

Where can studying

MATHS

take you?







Racing Car Designer



Christine Hogan is doing a PhD in fluid mechanics aerodynamics, with the aim of working in racing car design.

A car's speed is influenced by aerodynamics, the mathematical study of the motion of air. Using maths, racing car designers can know what affects the car's performance, and tweak the car to get the best results. This area of maths is also used to understand flight and can even improve sporting performance.

Many racing car teams use statisticians to keep track of all the cars' average speeds, instantaneous speed and more to use





Actuaries use maths and statistics to make financial sense of the future. For example, if an organisation is planning a large project, actuaries analyse the project, assess the financial risks and outcomes involved, and advise the organisation on the decisions to be made. Much of their work is on pensions, ensuring funds have enough money for when current workers have retired. They also work in insurance, making sure that premiums match the level of risk. Mathematics is used in

Meteorologist and

Climate Prediction



Meteorologists use mathematics to model the weather and make short-term predictions. They also study how changes to our environment impacts the climate. They use numerical analysis and computer modelling techniques to produce results, from tomorrow's weather forecast to long-term predictions of global climate change.

the numbers to win more races.

many other areas of finance, like banking, stock trading, and Jake Byrne works in insurance – making financial sense of the

future.

Helen Hewson is a Meteorologist at the Met Office working to develop our understanding of the weather.

Quantity Surveyor



Josh works for Transport for London as a Quantity Surveyor.

Audio software engineer



Most of today's music uses synthesizers and digital processors to correct pitch or add effects to the sound. These tools are created by audio software engineers who manipulate digital sounds using a mathematical technique called Fourier analysis. This kind of digital signal processing has many other applications including speech recognition, image enhancement and data compression.

Avalanche Researcher





Understanding how avalanches start and developing ways to predict when they might happen requires an area of maths

Skot MacDonald combines maths and music in his ideal career

as an audio software engineer.

called fluid mechanics. This is one of the most widely applied areas of mathematics and it is used in understanding volcanic eruptions, flight, ocean currents and even the stock market.

Jim McElwaine combines his twin passions of maths and

mountaineering in his career researching the causes of

avalanches.

He helps manage the financial side of projects, which means negotiating and agreeing contracts with suppliers and assisting the Commercial Manager. Josh's role uses Maths to make sure the company are being money efficient and saving money for the business.

When will I ever use Pi?...Jobs and Careers that use Pi



Space Scientist





Space scientists and engineers use Pi to put spacecraft into orbit. They also use Pi in more unexpected ways such as calculating the density of an asteroid by measuring the circumference and mass. They also use Pi to search for exoplanets, which are planets that orbit stars other than our own sun. Powerful telescopes track how much light is emitted by distant starts—knowing the percentage of this decrease and the formula for the area of a circle, scientists can deduce the planet's size

Statistician



The Normal Distribution is undoubtedly the most important distribution in statistics and yes, you guessed it, Pi is right there at the core! The familiar bell shaped curve crops up everywhere and describes real world situations such as the distribution of shoe sizes or foot length. The probability density function of the Standard Normal Distribution contains Pi.

Video Games Programmer



Need to rotate your spaceship in your virtual world? Most programming languages use radians rather than degrees. Radians are first introduced in A Level Maths and 360 degrees is equal to 2π radians.

Aeronautical Engineer





If something moves in a circle like a jet engine, then it won't be long before you need the equations of Circular Motion using Pi. Pi has a big role to play in actuation. Actuators control the flaps that move on aircraft wings and tails or the parts that open and close valves on jet engines. Controllers send signals to electric motors, telling them how fast they need to spin to make the actuators move. The equation: Omega = 2π times frequency (Hz).

Garden Designer



Product Engineer



Want to make something round in a factory? From tin cans

Looking to create a round flowerbed, or a circular patio? Need to work out how much edging material or gravel you will need? The circumference of the circle 2πr and the area of the circle πr² will be useful. Pi comes in very handy for Garden Designers. to ball bearings, there are plenty of products which are round. A product engineer works in manufacturing to make production possible and they need to use Pi to get their calculations correct.

Artist or sculptor





Structural Engineer



A structural engineer uses formulae to keep their

Architect



Some artists and sculptors like to focus on using geometrical forms in their work. Sculptors may use Pi when they are making works of art based on the circle, as this allows them to estimate the volume of material needed. Having a deep understanding of geometry can be a big advantage for an artist. You would use Pi if you wanted to create a sculpture like these above. buildings safe. One example using Pi is Euler's critical load
formula which predicts when a column in a building is
going to buckle. Pi is used in the construction of arches,
bridges, churches and other buildings. Since the bridges
and arches are semi-circles, Pi helps in determining
perimeter of the semi-circle which in turn helps in
calculating the amount to f materials required for

construction

Architects need to have a good understanding of geometry to produce curved surfaces. Some architects take it one step further and base their whole building on mathematical forms such as in the case of the Sage Music Centre in Gateshead which is made up of 27 pieces of a torus, a curved doughnut shape which is based on the circle.