniques have improved, even today Fleming's work still underpins the ways in which stars are grouped.



In addition to her innovative categorising techniques, Fleming also discovered many astronomical objects. Some of the most notable were the Horsehead Nebula, an impressive star forming region in the shape of, you guessed it, a horse head. She also discovered over 300 pulsating variable stars, which are crucial in determining distances to other galaxies in our Universe. Finally, she was the first to discover white dwarfs, which are the immensely dense and very small remains of stars at the end of their lives.

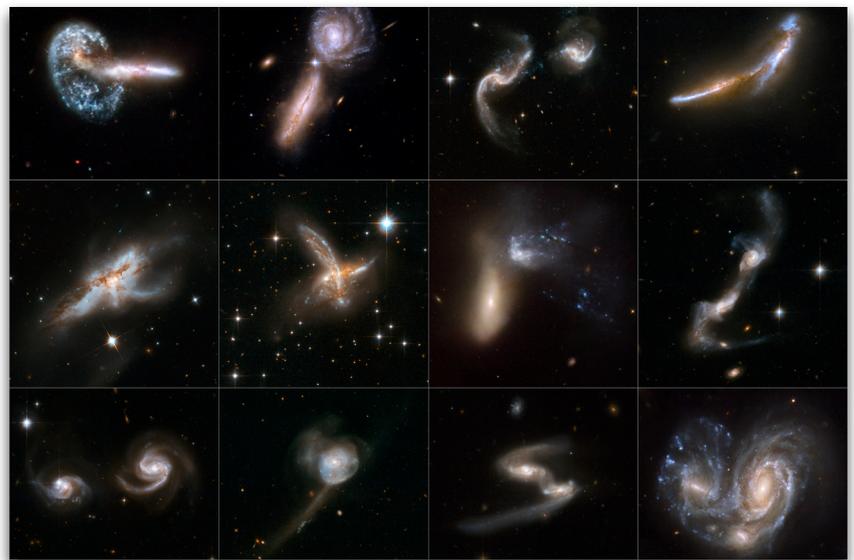
**Despite her challenging early life, a lot of what we know about the night sky is due to Williamina Fleming's persistent drive to discover and understand the Universe.**

*The Horsehead Nebula  
Image credit: Ken Crawford <http://www.imagingdeepsky.com/Nebulae/Horsehead/Horsehead.htm>*

## Galaxy Classification Activity

One of Williamina Fleming's main roles was categorising stars. Sorting out all the pictures and information astronomers get from their telescopes is still one of the most important ways discoveries are made.

You can have a go at sorting images of galaxies through the exciting citizen science project, Galaxy Zoo.



*GalaxyZoo  
Image credit: NASA & ESA*

This project is hoping to discover more about how galaxies form, and they need all of our help to sort pictures of galaxies by their shape. If you help out, there is a good chance you might be the first human being to ever see the galaxies you are asked to classify.

Click [here](#) to get involved!

