COMPUTING, ARTIFICIAL INTELLIGENCE, DATA SCIENCE AND MATHEMATICS

At Stirling, we combine cutting-edge research in predictive modelling and data science with their application in multiple areas.

We explore the connections between computer science, mathematics, life sciences, social sciences and management. Our interdisciplinary research environment enables computer scientists and mathematicians to work together on solving challenging problems in food and health, the environment, business and social organisation.

Demand for experts and analysts in Artificial Intelligence (AI) and data scientists is on the rise and employers require skills such as scripting languages, big data, SQL databases and machine learning to interpret big data and apply it in practice. Our courses have been developed in partnership with organisations to fill this gap and prepare the data scientists of the future.

We work collaboratively with a number of organisations, including The Data Lab, Scotland's Data Science Innovation Centre, that supports students with funding, networking and routes to employment, and the Scottish Informatics and Computing Science Alliance (SICSA), to ensure our students have the best platform to succeed.

RESEARCH COURSES

Research excellence underpins all we do. As part of our research community, you will contribute innovative, practical and applied solutions to the challenges facing society today.

We offer research options, including PhDs, in the following areas:

- Fintech
- Blockchain technologies
- Computational heuristics
- Artificial intelligence
- Clinical decisions support systems
- Process algebra
- Computational intelligence and machine learning
- Data mining
- Modelling and analysis of complex systems

Many of our courses offer multiple start dates, please check course webpages for details.

FT Full-time course

PT Part-time course

To find out more about identifying a supervisor and submitting a research proposal, visit: **stir.ac.uk/research**

ARTIFICIAL INTELLIGENCE

Click for course web page

Campus based
MSc, PG Dip, PG Cert

Artificial Intelligence (AI) is revolutionising sectors such as marketing, finance, sport, manufacturing, healthcare and government. It is also a skill highly sought-after by tech giants including Google, Facebook and Amazon.

Our course was designed in collaboration with employers to ensure that Stirling students have the relevant skills to meet sector demand, preparing industry-ready graduates.

This course covers the theoretical underpinning of a wide variety of AI-related techniques, including machine learning and deep learning, mathematics and statistics for data science, programming using Python, computer vision and natural language processing. The course also covers the technology, techniques, tools, software and methodologies used to apply these underlying theories to real-world problems.

You will have the opportunity to work with academics on ongoing commercially-relevant research projects and also take part in placement projects with industry or technology providers.

CORE MODULES

- Mathematical and Statistical Foundations
- Networks and Graph Theory
- Statistics for Data Science
- Representing and Manipulating Data
- Commercial and Scientific Applications
- Machine Learning
- Deep Learning for Vision and NLP
- Heuristic Optimisation and Decision Support
- Dissertation or a summer project in partnership with a company or technology provider

Check course web page for optional modules

CAREER PROSPECTS

Graduates with an AI qualification will find employment in sectors such as: business or customer analytics, robotics, advanced healthcare, financial technology (fintech), legal technology (lawtech), automotive (self-driving cars), cyber security and social media.

The UK AI market is worth more than £16.9 billion, according to the US International Trade Administration, and is expected to grow to £803.7 billion by 2035.

Course Starts: September and January

FT PT

BIG DATA

Campus based
MSc, PG Dip, PG Cert

Click for course web page

Big data is increasingly important in today's commercial landscape and these skills are in high demand.

The global data science market is projected to grow from $81.47 billion in 2022 to $484.17 billion by 2029 (Fortune Business Insights 2024). Scotland has an exciting future at the heart of the data science revolution, with more than £660 million invested in turning our capital city, Edinburgh, into the 'Data Capital of Europe' (Source: Scottish Development International 2020). Stirling is home to over 70 tech companies making it a key centre for digital technology growth and one of the major tech hubs in Central Scotland (Hollerings.com).

The MSc Big Data is an advanced Masters course covering the technology of big data and the science of data analytics.

As a data scientist specialising in big data, you will help companies make sense of large amounts of data, providing rapid insights that enable them to make better, quicker decisions. The course will also teach you how to collect, manage and analyse big, fast-moving data for science or commerce through cutting-edge technology such as data analytics, R, Hadoop, NoSQL and machine learning.

The Stirling Masters has been developed, with the option to apply for an in partnership with companies that employ data scientists internship and to make industry connections and benefit your future career.

CORE MODULES

- Representing and Manipulating Data
- Commercial and Scientific Applications
- Mathematical and Statistical Foundations
- Relational and non-Relational Databases
- Machine Learning
- Cluster Computing
- Dissertation or a Summer Project in partnership with a company or technology provider

CAREER PROSPECTS

As a graduate in Big Data you'll be able to work in a wide range of sectors such as digital technologies, energy and utilities, financial services, public sector and healthcare.

Our graduates have found employment with data solutions consultancy companies such as bigspark, the NHS, the Scottish government, The Data Lab and many more.

The demand for specialist data skills is growing. In 2023, the World Economic Forum surveyed 803 global companies and found that 'AI and Machine Learning Specialists' and 'Data Analysts and Scientists' roles were in the top 10 jobs expected to grow fastest between 2023 and 2027.

Course Starts: September and January

FT PT

FINANCIAL TECHNOLOGY (FINTECH)

Click for course web page

Campus based
MSc, PG Dip, PG Cert

Fintech is taking over the banking and finance industry and introducing a whole new set of ideas and opportunities in business, finance, technology and society.

Our MSc Financial Technology is one of the first offered in the UK. The course provides you with a solid foundation in computing, financial theory, ethical and regulatory constraints, and business skills.
It includes topics and technologies from big data and analytics, computing for finance, blockchain and digital currencies, mobile computing and modern financial services.

We equip our graduates with the latest knowledge and skills required to work in the fintech sector, with a multi-disciplinary approach open to students with both computing/engineering and finance/economics background.

Scotland is home to more than 140 fintech companies and is the second largest fintech hub after London, employing more than 160,000 people in the financial services sector.

Stirling is a city with a strong background in financial services, with 335 businesses in Stirling operating in the sector, accounting for 8% of the total employment in the area, which is the second highest percentage in Scotland. Major players in the area are Capita, Prudential, and US firm International Financial Data Services (IFDS) (fintechscotland.com).

This course has been developed in partnership with global organisations specifically to provide the skills that employers in the fintech industry need.

You will develop an independent project on cutting-edge developments in the sector, either in collaboration with industry, or on applications or research topics.

CORE MODULES

- Blockchain Technologies
- Cyber Security
- Bank Theory, Operations and Strategy
- Machine Learning
- Mobile Financial Applications
- Dissertation or a summer project in partnership with a company or technology provider

Check course web page for optional modules

CAREER PROSPECTS

Fintech is a growth sector in its own right and there are opportunities across the career spectrum from new and exciting start-up companies to established banks and insurance companies.

Companies such as HSBC, Sainsbury's Bank, JP Morgan and MBN helped us shape the course with employability in mind.

Course Starts: September and January

FT PT

MATHEMATICS AND DATA SCIENCE

Click for course web page

Campus based
MSc, PG Dip, PG Cert

Our course is one of the first to link Mathematics and Data Science, to meet industry demand for these skills and give you practical experience of using them in financial, business and medical systems, as well as the tools for studying data networks.

There is a global shortage of qualified analysts, and in particular, graduates who can both manage the data (computing skills), and analyse the data to extract patterns, build models and make predictions (mathematics skills).

You will gain knowledge of mathematical modelling and analysis of data-driven systems to develop your computing skills, from programming Python and R, to advanced techniques including Artificial Intelligence and machine learning. You will learn through real-life applications and hear from external speakers about how big data is used in industrial and scientific applications.

CORE MODULE

- Representing and Manipulating Data
- Commercial and Scientific Applications
- Statistics and Networks Analysis in Data Science
- Modelling in Financial and Medical Systems
- Stochastic Processes and Optimisation
- Dissertation or a summer project in partnership with a company or technology provider

Check course web page for optional modules

CAREER PROSPECTS

Graduates who are skilled in data science and mathematics are in high demand. Our graduates have gone on to work in financial institutions, energy firms, sport and fitness, start-ups, NHS and pharma, environmental agencies, government agencies, as well as gone on to undertake PhDs in the UK and overseas.

Scotland has become a data science hub with students and start-up companies benefiting from organisations such as The Data Lab and CodeBase.

Course Starts: September and January

FT PT

ADVANCED COMPUTING WITH ARTIFICIAL INTELLIGENCE

Click for course web page

Campus based
MSc, PG Dip, PG Cert

This course addresses the demand and skills gap for specialists with an advanced understanding of both AI and computing, to meet market demand for experienced and skilled graduates.

Advances in data driven AI and machine learning, particularly computer vision and natural language, are becoming increasingly popular in industry and society at large. Technologies such as self-driving cars, intelligent assistants (like Alexa), ChatGPT, and AI health care have made AI an increasingly everyday technology, and one that will revolutionise the way we live and work in the years to come.

This course teaches advanced computing skills, with an emphasis on applications of artificial intelligence. It is designed for graduates in computer science or a closely related subject, with significant programming experience.

Modern computing hardware exploits parallel processing of both data and computational effort. Programming highly parallel architecture requires advanced techniques, and awareness of the trade-offs involved.

You will develop advanced programming and modern artificial intelligence (AI) skills to prepare you for a career in advanced software development or AI. You will learn mathematics and statistics, advanced programming and scripting in the languages Python and R, parallel processing, and a modern, data-driven approach to AI including computer vision, natural language processing, and generative AI.

Course Starts: September and January

FT PT

CORE MODULE

- Artificial Intelligence for Natural Language Processing
- Advanced Programming with Python
- Machine Learning
- Artificial Intelligence for Computer Vision
- Stochastic Processes and Optimisation
- Dissertation

Check course web page for optional modules

CAREER PROSPECTS

Global organisations are aware of the benefits achieved through the power of machine learning, computer vision and AI.

There is a growing jobs market for graduates with advanced computing, AI and data science skills. This course prepares you with the skills sought after by software houses and AI companies.

AI software requires developers with hard skills, such as systems thinking, architecture and debugging, as well as soft skill in verbal and textual communication. This course covers both, to give you advanced programming skills which meet industry demand for career ready graduates.

PROFESSOR KEVIN SWINGLER
HEAD OF DIVISION, COMPUTING SCIENCE AND MATHEMATICS

Professor Kevin Swingler is Head of the Division of Computing Science and Mathematics and was responsible for developing the Masters courses in Big Data, Fintech and Artificial Intelligence at Stirling.

SKILL SHARE

What are the key differences between big data, artificial intelligence and financial technology?

We take a data-driven approach to artificial intelligence (AI) and Financial Technology (Fintech), so these courses share material such as python scripting and machine learning. Big data is more focused on technology - such as databases, scripting, machine learning and cluster computing - than fintech, which has a focus on finance, banking and entrepreneurship.

The computing part of the fintech course is about cybersecurity, mobile apps and blockchain. Artificial intelligence does not cover technology such as databases, but has a focus on giving computers human like abilities, like seeing and understanding language.

The Faculty of Natural Sciences at Stirling offers five courses in: Big Data; Mathematics and Data Science; Artificial Intelligence and Fintech - but I am not sure which is for me?

Fintech is the odd one out among these courses because it is geared towards a specific application in banking and finance. The other courses are designed to give you more generic data science skills. Big data concentrates on technology and skills such as hadoop, python, NoSQL and machine learning.

Mathematics and Data Science is for students who have a love of maths and want an interesting and challenging subject that allows them to put their skills into practice. AI offers more advanced machine learning topics such as convolutional neural networks. You have the choice of joining our MSc Artificial Intelligence; or our new MSc Advanced Computing with Artificial Intelligence.

We also offer three data science Masters courses within Stirling Management School: Data Science for Business, Business Analytics and Marketing Analytics.

The Stirling data science courses were built from scratch by Stirling academics with student employability in mind. How did you create the course content?

The courses were designed with one thing in mind: to prepare and qualify students for jobs in data science. We consulted with recruitment agencies and companies who hire data scientists and Fintech professionals, such as HSBC and MBN.

Our goal was to give students the best CV that we could, which is why we do our best to find work placements for students during their summer project.